RDR-HXD870/HXD970/ HXD1070

RMT-D248P

SERVICE MANUAL

AEP Model
UK Model
RDR-HXD870/HXD970/HXD1070
Australian Model
RDR-HXD870/HXD970

Self Diagnosis Supported model

Ver. 1.1 2007.10

Revised-1

Photo: RDR-HXD870
RMT-D248P

SPECIFICATIONS

System
Laser: Semiconductor laser
Transmission standards (Digital broadcasting): DVB-T
Channel coverage (Digital broadcasting):
VHF: E5 to E12, F5 to F10, Italian D to H2, Australian AS6 to AS12
UHF: E21 to E69, B21 to B68, F21 to F69, Australian AS27 to AS69
Channel coverage (Analogue broadcasting):
PAL (B/G, D/K, I)/SECAM (L)
VHF: E2 to E12, R1 to R12, F2 to F10, Italian A to H, AS0 to AS12, NZ1 to NZ11, Ireland A to J, South Africa 4 to 11, 13
UHF: E21 to E69, AS28 to AS69, R21 to R69, B21 to B69, F21 to F69
CATV: S01 to S05, S1 to S20, France B to Q
HYPER: S21 to S41

The above channel coverage merely ensures the channel reception within these ranges. It does not guarantee the ability to receive signals in all circumstances. For details, see “Receivable channels”.

Video reception: Frequency synthesizer system
Audio reception: Split carrier system
Aerial out: 75-ohm asymmetrical aerial socket
Timer: Clock: Quartz locked/Timer indication: 24-hour cycle (digital)/ Power back-up duration: 1 hour

Video recording format: MPEG-2, MPEG-1
Audio recording format/applicable bit rate: Dolby Digital 2 ch 256 kbps/128 kbps (in EP, SLP, and SEP mode), PCM

Inputs and outputs
LINE 2 OUT
(AUDIO): Phono jack/2 Vrms/10 kilohms
(VIDEO): Phono jack/1.0 Vp-p
(S VIDEO): 4-pin mini DIN/Y: 1.0 Vp-p, C: 0.3 Vp-p (PAL)
LINE 2 IN
(AUDIO): Phono jack/2 Vrms/more than 22 kilohms
(VIDEO): Phono jack/1.0 Vp-p
(S VIDEO): 4-pin mini DIN/Y: 1.0 Vp-p, C: 0.3 Vp-p (PAL)
LINE 3 – TV: 21-pin
CVBS OUT
S-Video/RGB OUT (upstream)
LINE 1/DECODER (AEP, UK only): 21-pin
CVBS IN/OUT
S-Video/RGB IN
Decoder (AEP, UK only)
DV IN: 4-pin/i.LINK S100
DIGITAL OUT (COAXIAL): Phono jack/ 0.5 Vp-p/75 ohms
COMPONENT VIDEO OUT (Y, P_B/C_B, P_R/C_R):
Phono jack/Y: 1.0 Vp-p,
P_B/C_B: 0.7 Vp-p, P_R/C_R: 0.7 Vp-p
G-LINK: mini jack (AEP, UK only)
HDMI OUT: HDMI 19-pin-Standard Connector

USB:
USB jack Type A (For connecting digital still camera, Memory card reader and USB memory)
USB jack Type B (For connecting PictBridge-compatible printers)

General
Power requirements: 220-240 V AC, 50/60 Hz
Power consumption: 49 W
Dimensions (approx.):
430 × 76.5 × 286 mm (width/height/ depth) incl. projecting parts
Hard disk drive capacity:
RDR-HXD870: 160 GB
RDR-HXD970: 250 GB
RDR-HXD1070: 500 GB
Mass (approx.): 4.7 kg
Operating temperature: 5ºC to 35ºC
Operating humidity: 25% to 80%
Supplied accessories:
Mains lead (1)
Aerial cable (1)
Remote commander (remote) (1)
Audio/Video cord (1) (Australian)
Set top box controller (1) (AEP, UK model)
R6 (size AA) batteries (2)
EURO AV adapter with selector (1) (Australian model)
EURO AV adapter (1) (Australian model)

Specifications and design are subject to change without notice.

DVD RECORDER

SONY

WARNING!!

WHEN SERVICING, DO NOT APPROACH THE LASER EXIT WITH THE EYE TOO CLOSELY. IN CASE IT IS NECESSARY TO CONFIRM LASER BEAM EMISSION, BE SURE TO OBSERVE FROM A DISTANCE OF MORE THAN 25 cm FROM THE SURFACE OF THE OBJECTIVE LENS ON THE OPTICAL PICK-UP BLOCK.

CAUTION:
The use of optical instrument with this product will increase eye hazard.

CAUTION
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

Unleaded solder
Boards requiring use of unleaded solder are printed with the lead-free mark (LF) indicating the solder contains no lead.
(Caution: Some printed circuit boards may not come printed with the lead free mark due to their particular size.)

: LEAD FREE MARK
Unleaded solder has the following characteristics.
- Unleaded solder melts at a temperature about 40°C higher than ordinary solder.
  Ordinary soldering irons can be used but the iron tip has to be applied to the solder joint for a slightly longer time.
  Soldering irons using a temperature regulator should be set to about 350°C.
  Caution: The printed pattern (copper foil) may peel away if the heated tip is applied for too long, so be careful!
- Strong viscosity
  Unleaded solder is more viscous (sticky, less prone to flow) than ordinary solder so use caution not to let solder bridges occur such as on IC pins, etc.
- Usable with ordinary solder
  It is best to use only unleaded solder but unleaded solder may also be added to ordinary solder.

Special Component Notice
The components identified by mark 🔒 contain confidential information.
Strictly follow the instructions whenever the components are repaired and/or replaced.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer.

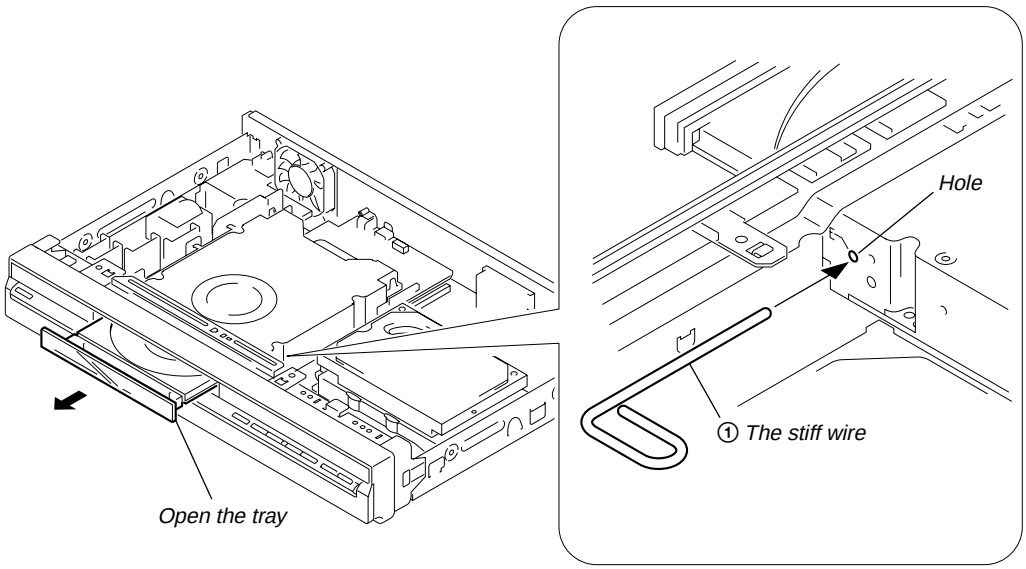
1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, through functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.
6. Flexible Circuit Board Repairing
   - Keep the temperature of the soldering iron around 270˚C during repairing.
   - Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
   - Be careful not to apply force on the conductor when soldering or unsoldering.

TABLE OF CONTENTS

SERVICE NOTE

1. DISK REMOVAL PROCEDURE IF THE TRAY CANNOT BE EJECTED (FORCED EJECTION)

1. Remove the upper case.
2. Insert the stiff wire in the hole and eject the tray.



NOTES DURING THE FORCED EJECTION

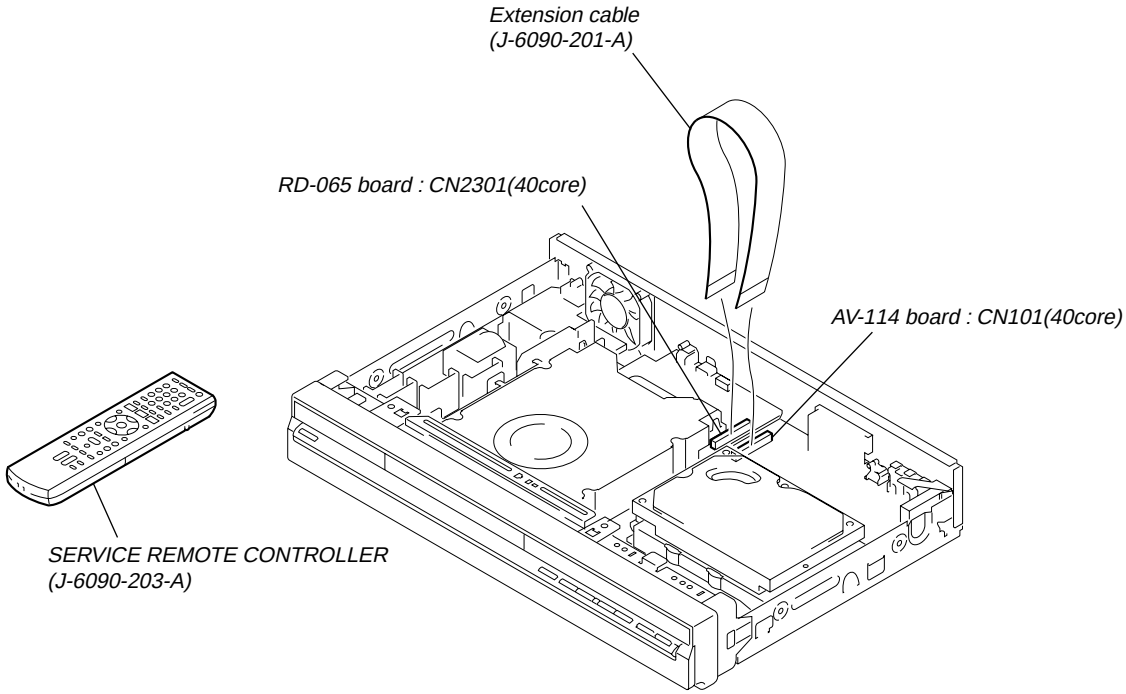
1. If the forced ejection is executed while a blank disc media (DVD±RW, ±R) exists on the tray
   - Insert a DVD-ROM (DVD test disc, DVD software available on the market, or the like) in the tray and then close the tray.

Note1: If you close the tray while it is empty, ejection of the tray becomes impossible.
Note2: If you close the tray with a CD disc inserted in it, the CD can be ejected. However, if you close the tray while it is empty, there can be a case that ejection of the tray becomes impossible.
Note3: Even if you replace the DVD drive unit while the tray remains under the state as described above, the situation cannot be improved.

2. If the tray cannot be ejected while the disc is not inserted
   - Execute the forced ejection.
   - Insert a DVD-ROM (DVD test disc, DVD software available on the market, or the like) on the tray and try to close the tray. (There are cases that it recovers the trouble.)

3. Contents of forcedly ejected blank disc media (DVD±RW, ±R) can be damaged. (There can be a case that initialization is also impossible.)

2. BOARD CONNECTION, SERVICE REMOTE CONTROLLER



3. MODEL NAME SETTING METHOD WHEN ENGINE IS REPLACED

Required equipment:

- Remote controller (RMT-D248P)
- Service remote controller (J-6090-203-A)
- Monitor

Model name delete method

1. Turn the main POWER ON.
2. Press the following buttons on the service remote controller in this order.:
   "ESC" ⇨ "CHAP" ⇨ "1"
   * Confirm that the above operation is performed in the state that the screen has exited all settings such as "Home Menu" or "Simple Setting".
3. Turn the main POWER OFF.
4. Turn the main POWER ON. (The screen as shown in Fig. 1 appears.)
5. Select "2" on the screen by using the service remote controller.
   * If "1" is selected on the screen, the machine will not work at all. Be sure to select "2".
6. Find out the tentative model name from the Correspondence Table (Table 1) for the client machine. Then, enter the 4-digit "Input No." on the screen using the service remote controller.
7. The model name setting method is complete. (Screen disappears.)
   * Upon completion of the model name setting, be sure to press both "ENTER" and "3" simultaneously on the service remote controller without fail. It sets the remote control code "3".

Fig.1 S-company/P-company selection

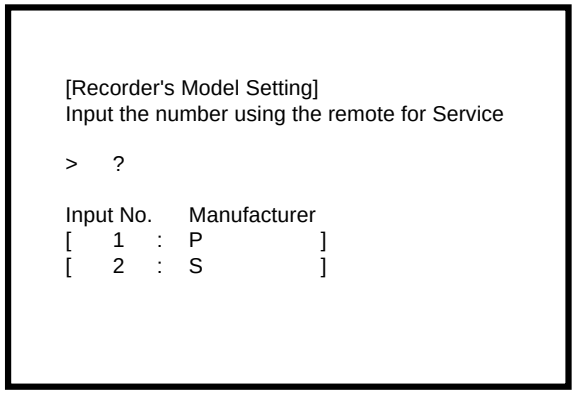


Table1 Correspondence table between tentative model name and final product name

Model name	Tentative model name				
	AEP1	AEP2	AEP3	UK	Australian
RDR-HXD870	MRX-1660/EC1	MRX-1665/EC2	MRX-1660/EC3	MRX-1660/CEK	MRX-1660/AU2
RDR-HXD970	MRX-1670/EC1	MRX-1675/EC2	MRX-1670/EC3	MRX-1670/CEK	MRX-1670/AU2
RDR-HXD1070	MRX-1680/EC1	MRX-1685/EC2	—	MRX-1680/CEK	—

4. HOW TO DIAGNOSE HDD FAILURE

4-1. Defective HDD

There are four symptoms of defects in the HDD.

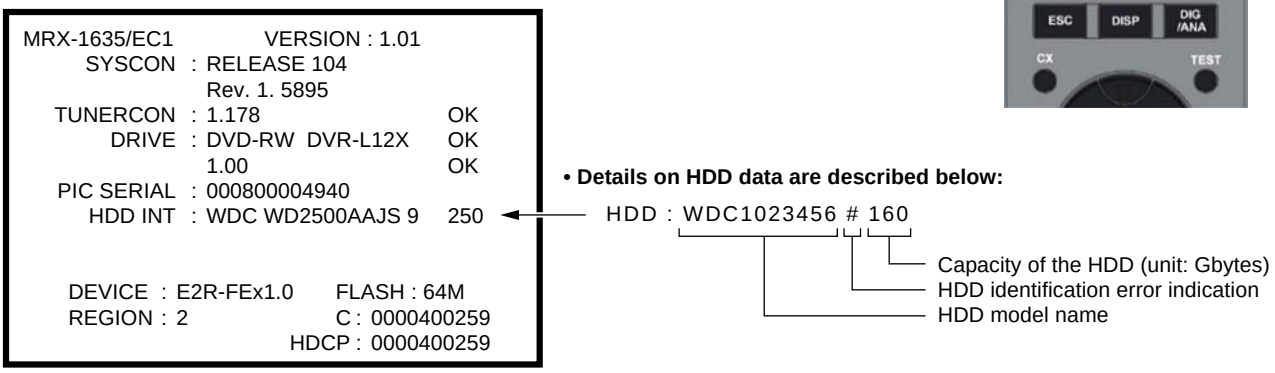
1. “E01” is displayed on the FLD.
   (The HDD is not recognized or is not authorized.)
2. “E02” is displayed on the FLD.
3. When playing a video, MP3, or JPG, contents freeze.
4. Irregular noises from the HDD

4-2. HDD Recognition status

How to enter Recognition status and sub screen mode.

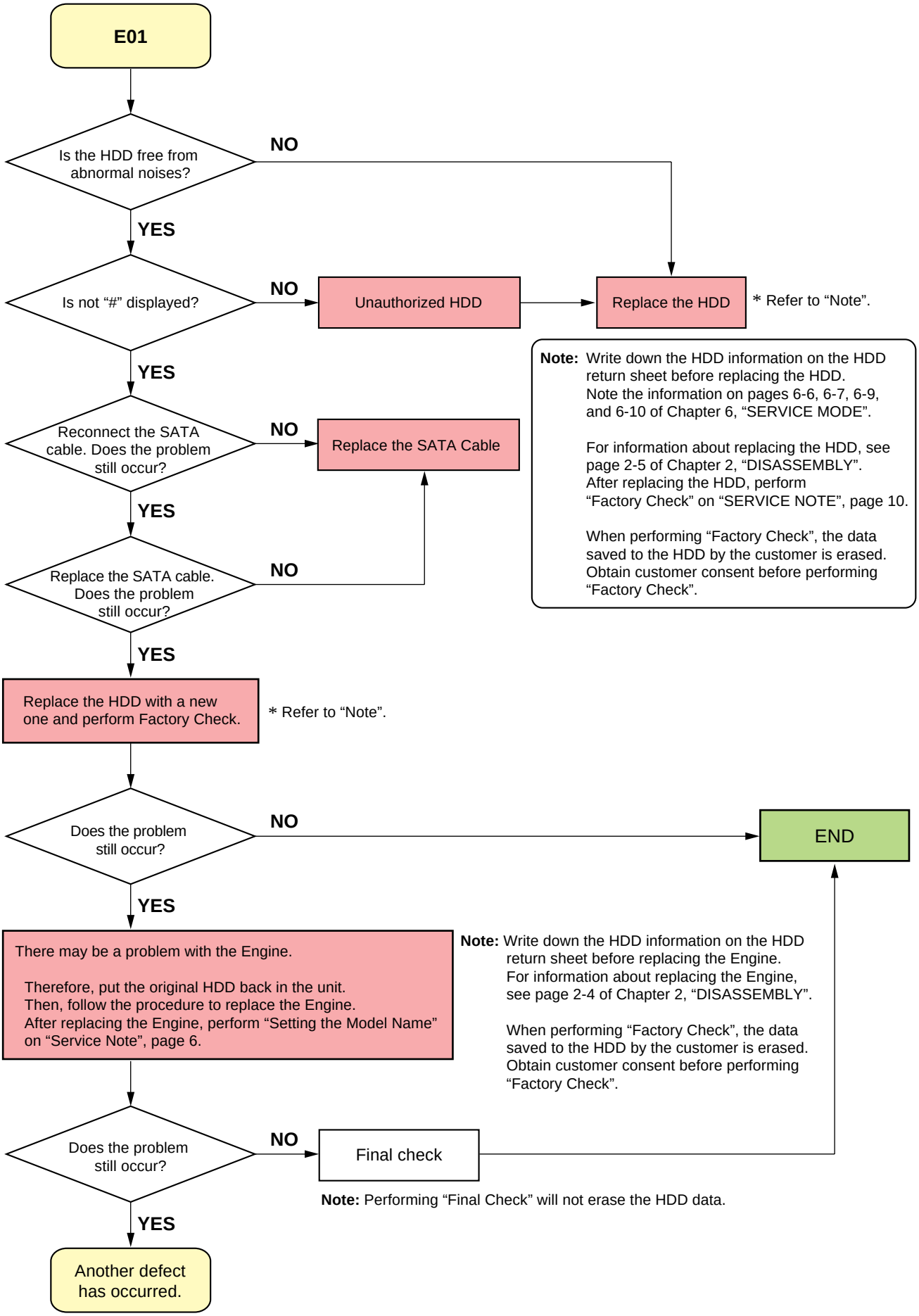
- While the GUI screen is not displayed, use the service remote controller and press “ESC” key followed by “DISP” key.
- While the first screen is displayed, press “DIG/ANA” key repeatedly until the desired subscreen is displayed.
  The subscreens change.

Service remote controller
(Part code: J-6090-203-A)



FL Display	OS Display	HDD identification conditions	Details on HDD data are described below.	Remarks
REPAIR	“Repaining the HDD”. ↓ “HDD repair is complete”.			
E01	An error occurred. Please consult your nearest Sony dealer. Note that contents on the HDD may be erased when servicing this unit.	Failure to physically identify the HDD (no connection, defective HDD, interface error).	Blank space	Check the connection to the SATA cable and power cable. Replace the SATA cable or power cable. Replace the HDD. Replace the FE or part in the SATA/ATA communication.
		Physical identification of HDD possible, but not identified	WDC 10234564 # 160	“#” indicates that the HDD is not recognized.
E02	The Hard Disk Drive info is incorrect. Use the Disk Setup menu to reformat.	Physical identification of HDD possible, HDD identified, but failure in logical formatting.	WDC 10234564 ! 160	“!” indicates an HDD authorization error. Initialize the HDD.
Normal		Physical identification of HDD possible, HDD identified, and correct logical formatting (HDD correctly identified).	WDC 10234564 160	

4-3. Display [E01] on FLD with unrecognized HDD



Note: Write down the HDD information on the HDD return sheet before replacing the HDD.
Note the information on pages 6-6, 6-7, 6-9, and 6-10 of Chapter 6, "SERVICE MODE".

For information about replacing the HDD, see page 2-5 of Chapter 2, "DISASSEMBLY".
After replacing the HDD, perform "Factory Check" on "SERVICE NOTE", page 10.

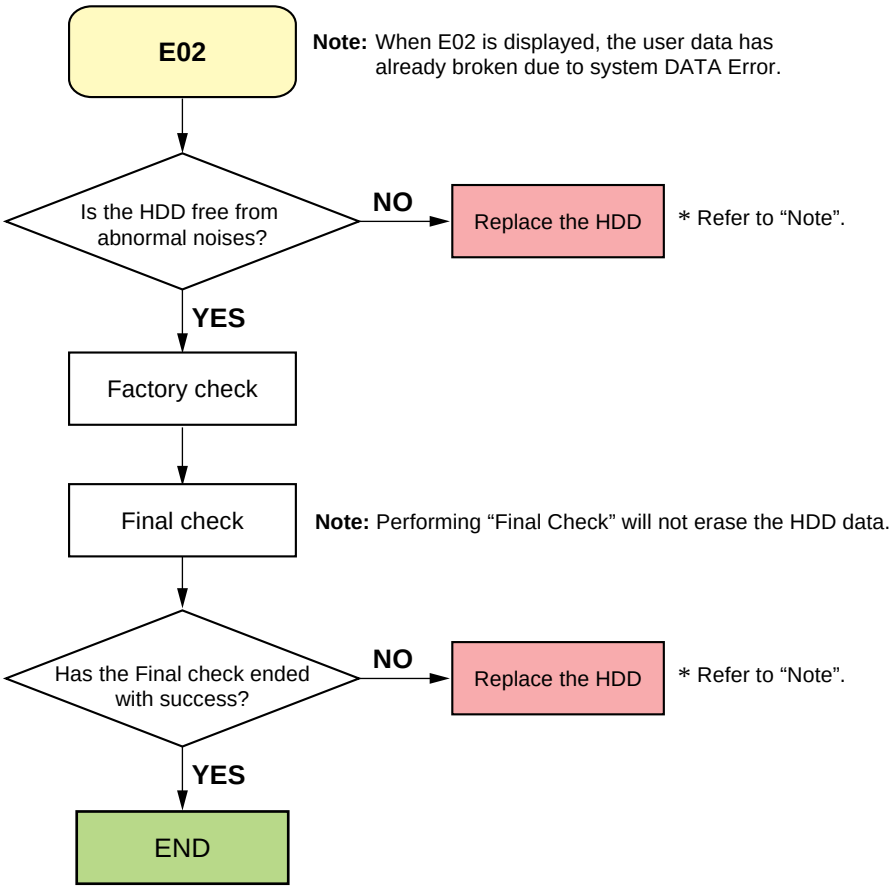
When performing "Factory Check", the data saved to the HDD by the customer is erased.
Obtain customer consent before performing "Factory Check".

Note: Write down the HDD information on the HDD return sheet before replacing the Engine.
For information about replacing the Engine, see page 2-4 of Chapter 2, "DISASSEMBLY".

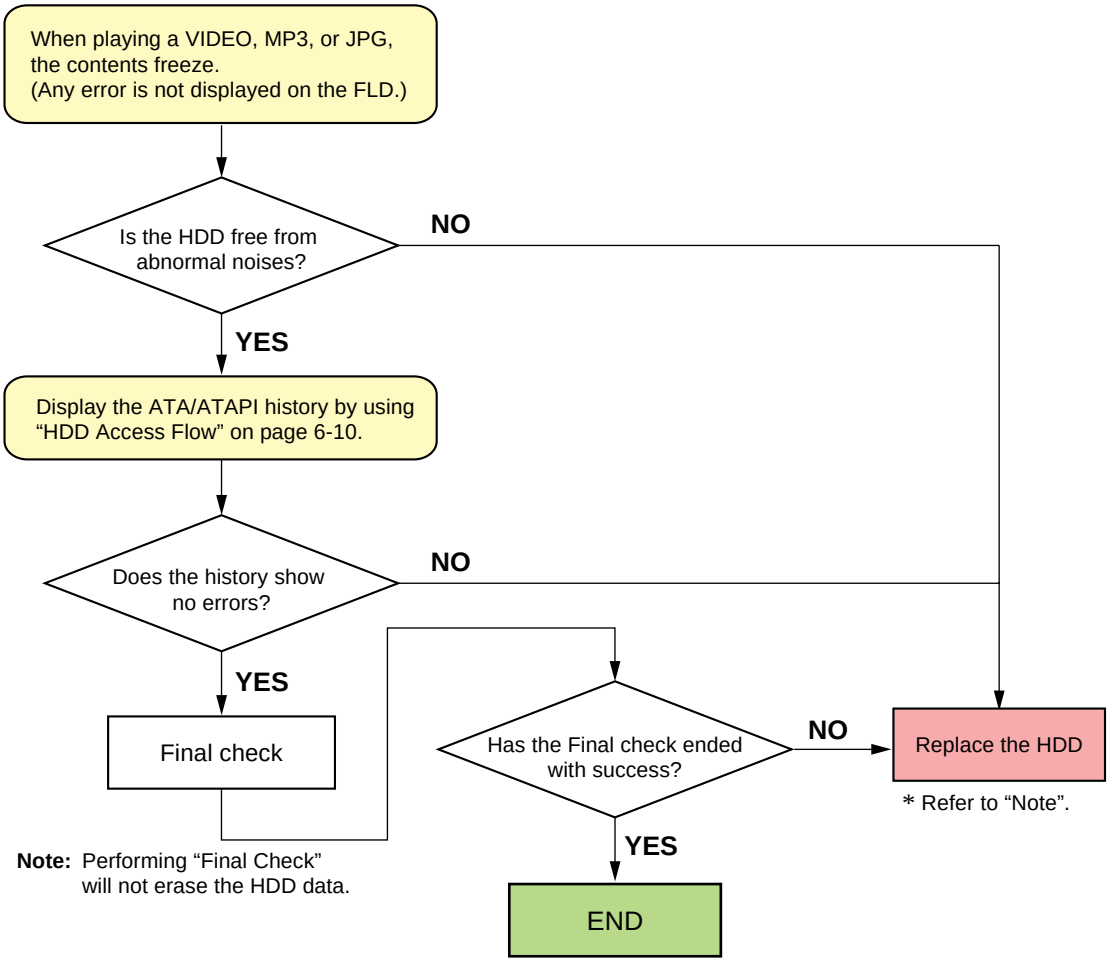
When performing "Factory Check", the data saved to the HDD by the customer is erased.
Obtain customer consent before performing "Factory Check".

Note: Performing "Final Check" will not erase the HDD data.

4-4. Display [E02] on FLD



4-5. When playing a VIDEO, MP3, or JPG, the contents freeze



4-6. Factory Check

1. Pull out and then reconnect the AC cable.
2. Press “ESC” key followed by “P.RUN” key to start Formatting.
3. When “B COMPLETE” appears, the Factory Check is complete.
4. Press “Power” button. The unit starts normally.

When “Factory Check” has finished completely without error, reset “Recording Error History” and “ATA/ATAPI History Error” with the Clear key.

Recording Error History Display

07-03-19	12:36:06	ESFSYS INIT
07-03-19	12:36:06	HDD Zero MR
07-03-19	12:36:06	HDD Initialze
07-03-19	12:36:06	HDD Zero MR
07-03-19	12:27:27	Status NG

Note: Write down the HDD information on the HDD return sheet before replacing the HDD.
Note the information on pages 6-6, 6-7, 6-9, and 6-10 of Chapter 6, “SERVICE MODE”.

When performing “Factory Check”, the data saved to the HDD by the customer is erased.
Obtain customer consent before performing “Factory Check”.

“Recording Error History” and “ATA/ATAPI History Error”, see pages 6-9, 6-10 of Chapter 6, “SERVICE MODE”.

4-7. Final Check

4-7-1. SELF TEST (SMART TEST)

This is a simplified diagnosis for the HDD.
A serious failure in the HDD can be detected with this test.
Time required for testing: Approx. 60 sec.

How to start/terminate the diagnostic program

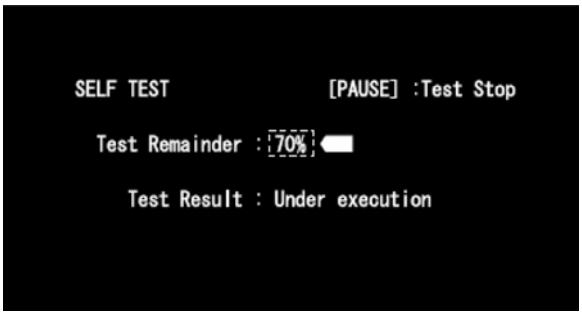
Use the remote control unit for servicing.

- How to start: Press “ESC”, “CX”, “0”, and “1” keys simultaneously.
- How to terminate: Press “ESC” key.

Execute Self-Test.

- Press “3” key on the remote control unit for servicing while the menu screen is displayed.
- When the following screen is displayed, press “1” key to start the Self-Test.

Note: “2. Exe Ext Self Test” is not used.



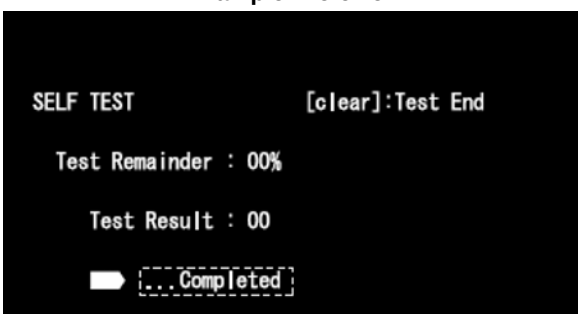
Note: Performing “Self Test” will not erase the HDD data.

Diagnosis results

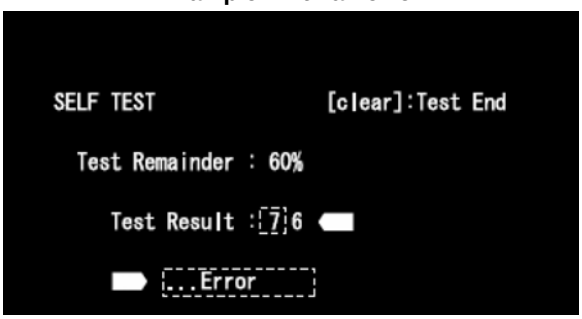
- Without an error: “. . . Completed” is displayed.
  Then, proceed to the Extended Self-Test.
- With an error: “. . . Error” is displayed. Look at the number in Test Result.
  If the place value for tens is 1 or 2, execute the Self-Test again.
  If it is from 3 to 7, the HDD must be replaced.

Note: If the result of the second test is the same, replacement of the HDD is required.

Example: No error



Example: With an error



4-7-2. Performance Check

Press “ESC” key, then “A.MON” key.

This is a reading test across all sectors of the HDD.
Data recorded on the HDD will not be erased, because no writing operation is performed.
Time required for testing: Approx. 45 min/160 G
75 min/250 G
130 to 150 min/500 G

When “Performance Check” finishes completely without error, reset “ATA/ATAPI History Error” with the Clear key.

FL display specification

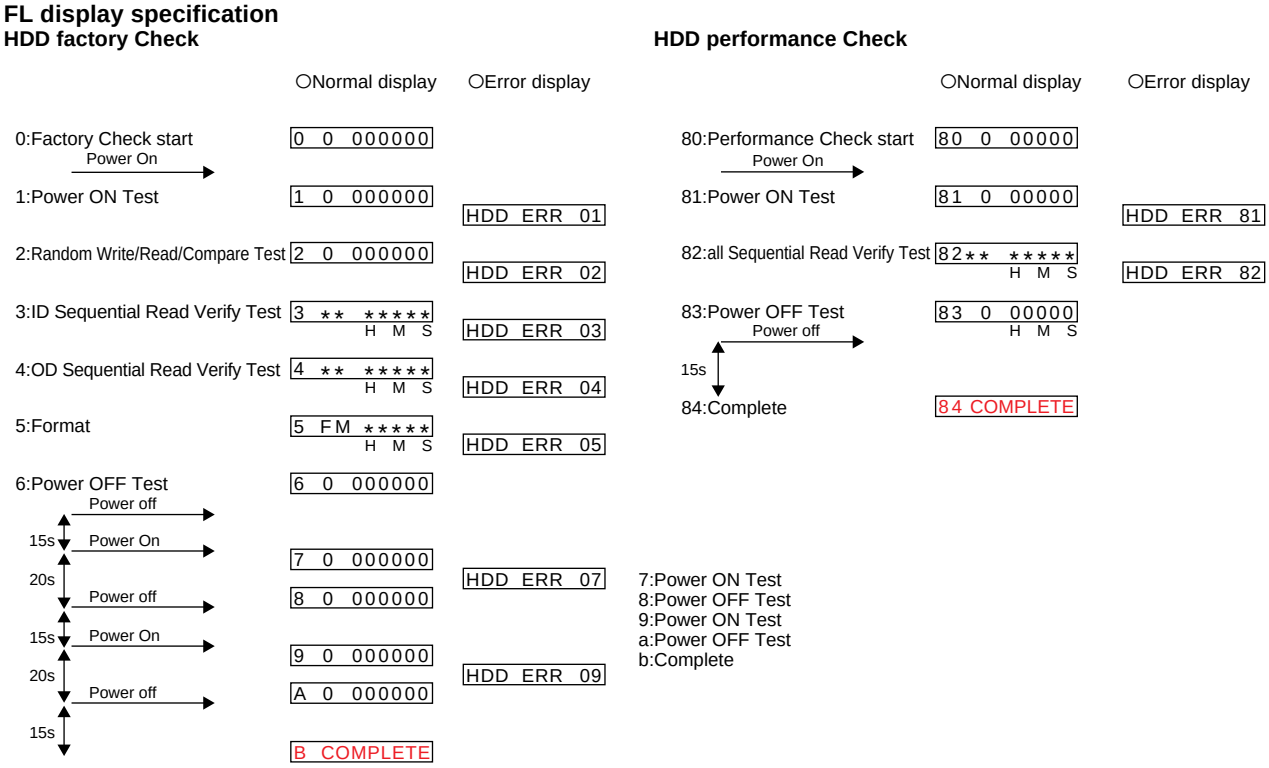


Fig 1. FL Display Flow

* The logo for “Factory Check” and “Performance Check” is recorded in “ATA/ATAPI History Error”.

MEMO

This section is extracted from instruction manual.
(RDR-HXD770/HXD870/HXD970/HXD1070: 3-113-760-11 (1))

SECTION 1 GENERAL

WARNING

To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.
The mains lead must be changed only at a qualified service shop.
Do not expose the battery to excessive heat such as direct sunlight, fire or the like.

This appliance is classified as a CLASS 1 LASER product. The CLASS 1 LASER PRODUCT MARKING is located on the rear of the unit.

CAUTION

The use of optical instruments with this product will increase eye hazard. As the laser beam used in this DVD recorder is harmful to eyes, do not attempt to disassemble the cabinet.
Refer servicing to qualified personnel only.

This label is located on the laser protective housing inside the enclosure.

Notice for customers in the United Kingdom and Republic of Ireland

A molded plug complying with BS1363 is fitted to this equipment for your safety and convenience.
Should the fuse in the plug supplied need to be replaced, a 5 AMP fuse approved by ASTA or BSI to BS1362, (i.e., marked with ⌂ or ♡ mark) must be used.
If the plug supplied with this equipment has a detachable fuse cover, be sure to attach the fuse cover after you change the fuse. Never use the plug without the fuse cover. If you should lose the fuse cover, please contact your nearest Sony service station.

Precautions

- This unit operates on 220 – 240 V AC, 50/60 Hz. Check that the unit's operating voltage is identical with your local power supply.
- To prevent fire or shock hazard, do not place objects filled with liquids, such as vases, on the apparatus.
- Install this system so that the mains lead can be unplugged from the wall socket immediately in the event of trouble.

Disposal of Old Electrical & Electronic Equipment (Applicable in the European Union and other European countries with separate collection systems)

This symbol on the product or on its packaging indicates that this product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources. For more detailed information about recycling of this product, please contact your local Civic Office, your household waste disposal service or the shop where you purchased the product.

The manufacturer of this product is Sony Corporation, 1-7-1 Konan Minato-ku Tokyo, 108-0075 Japan. The Authorized Representative for EMC and product safety is Sony Deutschland GmbH, Hedelfinger Strasse 61, 70327 Stuttgart, Germany. For any service or guarantee matters please refer to the addresses given in separate service or guarantee documents.

Precautions

This equipment has been tested and found to comply with the limits set out in the EMC Directive using a connection cable shorter than 3 metres.

On safety

Should any solid object or liquid fall into the cabinet, unplug the recorder and have it checked by qualified personnel before operating it any further.

About the hard disk drive

The hard disk has a high storage density, which enables long recording durations and quick access to the written data. However, it can easily be damaged by shock, vibration or dust, and should be kept away from magnets. To avoid losing important data, observe the following precautions.

- Do not apply a strong shock to the recorder.
- Do not place the recorder in a location subject to mechanical vibrations or in an unstable location.
- Do not place the recorder on top of a hot surface, such as a VCR or amplifier (receiver).
- Do not use the recorder in a place subject to extreme changes in temperature (temperature gradient less than 10 °C/hour).
- Do not move the recorder with its mains lead connected.
- Do not disconnect the mains lead while the power is on.
- When disconnecting the mains lead, turn off the power and make sure that the hard disk drive is not operating (the clock is displayed in the front panel display for at least 30 seconds and all recording or dubbing has stopped).
- Do not move the recorder for one minute after you have unplugged the mains lead.
- Do not attempt to replace or upgrade the hard disk by yourself, as this may result in malfunction.

If the hard disk drive should malfunction, you cannot recover lost data. The hard disk drive is only a temporary storage space.

About repairing the hard disk drive

- The contents of the hard disk drive may be checked in case of repair or inspection during a malfunction or modification. However, the contents will not be backed up or saved by Sony.
- If the hard disk needs to be formatted or replaced, it will be done at the discretion of Sony. All contents of the hard disk drive will be erased, including contents that violate copyright laws.

On power sources

- The recorder is not disconnected from the AC power source (mains) as long as it is connected to the wall outlet, even if the recorder itself has been turned off.
- If you are not going to use the recorder for a long time, be sure to disconnect the recorder from the wall outlet. To disconnect the AC power cord (mains lead), grasp the plug itself; never pull the cord.

On placement

- Place the recorder in a location with adequate ventilation to prevent heat build-up in the recorder.
- Do not place the recorder on a soft surface such as a rug that might block the ventilation holes.
- Do not place the recorder in a confined space such as a bookshelf or similar unit.
- Do not place the recorder in a location near heat sources, or in a place subject to direct sunlight, excessive dust, or mechanical shock.
- Do not place the recorder in an inclined position. It is designed to be operated in a horizontal position only.
- Keep the recorder and discs away from equipment with strong magnets, such as microwave ovens, or large loudspeakers.
- Do not place heavy objects on the recorder.

On recording

Make trial recordings before making the actual recording.

On compensation for lost recordings

Sony is not liable and will not compensate for any lost recordings or relevant losses, including when recordings are not made due to reasons including recorder failure, or when the contents of a recording are lost or damaged as a result of recorder failure or repair undertaken to the recorder. Sony will not restore, recover, or replicate the recorded contents under any circumstances.

Copyrights

- Television programmes, films, video tapes, discs, and other materials may be copyrighted. Unauthorized recording of such material may be contrary to the provisions of the copyright laws. Also, use of this recorder with cable television transmission may require authorization from the cable television transmitter and/or programme owner.
- This product incorporates copyright protection technology that is protected by U.S. patents and other intellectual property rights. Use of this copyright protection technology must be authorized by Macrovision, and is intended for home and other limited viewing uses only unless otherwise authorized by Macrovision. Reverse engineering or disassembly is prohibited.

➡continued

- This Product includes FontAvenue® fonts licenced by NEC corporation. FontAvenue is a registered trademark of NEC corporation.

Copy guard function

Since the recorder has a copy guard function, programmes received through an external tuner (not supplied) may contain copy protection signals (copy guard function) and as such may not be recordable, depending on the type of signal.

IMPORTANT NOTICE

Caution: This recorder is capable of holding a still video image or on-screen display image on your television screen indefinitely. If you leave the still video image or on-screen display image displayed on your TV for an extended period of time you risk permanent damage to your television screen. Plasma display panels and projection televisions are especially susceptible to this.

If you have any questions or problems concerning your recorder, please consult your nearest Sony dealer.

About this manual

Check your model name

The instructions in this manual are for 4 models: RDR-HXD770, RDR-HXD870, RDR-HXD970 and RDR-HXD1070. Check your model name by looking at the front panel of the recorder.

- In this manual, the internal hard disk drive is written as "HDD," and "disc" is used as a general reference for the HDD, DVDs, or CDs unless otherwise specified by the text or illustrations.
- Icons, such as DVD, listed at the top of each explanation indicate what kind of media can be used with the function being explained.
- Instructions in this manual describe the controls on the remote. You can also use the controls on the recorder if they have the same or similar names as those on the remote.
- The on-screen display illustrations used in this manual may not match the graphics displayed on your TV screen.
- The explanations regarding DVDs in this manual refer to DVDs created on this recorder. The explanations do not apply to DVDs that are created on other recorders and played back on this recorder.

Quick Guide to Disc Types

Recordable and playable discs

Type		Disc Logo	Icon used in this manual	Formatting (new discs)	Compatibility with other DVD players (finalising)
Hard disk drive (internal)	VR mode	HDD	HDD	Select "Video Mode Off" in "HDD Recording Format" (page 144)	Dub HDD contents to a DVD (VR mode) to play on other DVD players
	Video mode			Select "Video Mode On" (default) in "HDD Recording Format" (page 144)	Dub HDD contents to a DVD (Video mode) to play on other DVD players
DVD+RW		DVD+ReWritable / DVD+ReWritable High Speed	+RW	Automatically formatted in +VR mode (DVD+RW VIDEO)	Playable on DVD+RW compatible players (automatically finalised)
DVD-RW	VR mode	DVD-RW	-RWVR	Format in VR mode (page 36)	Playable only on VR mode compatible players (finalisation unnecessary)
	Video mode	DVD-RW / RW 2	-RWVideo	Format in Video mode (page 36)	Playable on most DVD players (finalisation necessary) (page 45)
DVD+R DVD+R DL		DVD+R / DVD+R DL	+R	Automatically formatted in +VR mode (DVD+R VIDEO)	Playable on most DVD players (finalisation necessary) (page 45)
DVD-R	VR mode	DVD-R 4.7	-RVR	Format in VR mode (page 36)*1 Formatting is performed in the "Format" setup (page 47).	Playable only on DVD-R in VR mode compatible players (finalisation necessary) (page 45)
DVD-R DL	Video mode	DVD-R / R DL 4X/2X	-RVideo	Automatically formatted in Video mode	Playable on most DVD players (finalisation necessary) (page 45)

Usable disc versions (as of April 2007)
- 8x-speed or slower DVD+RWs
- 6x-speed or slower DVD-RWs (Ver.1.1, Ver.1.2 with CPRM*2)
- 16x-speed or slower DVD+Rs
- 16x-speed or slower DVD-Rs (Ver.2.0, Ver.2.1 with CPRM*2)
- 8x-speed or slower DVD+R DL (Double Layer) discs
- 8x-speed or slower DVD-R DL (Dual Layer) discs (Ver.3.0 with CPRM*2)

"DVD+RW," "DVD-RW," "DVD+R," "DVD+R DL," "DVD-R," and "DVD-R DL" are trademarks.

*1 When an unformatted DVD-R is inserted into this recorder, it is automatically formatted in Video mode. To format a new DVD-R in VR mode, format in the "Format" setup (page 47).
*2 CPRM (Content Protection for Recordable Media) is a coding technology that protects copyrights for images.

Discs that cannot be recorded on
- DVD-RAMs

→continued

Playable discs

Type	Disc Logo	Icon used in this manual	Characteristics
DVD VIDEO	DVD VIDEO	DVD	Discs such as movies that can be purchased or rented This recorder also recognises DVD-RAMs* as DVD Video compatible discs.
VIDEO CD	COMPACT disc DIGITAL VIDEO	VCD	VIDEO CDs or CD-Rs/CD-RWs in VIDEO CD/Super VIDEO CD format
CD	COMPACT disc DIGITAL AUDIO	CD	Music CDs or CD-Rs/CD-RWs in music CD format
DATA DVD	—	DATA DVD	DVD+RWs/DVD+Rs/DVD-RAMs* containing MP3 audio tracks or DivX video files DVD-RWs/DVD-Rs/DVD-ROMs containing MP3 audio tracks, JPEG image files or DivX video files
DATA CD	—	DATA CD	CD-ROMs/CD-Rs/CD-RWs containing either MP3 audio tracks, JPEG image files or DivX video files

"DVD VIDEO" and "CD" are trademarks.

DivX, DivX Certified, and associated logos are trademarks of DivX, Inc. and are used under license.
DivX® is a video file compression technology, developed by DivX, Inc.

* If the DVD-RAM has a removable cartridge, remove the cartridge before playback.

Discs that cannot be played
- PHOTO CDs
- CD-ROMs/CD-Rs/CD-RWs that are recorded in a format different from the formats mentioned in the table above.
- Data part of CD-Extras
- BDs
- HD DVDs
- Discs recorded with an AVCHD-compatible DVD video camera
- DVD-ROMs/DVD+RWs/DVD-RWs/DVD+Rs/DVD-Rs that do not contain DVD Video, DivX video, JPEG image files, or MP3 audio tracks.
- DVD Audio discs
- Cartridge-only type DVD-RAMs.
- HD layer on Super Audio CDs
- DVD VIDEOs with a different region code (page 13).
- DVDs that were recorded on a different recorder and not correctly finalised.

Maximum recordable number of titles

Disc	Number of titles
HDD*	999
DVD-RW/DVD-R	99
DVD+RW/DVD+R	49
DVD+R DL	49
DVD-R DL	99

* The maximum length for one title is 12 hours.

Note on playback operations of DVD VIDEOs/VIDEO CDs
Some playback operations of DVD VIDEOs/VIDEO CDs may be intentionally set by software producers. Since this recorder plays DVD VIDEOs/VIDEO CDs according to the disc contents the software producers designed, some playback features may not be available. See the instructions supplied with the DVD VIDEOs/VIDEO CDs.

Region code (DVD VIDEO only)
Your recorder has a region code printed on the rear of the unit and will only play DVD VIDEOs (playback only) labelled with identical region codes. This system is used to protect copyrights.
DVD VIDEOs labelled (ALL) will also play on this recorder.
If you try to play any other DVD VIDEO, the message "Playback prohibited by region code." will appear on the TV screen.
Depending on the DVD VIDEO, no region code indication may be labelled even though playing the DVD VIDEO is prohibited by area restrictions.

Music discs encoded with copyright protection technologies
This product is designed to play back discs that conform to the Compact Disc (CD) standard.
Recently, various music discs encoded with copyright protection technologies are being marketed by some record companies. Please be aware that among those discs, there are some that do not conform to the CD standard and may not be playable by this product.

Note on DualDiscs
A DualDisc is a two sided disc product which mates DVD recorded material on one side with digital audio material on the other side. However, since the audio material side does not conform to the Compact Disc (CD) standard, playback on this product is not guaranteed.

Notes
- Some DVD+RWs/DVD+Rs, DVD-RWs/DVD-Rs, DVD-RAMs, or CD-RWs/CD-Rs cannot be played on this recorder due to the recording quality or physical condition of the disc, or the characteristics of the recording device and authoring software. The disc will not play if it has not been correctly finalised. For more information, see the operating instructions for the recording device.
- You cannot mix VR mode and Video mode on the same DVD-RW. To change the disc's format, reformat the disc (page 47). Note that the disc's contents will be erased after reformatting.
- You cannot shorten the time required for recording even with high-speed discs.
- It is recommended that you use discs with "For Video" printed on their packaging.
- You cannot add new recordings to DVD+Rs, DVD-Rs, or DVD-RWs (Video mode) that contain recordings made on other DVD equipment.
- In some cases, you may not be able to add new recordings to DVD+RWs that contain recordings made on other DVD equipment. If you do add a new recording, note that this recorder will rewrite the DVD menu.
- You cannot edit recordings on DVD+RWs, DVD-RWs (Video mode), DVD+Rs, or DVD-Rs that are made on other DVD equipment.
- If the disc contains PC data unrecognizable by this recorder, the data may be erased.
- You may not be able to record, edit, or dub on some recordable discs, depending on the disc.
- Do not insert any discs that cannot be recorded or played on this recorder. This may cause the recorder to malfunction.

Hooking Up the Recorder

Follow steps 1 through 6 to hook up and adjust the settings of the recorder. Do not connect the mains lead until you reach “Step 4: Connecting the Mains Lead” on page 23.

Notes
- See “Specifications” (page 160) for a list of supplied accessories.
- Plug in cords securely to prevent unwanted noise.
- Refer to the instructions supplied with the components to be connected.
- You cannot connect this recorder to a TV that does not have a SCART or video input jack.
- Be sure to disconnect the mains lead of each component before connecting.

Checking hookup and setting methods

The recorder incorporates both analogue and digital tuners. The programme guide and timer recording method differ depending on which one you select. Depending on the broadcasts you are receiving and your equipment, select one of the following aerial hookups. Do NOT set “LINE 1 In” to “Decoder” in the “Video In/Out” setup (page 137) when making connection B.

When you receive	Hookup	Programme guide	Timer recording using programme guide
Freeview	A (page 16)	Digital Service (page 48)	See page 52.
Satellite, Cable	B (page 17)	GUIDE Plus+ (page 63)	See page 71.
Terrestrial	C (page 18)	GUIDE Plus+ (page 63)	See page 71.

Note

Beginning in 2008, analogue broadcasts in the UK will end area by area, with all analogue broadcasts scheduled to end by 2012. After analogue broadcasts end in your area, you will not be able to use hookup C to view TV broadcasts. At that time, change to hookup A to view digital broadcasts.

Step 1: Connecting the Aerial Cable and Set Top Box Controller

If the set top box receiver can output RGB signals

This recorder accepts RGB signals. If the set top box receiver can output RGB signals, connect the TV SCART connector on the set top box receiver to the LINE 1/DECODER jack, and set “LINE 1 In” to “RGB” in the “Video In/Out” setup (page 137). See the instructions supplied with the set top box receiver.

Using the set top box receiver control function

The set top box receiver control function can be used with hookup B. It allows the recorder to control a set top box receiver via the supplied set top box controller. The recorder controls programme positions on the set top box receiver for timer recording. You can also use the recorder’s remote control to change programme positions on the set top box receiver whenever the set top box receiver and recorder are turned on.

To use the set top box receiver control function, you need to connect the set top box controller (page 17). After setting up the set top box receiver control, check that the recorder can correctly control the set top box receiver (page 28).

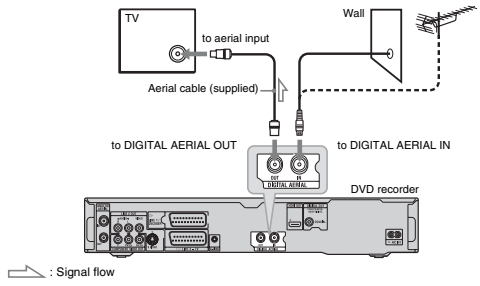
Notes
- If your aerial is a flat cable (300-ohm twin lead cable), use an external aerial connector (not supplied) to connect the aerial to the recorder.
- If you have separate cables for AERIAL antennas, use an AERIAL UHF/VHF band mixer (not supplied) to connect the aerial to the recorder.
- If you disconnect the recorder’s mains lead, you will not be able to view the signals from the connected set top box receiver.

➡continued

A: Receiving Freeview (For digital broadcasting)

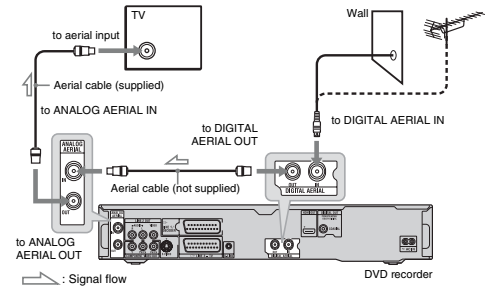
Use this hookup if you can receive Freeview.

With this hookup, you can record any programme position by selecting the programme position on the recorder.



If you want to view both analogue and digital broadcasts

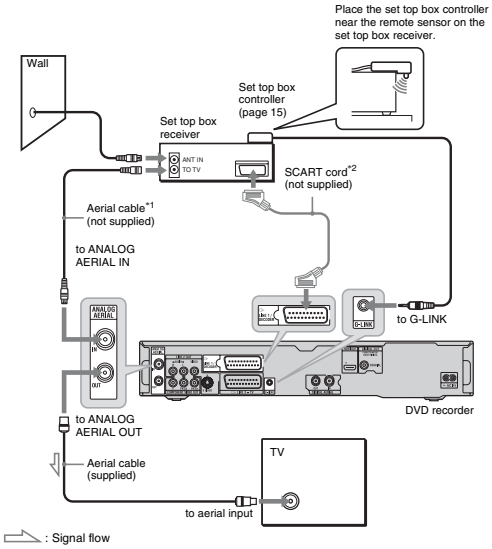
This recorder has separate built-in TV tuners for terrestrial digital and terrestrial analogue TV broadcasts.



B: Receiving cable or satellite (For analogue broadcasting)

With this hookup, you can record any programme position on the set top box receiver.

To watch cable programmes, you need to match the programme position on the recorder to the aerial output programme position on the set top box receiver.



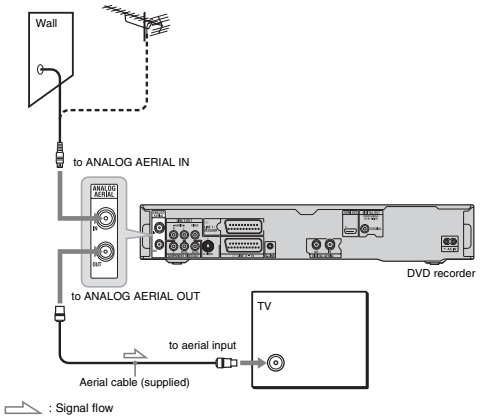
*1 If your set top box receiver does not have an aerial output jack, connect the aerial to the recorder’s ANALOG AERIAL IN jack.

*2 Connect only if your set top box receiver has a SCART connector.

➡continued

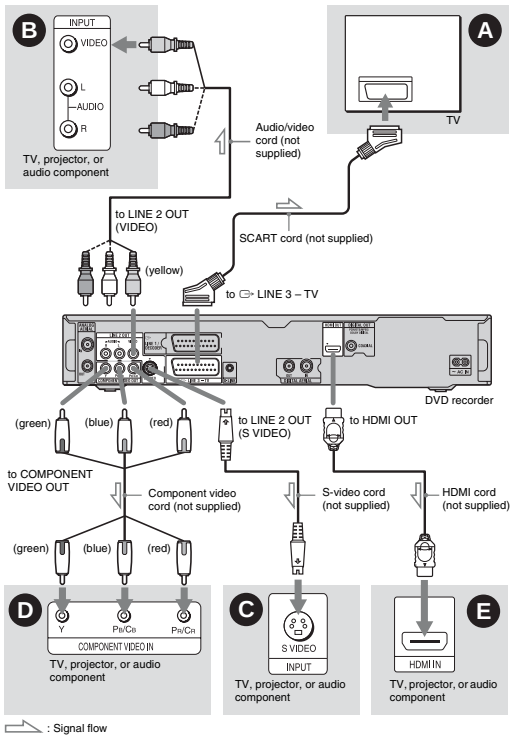
C: Receiving terrestrial (For analogue broadcasting)

Use this hookup if you watch cable programme positions without a set top box receiver. Also use this hookup if you are only connecting an aerial antenna.
With this hookup, you can record any programme position by selecting the programme position on the recorder.



Step 2: Connecting the Video Cords/HDMI Cord

Select one of the following patterns, A through E, according to the input jack on your TV monitor, projector, or audio component such as an AV amplifier (receiver). This will enable you to view pictures.



A SCART input jack
When setting “LINE 3 Out” to “S-Video” or “RGB” in the “Video In/Out” setup (page 136), use a SCART cord that conforms to the selected signal.

B Video input jack
You will enjoy standard quality images.

C S VIDEO input jack
You will enjoy high quality images.

D Component video input jacks (Y, PB/CB, PR/CR)
You will enjoy accurate colour reproduction and high quality images.
If your TV accepts progressive 525p/625p format signals, use this connection and set “Progressive” to “Compatible” in the “Easy Setup” setup (page 26). Then set “Component Video Out” to “Progressive” in the “Video In/Out” setup to send progressive video signals. For details, see “Component Video Out” on page 136.

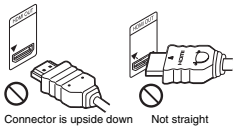
E HDMI input jack
Use a certified HDMI cord (not supplied) to enjoy high quality digital picture and sound through the HDMI OUT jack.

When connecting a Sony TV that is compatible with the HDMI control function, see page 21.
To see the signals from the connected set top box receiver when the set top box receiver is connected to the recorder using a SCART cord only, turn the recorder on.

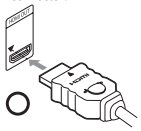
When connecting to the HDMI jack

Follow the steps below. Improper handling may damage the HDMI jack and the connector.

1 Carefully align the HDMI jack on the rear of the recorder and the HDMI connector by checking their shapes. Make sure the connector is not upside down or tilted.



2 Insert the HDMI connector straight into the HDMI jack.
Do not bend or apply pressure to the HDMI connector.



Notes
- Be sure to disconnect the HDMI cord when moving the recorder.
- Do not apply too much pressure to the cabinet wall, if you place the recorder on the cabinet with the HDMI cord connected. It may damage the HDMI jack or the HDMI cord.
- Do not twist the HDMI connector while connecting to or disconnecting from the HDMI jack to avoid damaging the HDMI jack and connector.

When playing “wide screen” images

Some recorded images may not fit your TV screen. To change the picture size, see page 144.

If you are connecting to a VCR

Connect your VCR to the LINE 1/ DECODER jack on the recorder (page 31).

Notes
- Do not connect more than one type of video cord between the recorder and your TV at the same time.
- Do not make connections A and E at the same time.
- When you connect the recorder to your TV via the SCART jacks, the TV’s input source is set to the recorder automatically when you start playback. If necessary, press the TV ⏎ button on the remote to return the input to the TV.
- If you connect the recorder to a TV with SMARTLINK, set “LINE 3 Out” to “Video” in the “Video In/Out” setup.
- You cannot connect the HDMI OUT jack (connection E) to DVI jacks that are not HDCP compliant (e.g., DVI jacks on PC displays).
- Component video and RGB signals are not output when using the HDMI connection.

* This DVD recorder incorporates High-Definition Multimedia Interface (HDMI™) technology.

About the SMARTLINK features (for SCART connections only)

If the connected TV (or other connected equipment such as a set top box) complies with SMARTLINK, NexTView Link*3, MEGALOGIC*1, EASYLINK*2, CINEMALINK*2, Q-Link*3, EURO VIEW LINK*4, or T-V LINK*5, you can enjoy the following SMARTLINK features.
- TV Direct Rec. (page 37)
- One-Touch Play (page 81)
- Preset Download
  You can download the tuner preset data from your TV to this recorder, and tune the recorder according to that data in “Easy Setup.”
- NexTView Download
  You can easily set the timer by using the NexTView Download function on your TV.

To prepare for the SMARTLINK features

Set “LINE 3 Out” to “Video” in the “Video In/Out” setup (page 136) and “SMARTLINK” to “This Recorder Only” in the “Options” setup (page 150).

Notes
- For correct SMARTLINK connection, you will need a SCART cord that has the full 21 pins. Refer to your TV’s instruction manual as well for this connection.
- Not all TVs respond to the functions above.

*1 “MEGALOGIC” is a registered trademark of Grundig Corporation.
*2 “EASYLINK” and “CINEMALINK” are trademarks of Philips Corporation.
*3 “Q-Link” and “NexTView Link” are trademarks of Panasonic Corporation.
*4 “EURO VIEW LINK” is a trademark of Toshiba Corporation.
*5 “T-V LINK” is a trademark of JVC Corporation.

About the HDMI Control functions for ‘BRAVIA’ Theatre Sync (for HDMI connections only)

By connecting Sony components that are compatible with the HDMI Control function with an HDMI cord (not supplied), operation is simplified as below:
- One-Touch Play (page 81)
- System Power-Off
  When you turn the TV off by using the power button on the TV’s remote, the components compatible with the HDMI Control function turn off automatically.

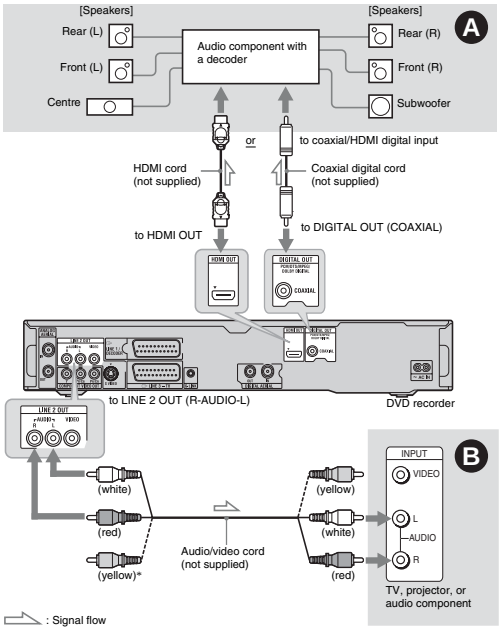
To prepare for the ‘BRAVIA’ Theatre Sync features

Set “HDMI Control” to “On” in the “HDMI Output” setup (page 148). For details on TV settings, refer to the operating instructions supplied with the TV.

Notes
- Depending on the connected component, the HDMI Control function may not work. Refer to the operating instructions supplied with the component.
- The recorder supports only the playback option of HDMI Control. “Player” appears on the TV screen when using the HDMI Control functions.

Step 3: Connecting the Audio Cords/HDMI Cord

Select one of the following patterns, Ⓐ or Ⓑ, according to the input jack on your TV monitor, projector, or audio component such as an AV amplifier (receiver). This will enable you to listen to sound.



* The yellow plug is used for video signals (page 19).

Ⓐ Digital audio input jack

If your audio component has a Dolby*1 Digital, DTS*2, or MPEG audio decoder and a digital input jack, use this connection. You can enjoy Dolby Digital (5.1ch), DTS (5.1ch), and MPEG audio (5.1ch) surround effects.

If you connect a Sony audio component that is compatible with the HDMI control function, refer to the operating instructions supplied with the audio component.

Ⓑ Audio L/R (left/right) input jacks

This connection will use your TV's or audio component's two speakers for sound.

Hint

For correct speaker location, see the operating instructions supplied with the connected components.

Notes

- Do not connect your TV's audio output jacks to the LINE IN (R-AUDIO-L) jacks at the same time. This will cause unwanted noise to come from your TV's speakers.
- With connection Ⓑ, do not connect the LINE IN (R-AUDIO-L) and LINE 2 OUT (R-AUDIO-L) jacks to your TV's audio output jacks at the same time. This will cause unwanted noise to come from your TV's speakers.
- With connection Ⓐ, after you have completed the connection, make the appropriate settings in the "Audio Out" setup (page 138). Otherwise, no sound or a loud noise will come from your speakers.
- When you connect the recorder to an audio component using an HDMI cord, you will need to do one of the following:
  – Connect the audio component to the TV with the HDMI cord, or
  – Connect the recorder to the TV with a video cord other than HDMI cord (component video cord, S-video cord, or audio/video cord).

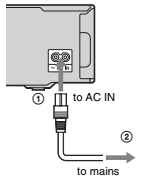
*1 Manufactured under license from Dolby Laboratories.
"Dolby" and the double-D symbol are trademarks of Dolby Laboratories.

*2 "DTS" and "DTS Digital Out" are registered trademarks of DTS, Inc.

Step 4: Connecting the Mains Lead

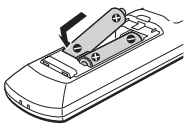
Connect the supplied mains lead to the AC IN terminal of the recorder. Then plug the recorder and TV mains leads (AC power cords) into the mains. After you connect the mains lead, **you must wait for a short while before operating the recorder.** You can operate the recorder once the front panel display lights up and the recorder enters standby mode.

If you connect additional equipment to this recorder (page 31), be sure to connect the mains lead after all connections are complete.



Step 5: Preparing the Remote

You can control the recorder using the supplied remote. Insert two R6 (size AA) batteries by matching the ⊕ and ⊖ ends on the batteries to the markings inside the battery compartment. When using the remote, point it at the remote sensor ▣ on the recorder.



Notes

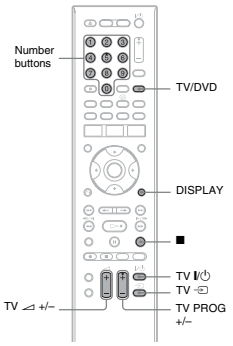
- If the supplied remote interferes with your other Sony DVD recorder or player, change the command mode number for this recorder (page 25).
- Use the batteries correctly to avoid possible leakage and corrosion. Should leakage occur, do not touch the liquid with bare hands. Observe the following:
  – Do not use a new battery with an old battery, or batteries of different manufacturers.
  – Do not attempt to recharge the batteries.
  – If you do not intend to use the remote for an extended period of time, remove the batteries.
  – If battery leakage occurs, wipe out any liquid inside the battery compartment, and insert new batteries.
- Do not expose the remote sensor (marked ▣ on the front panel) to strong light, such as direct sunlight or a lighting apparatus. The recorder may not respond to the remote.
- When you replace the batteries of the remote, the code number and Command Mode may be reset to the default setting. Set the appropriate code number and Command Mode again.

Controlling TVs with the remote

You can adjust the remote's signal to control your TV.

Notes

- Depending on the connected unit, you may not be able to control your TV with some or all of the buttons below.
- If you enter a new code number, the code number previously entered will be erased.



1 Hold down TV I/⏻ located at the bottom of the remote.

Do not press the I/⏻ button at the top of the remote.

2 With TV I/⏻ pressed down, enter the TV's manufacturer code using the number buttons.

For instance, to enter "09," press "0" then "9." After you enter the last number, release the TV I/⏻ button.

Code numbers of controllable TVs

If more than one code number is listed, try entering them one at a time until you find the one that works with your TV.

Manufacturer	Code number
Sony	01 (default)
Grundig	11
Hitachi	24
ITT/Nokia	15, 16
JVC	33
Loewe	45
Nokia	69, 73
Panasonic	17, 49
Philips	06, 07, 08, 72
Saba	12, 13, 74
Samsung	22, 23, 71
Sanyo	25
Sharp	29
Telefunken	36
Thomson	43, 75
Toshiba	38

The remote performs the following:

Buttons	Operations
TV I/⏻	Turns your TV on or off.
TV ◿ (volume) +/–	Adjusts the volume of your TV.
TV PROG +/–	Selects the programme position on your TV.
TV ⏻ (input select)	Switches your TV's input source.

To operate the TV/DVD button (for SCART connections only)

The TV/DVD button switches between TV mode and DVD mode. Press the TV/DVD button when in stop mode or no menu appears on the TV screen. Point your remote at the recorder when using this button.

TV mode: switch to this when you use the TV's tuner mainly. When you start playback, the input source for the TV is set to the recorder automatically.

DVD mode: switch to this when you use the recorder's tuner mainly.

To check the current mode, press DISPLAY (page 40).

If you have a Sony DVD player or more than one Sony DVD recorder

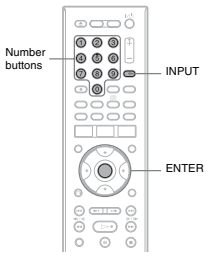
If the supplied remote interferes with your other Sony DVD recorder or player, set the command mode number for this recorder and the supplied remote to one that differs from the other Sony DVD recorder or player after you have completed "Step 6: Easy Setup." The default command mode setting for this recorder and the supplied remote is DVD3. You can check the current Command Mode in the front panel display. For details, see page 149.

The default command mode setting for this recorder and the supplied remote is DVD3. The remote does not function if different command modes are set for the recorder and remote. Set the same command mode.

➡continued

Changing programme positions of the recorder using the remote

You can change programme positions of the recorder using the number buttons.

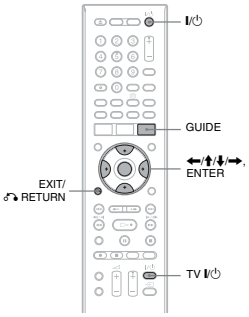


Example: for channel 50
Press “5,” “0,” then press ENTER.

Hint
If the aerial cables are connected to both DIGITAL AERIAL IN and ANALOG AERIAL IN jacks, you can switch between digital mode and analogue mode using the INPUT button.

Step 6: Easy Setup

Make the basic adjustments by following the on-screen instructions in “Easy Setup.”
Be careful not to disconnect the cables or exit the “Easy Setup” function during this procedure.

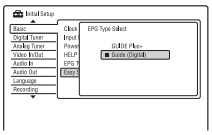


1 Turn on the recorder and your TV. Then switch the input selector on your TV so that the signal from the recorder appears on your TV screen.
The “Language” display appears.
• If the “Language” display does not appear, select “Easy Setup” in the “Basic” setup from “Initial Setup” in the System Menu (page 130).

2 Select a language for the on-screen displays using ←/↑/↓/→, and press ENTER.
The initial settings message appears.

3 Select “Start” using ↑/↓, and press ENTER.
Follow the on-screen instructions to make the following settings.

Select “Guide (Digital)” to use the digital electronic programme guide (see “Guide to Digital Services (For Freeview users only)” on page 48).
Select “Guide (Digital)” if you receive only digital broadcasts.



Select “GUIDE Plus+” to use the Gemstar GUIDE Plus+ electronic programme guide (see “GUIDE Plus+ (For analogue broadcasting only)” on page 63).

◆TV Screen Size (page 144)
If you have a wide-screen TV, select “Wide (16:9).” If you have a standard TV, select “Standard (4:3).” This will determine how “wide-screen” images are displayed on your TV.

◆Progressive
When you connect a progressive format TV to this recorder using the COMPONENT VIDEO OUT jacks, select “Compatible.”

◆HDD caution messages
Read the HDD caution messages, and press ENTER.

4 Select “Finish Setup” using ↑/↓, and press ENTER.
“Easy Setup” is completed.

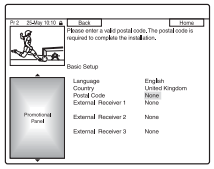
To return to the previous step
Press ↩ RETURN.

Hint
If you want to run “Easy Setup” again, select “Easy Setup” in the “Basic” setup from “Initial Setup” in the System Menu (page 130).

Setting up your set top box receiver for the GUIDE Plus+® system (For analogue broadcasting)

Follow the steps below to set up the GUIDE Plus+ system and set top box controller. The GUIDE Plus+ system is available in the UK only.

1 Press GUIDE.
The GUIDE Plus+ system “Basic Setup” appears.



For users other than in the UK, go to step 4.

2 Select “Postal Code,” and press ENTER.

3 Enter your postal code using ←/↑/↓/→, and press ENTER.
If “Country” is set to “Others,” you cannot enter a postal code and the GUIDE Plus+ system will not search for a host channel.

4 Select “External Receiver 1,” and press ENTER.
You can also select “External Receiver 2” or “External Receiver 3” if you have connected additional set top box receivers.

5 Press ENTER to select “Continue.”

6 Select the set top box receiver type using ↑/↓, and press ENTER.

7 Select the provider using ↑/↓, and press ENTER.

◆D.TV Auto Channel Setting
If the aerial cable is connected to the DIGITAL AERIAL IN jack (hookup A), select “Auto Scan.” Then, select your country/region using ←/→, and press ENTER. The recorder will automatically capture and store the available TV and Radio channels.

If the aerial cable is connected to the ANALOG AERIAL IN jack (hookup B or C), select “Do not set.”

For details, see page 15.

◆A.TV Auto Channel Setting
If the aerial cable is connected to the ANALOG AERIAL IN jack (hookup B or C) and the TV is connected to this recorder not using SMARTLINK, select “Auto Scan.” Then, select your country/region using ←/→, and press ENTER. The programme position order will be set according to the country/region you set.

If the aerial cable is connected to the ANALOG AERIAL IN jack (hookup B or C) and the TV is connected to this recorder with SMARTLINK, select “Download from TV” (For details, refer to the operating instructions supplied with your TV). Then, select your country/region using ←/→, and press ENTER. The tuner preset data will be downloaded from your TV to this recorder.

For details, see page 15.

If the aerial cable is connected to the DIGITAL AERIAL IN jack (hookup A) only, or to skip this setting, select “Do not set.” Then, select your country/region using ←/→, and press ENTER.
To set the programme positions manually, see page 131.

◆Clock Setting
The recorder will automatically set the clock when any digital channels have been scanned and stored. Go to the “EPG Type Select” setting.

Select “Auto” when a programme position in your local area broadcasts a time signal. The “Auto Clock Setting” display appears.

1 Select the programme position of the station that carries a time signal using ←/→.

2 Select “Start” using ↓, and press ENTER.
If a clock signal cannot be found, press ↩ RETURN, and set the clock manually.

Select “Manual” to set the clock manually. The “Manual Clock Setting” display appears.

1 Select the time zone for your area using ←/→, and press ↓.

2 Select “On” if you are now on summer time, and press ENTER.

3 Set the day, month, year, hour, and minutes using ←/↑/↓/→, and press ENTER to start the clock.

◆EPG Type Select
Select the EPG (Electronic Programme Guide) type to use.
If no programme positions for digital broadcasts are found after scanning, the “EPG Type Select” display does not appear. The EPG type is automatically set to the country/area you select when setting the program positions.

→continued

8 Select the receiver brand using ↑/↓, and press ENTER.
If you select “Other providers,” you can select a receiver brand from a list of all available brands.
If your receiver brand is not on the list, select “???.”
The receiver brand list is automatically updated, so your receiver may be available at a later date. Select your brand when it becomes available. Until then, use “???.”

9 Select the connection you used for your set top box receiver using ↑/↓, and press ENTER.
When the set top box receiver is connected to the recorder using hookup B with both an aerial cable and a SCART cord, select either “Line1” or “Antenna.” The display asks for confirmation.

10 Press ENTER to select “Continue.”
The Video Window switches to the specified programme position.

11 Select “YES” using ↑/↓, and press ENTER.
The display asks for confirmation.
If the Video Window does not switch to the specified programme position, select “NO” and press ENTER until the Video Window switches to the specified programme position.

To receive GUIDE Plus+ system data your recorder must be turned off when not in use. If your recorder is connected to a set top box receiver, be sure to leave the set top box receiver turned on. After initial setup, it may take up to 24 hours to begin receiving TV programme listings.

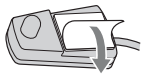
Note
You cannot set tuner system or “OSD Language” to a country/region or language that is not supported by the GUIDE Plus+ system.

If you cannot get the recorder to control your set top box receiver
Check the connection and position of the set top box controller (page 17).
If your set top box receiver still does not operate with this recorder, refer to the instructions supplied with your set top box receiver and contact your cable or satellite company to see if they can provide you with a compatible set top box receiver.

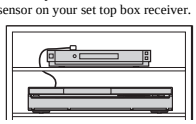
Notes
• The list of external receivers controllable by the GUIDE Plus+ system is updated constantly and is distributed through GUIDE Plus+ system data signals. Since the time your recorder has been produced and the time you installed your recorder for the first time, new external receiver codes might have been added.
• If the external receiver is still not on the list or is not controlled properly by the recorder, please call Customer Support to report the brand and model of your external receiver.

To fix the set top box controller to your set top box receiver
Once you have confirmed that the set top box controller controls your set top box receiver, fix it in place.

1 Remove the backing on the double-sided tape.



2 Attach it so that the set top box controller is directly above the remote control sensor on your set top box receiver.



→continued

To change the basic GUIDE Plus+ settings

1 Press GUIDE.
The GUIDE Plus+ system "Home Screen" appears.

2 Select "Setup" in the Menu Bar using ↑/→, and press ENTER.
The GUIDE Plus+ setup menu appears.

3 Select "Basic Setup" using ↑/↓, and press ENTER.

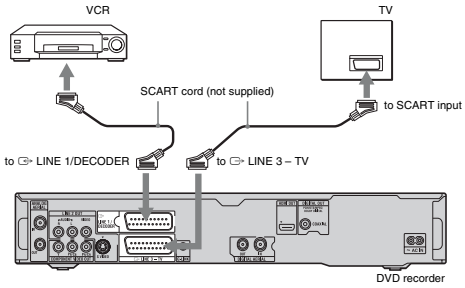
4 Repeat from step 2 of "Setting up your set top box receiver for the GUIDE Plus+® system (For analogue broadcasting)" on page 28.

Connecting a VCR or Similar Device

After disconnecting the recorder's mains lead from the mains, connect a VCR or similar recording device to the LINE IN jacks of this recorder.
Use the DV IN jack on the front panel if the equipment has a DV output jack (i.LINK jack) (page 104).
For details, refer to the instruction manual supplied with the connected equipment.
To record on this recorder, see "Recording from Connected Equipment" on page 79.

Connecting to the LINE 1/DECODER jack

Connect a VCR or similar recording device to the LINE 1/DECODER jack of this recorder.



Notes
- Pictures containing copy protection signals that prohibit any copying cannot be recorded.
- If you pass the recorder signals through a VCR, you may not receive a clear image on your TV screen.

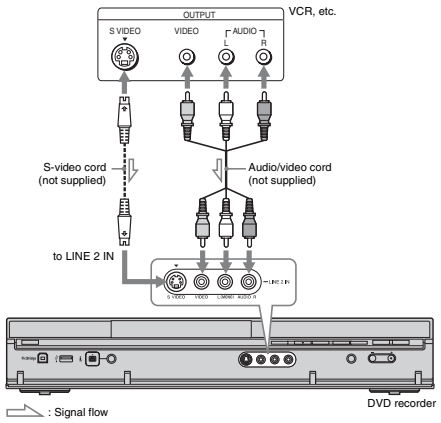
Be sure to connect your VCR to the DVD recorder and to your TV in the order shown below. To watch video tapes, watch the tapes through a second line input on your TV.

- The SMARTLINK features are not available for devices connected via the DVD recorder's LINE 1/ DECODER jack.
- To watch the connected VCR or similar device's pictures through the recorder while the recorder is in standby mode, set "Power Save" to "Off" (default) in the "Basic" setup (page 130).
- When you record to a VCR from this DVD recorder, do not switch the input source to TV by pressing the TV/DVD button on the remote.
- If you disconnect the recorder's mains lead, you will not be able to view the signals from the connected VCR.

→continued

Connecting to the LINE 2 IN jacks on the front panel

Connect a VCR or similar recording device to the LINE 2 IN jacks of this recorder. If the equipment has an S-video jack, you can use an S-video cord instead of an audio/video cord.



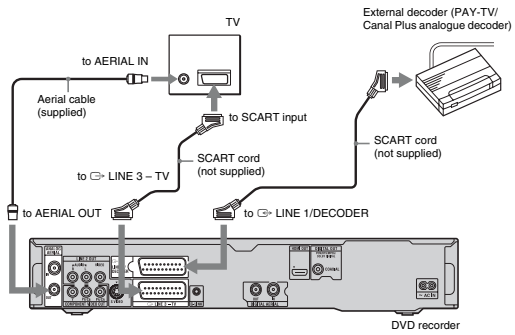
Hint
When the connected equipment outputs only monaural sound, connect to only the L(MONO) and VIDEO input jacks on the front of the recorder. Do not connect the R input jack.

Notes
- Do not connect the yellow LINE IN (VIDEO) jack when using an S-video cord.
- Do not connect the output jack of this recorder to another equipment's input jack with the other equipment's output jack connected to the input jack of this recorder. This may cause noise (feedback).
- Do not connect more than one type of video cord between the recorder and your TV at the same time.

Connecting an External Decoder

You can watch or record external decoder (PAY-TV/Canal Plus analogue decoder) programmes if you connect a decoder (not supplied) to the recorder. Disconnect the recorder's mains lead from the mains when connecting the decoder. Note that when you set "LINE 1 In" to "Decoder" in step 7 of "Setting external decoder (PAY-TV/Canal Plus analogue decoder) programme positions" (page 34), you will not be able to select "L1" because Line 1 will become a dedicated line for the decoder.

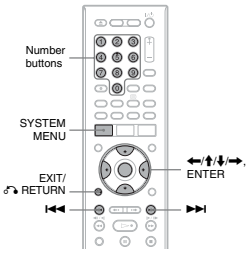
Connecting a decoder



→continued

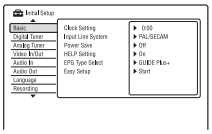
Setting external decoder (PAY-TV/Canal Plus analogue decoder) programme positions

To watch or record PAY-TV/Canal Plus analogue programmes, set your recorder to receive the programme positions using the on-screen display.
In order to set the programme positions correctly, be sure to follow all of the steps below.

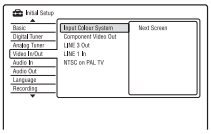


1 Press SYSTEM MENU.
The System Menu appears.

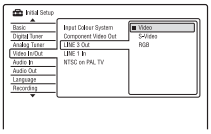
2 Select “Initial Setup,” and press ENTER.



3 Select “Video In/Out,” and press ENTER.

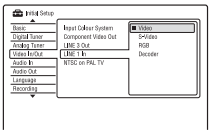


4 Select “LINE 3 Out,” and press ENTER.



5 Press ↑/↓ to select “Video” or “RGB,” and press ENTER.

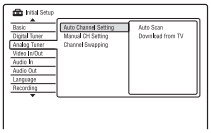
6 Select “LINE 1 In,” and press ENTER.



7 Press ↑/↓ to select “Decoder,” and press ENTER.

8 Press ↩ RETURN to return the cursor to the left column.

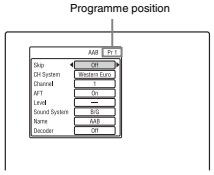
9 Select “Analog Tuner,” and press ENTER.



10 Select “Manual CH Setting,” and press ENTER.

11 Select “Next Screen,” and press ENTER.

12 Select your country/region, and press ENTER.



13 Select the desired programme position using I◄◄/►►I or number buttons.

14 Select “Channel” using ↑/↓.

15 Select the external decoder programme position using ←/→.

16 Select “Sound System” using ↑/↓.

17 Press ←/→ to select an available TV system, B/G, D/K, I, or L.
To receive broadcasts in France, select “L.”

18 Select “Decoder” using ↑/↓.

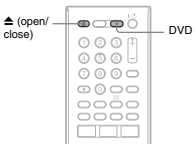
19 Select “On” using ←/→, and press ENTER.

To return to the previous step
Press ↩ RETURN.

Notes
- If you disconnect the recorder’s mains lead, you will not be able to view the signals from the connected decoder.
- To watch the connected external decoder (PAY-TV/Canal Plus analogue decoder) programmes during recording, press the PROGRAM + button on the recorder (“SCART THRU” appears on the front panel display). To return to the previous display, press the PROGRAM – button on the recorder (“SCART NORM” appears on the front panel display). The recorder automatically switches to the programme tuned by the recorder’s tuner after the recording has finished. To watch the connected external decoder (PAY-TV/Canal Plus analogue decoder) programmes while the recorder is in standby mode, set “Power Save” to “Off” (default) in the “Basic” setup (page 130).

1. Inserting a Disc

+RW -RWVR -RWVideo +R -RVR -RVideo DVD VCD CD DATA DVD DATA CD



1 Press DVD.

2 Press ▲ (open/close), and place a disc on the disc tray.


Recording/playing side facing down

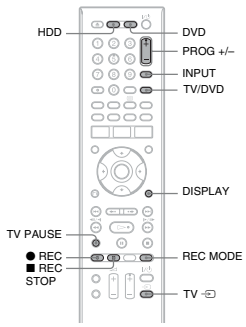
3 Press ▲ (open/close) to close the disc tray.
Wait until “LOAD” disappears from the front panel display.
Unused DVDs are formatted automatically.
- For DVD-RW discs
  DVD-RWs are formatted in the recording format (VR mode or Video mode) set by “Format DVD-RW” of “Basic” in the “Disc Setup” setup (page 128).
- For DVD-R discs
  DVD-Rs are automatically formatted in Video mode. To format an unused DVD-R in VR mode, format the disc in the “Format” setup (page 47) **before** you make a recording.

If the disc is recordable on this recorder, you can manually re-format the disc to make a blank disc (page 47).

2. Recording a Programme

HDD +RW -RWVR -RWVideo +R -RVR -RVideo

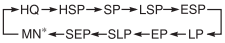
This section introduces the basic operation to record a current TV programme to the hard disk (HDD) or to a disc (DVD). For an explanation of how to make timer recordings, see page 52 (Digital Mode) or page 71 (Analogue Mode).



1 Press HDD or DVD.
If you want to record to a DVD, insert a recordable DVD.

2 Press PROG +/– to select the programme position or input source you want to record.

3 Press REC MODE repeatedly to select the recording mode.
Each time you press the button, the display on the TV screen changes as follows:



* Available when “Manual Rec. Mode” is set to “On (go to setup)” in the “Recording” setup (page 141).
For more details about the recording mode, see page 71.

4 Press ● REC.
Recording starts.
When recording to the HDD, recording stops after 12 hours of continuous recording or when the HDD is full.
When recording to a DVD, recording stops when the DVD is full.

To stop recording
Press ■ REC STOP.
Note that it may take a few seconds for recorder to stop recording.

To watch another TV programme while recording
If your TV is connected to the ⇨ LINE 3 – TV jack, set your TV to the TV input using the TV/DVD button and select the programme you want to watch. If your TV is connected to the LINE 2 OUT or COMPONENT VIDEO OUT jacks, set the TV to TV input using the TV ⇦ button (page 24).

TV Direct Rec. (for SMARTLINK connections only)
When the TV is turned on and the recorder is turned off, press TV PAUSE. The recorder automatically turns on and starts recording what you are watching on the TV to the HDD. Set “TV Pause” to “TV’s Tuner” in the “Options 2” setup (page 150).

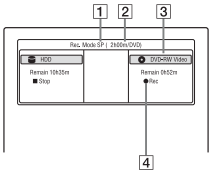
Hint
If the aerial cables are connected to both DIGITAL AERIAL IN and ANALOG AERIAL IN jacks, you can switch between digital mode and analogue mode using the INPUT button.

Notes
- To turn off the TV Direct Rec. function, set “SMARTLINK” to “Pass Through” in the “Options” setup (page 150).
- Some buttons, such as the TITLE LIST button or ▷ button, do not work when “TV” appears in the front panel display.
- If you press the ⏻ button while recording, the recorder stops recording and turns off.
- After pressing the ● REC button, it may take a short while to start recording.
- You cannot change the recording mode while recording.
- If there is a power failure, the programme you are recording may be erased.
- You cannot watch a PAY-TV/Canal Plus programme while recording another PAY-TV/ Canal Plus programme.
- To use the TV Direct Rec. function, you must first correctly set the recorder’s clock.

Checking the disc status while recording

You can check the recording information such as recording time or disc type.

Press DISPLAY during recording.
The recording information appears.



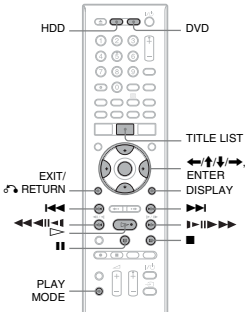
1 Recording mode
2 Recording time
3 Disc type/format
4 Recording status

Press DISPLAY to turn off the display.

3. Playing the Recorded Programme (Title List)

HDD +RW -RWVR -RWVideo +R -RVR -RVideo

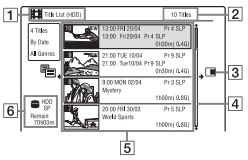
To play a recorded title, select the title from the Title List.



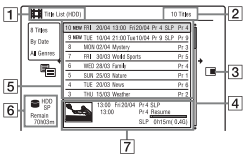
1 Press HDD or DVD.
If you select DVD, insert a DVD (see "1. Inserting a Disc" on page 36).
Playback starts automatically depending on the disc.

2 Press TITLE LIST.
To show the 8-Title List, press ← to select "Title View," and press ENTER, then select "8 Titles" using ↑/↓, and press ENTER.

4-Title List (Example: HDD)



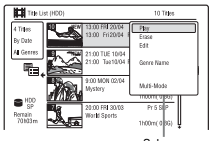
8-Title List



1 Disc type:
Displays the media type, HDD or DVD.

2 Total number of titles

3 Sub-menu:
Press → to display the sub-menu.
The sub-menu displays options applicable only to the selected item. The displayed options differ depending upon the model, situation, and disc type.



4 Scroll bar:
Appears when all of the titles do not fit on the list. To view the hidden titles, press ↑/↓.

5 Title information:
Displays the title number, title thumbnail picture (playback picture for the selected title, still images for the other titles), recording date, recorded station name (or programme position number), recording mode, title name, and title size.

"Recording": Indicates that the title is currently being recorded.
🔒: Indicates protected title.
"NEW": Indicates that the title is newly recorded (not played back) (HDD only).
COPY: Press DISPLAY to display "COPY." "COPY" indicates titles containing "Copy-Once" copy protection signals (HDD only) (page 99).
🔄: Indicates that the title is recorded using the Update function.
Genre icons: Indicates the title's genre (HDD only).

6 Remaining time of the current disc in the current recording mode (example: SP mode)

7 Detailed information for the selected title
The resume point time is shown in the 8-Title List.

3 Select a title using ↑/↓, and press ENTER.
Playback starts from the selected title.

To stop playback
Press ■ (stop).

To scroll the list display by page (Page mode)
Press I◄◄ /►►I while the Title List is displayed. Each time you press I◄◄ /►►I, the entire Title List changes to the next/previous page of titles.

About the Title List for DVD-RWs/DVD-Rs (VR mode)
You can switch the Title List to show Original or Playlist titles.

1 Press ← while the Title List is displayed.

2 Select "Play List" using ↑/↓, and press ENTER.

3 Select "Original" or "Play List" using ↑/↓, and press ENTER.

To change the title order for HDD (Sort Titles)

1 Press ← while the Title List is displayed.

2 Select "Sort Titles" using ↑/↓, and press ENTER.

3 Select the item using ↑/↓, and press ENTER.

Order	Sorted
By Date	In order of when the titles were recorded. The title that is recorded most recently is listed at the top.
Unseen Title	In order of when the titles were recorded. The title that is recorded most recently and has not been played is listed at the top. Playlist titles are not displayed.
By Title	In alphabetical order.
By Number	In order of recorded title number.

To search for a title by genre (HDD only)

1 Press ← while the Title List is displayed.

2 Select "Genre" using ↑/↓, and press ENTER.

3 Select a genre using ↑/↓, and press ENTER.

To change a title thumbnail picture (Thumbnail)
After recording, the first scene of the recording (the title) is automatically set as the thumbnail picture.
You can select a favourite scene for the thumbnail picture shown in the Title List.

1 Press TITLE LIST.
For DVD-RWs/DVD-Rs (VR mode), switch the Title Lists, if necessary.

2 Select a title, and press →.
The sub-menu appears.

→continued

3 Select "Edit" using ↑/↓, and press ENTER.

4 Select "Set Thumbnail" using ↑/↓, and press ENTER.
The display for setting the thumbnail point appears and the title starts to play.

5 While watching the playback picture, press ▷, ❚❚ or ◄❚❚ ◄❚ ◄◄/►► ❚► ❚❚► to select the scene you want to set for a thumbnail picture, and press ❚❚.
Playback pauses.
You can also select a scene using the PLAY MODE button (page 89).

6 Select "OK" using ↑/↓, and press ENTER.
The scene is set for the title's thumbnail picture.
To return to the Title List, press ↩ RETURN.

To change the thumbnail preview mode (Set Preview) (HDD only)
You can select "Quick Preview" or "Normal" for the thumbnail preview mode in the Title List. Set "Set Preview" in the "Options" setup (page 150).

To turn off the Title List
Press TITLE LIST.

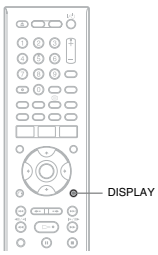
Hint
You can select "Title List" from the System Menu.

Notes
- The title names may not appear for DVDs created on other DVD recorders.
- It may take a few seconds for the thumbnail pictures to be displayed.
- After editing, the title thumbnail picture may change to the first scene of the recording (title).
- After dubbing, the title thumbnail picture set on the source recording is cancelled.

4. Displaying the Playing Time and Play Information

HDD +RW -RWVR -RWVideo +R -RVR -RVideo DVD VCD CD DATA DVD DATA CD

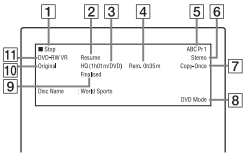
You can check the playing time of the current title, chapter, track, or disc. Also, you can check the disc name recorded on the DVD/CD.



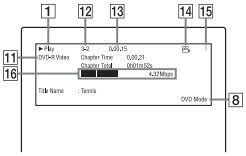
Press DISPLAY repeatedly.

The displays differ depending on the disc type or playing status.

In stop mode
Example: DVD-RW in VR mode



During playback
Example: DVD-R in Video mode



1 Playing status

2 Shows that the Resume Play is available (page 81).

3 Current selected recording mode (remaining DVD recording time/disc type) (page 71)

4 Remaining time

5 Station name and programme position number

6 Audio setting for the current programme

7 Recording restrictions for the current programme

8 TV mode or DVD mode (page 25)

9 Disc information

10 Title type (Original or Playlist) for DVD-RW/DVD-R in VR mode

11 Disc type/format (page 10)
Displays the finalised disc in Video mode as "DVD-Video."

12 Title number-Chapter number (page 89)

13 Playing time

14 Multi-angles indicator (page 80)

15 Copy-protected indicator (page 99)

16 Data transfer bar and rate

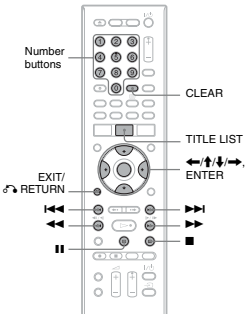
Hints
- When "On Screen Display" is set to "On" (default) in the "Options" setup (page 149), information automatically appears on the screen when the recorder is operated.
- To increase disc space, see "To open up disc space" (page 92).

Note
Playing time of MP3 audio tracks may not be displayed correctly.

5. Changing the Name of a Recorded Programme

HDD +RW -RWVR -RWVideo +R -RVR -RVideo

You can label a DVD, title, or programme by entering characters. You can enter up to 64 characters for a title recorded in the HDD/DVD-RW/DVD-R (VR mode), 40 characters for a title recorded in the DVD+RW/DVD-RW (Video mode)/DVD+R/DVD-R (Video mode), but the actual number of characters displayed in the menus such as the Title List will vary. The steps below explain how to change the name of the recorded programme.

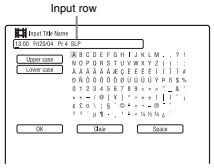


1 **Press TITLE LIST.**

2 **Select a title, and press →.**
The sub-menu appears.

3 **Select “Edit,” and press ENTER.**

4 **Select “Title Name,” and press ENTER.**
The display for entering characters appears.
The current name is displayed at the input row.



5 **Move the cursor to the point where you want to insert the character using ◀◀/▶▶.**
To erase all of the characters, press and hold CLEAR for 2 seconds or more.

6 **Select “Upper case” or “Lower case” using I◀◀ /▶▶I.**
The characters for the selected type are displayed.
The type of characters will change according to the language you select in “Easy Setup.”

7 **Press ←/↑/↓/→ to select the character you want to enter, and press ENTER.**
The selected character appears at the input row.
To insert a space, press II (or select “Space,” and press ENTER).

8 **Repeat steps 6 and 7 to enter the remaining characters.**
To erase a character, move the cursor to the character at the input row, and press CLEAR (or select “Clear,” and press ENTER).
To insert a character, move the cursor to the right of the point where you want to insert the character. Then select the character, and press ENTER.
To erase all of the characters, press and hold CLEAR for 2 seconds or more.

9 **Press ■ (or select “OK,” and press ENTER).**
To cancel the setting, press ↩ RETURN.

To use the number buttons
You can also use the number buttons to enter characters. Refer to the number next to each row of letters on your TV screen.

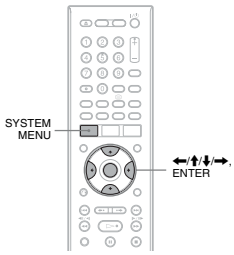
1 In step 7 above, press a number button repeatedly to select a character.
Example:
Press the number 3 button once to enter “D.”
Press the number 3 button three times to enter “F.”

2 Press ENTER and select the next character.

3 Press ■ (or select “OK,” and press ENTER).

6. Labelling and Protecting a Disc

You can execute options effective for the entire disc in the “Disc Setup” setup.



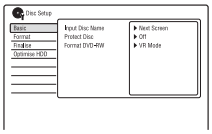
Labelling a disc

+RW -RWVR -RWVideo +R -RVR -RVideo

1 **Insert a disc.**
See “1. Inserting a Disc” on page 36.

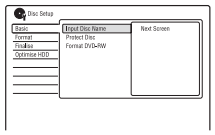
2 **Press SYSTEM MENU.**
The System Menu appears.

3 **Select “Disc Setup,” and press ENTER.**



→continued

4 **Select “Basic,” and press ENTER.**



5 **Select “Input Disc Name,” and press ENTER.**

6 **Select “Next Screen,” and press ENTER.**
Enter the disc name (page 42).

Note
You can enter up to 64 characters for a DVD-RW/DVD-R (VR mode) disc name, and 40 characters for a DVD+RW/DVD-RW (Video mode)/DVD+R/DVD-R (Video mode) disc name. The disc name may not appear when the disc is played on other DVD equipment.

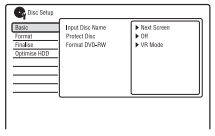
Protecting a disc

-RWVR -RVR

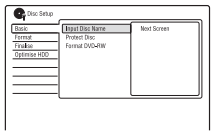
1 **Insert a disc.**
See “1. Inserting a Disc” on page 36.

2 **Press SYSTEM MENU.**
The System Menu appears.

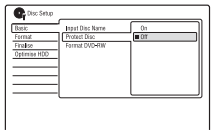
3 **Select “Disc Setup,” and press ENTER.**



4 **Select “Basic,” and press ENTER.**



5 **Select “Protect Disc,” and press ENTER.**



6 **Select “On,” and press ENTER.**

7 **Press SYSTEM MENU to exit.**

To cancel the protection
Select “Off” in step 6.

Hint
You can set protection for individual titles (page 92).

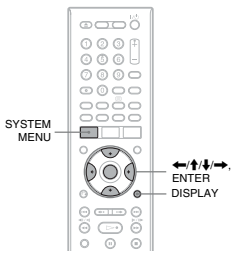
7. Playing the Disc on Other DVD Equipment (Finalise)

+RW -RWVR -RWVideo +R -RVR -RVideo

Finalising is necessary when you play discs recorded with this recorder on other DVD equipment.
When you finalise a DVD+RW, DVD-RW (Video mode), DVD+R, or DVD-R (Video mode), a DVD menu will be automatically created, which can be displayed on other DVD equipment.
Before finalising, check the differences between the disc types in the table below.

Differences between disc types

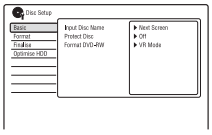
+RW	Discs are automatically finalised when removed from the recorder. However, you may need to finalise the disc for certain DVD equipment, or if the recording time is short. You can edit or record on the disc even after finalising.
-RWVR	Finalising is unnecessary when playing a disc on VR format compatible equipment. Even if your other DVD equipment is VR format compatible, you may need to finalise the disc, especially if the recording time is short. You can edit or record on the disc even after finalising.
-RWVideo	Finalising is necessary when playing on any equipment other than this recorder. After finalising, you cannot edit or record on the disc. If you want to record on it again, unfinalise (page 46) or reformat the disc (page 47). However, if you reformat the disc, all recorded contents will be erased.
-RVR	Finalising is necessary. The disc can be played only on equipment that supports DVD-R in VR mode. After finalising you cannot edit or record on the disc using this recorder.
+R -RVideo	Finalising is necessary when playing on any equipment other than this recorder. After finalising, you cannot edit or record on the disc.



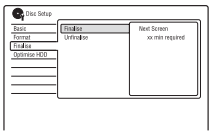
1 **Insert a disc.**
See “1. Inserting a Disc” on page 36.

2 **Press SYSTEM MENU.**
The System Menu appears.

3 **Select “Disc Setup,” and press ENTER.**



4 **Select “Finalise,” and press ENTER.**



5 **Select “Finalise,” and press ENTER.**

→continued

6 **Select "Next Screen," and press ENTER.**
For DVD-RW/DVD-R (VR mode), the recorder starts finalising the disc. Go to step 9.

7 **(DVD+RW/DVD-RW (Video mode)/ DVD+R/DVD-R (Video mode) only) Select a title menu style, and press ENTER.**
The menu appears in the selected title menu style when the "top menu" (or "menu" for a DVD+RW/DVD+R) is selected on the DVD equipment.

8 **(DVD+RW/DVD-RW (Video mode)/ DVD+R/DVD-R (Video mode) only) Select "Yes," and press ENTER.**
The recorder starts finalising the disc.

9 **Press SYSTEM MENU to exit.**

Hint
You can check whether the disc has been finalised or not. Press DISPLAY after step 1 (page 40).

Notes
- Depending on the condition of the disc, recording, or the DVD equipment, discs may not play even if the discs are finalised.
- The recorder may not be able to finalise the disc if it was recorded on another recorder.
- Inserting an unfinalised disc into other DVD equipment may damage the recorded contents.
- When using a DVD+RW, you can edit or record on the disc even after finalising. However, the title menu will not be displayed. Finalise the disc again to display the title menu.

Unfinalising a disc

-RW VR -RW Video

For DVD-RWs (Video mode)
DVD-RWs (Video mode) that have been finalised to prohibit additional recording or editing can be unfinalised to allow further recording or editing.

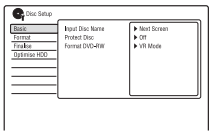
For DVD-RWs (VR mode)
If you cannot record or edit on a DVD-RW (VR mode) that has been finalised with other DVD equipment, unfinalise the disc.

Note
The recorder is not able to unfinalise DVD-RWs (Video mode) that have been finalised on another recorder.

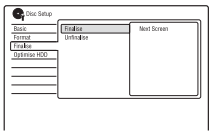
1 **Insert a disc.**
See "1. Inserting a Disc" on page 36.

2 **Press SYSTEM MENU.**
The System Menu appears.

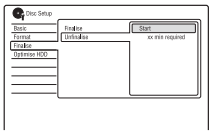
3 **Select "Disc Setup," and press ENTER.**



4 **Select "Finalise," and press ENTER.**



5 **Select "Unfinalise," and press ENTER.**

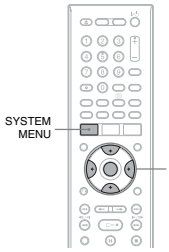


6 **Select "Start," and press ENTER.**
The recorder starts unfinalising the disc. Unfinalising may take several minutes.

8. Reformatting a Disc

+RW -RW VR -RW Video -R VR -R Video

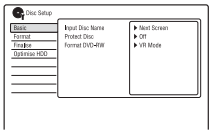
New discs are automatically formatted when inserted. If necessary, you can manually re-format a DVD+RW, DVD-RW, or DVD-R disc to make a blank disc. For DVD-RWs or DVD-Rs, you can select a recording format (VR mode or Video mode) according to your needs.



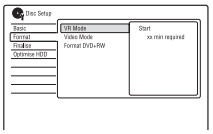
1 **Insert a disc.**
See "1. Inserting a Disc" on page 36.

2 **Press SYSTEM MENU.**
The System Menu appears.

3 **Select "Disc Setup," and press ENTER.**



4 **Select "Format," and press ENTER.**



5 **Select an item, and press ENTER.**
"VR Mode": Formats DVD-RWs/DVD-Rs (VR mode or unrecorded discs) in VR mode.
"Video Mode": Formats DVD-RWs/DVD-Rs in Video mode.
"Format DVD+RW": Formats DVD+RWs.

6 **Select "Start," and press ENTER.**
All contents on the disc are erased.

Hint
By reformatting, you can change the recording format on DVD-RWs, or record again on DVD-RWs that have been finalised.

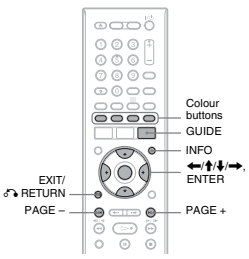
EPG (Electronic Programme Guide)

The Electronic Programme Guide is a guide showing the television programme schedule for a day or more at a time on your television (via the Digital Terrestrial Television tuner included in this recorder).

The EPG provides a quick and easy way to:
- View a complete list of all available channels.
- View a channel list related to a chosen date or genre.
- Set a programme to be recorded (page 55).

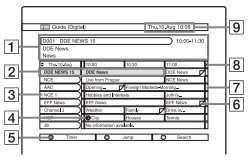
Note
Digital Services availability and content depend on the broadcaster.
Digital Services are not instantly available when the recorder is first turned on.

Viewing a list of available channels



1 **Press GUIDE.**
This display consists of an information box and an 8-channel programme list covering a 30-minute period.

Example of EPG Display:



1 Indicates the currently selected channel number and station name with the programme title and genre.

2 Indicates the currently selected programme and allows you to move around the list.

3 Channel name

4 Indicates if a timer recording is associated with the programme (page 55).

5 Colour buttons

6 Indicates that short programmes that are not displayed on the list are scheduled.

7 Truncated programme title in case the name is too long to be displayed in the cell.

8 Time slot

9 Indicates the current time and date.

2 **Select a programme using ←/↑/↓/→, and press ENTER.**
You can also select a programme using the red button.
If you press → after selecting the last programme on the right, the schedule for the next 30 minutes is displayed (depending on availability from the broadcaster).

Hint
You can display the channel list by pressing the ENTER button while watching a programme. To watch another channel, select a channel using ←/↑/↓/→, and press ENTER.

Available buttons in the programme list

Buttons	Operations
PAGE +/–	Display the previous/next eight channels.
INFO	Display the detailed information of the programme (page 49).
↩ RETURN	Close the display.

To search for programmes by date

1 Press the green button while the programme list is displayed.

2 Select a date in the "Date" row.

3 Select a time in the "Time" row.

4 Select "Jump," and press ENTER.
The programme list for the specified date and time is displayed.

To search programmes by genre

1 Press the yellow button while the programme list is displayed.

2 Select a date in the "Date" row.

3 Select a time in the "Time" row.

4 Select the "Genre" row, and press ENTER.
The genre list is displayed.

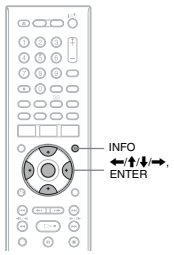
5 Select a genre using ←/↑/↓/→, and press ENTER.

6 Select "OK," and press ENTER.

7 Select "Search," and press ENTER.
The programme list for the specified genre is displayed.

Programme Information

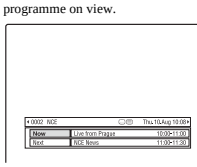
The programme information display provides a quick and easy way to:
- View descriptions of the programmes being broadcast now and next on the current channel.
- View descriptions of the programmes being broadcast now and next on the other channels.



Displaying the programme information

1 **Select a channel.**

2 **Press INFO.**
The Information display appears showing a description of the current programme on view.



→continued

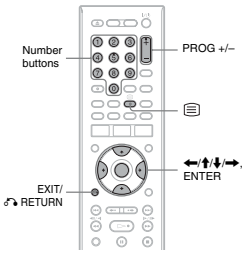
Available buttons in the Information display

Buttons	Operations
↑/↓	Toggle the display between description of the current/ next programme
←/→	Display programme information for other channels
ENTER	View the selected channel
INFO	Display the detailed programme information

Viewing a Digital Text Service

Many digital TV channels broadcast information via their text service. This digital service includes high-quality digital text and graphics along with advanced navigation options. Additionally, this recorder has access to dedicated text channels transmitted by the broadcasters.

Note
The appearance, content and navigation methods of all digital text services are decided by the broadcaster.



Selecting digital text from dedicated digital teletext channels

1 Select a dedicated channel that is broadcasting digital text.
You can search for a dedicated digital text channel using the "Electronic Programme Guide" (page 48).
The text page is displayed.

2 Once the text page is displayed (this may take some time), follow the on-screen instructions to obtain your required selection.
On some pages the TV programme may also be displayed on the text screen. On-screen instructions will inform you how to change the displayed programme.
If you are instructed to press "OK" or "Select" when viewing the text pages, press ENTER.

To exit the text service
Follow the on-screen instructions, or press PROG +/–.

Selecting digital text from other channels

Digital text services may also be available on other digital channels. This is sometimes indicated by a small symbol on your TV screen, superimposed on the programme you are watching.

1 Select a channel.

2 Press (text) or the button indicated on screen by the broadcaster.
The text information appears.

3 Access required information using ←/↑/↓/→, the colour buttons and/ or the number buttons.
If you are instructed to press "OK" or "Select" when viewing the text pages, press ENTER.

To exit the text service
Follow the on-screen instructions, or press (text) or EXIT/↶ RETURN.

Timer Recording
(For Freeview users only)

Before Recording

Before you start recording…
- Check that the disc has enough available space for the recording (page 40). For the HDD, DVD+RWs, and DVD-RWs, you can free up disc space by erasing titles (page 92).
- Adjust the recording picture quality if necessary (page 59).

Notes
- To play a recorded disc on other DVD equipment, finalise the disc (page 45).
- If digital teletext is operated while recording, its contents will be recorded on the disc.
- If the subtitles are displayed while recording, they will be recorded on the disc.

Recording mode

Like the standard ×3 recording modes of video tapes, you can select the desired recording mode using the REC MODE button.
Recording modes with higher quality provide a more beautiful recording, but the large data volume also results in a shorter recording time.
Conversely, a longer duration provides a longer recording time, but the lower data volume results in a coarser picture quality.

Press REC MODE repeatedly to switch the recording modes.
To select further options for recording mode (manual recording mode), set "Manual Rec. Mode" to "On (go to setup)" in the "Recording" setup (page 141). To record pictures in higher quality than HQ mode on the HDD, set "Manual Rec. Mode" to "On (go to setup)," and then select "HQ+." For details about manual recording mode, see page 141.
For timer recording, you can also select "AUTO" as recording mode, which maximizes the recording quality for the space available on the disc (if recording to DVD), or to fit onto a blank disc (if recording to HDD).

Recording mode		Approx. recording time (hours)				
		HDD				DVD*1
		RDR-HXD 770	RDR-HXD 870	RDR-HXD 970	RDR-HXD 1070	
HQ (High quality)		25	34	53	105	1 hr. 1 min.
HSP	↑	37	50	79	155	1 hr. 30 min.
SP (Standard mode)		51	68	105	210	2
LSP	↓	63	84	130	265	2 hr. 30 min.
ESP	↓	75	100	155	315	3
LP	↓	100	135	210	420	4
EP	↓	150	200	315	635	6
SLP	↓	200	270	425	850	8
SEP*2 (Long duration)		255	340	530	1060	10

*1 The approximate recording time is for 12 cm DVD discs.
The approximate recording times for DVD+R DL (Double Layer)/DVD-R DL (Dual Layer) discs are as follows:
HQ: 1 hour 51 minutes
HSP: 2 hours 41 minutes
SP: 3 hours 35 minutes
LSP: 4 hours 29 minutes
ESP: 5 hours 23 minutes
LP: 7 hours 11 minutes
EP: 10 hours 46 minutes
SLP: 14 hours 21 minutes
SEP: 17 hours 57 minutes

*2 When recording to DVD+RW or DVD+R, SLP is the longest recording time available. If you select SEP, the recording mode will automatically revert to SLP.

Hint
To easily select a manual recording mode, press REC MODE repeatedly to display "MN," and select a manual recording mode using ←/→.

Notes
- The maximum continuous recording time to the HDD is 12 hours for a single title. A title longer than 12 hours is divided.
- Situations below may cause slight inaccuracies with the recording time.
  – Recording a programme with poor reception, or a programme or video source of low picture quality.
  – Recording on a disc that has already been edited.
  – Recording only a still picture or just sound.
- Programmes are recorded in the following aspect ratio.
  – In the original aspect ratio, when recording to the HDD (when "HDD Recording Format" is set to "Video Mode Off" in the "Recording" setup (page 144))/DVD-RWs/DVD-Rs (VR mode).
  – In 4:3 when recording to DVD+RWs/DVD+Rs.
- When recording to DVD-R DLs (Video mode), the title is divided when the layer switches.

Unrecordable pictures

Pictures with copy protection cannot be recorded on this recorder.

Copy control signals	Recordable discs
Copy-Free	HDD +RW -RWVR -RWVideo +R -RVR -RVideo
Copy-Once	HDD -RWVR (CPRM*) -RVR (CPRM*)
Copy-Never	None

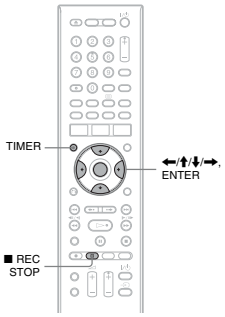
* The recorded disc can be played only on CPRM compatible equipment (page 10).

Timer Recording (Standard/EPG)

HDD +RW -RWVR -RWVideo +R -RVR -RVideo

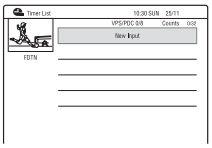
You can set the timer for a total of 32 programmes, up to 30 days in advance.
There are three methods to set the timer: the standard method, EPG method and Series Recording method.
- Standard: Set the date, time, and programme position of the programme manually.
- EPG: Set a programme to be recorded based on the information provided by the EPG (Electronic Programme Guide) (page 55).
- Series Recording: Automatically sets the recorder to record programmes in a series (page 57).

Setting the timer manually (Standard)

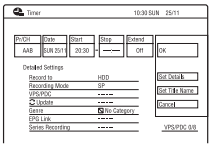


→continued

1 Press TIMER.
The “Timer List” display appears.



2 Select the “New Input” row, and press ENTER.



3 Select an item using ←/→ and adjust using ↑/↓. Then press ENTER.
The adjustable items are listed below.
“Pr/CH”: Sets the programme position and the source.
“Date”: Sets the date (up to 30 days later). Select a recording pattern by pressing ↑ repeatedly to set the timer for the same daily or weekly programmes.
“Start”: Sets the start time.
“Stop”: Sets the stop time.
“Extend”: Sets duration when a timer recording is in progress. If the programme set to be recorded daily or weekly is extended, the manually extended time set here will be added to the subsequent timer recording times. Note that when “VPS/PDC” is set to “On,” you cannot make the “Extend” setting.
• If you want to make the detailed settings, select “Set Details” and press ENTER. Select an item using ↑/↓ and set using ←/→.
“Record to”: Sets the recording destination. If there is not enough available DVD disc space for the recording, the recorder automatically records the programme to the HDD even if you select “DVD” (Recovery Recording).
“Recording Mode”: Sets the recording mode (page 52).
“VPS/PDC”: Sets the VPS/PDC function. See “About the VPS/PDC function (For analogue broadcasting only)” below.
“Update”: Sets the recorder automatically replacing the previous timer recording with the new one.
“EPG Link” (page 58)
“Series Recording” (page 57)
• To enter a title name, select “Set Title Name” and press ENTER (page 42).
• If you make a mistake, select the item and change the setting.

4 Select “OK,” and press ENTER.
The “Timer List” display (page 60) appears.
The timer recording indicator lights up on the front panel display and the recorder is ready to start recording. Unlike a VCR, there is no need to turn off the recorder before the timer recording starts.

To stop recording during timer recording
Press ■ REC STOP.
Note that it may take a few seconds for the recorder to stop recording.
On-screen instructions may appear after pressing ■ REC STOP. In this case, follow the on-screen instructions.

About the VPS/PDC function (For analogue broadcasting only)
VPS/PDC signals are transmitted with TV programmes in some broadcast systems. These signals ensure that timer recordings are made regardless of any broadcast delays, early starts, or broadcast interruptions.

◆To use the VPS/PDC function
Set “VPS/PDC” to “On” in step 3 above. When you turn on this function, the recorder starts scanning the channels before the timer recording starts.

Rec. Mode Adjust
If there is not enough available disc space for the recording, the recorder automatically adjusts the recording mode to enable the entire programme to be recorded. Set “Rec. Mode Adjust” to “On” in the “Recording” setup (page 143).

If the timer settings overlap
The confirmation screen appears.
To store the setting, select “Yes.”
To cancel the overlapped setting, select “No.”

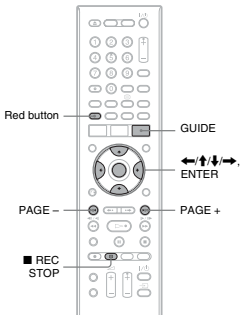
To confirm, change, or cancel a timer recording
See “Checking/Changing/Cancelling Timer Settings (Timer List)” on page 60.

Hints
• You can also display the Timer display by selecting “Timer Recording” from the System Menu.
• You can play the title as it is being recorded by selecting the programme title on the Title List (page 88).

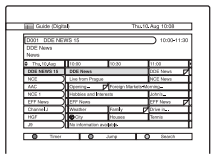
Notes
• If a message indicating that the HDD is full appears on the screen, change the recording destination to “DVD,” or make available space for the recording (page 92).
• Check that the clock is correctly set before setting the timer recording. If not, the timer recording cannot be made.
• To record a satellite programme, turn on the satellite tuner and select the satellite programme you want to record. Leave the satellite tuner turned on until the recorder finishes recording.
• Even if the timer is set for the same daily or weekly programme, the timer recording cannot be made if it overlaps with a programme that has priority. “Overlap” will appear next to the overlapped setting in the Timer List. Check the priority order of the settings (page 60).
• Even if the timer is set, timer recordings cannot be made while recording a programme that has priority.
• The beginning of some recordings may not be made when using the VPS/PDC function.
• You cannot extend the recording duration time when “VPS/PDC” is set to “On.”
• The “Rec. Mode Adjust” function only works with a timer recording and the VPS/PDC function set to off. It does not function with Quick Timer.
• The recording mode cannot be set to “AUTO” when “VPS/PDC” is set to “On.”

Recording TV programmes using the EPG

The EPG function is a feature that simplifies setting the timer. Just select the programme you want to record in the EPG display. The date, time, and channel of that programme are set automatically.

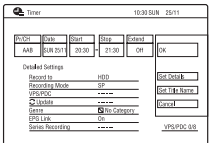


1 Press GUIDE.



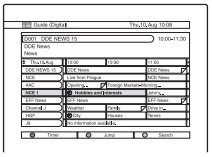
2 Select a programme using ←/↑/↓/→.
To know more about the navigation options in the EPG application, see page 48.

3 Press the red button.
The date, start and stop times, programme position, recording mode, etc., settings appear.



• If you want to change the setting, press ←/→ to select the item and press ↑/↓ to change the setting (page 54).
“EPG Link” (page 58)
“Series Recording” (page 57)

4 Select “OK,” and press ENTER.
• In case of a current TV/radio/data broadcast timer setting, your recorder will immediately start recording.



Your recorder will automatically begin recording when the programme starts. To modify the timer setting, see page 60.

◆Some examples of timer event icon types are:
(red): Indicates that the whole programme is set to be recorded.
(grey): Indicates that the programme is set to be recorded using Series Recording (page 57).

To scroll the EPG display by page (Page mode)
Press PAGE +/– while the EPG display is turned on to display the previous/next eight channels.

To stop recording during timer recording
Press ■ REC STOP.
Note that it may take a few seconds for the recorder to stop recording.
On-screen instructions may appear after pressing ■ REC STOP. In this case, follow the on-screen instructions.

If the timer settings overlap
See page 55.

To extend the recording duration time while recording (only when “EPG Link” is set to “Off”)
See page 54.

To confirm, change, or cancel timer recording (only when “EPG Link” is set to “Off”)
See “Checking/Changing/Cancelling Timer Settings (Timer List)” (page 60).

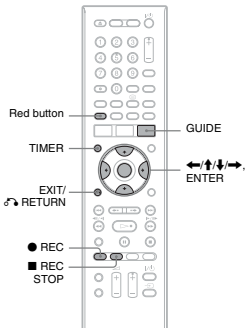
Hint
The “Rec. Mode Adjust” function also works with this timer method (page 55).

Note
The EPG programme start and end time are determined by the broadcaster.

Recording programmes using Series Recording

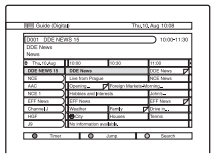
Series Recording is a feature which uses information from the Electronic Programme Guide.

Notes
• This function cannot be used when the broadcaster does not include series information with the programme data.
• Whether or not a programme is in a series is determined by the broadcaster.



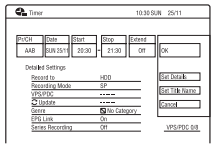
Series Recording
Automatically record programmes in a series.

1 Press GUIDE.



2 Select a programme using ←/↑/↓/→.

3 Press the red button.
The date, start and stop times, programme position, recording mode, etc., settings appear.



4 Select “Set Details,” and press ENTER.

5 Set “Series Recording” to “On,” and press ↶ RETURN.

6 Select “OK,” and press ENTER.
The selected programme is set for recording and appears in the Timer List (page 60). The other programmes in the series will be set for recording (appear in the Timer List) as each previous recording is completed.
For example, if there are three programmes in a series, the second programme will be set for recording only after the first recording is finished. The third programme will be set for recording only after the second recording is finished.
You can search for link programmes using “Series Search” (page 58).

EPG Link
Automatically update the date, start and stop times settings when changing the Electronic Programme Guide.

Set “EPG Link” to “On” in step 5 of “Series Recording” on page 57.

◆Recording Split Programmes
Movies and other programmes that are split into 2 or more parts are called Split Programmes. If you set the timer for one part of a Split Programme, the other parts are automatically recorded. For example, if the first half is set to be recorded, the last half will be recorded automatically.

◆To search for link programmes

1 Press TIMER.
2 Select the timer setting, and press ➡.
3 When the following options appear in the sub-menu, select an option, and press ENTER.
“Alternate Search”: Searches for repeat programmes. The repeat programmes are displayed in the EPG.
“Series Search”: Searches for programmes in a series. The programmes in the series are displayed in the EPG.
“Recommendation Search”: Searches for programmes recommended by broadcaster as a link for current series. The recommended programmes are displayed in the EPG.

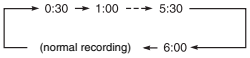
To set the programme for recording, follow the instructions for “Recording TV programmes using the EPG” (page 55) from step 2.

Notes
- Only the earliest part of the Split Programme is displayed on the Timer List.
- Any next Split Programme part that starts 3 or more hours later cannot be recorded automatically.
- This recorder is featured with an EPG timer auto extend functionality that allows EPG timer recordings to be made in case of an early start (before the scheduled start time) or late finish (after the scheduled end time).
- When “EPG Link” is set to “On,” you cannot change the date, start and stop time settings.

Using the Quick Timer function

You can set the recorder to record in 30-minute increments.

Press ● REC repeatedly to set the duration.
Each press advances the time in 30-minute increments. The maximum duration is six hours.



The time counter decreases minute by minute to 0:00, then the recorder stops recording (the power turns off).

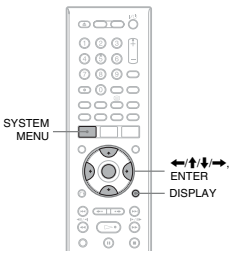
To cancel the Quick Timer
Press ● REC repeatedly until the counter appears in the front panel display. The recorder returns to normal recording mode. To stop recording, press ■ REC STOP.

Note
If you turn off the recorder during recording, recording is stopped.

Adjusting the recording picture quality

You can adjust the picture quality of digitally broadcasts programmes by selecting a preset setting. You can also adjust the picture quality by changing detailed settings, and store up to three settings in the memory.

Note
Only progressive video signals for recording can be adjusted.



1 Press SYSTEM MENU in stop mode.
The System Menu appears.
2 Select “Picture Adjustment,” and press ENTER.
3 Select a preset setting, and press ENTER.
“Tuner”: TV broadcasts
“VCR”: Video cassettes
“DTV”: Digital broadcasts
“Memory1”/“Memory2”/“Memory3”: Your own settings. To create your own settings, see “To create your own setting” on page 59.
To check the detailed settings for the selected preset, press DISPLAY.
4 Press SYSTEM MENU to exit.

To create your own setting

1 Select “Memory1,” “Memory2,” or “Memory3” in step 3.
2 Select “Detailed Settings,” and press ENTER.
The display for adjusting detailed settings appears.
3 Select an item using ↑/↓, and adjust settings using ←/→.
For details about each setting, see the explanation of the display.
“Prog. Motion”: Adjusts the progressive video signal when “Component Video Out” is set to “Progressive” (page 136).
Select “Motion” for a picture, including subjects that move dynamically.
Select “Still” for a picture with little movement.
“Cinema”: Converts the progressive video signal to match the type of DVD software that you are watching when “Component Video Out” is set to “Progressive” (page 136).
Select “Auto” to detect the software type (Film-based or Video-based) automatically and select the appropriate conversion mode. Normally select this position.
Select “Off” to fix the conversion mode to the mode for Video-based software.
4 Press SYSTEM MENU to exit.
The setting is automatically stored as the setting you selected in step 1.

Creating chapters in a title

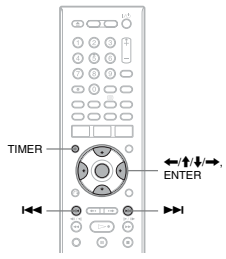
The recorder can automatically divide a recording (a title) into chapters by inserting chapter marks. To select chapter mark intervals or disable this function, see “Auto Chapter (HDD/VR),” “Auto Chapter (Video),” or “Auto Chapter (DVD+R/+RW)” in the “Recording” setup (page 143).
When recording to the HDD, a DVD-R (VR mode) or a DVD-RW (VR mode), you can edit chapter marks (page 95).

Checking/Changing/Cancelling Timer Settings (Timer List)

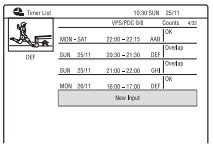
HDD +RW -RWVR -RWVideo +R -RVR -RVideo

You can check, change, or cancel the timer settings using the Timer List.

Note
You cannot change the timer settings with “EPG Link” set to “On.”



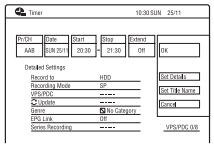
1 Press TIMER.
The “Timer List” display appears.



Timer information displays the recording date, time, recording mode, etc.

When all of the timer settings do not fit on the list, the scroll bar appears.
To view the hidden timer settings, press ↑/↓.

2 Select the timer setting you want to check/change/cancel, and press ➡.
The sub-menu appears.
3 Select an option, and press ENTER.
“Modify”:
Changes the timer setting.
Select an item using ←/➡ and adjust using ↑/↓. Select “OK” and press ENTER.



“Erase”:
Erases the timer setting.
Select “Yes” and press ENTER.
“Skip Once”:
Cancels the daily or weekly recordings only once. After cancelling the timer setting, “Skip Once” appears next to the timer setting in the Timer List.
“Alternate Search” (page 58)
“Series Search” (page 58)
“Recommendation Search” (page 58)
To change or cancel the setting, repeat steps 2 and 3 above.

When the timer settings overlap
- The programme that starts first has priority and the entire programme is recorded.
- After finishing the previous recording, the other recording starts with several tens-of-second’s delay (when the end-time of one recording and the start-time of another are the same).
- When the recordings start at the same time, only one of them will be recorded. Cancel the timer setting for the programme that you are not going to record.

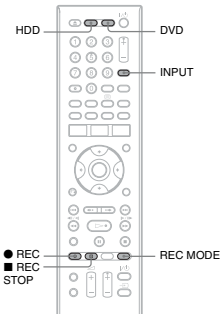
Hints
- For manual timer settings, you cannot modify the timer setting for the current recording, but you can extend the duration of the recording time while recording (page 56).
For timer settings using the EPG, you can modify the timer setting for the current recording while recording, and extend the duration of the recording (only when “EPG Link” is set to “Off”).
- You can move to the first row/bottom row of the Timer List using I◀◀/▶▶I while the list is displayed.

Notes
- When “VPS/PDC” is set to “On” for one or more timer recordings, the start times may change in the event of a broadcast delay or early start.
- Even if the timer is set, timer recordings cannot be made while recording a programme that has priority.
- Even if the timer is set for the same daily or weekly programme, the timer recording cannot be made if it overlaps with a programme that has priority. “Overlap” will appear next to the overlapped setting in the Timer List. Check the priority order of the settings.

Recording from Connected Equipment

HDD +RW -RWVR -RWVideo +R -RVR -RVideo

You can record from a connected VCR or similar device. To connect a VCR or similar device, see “Connecting a VCR or Similar Device” on page 31. Use the DV IN jack on the front panel if the equipment has a DV output jack (i.LINK jack).



1 Press HDD or DVD.
If you select DVD, insert a recordable DVD (see “1. Inserting a Disc” on page 36).
2 Press INPUT to select an input source according to the connection you made.
The front panel display changes as follows:

➡continued

3 Select the desired audio signal when recording a bilingual programme to the HDD or DVD-RWs/DVD-Rs (Video mode).
Set “External Audio” to “Bilingual” and “Bilingual Recording” to “A/L” or “B/R” in the “Audio In” setup (page 138).

4 Press REC MODE repeatedly to select the recording mode.
For details about the recording mode, see page 52.

5 Insert the source tape into the connected equipment and set to playback pause.

6 Press ● REC.
This recorder starts recording.

7 Press the pause (or play) button on the connected equipment to cancel the playback pause status.
The connected equipment starts playback and the playback image is recorded by this recorder.
To stop recording, press ■ REC STOP on this recorder.

If you connect a digital video camera with a DV IN jack
See “DV Camcorder Dubbing” on page 104 for an explanation of how to record from the DV IN jack.

Hint
You can adjust the settings for the recording picture before recording. See “Adjusting the recording picture quality” on page 59.

Notes
- When recording a video game image, the screen may not be clear.
- Any programme that contains a Copy-Never copy guard signal cannot be recorded.
- When “Bilingual Recording” is set to “A/L” or “B/R” in step 3, you cannot select the sound when playing in the following cases.
  – When recording in PCM mode.
  – When recording to the HDD (“HDD Recording Format” is set to “Video Mode On” in the “Recording” setup (page 144))/DVD+RW/DVD+R/DVD-RW/DVD-R (Video mode).
- You cannot select “L1” in step 2 if “LINE 1 In” is set to “Decoder” in the “Video In/Out” setup (page 137).

GUIDE Plus+ (For analogue broadcasting only)

Introduction to the GUIDE Plus+ System

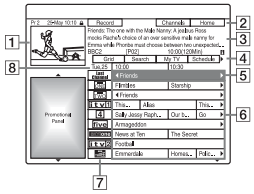
The GUIDE Plus+® system is a free interactive programme guide. It displays up to seven days of programme listings, including programme titles, promotions, and broadcast information. GUIDE Plus+ data for the television programme listings are carried by your local broadcast host channel and are received through your aerial, set top box receiver, or direct cable connection from the wall.
Visit www.europe.guideplus.com for a list of all European host channels.

These are just a few of the ways to use the GUIDE Plus+ system.
– Search for programmes by listing them according to category (such as Movies or Sport) or by using the Keyword Search function (page 66).
– Once you have found the programme you are looking for, use the GUIDE Plus+ system to set the timer for recording (page 73).
– You can set the system to display your favourite programmes according to conditions that you set, such as category and keyword (page 67).

For more information, see “Watching TV Using the GUIDE Plus+ System” (page 65).

Learning the common elements

Press GUIDE.
The GUIDE Plus+ system “Home Screen” appears.



1 Video Window: This shows the programme you were watching when you pressed GUIDE.

2 Action Bar: When the same colour button on the remote is pressed, the Action Bar functions. The Action Bar function differs according to the screen.

3 Information Box: Shows information about the selected programme when the “Home Screen” is displayed. Contents will differ according to the displayed screen.

4 Menu Bar: Press the blue button (“Home”), and press ↑ to move the cursor to the Menu Bar. Then select one of the following features using ←/→, and press ENTER.
“Grid”: Shows the programmes for the current time slot and next 7 days.
“Search”: Allows you to search for titles by category or by keyword (page 66). The displayed category depends upon the programme data received by this recorder. Movies, Sport, and Children are examples of possible categories.
“My TV”: Sets the profile for your favourite programmes (page 67).
“Schedule”: Displays the list of timer settings (page 77).

→continued

“Info”: Shows information when available.
“Editor”: Allows you to edit the channel lineup and channel display (page 69).
“Setup”: Allows you to change the language, country/region, postal code, input source, or host channel.

5 “Home” position: When you press the blue button (“Home”), the cursor returns to the last programme position on the “Grid.”

6 Tiles: Shows the programme titles and category; green (sports), purple (movies), blue (children’s), teal (others).

7 Broadcast station Logo: Shows the broadcast station logo.

8 Time Slot: Indicates the currently selected time slot. Use ←/→ to select a different time slot.

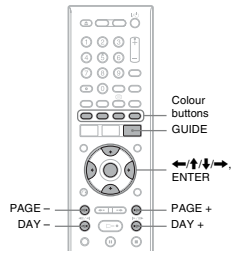
Hint
You can also move the cursor to the Menu Bar by pressing MENU.

Troubleshooting guide

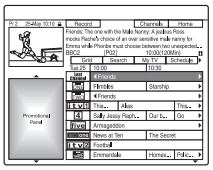
If you are having trouble displaying the television programme list, please check the following:
- The clock must be set correctly. If the clock is not set, set it manually (page 129).
- This recorder downloads the GUIDE Plus+ data several times a day when the recorder is turned off (standby mode). Turn off the recorder when you are not using it (for example, at night). After initial setup (page 26), it may take up to 24 hours for your recorder to start receiving programme listings. It may take up to one day to receive all seven days of TV programme listings.
- Check the following if the programme guide data has not been received after waiting for a day:
  – “Easy Setup” (page 26) is completed.
  – The host channel is not disabled (see “Disabling programme positions” on page 70).
  – The timer is not set.
  If the programme guide data still cannot be received after checking the above, search for the host channel at the following website and set the host channel manually (page 69):
  www.europe.guideplus.com
- If the host channel has changed or moved, the programme guide data cannot be received. In this case, follow the steps in “Searching for the GUIDE Plus+ host channel” (page 68) to update the host channel setting.
- If the set top box receiver is connected to the recorder using a SCART cord only, do the following:
  – Turn on your set top box receiver.
  – Connect the set top box controller.
  – Follow the steps in “Changing the GUIDE Plus+ host channel manually” (page 69) to set the host channel manually. Be sure to set your set top box receiver (tuner) as the source.

Notes
- Your set top box receiver’s programme position may suddenly change even if the recorder is turned off. This is because the set top box controller has changed the programme position to receive the GUIDE Plus+ data.
- When you reset the recorder (page 158) the following GUIDE Plus+ system settings are reset:
  – Country/region setting in “Easy Setup”
  – “Country” of “Setup” - “Basic Setup” in the Menu Bar
  – “Postal Code” of “Setup” - “Basic Setup” in the Menu Bar
  Note that the GUIDE Plus+ system is also reset when you make changes to the host channel settings.
- The GUIDE Plus+ system cannot be used when “Input Line System” is set to “NTSC” in the “Basic” setup (page 130).

Watching TV Using the GUIDE Plus+ System



1 Press GUIDE.
The GUIDE Plus+ system “Home Screen” appears.

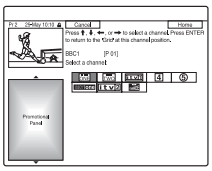


2 Select a programme using ←/↑/↓/→, and press ENTER.
The GUIDE Plus+ system disappears and the programme position changes to the selected programme.

To select a programme position quickly using the TV broadcast station logo

1 Press GUIDE.
The GUIDE Plus+ system “Home Screen” appears.

2 Press the yellow button (“Channels”).



3 Select the TV broadcast station logo using ←/↑/↓/→, and press ENTER.
The display returns to “Grid” and the programme currently being broadcast by the selected TV station is selected.

4 Select a programme using ←/→, and press ENTER.

To return to the “Home” position
Press the blue button (“Home”).
The cursor returns to the home position on the “Grid.”

To set a programme for timer recording
See “One Button Recording (GUIDE Plus+ (in the UK only))” (page 73).

To close the GUIDE Plus+ system
Press GUIDE.

Hints
- Press the PAGE +/– buttons to change the programme list by page.
- Press the DAY +/– buttons to change the programme list by day.

→continued

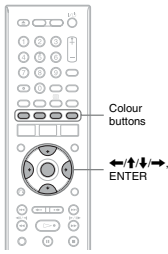
To unlock the Video Window

The Video Window is locked so that it does not change programme positions when you move the cursor across other titles.
From “Grid,” select the logo of the programme position that is locked, and press the red button (“Unlock”). “🔒” changes to “🔓” and the Video Window is unlocked. To lock the Video Window, select the logo of the programme position you want to lock and press the red button (“Lock”).

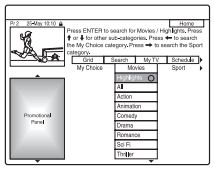
Notes

- The Video Window is locked during recording and the lock indicator appears in the Video Window. You cannot unlock the Video Window while recording.
- If you are watching programmes through a set top box receiver, the Video Window may not change as fast as you move the cursor. In this case, lock the Video Window (page 66).

Searching for a Programme Using the GUIDE Plus+ System



1 Select “Search” in the Menu Bar, and press ENTER.



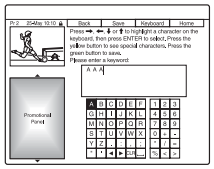
2 Select a category using ←/→.
To search for a programme by keyword, select “My Choice.” You can search for all programmes that contain the keyword in the programme’s title and in the programme’s Information Box. If no keywords are displayed, enter the keyword. See “To enter a new keyword” below.

3 Select a sub-category using ↑/↓, and press ENTER.
Programmes that meet the conditions are listed.
The sub-categories differ according to country/region.

4 Select a programme using ↑/↓, and press ENTER.

To enter a new keyword

1 Select “Search” in the Menu Bar, and press ENTER.
2 Select “My Choice” using ←/→.
3 Press the yellow button (“Add”).
The display for entering characters appears.



4 Select a character on the keyboard using ←/↑/↓/→, and press ENTER.
To switch between upper-case, lower-case, or characters with accents, press the yellow button (“Keyboard”) repeatedly.
To cancel entering a new keyword, press the red button (“Back”).
5 Repeat step 4 to enter the keyword.
6 Press the green button (“Save”).
The entered keyword is registered.
To delete the keyword, select the keyword you want to delete, and press the red button (“Delete”).
To change the keyword, select the keyword you want to change, and press the green button (“Edit”).

To set a programme for timer recording

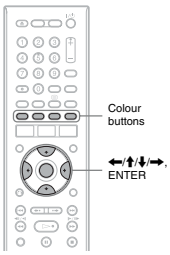
See “One Button Recording (GUIDE Plus+ (in the UK only))” (page 73).

Hint

When two or more keywords are set for “My Choice,” you can select “All” for sub-category.

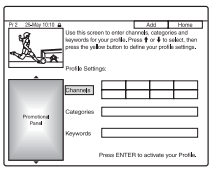
Listing Up Your Favourite Programme Information (My TV)

You can set a profile and list up only your favourite programme information.



Setting a profile

1 Select “My TV” in the Menu Bar, and press the yellow button (“Profile”).



2 Select “Channels,” “Categories,” or “Keywords,” and press the yellow button (“Add”).
“Channels”: Select the programme position using ←/↑/↓/→, and press ENTER. To add more programme positions, press the yellow button (“Add”). You can register up to 16 programme positions.
To cancel the registration, select a programme position, and press the red button (“Delete”).
“Categories”: Select the category using ←/↑/↓/→, and press ENTER. To add more categories, press the yellow button (“Add”). You can register up to 4 categories.
To cancel the registration, select a category, and press the red button (“Delete”).
“Keywords”: Enter a keyword. See “To enter a new keyword” on page 67. To add more keywords, press the yellow button (“Add”). You can register up to 16 keywords.
To cancel the registration, select a keyword, and press the red button (“Delete”).
3 Press ENTER.

To change the profile settings

Repeat from step 1 above.

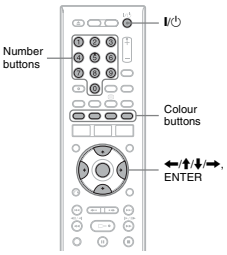
Selecting and watching a programme from My TV

1 Select “My TV” in the Menu Bar, and press ENTER.
The programmes that match the profile conditions are displayed.
2 Select a programme using ←/↑/↓/→, and press ENTER.

To set a programme for timer recording

See “One Button Recording (GUIDE Plus+ (in the UK only))” (page 73).

Making Changes to the GUIDE Plus+ System



Searching for the GUIDE Plus+ host channel

The default host channel setting is set to “Automatic,” so you should not have to change the host channel setting. However, if the host channel has changed or moved, update the host channel setting.
If the set top box receiver is connected to the recorder using a SCART cord only (page 17), see “Changing the GUIDE Plus+ host channel manually” on page 69.

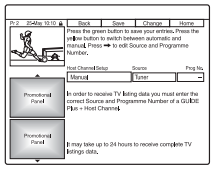
1 Select “Setup” in the Menu Bar.
The GUIDE Plus+ setup menu appears.
2 Select “Host Channel Setup” using ↑/↓, and press ENTER.
3 Press the yellow button (“Reset”).
4 Press I/⏻ to turn off the recorder.

5 Wait for one day until the programme guide data can be received.
If the programme guide data has not been received after waiting for a day, search for the host channel at the following website and set the host channel manually (“Changing the GUIDE Plus+ host channel manually” (page 69)).
www.europe.guideplus.com

Changing the GUIDE Plus+ host channel manually

If the set top box receiver is connected to the recorder using a SCART cord only and you want to receive the programme guide data from your set top box receiver, search for the host channel on the following website and set it for your area, following the steps below:
www.europe.guideplus.com

1 Select “Setup” in the Menu Bar.
The GUIDE Plus+ setup menu appears.
2 Select “Host Channel Setup” using ↑/↓, and press ENTER.
3 Press the yellow button (“Change”) twice.
“Manual” appears.



4 Select “Source” using →.
5 Press the yellow button (“Source”) repeatedly to select the input source.
6 Select “Prog. No.” using →.
7 Enter the programme position number using the number buttons.
8 Press the green button (“Save”).
The display asks for confirmation.

9 Select “Confirm” using ←/→, and press ENTER.
The display returns to the GUIDE Plus+ setup menu.
10 Wait one day until the programme guide data can be received.

To cancel the settings

Press the red button (“Back”).

To return to the “Home” position

Press the blue button (“Home”).
The cursor returns to the home position on the “Grid.”

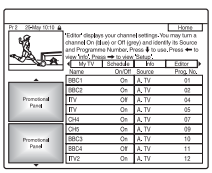
To check the GUIDE Plus+ system information

1 Select “Setup” in the Menu Bar, and press ENTER.
2 Select “GUIDE Plus+ system Information” using ↑/↓, and press ENTER.

Checking programme positions

Check whether programme position numbers are the same as the programme position numbers set in the “Analog Tuner” setup. If you want to make adjustments to the channel settings or change the channel name, see “Aerial Reception Settings (Analog Tuner)” (page 133).

1 Select “Editor” in the Menu Bar.



2 Press ENTER.
3 Press → to move the cursor to the right column.

4 Select the programme position you want to check using ↑/↓.

To change the input source, press the red button (“Source”).
To change the programme position, press the green button (“Prog. No.”), then enter a programme position number using the number buttons, and press ENTER.

Note

To receive from the recorder a programme position that can be received by either the set top box receiver or the recorder, change the input source in step 4.

Disabling programme positions

If any programme positions are unused or contain unwanted channels, you can hide them.

1 Select “Editor” in the Menu Bar, and press ENTER.

2 In the left column, select the programme position you want to hide or display using ↑/↓.

3 Press the red button (“On/Off”).

The disabled positions will turn grey.
To show the disabled positions, press the red button (“On/Off”) again.

Notes

- You cannot record a programme position if it is not set in “Aerial Reception Settings (Analog Tuner)” (page 133) even if it is set to “On” in the “Editor” in the Menu Bar.
- If you are using your set top box receiver to receive programmes (when the set top box receiver is connected to the recorder using a SCART cord only, page 17) and are able to receive the same programme with both the set top box receiver and the recorder, change the “Source” to receive the programme with the recorder’s tuner.

Notes

- The maximum continuous recording time to the HDD is 12 hours for a single title. A title longer than 12 hours is divided.
- Situations below may cause slight inaccuracies with the recording time.
  - Recording a programme with poor reception, or a programme or video source of low picture quality.
  - Recording on a disc that has already been edited.
  - Recording only a still picture or just sound.
- Programmes are recorded in the following aspect ratio.
  - In the original aspect ratio, when recording to the HDD (when “HDD Recording Format” is set to “Video Mode Off” in the “Recording” setup (page 144))/DVD-RWs/DVD-Rs (VR mode).
  - In 4:3 when recording to DVD+RWs/DVD+Rs.
- When recording to DVD-R DLs (Video mode), the title is divided when the layer switches.

Recording stereo and bilingual programmes

The recorder automatically receives and records stereo and bilingual programmes based on the ZWEITON system or the NICAM system.
The HDD (when “HDD Recording Format” is set to “Video Mode Off” in the “Recording” setup (page 144)) and a DVD-RW (VR mode) or DVD-R (VR mode) can record both main and sub sounds. You can switch between main and sub when playing the disc.
The HDD (when “HDD Recording Format” is set to “Video Mode On” in the “Recording” setup (page 144)) and a DVD+RW, DVD+R, DVD-RW (Video mode), or DVD-R (Video mode) can record only one sound track (main or sub) at a time. Select the sound track in the “Audio In” setup before recording starts. Set “Bilingual Recording” to “A/L” (default) or “B/R” in the “Audio In” setup (page 138).
About HDD Recording format, see page 144.

ZWEITON (German stereo) system

When a stereo-based programme is received, “Stereo” appears.
When a bilingual ZWEITON-based programme is received, “L,” “R,” or “L+R” appears.

NICAM system

To record a NICAM programme, be sure to set “NICAM Select” to “NICAM” (default) in the “Audio In” setup. If the sound is not clear when listening to NICAM broadcasts, set “NICAM Select” to “Standard” (page 137).

Hint

You can select the audio (main or sub) while recording bilingual programmes using the AUDIO button. This does not affect the recorded sound.

Unrecordable pictures

Pictures with copy protection cannot be recorded on this recorder.

Copy control signals	Recordable discs
Copy-Free	HDD +RW -RWVR -RWVideo +R -RVR -RVideo
Copy-Once	HDD -RWVR (CPRM*) -RVR (CPRM*)
Copy-Never	None

* The recorded disc can be played only on CPRM compatible equipment (page 10).

Timer Recording (For analogue broadcasting only)

Before Recording

Before you start recording…

- Check that the disc has enough available space for the recording (page 40). For the HDD, DVD+RWs, and DVD-RWs, you can free up disc space by erasing titles (page 92).
- Adjust the recording picture quality if necessary (page 76).

Note

To play a recorded disc on other DVD equipment, finalise the disc (page 45).

Recording mode

Like the standard ×3 recording modes of video tapes, you can select the desired recording mode using the REC MODE button.
Recording modes with higher quality provide a more beautiful recording, but the large data volume also results in a shorter recording time.
Conversely, a longer duration provides a longer recording time, but the lower data volume results in a coarser picture quality.

Press REC MODE repeatedly to switch the recording modes.

To select further options for recording mode (manual recording mode), set “Manual Rec. Mode” to “On (go to setup)” in the “Recording” setup (page 141). To record pictures in higher quality than HQ mode on the HDD, set “Manual Rec. Mode” to “On (go to setup),” and then select “HQ+.” For details about manual recording mode, see page 141.
For timer recording, you can also select “AUTO” as recording mode, which maximizes the recording quality for the space available on the disc (if recording to DVD), or to fit onto a blank disc (if recording to HDD).

Recording mode	Approx. recording time (hours) HDD RDR-HXD770	RDR-HXD870	RDR-HXD970	RDR-HXD1070	DVD*1
HQ (High quality)	25	34	53	105	1 hr. 1 min.
HSP ↑	37	50	79	155	1 hr. 30 min.
SP (Standard mode)	51	68	105	210	2
LSP ↓	63	84	130	265	2 hr. 30 min.
ESP ↓	75	100	155	315	3
LP ↓	100	135	210	420	4
EP ↓	150	200	315	635	6
SLP ↓	200	270	425	850	8
SEP*2 (Long duration)	255	340	530	1060	10

*1 The approximate recording time is for 12 cm DVD discs.
The approximate recording times for DVD+R DL (Double Layer)/DVD-R DL (Dual Layer) discs are as follows:
HQ: 1 hour 51 minutes
HSP: 2 hours 41 minutes
SP: 3 hours 35 minutes
LSP: 4 hours 29 minutes
ESP: 5 hours 23 minutes
LP: 7 hours 11 minutes
EP: 10 hours 46 minutes
SLP: 14 hours 21 minutes
SEP: 17 hours 57 minutes

*2 When recording to DVD+RW or DVD+R, SLP is the longest recording time available. If you select SEP, the recording mode will automatically revert to SLP.

Hint

To easily select a manual recording mode, press REC MODE repeatedly to display “MN,” and select a manual recording mode using ←/→.

➡continued

Timer Recording (GUIDE Plus+/Manual)

HDD +RW -RWVR -RWVideo +R -RVR -RVideo

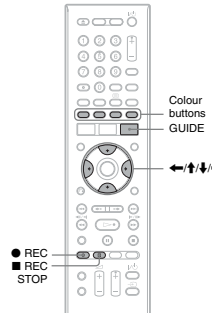
There are two methods to set the timer within the GUIDE Plus+ system: One Button Recording and setting the timer manually. You can set the timer for a total of 32 programmes (8 programmes when using the VPS/PDC function), up to 30 days in advance.

Notes

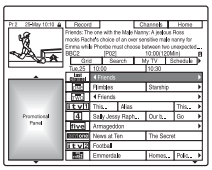
- When the recorder is connected to a set top box receiver and you want to record using the GUIDE Plus+ system, turn on the set top box receiver and connect the set top box controller.
- Do not operate your set top box receiver just before or during a timer recording. This may prevent the accurate recording of a programme.

One Button Recording (GUIDE Plus+ (in the UK only))

You can use the GUIDE Plus+ system to set the timer to record a programme up to seven days in advance.



1 Press GUIDE.



2 Select a programme using ←/↑/↓/→.

To search for a programme by category or by keyword, select “Search” in the Menu Bar. See “Searching for a Programme Using the GUIDE Plus+ System” on page 66 for more information about searching for a programme.
You can select a programme from “My TV” (page 67).

3 Press the red button (“Record”) or ● REC.

The set programme and Time Slot change colour and the recorder is ready to start recording. When recording from a set top box receiver, be sure to turn it on. Unlike a VCR, there is no need to turn off the recorder before the timer recording starts.

- To record on a DVD
  See “Checking/Changing/Cancelling Timer Settings” on page 77.
- To make more detailed timer settings
  See “Checking/Changing/Cancelling Timer Settings” on page 77.

To confirm, change, or cancel a timer recording

See “Checking/Changing/Cancelling Timer Settings” on page 77.

To stop recording during timer recording

Press ■ REC STOP.
Note that it may take a few seconds for the recorder to stop recording.
On-screen instructions may appear after pressing ■ REC STOP. In this case, follow the on-screen instructions.

➡continued

Rec. Mode Adjust

If there is not enough available disc space for the recording, the recorder automatically adjusts the recording mode to enable the entire programme to be recorded. Set “Rec. Mode Adjust” to “On” in the “Recording” setup (page 143).

If the timer settings overlap

If one or more timer settings overlap, a message appears. To change the timer settings, see “Checking/Changing/Cancelling Timer Settings” on page 77.

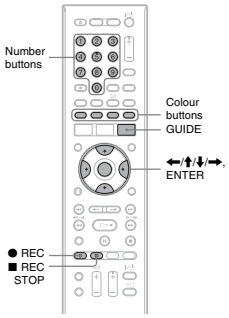
Hint

If you are recording to the HDD, you can play the title as it is being recorded by selecting the programme title on the Title List (page 88).

Notes

- If a message indicating that the HDD is full appears on the screen, change the recording destination to “DVD,” or make available space for the recording (page 92).
- If there is not enough available DVD disc space for the recording, the recorder automatically records the programme to the HDD even if you select “DVD” (Recovery Recording).
- The last recording mode you selected manually becomes the default recording mode for timer recordings made from the GUIDE Plus+ system.
- You cannot adjust the recording quality (HDD or DVD) once the recording starts.
- The beginning of some recordings may not be made when using the VPS/PDC function.
- You cannot extend the recording duration time when “VPS/PDC” is selected (page 78).
- The “Rec. Mode Adjust” function only works with a timer recording to DVD, and the VPS/PDC function set to off.
- The recording mode cannot be set to “AUTO” when “VPS/PDC” is set to “On.”

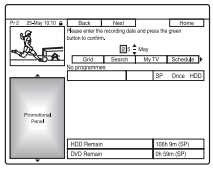
Setting the timer manually



1 Press GUIDE.

2 Select “Schedule” in the Menu bar.
The SCHEDULE list appears.

3 Press the green button (“Manual”).



4 Set the date using the number buttons and ←/↑/↓/→. Then press the green button (“Next”).

5 Set the start time using the number buttons and ←/↑/↓/→. Then press the green button (“Next”).

6 Set the stop time using the number buttons and ←/↑/↓/→. Then press the green button (“Next”).

7 Select the input source using ↑/↓, and select the programme position using the number buttons or ↑/↓.
You can also select the programme position using the yellow button (“Channels”).

8 Press the green button (“Next”).
The display for entering characters appears.
To change the title name, select a character on the keyboard using ←/↑/↓/→, and press ENTER.
To switch between upper-case, lower-case, or characters with accents, press the yellow button (“Keyboard”).

9 Press the green button (“Save”).
The date, start and stop times, programme position, etc. settings appear. The recorder is ready to start recording.

To confirm, change, or cancel a timer recording

See “Checking/Changing/Cancelling Timer Settings” on page 77.

To stop recording during timer recording

Press ■ REC STOP.
Note that it may take a few seconds for the recorder to stop recording.
On-screen instructions may appear after pressing ■ REC STOP. In this case, follow the on-screen instructions.

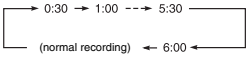
Rec. Mode Adjust

If there is not enough available disc space for the recording, the recorder automatically adjusts the recording mode to enable the entire programme to be recorded. Set “Rec. Mode Adjust” to “On” in the “Recording” setup (page 143).

Using the Quick Timer function

You can set the recorder to record in 30-minute increments.

Press ● REC repeatedly to set the duration.
Each press advances the time in 30-minute increments. The maximum duration is six hours.



The time counter decreases minute by minute to 0:00, then the recorder stops recording (the power turns off).

To cancel the Quick Timer

Press ● REC repeatedly until the counter appears in the front panel display. The recorder returns to normal recording mode. To stop recording, press ■ REC STOP.

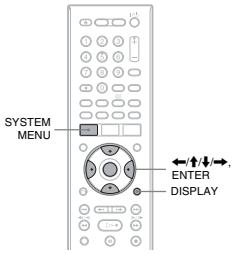
Note

If you turn off the recorder during recording, recording is stopped.

→continued

Adjusting the recording picture quality

You can adjust the picture quality by selecting a preset setting. You can also adjust the picture quality by changing detailed settings, and store up to three settings in the memory.



1 Press SYSTEM MENU in stop mode.
The System Menu appears.

2 Select “Picture Adjustment,” and press ENTER.

3 Select a preset setting, and press ENTER.
“Tuner”: TV broadcasts
“VCR”: Video cassettes
“DTV”: Digital broadcasts
“Memory1”/“Memory2”/“Memory3”: Your own settings. To create your own settings, see “To create your own setting” on page 76.
To check the detailed settings for the selected preset, press DISPLAY.

4 Press SYSTEM MENU to exit.

To create your own setting

1 Select “Memory1,” “Memory2,” or “Memory3” in step 3.

2 Select “Detailed Settings,” and press ENTER.
The display for adjusting detailed settings appears.

3 Select an item using ↑/↓, and adjust settings using ←/→.
For details about each setting, see the explanation of the display.
“Prog. Motion”: Adjusts the progressive video signal when “Component Video Out” is set to “Progressive” (page 136).
Select “Motion” for a picture, including subjects that move dynamically.
Select “Still” for a picture with little movement.
“Cinema”: Converts the progressive video signal to match the type of DVD software that you are watching when “Component Video Out” is set to “Progressive” (page 136).
Select “Auto” to detect the software type (Film-based or Video-based) automatically and select the appropriate conversion mode. Normally select this position.
Select “Off” to fix the conversion mode to the mode for Video-based software.
“3-D Y/C”: Adjusts the brightness/colour separation for the video signals.
Select “Motion” for a picture, including subjects that move dynamically.
Select “Still” for a picture with little movement.
“YNR” (luminance noise reduction): Reduces noise contained in the luminance element of the video signal.
“CNR” (chroma noise reduction): Reduces noise contained in the chroma element of the video signal.
“Detail”: Adjusts the sharpness of images outlines.
“White AGC”: Turn on for automatic white level adjustment.
“White Enhancer”: Adjusts the intensity of white.
“Black Enhancer”: Adjusts the intensity of black.
“Black Level”: Selects the black level (setup level) for the NTSC video signals.
Select “ON” to raise the standard black level. Select this when the picture appears too dark.
Select “OFF” to set the black level of the input signals to the standard level. Normally, select this position.
“Hue”: Adjusts the colour balance.
“Chroma Level”: Makes the colours deeper or lighter.

4 Press SYSTEM MENU to exit.
The setting is automatically stored as the setting you selected in step 1.

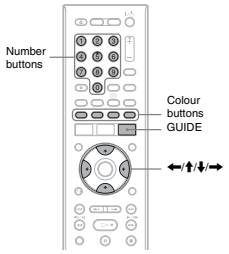
Creating chapters in a title

The recorder can automatically divide a recording (a title) into chapters by inserting chapter marks. To select chapter mark intervals or disable this function, see “Auto Chapter (HDD/VR),” “Auto Chapter (Video),” or “Auto Chapter (DVD+R/+RW)” in the “Recording” setup (page 143).
When recording to the HDD, a DVD-R (VR mode) or a DVD-RW (VR mode), you can edit chapter marks (page 95).

Checking/Changing/Cancelling Timer Settings

HDD +RW -RWVR -RWVideo +R -RVR -RVideo

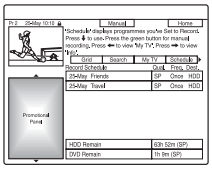
You can change or cancel timer settings using the SCHEDULE list.



Changing timer settings

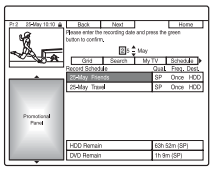
1 Press GUIDE.

2 Select “Schedule” in the Menu bar.
The SCHEDULE list appears.



→continued

3 Select the timer setting you want to change using ↑/↓, and press the green button (“Edit”).



4 In the left column, select an item using the red button (“Back”) or the green button (“Next”), and adjust using the number buttons or ←/↑/↓/→.

You can change the date, start time, stop time, programme position, or input source.
The cursor moves to the right column.

5 Press the corresponding colour button repeatedly to change settings.

- Yellow button (“Destination”): Sets the recording destination. If there is not enough available DVD disc space for the recording, the recorder automatically records the programme to the HDD even if you select “DVD” (Recovery Recording). When you set a daily or weekly timer, “HDDr” allows you to replace the previous timer recording with the new one automatically (HDD only).
- Green button (“Frequency”): Selects the recording pattern.
- Red button (“Quality”): Selects the recording mode (page 71).

6 Press → to display “Timing.”

7 Press the green button (“Timing”) repeatedly to select the duration time or to set the VPS/PDC function.

See “About the VPS/PDC function” below.

- If you want to record to a particular HDD genre, press the yellow button (“Genre”) repeatedly.

Notes

- The new settings become effective when you exit the GUIDE Plus+ system.
- When you set the recording destination to “HDDr,” the previous timer recording will be replaced with the new one even if you have not watched it.

About the VPS/PDC function

VPS/PDC signals are transmitted with TV programmes in some broadcast systems. These signals ensure that timer recordings are made regardless of any broadcast delays, early starts, or broadcast interruptions.

◆To use the VPS/PDC function

Select “VPS / PDC” in step 7 above.
When you turn on this function, the recorder starts scanning the channels before the timer recording starts.

Cancelling timer settings

1 Press GUIDE.

2 Select “Schedule” in the Menu bar.

The SCHEDULE list appears.

3 Select the timer setting you want to cancel using ↑/↓, and press the red button (“Delete”).

To close the SCHEDULE list

Press GUIDE.

When the timer settings overlap

- The programme that starts first has priority and the entire programme is recorded.
- After finishing the previous recording, the other recording starts with several tens-of-second’s delay (when the end-time of one recording and the start-time of another are the same).
- When the recordings start at the same time, only one of them will be recorded. Cancel the timer setting for the programme that you are not going to record.

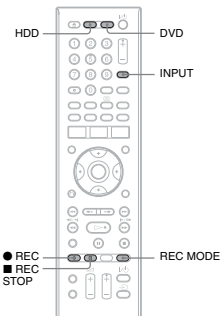
Note

When “VPS / PDC” is set for one or more timer recordings, the start times may change in the event of a broadcast delay or early start.

Recording from Connected Equipment

HDD +RW -RWVR -RWVideo +R -RVR -RVideo

You can record from a connected VCR or similar device. To connect a VCR or similar device, see “Connecting a VCR or Similar Device” on page 31. Use the DV IN jack on the front panel if the equipment has a DV output jack (i.LINK jack).

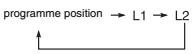


1 Press HDD or DVD.

If you select DVD, insert a recordable DVD (see “1. Inserting a Disc” on page 36).

2 Press INPUT to select an input source according to the connection you made.

The front panel display changes as follows:



3 Select the desired audio signal when recording a bilingual programme to the HDD or DVD-RWs/DVD-Rs (Video mode).

Set “External Audio” to “Bilingual” and “Bilingual Recording” to “A/L” or “B/R” in the “Audio In” setup (page 138).

4 Press REC MODE repeatedly to select the recording mode.

For details about the recording mode, see page 71.

5 Insert the source tape into the connected equipment and set to playback pause.

6 Press ● REC.

This recorder starts recording.

7 Press the pause (or play) button on the connected equipment to cancel the playback pause status.

The connected equipment starts playback and the playback image is recorded by this recorder.
To stop recording, press ■ REC STOP on this recorder.

If you connect a digital video camera with a DV IN jack

See “DV Camcorder Dubbing” on page 104 for an explanation of how to record from the DV IN jack.

Hint

You can adjust the settings for the recording picture before recording. See “Adjusting the recording picture quality” on page 76.

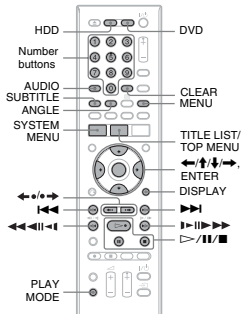
Notes

- When recording a video game image, the screen may not be clear.
- Any programme that contains a Copy-Never copy guard signal cannot be recorded.
- When “Bilingual Recording” is set to “A/L” or “B/R” in step 3, you cannot select the sound when playing in the following cases.
  – When recording in PCM mode.
  – When recording to the HDD (“HDD Recording Format” is set to “Video Mode On” in the “Recording” setup (page 144))/DVD+RW/DVD+R/DVD-RW/DVD-R (Video mode).
- You cannot select “L1” in step 2 if “LINE 1 In” is set to “Decoder” in the “Video In/Out” setup (page 137).

Playing the Recorded Programme/DVD

HDD +RW -RWVR -RWVideo +R -RVR -RVideo DVD VCD DATA DVD * DATA CD *

* DivX video file only

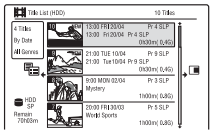


1 Press HDD or DVD.

- If you select DVD, insert a disc (see “1. Inserting a Disc” on page 36).
- If you insert a DVD VIDEO, VIDEO CD, DATA DVD or DATA CD, press ▷. Playback starts.

2 Press TITLE LIST.

For details about the Title List, see “3. Playing the Recorded Programme (Title List)” on page 38.
Example: HDD



3 Select a title using ↑/↓, and press ENTER.

Playback starts from the selected title.

To use the DVD’s Menu

When you play a DVD VIDEO, or a finalised DVD+RW, DVD-RW (Video mode), DVD+R, or DVD-R (Video mode), you can display the disc’s menu by pressing TOP MENU or MENU.

Note

The ▷ button is not available in the disc’s menu.

To play VIDEO CDs/Super VIDEO CDs with PBC functions

PBC (Playback Control) allows you to play VIDEO CDs/Super VIDEO CDs interactively using the menu on your TV screen.
When you start playing a VIDEO CD/Super VIDEO CD with PBC functions, the menu appears.
Select an item using the number buttons, and press ENTER. Then, follow the instructions in the menu (press ▷ when “Press SELECT” appears).

Note

Some playback options such as search, repeat play or programme play cannot be played with PBC function. To play with playback options, start playback without PBC functions using the Title List.

To change the angles

If various angles (multi-angles) for a scene are recorded on the disc, “” appears on the screen. Press ANGLE during playback. To switch the angle mark indicator to off, set “Angle Indicator” to “Off” in the “Playback” setup (page 145).

To stop playback

Press ■.

To playback quickly with sound (Scan Audio)

When you press ▶▶ during playback, you can play quickly with dialogue or sound (except for VIDEO CDs/Super VIDEO CDs).
No sound is output when you press ▶▶ two or more times to change search speed.

To display the registration code for this recorder

Select “Registration Code” of “DivX” in the “Options” setup (page 150).

To resume playback from the point where you stopped (Resume Play)

When you press ▷ again after you stop playback, the recorder resumes playback from the point where you pressed ■.

To start from the beginning, press ■ again, and press ▷. Playback starts from the beginning of the title/track/scene.

The point where you stopped playing is cleared when:
– you open the disc tray (except HDD).
– you play another title (except HDD).
– you switch the Title List to Original or Playlist (DVD-RWs/DVD-Rs in VR mode only).
– you edit the title after stopping playback.
– you change the settings on the recorder.
– you make a recording (except HDD/DVD-RWs/DVD-Rs in VR mode).
– you disconnect the mains lead.

Notes

- You cannot resume playback during TV Pause.
- Resume Play is not available for Super VIDEO CDs.

To play restricted DVDs (Parental Lock)

If you play a restricted DVD, the display for entering your password appears on your TV screen.
Enter your four-digit password using the number buttons, and press ENTER.
The recorder starts playback.

To register or change the password, see “Limitation Settings (Parental Lock)” on page 145.

To lock the recorder (Child Lock)

You can lock all of the buttons on the recorder so that the settings are not cancelled by mistake.
When the recorder is turned off, hold down ■ on the recorder until “LOCKED” appears in the front panel display. The recorder does not work except for timer recordings while the Child Lock is set.

To unlock the recorder, hold down ■ on the recorder until “UNLOCKED” appears in the front panel display.

One-Touch Play (for SCART/HDMI connections only)

Press ▷. With one touch of the ▷ button, the recorder and your TV automatically turn on and the TV’s input is switched to the recorder. Playback starts automatically.

Hint

You can also use the ▷ button in step 3 (page 80) to start playback.

Note

When using the HDMI connection, there may be a delay, before the playback picture appears on the TV screen, and the beginning portion of the playback picture may not be displayed.

➡continued

Playback options

To check the position of the buttons below, see the illustration on page 80.

Buttons	Operations
AUDIO HDD -RWVR -RVR DVD VCD DATA DVD * DATA CD * * DivX video file only	Selects one of the audio tracks recorded on the disc when pressed repeatedly in normal playback mode. DVD DATA DVD * DATA CD *: Selects the language. HDD -RWVR -RVR : Selects the main or sub sound. VCD : Selects stereo or monaural audio tracks.
SUBTITLE DVD DATA DVD * DATA CD * * DivX video file only	Selects a subtitle language when pressed repeatedly.
⏮/⏭ (instant replay/ instant advance)	Each time you press ⏮, replays the scene for the following duration. 5 seconds → 15 seconds → 30 seconds → 1 minute → 2 minutes → 3 minutes → 5 minutes → 10 minutes → 20 minutes → advances the time in 10-minute increments → 2 hours Each time you press ⏭, briefly fast forwards the current scene for the following duration. 30 seconds → 1 minute → 1 minute 30 seconds → 2 minutes → 3 minutes → 5 minutes → 10 minutes → 20 minutes → advances the time in 10-minute increments → 2 hours
⏮ (previous)/ ⏭ (next)	Goes to the beginning of the previous/next title/chapter/scene/track when pressed during playback. Goes to the beginning of the first title/track when pressed in stop mode.
◀◀ ◀II ◄I/I► II▶ ▶▶ (fast reverse/fast forward)	Fast reverses/fast forwards the disc when pressed during playback. Search speed changes as follows: fast reverse ◀◀FR1*1 ← → ▶▶FF1*2 ◀◀FR2 ← ← → → ▶▶FF2 ◀◀FR3*3 ← ← ← → → → ▶▶FF3*3 ◀◀FR4*3 ← ← ← ← → → → → ▶▶FF4*3 When you press and hold the button, fast forward/fast reverse continues at the selected speed until you release the button. *1 When you press ◀◀ once during playback, you can play Reverse play (not available for VIDEO CDs/Super VIDEO CDs/DivX video files). *2 When you press ▶▶ once during playback, you can play quickly with sound (not available for VIDEO CDs/Super VIDEO CDs). *3 Not available for VIDEO CDs/Super VIDEO CDs. To resume normal playback, press ▷.

Buttons	Operations
◀◀ ◀II ◄I/I► II▶ ▶▶ (slow, freeze frame) HDD +RW -RWVR -RWVideo +R -RVR -RVideo DVD VCD *1 *1*2 DATA DVD DATA CD *1*2 *1 Playback direction only *2 DivX video file only	Plays in slow motion when pressed for more than one second in pause mode. Plays one frame at a time when pressed briefly in pause mode. To resume normal playback, press ▷.
II (pause)	Pauses playback. To resume normal playback, press ▷.

Notes

- Angles and subtitles cannot be changed with titles recorded on this recorder.
- JPEG image files made with a DVD camcorder can only be played as a slideshow. For video files containing JPEG image files and movies, the recorder can play movie parts only.

Notes on playing DVDs with a DTS sound track

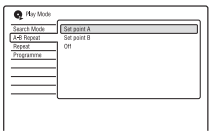
DTS audio signals are output only through the DIGITAL OUT (COAXIAL) jack.
When you play a DVD with DTS sound tracks, set "DTS Output" to "On" in the "Audio Out" setup (page 139).

→continued

Playing a specific portion repeatedly (A-B Repeat)

1 Press PLAY MODE during playback.
The "Play Mode" menu appears.

2 Select "A-B Repeat," and press ENTER.
"Set point A" is selected.



3 While monitoring the sound, press ENTER at the starting point (point A) of the portion to be played repeatedly.
"Set point B" is selected.

4 Continue playing to locate the ending point (point B), and press ENTER.
A-B Repeat starts.

To cancel A-B Repeat

Press CLEAR. Or, set "A-B Repeat" to "Off" in the "Play Mode" menu.

Hint
You can select "A-B Repeat" from "Play Mode" in the System Menu.

Note
When playing an HDD/DVD VIDEO/DVD-RW (Video mode)/DVD-R (Video mode), set the start and stop points within the same title.

Playing repeatedly (Repeat)

You can play repeatedly all the titles/tracks/files or a single title/chapter/track on the HDD or a disc.

1 Press PLAY MODE during playback.
The "Play Mode" menu appears.

2 Select "Repeat," and press ENTER.

3 Select an item to be repeated using ↑/↓.
"Repeat Title" (for HDD/DVDs/DATA DVDs*1/DATA CDs*1): repeats the current title.
"Repeat Chapter" (for HDD/DVDs): repeats the current chapter.
"Repeat Track" (for VIDEO CDs*2): repeats the current track.
"Repeat Programme": repeats the current programme (page 85).
"Repeat Disc" (for VIDEO CDs*2/DVD-RWs/DVD-Rs (VR mode)): repeats all of the tracks on a disc.
*1 DivX video file only
*2 Available only when playing without PBC functions

4 Press ENTER.
Repeat play starts.

To cancel Repeat play

Press CLEAR. Or, set "Repeat" to "Repeat Off" in the "Play Mode" menu.

Hint
You can select "Repeat" from "Play Mode" in the System Menu.

Note
You cannot select "Repeat Programme" when no programme remains.

Creating your own programme (Programme)

HDD -RWVideo * -RVideo * VCD

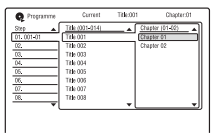
* finalised disc only

You can play the contents of the HDD or a disc in the order you want by arranging the order of the titles/chapters/albums/tracks on the HDD or disc to create your own programme. You can make a programme of up to 24 steps.

1 Press PLAY MODE during playback.
The "Play Mode" menu appears.

2 Select "Programme," and press ENTER.

3 Select "Input/Edit Programme," and press ENTER.
The "Input/Edit Programme" display differs depending upon the disc type.
Example: DVD



4 Select a title or album (example: Title 001) using ↑/↓, and press ENTER.

5 Select a chapter or track (example: Chapter 01) using ↑/↓, and press ENTER.
The chapter or track is programmed.
If you make a mistake, select the step number (example: 01.) using ←/↑/↓, and press CLEAR.

6 To programme other chapters or tracks, press ←/↑/↓/→ to select a step number, and repeat steps 4 and 5.

7 Press ▷.
Programme play starts.

To cancel Programme play

Press CLEAR during playback. Or, set "Programme" to "Cancel Programme Play" in the "Play Mode" menu.

To erase the programme

Press CLEAR in stop mode. Or, set "Programme" to "Erase Programme List" in the "Play Mode" menu.

Hints

- The program you made remains after Programme play finishes. To play the same program again, set "Programme" to "Start Programme Play" in the "Play Mode" menu. However, the programme is cleared after you remove the disc or press ⏻.
- You can repeat Programme play. Set "Repeat" to "Repeat Programme" in the "Play Mode" menu (page 84).
- You can select "Programme" from "Play Mode" in the System Menu.

Adjusting the picture quality

HDD +RW -RWVR -RWVideo +R -RVR -RVideo DVD VCD DATA DVD * DATA CD *

* DivX video file only

You can adjust the picture quality from connected equipment, such as a TV or projector by selecting a preset setting. You can also adjust the picture quality by changing detailed settings, and store up to three settings in the memory.

1 Press SYSTEM MENU during playback or in pause mode.
The System Menu appears.

2 Select "Picture Adjustment," and press ENTER.

3 Select a preset setting using ←/→, and press ENTER.
Dynamic: produces a bold dynamic picture by increasing the picture contrast and the colour intensity.
Standard: displays a standard picture.
Professional: displays an original picture.
Memory1/Memory2/Memory3: Your own settings. To create your own settings, see "To create your own setting" below.

→continued

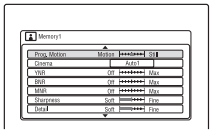
To check the detailed settings for the selected preset, press DISPLAY.

4 Press SYSTEM MENU to exit.

To create your own setting

1 Select “Memory1,” “Memory2,” or “Memory3” in step 3.

2 Select “Detailed Settings,” and press ENTER.
The display for adjusting detailed settings appears.



3 Select an item using ↑/↓, and adjust settings using ←/→.
For details about each setting, see the explanation of the display.
“Prog. Motion”: Adjusts the progressive video signal when “Component Video Out” is set to “Progressive” (page 136).
Select “Motion” for a picture, including subjects that move dynamically.
Select “Still” for a picture with little movement.
“Cinema”: Converts the progressive video signal to match the type of DVD software that you are watching when “Component Video Out” is set to “Progressive” (page 136).
Select “Auto1” to automatically detect the software type (Film-based or Video-based) and select the appropriate conversion mode. Normally select this position.
If the picture appears unnatural, select “Auto2,” “On,” or “Off.”
“YNR” (luminance noise reduction): Reduces noise contained in the luminance element of the video signal.
“BNR” (block noise reduction): Reduces “block noise” or mosaic-like patterns in the picture.
“MNR” (mosquito noise reduction): Reduces the faint noise appearing around the outlines of the images. The noise reduction effects are automatically adjusted within each setting range according to the video bit rate and other factors.
“Sharpness”: Sharpens the outlines of the images.
“Detail”: Adjusts the sharpness of images outlines.
“White Enhancer”: Adjusts the intensity of white.
“Black Enhancer”: Adjusts the intensity of black.
“Black Level”: Selects the black level (setup level) for the video signals.
Select “ON” to raise the standard black level. Select this when the picture appears too dark.
Select “OFF” to set the black level of the input signals to the standard level. Normally, select this position.
“Gamma Correction”: Adjusts how dark areas look.
“Hue”: Adjusts the colour balance.
“Chroma Level”: Makes the colours deeper or lighter.

4 Press SYSTEM MENU to exit.
The setting is automatically stored as the setting you selected in step 1.

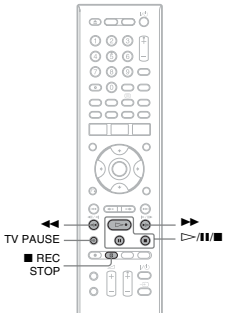
Notes

- If the outlines of the images on your screen become blurred, set “BNR” and/or “MNR” to “Off.”
- Depending on the disc or the scene being played, the above BNR or MNR effects may be hard to discern. Also, these functions may not work with some screen sizes.
- The following settings are not available for the signals output from the HDMI jack.
  – “Sharpness”
  – “White Enhancer”
  – “Black Enhancer”
  – “Black Level”
  – “Gamma Correction”
  – “Hue”
  – “Chroma Level”

Pausing a TV Broadcast (TV Pause/Pause Live TV)

HDD

You can pause a current TV broadcast, and record it on the HDD, then continue watching the programme at a later time. This is useful when you receive an unexpected phone call or visitor while watching TV.
When connecting the recorder to your TV using the SCART jack, do the followings.
– set “SMARTLINK” to “This Recorder Only” in the “Options” setup (page 150).
– set “TV Pause” to “TV’s Tuner” in the “Options 2” setup (page 150).
– preset programme positions by downloading from your TV using “Download from TV” of “Auto Channel Setting” in the “Analog Tuner” setup (page 133).
If you do not make the SCART connection, set “TV Pause” to “Recorder’s Tuner” in the “Options 2” setup (page 150).



1 While viewing a TV broadcast, press TV PAUSE.
The picture pauses, and the recorder starts recording the current TV channel to the HDD.
It may take up to 10 seconds to start recording.

2 Press ▷ to resume watching the programme.
You can fast forward/fast reverse, pause, or stop the programme using ◀◀/▶▶, II and ■ without affecting the recording.

3 Press ■ REC STOP to stop recording.

Notes

- The picture does not pause and the recorder starts only recording in the following cases.
  – when the programme positions are preset differently between the recorder and the connected TV.
  – when watching the programme from the external equipment connected to your TV.
- The picture tuned by the recorder pauses when “TV Pause” is set to “Recorder’s Tuner” in the “Options 2” setup (page 150).
- You may not be able to use the “TV Pause” function depending on some TVs. For details, refer to the operating instructions supplied with your TV.
- The “TV Pause” function will not work correctly when watching TV via the connected component such as a VCR or digital tuner. The “TV Pause” function works only with the channel selected on the TV.
- You cannot use the “TV Pause” function as a recording feature from the component (VCR, etc.) connected to the LINE 1/DECODER jack.
- The “TV Pause” function will not work if the connected TV does not comply with SMARTLINK. To check whether your TV complies with SMARTLINK, refer to the operating instructions supplied with your TV.

Playback

Playing from the Beginning of the Programme You Are Recording (Chase Play)

HDD

“Chase Play” allows you to view the recorded part of a programme on the HDD while the recording is being made. You do not need to wait until the recording finishes.

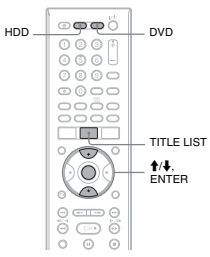
Press ▷ while recording.
Playback starts from the beginning of the programme you are recording.
When you fast forward to the point that you are recording, “Chase Play” returns to normal playback.

Playing a Previous Recording While Making Another (Simultaneous Rec and Play)

HDD +RW -RWVR -RWVideo +R -RVR -RVideo DVD VCD DATA DVD DATA CD

“Simultaneous Rec and Play” allows you to view a previously recorded programme while recording programmes. Playback continues even if a timer recording starts. Use this function as follows:
- While recording to the HDD:
  Play another title on the HDD.
  Play a previously recorded programme on a DVD by pressing the DVD button.
- While recording to a DVD:
  Play a previously recorded programme on the HDD by pressing the HDD button.

You can also play a DVD VIDEO, VIDEO CD, Super VIDEO CD, DATA DVD, or DATA CD while recording on the HDD.



Example: Play another title on the HDD while recording to the HDD.

1 While recording, press TITLE LIST to display the HDD Title List.

2 Select the title you want to play, and press ENTER.
Playback starts from the selected title.

Example: Play a DVD while recording to the HDD.

1 While recording, press DVD and insert the DVD into the recorder.

2 Press TITLE LIST to display the DVD Title List.

3 Select the title you want to play, and press ENTER.
Playback starts from the selected title.

Note

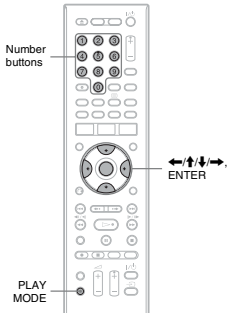
You cannot play a DVD, DivX video or VIDEO CD recorded in the NTSC colour system while recording on the HDD in the PAL/SECAM colour system.

Searching for a Time/ Title/Chapter/Track, etc.

HDD +RW -RWVR -RWVideo +R -RVR -RVideo DVD VCD DATA DVD * DATA CD *

* DivX video file only

You can search a disc by title, chapter, scene or track. As titles and tracks are assigned individual numbers, select the title or track by entering its number. You can also search for a scene using the time code.



1 Press PLAY MODE during playback.
The “Play Mode” menu appears.

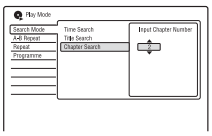
2 Select “Search Mode,” and press ENTER.

3 Select a search method, and press ENTER.
“Time Search” (for HDD/DVDs/DATA DVDs*1/DATA CDs*1/VIDEO CDs*2): Searches for a starting point by entering the time code.
“Title Search” (for HDD/DVDs/DATA DVDs*1/DATA CDs*1)
“Chapter Search” (for HDD/DVDs)
“Track Search” (for VIDEO CDs*3)
*1 DivX video file only
*2 Except Super VIDEO CDs
*3 Available only when playing without PBC functions

Playback

➡continued

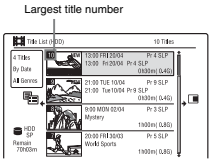
The display for entering the number appears.
Example: Chapter Search



4 Press the number buttons to select the number of the title, chapter, time code, etc., you want.
For example: Time Search
To find a scene at 2 hours, 10 minutes, and 20 seconds, enter "21020."
If you make a mistake, select another number.

5 Press ENTER.
The recorder starts playback from the selected number.

To open up disc space
To open up disc space on a DVD+RW or DVD-RW (Video mode), erase the title with the largest number in the title list.



To open up disc space on the HDD or a DVD-RW (VR mode), you can erase any title. See "Erasing and Editing a Title" on page 92. For DVD-Rs and DVD+Rs, the available disc space does not increase even if you erase titles.

To switch between the Playlist and Original Title List (DVD-RW/DVD-R in VR mode only)
You can display the Playlist titles in the Title List (Playlist), or the Original titles in the Title List (Original).

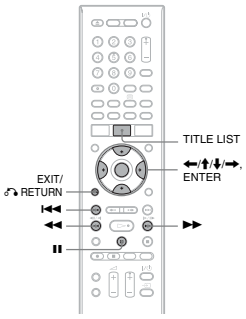
1 Press ← while the Title List is displayed.
2 Select "Original" using ↑/↓, and press ENTER.
3 Select "Original" or "Play List" using ↑/↓, and press ENTER.

About editing accuracy
When editing the titles recorded on the HDD, you can select the type of editing.
"Video Mode Compatible Editing": Recommended if you are going to dub the titles to DVD-RWs/DVD-Rs (Video mode) or DVD+RWs/DVD+Rs afterward by High-speed dubbing. The editing points and chapter marks may be slightly different from those you selected.
"Frame Accurate Editing": Recommended when you want to edit titles precisely. However, the editing points may be slightly different from the point you selected when you dub the titles by High-speed dubbing.

Erasing and Editing a Title

HDD +RW -RWVR -RWVideo +R -RVR -RVideo

This section explains the basic edit functions. Note that editing is irreversible. To edit DVD-RWs/DVD-Rs (VR mode) without changing the original recordings, create a Playlist title (page 96).



1 Press TITLE LIST.
For DVD-RWs/DVD-Rs in VR mode, switch the Title List (Original or Playlist), if necessary.

2 Select a title, and press →.
The sub-menu appears.

3 Select an option, and press ENTER.
You can make the following edits to the title.
"Erase": Erases the selected title. Select "Yes" when asked for confirmation.
"Edit": Allows you to make the following edits.
- "Title Name": Allows you to enter or re-enter a title name (page 42).
- "Set Thumbnail": Changes the title's thumbnail picture that appears in the Title List (page 39).

Before Editing

This recorder offers various edit options for various disc types.

Notes
- You may lose the edited contents if you remove the disc or a timer recording starts while editing.
- DVD discs created by DVD camcorders cannot be edited on this recorder.
- If a message appears and indicates that the disc's control information is full, erase or edit unnecessary titles.
- The remaining disc space displayed on the screen may differ from the actual remaining disc space.
- When editing a DVD+R or DVD-R, finish all editing before finalising the disc. You cannot edit a finalised disc.

Edit features		HDD	+RW, -RWVideo, +R, -RVideo	-RWVR, -RVR	
				Original title	Playlist title
Title edit	Erase (page 92)	Yes	Yes	Yes	Yes
	Title Name (page 92)	Yes	Yes	Yes	Yes
	Set Thumbnail (page 92)	Yes	Yes	Yes	Yes
	A-B Erase (page 93)	Yes	No	Yes	Yes
	Divide (page 94)	Yes	No	No	Yes
	Set Genre (page 92)	Yes	No	No	No
	Protect (page 92)	Yes	Yes	Yes	No
	Move (page 97)	No	No	No	Yes
	Combine (page 97)	No	No	No	Yes
	Genre Name (page 92)	Yes	No	No	No
	Editing multiple titles (Multi-Mode) (page 93)	Yes	No	No	No
	Creating a Playlist (page 96)	No	No	No	Yes
	Undo (page 92)	No	Yes	Yes	Yes
Chapter edit	Divide (page 95)	Yes	No	Yes	Yes
	Erase (page 96)	Yes	No	Yes	Yes
	Move (page 97)	No	No	No	Yes
	Combine (page 96)	Yes	No	Yes	Yes

- "A-B Erase": Erases a section of the title (page 93).
- "Divide": Divides a title into two titles (page 94).
- "Chapter Edit": Edits chapters in a title (page 95).
- "Set Genre": Assigns a genre to a title.
- "Protect": Protects the title. "🔒" appears next to the protected title.
- "Move": Changes the title's playing order (page 97).
- "Combine": Combines two titles into one (page 97).

"Genre Name": Allows you to enter a genre name (up to 12 characters) (page 42).
"Multi-Mode": Allows you to select and edit multiple titles at one time (page 93).
"Create": Creates a Playlist (page 96).
"Undo": Undoes the last edit you made.

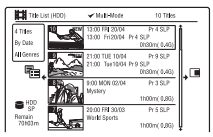
Hint
You can label or re-label DVDs (page 43).

Editing multiple titles (Multi-Mode)

HDD

You can select and edit up to 24 titles at one time.

1 Press TITLE LIST.
2 Press →.
The sub-menu appears.
3 Select "Multi-Mode," and press ENTER.
The display for selecting titles to be edited appears.



4 Select a title, and press ENTER.
A check mark appears in the check box. To clear the check mark, press ENTER again.
5 Repeat step 4 to select all of the titles you want to edit.
6 When you finish selecting titles, press →.
The sub-menu appears.
7 Select an option, and press ENTER.
"Erase": Erases the selected titles.
"Protect": Protects the titles. "🔒" appears next to the protected title.
"Unprotected": Unprotects the titles.
"Change Genre": Changes the genre of the titles.

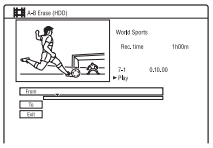
Hint
You can exit "Multi-Mode" by pressing → and selecting "Single-Mode" while selecting titles.

Erasing a section of a title (A-B Erase)

HDD -RWVR -RVR

You can select a section (scene) in a title and erase it. Note that erasing scenes in a title cannot be undone.

1 After step 2 of "Erasing and Editing a Title," select "Edit," and press ENTER.
2 Select "A-B Erase," and press ENTER.
For the HDD, select a type of editing, and press ENTER. For details, see page 92.
The display for setting point A appears.
The title starts to play.



3 **Select point A using ◄◄/►►, and press ❚❚.**
- To return to the beginning of the title, press ❚❚ and then press I◄◄.

4 **Select "From," and press ENTER.**
The position of point A is displayed, and the title re-starts playing.

5 **Select point B using ◄◄/►►, and press ❚❚.**

6 **Select "To," and press ENTER.**
The position of point B is displayed.

7 **Select "Yes," and press ENTER.**
The scene is erased.

To cancel "A-B Erase"
Press ↶ RETURN. The Title List appears.

Hint
A chapter mark is inserted after the scene is erased. The chapter mark divides the title into separate chapters on either side of the mark.

Notes
- Images or sound may be momentarily interrupted at the point where you erase a section of a title.
- Sections shorter than five seconds may not be erased.

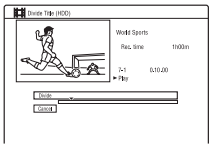
Dividing a title (Divide)

HDD -RWVR* -RVR*

If you want to dub a long title to a disc but do not want to reduce the picture quality, divide the title into two shorter titles. Note that dividing a title cannot be undone.
* Only playlist titles can be divided for DVD-RWs/DVD-Rs in VR mode.

1 **After step 2 of "Erasing and Editing a Title," select "Edit," and press ENTER.**

2 **Select "Divide," and press ENTER.**
For the HDD, select a type of editing, and press ENTER. For details, see page 92.
The display for setting the dividing point appears.
The title starts to play.



3 **Select the dividing point using ◄◄/►►, and press ❚❚.**
- To return to the beginning of the title, press ❚❚ and then press I◄◄.

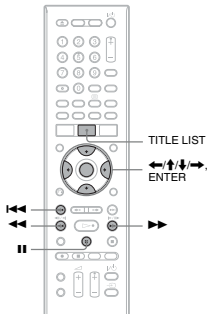
4 **Press ENTER.**
The display asks for confirmation.

5 **Select "Yes," and press ENTER.**
The title is divided into two.

Erasing and Editing a Chapter

HDD -RWVR -RVR

You can edit individual chapters within a title. To edit DVD-RWs/DVD-Rs (VR mode) without changing the original recordings, create a Playlist (page 96).



1 **Press TITLE LIST.**
For DVD-RWs/DVD-Rs in VR mode, switch the Title List (Original or Playlist), if necessary.

2 **Select a title containing the chapter you want to edit, and press →.**
The sub-menu appears.

3 **Select "Edit," and press ENTER.**

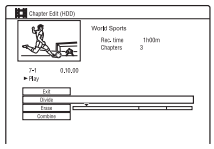
4 **Select "Chapter Edit," and press ENTER.**
For the HDD, select a type of editing, and press ENTER. For details, see page 92.

5 **Select an option, and press ENTER.**
You can make the following edits to the chapter.
"Divide": Divides a chapter into two (page 95).
"Erase/Move"
- "Erase": Erases the selected chapter (page 96).
- "Move" (for Playlist titles on DVD-RWs/DVD-Rs in VR mode): Changes the chapter's playing order (page 97).

"Combine": Combines two chapters into one (page 96).

Dividing a chapter (Divide)

1 **After step 4 of "Erasing and Editing a Chapter," select "Divide."**



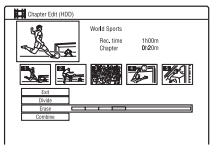
2 **Select a chapter using ←/→, and press ENTER.**
The chapter starts to play.

3 **Select the dividing point using ◄◄/►►, and press ❚❚.**
- To return to the beginning of the chapter, press ❚❚ and then press I◄◄.

4 **Press ENTER.**
The chapter is divided into two.

Erasing a chapter (Erase)

1 **After step 4 of "Erasing and Editing a Chapter," select "Erase/Move."**



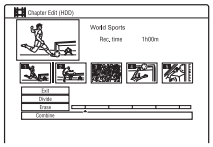
2 **Select a chapter using ←/→, and press ENTER.**

3 **Select "Erase," and press ENTER.**
The display asks for confirmation.

4 **Select "Yes," and press ENTER.**
The chapter is erased.

Combining multiple chapters (Combine)

1 **After step 4 of "Erasing and Editing a Chapter," select "Combine."**



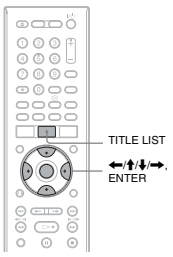
2 **Move the combining bar using ←/→, and press ENTER.**
The two adjacent chapters of the combining bar are combined.

Creating and Editing a Playlist

-RWVR -RVR

Playlist edit allows you to edit or re-edit without changing the actual recordings. You can create up to 99 Playlist titles.

Note
Playlist titles containing titles recorded with the "Copy-Once" copy protection signal cannot be dubbed or moved (page 99).



1 **Press TITLE LIST.**
Switch to the Playlist (page 92).

2 **Press →.**
The sub-menu appears.

3 **Select "Create," and press ENTER.**
The original titles in the Title List appear.

4 **Select an original title to add to the Playlist, and press ENTER.**
The selected title is added to the Playlist.

5 **Repeat steps 3 and 4 to select all of the titles you want to add to the Playlist.**

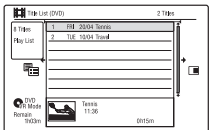
Moving a Playlist title (Move)

1 **Press TITLE LIST.**
Switch to the Playlist (page 92).

2 **Select a Playlist title, and press →.**
The sub-menu appears.

3 **Select "Edit," and press ENTER.**

4 **Select "Move," and press ENTER.**



5 **Select a new location for the title using ↑/↓, and press ENTER.**
The title moves to the new location.
- To move more titles, repeat from step 2.

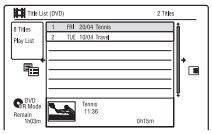
Combining multiple Playlist titles (Combine)

1 **Press TITLE LIST.**
Switch to the Playlist (page 92).

2 **Select a Playlist title, and press →.**
The sub-menu appears.

3 **Select "Edit," and press ENTER.**

4 **Select "Combine," and press ENTER.**



5 **Select a title you want to combine.**

6 **Select "Yes," and press ENTER.**
The titles are combined.

Dividing a Playlist title (Divide)

You can divide a Playlist title. For instructions, see page 94.

Moving a chapter (Move)

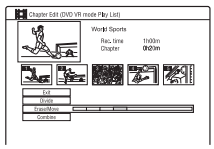
1 **Press TITLE LIST.**
Switch to the Playlist (page 92).

2 **Select a Playlist title containing the chapter you want to edit, and press →.**
The sub-menu appears.

3 **Select "Edit," and press ENTER.**

4 **Select "Chapter Edit," and press ENTER.**

5 **Select "Erase/Move."**



6 **Select a chapter using ←/→, and press ENTER.**

7 **Select "Move," and press ENTER.**

8 **Select a new location for the chapter using ←/→, and press ENTER.**
The chapter moves to the new location.

Before Dubbing

HDD +RW -RWVR -RWVideo +R -RVR -RVideo

In this section, “dubbing” refers to “copying a recorded title on the internal hard disk drive (HDD) to another disc, or vice versa.” You can dub a playing title using the HDD/DVD DUB button (see “HDD/DVD Dubbing” on page 99) or you can select to dub multiple titles all at once (see “Dubbing Using Dubbing List” on page 100). You can also dub an entire DVD disc to make a backup copy (see “Making a Backup Disc (DVD Backup)” on page 103).
Before you start, read the following precautions, which are common to all dubbing methods.

If you want to record from a digital video camera connected to the DV IN jack, see “DV Camcorder Dubbing” on page 104.
To record from equipment connected to the LINE IN jacks, see “Recording from Connected Equipment” on page 79.

Before you start…

- You cannot record both the main and sub sound on the HDD (when “HDD Recording Format” is set to “Video Mode On” in the “Recording” setup), DVD+RWs, DVD-RWs (Video mode), DVD+Rs, or DVD-Rs (Video mode). For bilingual programmes, set “Bilingual Recording” to either “A/L” (default) or “B/R” in the “Audio In” setup (page 138). About HDD Recording format, see page 144.
- A title name in the dubbing source is dubbed. However, only up to 40 characters of a title name are dubbed when dubbing from the HDD to a DVD+RW/DVD-RW (Video mode)/DVD+R/DVD-R (Video mode).
- The chapter marks in the dubbing source are dubbed. The position of chapter marks may be slightly changed from the original. However, the chapter marks in the dubbing source are not retained in the dubbed title when dubbing to a DVD-RW/DVD-R (Video mode), DVD+RW, or DVD+R at normal speed. The chapter marks are automatically inserted according to the “Auto Chapter (Video)” and “Auto Chapter (DVD+R/+RW)” settings in the “Recording” setup (page 143).
- The “Set Thumbnail” setting in the dubbing source is dubbed as a thumbnail picture marker (except when dubbing from a DVD+RW/DVD-RW (Video mode)/DVD+R/DVD-R (Video mode)). The position of thumbnail picture markers may be slightly changed from the original.

Hint
When you dub a Playlist title, it is recorded as an Original title.

Notes
- You cannot make a recording while dubbing.
- Before playing a dubbed disc on other DVD equipment, finalise the disc (page 45, 100).
- You cannot dub from DVD VIDEOs or finalised DVD-RWs/DVD-Rs (Video mode) to the HDD.
- Titles containing mixed aspect ratios cannot be dubbed to a DVD+RW/DVD+R/DVD-RW/DVD-R (Video mode) using the HDD/DVD DUB button.
- Titles over 8 hours cannot be dubbed to single-layer DVD+RWs/DVD+Rs.
- Low resolution (SEP through LP modes) 16:9 size titles cannot be dubbed to a DVD+RW/DVD+R/DVD-RW/DVD-R (Video mode).
- When dubbing to a DVD+R DL, DVD-R DL (Video mode) in Real-Time Dubbing mode, the dubbing contents are divided into titles.

Dubbing restriction

You cannot dub movies and other DVD VIDEOs to the HDD. Also, when dubbing from a DVD to the HDD, scenes that contain a copy protection signal cannot be recorded. Titles containing “Copy-Once” copy protection signals can be moved only from the HDD to a DVD-RW/DVD-R (VR mode)* (after the title is moved, the original title in the HDD is erased). The “Move” function is performed using Dubbing List. Titles containing “Copy-Once” copy protection signals are indicated with COPY.

Copy protection signals	Dubbing
Copy-Free (No copy protection signal)	HDD ↔ +RW, -RWVR, -RWVideo, +R, -RVR, -RVideo
Copy-Once	HDD → -RWVR *, -RVR *

* CPRM-compatible DVD-RWs/DVD-Rs (VR mode) only.
CPRM (Content Protection for Recordable Media) is a coding technology that protects copyrights for images.

Notes
- Protected titles in the HDD cannot be moved.
- The “Move” function is not available for HDD/DVD DUB dubbing.
- Even if you erase a scene that contains a copy protection signal, the recording restrictions on that title are retained.

HDD/DVD Dubbing

HDD +RW -RWVR -RWVideo +R -RVR -RVideo

You can dub a single title by pressing the HDD/DVD DUB button during playback.

1 Start playback of a title.
For playing a title, see “Playing the Recorded Programme/DVD” on page 80.

2 Press HDD/DVD DUB.
The recorder starts dubbing the current playing title from the beginning.
The recorder turns off automatically when you do not use the recorder for more than 20 minutes after the dubbing has finished.

To cancel the dubbing

Press and hold HDD/DVD DUB for more than one second.
When dubbing (Move) is stopped partway, no part of the title will be moved to the dubbing target. However, note that this will decrease the free space for DVD+Rs/DVD-Rs.

About dubbing mode

Titles on the HDD are dubbed to a disc at high speed (High-speed dubbing).
Titles on a disc are dubbed to the HDD at normal speed (Real-Time dubbing).

To convert the recording mode (only when dubbing from a disc to the HDD)

After step 1, press REC MODE to select the recording mode.

Note
You cannot use the HDD/DVD DUB button in the following cases. Dub the title using Dubbing List (page 100).
– When dubbing the title recorded in MN6 mode or longer duration mode to a DVD+RW/DVD+R.
– When dubbing the title recorded in HQ+ mode to a DVD.

Dubbing Using Dubbing List

HDD +RW -RWVR -RWVideo +R -RVR -RVideo

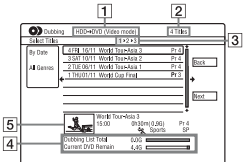
You can select the titles you want to dub using Dubbing List. You can also edit titles before dubbing without changing the original titles.

1 Press SYSTEM MENU.
The System Menu appears.

2 Select “Dubbing,” and press ENTER.

3 Select a dubbing direction, and press ENTER.
To dub titles from the HDD to a disc, select “HDD -> DVD.”
To dub titles from a disc to the HDD, select “DVD/CD -> HDD.”

4 Select “Create New Dubbing List,” and press ENTER.
The Dubbing List appears.
- If you have previously saved a Dubbing List and want to resume editing it, select “Use Previous Dubbing List,” and go to step 7.



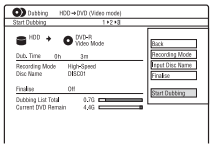
1 Direction of dubbing
2 Total number of titles to be dubbed
3 Dubbing step number
Display 1: Select a title you want to dub (the “Select Titles” display).
Display 2: Edit a title (the “Title Edit” display).
Display 3: Confirm the settings and start dubbing (the “Start Dubbing” display).
4 Total size of the selected titles and available space on the disc to be dubbed (approximate)
5 Selected title’s thumbnail picture

5 Select a title, and press ENTER.
The selected title changes colour.
When you select “HDD -> DVD” in step 3, you can change the title order or search for a title by genre (see “3. Playing the Recorded Programme (Title List)” on page 38).

6 Repeat step 5 to select all of the titles in the order you want to dub.

7 Select “Next” using ➡, and press ENTER.
The “Title Edit” display appears.
For details about editing, see “To edit titles on the Dubbing List” on page 102.

8 Select “Next” using ➡, and press ENTER.
The “Start Dubbing” display appears.



9 Select an option using ↑/↓, and press ENTER.
The options differ depending on the dubbing direction or disc type.
“Recording Mode”: Changes the dubbing mode of all selected titles at a time using ↑/↓ (page 71).
“Input Disc Name”: Changes the disc name (page 42).
“Finalise”: Select “Yes” to finalise a disc automatically after dubbing (DVD-RW/DVD-R (Video mode), or DVD+R).

10 Select “Start Dubbing,” and press ENTER.
When you set “Finalise” to “Yes” in step 9, select the title menu style, and press ENTER.
The recorder turns off automatically when you do not use the recorder for more than 20 minutes after the dubbing has finished.

To cancel dubbing

Press and hold HDD/DVD DUB for more than one second.
When dubbing (Move) is stopped partway, no part of the title will be moved to the dubbing target. However, note that this will decrease the free space for DVD+Rs/DVD-Rs.

About dubbing mode

“” appears next to the title that can be dubbed at high speed (High-speed dubbing) in the “Title Edit” display. The following titles are dubbed at normal speed (Real-Time dubbing).
– Titles containing both main and sub sounds (except DVD-RWs/DVD-Rs (VR mode)).
– Titles recorded in mixed picture size (4:3 and 16:9, etc.) (except for DVD-RWs/DVD-Rs (VR mode)).
– Titles recorded on DVD+RWs/DVD-RWs (Video mode)/DVD+R/DVD-R (Video mode).
– 16:9 size titles recorded on DVD+RW/DVD+R.

The minimum required time is as follows (approximate).

Required times for High-speed Dubbing from HDD to DVD (for 60-minute programme)*1

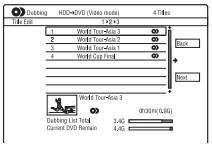
Speed*2	6x	2.4x	2x
Rec. mode	High-speed DVD+RW/ DVD-RW/ DVD+R/ DVD-R	DVD+R (Double Layer)	DVD-R (Dual Layer)
HQ	Approx. 10 min.	Approx. 25 min.	Approx. 30 min.
HSP	Approx. 6 min. 40 sec.	Approx. 16 min. 40 sec.	Approx. 20 min.
SP	Approx. 5 min.	Approx. 12 min. 30 sec.	Approx. 15 min.
LSP	Approx. 4 min.	Approx. 10 min.	Approx. 12 min.
ESP	Approx. 3 min. 20 sec.	Approx. 8 min. 20 sec.	Approx. 10 min.
LP	Approx. 2 min. 30 sec.	Approx. 6 min. 15 sec.	Approx. 7 min. 30 sec.
EP	Approx. 1 min. 40 sec. *3	Approx. 60 min. *3	Approx. 5 min.
SLP	Approx. 1 min. 15 sec. *3	Approx. 60 min. *3	Approx. 3 min. 45 sec.
SEP	Approx. 1 min. *3	Approx. 60 min. *3	Approx. 3 min. *3

*1 The values in the above table are for reference only. Actual times for dubbing also require time for creating disc’s control information and other data.
*2 This is the maximum recording speed of this recorder. The recording speed cannot exceed the value indicated in the above table even when using discs that support higher recording speeds. In addition, depending on the disc condition, the recorder may be unable to record at the maximum recording speed indicated in the table.
*3 High-speed dubbing is not available when dubbing titles recorded in SEP, SLP, or EP mode to DVD+RWs and DVD+Rs.

➡continued

To edit titles on the Dubbing List

1 Follow steps 1 to 7 of “Dubbing Using Dubbing List” on page 100.
The “Title Edit” display appears.



2 Select a title you want to edit, and press ENTER.
The sub-menu appears.

3 Select an option, and press ENTER.
The options differ depending on the dubbing direction or disc type.
“Erase”: Erases the selected title.
“Title Name”: Names or renames a title (page 42).
“A-B Erase”: Erases the section of the title (page 93).
“Move”: Changes the order of titles (page 97).
“Preview”: Allows you to check the content of a title.
“Divide”: Divides a title into two titles (page 94).
“Combine”: Combines two titles (page 97).
“Chapter Edit”: Edits chapters (page 95).
“Set Thumbnail”: Changes the title’s thumbnail frame that appears in the Title List (page 39).
“Recording Mode”: Sets the picture quality of the dubbing.
“Bilingual”: Sets how a bilingual audio programme is dubbed.
“Cancel”: Exits the sub-menu.

4 Repeat steps 2 and 3 to edit all of the titles.

5 Go to step 8 of “Dubbing Using Dubbing List” on page 100 to dub edited titles.

Notes
- The Dubbing List you created remains after dubbing. To edit the existing Dubbing List, select “Use Previous Dubbing List” in step 4. The Dubbing List is cleared when:
  – you change “Input Line System” setting in the “Basic” setup (page 130).
  – you reset the recorder (page 158).
  – you open the disc tray (except when dubbing from the HDD).
  – you edit the titles on a disc (except when dubbing from the HDD).
  – you switch the Title List to Original or Playlist (when dubbing from DVD-RWs/DVD-Rs in VR mode only).
  – you finalise the disc.
- The “seams” that are left over from editing may remain on the disc after dubbing to DVD+RWs/DVD-RWs (Video mode)/DVD+Rs/DVD-Rs (Video mode).
- Finalisation is cancelled if a timer recording starts, even if you set “Finalise” to “Yes” in step 9.

Making a Backup Disc (DVD Backup)

+RW -RW Video +R -R Video

You can dub all of the contents on a finalised DVD+RW/DVD+R or finalised DVD-RW/DVD-R (Video mode) to another recordable DVD+RW/DVD-RW or unused DVD+R/DVD-R via the HDD as a backup copy.

Note
Backup discs of unfinalised discs cannot be made.

1 **Press SYSTEM MENU.**
The System Menu appears.

2 **Select “Dubbing,” and press ENTER.**

3 **Select “DVD Backup,” and press ENTER.**

4 **Select “Start new DVD Backup,” and press ENTER.**
- If you have previously dubbed backup data to the HDD, select “Resume writing data,” and go to step 7.

5 **Insert the DVD you are going to make a backup of.**

6 **Select “Start,” and press ENTER.**
The recorder starts dubbing all of the contents on a DVD to the HDD.

7 **Press ⏏ (open/close), and replace the DVD with a recordable DVD+RW/DVD-RW or an unused DVD+R/DVD-R.**
To make a backup disc of DVD+RWs/DVD+Rs, insert a recordable DVD+RW or unused DVD+R.
To make a backup disc of DVD-RWs/DVD-Rs, insert a recordable DVD-RW or unused DVD-R.

8 **Select “Start,” and press ENTER.**
The recorder starts High-speed dubbing the contents that were dubbed to the HDD in step 6.

9 **Select “Cancel,” and press ENTER.**
The disc is automatically finalised.
- To make another backup disc, replace discs, select “Start,” and press ENTER.

10 **Select “Yes” or “No,” and press ENTER.**
To erase the backup data on the HDD, select “Yes.”
To make another backup disc later, select “No.”
The recorder turns off automatically when you do not use the recorder for more than 20 minutes after the dubbing has finished.

To display the dubbing information
Press DISPLAY while dubbing.

To cancel DVD backup during dubbing
Press and hold HDD/DVD DUB for more than one second.

To erase backup data on the HDD

1 Select “Erase back-up data” in step 4, and press ENTER.
The display asks for confirmation.

2 Select “Yes,” and press ENTER.

Notes
- When dubbing to a DVD+R/DVD-R is stopped partway in step 8, you cannot play or record on the disc.
- You cannot make a backup disc of DVD+R DLs/DVD-R DLs.
- You may not use the “DVD Backup” function depending on the recording quality or physical condition of the disc, or characteristics of the recording device and authoring software.

DV Camcorder Dubbing

Before DV Camcorder Dubbing

This section explains dubbing with a DV camcorder and playing the contents of a DV camcorder via the DV IN jack on the front panel. If you want to dub by way of the LINE IN jacks, see “Recording from Connected Equipment” on page 79.
The DV IN jack on this recorder conforms to the i.LINK standard.
Follow the instructions in “Preparing for DV camcorder dubbing,” and then move on to the section on dubbing. For more information about i.LINK, see “About i.LINK” on page 163.

How chapters are created
The contents dubbed to the HDD or DVD become a single title. This title is divided into chapters. When dubbing to the HDD or a DVD-RW/DVD-R (VR mode) and when “Auto Chapter (HDD/VR)” is set to “On” in the “Recording” setup (page 143), each shooting session on the tape becomes a chapter on the disc. For other discs, the recorder divides the title into chapters according to the “Auto Chapter (Video)” or “Auto Chapter (DVD+R/+RW)” setting in the “Recording” setup (page 143).

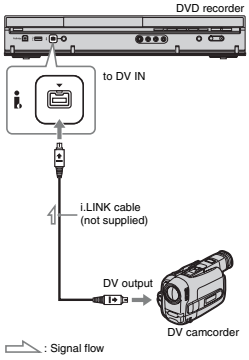
Preparing for DV camcorder dubbing

You can connect a digital video camera to the DV IN jack on the recorder to record or edit from a DV/Digital8 format tape. Operation is straightforward because the recorder will fast forward and rewind the tape for you – you do not need to operate your digital video camera. Do the following to start using the “Manual Dubbing” functions of this recorder.
See the instruction manual supplied with the digital video camera as well before connecting.

Hint
If you plan to do additional editing on a disc after the initial dub, use the DV IN jack and record on a DVD-RW/DVD-R (VR mode) or HDD.

Notes
- You cannot make a recording while DV camcorder dubbing.
- The DV IN jack is for input only. It will not output signals.
- You cannot use the DV IN jack when:
  – signal input to the DV IN jack on the front panel or recorder operation cannot be performed correctly when using a digital video camera (see “About i.LINK” on page 163). Connect the camera to the LINE IN jack and follow the instructions of “Recording from Connected Equipment” on page 79.
  – the input signal is not in DVC-SD format. Do not connect a MICRO MV format digital video camera even if it has an i.LINK jack.
  – the images on the tape contain copy protection signals, which limit recording.
- If you want to play DVDs dubbed from a DV camcorder on other DVD equipment, finalise the disc (page 45).
- Set the recorder and DV camcorder to the same colour system (page 130).

Hookups



1 **Press HDD or DVD to select the recording destination.**
If you select DVD, insert a disc (see “1. Inserting a Disc” on page 36).

2 **Insert the source DV/Digital8 format tape into your digital video camera.**
For the recorder to record or edit, your digital video camera must be set to video playback mode.

3 **Press REC MODE on the remote repeatedly to select the recording mode.**
The recording mode changes as follows:
HQ → HSP → SP → LSP → ESP → MN ← SEP ← SLP ← EP ← LP ←
For details about the recording mode, see page 71. Note that you cannot select manual recording mode.

4 **Set the “External Audio” setting in the “Audio In” setup (page 138).**

5 **Set the “DV Input” setting in the “Audio In” setup (page 138).**
You are ready to start dubbing. Select one of the dubbing methods on the following pages.

To playback DV/Digital8 format tape
You can check the contents of DV/Digital8 format tape before dubbing. For details, see “Playing from a DV Camcorder” on page 107.

Hint
The recorder completes dubbing even after being turned off.

Notes
- You cannot connect more than one piece of digital video equipment to the recorder.
- You cannot control the recorder using another device or another recorder of the same model.
- You cannot record date, time, or the contents of the cassette memory onto the disc.
- If you record from a DV/Digital8 format tape that is recorded in multiple sound tracks, such as a tape with multiple sampling frequencies (48 kHz, 44.1 kHz, or 32 kHz), no sound or an unnatural sound will be output when playing back the sampling frequency switch point on the disc.
- In order to use this recorder’s “Auto Chapter” setting (page 104), be sure to correctly set the clock on your digital video camera before shooting.
- The recorded picture may be momentarily affected or the start and end points of a title may be different from what you have set if the source DV/Digital8 format tape is in any of the following conditions. In this case, see “Recording from Connected Equipment” (page 79).
  – There is a blank space in the recorded portion of the tape.
  – The tape’s time code is not sequential.
  – If the picture size or the recording mode on the tape being dubbed changes.
- A blank or black coloured screen will be dubbed when the recorder is set to a different colour system from the DV tape contents’ system. Set “Input Line System” in the “Basic” setup to the same colour system as the DV tape contents’ system (page 130).

Dubbing an Entire DV Format Tape (DV One Touch Dubbing)

HDD +RW -RWVR -RWVideo +R -RVR -RVideo

You can record the entire contents of a DV/Digital8 format tape onto a disc with a single press of the ONE-TOUCH DUB button on the recorder. The recorder controls the digital video camera for the whole process, and completes the recording.

Follow steps 1 to 5 of "Preparing for DV camcorder dubbing" on page 104, and press ONE-TOUCH DUB on the recorder.
The recorder rewinds the tape and then starts recording the tape contents.
After the recording is finished, the recorder rewinds the tape in the digital video camera, and finalises the recorded disc (except DVD-RW/DVD-R (VR mode)) automatically.

To stop during recording
Press ■ REC STOP more than 3 seconds. Note that it may take a few seconds for the recorder to stop recording.

Hint
You can also start DV One Touch Dubbing by selecting "One-Touch Dubbing" of "DV" in the System Menu.

Notes
- When a blank space between the recordings on the tape continues for more than two minutes, DV One Touch Dubbing ends automatically.
- The recorder will pause recording when there is a blank space or an image containing copy protection signals on the tape. The recorder will resume recording automatically when receiving a recordable signal.
- Finalisation is cancelled if a timer recording starts (except for DVD-RW/DVD-R (VR mode)).
- DV One Touch Dubbing ends automatically when there are images containing copy protection signals at the beginning of the tape.

Dubbing Selected Scenes (Manual Dubbing)

HDD +RW -RWVR -RWVideo +R -RVR -RVideo

You can select and dub scenes while playing a DV/Digital8 format tape.

1 **Follow steps 1 to 5 of "Preparing for DV camcorder dubbing" on page 104.**
2 **Press SYSTEM MENU.**
The System Menu appears.
3 **Select "DV," and press ENTER.**
4 **Select "Manual Dubbing," and press ENTER.**
5 **Select the recording destination, "Record to Hard Disk Drive" or "Record to DVD," and press ENTER.**
6 **Press ▷.**
The scene starts to play.
7 **Find the point on the DV/Digital8 format tape that you want to start dubbing from using ◀◀/▶▶ or ◀II/II▶, and press II.**
8 **Select "Start Rec.," and press ENTER.**
The recorder starts dubbing.
9 **Select "Pause Rec," and press ENTER.**
The recorder pauses dubbing.
10 **Repeat steps 6 to 9 to dub more scenes.**
11 **Select "Stop Rec," and press ENTER.**
The selected scenes are dubbed as a single title.

To cancel during "Manual Dubbing"
Press SYSTEM MENU.

Hint
You can turn off the dubbing menu by pressing the DISPLAY button during dubbing. Press the DISPLAY button again to display the dubbing menu.

Note
You cannot set a scene to be shorter than one second.

Playing from a DV Camcorder

1 **Connect your DV camcorder to the DV IN jack on the front panel.**
2 **Press SYSTEM MENU.**
The System Menu appears.
3 **Select "DV," and press ENTER.**
4 **Select "Playback," and press ENTER.**
5 **Start playback on the DV camcorder.**
Images from the DV camcorder appear on your TV screen.

To cancel playback
Press SYSTEM MENU.

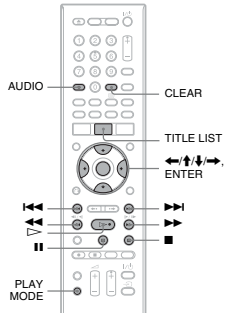
Hint
You can dub the playing tape contents. During playback, press HDD or DVD to select the dubbing destination, and press ● REC. To stop dubbing, press ■ REC STOP.

Audio Tracks

Playing Audio Tracks from CD/DVD

CD DATA DVD DATA CD

You can play audio tracks on CDs, DATA DVDs (DVD-ROMs/DVD+RWs/DVD+Rs/DVD-RWs/DVD-Rs/DVD-RAMs), or DATA CDs (CD-ROMs/CD-Rs/CD-RWs).



1 **Insert a disc.**
See "1. Inserting a Disc" on page 36.
2 **Press ▷.**
Playback starts.

To stop playback
Press ■ (stop).

Hint
You can play audio tracks using the Title List. Press TITLE LIST. Then select a track, and press ENTER.

Note
When any video titles are recorded on a DATA DVD, the MP3 audio tracks on that DATA DVD cannot be played.

To lock the recorder (Child Lock)
You can lock all of the buttons on the recorder so that the settings are not cancelled by mistake.
When the recorder is turned off, hold down ■ on the recorder until "LOCKED" appears in the front panel display. The recorder does not work except for timer recordings while the Child Lock is set.

To unlock the recorder, hold down ■ on the recorder until "UNLOCKED" appears in the front panel display.

Playback options

CD DATA DVD DATA CD

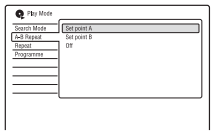
Buttons	Operations
AUDIO	Selects stereo or monaural audio tracks recorded on the disc when pressed repeatedly in normal playback mode.
I◀◀ /▶▶I (previous/ next)	Goes to the next or previous track when pressed during playback. For MP3 discs, goes to the next or previous album when pressed repeatedly.
◀◀/▶▶ (fast reverse/fast forward)	Fast reverses/fast forwards the disc when pressed during playback. Search speed changes as follows: fast reverse ← fast forward ◀◀FR1 ← → ▶▶FF1 ◀◀FR2 ← ← → → ▶▶FF2 When you press and hold the button, fast forward/fast reverse continues at the selected speed until you release the button. To resume normal playback, press ▷.
II (pause)	Pauses playback. To resume normal playback, press ▷.

Notes on playing DTS sound tracks on a CD
- When playing DTS-encoded CDs, excessive noise will be heard from the LINE 3-TV/LINE 1/DECODER/LINE 2 OUT (R-AUDIO-L) jacks. To avoid possible damage to the audio system, the user should take proper precautions when the LINE 3-TV/LINE 1/DECODER/LINE 2 OUT (R-AUDIO-L) jacks of the recorder are connected to an amplification system. To enjoy DTS Digital Surround™ playback, an external DTS decoder must be connected to the DIGITAL OUT jack of the recorder.
- Set the sound to "Stereo" using the AUDIO button when you play DTS sound tracks on a CD (page 108).

Playing a specific portion repeatedly (A-B Repeat)

CD

1 **Press PLAY MODE during playback.**
The "Play Mode" menu appears.
2 **Select "A-B Repeat," and press ENTER.**
"Set point A" is selected.



3 **While monitoring the sound, press ENTER at the starting point (point A) of the portion to be played repeatedly.**
"Set point B" is selected.
4 **Continue playing to locate the ending point (point B), and press ENTER.**
A-B Repeat starts.

To cancel A-B Repeat
Press CLEAR. Or, set "A-B Repeat" to "Off" in the "Play Mode" menu.

Hint
You can select "A-B Repeat" from "Play Mode" in the System Menu.

Note
"A-B Repeat" is not available for MP3 audio tracks.

Playing repeatedly (Repeat)

CD DATA DVD DATA CD

You can play repeatedly all the tracks or a single track on an album or disc.

1 **Press PLAY MODE during playback.**
The "Play Mode" menu appears.
2 **Select "Repeat," and press ENTER.**
3 **Select an item to be repeated using ↑/↓.**
"Repeat Disc": repeats all of the tracks on a disc.
"Repeat Album" (except for CD): repeats the current album.
"Repeat Track": repeats the current track.
"Repeat Programme": repeats the current programme (page 110).
4 **Press ENTER.**
Repeat play starts.

To cancel Repeat play
Press CLEAR. Or, set "Repeat" to "Repeat Off" in the "Play Mode" menu.

Hint
You can select "Repeat" from "Play Mode" in the System Menu.

Note
You can select "Repeat Programme" only during Programme play.

→continued

Creating your own programme (Programme)

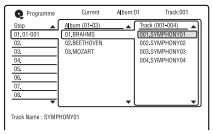
CD DATA DVD DATA CD

You can play the contents of an album or disc in the order you want by arranging the order of the albums/tracks on a disc to create your own programme. You can make a programme of up to 24 steps.

1 **Press PLAY MODE during playback.**
The “Play Mode” menu appears.

2 **Select “Programme,” and press ENTER.**

3 **Select “Input/Edit Programme,” and press ENTER.**
The “Input/Edit Programme” display differs depending upon the disc type.
Example: DATA DVD



4 **Select an album (example: 01.BRAHMS) using ↑/↓, and press →.**

5 **Select a track (example: 001.SYMPHONY01) using ↑/↓, and press ENTER.**
The track is programmed.
If you make a mistake, select the step number (example: 01-001) using ←/↑/↓, and press CLEAR.

6 **To programme other tracks, press ←/↑/↓/→ to select a step number, and repeat steps 4 and 5.**

7 **Press ▷.**
Programme play starts.

To cancel Programme play
Press CLEAR during playback. Or, set “Programme” to “Cancel Programme Play” in the “Play Mode” menu.

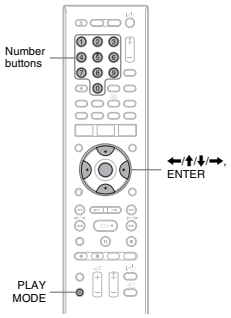
To erase the programme
Press CLEAR in stop mode. Or, set “Programme” to “Erase Programme List” in the “Play Mode” menu.

Hints
- The programme you made remains after Programme play finishes. To play the same programme again, set “Programme” to “Start Programme Play” in the “Play Mode” menu. However, the programme is cleared after you remove the disc or press I/⏻.
- You can repeat Programme play. Set “Repeat” to “Repeat Programme” in the “Play Mode” menu (page 109).
- You can select “Programme” from “Play Mode” in the System Menu.

Searching for an Audio Track

CD DATA DVD DATA CD

You can search a disc by album or track. As albums and tracks are assigned individual numbers, select the album or track by entering its number.

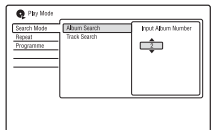


1 **Press PLAY MODE during playback.**
The “Play Mode” menu appears.

2 **Select “Search Mode,” and press ENTER.**

3 **Select a search method, and press ENTER.**
“Album Search” (except for CD)
“Track Search”

The display for entering the number appears.
Example: Album Search



4 **Press the number buttons to select the number of the album or track you want.**
If you make a mistake, select another number.

5 **Press ENTER.**
The recorder starts playback from the selected number.

Hint
You can select an album or track using ↑/↓ in step 4.

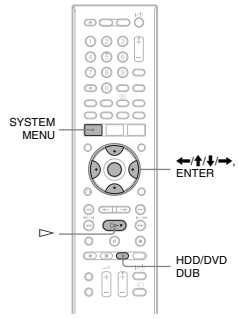
About Jukebox

There are two methods to use Jukebox: connecting the USB device or copying audio tracks to the HDD.
When using Jukebox, you can do followings:
- Store audio tracks on the HDD.
- Play audio tracks using various play modes.
- Label tracks or albums.
- Assign albums a genre.
- Change the track order.

Notes on copying
- You cannot copy audio tracks on the HDD to discs or USB devices.
- Some audio tracks may not be copied depending on the file size.
- You cannot copy audio tracks if the HDD is full or almost full.
- An album name and MP3 audio track name are also copied. However, there may be some names that cannot be copied.
- When copying is stopped partway, tracks finished copying before you stop will remain copied onto the HDD as an album. See the Album List to check which albums have been copied (page 114).
- When copying audio tracks from a CD, the album name is labelled as “F_***” and the audio track names are labelled as “T_***” automatically.
- During copying, other operations cannot be performed.
- While copying, timer recordings are unavailable. If the timer is set during copying, the recorder starts the timer recording after copying is finished.
- Copy-protected CDs cannot be copied to the HDD.

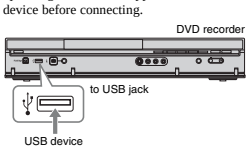
Preparing for Using Jukebox

Connect a USB device to the USB jack on the recorder, or copy audio tracks from CDs/ DATA CDs/DATA DVDs or the connected USB device to the HDD.



Connecting the USB device

You can connect a USB device to the USB jack on the recorder to listen to the MP3 audio tracks or copy to the HDD. Refer to the operating instructions supplied with the USB device before connecting.



Copying audio tracks (DISC → HDD)

1 **Insert a disc that you are going to copy to the HDD.**

2 **Press ▷ to start playback.**

3 **Press HDD/DVD DUB.**
For CDs, all the tracks on the disc are copied to the HDD.
For DATA CDs/ DATA DVDs, the current album is copied to the HDD.

To cancel copying
Press ENTER.

Hint
You can copy all the contents on the disc by selecting “DVD/CD -> HDD” in “Dubbing” in the System Menu.

Copying an album (USB → HDD)

You can copy up to 99 albums or 999 tracks on the USB device to the HDD.

1 **Connect the USB device to the USB jack on the recorder (page 112).**

2 **Press SYSTEM MENU.**
The System Menu appears.

3 **Select “Music Jukebox,” and press ENTER.**

4 **Select “Listen to Music from USB Device,” and press ENTER.**
The Album List appears.

5 **Select an album, and press →.**

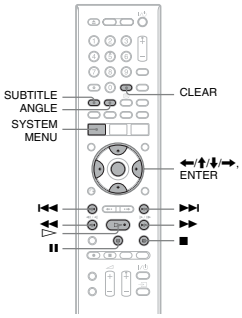
6 **Select “Edit” using ↑/↓, and press ENTER.**
The sub-menu appears.

7 **Select “Copy Album,” and press ENTER.**
The display asks for confirmation.

8 **Select “Yes” using ←/→, and press ENTER.**
The selected album is copied to the HDD.
• To copy more albums, go to step 5.

To cancel copying
Press ENTER.

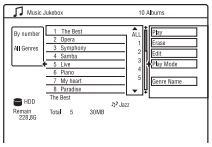
Playing Audio Tracks Using Jukebox/USB Device



1 Press SYSTEM MENU.
The System Menu appears.

2 Select "Music Jukebox," and press ENTER.

3 Select "Listen to Music / Edit" or "Listen to Music from USB Device," and press ENTER.
To listen to the audio tracks on the HDD, select "Listen to Music / Edit."
To listen to the MP3 audio tracks from the connected USB device, select "Listen to Music from USB Device."
The Album List appears.



4 Select an album or track, and press ENTER.
Playback starts from the selected album or track.

To stop playback
Press ■ (stop).

To scroll the list display by page (Page mode)
Press SUBTITLE (previous)/ANGLE (next) while the Album List is displayed. Each time you press SUBTITLE (previous)/ANGLE (next), the entire Album List changes to the next/previous page of the album.

To change the album order (Sort Titles) (HDD only)
1 Press ← while the Album List is displayed.
2 Select "Sort Titles" using ↑/↓, and press ENTER.
3 Select the item using ↑/↓, and press ENTER.

Order	Sorted
By number	In order of album number.
By favourite	In order of playback times. The album that is most often played is listed at the top.
By album	In alphabetical order.

To search for the album by genre (Genre) (HDD only)
1 Press ← while the Album List is displayed.
2 Select "Genre" using ↑/↓, and press ENTER.
3 Select the genre using ↑/↓, and press ENTER.
The albums in the selected genre appear.
To display all albums, select "All Genres."

To skip a track (Set Skip)
If you want a track not to play, set the track to be skipped.
1 Select a track you want to skip.
2 Press → while the Album List is displayed.
3 Select "Edit" using ↑/↓, and press ENTER.
4 Select "Set Skip" using ↑/↓, and press ENTER.
"✓" appears next to the selected track.
To cancel, select "Set Skip," and press ENTER again.

Playback options

Buttons	Operations
⏮/⏭ (previous/next)	Goes to the next or previous track when pressed during playback.
◀◀/▶▶ (fast reverse/fast forward)	Fast reverses/fast forwards the disc when pressed during playback. Search speed changes as follows: fast reverse fast forward ◀◀ ← → ▶▶ ◀◀ ← ← → → ▶▶ When you press and hold the button, fast forward/fast reverse continues at the selected speed until you release the button. To resume normal playback, press ▷.
❚❚ (pause)	Pauses playback. To resume normal playback, press ▷.

Playing repeatedly (Repeat)
You can play repeatedly all the tracks or a single track in the album.

1 Press → during playback.
2 Select "Play Mode," using ↑/↓, and press ENTER.
The "Play Mode" menu appears.
3 Select "Repeat," and press ENTER.
4 Select an item to be repeated using ↑/↓.
"Repeat Album": repeats the current album.
"Repeat Track": repeats the current track.
"Repeat Programme": repeats the current programme (page 116).
5 Press ENTER.
Repeat play starts.

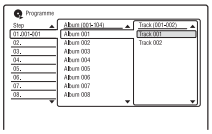
To cancel Repeat play
Set "Repeat" to "Repeat Off" in the "Play Mode" menu.

Notes
- You can select "Repeat Programme" only during Programme play.
- "A-B Repeat" is not available when using "Music Jukebox."

→continued

Creating your own programme (Programme)
You can play the contents of the HDD or connected USB device in the order you want by arranging the order of the tracks on the HDD or connected USB device to create your own programme. You can make a programme of up to 24 steps.

1 Press → while the Album List is displayed.
2 Select "Play Mode," using ↑/↓, and press ENTER.
The "Play Mode" menu appears.
3 Select "Programme," and press ENTER.
4 Select "Input/Edit Programme," and press ENTER.



5 Select an album (example: Album 001) using ↑/↓, and press →.
6 Select a track (example: Track 001) using ↑/↓, and press ENTER.
The track is programmed.
If you make a mistake, select the step number (example: 01.) using ←/↑/↓, and press CLEAR.
7 To programme other tracks, press ←/↑/↓/→ to select a step number, and repeat steps 5 and 6.
8 Press ▷.
Programme play starts.

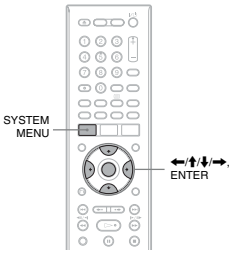
To cancel Programme play
Set "Programme" to "Cancel Programme Play" in the "Play Mode" menu during playback.

To erase the programme
Set "Programme" to "Erase Programme List" in the "Play Mode" menu.

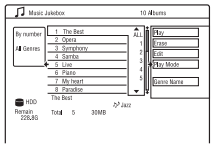
Hints
- You can select and play a track that is set to "Set Skip."
- The programme you made remains after Programme play finishes. To play the same programme again, set "Programme" to "Start Programme Play" in the "Play Mode" menu. However, the programme is cleared after you press I/⏻.
- You can repeat Programme play. Set "Repeat" to "Repeat Programme" in the "Play Mode" menu (page 115).

Managing Audio Tracks on the Music Jukebox

You can erase or label albums/tracks on the HDD. You can also assign an album a genre.



1 Press SYSTEM MENU.
The System Menu appears.
2 Select "Music Jukebox," and press ENTER.
3 Select "Listen to Music / Edit," and press ENTER.
The Album List appears.



4 Select an album or track, and press →.
5 Select an option, and press ENTER.
"Erase": Erases the selected album/track. Select "Yes" when asked for confirmation.
"Edit": Allows you to make the following edits.
- "Album Name": Allows you to enter or re-enter an album name (page 42).
- "Track Name": Allows you to enter or re-enter a track name (page 42).
- "Set Genre": Assigns an album a genre.
- "Set Skip": Sets a track to be skipped (page 115).

"Play Mode": Selects play modes (page 115).
"Genre Name": Allows you to enter a genre name (up to 12 characters) (page 42).

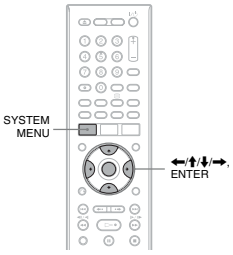
Note
You cannot edit audio tracks on the connected USB device.

About the “Photo Album” Function

The “Photo Album” function enables you to do following.
- Store JPEG image files on the HDD.
- View JPEG image files on the HDD, DATA DVDs (DVD-RWs/DVD-Rs)/DATA CDs, or connected USB device.
- Edit JPEG image files.
- Print JPEG image files.
- Copy JPEG image files and slideshow to DVD-RWs/DVD-Rs.

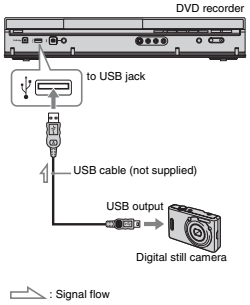
Preparing for Using the “Photo Album” Function

Connect a USB device to the USB jack on the recorder, or copy JPEG image files from DATA CDs/DATA DVDs or the connected USB device to the HDD.



Connecting the USB device

You can connect a USB device (digital still camera, Memory card reader, and USB memory) to the USB jack on the recorder to view JPEG image files or copy to the HDD. Refer to the operating instructions supplied with the USB device before connecting.



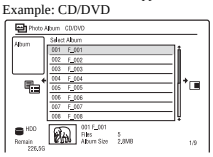
Copying JPEG image files to the HDD (DISC/USB → HDD)

1 **Insert a disc that you are going to copy to the HDD or connect the USB device to the USB jack on the recorder.**

2 **Press SYSTEM MENU.**
The System Menu appears.

3 **Select “Photo Album,” and press ENTER.**
The “Photo Album” menu appears.

4 **Select the item, and press ENTER.**
To copy from DATA CDs/DATA DVDs (DVD-RWs/DVD-Rs), select “View Photos on a CD/DVD.”
To copy from the connected USB device, select “View Photos on a USB Device.”
The “Photo Album” list appears.
Example: CD/DVD



5 **Select an album or JPEG image file using ↑/↓, and press →.**
The sub-menu appears.

6 **Select an item, and press ENTER.**
To copy two or more albums or JPEG image files, select “Multi-Mode.”
To copy all the albums and JPEG image files, select “Copy all to HDD,” and go to step 11.
To copy the album or file selected in step 5 only, select “Copy to HDD,” and go to step 11.

7 **Select an album or JPEG image file, and press ENTER.**
A check mark appears in the check box by the selected item.
- To clear the check mark, press ENTER again.
- To clear all check marks, press → to select “Single-Mode” from the sub-menu.

8 **Repeat step 7 to select all of the albums or JPEG image files you want to copy.**

9 **Press →.**
The sub-menu appears.

10 **Select “Copy to HDD,” and press ENTER.**
The display asks for confirmation.

11 **Select “Yes,” and press ENTER.**
- To cancel, select “No.”

Copying all JPEG image files from the connected USB device (USB → DVD-RW/DVD-R)

1 **Connect the USB device to the USB jack on the recorder.**

2 **Insert a blank DVD-RW/DVD-R (Video mode).**

3 **Press SYSTEM MENU.**
The System Menu appears.

4 **Select “Photo Album,” and press ENTER.**
The “Photo Album” menu appears.

5 **Select “Copy Photos from a Digital Camera,” and press ENTER.**
The display asks for confirmation.

6 **Select “Yes,” and press ENTER.**
- To cancel, select “No.”

Hint
See “8. Reformatting a Disc” (page 47) to format DVD-RWs/DVD-Rs in Video mode.

Notes
- During copying, other operations cannot be performed.
- While copying JPEG image files, timer recordings are unavailable. If the timer is set during copying, the recorder starts the timer recording after copying is finished.

Copying JPEG image files or albums on the HDD (HDD ↔ HDD)

1 **Press SYSTEM MENU.**
The System Menu appears.

2 **Select “Photo Album,” and press ENTER.**
The “Photo Album” menu appears.

3 **Select “View/Edit Photos on the HDD,” and press ENTER.**
The “Photo Album” list appears.

4 **Select an album using ↑/↓.**
To copy the selected album, go to step 6.
To copy a JPEG image file, go to step 5.

→continued

5 **Press ENTER, and select a JPEG image file using ↑/↓.**

6 **Press →.**
The sub-menu appears.

7 **Select an item, and press ENTER.**
To copy two or more albums or files, select “Multi-Mode.”
To copy the selected album, select “Copy Album Contents” in “Album Options,” and go to step 12.
To copy the selected files, select “Copy” in “File Options,” and go to step 12.

8 **Select an album or JPEG image file, and press ENTER.**
A check mark appears in the check box by the selected item.
- To clear the check mark, press ENTER again.
- To clear all check marks, select “Single-Mode.”

9 **Repeat step 8 to select all of the albums or JPEG image files you want to copy.**

10 **Press →.**
The sub-menu appears.

11 **Select “Copy,” and press ENTER.**

12 **Select the destination album using ↑/↓, and press ENTER.**
- To cancel, select “No.”

Note
Albums or JPEG image files are not copied to the HDD in the following cases.
– when the HDD disc space is insufficient for copying.
– when there are already the maximum number of files and/or albums on the HDD.

Copying JPEG image albums to a disc (HDD → DVD-RW/DVD-R)

You can copy the edited JPEG image albums to a DVD-RW/DVD-R (Video mode).
A slideshow is also recorded to the disc as a video file. You can play the slideshow on other DVD equipment that may not be compatible with the playback of JPEG image files.

1 **Insert a DVD-RW/DVD-R (in Video mode).**

2 **Press SYSTEM MENU.**
The System Menu appears.

3 **Select “Photo Album,” and press ENTER.**
The “Photo Album” menu appears.

4 **Select “View/Edit Photos on the HDD,” and press ENTER.**
The “Photo Album” list appears.

5 **Select an album using ↑/↓, and press →.**
The sub-menu appears.

6 **Select “Multi-Mode,” and press ENTER.**
To copy the album selected in step 5 only, go to step 10.

7 **Select an album, and press ENTER.**
A check mark appears in the check box by the selected item.
- To clear the check mark, press ENTER again.
- To clear all check marks, select “Single-Mode.”

8 **Repeat step 7 to select all of the albums you want to copy.**

9 **Press →.**
The sub-menu appears.

10 **Select “Copy to DVD,” and press ENTER.**
The display asks for confirmation.

11 **Select “Yes,” and press ENTER.**
The selected JPEG image albums are copied in the “PICTURE” folder on the disc.
The JPEG image album names are automatically labelled as “***ALBUM.”
If you want to play the disc on other DVD equipment, finalise the disc (page 45).
- To cancel, select “No.”

Hints
- See “8. Reformatting a Disc” (page 47) to format DVD-RWs/DVD-Rs in Video mode.
- See the “Photo Album” list to check which albums have been copied (page 122).

Notes
- You may not be able to play the slideshow depending on DVD equipment.
- You cannot copy JPEG image files to a recordable DVD which has been recorded using other recorders/devices.
- DATA DVDs finalised on this recorder may not be able to play on other equipment (page 45).
- No more than 99 slideshows can be recorded to a disc.
- When copying an album containing more than 99 JPEG image files to a disc, slideshows will be created with every 99 JPEG image files and recorded to a disc.
- For DVD-Rs, the available disc space does not increase even if you erase slideshows.

Copying JPEG image files to a disc (HDD → DVD-RW/DVD-R)

You can copy the edited JPEG image files to a DVD-RW/DVD-R (Video mode).
A slideshow is also recorded to the disc as a video file. You can play the slideshow on other DVD equipment that may not be compatible with the playback of JPEG image files.

1 **Insert a DVD-RW/DVD-R (in Video mode).**

2 **Press SYSTEM MENU.**
The System Menu appears.

3 **Select “Photo Album,” and press ENTER.**
The “Photo Album” menu appears.

4 **Select “View/Edit Photos on the HDD,” and press ENTER.**
The “Photo Album” list appears.

5 **Select an album using ↑/↓, and press ENTER.**
The photo list appears.

6 **Select a JPEG image file using ↑/↓, and press →.**
The sub-menu appears.

7 **Select “Multi-Mode,” and press ENTER.**
To copy the JPEG image file selected in step 6 only, go to step 11.

8 **Select a JPEG image file, and press ENTER.**
A check mark appears in the check box by the selected item.
- To clear the check mark, press ENTER again.
- To clear all check marks, select “Single-Mode.”

9 **Repeat step 8 to select all of the JPEG image files you want to copy.**

10 **Press →.**
The sub-menu appears.

11 **Select “Copy to DVD,” and press ENTER.**
The display asks for confirmation.

12 **Select “Yes,” and press ENTER.**
The selected JPEG image files are copied in the “PICTURE” folder on the disc.
The JPEG image file names are automatically labelled as “PHOT****.”
If you want to play the disc on other DVD equipment, finalise the disc (page 45).
- To cancel, select “No.”

To select a JPEG image file from a different album

1 Switch to the album list in step 8.
For instructions, see “To switch between the album list and JPEG image file list” on page 123.

2 Select an album using ↑/↓, and press ←.

→continued

3 Switch to the JPEG image file list.
For instructions, see “To switch between the album list and JPEG image file list” on page 123.

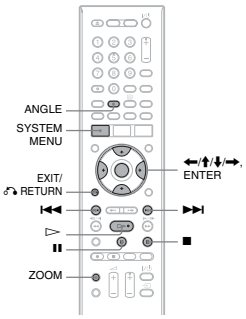
4 Select a JPEG image file using ↑/↓, and press ENTER.

Hints
- See “8. Reformatting a Disc” (page 47) to format DVD-RWs/DVD-Rs in Video mode.
- See the “Photo Album” list to check which albums have been copied (page 122).

Notes
- You may not be able to play the slideshow depending on DVD equipment.
- You cannot copy JPEG image files to a recordable DVD which has been recorded using other recorders/devices.
- DATA DVDs finalised on this recorder may not be able to play on other equipment (page 45).
- No more than 99 slideshows can be recorded to a disc.
- For DVD-Rs, the available disc space does not increase even if you erase slideshows.

Using the “Photo Album” List

You can play JPEG image files on the HDD, DATA DVDs/DATA CDs, or connected USB device using the “Photo Album” list.



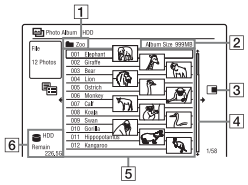
1 Press SYSTEM MENU.
The System Menu appears.

2 Select “Photo Album,” and press ENTER.
The “Photo Album” menu appears.

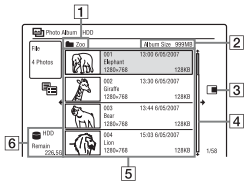
3 Select the item, and press ENTER.
To play JPEG image files on the HDD, select “View/Edit Photos on the HDD.”
To play JPEG image files on DATA CDs/DATA DVDs, select “View Photos on a CD/DVD.”
To play JPEG image files from the connected USB device, select “View Photos on a USB Device.”
The “Photo Album” list appears.

4 Select an album using ↑/↓, and press ENTER.
To show the 4-Photo List or 1-Photo List, press ← to select “Title View,” and press ENTER, then select “4 Photos” or “1 Photo” using ↑/↓, and press ENTER.

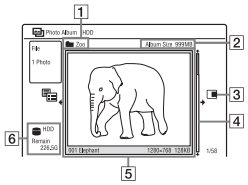
12-Photo List (Example: HDD)



4-Photo List

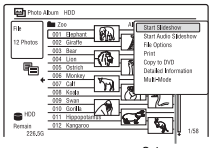


1-Photo List



1 Album name
2 Album size

3 Sub-menu:
Press → to display the sub-menu.
The sub-menu displays options applicable only to the selected item. The displayed options differ depending upon the model, situation, and disc type.



Sub-menu

4 Scroll bar:
Appears when all of the JPEG image files do not fit on the list. To view the hidden JPEG image files, press ↑/↓.

5 Album and JPEG image file information:
Displays the image, JPEG image file number, recording date and time, JPEG image file name, and JPEG image file size.

6 Disc type and remaining space of current disc

To scroll the list display by page (Page mode)
Press I◄◄ /►►I while the “Photo Album” list is displayed. Each time you press I◄◄ / ►►I, the entire “Photo Album” list changes to the next/previous page of albums/JPEG image files.

To switch between the album list and JPEG image file list

1 Press ← while the “Photo Album” list is displayed.

2 Select “Display Mode” using ↑/↓, and press ENTER.

3 Select “File” or “Album” using ↑/↓, and press ENTER.

To turn off the “Photo Album” list
Press SYSTEM MENU.

→continued

To reload the files or folders
When a disc or the connected USB device contains 1,000 or more files and/or 100 or more folders, select “Read next” in the “Photo Album” list, and press ENTER to view unloaded files or folders.
It may take a few minutes to load files or folders.

Note
The thumbnail for a file that cannot be playable on the recorder is displayed as “ ”.

Viewing a JPEG image file

1 Follow steps 1 to 4 of “Using the “Photo Album” List.”
The “Photo Album” list appears.
Switch to the album list, if necessary.

2 Select a JPEG image file using ↑/↓, and press ENTER.
The selected JPEG image file is displayed on the entire screen.

To display the detailed information

1 Select a JPEG image file, and press →.

2 Select “Detailed Information,” and press ENTER.
The detailed information for the selected JPEG image file appears.

Playing a slideshow

1 Follow steps 1 to 4 of “Using the “Photo Album” List.”
The “Photo Album” list appears.
Switch between the album list and JPEG image file list, if necessary.

2 Select an album or JPEG image file using ↑/↓, and press ▷.
The slideshow starts.
If you press ▷ while selecting a JPEG image file, the slideshow starts from the selected JPEG image file.

To play a slideshow with the sound (HDD only)
You can enjoy a slideshow while listening to the sound stored in the HDD.

1 Select “View/Edit Photos on the HDD” in step 3 of “Using the “Photo Album” List” on page 122.
The “Photo Album” list appears.
Switch between the album list and JPEG image file list, if necessary.

2 Select an album or JPEG image file using ↑/↓, and press →.

3 Select “Start Audio Slideshow,” and press ENTER.

4 Select a genre using ←/→.
For details about assigning a genre, see “Managing Audio Tracks on the Music Jukebox” on page 117.

5 Select “Start,” and press ENTER.
The slideshow and the playback from the first track of the selected genre start.

Notes
- Depending on the aspect ratio, some pictures may be displayed with black bands at top and bottom, or left and right.
- Large picture files may take a few seconds to display. This is not a malfunction.
- All albums or tracks in the selected genre will be played during Slideshow even if some albums or tracks are set to skip.

To stop a slideshow
Press ■ (stop) or ↩ RETURN.

To pause a slideshow
Press ❚❚ (pause).
Note that only slideshow pauses and the sound continues to play.

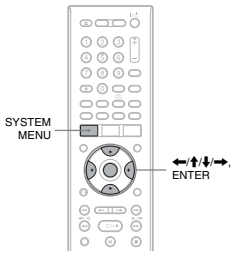
To view the next/previous image during a slideshow
Press I◄◄ /►►I.

To zoom an image
Press ZOOM repeatedly during a slideshow. Each time you press ZOOM, the magnification changes as shown below.
2× → 4× → normal magnification
You can move the area you want to zoom using ←/↑/↓/→.

To rotate an image
Press ANGLE repeatedly during a slideshow. Each time you press ANGLE, the image turns clockwise by 90°.

Hint
You can start a slideshow by selecting “Start Slideshow” from the sub-menu.

Managing JPEG Image Files on the HDD



1 Press SYSTEM MENU.
The System Menu appears.

2 Select “Photo Album,” and press ENTER.
The “Photo Album” menu appears.

3 Select “View/Edit Photos on the HDD,” and press ENTER.
The “Photo Album” list appears.

4 Select an album or JPEG image file, and press →.
The sub-menu appears.

5 Select an option, and press ENTER.
You can make the following edits to the album/JPEG image file.

“Start Slideshow”: Starts a slideshow (page 124).
“Start Audio Slideshow” (HDD only): Starts a slideshow with the sound (page 124).
“New Album”: Creates a new album.

“Album Options”
- “Erase Album”: Erases the selected album.
- “Copy Album Contents”: Copies all JPEG image files in the selected album to the HDD (page 119).

→continued

• “Rename Album”: Changes the selected album name (page 42).
• “Protect Album Contents”: Protects all JPEG image files in the selected album.
• “Cancel Protection”: Cancels protection of all JPEG image files in the selected album.

“Copy to DVD”: Copies the selected album or JPEG image file to a DVD (page 120).
“Multi-Mode”: Selects multiple albums or JPEG image files to edit.
“Copy all to HDD”: Copies all the albums and JPEG image files to the HDD (page 118).
“Copy to HDD”: Copies the selected album or JPEG image file to the HDD (page 118).

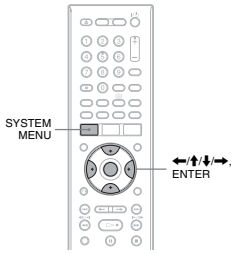
“File Options”
• “Erase”: Erases the selected JPEG image file.
• “Copy”: Copies the selected JPEG image file (page 119).
• “Rename File”: Changes the selected JPEG image file name (page 42).
• “Protect”: Protects the selected JPEG image file. Select again to cancel the protection.

“Print”: Prints the selected JPEG image file (page 126).
“Detailed Information”: Displays the detailed information for the selected JPEG image file (page 124).

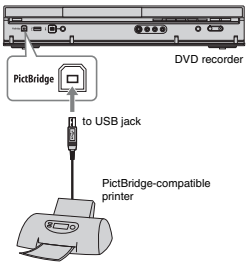
“Single-Mode”: Cancels “Multi-Mode.”

Printing JPEG Image Files

You can print JPEG image files on the HDD or connected USB device by connecting a PictBridge-compatible printer to the USB jack on the recorder.
Refer to the instructions supplied with the printer.



1 Connect a PictBridge-compatible printer to the USB jack on the recorder.



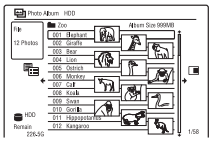
2 Connect the USB device to the USB jack on the recorder.
When printing JPEG image files on the HDD, skip this step.

3 Press SYSTEM MENU.
The System Menu appears.

4 Select “Photo Album,” and press ENTER.
The “Photo Album” menu appears.

5 Select the item, and press ENTER.
To print JPEG image files on the HDD, select “View/Edit Photos on the HDD.”
To print JPEG image files from the connected USB device, select “View Photos on a USB Device.”
The “Photo Album” list appears.

6 Select an album, and press ENTER.



7 Select a file using ↑/↓, and press →.
The sub-menu appears.

8 Select the item, and press ENTER.
To print two or more files, select “Multi-Mode.”
To print the file selected in step 7 only, go to step 12.

9 Select a file, and press ENTER.
A check mark appears in the check box by the selected item.
• To clear the check mark, press ENTER again.
• To clear all check marks, select “Single-Mode.”

10 Repeat step 9 to select all files you want to print.

11 Press →.
The sub-menu appears.

12 Select “Print,” and press ENTER.
The display asks for confirmation.

13 Select “Start,” and press ENTER.
You can set the paper size and layout. Refer to the operating instructions supplied with the printer.

To cancel printing
Press ENTER.

To display the connected printer
Select “Confirm Printer” of “USB” in the “Options 2” setup (page 150).

To restart the connected USB device
Select “Restart USB Device” of “USB” in the “Options 2” setup (page 150).

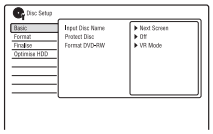
Hint
Printing options, such as paper size or layout, differ depending on the printer. For details, refer to the instructions supplied with the printer.

Disc Settings (Disc Setup)

The “Disc Setup” setup allows you to adjust DVD related settings.

1 Press SYSTEM MENU while the recorder is in stop mode.

2 Select “Disc Setup,” and press ENTER.
The “Disc Setup” setup appears with the following options. The default settings are underlined.



Basic

◆Input Disc Name
You can label a disc.
For details, see page 43.

◆Protect Disc
You can protect a disc against erasure.
For details, see page 44.

◆Format DVD-RW (DVD-RW only)
The recorder automatically starts formatting in VR mode or Video mode, whichever is selected below, when a new, unformatted DVD-RW is inserted.

VR Mode	Automatically formats the disc in VR mode.
Video Mode	Automatically formats the disc in Video mode.

Format
You can manually re-format a DVD+RW, DVD-RW, or DVD-R disc to make a blank disc.
For details, see page 47.

Finalise
Finalises a disc to play it on other DVD equipment.
For details, see page 45.

Optimise HDD
As you record, erase and edit recordings repeatedly, the HDD file system gradually becomes fragmented. To ‘clean up’ all the fragmented files, optimise the HDD periodically. When the HDD needs optimising, a message recommending optimisation will appear automatically.

1 Select “Optimise HDD” in “Disc Setup,” and press ENTER.
2 Select “Start,” and press ENTER.
A progress bar appears and the optimisation starts.
To cancel optimisation, press ENTER.
The HDD will be partly optimised.

Notes
• It will take about eight hours to optimise the HDD. During optimisation, other operations, such as recording or playback, cannot be performed.
• You cannot optimise the HDD when the HDD disc space is insufficient for optimising. Erase titles to open up disc space (page 92).

Format HDD.
You can format the HDD and resolve the problem when the hard disk error occurred. “Format HDD.” can be selected only when the hard disk needs formatting. Note that all of the recorded content on the HDD will be erased.

1 Select “Format HDD.” in “Disc Setup,” and press ENTER.
2 Select “Start,” and press ENTER.

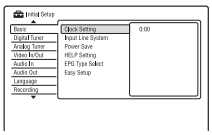
Recorder Settings (Basic)

The “Basic” setup helps you to make clock and other recorder related settings.

1 Press SYSTEM MENU while the recorder is in stop mode.

2 Select “Initial Setup,” and press ENTER.

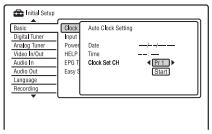
3 Select “Basic,” and press ENTER.
The “Basic” setup appears with the following options. The default settings are underlined.
To turn off the display, press SYSTEM MENU.



Clock Setting
The recorder will automatically set the clock when any digital channels have been scanned and stored.

◆Auto (Auto Clock Set)
Turns on the Auto Clock Set function when a programme position in your local area broadcasts a time signal.

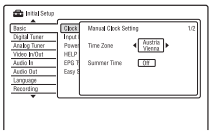
1 Select “Clock Setting” in “Basic,” and press ENTER.
2 Select “Auto,” and press ENTER.



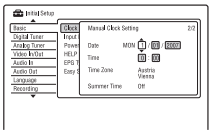
3 Press ←/→ repeatedly until the programme position of the station that carries a time signal appears.
4 Press ↓ to select “Start,” and press ENTER.
• If the recorder does not receive a time signal from any station, press ↶ RETURN and set the clock manually.
• If the Auto Clock Set function did not set the clock correctly for your local area, try another station for the Auto Clock Set function or set the clock manually.

◆Manual (Manual Clock Set)
Set the clock manually.

1 Select “Clock Setting” in “Basic,” and press ENTER.
2 Select “Manual,” and press ENTER.



3 Press ←/→ to select the time zone for your area, and press ↓.
4 Select “On” if you are now on summer time, and press ENTER.



→continued

5 Press ↑/↓ to set the day, and press →. Set the month, year, hour, and minutes in sequence. Press ←/→ to select the item to be set, then press ↑/↓ to set the numbers. The day of the week is set automatically.

To change the numbers, press ← to return to the item to be changed, and press ↑/↓.

6 Press ENTER to start the clock.

Input Line System

Selects the colour system when recording from the connected equipment.

NTSC	Records in NTSC or PAL-60 colour system.
PAL/ SECAM	Records in PAL or SECAM colour system.

Notes

- When picture noise appears after you change the "Input Line System" setting, change the "Input Colour System" setting (page 136). If picture noise still appears, hold down ■ (stop) on the recorder, and press INPUT on the recorder.
- When you change the "Input Line System" setting, the Dubbing List is erased.

Power Save

Selects whether this recorder is in power save mode when the power is turned off (standby).

Mode 1	Only antenna input signals are output to the connected TV when the recorder is in standby.
Mode 2	No input signals are output when the recorder is in standby.
Off	Does not set to power save mode. Normally, select this setting.

Note

Power Save mode does not function in the following cases, even when "Power Save" is set to "Mode 1" or "Mode 2."

– There is a timer setting with "VPS / PDC" in the SCHEDULE list.
– The SMARTLINK features are not available when "Power Save" is set to "Mode 1" or "Mode 2."

HELP Setting

On	Displays Help information for GUI displays.
Off	Does not set to HELP setting mode.

EPG Type Select

Selects the EPG (Electronic Programme Guide) type to use.

GUIDE Plus+	Select this to use the Gemstar GUIDE Plus+ electronic programme guide (page 63).
Guide (Digital)	Select this to use the digital electronic programme guide (page 48).

Easy Setup (Resetting the Recorder)

Select this to run the "Easy Setup" programme.

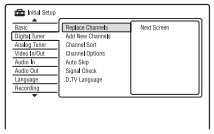
1 Select "Easy Setup" in "Basic," and press ENTER.
2 Select "Start," and press ENTER.
3 Follow the instructions for "Easy Setup" (page 26) from step 2.

Aerial Reception Settings (Digital Tuner)

The "Digital Tuner" setup helps you to make digital tuner and programme position settings for the recorder.

1 Press SYSTEM MENU while the recorder is in stop mode.
2 Select "Initial Setup," and press ENTER.
3 Select "Digital Tuner," and press ENTER.

The "Digital Tuner" setup display appears with the following options. The default settings are underlined.
To turn off the display, press SYSTEM MENU.



Replace Channels

Scans available digital channels, and replaces all the channels already stored in the channel list with the scanned results.

1 Select "Replace Channels" in "Digital Tuner," and press ENTER.
2 Select "Next Screen," and press ENTER.
3 Select your country/region using ←/→, and press ENTER.
The recorder scans available digital channels and stores them.
To cancel the scan, press SYSTEM MENU or EXIT.
If any programme positions are unused or contain unwanted channels, you can disable them (page 132).

Note

The timer settings for the replaced channels are deleted.

Add New Channels

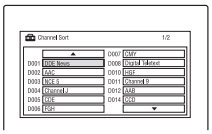
Scans digital channels and adds found channels to the channel list.

1 Select "Add New Channels" in "Digital Tuner," and press ENTER.
2 Select "Next Screen," and press ENTER.
The recorder scans channels and stores them.
To cancel the scan, press SYSTEM MENU or EXIT.

Channel Sort

After the programme positions have been set, you can change the order of each programme position in the displayed list.

1 Select "Channel Sort" in "Digital Tuner," and press ENTER.
2 Select "Next Screen," and press ENTER.



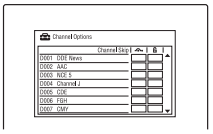
3 Press ↑/↓ to select a programme position you want to move, and press ENTER.
• To display other pages, press ↑/↓ repeatedly.
4 Press ↑/↓ to select the programme position number to swap for the one selected in step 3, and press ENTER.
The programme position numbers are swapped.
• To move other programme positions, repeat from step 3.

→continued

Channel Options

You can skip or lock certain channels.

1 Select "Channel Options" in "Digital Tuner," and press ENTER.
2 Select "Next Screen," and press ENTER.
3 Enter your four-digit password using the number buttons, and press ENTER.
To set a password, see page 145.



4 Select the programme position you want to skip or lock using ↑/↓, and press ENTER.
5 Select an option, and press ENTER.
• To skip the programme position, select .
• To lock the programme position, select .
A check mark appears in the check box next to the selected programme position.

Auto Skip

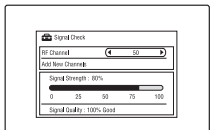
Selects whether to skip radio or data channels.

Off	No channels are skipped.
Radio	Radio channels are skipped.
Data	Data channels are skipped.
Radio & Data	Radio and data channels are skipped when selecting channels.

Signal Check

You can check the signal strength and quality of the channel.

1 Select "Signal Check" in "Digital Tuner," and press ENTER.
2 Select "Next Screen," and press ENTER.

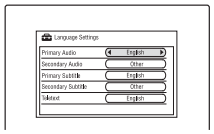


To check the signal strength and quality of other channels, select a channel using ←/→.

D.TV Language

Selects main and sub audio/subtitle languages or teletext language for bilingual programmes.

1 Select "D.TV Language" in "Digital Tuner," and press ENTER.
2 Select "Next Screen," and press ENTER.



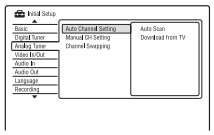
3 Select an item using ↑/↓.
4 Select a language using ←/→.

Aerial Reception Settings (Analog Tuner)

The "Analog Tuner" setup helps you to make analogue tuner and programme position settings for the recorder.

1 Press SYSTEM MENU while the recorder is in stop mode.
2 Select "Initial Setup," and press ENTER.
3 Select "Analog Tuner," and press ENTER.

The "Analog Tuner" setup appears with the following options. The default settings are underlined.
To turn off the display, press SYSTEM MENU.



Auto Channel Setting

Auto Scan

If you connect a TV to this recorder not using SMARTLINK, you can preset programme positions automatically using "Auto Scan."

1 Select "Auto Channel Setting" in "Analog Tuner," and press ENTER.
2 Select "Auto Scan," and press ENTER.
3 Select your country/region using ←/→, and press ENTER.
The programme position order will be set according to the country/region you set.
If any programme positions are unused or contain unwanted channels, you can disable them (page 134).

Download from TV

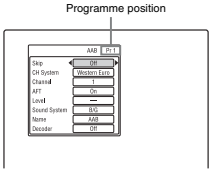
If you connect a TV to this recorder with SMARTLINK, you can preset programme positions by downloading from your TV. For details, refer to the operating instructions supplied with your TV.

1 Select "Download from TV," and press ENTER.
2 Select your country/region using ←/→, and press ENTER.
The tuner preset data will be downloaded from your TV to this recorder.
If any programme positions are unused or contain unwanted channels, you can disable them (page 134).

Manual CH Setting

Presets programme positions manually.
If some programme positions could not be set using the "Easy Setup" function, you can set them manually.
If there is no sound or if the picture is distorted, the wrong tuner system may have been preset during "Easy Setup." Set the correct tuner system manually in the steps below.

1 Select "Manual CH Setting" in "Analog Tuner," and press ENTER.
2 Select "Next Screen," and press ENTER.
3 Select your country/region using ←/→, and press ENTER.



4 Press I◄◄/►►I to select the programme position.
5 Select the item you want to change using ↑/↓, and change the settings using ←/→, then press ENTER.
• To preset another programme position, repeat from step 4.

→continued

Skip

On	Select this when the programme position is unused or contains unwanted channels. The selected position will be skipped when you press PROG +/–.
Off	Does not skip the selected programme position.

CH System

Select the region to get the best broadcast reception.

FR	Select this when in France.
Western Euro	Select this when in West European countries.
UK & IE	Select this when in Great Britain/Ireland.
Eastern Euro	Select this when in East European countries.

AFT

On	Turns on the Auto Fine Tuning function. Normally select this position.
Off	Allows you to adjust the picture manually.

• If the Auto Fine Tuning function does not work effectively, select "Off" and press ↓. Press ←/→ to obtain a clearer picture, and press ENTER.

Sound System

Select an available TV system (page 135).

B/G	Select this when in West European countries, except those listed in "Receivable channels" on page 135.
D/K	Select this when in East European countries.
I	Select this when in Great Britain/Ireland.
L	Select this when in France.

Name

Changes or enters a new station name (up to 5 characters). The recorder must receive programme position information (e.g., SMARTLINK information) for station names to appear automatically.
Press →, then press ←/→ repeatedly to select a character.
To change the characters, press ↑/↓ to move the cursor, and press ←/→.

Decoder

Sets the external decoder (PAY-TV/Canal Plus analogue decoder) channels.
For details, see page 34.

Channel

Press ←/→ repeatedly until the programme position you want is displayed.
• To select a cable or satellite programme position, press ←/→ until the programme position you want is displayed.

◆ Receivable channels

TV system	Channel coverage
BG (West European Countries, except those listed below)	E2 – E12 VHF
	Italia A – H VHF
	E21 – E69 UHF
	S1 – S20 CATV
	S21 – S41 HYPER
	S01 – S05 CATV
DK (East European Countries)	R1 – R12 VHF
	R21 – R69 UHF
	S1 – S20 CATV
	S21 – S41 HYPER
	S01 – S05 CATV
I (Great Britain/ Ireland)	Ireland A – J VHF
	South Africa 4 – 11, 13 VHF
	B21 – B69 UHF
	S1 – S20 CATV
	S21 – S41 HYPER
	S01 – S05 CATV
L* (France)	F2 – F10 VHF
	F21 – F69 UHF
	B – Q CATV
	S21 – S41 HYPER

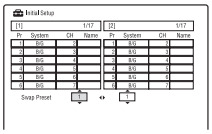
* To receive broadcasts in France, select "L."

Channel Swapping

After the programme positions have been set, you can change the order of each programme position in the display list.

1 Select "Channel Swapping" in "Analog Tuner," and press ENTER.

2 Select "Next Screen," and press ENTER.



3 Press ↑/↓ to select the programme position number you want to swap, and press →.
• To display other pages, press I◄◄ / ►►I repeatedly.

4 Press ↑/↓ to select the programme position number to swap for the one selected in step 3, and press ENTER. The programme position numbers are swapped.
• To swap the programme position number of another station, repeat from step 3.

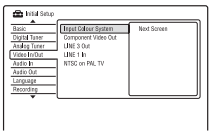
Video Settings (Video In/ Out)

The "Video In/Out" settings will adjust items related to the image, such as size and colour. Select the settings according to the type of TV, tuner, or decoder connected to the DVD recorder.

1 Press SYSTEM MENU while the recorder is in stop mode.

2 Select "Initial Setup," and press ENTER.

3 Select "Video In/Out," and press ENTER.
The "Video In/Out" setup appears with the following options. The default settings are underlined.



Input Colour System

Selects the colour system when picture noise appears after you change the "Input Line System" setting (page 130).

Auto	Recorder automatically detects signals of colour systems and selects the appropriate colour system.
PAL	Selects the PAL colour system when "Input Line System" is set to "PAL/ SECAM."
SECAM	Selects the SECAM colour system when "Input Line System" is set to "PAL/ SECAM."

Hint
When "Input Line System" is set to "NTSC," you can select "Auto," "3.58NTSC," or "PAL-60."

Note
"Input Colour System" cannot be set when viewing digital broadcasts.

Component Video Out

Selects the signal format in which the recorder outputs video signals: interlace or progressive, from the COMPONENT VIDEO OUT jacks.

Normal(Interlace)	Outputs signals in the interlace format.
Progressive	Outputs signals in the progressive format. Select this when you want to view progressive signals.

Notes
• When you set "LINE 3 Out" to "RGB," you cannot set "Component Video Out."
• When you connect the recorder to a monitor or projector via only the COMPONENT VIDEO OUT jacks, do not set "LINE 3 Out" to "RGB." If you set "LINE 3 Out" to "RGB," in this case, the picture may not appear.
• When picture noise appears after you set the recorder to progressive format, hold down ■ (stop) on the recorder, and press ⏏ (open/close) on the recorder.
• No video signals are output when using the HDMI connection.

LINE 3 Out

Selects a method of outputting video signals for the LINE 3 – TV jack.

Video	Outputs video signals.
S-Video	Outputs S-video signals.
RGB	Outputs RGB signals.

Notes
• If your TV does not accept S-video or RGB signals, the image will not be displayed in the selected method on the TV screen even if you select "S-Video" or "RGB." See the instructions supplied with your TV.
• SMARTLINK is available only when "Video" is selected.
• RGB signals are not output when using the HDMI connection.

LINE 1 In

Selects a method of inputting video signals for the LINE 1/DECODER jack. The picture will not be clear if this setting does not match the type of video input signal.

Video	Inputs video signals.
S-Video	Inputs S-video signals.
RGB	Inputs RGB signals.
Decoder	Select this when connecting to an external decoder (PAY-TV/Canal Plus analogue decoder). If you connect to a cable box/ satellite receiver such as CanalSat, do not select this option.

NTSC on PAL TV

Sets the recorder to convert signals of the NTSC colour system to the PAL colour system to play NTSC discs on PAL-only TVs. Refer to the operating instructions supplied with your TV.

On	Plays NTSC discs on PAL-only TVs.
Off	Select this if the connected TV is a multi-system (NTSC-compatible) TV.

Audio Input Settings (Audio In)

The "Audio In" setup allows you to adjust the sound according to the playback and connection conditions.

1 Press SYSTEM MENU while the recorder is in stop mode.

2 Select "Initial Setup," and press ENTER.

3 Select "Audio In," and press ENTER.
The "Audio In" setup appears with the following options. The default settings are underlined.

NICAM Select (page 72)

NICAM	Normally select this position.
Standard	Select this if the sound from NICAM broadcasts is not clear.

Analog Tuner Level

If the playback sound is distorted, set this item to "Compression." The recorder reduces the audio output level.
This function affects the output of the following jacks:
– LINE 2 OUT R-AUDIO-L jacks
– LINE 3 – TV jack
– LINE 1/DECODER jack

Normal	Normally select this position.
Compression	Select this when the playback sound from the speakers is distorted.

➡continued

External Audio

Stereo	Select this when receiving stereo programmes from connected equipment.
Bilingual	Select this when receiving bilingual programmes from connected equipment.

Note
When receiving audio input signals from the DV input jack, the recorder automatically selects "Stereo" or "Bilingual" regardless of the "External Audio" setting.

Bilingual Recording
Selects the sound to be recorded.

A/L	Records the main sound for the bilingual programme.
B/R	Records the sub sound for the bilingual programme.

Note
When recording a bilingual audio signal to the HDD (when "HDD Recording Format" is set to "Video Mode Off" (page 144) (except in PCM mode)) or a DVD-RW/DVD-R in VR mode (except in PCM mode), both audio channels are recorded and you can select the sound when playing.

DV Input
Select the setting for the audio input when DV camcorder dubbing.
Select "Mix (Stereo 1: 75 %)"/"Mix (Stereo 1: 50 %)"/"Mix (Stereo 1: 25 %)" or "Stereo 2" only if you have added a second audio when recording with your digital video camera.

Stereo 1	Records original sound only. Normally select this when dubbing a DV format tape.
Stereo 2	Records additional audio only.
Mix (Stereo 1: 75 %)	Records both stereo 1 and 2.
Mix (Stereo 1: 50 %)	
Mix (Stereo 1: 25 %)	

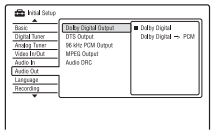
Audio Output Settings (Audio Out)

The "Audio Out" setup allows you to switch the method of outputting audio signals when you connect a component such as an amplifier (receiver) with a digital input jack. If you connect a component that does not accept the selected audio signal, a loud noise (or no sound) will come from the speakers, and may affect your ears or cause speaker damage.

1 Press SYSTEM MENU while the recorder is in stop mode.

2 Select "Initial Setup," and press ENTER.

3 Select "Audio Out," and press ENTER.
The "Audio Out" setup appears with the following options. The default settings are underlined.



Dolby Digital Output (HDD/DVDs only)
Selects the type of Dolby Digital signal.

Dolby Digital	Select this when the recorder is connected to an audio component with a built-in Dolby Digital decoder.
Dolby Digital -> PCM	Select this when the recorder is connected to an audio component lacking a built-in Dolby Digital decoder.

Note
If the HDMI OUT jack is connected to equipment not compatible with Dolby Digital signals, the PCM signals will be automatically output even when you select "Dolby Digital."

DTS Output (DVD VIDEOs only)
Selects whether or not to output DTS signals.

On	Select this when the recorder is connected to an audio component with a built-in DTS decoder.
Off	Select this when the recorder is connected to an audio component without a built-in DTS decoder.

Note
When HDMI output is performed to equipment not compatible with DTS signals, the signals will not be output regardless of the "DTS Output" setting.

96 kHz PCM Output (DVD VIDEOs only)
Selects the sampling frequency of the audio signal.

96 kHz -> 48 kHz	The audio signals of DVD VIDEOs are converted to 48 kHz and output.
96 kHz	All signals containing 96 kHz are output without conversion. However, the signals are output at 48 kHz if copyright-protected signals are contained.

Notes
- "96 kHz PCM Output" setting has no effect when audio signals are output from the LINE 2 OUT (R-AUDIO-L) jacks or LINE 3 – TV/LINE 1/DECODER jack. If the sampling frequency is 96 kHz, signals are simply converted to analogue signals and output.
- If the HDMI OUT jack is connected to equipment not compatible with 96 kHz signals, 48 kHz PCM will be automatically output even when you select "96 kHz."

MPEG Output (DVD VIDEOs only)
Selects the type of MPEG audio signal.

MPEG	Select this when the recorder is connected to an audio component with a built-in MPEG decoder.
MPEG -> PCM	Select this when the recorder is connected to an audio component without a built-in MPEG decoder. If you play MPEG audio sound tracks, the recorder outputs stereo signals via the DIGITAL OUT (COAXIAL) jack.

Note
If the HDMI OUT jack is connected to equipment not compatible with MPEG audio signals, the PCM signals will be automatically output even when you select "MPEG."

Audio DRC (Dynamic Range Control) (DVDs only)
Selects the dynamic range (difference between soft and loud sounds) setting when playing a DVD that conforms to "Audio DRC." This affects the output from the following jacks:
– LINE 2 OUT R-AUDIO-L jacks
– LINE 3 – TV jack
– LINE 1/DECODER jack
– DIGITAL OUT (COAXIAL)/HDMI OUT jack only when "Dolby Digital Output" is set to "Dolby Digital -> PCM" (page 138).

On	Makes low sounds clear even if you turn the volume down.
Off	Normally select this position.

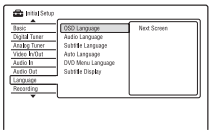
Language Settings (Language)

The "Language" setup allows you to adjust language settings.

1 Press SYSTEM MENU while the recorder is in stop mode.

2 Select "Initial Setup," and press ENTER.

3 Select "Language," and press ENTER.
The "Language" setup appears with the following options. The default settings are underlined.



OSD Language
Switches the display language on the screen.

Audio Language (DVD VIDEO only)
Switches the language of the sound track.

Subtitle Language (DVD VIDEO only)
Switches the language of the subtitles recorded on the disc.

Auto Language
The "Auto Language" function is available when "Audio Language" and "Subtitle Language" are set to the same language, and "Subtitle Display" is set to "On."

On	For DVD VIDEOs whose main audio track is the language you set in "Audio Language" and "Subtitle Language," the recorder plays the main audio track without subtitles. For DVD VIDEOs whose main audio track is not the language you set in "Audio Language" and "Subtitle Language," the recorder plays the main audio track with subtitles in the language you set.
Off	Turns off the function.

DVD Menu Language (DVD VIDEO only)
Switches the language for the DVD menu. Select "w/Subtitle Language" to set the same language as the language you set in "Subtitle Language."

Subtitle Display

On	Displays subtitles.
Off	Does not display subtitles.
Assist Subtitle	Displays special assistive subtitles, where available.

Hint
If you select "Others" in "Audio Language," "Subtitle Language," or "DVD Menu Language," press ↓, and enter a language code from "Language Code List" on page 167.

Note
If you select a language in "DVD Menu Language," "Subtitle Language," or "Audio Language" that is not recorded on the DVD VIDEO, one of the recorded languages will be automatically selected.

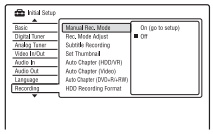
Recording Settings (Recording)

The "Recording" setup allows you to adjust recording settings.

1 Press SYSTEM MENU while the recorder is in stop mode.

2 Select "Initial Setup," and press ENTER.

3 Select "Recording," and press ENTER.
The "Recording" setup appears with the following options. The default settings are underlined.



Manual Rec. Mode

On (go to setup)	Allows you to select all recording modes. Select this, and press ENTER. Then, select a recording mode using ←/→, and press ENTER.
Off	Allows you to select standard recording modes only.

◆Manual recording mode
The table below shows the approximate recording times for the HDD and the different DVD types in each manual recording mode, as well as the standard recording mode equivalents.

The recording time for the HDD

Recording mode	Approx. recording time (hours) RDR-HXD770	RDR-HXD870	RDR-HXD970	RDR-HXD1070
HQ+*1	17	23	36	73
PCM*2	25	34	53	105
MN32 (HQ)	25	34	53	105
MN31	27	36	57	115
MN30	29	39	61	120
MN29	31	42	66	130
MN28	33	45	70	140
MN27	36	48	75	150
MN26 (HSP)	37	50	79	155
MN25	39	53	84	165
MN24	42	56	88	175
MN23	44	59	92	185
MN22	46	62	97	195
MN21 (SP)	51	68	105	210
MN20	54	73	115	230
MN19	59	79	120	245
MN18 (LSP)	63	84	130	265
MN17	67	90	140	280
MN16	72	96	150	300
MN15 (ESP)	75	100	155	315
MN14	78	105	165	335
MN13	82	110	175	350
MN12	86	115	185	370
MN11	90	120	190	390
MN10	93	125	200	405
MN9 (LP)	100	135	210	420
MN8	110	150	235	475

→continued

Recording mode	Approx. recording time (hours)			
	RDR-HXD770	RDR-HXD870	RDR-HXD970	RDR-HXD1070
MN7	120	165	265	530
MN6 (EP)	150	200	315	635
MN5	175	235	370	745
MN4 (SLP)	200	270	425	850
MN3 (SEP)	255	340	530	1060
MN2	300	405	635	1275
MN1	340	455	710	1420

The recording time for DVDs

Recording mode	Approx. recording time (hours)	
	DVD+RW/ DVD-RW/ DVD+R/ DVD-R	DVD+R DL/ DVD-R DL
PCM*2	1 hr. 1 min.	1 hr. 51 min.
MN32 (HQ)	1 hr. 1 min.	1 hr. 51 min.
MN31	1 hr. 5 min.	1 hr. 57 min.
MN30	1 hr. 10 min.	2 hr. 6 min.
MN29	1 hr. 15 min.	2 hr. 15 min.
MN28	1 hr. 20 min.	2 hr. 24 min.
MN27	1 hr. 25 min.	2 hr. 33 min.
MN26 (HSP)	1 hr. 30 min.	2 hr. 41 min.
MN25	1 hr. 35 min.	2 hr. 50 min.
MN24	1 hr. 40 min.	2 hr. 59 min.
MN23	1 hr. 45 min.	3 hr. 8 min.
MN22	1 hr. 50 min.	3 hr. 17 min.
MN21 (SP)	2	3 hr. 35 min.
MN20	2 hr. 10 min.	3 hr. 53 min.
MN19	2 hr. 20 min.	4 hr. 11 min.
MN18 (LSP)	2 hr. 30 min.	4 hr. 29 min.
MN17	2 hr. 40 min.	4 hr. 47 min.
MN16	2 hr. 50 min.	5 hr. 5 min.
MN15 (ESP)	3	5 hr. 23 min.
MN14	3 hr. 10 min.	5 hr. 41 min.
MN13	3 hr. 20 min.	5 hr. 59 min.

Recording mode	Approx. recording time (hours)	
	DVD+RW/ DVD-RW/ DVD+R/ DVD-R	DVD+R DL/ DVD-R DL
MN12	3 hr. 30 min.	6 hr. 17 min.
MN11	3 hr. 40 min.	6 hr. 35 min.
MN10	3 hr. 50 min.	6 hr. 53 min.
MN9 (LP)	4	7 hr. 11 min.
MN8	4 hr. 30 min.	8 hr. 4 min.
MN7	5	8 hr. 58 min.
MN6*3 (EP)	6	10 hr. 46 min.
MN5*3	7	12 hr. 34 min.
MN4*3 (SLP)	8	14 hr. 21 min.
MN3*3*4 (SEP*4)	10	17 hr. 57 min.
MN2*3*4	12	21 hr. 32 min.
MN1*3*4	13 hr. 22 min.	24

*1 Records in higher quality (15 Mbps). HQ+ mode is not available for DVDs. When recording to DVDs, the recording mode automatically switches to HQ mode even if you set to HQ+ mode.

*2 Audio signals are recorded in 48kHz PCM format, and video signals are recorded in HQ mode. When recording a bilingual programme, select the sound to be recorded (page 138).

*3 Titles recorded in MN6 or lower mode cannot be dubbed to DVD+RWs/DVD+Rs at high speed.

*4 SEP, MN1, MN2, or MN3 mode is not available for DVD+RWs/DVD+Rs/DVD+R DLs. When recording to DVD+RWs/DVD+Rs, the recording mode automatically switches to SLP mode even if you set to SEP, MN1, MN2, or MN3 mode.

Hint

Audio signals are recorded in Dolby Digital 2 ch format (except for PCM mode).

HDD Recording Format

Selects the HDD recording format.

Video Mode Off	Records to the HDD in VR mode. When recording stereo and bilingual programmes, both main and sub sounds can be recorded.
Video Mode On	Records to the HDD in Video mode. When recording stereo and bilingual programmes, only one sound track (main or sub) can be recorded. Set "Bilingual Recording" to "A/L" (default) or "B/R" in the "Audio In" setup (page 138).

Hint

The HDD contents recorded in Video mode can be dubbed to a disc at high speed (page 98).

Playback Settings (Playback)

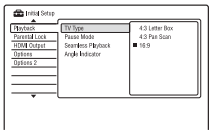
The "Playback" setup allows you to adjust the playback settings.

1 Press SYSTEM MENU while the recorder is in stop mode.

2 Select "Initial Setup," and press ENTER.

3 Select "Playback," and press ENTER.

The "Playback" setup appears with the following options. The default settings are underlined.



TV Type

Select the playback picture size according to the type of connected TV (wide-screen/wide mode TV or conventional 4:3 screen TV).

4:3 Letter Box	Select this when connecting to a 4:3 screen TV. Displays a wide picture with bands on the upper and lower portions of the screen.
4:3 Pan Scan	Select this when connecting to a 4:3 screen TV. Automatically displays a wide picture on the entire screen and cuts off the portions that do not fit.
16:9	Select this when connecting to a wide-screen TV or TV with a wide mode function.

◆Resolution

The first figure refers to when "Input Line System" is set to "NTSC"; the second when set to "PAL/SECAM" in the "Basic" setup (page 130).

For the HDD ("HDD Recording Format" is set to "Video Mode Off")/DVD-RW (VR mode)/ DVD-R (VR mode)

HQ+, PCM, MN32 to MN16: 720 × 480 / 720 × 576
MN15 to MN12: 544 × 480 / 544 × 576
MN11 to MN9: 480 × 480 / 544 × 576
MN8 and MN7: 352 × 480 / 352 × 576
MN6 to MN1: 352 × 240 / 352 × 288

For the HDD ("HDD Recording Format" is set to "Video Mode On")/DVD+RW/DVD-RW (Video mode)/DVD+R/DVD-R (Video mode)

HQ+, PCM, MN32 to MN9: 720 × 480 / 720 × 576
MN8 and MN7: 352 × 480 / 352 × 576
MN6 to MN1: 352 × 240 / 352 × 288

Rec. Mode Adjust

On	Automatically adjusts the recording mode to enable the entire programme to be recorded (page 74).
Off	Turns off the function.

Subtitle Recording

On	Records digital broadcast subtitles.
Off	No digital broadcast subtitles are recorded.

Set Thumbnail

Selects a scene for the thumbnail picture shown in the Title List.

0 seconds	The first frame of the title is set for the thumbnail picture.
30 seconds	The frame at 30 seconds from the first frame is set for the thumbnail picture.
3 minutes	The frame at 3 minutes from the first frame is set for the thumbnail picture.

Auto Chapter (HDD/VR) (HDD/DVD-RW/ DVD-R in VR mode only)

On	The recorder detects changes in the picture and sound and automatically inserts chapter marks (up to 99 chapters for one title recorded on the HDD).
Off	No chapter mark is inserted.

Notes

- The actual chapter mark interval may vary depending on the amount of information contained in the video to be recorded.
- Chapter marks are automatically inserted, where the date or time information changes on the tape, when "Auto Chapter (HDD/VR)" is set to "On" during DV dubbing to the HDD or a DVD-RW/ DVD-R (VR mode).

Auto Chapter (Video) (DVD-RW/DVD-R in Video mode only)

No Separation	No chapter mark is inserted.
10 minutes	Inserts chapter marks at approximately 10-minute intervals.
15 minutes	Inserts chapter marks at approximately 15-minute intervals.

Auto Chapter (DVD+R/+RW) (DVD+RW/ DVD+R only)

No Separation	No chapter mark is inserted.
10 minutes	Inserts chapter marks at approximately 10-minute intervals.
15 minutes	Inserts chapter marks at approximately 15-minute intervals.

➡continued

4:3 Letter Box

4:3 Pan Scan

16:9

Note

Depending on the disc, "4:3 Letter Box" may be selected automatically instead of "4:3 Pan Scan" or vice-versa.

Pause Mode

Selects the picture quality in pause mode.

Field	Outputs a stable, generally shake-free image.
Frame	Outputs a sharp image, but may be prone to shake.
Auto	Outputs a generally less sharp but more stable still image.

Seamless Playback (HDD/DVD-RW/DVD-R in VR mode only)

On	Playback is smooth, but with a trade-off against the accuracy of the edit points.
Off	You may notice momentary interruption at edited points during playback of a VR mode Playlist.

Angle Indicator (DVD VIDEOs only)

On	Displays "" on the TV screen if various angles (multi-angles) for a scene are recorded on the disc.
Off	Does not display "" on the TV screen.

Limitation Settings (Parental Lock)

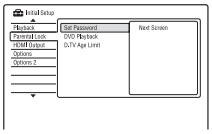
The "Parental Lock" setup allows you to set the password and limit the operations.

1 Press SYSTEM MENU while the recorder is in stop mode.

2 Select "Initial Setup," and press ENTER.

3 Select "Parental Lock," and press ENTER.

The "Parental Lock" setup display appears with the following options. The default settings are underlined.
To turn off the display, press SYSTEM MENU.

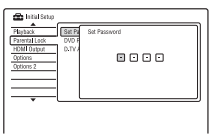


Set Password/Change Password

You can set or change the password that gives access to the "Channel Options" settings in the "Digital Tuner" setup and the "Parental Lock" settings.

1 Select "Set Password" or "Change Password" in "Parental Lock," and press ENTER.

2 Select "Next Screen," and press ENTER. The display for registering a password appears.
Example: when you select "Set Password" in step 1



➡continued

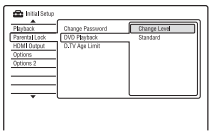
3 Enter your four-digit password using the number buttons, and press ENTER.
- To change the password, enter your four-digit password in the “Current Password” row using the number buttons, and press ENTER. Then enter a new password in the “New Password” row using the number buttons.

The password setting/password changing setting is completed.

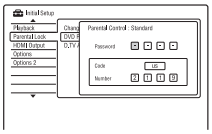
Note
If you forgot your password, reset the recorder (page 158).

DVD Playback (DVD VIDEO only)
Playback of some DVD VIDEOs can be limited according to a predetermined level, such as the age of the users. Scenes may be blocked or replaced with different scenes.

1 Select “DVD Playback” in “Parental Lock,” and press ENTER.
To register a new password, see “Set Password/Change Password” on page 145.



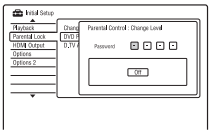
2 Select “Standard,” and press ENTER.



3 Enter your four-digit password using the number buttons, and press ENTER.

4 Select “Code” (geographic area) as the playback limitation level, and press ENTER.
The area is selected.
- When you select “Number,” press the number buttons to select and enter a country/area code in the table (page 168), and press ENTER.

5 Select “Change Level,” and press ENTER.



6 Enter your four-digit password using the number buttons, and press ENTER.

7 Select the level.
The lower the value, the stricter the limitation.
Discs rated higher than the selected level will be restricted.

8 Press ENTER.
The DVD Playback setting is completed.
To cancel the DVD Playback setting for the disc, select “Off” in step 7.

D.TV Age Limit
Viewing of some digital TV programmes can be limited according to the age limit you set. To watch programmes that exceed the age limit you set, your password is required. (for customers in France/Denmark/Finland, or Sweden only)

1 Select “D.TV Age Limit” in “Parental Lock,” and press ENTER.

2 Select “Next Screen,” and press ENTER.
The “D.TV Age Limit” display appears.

3 Enter your four-digit password using the number buttons, and press ENTER.

4 Select an age as limitation level, and press ENTER.
The setting is completed.
To cancel the setting, select “Off.”

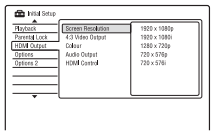
HDMI Settings (HDMI Output)

The “HDMI Output” setup allows you to adjust items related to the HDMI connection. You can select “HDMI Output” only when connecting equipment to the HDMI OUT jack.

1 Press SYSTEM MENU while the recorder is in stop mode.

2 Select “Initial Setup,” and press ENTER.

3 Select “HDMI Output,” and press ENTER.
The “HDMI Output” setup appears with the following options. The default settings are underlined.
After connecting equipment to the HDMI OUT jack, “Screen Resolution,” “4:3 Video Output,” and “Colour” are automatically set to the appropriate settings.



Screen Resolution
Selects the type of video signals output from the HDMI OUT jack. If the picture is not clear, natural or to your satisfaction, try another option that suits the disc and your TV/projector, etc. For details, refer also to the instruction manual supplied with the TV/projector, etc.

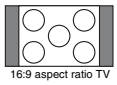
1920 x 1080p	Sends 1920×1080p video signals.
1920 x 1080i	Sends 1920×1080i video signals.
1280 x 720p	Sends 1280×720p video signals.
720 x 576p*1	Sends 720×576p video signals.
720 x 480p*2	Sends 720×480p video signals.
720 x 576i*1	Sends 720×576i video signals.
720 x 480i*2	Sends 720×480i video signals.

*1 Can be selected only when “Input Line System” is set to “PAL/SECAM” in the “Basic” setup (page 130).
*2 Can be selected only when “Input Line System” is set to “NTSC” in the “Basic” setup (page 130).

Notes
- When picture noise appears after you change the “Screen Resolution” setting, hold down ■ (stop) on the recorder, and press ⏏ (open/close) on the recorder.
- When “Colour” is set to “YCbCr 4:2:2” in the “HDMI Output” setup, you cannot select “720 x 576i” (or “720 x 480i”).

4:3 Video Output
This setting is effective only when you set “TV Type” to “16:9” in the “Playback” setup. Adjust this setting to watch 4:3 aspect ratio signals. If you can change the aspect ratio on your TV, change the setting on your TV, not this recorder.
Note that this setting is effective only for HDMI connection.

Full	Select this when you can change the aspect ratio on your TV.
Normal	Select this when you cannot change the aspect ratio on your TV. Shows a 4:3 size video with the aspect ratio as it is.


16:9 aspect ratio TV

Settings and Adjustments

→continued

Colour
Selects the method of outputting video signals for the HDMI jack.

RGB (0-255)	Outputs RGB (0-255) signals. Select this when connecting to an RGB (0-255) device.
RGB (16-235)	Outputs RGB (16-235) signals. Select this if colours appear overly rich and the black appears too deep.
YCbCr 4:2:2	Outputs 10-bit YCbCr 4:2:2 component signals.
YCbCr 4:4:4	Outputs 8-bit YCbCr 4:4:4 component signals.

Notes
- Some settings may not be available depending on the connected device.
- When a DVI device is connected, you cannot select “YCbCr 4:2:2” or “YCbCr 4:4:4.”
- When “Screen Resolution” is set to “720 x 576i” (or “720 x 480i”) in the “HDMI Output” setup, you cannot select “YCbCr 4:2:2.”

Audio Output
Selects the type of audio signal output from the HDMI OUT jack.

Auto	Outputs Dolby Digital, MPEG and DTS audio signals as a bitstream signal. Normally select this position.
PCM	Converts all audio signals except for DTS signals to PCM.
Bitstream Priority	Select this if the connected device is compatible with bitstream audio.

Notes
- The PCM signals may not be output even when you select “Auto” depending on the “Audio Out” settings, number of audio channels, and the HDMI-connected device.
- The “Audio Output” function is not available when a DVI device is connected.

HDMI Control

On	Allows you to use the HDMI control features (page 21).
Off	Turns off the function.

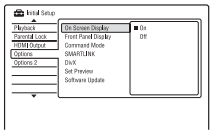
Other Settings (Options)

The “Options” and “Options 2” setups allow you to set up other operational settings.

1 Press SYSTEM MENU while the recorder is in stop mode.

2 Select “Initial Setup,” and press ENTER.

3 Select “Options” or “Options 2,” and press ENTER.
The “Options” or “Options 2” setup appears with the following options. The default settings are underlined.
Example: “Options” setup



Options

On Screen Display

On	Automatically displays information on the screen when the recorder is turned on, etc.
Off	Displays information only when DISPLAY is pressed.

Front Panel Display
Adjusts the lighting of the front panel display.

On	Bright lighting.
Off	Turns off the lighting when the power is off.

Command Mode
Changes the Command Mode of the recorder to avoid interference with your other Sony DVD recorder or player.

1 Select “Command Mode” in “Options,” and press ENTER.

2 Select a Command Mode (DVD1, DVD2, or DVD3), and press ENTER.

Note
The default command mode setting for this recorder and the supplied remote is DVD3. The remote does not function if different command modes are set for the recorder and remote. Set the same command mode.

3 Set the Command Mode for the remote so it matches the Command Mode for the recorder you set above.
Follow the steps below to set the Command Mode on the remote.
① Hold down ENTER.
② While holding down ENTER, enter the Command Mode code number using the number buttons.

Command Mode	Code number
DVD1	number button 1
DVD2	number button 2
DVD3	number button 3

③ Hold down both the number and ENTER buttons at the same time for more than three seconds.

Hint
You can check the Command Mode for the recorder in the front panel display.

Command Mode	In the front panel display
DVD1	“1” appears.
DVD2	“2” appears.
DVD3	Either “1” or “2” does not appear.

Settings and Adjustments

→continued

SMARTLINK

This Recorder Only	Allows you to use the SMARTLINK function with the recorder when the recorder is in standby mode.
Pass Through	Allows you to use the SMARTLINK function with the connected equipment when the recorder is in standby mode.

Note
Set “Power Save” to “Off” in the “Basic” setup (page 130) to set “SMARTLINK” to “Pass Through.”

DivX

◆Registration Code
Displays the registration code of DivX video files for this recorder.
For more information, go to http://www.divx.com/vod on the Internet.

Set Preview (HDD only)
Selects the thumbnail type shown in the Title List.

Quick Preview	Plays short excerpts from throughout the selected title.
Normal	Plays the selected title from the beginning.

Software Update
You can check the current software version of the built-in digital tuner and keep it up to date with the latest software.

◆Manual Update
Updates the software manually.

1 Select “Software Update” in “Options,” and press ENTER.
2 Press “Next Screen” and press ENTER.
3 Select “Start,” and press ENTER.
4 Select “Yes,” and press ENTER.
The update starts.

To cancel, press SYSTEM MENU.
The new software will be available next time the recorder is turned on.

◆Auto Update

On	Updates the software automatically. Normally, select this position.
Off	Does not update the software automatically.

◆Technical Info.
You can check the current hardware and software versions of the digital tuner.

Options 2

USB

◆Restart USB Device
Restarts the connected USB device if it does not respond to the recorder. If the connected USB device still does not work properly, try following:
– Turn the connected USB device off and on again.
– Disconnect and then connect the USB cable.

◆Confirm Printer
Displays the manufacturer and model name of the printer connected to the recorder. Note that this function may not work depending on the printer.

TV Pause
Selects the tuner for the TV Pause (page 87).

TV’s Tuner	Selects this when connecting the recorder to your TV using the SCART jack.
Recorder’s Tuner	Selects this when connecting the recorder to your TV not using the SCART jack.

Troubleshooting

If you experience any of the following difficulties while using the recorder, use this troubleshooting guide to help remedy the problem before requesting repairs. Should any problem persist, consult your nearest Sony dealer.

Power

The power does not turn on.
➡ Check that the mains lead is connected securely.

Tuner

The channel is not found or stored or missed.
➡ Make sure that your aerial is properly connected to the recorder.
➡ Confirm with your dealer that you are in an area that can receive a digital signal.
➡ Check your aerial installation.

Picture

There is no picture.
➡ Re-connect all connecting cords securely.
➡ The connecting cords are damaged.
➡ Check the connection to your TV (page 15).
➡ Switch the input selector on your TV (such as to “VCR” and “AV 1”) so that the signal from the recorder appears on the TV screen.
➡ Check that the “Video In/Out” setup is set to the appropriate item that conforms to your system (page 136).
➡ If you connect the recorder to your TV via only the COMPONENT VIDEO OUT jacks, set “Component Video Out” in the “Video In/Out” setup to “Progressive” (page 136).
➡ A scrambled channel is selected.
➡ When playing a double-layer DVD, the video and audio may be momentarily interrupted at the point where the layers switch.

Picture noise appears.
➡ If the picture output signal from your recorder passes through your VCR to get to your TV, or if you are connected to a combination TV/VIDEO player, the copy-protection signal applied to some DVD programmes could affect picture quality. If you still experience this problem even when you connect your recorder directly to your TV, try connecting your recorder to your TV’s S VIDEO input.
➡ You have set the recorder to progressive format even though your TV cannot accept the progressive signal. In this case, hold down ■ (stop) on the recorder, and press ⏏ (open/close) on the recorder.
➡ Even if your TV is compatible with progressive format (525p/625p) signals, the image may be affected when you set the recorder to progressive format. In this case, hold down ■ (stop) on the recorder, and press ⏏ (open/close) on the unit and the recorder is set to normal (interlace) format.
➡ You are playing a title recorded in a colour system that is different from your TV.
➡ Noise may appear in the pictures recorded on the HDD, which is due to the characteristics of HDD, and is not a malfunction.
➡ When playing a double-layer DVD, the video and audio may be momentarily interrupted at the point where the layers switch.

There is no picture or picture noise appears when connected to the DV IN jack.
➡ Try the following: ①Turn the recorder off and on again. ②Turn the connected equipment off and on again. ③Disconnect and then connect the i.LINK cable again.

There is no picture or picture noise appears when connected to the HDMI OUT jack.
➡ Try the following: ①Turn the recorder off and on again. ②Turn the connected equipment off and on again. ③Disconnect and then connect the HDMI cord again.

➡continued

➡ If the HDMI OUT jack is used for video output, changing the “Screen Resolution” setting in the “HDMI Output” setup may solve the problem (page 147). Connect the TV and the recorder using a video jack other than HDMI OUT, and switch the TV’s input to the connected video input so that you can see the on-screen displays. Change the “Screen Resolution” setting in the “HDMI Output” setup, and switch the TV’s input back to HDMI. If the picture still does not appear, repeat the steps and try other options.
➡ The recorder is connected to an input device that is not HDCP compliant (page 19).
➡ When picture noise appears after you change the “Screen Resolution” setting, hold down ■ (stop) on the recorder, and press ⏏ (open/close) on the recorder.

TV programme reception does not fill the screen.
➡ Set the channel manually in “Manual CH Setting” in the “Analog Tuner” setup (page 133).
➡ Select the correct source using the INPUT button, or select a channel of any TV programme using the PROG +/– buttons.

The picture is breaking up.
➡ The signal strength is low.
➡ Check aerial installation.

TV programme pictures are distorted.
➡ Reorient the TV aerial.
➡ Adjust the picture (see the TV’s instruction manual).
➡ Place the recorder and TV farther apart.
➡ Place the TV and any bunched aerial cables farther apart.
➡ The aerial cable is connected to the AERIAL OUT jack on the recorder. Connect the cable to the AERIAL IN jack.
➡ The recorder’s colour system is different from your TV. Hold down ■ (stop) on the recorder, and press INPUT on the recorder to change the recorder’s colour system.

TV channels cannot be changed.
➡ The channel is skipped (page 134).
➡ A timer recording started, which changed the channels.
➡ The Parental Lock is activated (page 145).

The picture from equipment connected to the recorder’s input jack does not appear on the screen.
➡ If the equipment is connected to the LINE 1/DECODER jack, select “L1” in the front panel display by pressing INPUT.
If the equipment is connected to the LINE 2 IN jacks, select “L2” in the front panel display by pressing INPUT.

The playback picture or TV programme from the equipment connected through the recorder is distorted.
➡ If the playback picture output from a DVD player, VCR, or tuner goes through your recorder before reaching your TV, the copy-protection signal applied to some programmes could affect picture quality. Disconnect the playback equipment in question and connect it directly to your TV.

The picture does not fill the screen.
➡ Set “TV Type” in the “Playback” setup in accordance with the screen size of your TV (page 144).

The picture does not fill the screen, even though the picture size is set in “TV Type” in the “Playback” setup.
➡ The picture size of the title is fixed.

The picture is black and white.
➡ Check that “LINE 3 Out” in the “Video In/Out” setup is set to the appropriate item that conforms to your system (page 136).
➡ If you are using a SCART cord, be sure to use one that is fully wired (21 pins).

GUIDE Plus+ system (in the UK only)

GUIDE Plus+ system does not appear.
➡ ①Even if you complete “Easy Setup,” TV programme listings do not appear until the recorder receives the GUIDE Plus+ data. ②Turn off the recorder, but do not unplug it. ③Wait for 24 hours. It may take several days for the recorder to receive the GUIDE Plus+ data for all programme positions. If the recorder does not receive the GUIDE Plus+ data after 24 hours, set the host channel manually (page 69).
➡ The country/region or postal code is incorrect. Correctly set your country/region and postal code (page 26).
➡ When the recorder is connected to a set top box receiver, the set top box receiver must be turned on to download the GUIDE Plus+ data.
➡ Area numbers that cannot be received using GUIDE Plus+ are set. Select “Easy Setup” in the “Basic” setup from “Initial Setup” in the System Menu, and follow the on-screen instructions to make the settings again (page 26).
➡ The “Time Lock” function on your cable box is activated. Set this function to off.
➡ If the host channel has changed or moved, the programme guide data cannot be received. In this case, follow the steps in “Searching for the GUIDE Plus+ host channel” (page 68) to update the host channel setting. If the problem persists after waiting for one day, search for the host channel at the following website and set the host channel manually (page 69).
www.europe.guideplus.com

The programme position number in the programme listing does not match the broadcast station.
➡ There may be more than one channel lineup for your area. To change the channel lineup, select “Editor” in the Menu Bar of the GUIDE Plus+ system (page 69).

Programme listings for some programme positions are missing.
➡ The programme guide data may not be updated. Turn off the recorder and let the recorder receive the programme guide data.
➡ Some broadcast stations support only two days of data. For details, see the following website:
www.europe.guideplus.com
➡ All of the GUIDE Plus+ data could not be received because the reception is poor.

The programme listing is not up to date.
➡ The recorder was in use during the time that the GUIDE Plus+ data was scheduled to be downloaded.
➡ All of the GUIDE Plus+ data could not be received because the reception is poor.

Sound

There is no sound.
➡ Re-connect all connections securely.
➡ The connecting cord is damaged.
➡ The input source setting on the audio component or the connection to the audio component is incorrect.
➡ The recorder is in reverse play, fast-forward, slow motion, or pause mode.
➡ If the audio signal does not come through the DIGITAL OUT (COAXIAL)/HDMI OUT jacks, check the “Audio Out” setup (page 138).
➡ The recorder supports only MP3 audio, Dolby Digital and MPEG audio for DivX video files. Press AUDIO and select MP3 audio or MPEG audio.

No sound is output from the HDMI OUT jack.
➡ Try the following: ①Turn the recorder off and on again. ②Turn the connected equipment off and on again. ③Disconnect and then connect the HDMI cord again.
➡ The HDMI OUT jack is connected to a DVI device (DVI jacks do not accept audio signals).
➡ The equipment connected to the HDMI OUT jack does not conform to the audio signal format. In this case, set “Audio Output” to “PCM” in the “HDMI Output” setup (page 148).

➡continued

Sound distortion occurs.

➡ Set “Analog Tuner Level” in the “Audio In” setup to “Compression” (page 137).

Sound is noisy.

➡ When playing a CD with DTS sound tracks, noise will come from the LINE 2 OUT R-AUDIO-L jacks, LINE 3 – TV jack, or LINE 1/DECODER jack (page 109).

The sound volume is low.

➡ The sound volume is low on some DVDs. The sound volume may improve if you set “Audio DRC” in the “Audio Out” setup to “On” (page 139).

➡ Set “Analog Tuner Level” in the “Audio In” setup to “Normal” (page 137).

An alternate audio track cannot be recorded or played.

➡ When recording from connected equipment, set “External Audio” to “Bilingual” in the “Audio In” setup (page 138).

➡ Multilingual tracks (main and sub) cannot be recorded on the HDD (when Video Mode On) DVD+RWs, DVD-RWs (Video mode), DVD+Rs, or DVD-Rs (Video mode). To record the language, set “Bilingual Recording” in the “Audio In” setup to “A/L” or “B/R” before recording (page 138). To record both the main and sub sounds on a disc, record on DVD-RWs/DVD-Rs (VR mode). To record on the HDD, set “HDD Recording Format” to “Video Mode Off” in the “Recording” setup (page 144).

➡ If you have connected an audio component to the DIGITAL OUT (COAXIAL) jack and want to change the audio track for the HDD (when “HDD Recording Format” is set to “Video Mode Off” in the “Recording” setup (page 144))/DVD-RWs/DVD-Rs (VR mode) during playback, set “Dolby Digital Output” in the “Audio Out” setup to “Dolby Digital -> PCM” (page 138).

The sound is breaking up.

➡ The signal strength is low.

➡ Check aerial installation.

Playback

The recorder does not play any type of disc (except HDD).

➡ The disc is upside down. Insert the disc with the labelled side facing up.

➡ The disc is not correctly inserted.

➡ Moisture has condensed inside the recorder. In this case, if the recorder is on, leave it on (if it is off, leave it off) for about an hour until the moisture evaporates.

➡ If the disc was recorded on another recorder and was not finalised (page 45), the recorder cannot play the disc.

The recorder does not start playback from the beginning.

➡ Resume play was activated (page 81).

➡ You have inserted a DVD whose Title menu or DVD menu automatically appears on the TV screen when it is first inserted. Use the menu to start playback.

The recorder starts playing automatically.

➡ The DVD VIDEO features an auto playback function.

Playback stops automatically.

➡ If the DVD has an auto pause signal, the recorder stops playback at the auto pause signal.

Some functions such as Stop, Search, or Slow-motion Play cannot be performed.

➡ Depending on the DVD, you may not be able to do some of the operations above. See the instruction manual supplied with the disc.

The language for the sound track cannot be changed.

➡ Multilingual tracks are not recorded on the DVD being played.

➡ The DVD VIDEO prohibits the changing of the language for the sound track.

➡ Try changing the language using the DVD VIDEO’s menu.

The subtitle language cannot be changed or turned off.

➡ Multilingual subtitles are not recorded on the DVD VIDEO.

➡ The DVD VIDEO prohibits changing of the subtitles.

➡ Try changing the subtitle using the DVD VIDEO’s menu.

➡ The subtitles cannot be changed for the titles recorded on this recorder.

The angles cannot be changed.

➡ Multi-angles are not recorded on the DVD VIDEO being played.

➡ You are trying to change the angles when “” does not appear on the TV screen (page 80). To display “” if various angles (multi-angles) for a scene are recorded on the disc, set “Angle Indicator” to “On” in the “Playback” setup (page 145).

➡ The DVD VIDEO prohibits changing angles.

➡ Try changing the angle using the DVD VIDEO’s menu.

➡ The angles cannot be changed for the titles recorded on this recorder.

➡ The angles cannot be changed during slow motion playback or when playback is paused.

The DivX video files do not play.

➡ The file is not created in DivX format.

➡ The file has an extension other than “.avi” or “.divx.”

➡ The DATA CD (DivX video)/DATA DVD (DivX video) is not created in a DivX format that conforms to ISO9660 Level 1/ Level 2, Romeo, Joliet, or UDF (Universal Disk Format) 1.02, 1.50, 2.00, or 2.01.

➡ The DivX video file format is larger than 720 (width) × 576 (height).

The MP3 audio tracks do not play.

➡ The MP3 audio tracks are not recorded in a format that the recorder can play (page 161).

The JPEG image files do not play.

➡ The JPEG image files are not recorded in a format that the recorder can play (page 161).

➡ Progressive JPEG images cannot be played.

TV Pause does not work.

➡ You are recording to the HDD or the HDD is full.

Recording/Timer recording/ Editing

The programme position cannot be changed from the programme position you are recording.

➡ Set the TV’s input source to “TV.”

Recording does not start immediately after you press ● REC.

➡ Operate the recorder only after “LOAD,” “FORMAT,” or “INFO WRITE” disappears from the front panel display.

Nothing was recorded even though you set the timer setting correctly.

➡ There was a power failure during recording.

➡ The recorder’s internal clock stopped due to a power failure that lasted for more than 1 hour. Reset the clock (page 129).

➡ The channel was disabled after the timer recording was set. See “Manual CH Setting” on page 133.

➡ The programme position was hidden after the timer recording was set. (See “Disabling programme positions” on page 70.)

➡ Disconnect the mains lead from the mains, and connect it again.

➡ The programme contains copy protection signals that restrict copying.

➡ Another timer setting overlapped the timer setting (page 60, 78).

➡ There is no DVD inside the recorder.

➡ There is not enough disc space for the recording.

➡ The set top box receiver was turned off.

➡ The set top box controller was incorrectly connected (page 15).

➡ The settings in “Setup” in the Menu bar have been changed (page 68).

➡ The recorder was in the process of dubbing.

➡ A scrambled channel is selected.

➡ The channel activated Parental Lock is selected (page 146).

➡continued

Recording does not stop immediately after you press ■ REC STOP.

➡ It will take a few seconds for the recorder to input disc data before recording can stop. On-screen instructions may appear after pressing ■ REC STOP. In this case, follow the on-screen instructions.

Recording does not stop after you press ■.

➡ Press ■ REC STOP.

Timer recording is not complete or did not start from the beginning.

➡ There was a power failure during recording. If the power recovers when there is a timer recording, the recorder resumes recording. Should the power failure continue for more than 1 hour, reset the clock (page 129).

➡ Another timer setting overlapped the timer setting (page 60, 78).

➡ Disc space was not sufficient.

➡ The VPS/PDC function is working.

Contents previously recorded were erased.

➡ Data that is not playable on this recorder but was recorded on a DVD with a PC will be erased from the disc when the disc is inserted.

The VPS/PDC function does not operate.

➡ Check that the clock and date are set correctly.

➡ Check that the VPS/PDC time you set is correct (there might be a mistake in the TV programme guide). If the broadcast you wanted to record did not send the correct VPS/PDC information, the recorder will not start recording.

➡ If the reception is poor, the VPS/PDC signal might be altered and the recorder might not start recording.

➡ The VPS/PDC function may not work if the GUIDE Plus+ host channel setup is not complete.

➡ The VPS/PDC function does not work when the GUIDE Plus+ data is being downloaded.

Dubbing

You dubbed a title, but the title did not appear in the HDD Title List.

➡ The title contained a copy protection signal, so it was moved (page 99).

High-speed dubbing is not possible.

➡ The title cannot be dubbed at high speed (page 100). Even if A-B erasure is performed so that a title does not contain mixed picture sizes, it is still treated as a title with mixed picture sizes.

HDD/DVD Dubbing is not possible.

➡ The title cannot be dubbed (page 99).

Display

The clock has stopped.

➡ Set the clock again (page 129).

➡ The clock stopped due to a power failure that lasted for more than 1 hour. Reset the clock (page 129).

The timer indicator is flashing.

➡ The disc does not have enough space.

➡ Insert a recordable disc into the recorder.

➡ The inserted DVD is protected (page 44).

The clock does not appear in the front panel display when the recorder is turned off.

➡ “Front Panel Display” is set to “Off” in the “Options” setup (page 149).

Remote control

The remote does not function.

➡ Different command modes are set for the recorder and remote. Set the same command mode (page 149). The default command mode setting for this recorder and the supplied remote is **DVD3**. You can check the current command mode in the front panel display (page 149).

➡ The batteries are weak.

➡ The remote is too far from the recorder.

➡ The remote’s manufacturer code returned to the default setting when you replaced the batteries. Reset the code (page 24).

➡ The remote is not pointed at the remote sensor on the recorder.

Others

The recorder does not detect a USB device connected to the recorder.

➡ Make sure that the USB device is securely connected to the recorder (page 126).

➡ Check if the USB device or a cable is damaged.

➡ Check if the USB device is on.

Display language on the screen switches automatically.

➡ When “HDMI Control” is set to “On” in the “HDMI Output” setup (page 148), the display language on the screen automatically switches, according to the language setting of the connected TV, if you change the language settings on your TV, etc.

The recorder does not operate properly.

➡ Press down I/⏻ on the recorder for more than five seconds until the recorder turns off. Then, press I/⏻ again to turn on the recorder.

➡ When static electricity, etc., causes the recorder to operate abnormally, turn off the recorder and wait until the clock appears in the front panel display. Then, unplug the recorder and after leaving it off for a while, plug it in again.

The disc tray does not open after you press ⏏ (open/close).

➡ It may take a few seconds for the disc tray to open after you have recorded or edited a DVD. This is because the recorder is adding disc data to the disc.

Any buttons do not function and “LOCKED” appears in the front panel display.

➡ The recorder is locked. Cancel the Child Lock (page 81, 108).

The disc tray does not open and “TRAYLOCKED” appears in the front panel display.

➡ Contact your Sony dealer or local authorized Sony service facility.

“REPAIR” appears in the front panel display.

➡ The recorder’s repair function is activated to repair the hard disk drive or disc when the recorder is turned on after a power failure has occurred during recorder operation, such as while recording, or when some errors have occurred. Leave the recorder on until “REPAIR” disappears from the front panel display.

“E01” appears in the front panel display.

➡ There is a problem in the HDD. Contact your nearest Sony dealer. Note that contents on the HDD may be erased when servicing this unit.

“E02” appears in the front panel display.

➡ A hard disk error has occurred and you cannot make a new recording to the HDD. Press and hold I/⏻ on the recorder for more than five seconds to turn the recorder off, then turn it on again. If “E02” still appears, format the HDD following the instructions of “Format HDD.” (page 128). Note that all of the recorded contents on the HDD will be erased. If this does not fix the problem, contact your nearest Sony dealer.

“HDCP_ERR” appears in the front panel display.

➡ The recorder is connected to an input device that is not HDCP compliant. Connect the equipment that is HDCP compliant (page 19).
Disregard this error message if the output picture is displayed correctly.

The Parental Lock does not work.

➡ Check the “D.TV Age Limit” setting in the “Parental Lock” setup (page 146).

➡continued

Mechanical sounds are heard when the recorder is off.

➡ While the recorder is updating the EPG information, operational noises (such as the internal fan) may be heard, even when the power is off. This is not a malfunction.

➡ While the recorder is adjusting the clock for the Auto Clock Set function or updating the EPG information, operational noises may be heard, even when the power is off. This is not a malfunction.

Resetting the Recorder

You can reset the recorder to all its factory settings.

1 Make sure that the recorder is turned on and remove the disc.

2 Hold down ■ (stop) on the recorder and press I/⏻ on the recorder.
All settings are reset and the recorder turns off.

Notes About This Recorder

On operation

- If the recorder is brought directly from a cold to a warm location, or is placed in a very damp room, moisture may condense on the lenses inside the recorder. Should this occur, the recorder may not operate properly. In this case, if the recorder is on, leave it on (if it is off, leave it off) for about an hour until the moisture evaporates.
- When you move the recorder, take out any discs and do not apply shock or vibration to the hard disk drive to avoid damaging the disc or hard disk drive (page 3).

On adjusting volume

Do not turn up the volume while listening to a section with very low level inputs or no audio signals. If you do, the speakers may be damaged when a peak level section is played.

On cleaning

Clean the cabinet, panel, and controls with a soft cloth slightly moistened with a mild detergent solution. Do not use any type of abrasive pad, scouring powder or solvent such as alcohol or benzine.

On cleaning discs, disc/lens cleaners

Do not use cleaning discs or disc/lens cleaners (including wet or spray types). These may cause the recorder to malfunction.

Notes about the discs

- To keep the disc clean, handle the disc by its edge. Do not touch the surface. Dust, fingerprints, or scratches on the disc may cause it to malfunction.

- Do not expose the disc to direct sunlight or heat sources such as hot air ducts, or leave it in a car parked in direct sunlight as the temperature may rise considerably inside the car.
- After playing, store the disc in its case.
- Clean the disc with a cleaning cloth. Wipe the disc from the centre out.

- Do not use solvents such as benzine, thinner, commercially available cleaners, or anti-static spray intended for vinyl LPs.
- Do not use the following discs.
  – A disc that has a non-standard shape (e.g., card, heart).
  – A disc with a label or sticker on it.
  – A disc that has cellophane tape or sticker adhesive on it.

On replacement of parts

In the event that this unit is repaired, repaired parts may be collected for reuse or recycling purposes.

Specifications

System
Laser: Semiconductor laser
Transmission standards (Digital broadcasting): DVB-T
Channel coverage (Digital broadcasting):
VHF: E5 to E12, F5 to F10, Italian D to H2
UHF: E21 to E69, B21 to B68, F21 to F69
Channel coverage (Analogue broadcasting):
PAL (B/G, D/K, I)/SECAM (L)
VHF: E2 to E12, R1 to R12, F2 to F10, Italian A to H, Ireland A to J, South Africa 4 to 11, 13
UHF: E21 to E69, R21 to R69, B21 to B69, F21 to F69
CATV: S01 to S05, S1 to S20, France B to Q
HYPER: S21 to S41

The above channel coverage merely ensures the channel reception within these ranges. It does not guarantee the ability to receive signals in all circumstances. For details, see "Receivable channels" (page 135).

Video reception: Frequency synthesizer system
Audio reception: Split carrier system
Aerial out: 75-ohm asymmetrical aerial socket
Timer: Clock: Quartz locked/Timer indication: 24-hour cycle (digital)/Power back-up duration: 1 hour
Video recording format: MPEG-2, MPEG-1
Audio recording format/applicable bit rate: Dolby Digital 2 ch
256 kbps/128 kbps (in EP, SLP, and SEP mode), PCM

Inputs and outputs
LINE 2 OUT
(AUDIO): Phono jack/2 Vrms/10 kilohms
(VIDEO): Phono jack/1.0 Vp-p
(S VIDEO): 4-pin mini DIN/Y: 1.0 Vp-p, C: 0.3 Vp-p (PAL)
LINE 2 IN
(AUDIO): Phono jack/2 Vrms/more than 22 kilohms
(VIDEO): Phono jack/1.0 Vp-p
(S VIDEO): 4-pin mini DIN/Y: 1.0 Vp-p, C: 0.3 Vp-p (PAL)
LINE 3 – TV: 21-pin
CVBS OUT
S-Video/RGB OUT (upstream)
LINE 1/DECODER: 21-pin
CVBS IN/OUT
S-Video/RGB IN
Decoder
DV IN: 4-pin/i.LINK S100
DIGITAL OUT (COAXIAL): Phono jack/0.5 Vp-p/75 ohms
COMPONENT VIDEO OUT (Y, P_B/C_B, P_R/C_R):
Phono jack/Y: 1.0 Vp-p,
P_B/C_B: 0.7 Vp-p, P_R/C_R: 0.7 Vp-p
G-LINK: mini jack
HDMI OUT: HDMI 19-pin-Standard Connector
USB:
USB jack Type A (For connecting digital still camera, Memory card reader and USB memory)
USB jack Type B (For connecting PictBridge-compatible printers)

General
Power requirements: 220-240 V AC, 50/60 Hz
Power consumption: 49 W
Dimensions (approx.):
430 × 76.5 × 286 mm (width/height/depth) incl. projecting parts
Hard disk drive capacity:
RDR-HXD770: 120 GB
RDR-HXD870: 160 GB
RDR-HXD970: 250 GB
RDR-HXD1070: 500 GB
Mass (approx.): 4.7 kg

Operating temperature: 5ºC to 35ºC
Operating humidity: 25% to 80%
Supplied accessories:
Mains lead (1)
Aerial cable (1)
Remote commander (remote) (1)
Set top box controller (1)
R6 (size AA) batteries (2)

Specifications and design are subject to change without notice.

Notes on MP3 Audio Tracks, JPEG Image Files, and DivX Video Files

About MP3 audio tracks, JPEG image files, and DivX video files

MP3 is an audio compression technology that satisfies certain ISO/MPEG regulations.
JPEG is an image compression technology.
You can play MP3 (MPEG1 Audio Layer 3) format audio tracks and JPEG image files on the HDD or DATA CDs (CD-ROMs/CD-Rs/CD-RWs) or JPEG image files on the HDD or DATA DVDs (DVD-ROMs/DVD+RWs/DVD+Rs/DVD-RWs/DVD-Rs).
DivX® is a video file compression technology, developed by DivX, Inc. This product is an official DivX® Certified product. You can play DATA CDs (CD-ROMs/CD-Rs/CD-RWs) and DATA DVDs (DVD-ROMs/DVD+RWs/DVD+Rs/DVD-RWs/DVD-Rs) that contain DivX video files.
DATA DVDs must be recorded according to ISO9660 Level 1, Level 2, Romeo, Joliet, or UDF (Universal Disk Format) 1.02, 1.50, 2.00*, or 2.01 format for the recorder to recognise the MP3 tracks, JPEG image files, and DivX video files.
DATA CDs must be recorded according to ISO9660 Level 1, Level 2, Romeo, or Joliet format for the recorder to recognise the MP3 tracks, JPEG image files, and DivX video files.
You can also play discs recorded in MultiSession/Border.
See the instructions supplied with the disc drives and the recording software (not supplied) for details on the recording format.

* Not available for MP3 audio tracks.

Note on MultiSession/Border discs

If audio tracks and images in Music CD format or Video CD format are recorded in the first session/border, only the first session/border will be played back.

➡ continued

MP3 audio tracks, JPEG image files, or DivX video files that the recorder can play

The recorder can play the following tracks and files:
– MP3 audio tracks with the extension ".mp3."
– JPEG image files with the extension ".jpeg" or ".jpg."
– Baseline JPEG image files that conform to the Exif 2.2* image files format, and Y:CB:CR is 4:4:4, 4:2:2, or 4:2:0.
– DivX video files with the extension ".avi" or ".divx."

* "Exchangeable Image File Format": The file format used by digital still cameras.

Hint

Since a disc with many trees takes longer to start playback, it is recommended that you create albums with no more than two trees.

Notes

- The recorder will play any data with the extension ".mp3," ".jpeg," ".jpg," ".avi," or ".divx" even if they are not in MP3, JPEG, or DivX format. Playing these data may generate a loud noise which could damage your speaker system.
- Depending on the disc, normal playback may not be possible. For example, the picture may be unclear, playback may not appear smooth, the sound may skip, and so on.
- Depending on the disc, playback may take some time to start.
- Some files cannot be played.
- For MP3 audio tracks and DivX video files, the recorder can play up to 99 albums each on a DATA CD or DATA DVD. Up to 99 tracks and files under an album can be played.
- For JPEG image files, the recorder can load up to 99 albums and/or up to 999 files under an album on a DATA CD/DATA DVD or the connected USB device at a time. To view unloaded albums, reload them.
- Proceeding to the next or another album may take some time.
- The image size that can be displayed is limited. The following image sizes can be displayed: width 160–5,120 pixels by height 120–3,840 pixels.
- This recorder supports MP3 audio tracks recorded with a sampling frequency of 32 kHz, 44.1 kHz, and 48 kHz.
- No more than a 1 GB MP3 audio track can be played.
- The recorder does not conform to audio tracks in mp3PRO format.
- The recorder cannot play a DivX video file of a size larger than 720 (width) × 576 (height)/4 GB.
- The recorder may not play a DivX video file when the file has been combined from two or more DivX video files.

Notes on copying JPEG image files/MP3 audio tracks

- You cannot copy JPEG image files/MP3 audio tracks to the HDD if:
  – The total number of JPEG image albums on the HDD exceeds 999.
  – The total number of JPEG image files/MP3 audio tracks under an album exceeds 999.
  – The MP3 audio tracks are 1 GB or larger.
- Note that the size of JPEG image files copied to the HDD may be automatically increased to fit the TV screen.
- You cannot copy JPEG image files onto a DATA DVD finalised on other recorders or devices.
- If a warning message indicating that the HDD is full appears, erase several albums or files to make space. For details on erasing tracks or files, see page 117 or 125.

About i.LINK

The DV IN jack on this recorder is i.LINK-compliant for digital video cameras. This section describes the i.LINK standard and its features.

What is i.LINK?

i.LINK is a digital serial interface for handling digital video, digital audio and other data in two directions between equipment having the i.LINK jack, and for controlling other equipment.
i.LINK-compatible equipment can be connected by a single i.LINK cable. Possible applications are operations and data transactions with various digital AV equipment. When two or more i.LINK-compatible equipment are connected to this recorder in a daisy chain, operations and data transactions are possible with not only the equipment that this recorder is connected to but also with other devices via the directly connected equipment.
Note, however, that the method of operation sometimes varies according to the characteristics and specifications of the equipment to be connected, and that operations and data transactions are sometimes not possible on some connected equipment.

Note

Normally, only one piece of equipment can be connected to this recorder by the i.LINK cable (DV connecting cable). When connecting this recorder to i.LINK-compatible equipment having two or more i.LINK jacks (DV jacks), see the instruction manual of the equipment to be connected.

About the name "i.LINK"

i.LINK is a more familiar term for IEEE 1394 data transport bus proposed by SONY, and is a trademark approved by many corporations. IEEE 1394 is an international standard standardized by the Institute of Electrical and Electronics Engineers.

i.LINK baud rate

i.LINK's maximum baud rate varies according to the equipment. Three maximum baud rates are defined:
S100 (approx. 100 Mbps*)
S200 (approx. 200 Mbps)
S400 (approx. 400 Mbps)

The baud rate is listed under "Specifications" in the instruction manual of each equipment. It is also indicated near the i.LINK jack on some equipment.
The maximum baud rate of equipment on which it is not indicated such as this unit is "S100."
When units are connected to equipment having a different maximum baud rate, the baud rate sometimes differs from the indicated baud rate.

* What is Mbps?
Mbps stands for megabits per second, or the amount of data that can be sent or received in one second. For example, a baud rate of 100 Mbps means that 100 megabits of data can be sent in one second.

i.LINK functions on this recorder

For details on how to dub when this recorder is connected to other video equipment having DV jacks, see page 104.
The DV jack on this recorder can only input DVC-SD signals. It cannot output signals.
The DV jack will not accept MICRO MV signals from equipment such as a MICRO MV digital video camera with an i.LINK jack.
For further precautions, see the notes on page 104.
For details on precautions when connecting this recorder, also see the instruction manuals for the equipment to be connected.

Required i.LINK cable

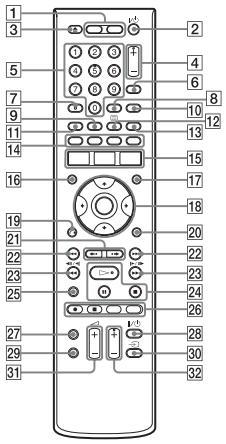
Use the Sony i.LINK 4-pin-to-4-pin cable.

i.LINK and , are trademarks.

Guide to Parts and Controls

For more information, see the pages in parentheses.

Remote



1 HDD button (36)
DVD button (36)

2 I/⏻ (on/standby) button (26)

3 ⏏ (open/close) button (36)

4 PROG (programme) +/– buttons (36)
The + button has a tactile dot*.

5 Number buttons (42, 89)
The number 5 button has a tactile dot*.

6 INPUT (input select) button (61, 79)

7 AUDIO button (82, 108)
The AUDIO button has a tactile dot*.

8 CLEAR button (42, 84, 109, 110)

9 ANGLE button (80, 125)

10 TV/DVD button (24)

11 SUBTITLE button (82)

12 (text) button (51)

13 MENU button (80)

14 Colour buttons (48, 65)

15 SYSTEM MENU button (76, 85, 100, 106, 112, 118, 128)
TITLE LIST button (38, 80, 92)
TOP MENU button (80)
GUIDE button (48, 63)

16 TIMER button (53, 60)

17 INFO (information) button (48, 63)

18 ←/↑/↓/→/ENTER button (26)

19 RETURN button (26)
EXIT button (131)

20 DISPLAY button (40)

21 ←•/•→ (instant replay/instant advance) buttons (82)

22 I◄◄/►►I (previous/next) buttons (82, 108, 115)
PAGE +/– buttons (48, 65)

23 ◄◄ ◄II ◄I/I► II► ►► (search/slow/freeze frame) buttons (82, 108, 115)
DAY +/– buttons (65)

24 ▷ (play) button (80, 108, 124)
II (pause) button (82, 108, 115, 124)
■ (stop) button (80, 108, 114, 124)
The ▷ button has a tactile dot*.

25 TV PAUSE button (87)

26 ● REC button (36)
■ REC STOP button (36)
HDD/DVD DUB button (99)
REC MODE button (36)

27 ZOOM button (124)

28 TV I/⏻ (on/standby) button (24)

29 PLAY MODE button (84, 89, 109, 111)

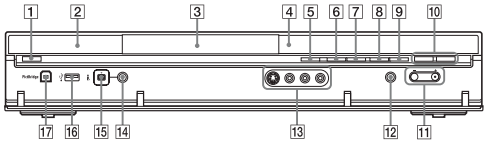
30 TV ⊖ (input select) button (24)

31 TV ◿ (volume) +/– buttons (24)

32 TV PROG (programme) +/– buttons (24)
The + button has a tactile dot*.

* Use the tactile dot as a reference when operating the recorder.

Front panel



1 I/⏻ (on/standby) button (26)

2 (remote sensor) (24)

3 Disc tray (36)

4 Front panel display (166)

5 ⏏ (open/close) button (36)

6 ► (play) button (80, 108, 124)
The ► button has a tactile dot*.

7 ■ (stop) button (80, 108, 114, 124)

8 ● REC button (36)

9 ■ REC STOP button (36)

10 HDD button/indicator (36)
DVD button/indicator (36)

11 PROGRAM +/– buttons (36)
The + button has a tactile dot*.

12 INPUT (input select) button (61, 79)

13 LINE 2 IN (S VIDEO/VIDEO/L(MONO) AUDIO R) jacks (32)

14 ONE-TOUCH DUB button (106)

15 , DV IN jack (104)

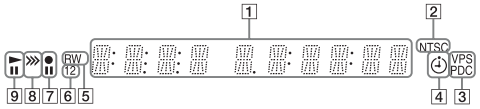
16 USB jack (type A) (112, 118)

17 PictBridge USB jack (type B) (126)

* Use the tactile dot as a reference when operating the recorder.

→continued

Front panel display



1 Displays the following:
- Playing time
- Current title/chapter/track/index number
- Recording time/recording mode
- Clock
- Programme position
- EPG indication (63)
  "EPG" appears when receiving the GUIDE Plus+ data.
- TV Direct Rec. indication (36):
  "TV" appears in the right most two digits.

2 NTSC indicator (130, 137)

3 VPS/PDC indicator (78)

4 Timer indicator (73)

5 Disc type
Lights when a recordable DVD-R or DVD-RW disc is loaded.

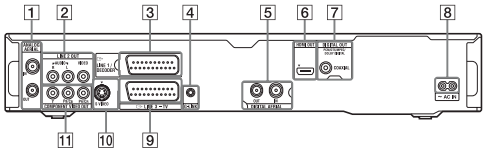
6 Command Mode indicator (149)
Displays the Command Mode of the remote.
When the Command Mode for the recorder is set to DVD3 (default), either "1" or "2" does not appear.

7 Recording status

8 Dubbing direction indicator

9 Playing status

Rear panel



1 ANALOG AERIAL IN/OUT jacks (15)

2 LINE 2 OUT (R-AUDIO-L/VIDEO) jacks (19, 22)

3 LINE 1/DECODER jack (31)

4 G-LINK jack (17)

5 DIGITAL AERIAL IN/OUT jacks (15)

6 HDMI OUT (high-definition multimedia interface out) jack (19, 22)

7 DIGITAL OUT (COAXIAL) jack (22)

8 AC IN terminal (23)

9 LINE 3 – TV jack (19)

10 LINE 2 OUT (S VIDEO) jack (19)

11 COMPONENT VIDEO OUT (Y, PB/CB, PR/CR) jacks (19)

Language Code List

For details, see page 140.
The language spellings conform to the ISO 639: 1988 (E/F) standard.

Number	Language (code)	Number	Language (code)	Number	Language (code)
0101	Afar (aa)	0905	Interlingue (ie)	1813	Rhaeto-Romance (rm)
0102	Abkhazian (ab)	0911	Inupiak (ik)	1814	Kirundi (rn)
0106	Afrikaans (af)	0914	Indonesian (in)	1815	Romanian (ro)
0113	Amharic (am)	0919	Icelandic (is)	1821	Russian (ru)
0118	Arabic (ar)	0920	Italian (it)	1823	Kinyarwanda (rw)
0119	Assamese (as)	0923	Hebrew (iw)	1901	Sanskrit (sa)
0125	Aymara (ay)	1001	Japanese (ja)	1904	Sindhi (sd)
0126	Azerbaijani (az)	1009	Yiddish (ji)	1907	Sangho (sg)
0201	Bashkir (ba)	1023	Javanese (jw)	1908	Serbo-Croatian (sh)
0205	Byelorussian (be)	1101	Georgian (ka)	1909	Singhalese (si)
0207	Bulgarian (bg)	1111	Kazakh (kk)	1911	Slovak (sk)
0208	Bihari (bh)	1112	Greenlandic (kl)	1912	Slovenian (sl)
0209	Bislama (bi)	1113	Cambodian (km)	1913	Samoan (sm)
0214	Bengali (bn)	1114	Kannada (kn)	1914	Shona (sn)
0215	Tibetan (bo)	1115	Korean (ko)	1915	Somali (so)
0218	Breton (br)	1119	Kashmiri (ks)	1917	Albanian (sq)
0301	Catalan (ca)	1121	Kurdish (ku)	1918	Serbian (sr)
0315	Corsican (co)	1125	Kirghiz (ky)	1919	Siswati (ss)
0319	Czech (cs)	1201	Latin (la)	1920	Sesotho (st)
0325	Welsh (cy)	1214	Lingala (ln)	1921	Sundanese (su)
0401	Danish (da)	1215	Laothian (lo)	1922	Swedish (sv)
0405	German (de)	1220	Lithuanian (lt)	1923	Swahili (sw)
0426	Bhutani (dz)	1222	Latvian (lv); Lettish	2001	Tamil (ta)
0512	Greek (el)	1307	Malagasy (mg)	2005	Telugu (te)
0514	English (en)	1309	Maori (mi)	2007	Tajik (tg)
0515	Esperanto (eo)	1311	Macedonian (mk)	2008	Thai (th)
0519	Spanish (es)	1312	Malayalam (ml)	2009	Tigrinya (ti)
0520	Estonian (et)	1314	Mongolian (mn)	2011	Turkmen (tk)
0521	Basque (eu)	1315	Moldavian (mo)	2012	Tagalog (tl)
0601	Persian (fa)	1318	Marathi (mr)	2014	Setswana (tn)
0609	Finnish (fi)	1319	Malay (ms)	2015	Tonga (to)
0610	Fiji (fj)	1320	Maltese (mt)	2018	Turkish (tr)
0615	Faroese (fo)	1325	Burmese (my)	2019	Tsonga (ts)
0618	French (fr)	1401	Nauru (na)	2020	Tatar (tt)
0625	Frisian (fy)	1405	Nepali (ne)	2023	Twi (tw)
0701	Irish (ga)	1412	Dutch (nl)	2111	Ukrainian (uk)
0704	Scots Gaelic (gd)	1415	Norwegian (no)	2118	Urdu (ur)
0712	Galician (gl)	1503	Occitan (oc)	2126	Uzbek (uz)
0714	Guarani (gn)	1513	(Afan)Oromo (om)	2209	Vietnamese (vi)
0721	Gujarati (gu)	1518	Oriya (or)	2215	Volapük (vo)
0801	Hausa (ha)	1601	Panjabi (pa)	2315	Wolof (wo)
0809	Hindi (hi)	1612	Polish (pl)	2408	Xhosa (xh)
0818	Croatian (hr)	1619	Pashto (ps); Pushto (ps)	2515	Yoruba (yo)
0821	Hungarian (hu)			2608	Chinese (zh)
0825	Armenian (hy)	1620	Portuguese (pt)	2621	Zulu (zu)
0901	Interlingua (ia)	1721	Quechua (qu)		

Country/Area Code

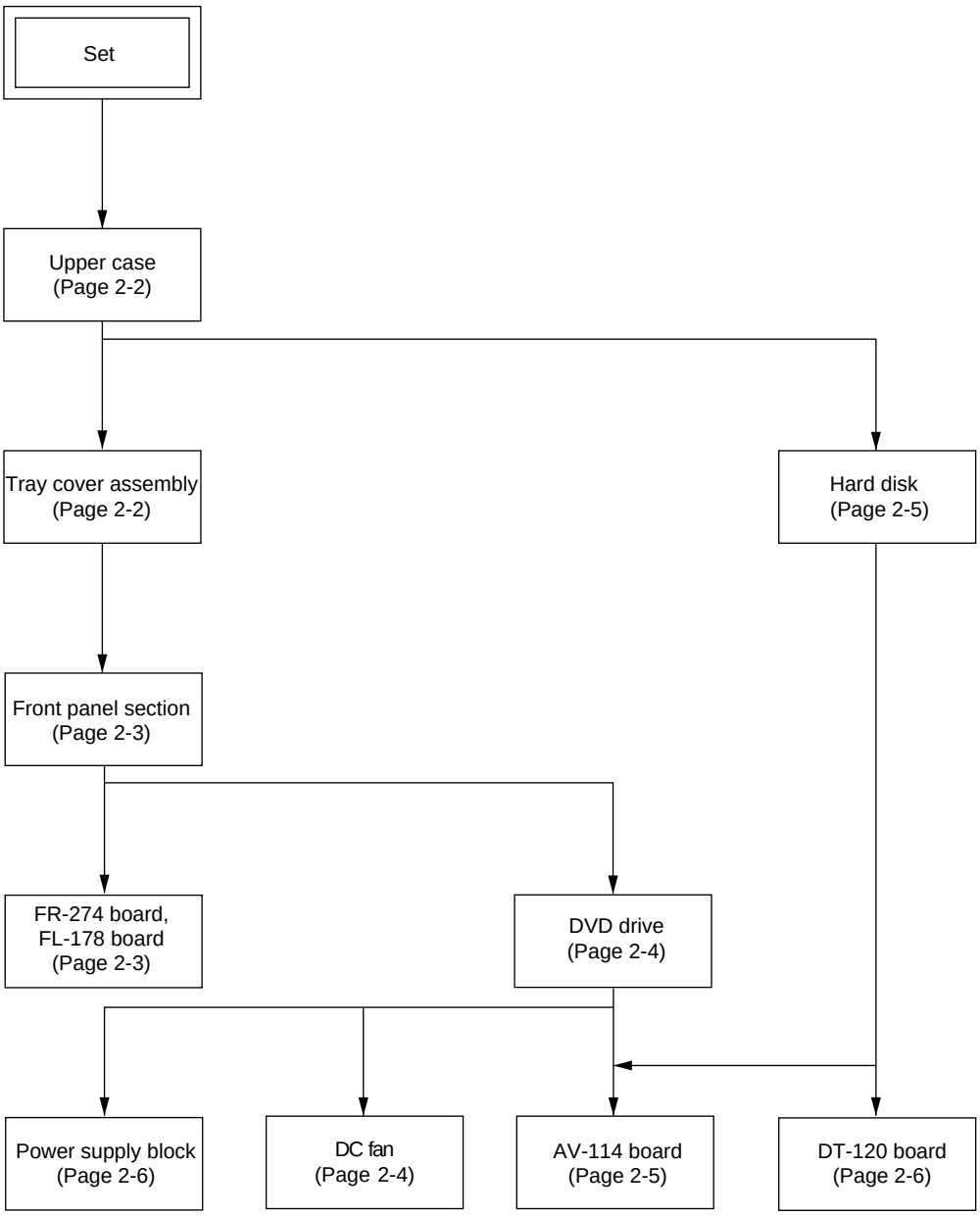
For details, see page 145.

Number	Area (Code)	Number	Area (Code)
0118	Argentina (ar)	1325	Malaysia (my)
0121	Australia (au)	1324	Mexico (mx)
0120	Austria (at)	1412	Netherlands (nl)
0205	Belgium (be)	1426	New Zealand (nz)
0218	Brazil (br)	1415	Norway (no)
0301	Canada (ca)	1611	Pakistan (pk)
0312	Chile (cl)	1608	Philippines (ph)
0314	China (cn)	1620	Portugal (pt)
0411	Denmark (dk)	1821	Russia (ru)
0609	Finland (fi)	1907	Singapore (sg)
0618	France (fr)	0519	Spain (es)
0405	Germany (de)	1905	Sweden (se)
0811	Hong Kong (hk)	0308	Switzerland (ch)
0914	India (in)	2023	Taiwan (tw)
0904	Indonesia (id)	2008	Thailand (th)
0920	Italy (it)	0702	United Kingdom (gb)
1016	Japan (jp)	2119	USA (us)
1118	Korea (kr)		

MEMO

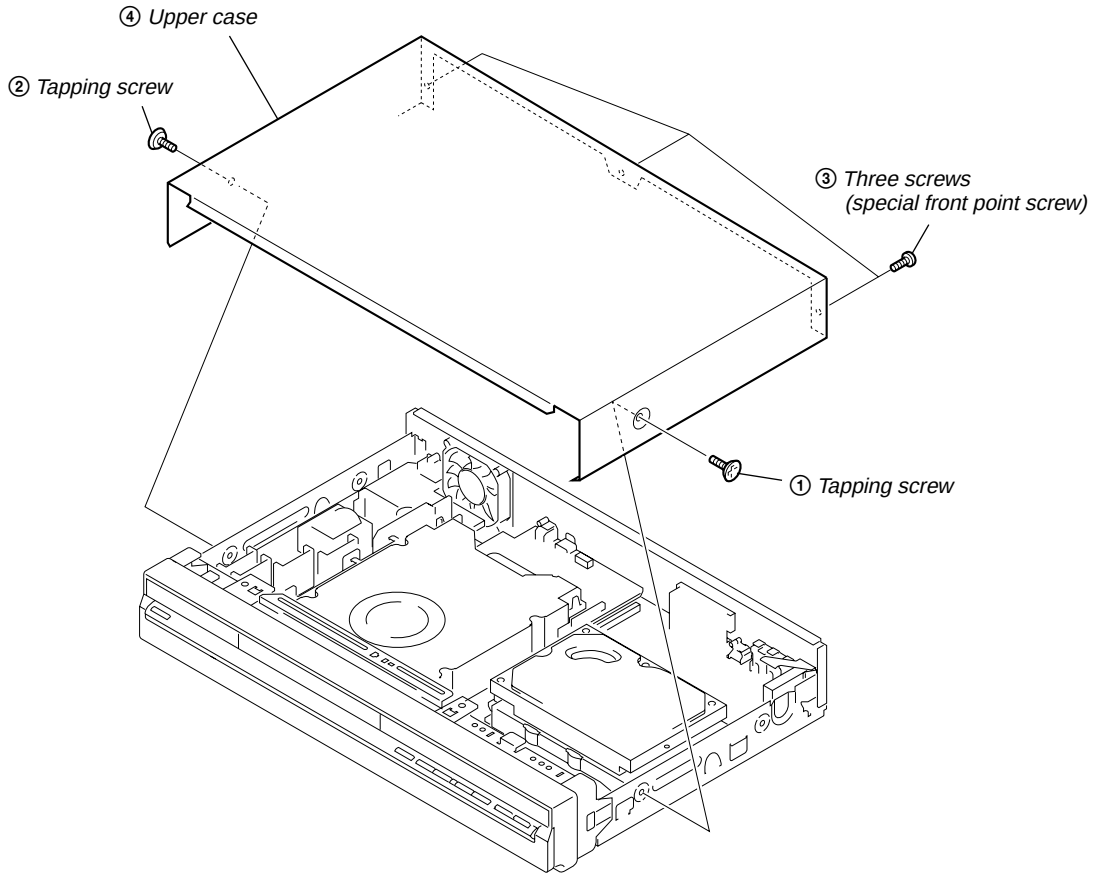
SECTION 2
DISASSEMBLY

NOTE: The following flow chart shows the disassembly procedure.

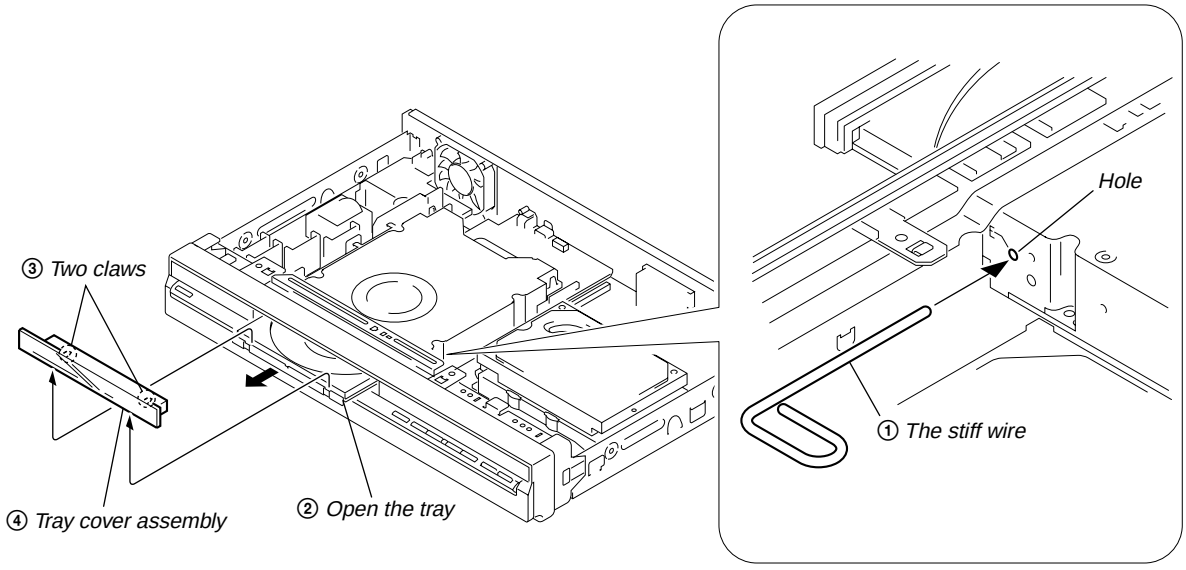


NOTE: Follow the disassembly procedure in the numerical order given.

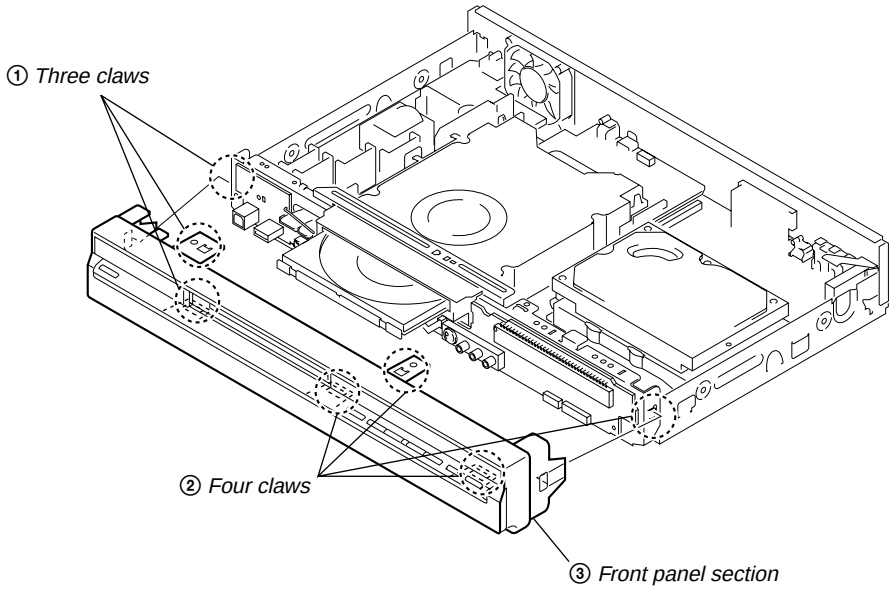
2-1. UPPER CASE



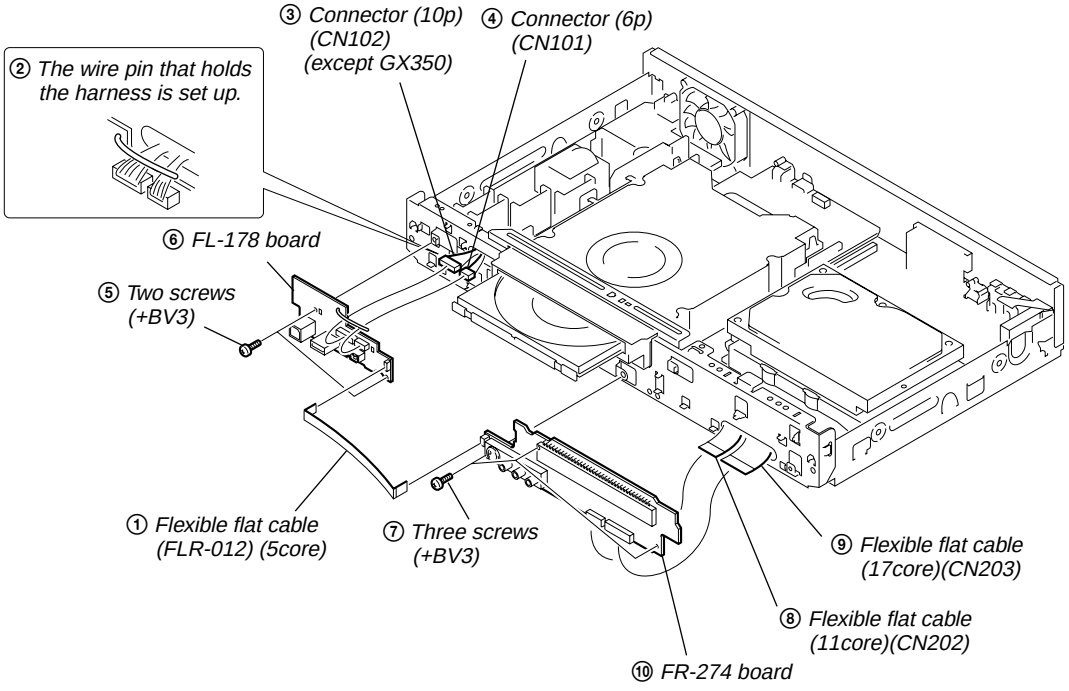
2-2. TRAY COVER ASSEMBLY



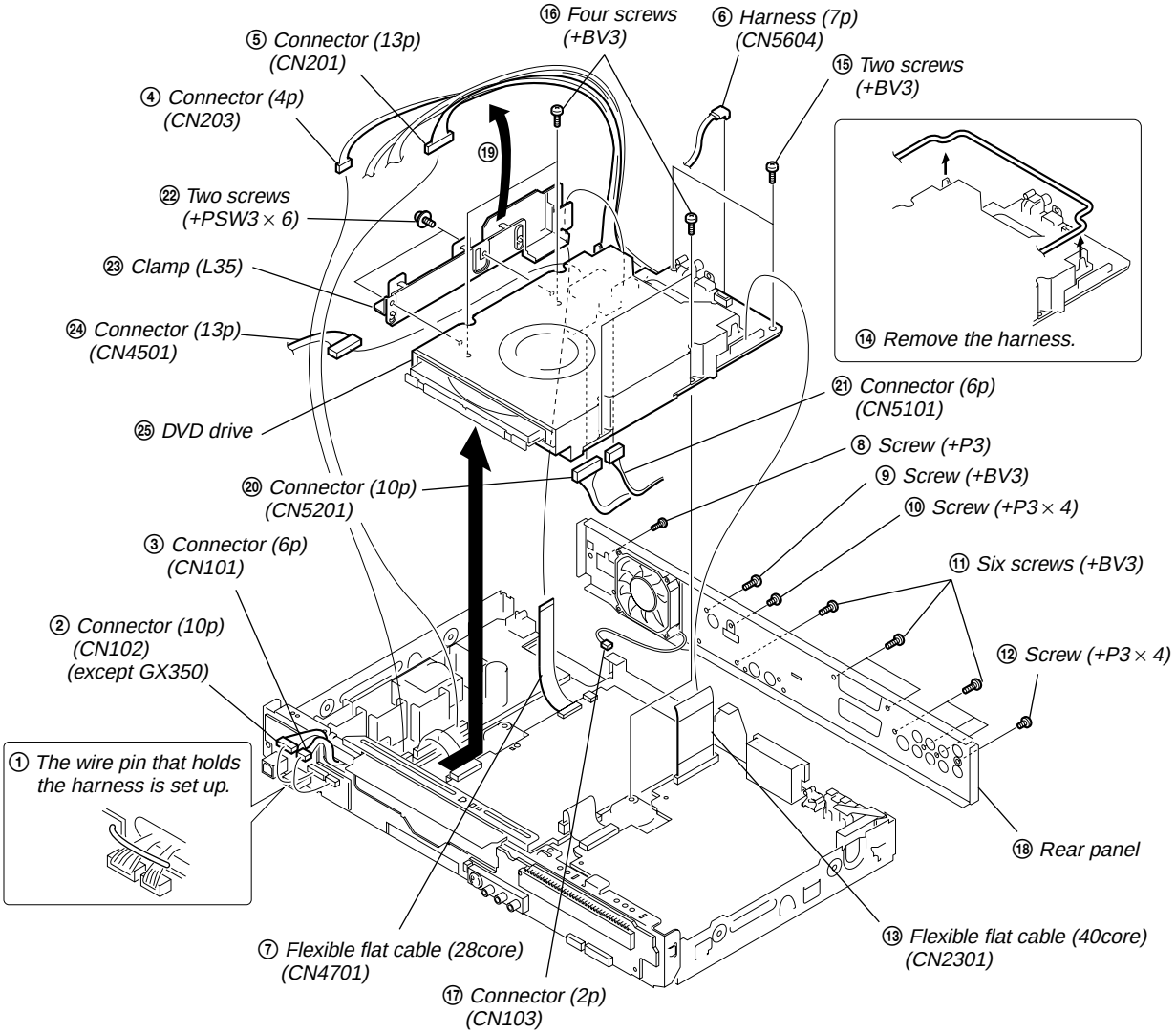
2-3. FRONT PANEL SECTION



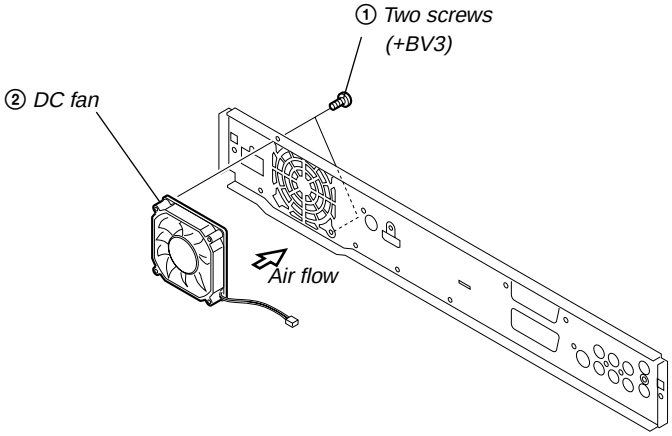
2-4 FR-274 BOARD, FL-178 BOARD



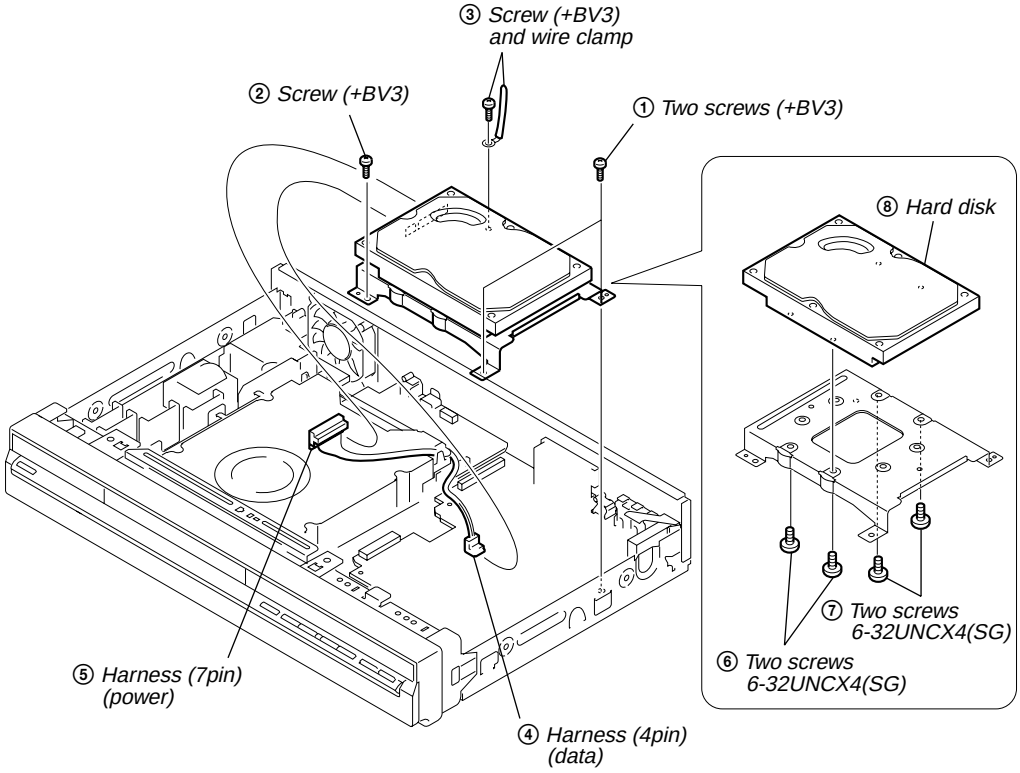
2-5. DVD DRIVE



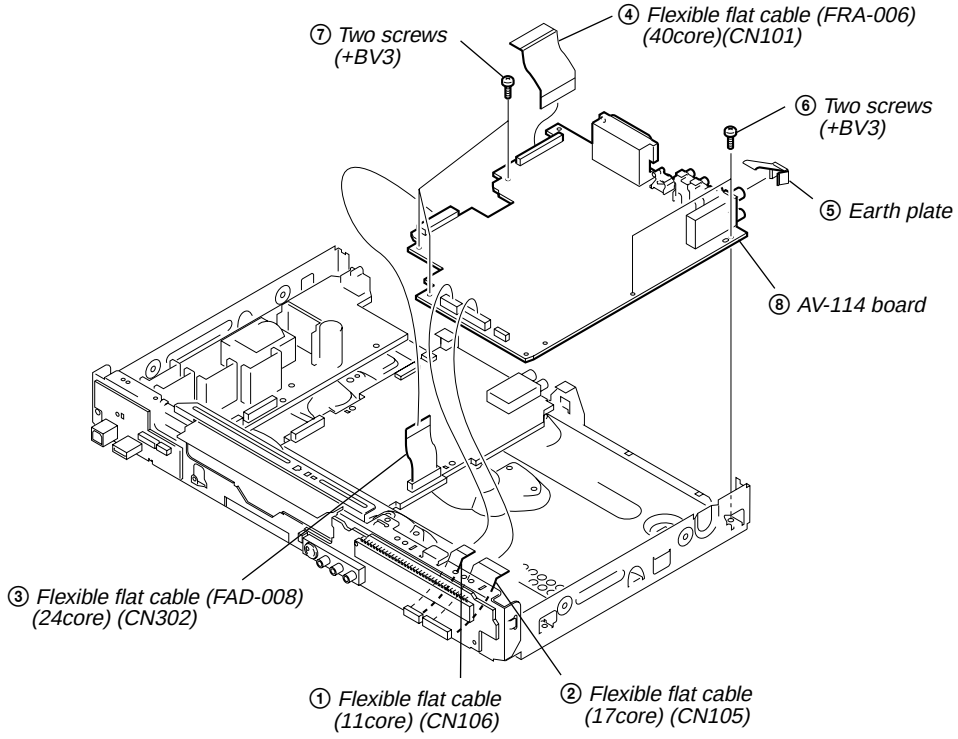
2-6. DC FAN



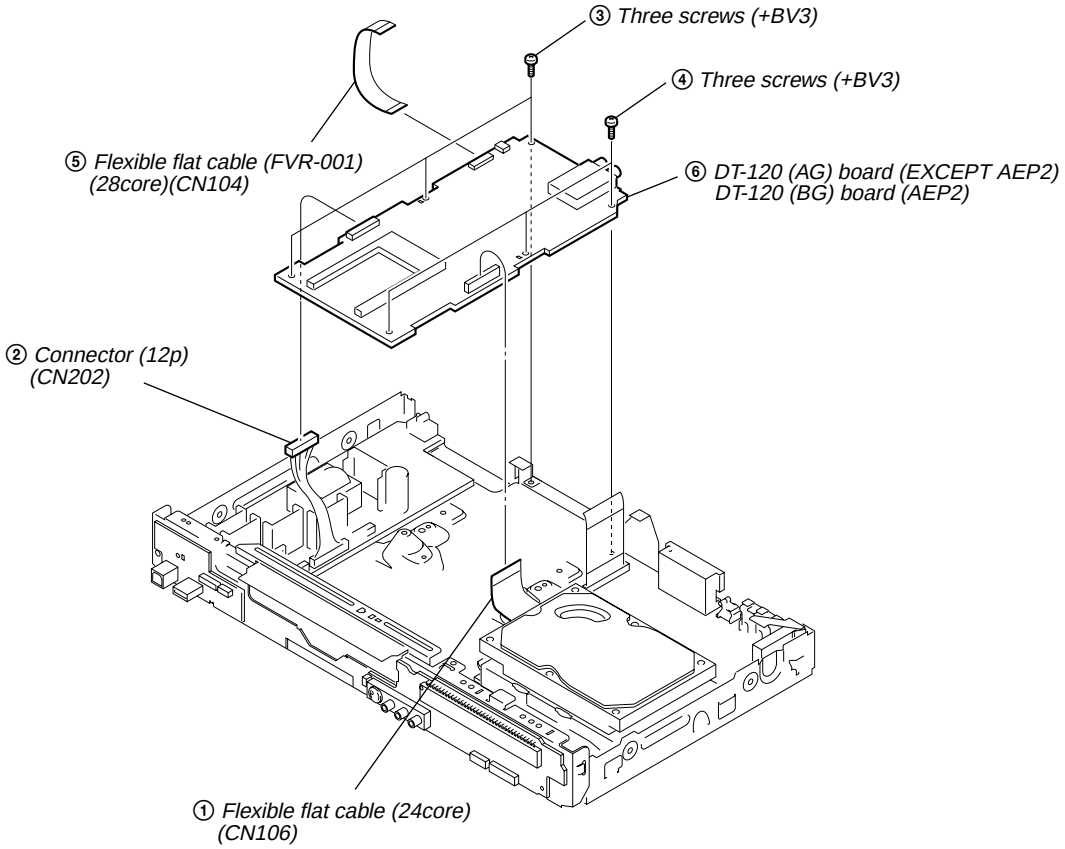
2-7. HARD DISK



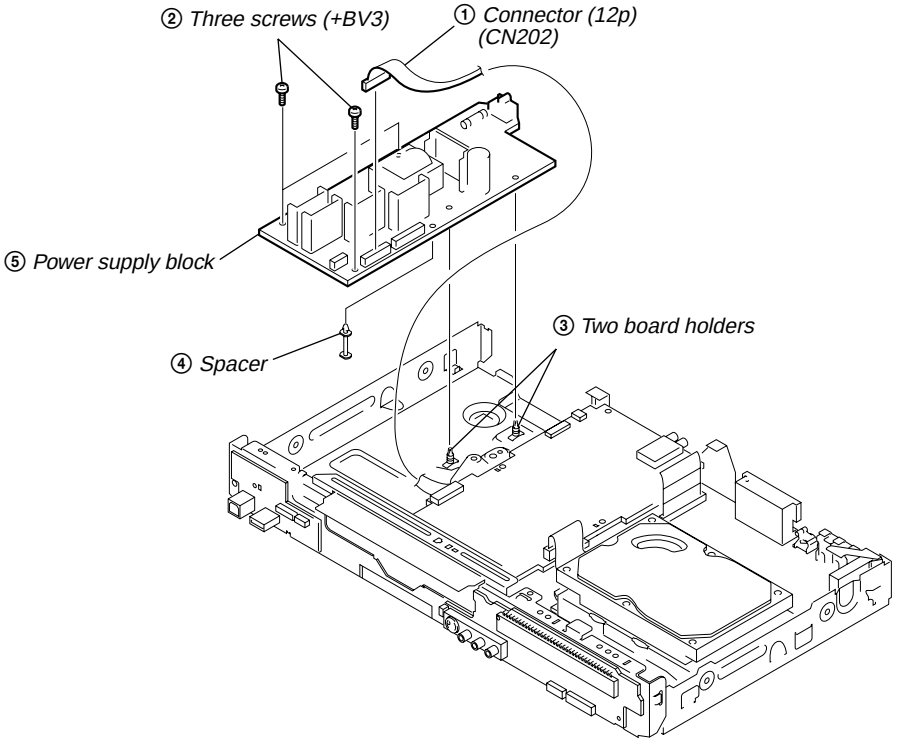
2-8. AV-114 BOARD



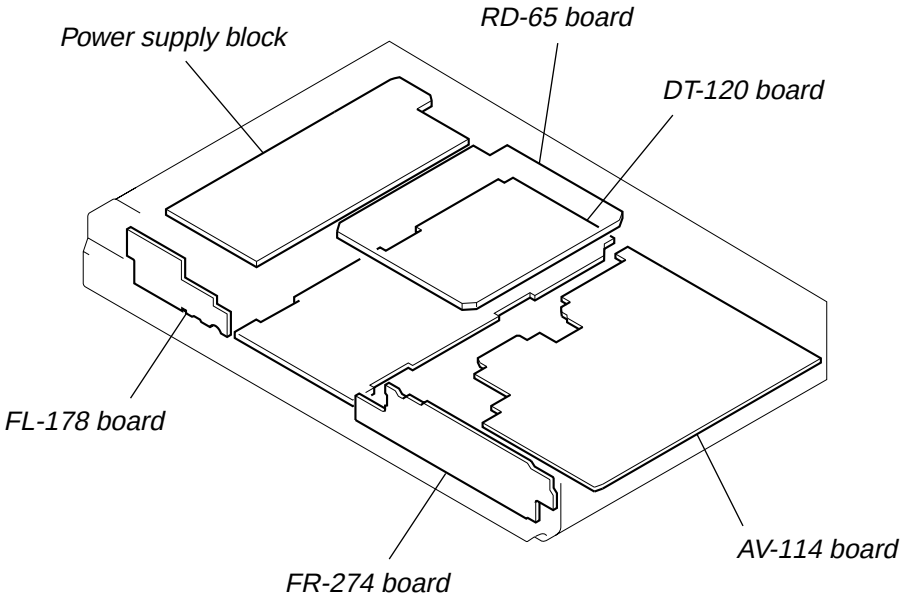
2-9. DT-120 BOARD



2-10. POWER SUPPLY BLOCK



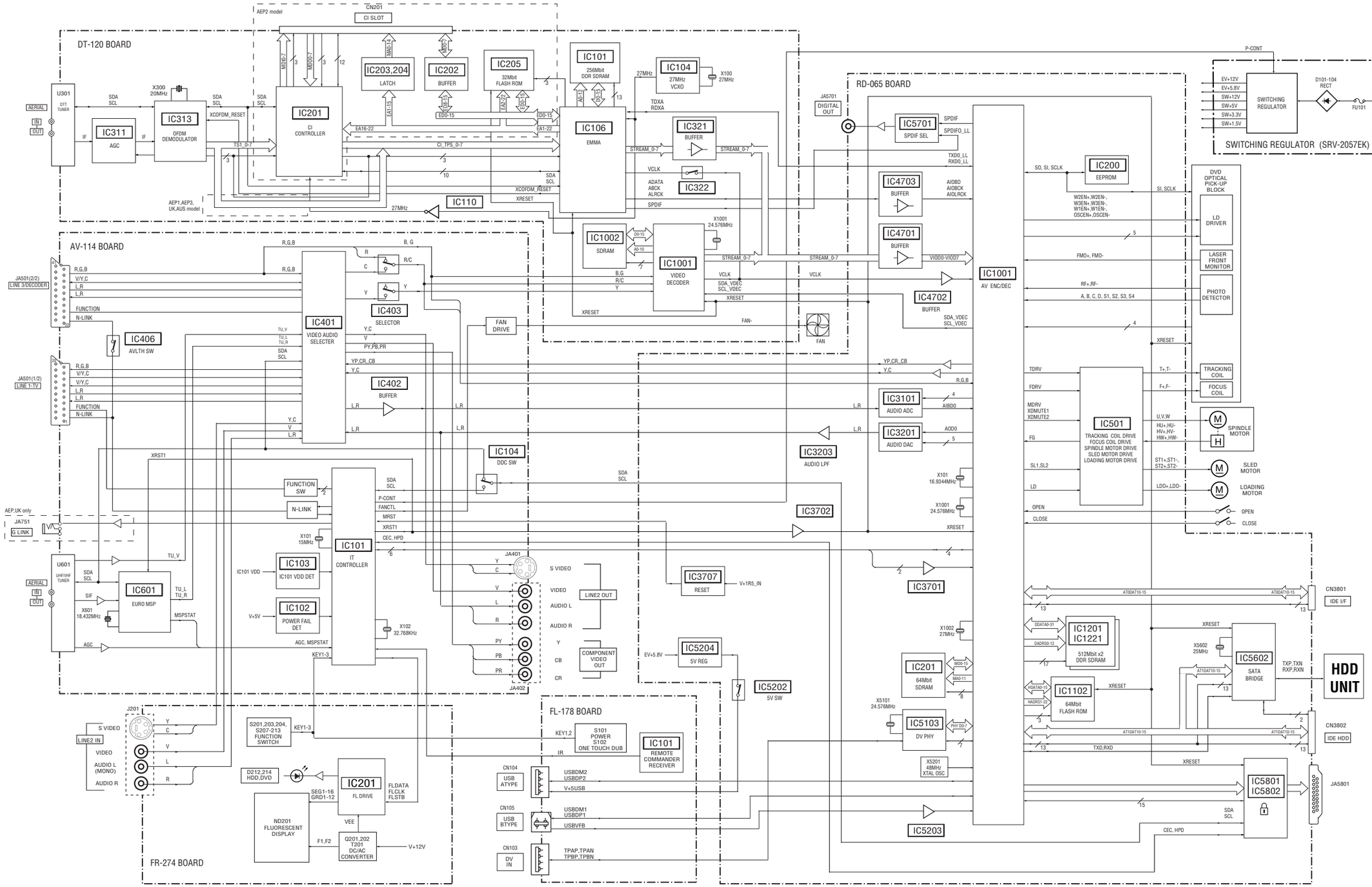
2-11. CIRCUIT BOARDS LOCATION



MEMO

SECTION 3
BLOCK DIAGRAMS

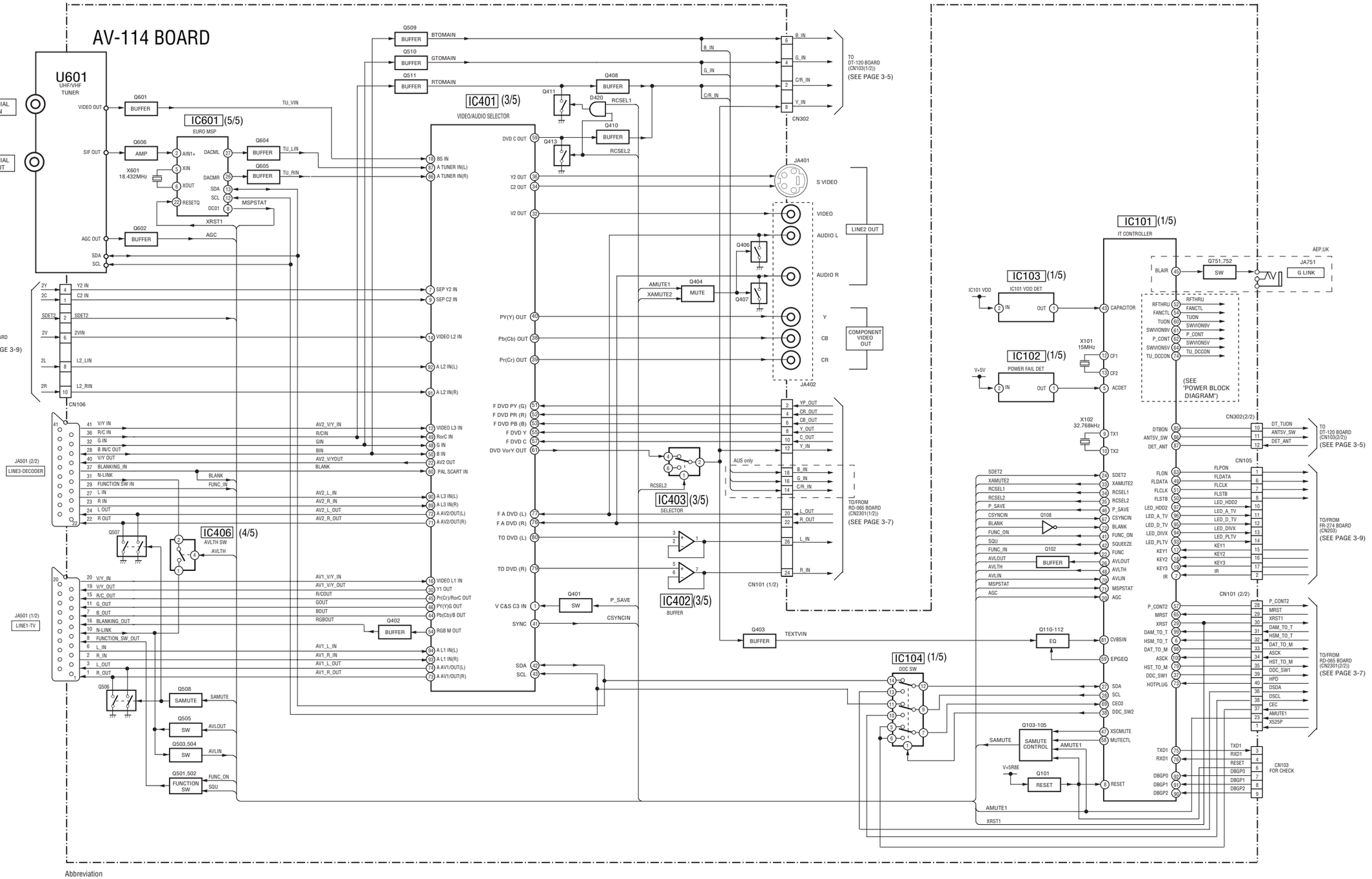
3-1. OVERALL BLOCK DIAGRAM



Abbreviation
AUS:Australian model.

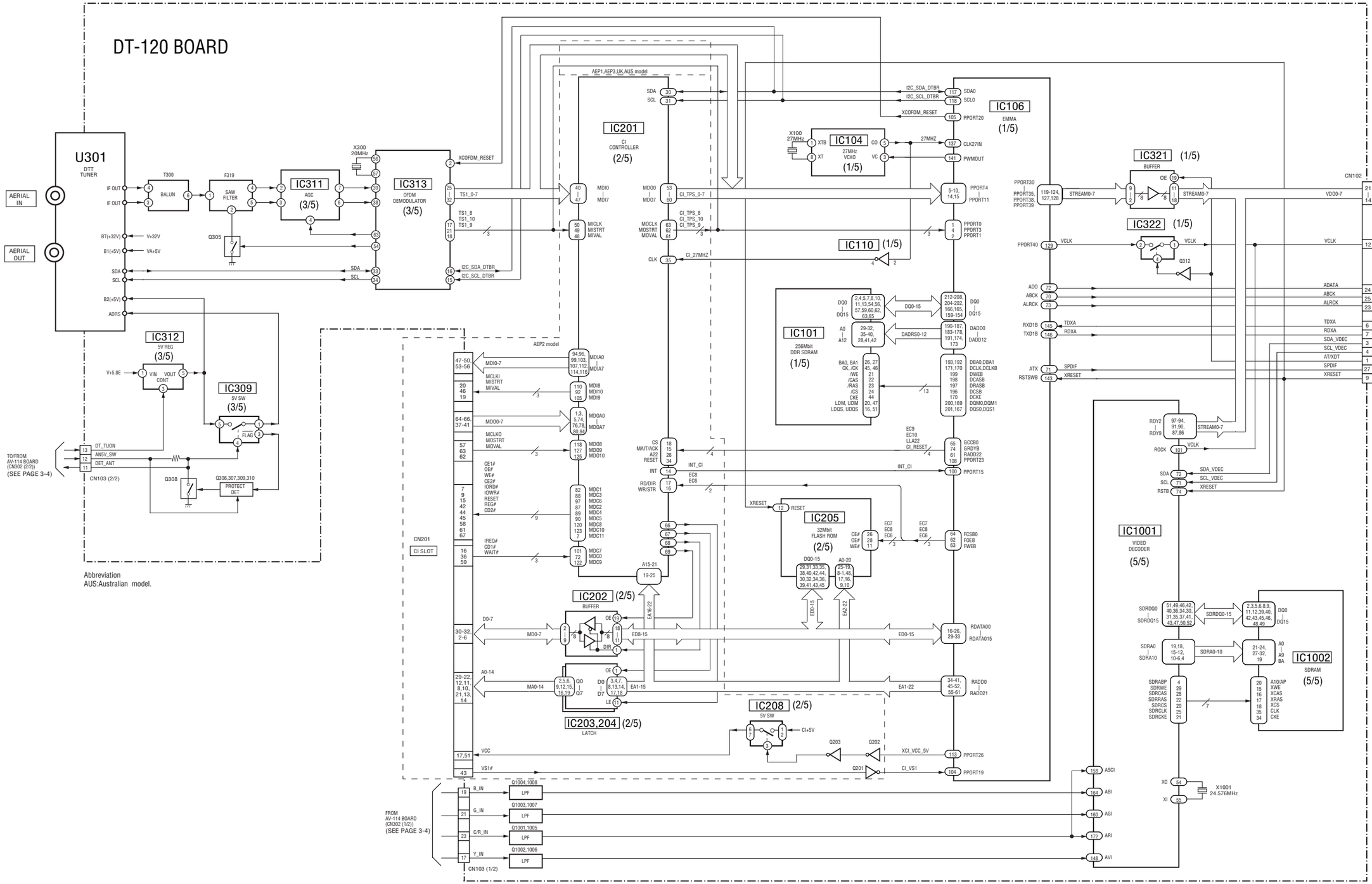
Note1: The HDMI block is highly confidential, and prohibited from releasing to public.
Note2: The components identified by mark 🔒 contain confidential information.
Strictly follow the instructions whenever the components are repaired and/or replaced.

3-2. AV-114 BLOCK DIAGRAM



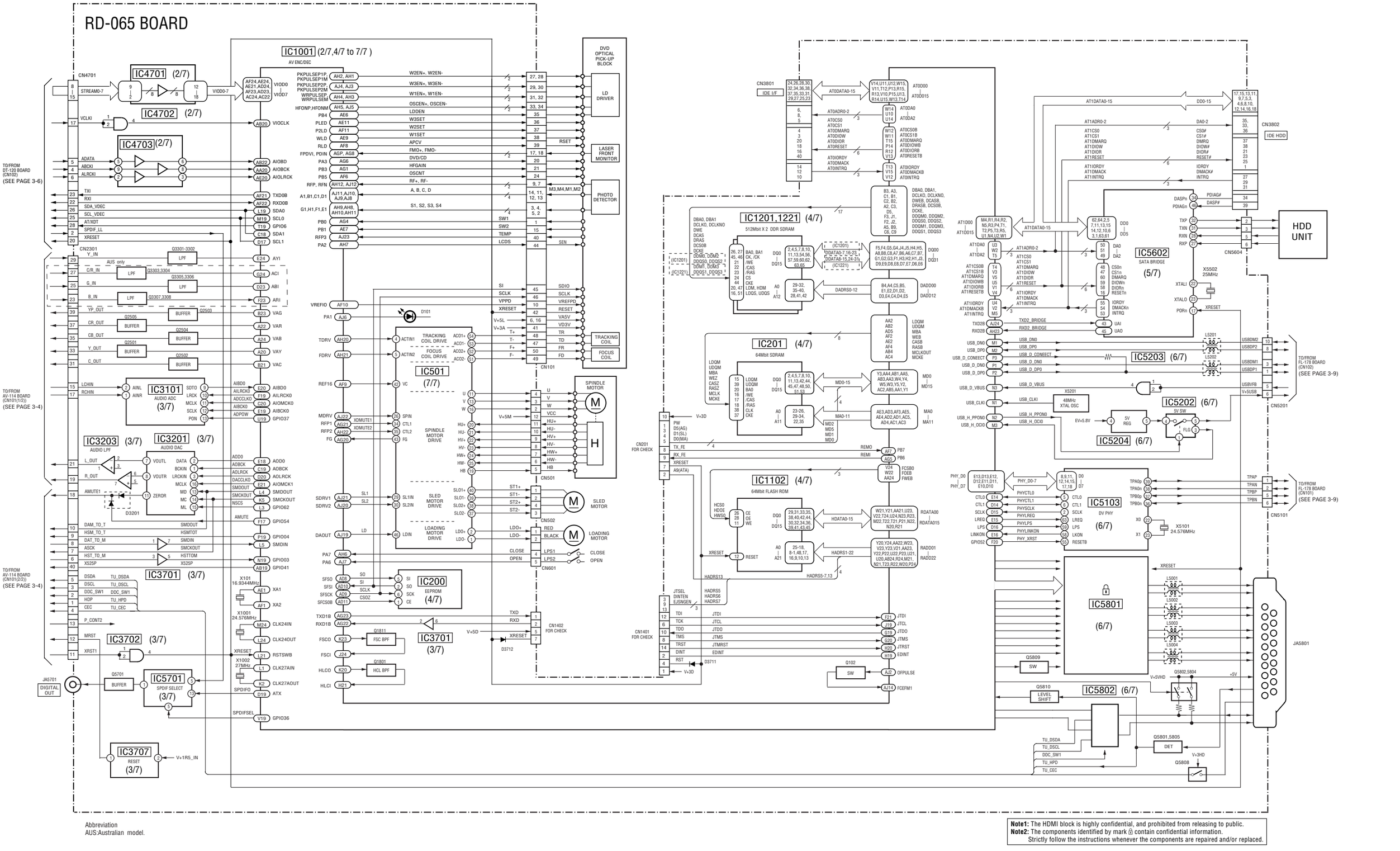
Abbreviation
AUS:Australian model.

3-3. DT-120 BLOCK DIAGRAM



Abbreviation
AUS:Australian model.

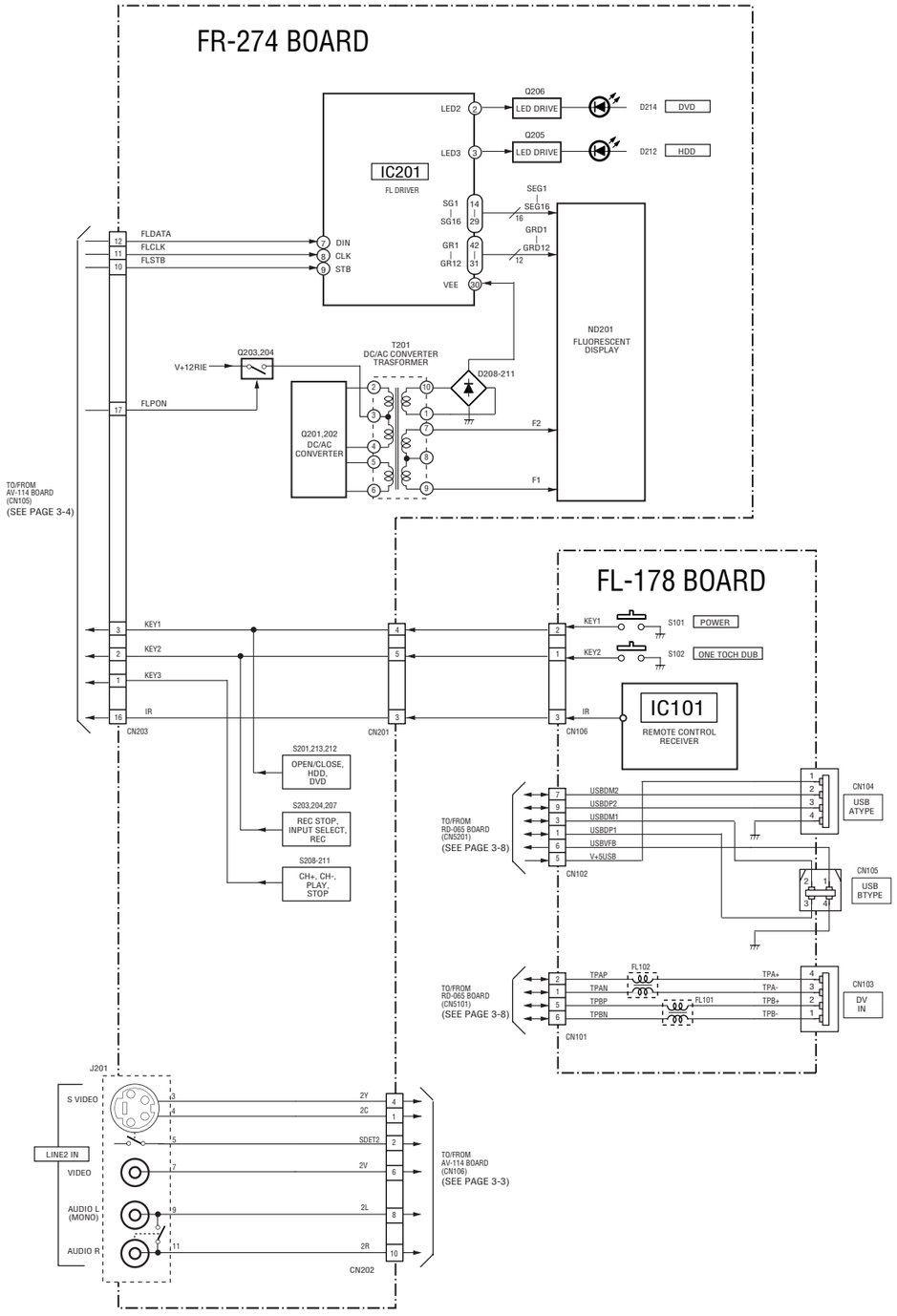
3-4. RD-065 BLOCK DIAGRAM



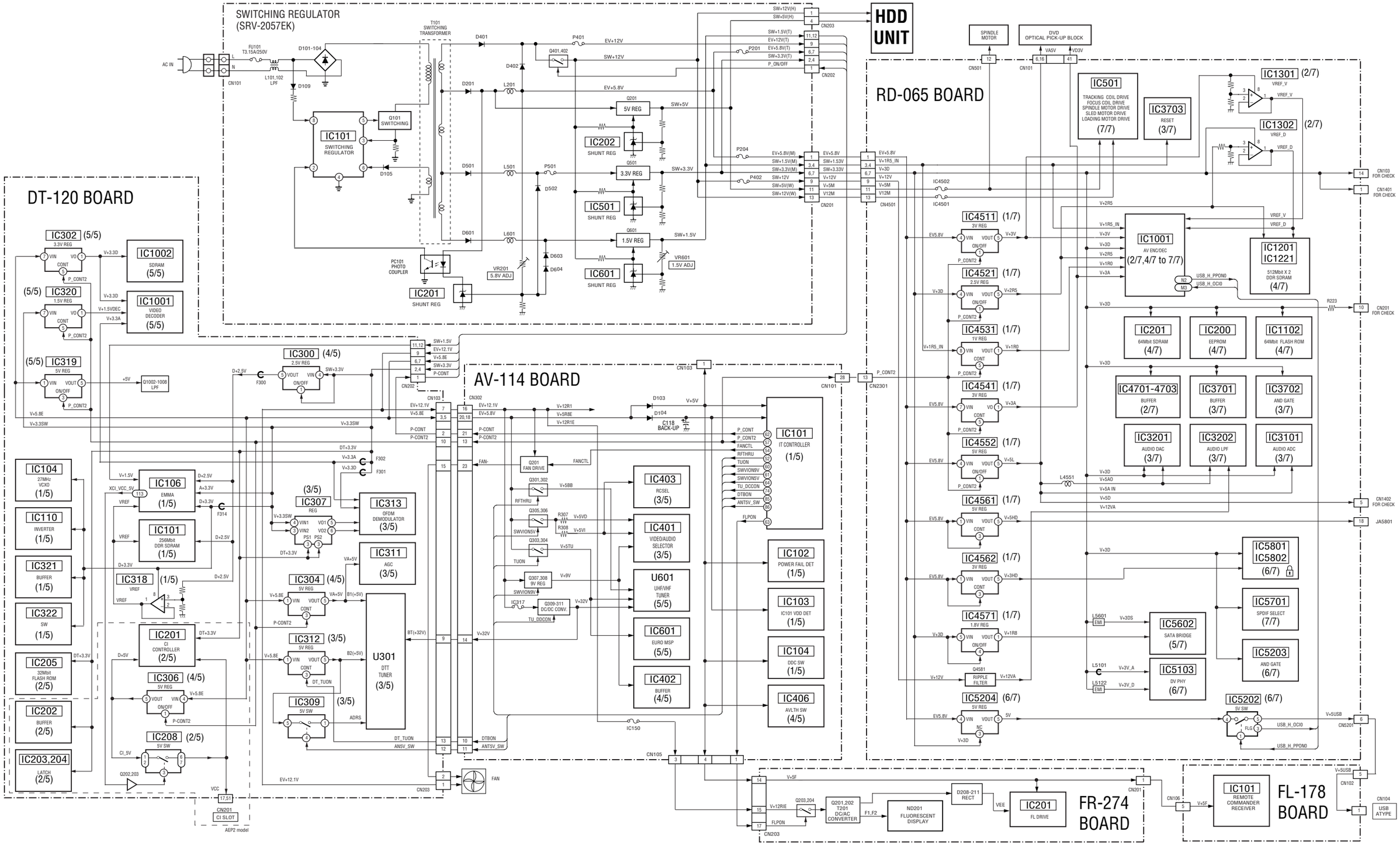
Abbreviation
AUS:Australian model.

Note1: The HDMI block is highly confidential, and prohibited from releasing to public.
Note2: The components identified by mark ⚠ contain confidential information.
Strictly follow the instructions whenever the components are repaired and/or replaced.

3-5. FL-178, FR-274 BLOCK DIAGRAM



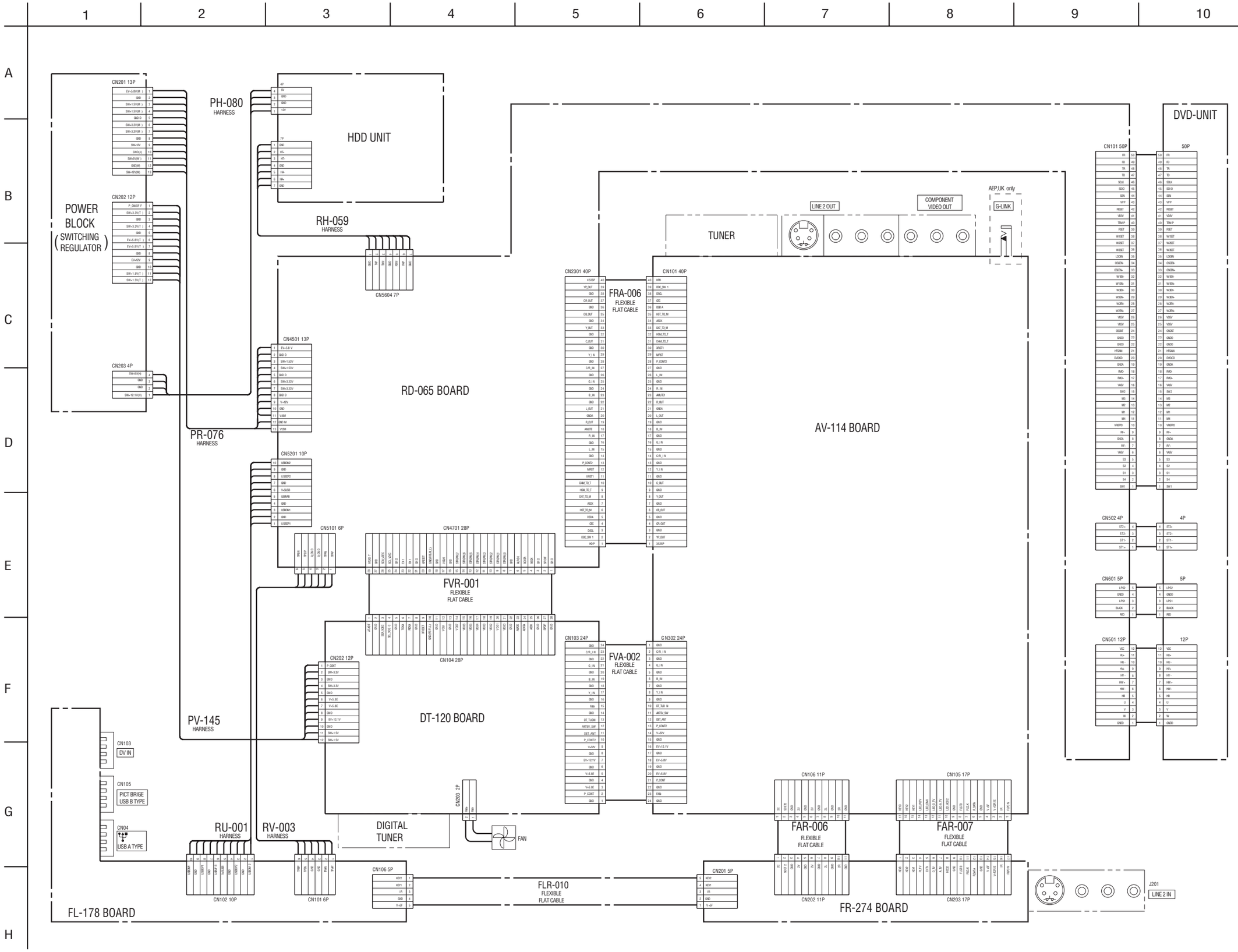
3-6. POWER BLOCK DIAGRAM



Note1: The HDMI block is highly confidential, and prohibited from releasing to public.
Note2: The components identified by mark ⚠ contain confidential information.
Strictly follow the instructions whenever the components are repaired and/or replaced.

SECTION 4
SCHEMATIC DIAGRAMS AND PRINTED WIRING BOARDS

4-1. FRAME SCHEMATIC DIAGRAM



4-2. SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR SCHEMATIC DIAGRAMS
(In addition to this, the necessary note is printed in each block)

(For schematic diagrams)

- All capacitors are in µF unless otherwise noted. pF : µµF. 50V or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, 1/4 W (Chip resistors : 1 /10 W) un-less otherwise specified.
  kΩ=1000Ω, MΩ=1000kΩ.
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, be-cause it is damaged by the heat.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : non flammable resistor
- : fusible resistor
- : panel designation
- △ : internal component
- : adjustment for repair
- ▷ : IN/OUT direction of (+/–) B line
- B + : B+ Line
- B − : B– Line
- Circled numbers refer to waveforms.
- Voltages are dc between measurement point and ground.
- Readings are taken with a color-bar signals on DVD reference disc.
- Readings are taken with a digital multimeter (DC 10MΩ).
- Voltage variations may be noted due to normal production toler-ances.
- Abbreviation
  AUS : Australian model

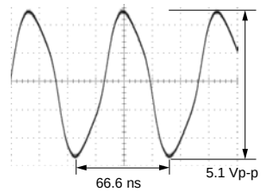
Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

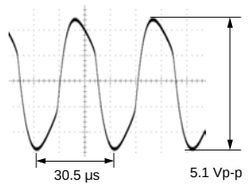
WAVEFORMS

AV-114 BOARD

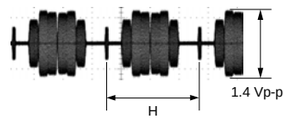
① X101



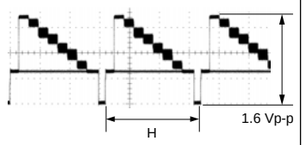
② X102



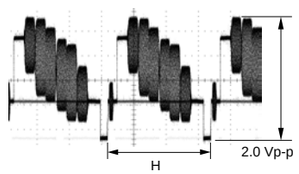
③ JA401 S-VIDEO C



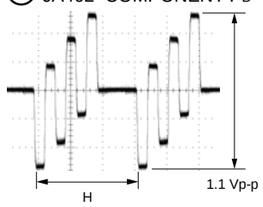
④ JA401 S-VIDEO Y



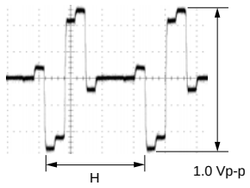
⑤ JA402 VIDEO



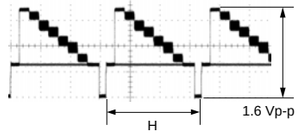
⑥ JA402 COMPONENT PB



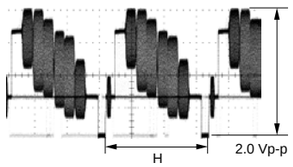
⑦ JA402 COMPONENT PR



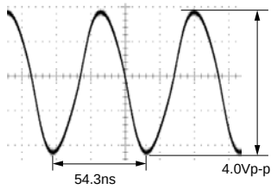
⑧ JA402 COMPONENT Y



⑨ JA501 ⑲

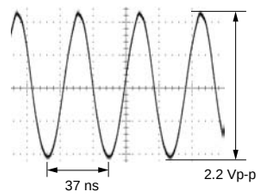


⑩ X601

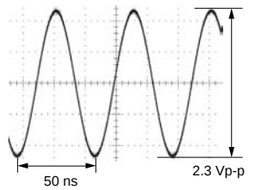


DT-120 BOARD

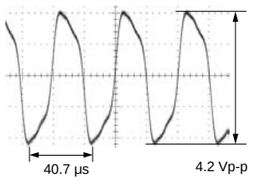
① X100



② X300

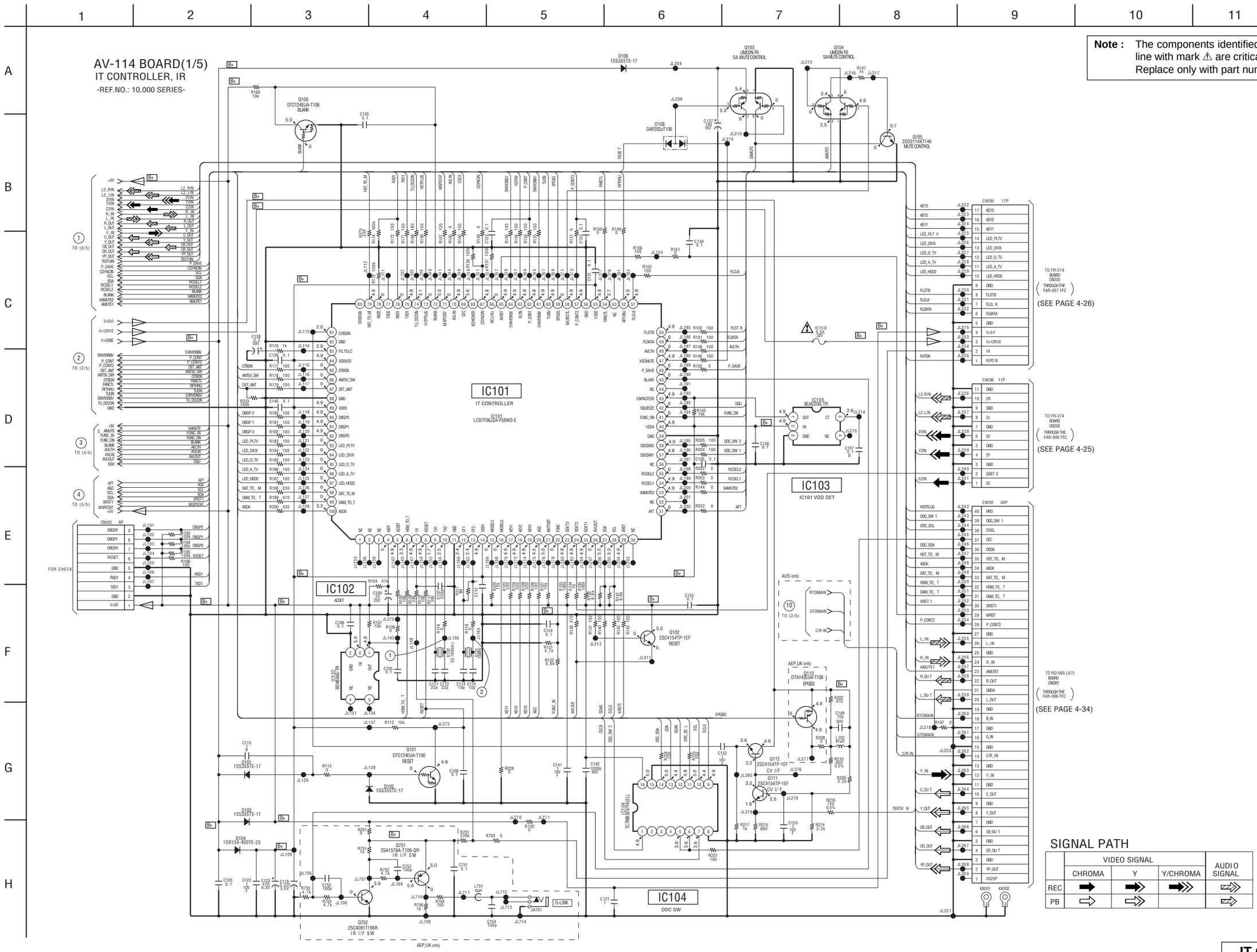


③ X1001



For Schematic Diagram
• Refer to page 4-47 for printed wiring board.

Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

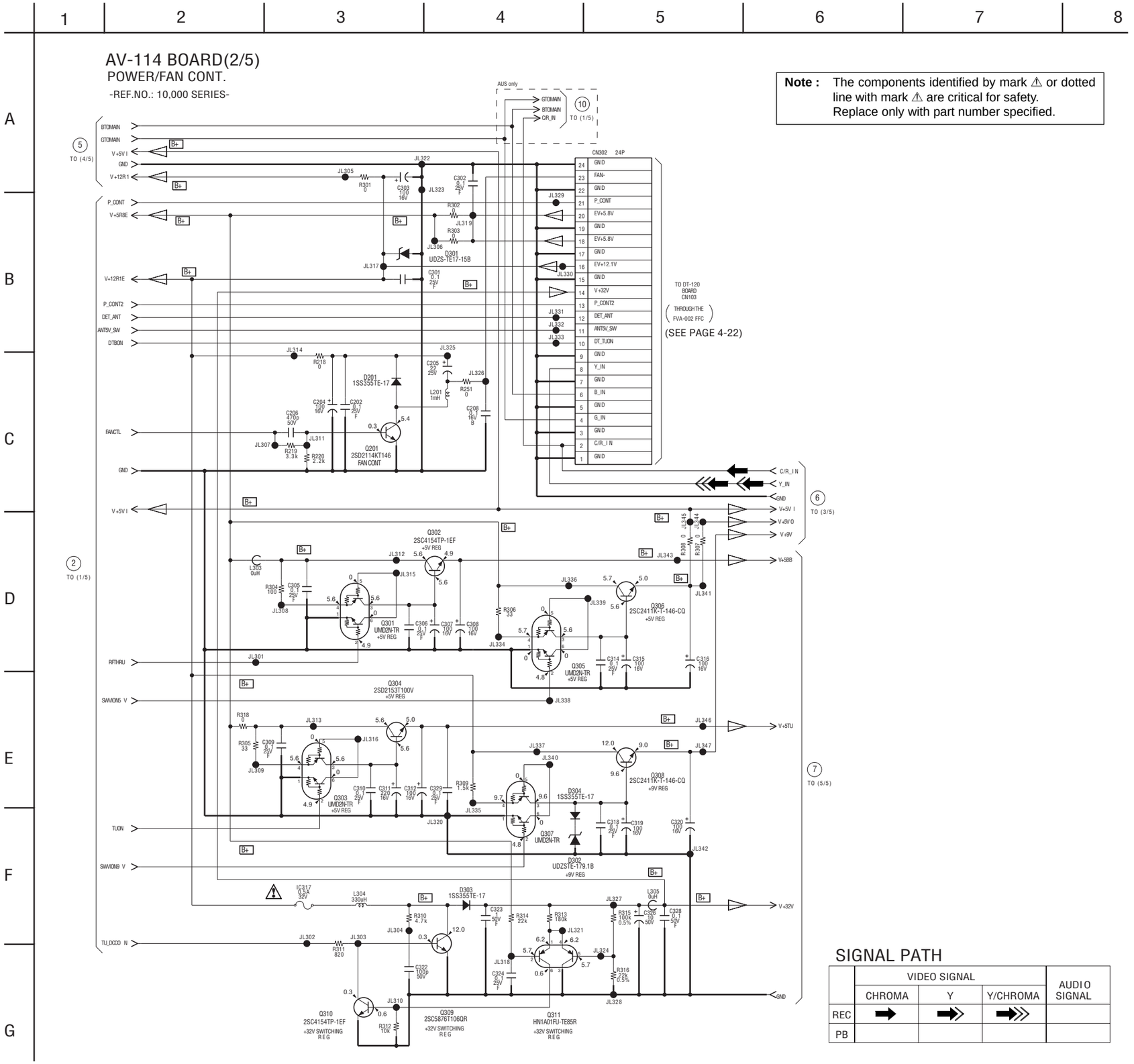


SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡	➡	⇨
PB	⇨	⇨		⇨

IT CONTROLLER, IR
AV-114 (1/5)

For Schematic Diagram
• Refer to page 4-47 for printed wiring board.



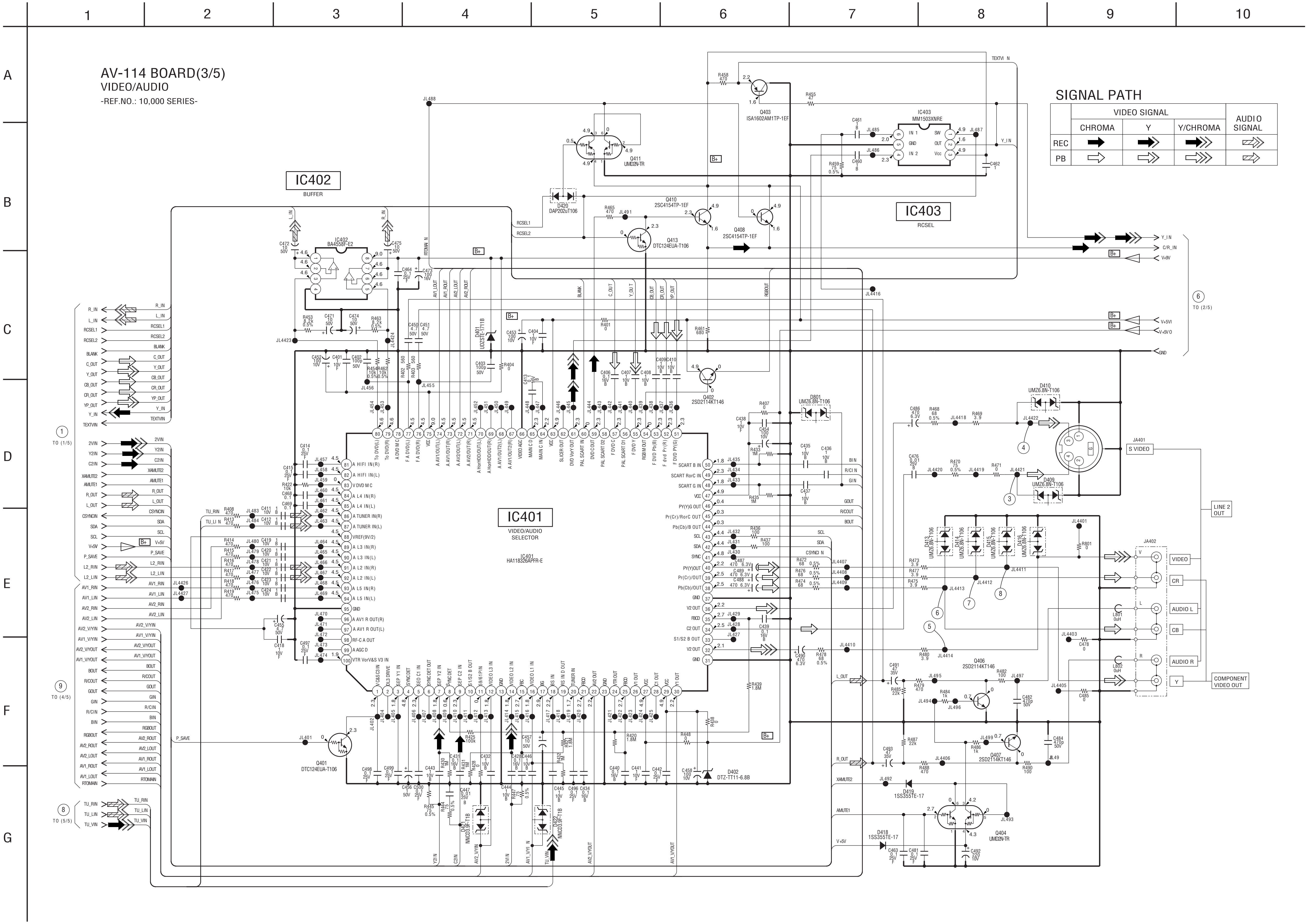
Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

SIGNAL PATH

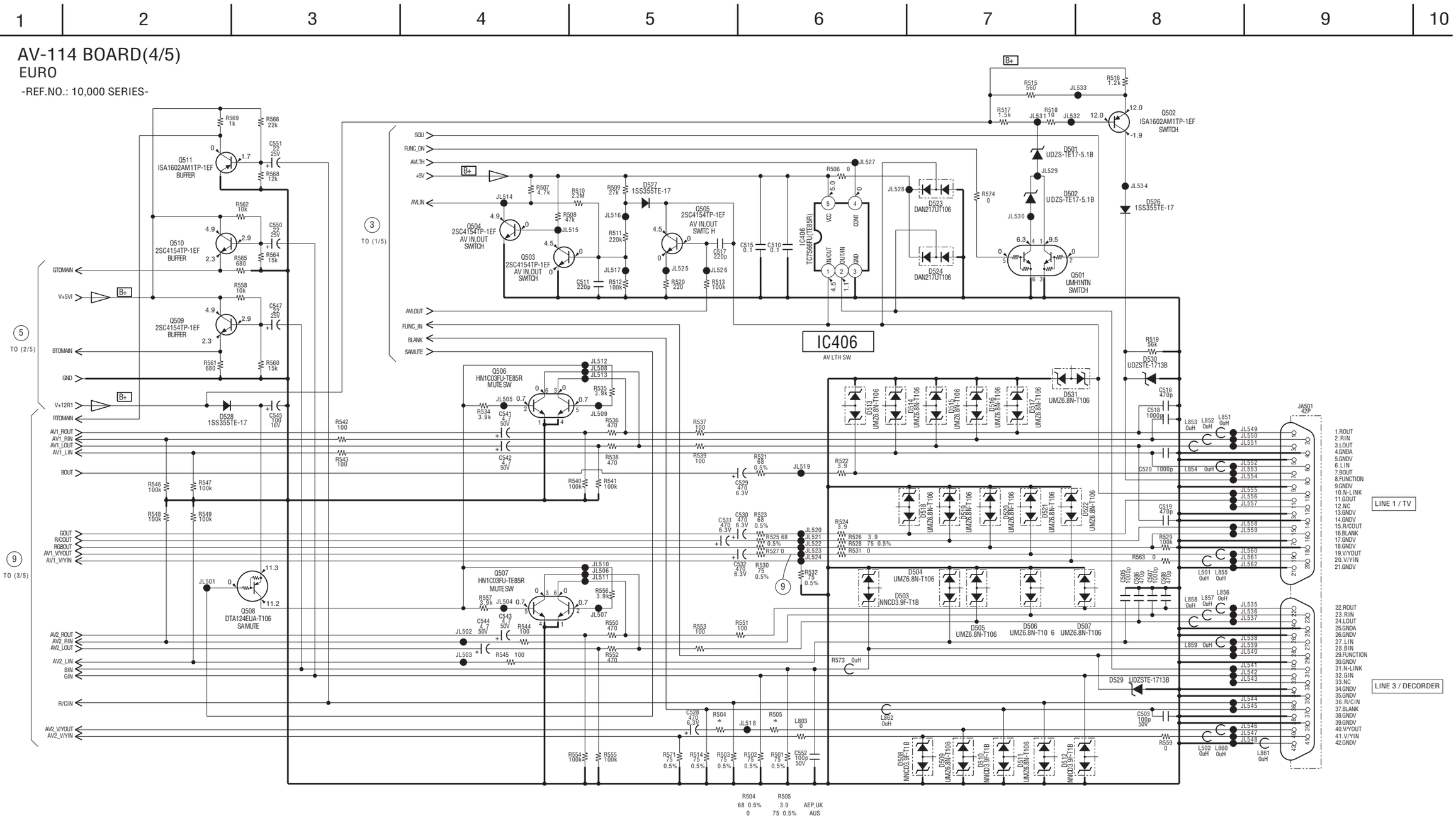
	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡	➡	
PB				

POWER/FAN CONT.
AV-114 (2/5)

For Schematic Diagram
- Refer to page 4-4 for waveforms.
- Refer to page 4-47 for printed wiring board.



For Schematic Diagram
• Refer to page 4-47 for printed wiring board.

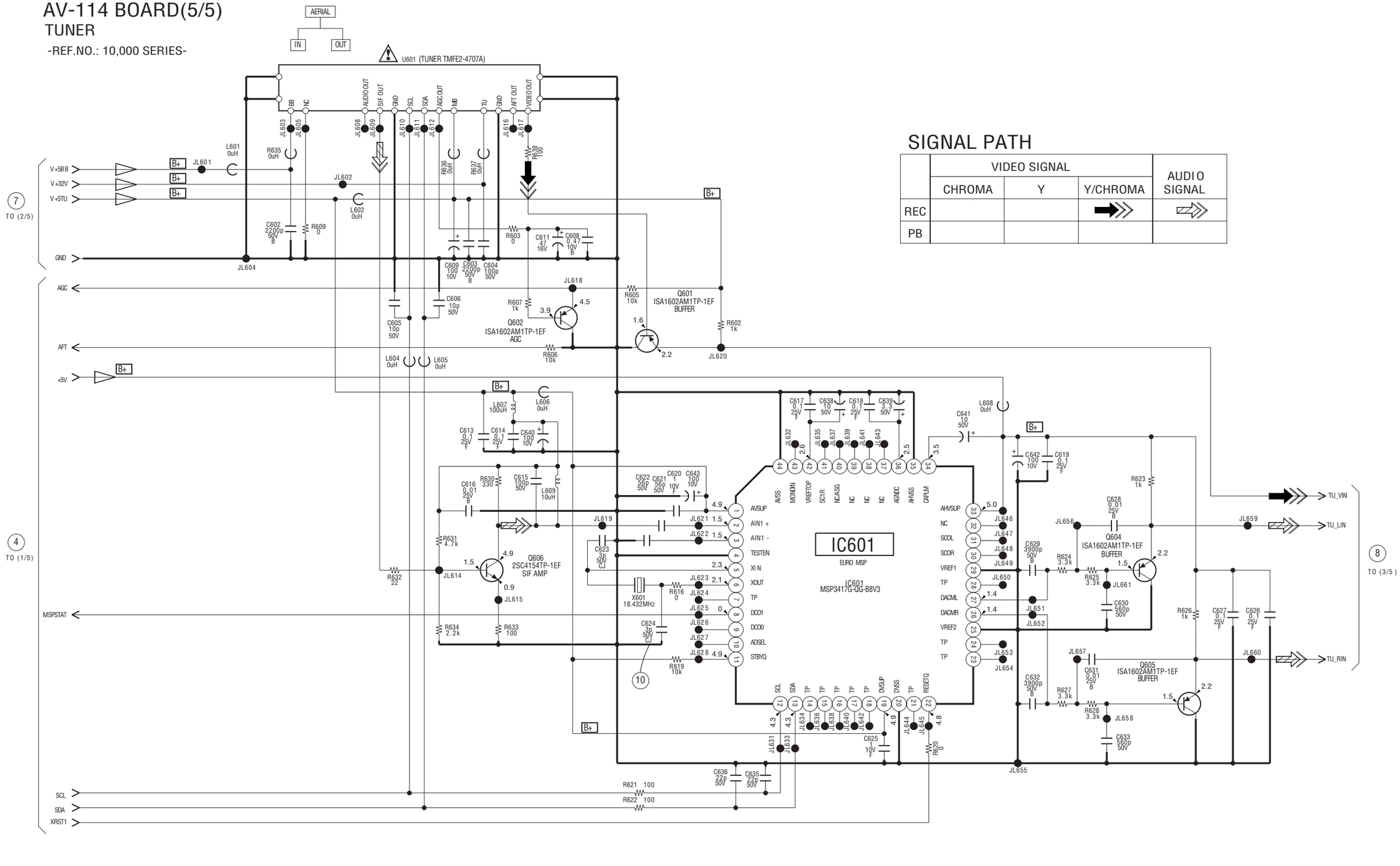


For Schematic Diagram
- Refer to page 4-4 for waveforms.
- Refer to page 4-47 for printed wiring board.

AV-114 BOARD(5/5)

TUNER

-REF.NO.: 10,000 SERIES-

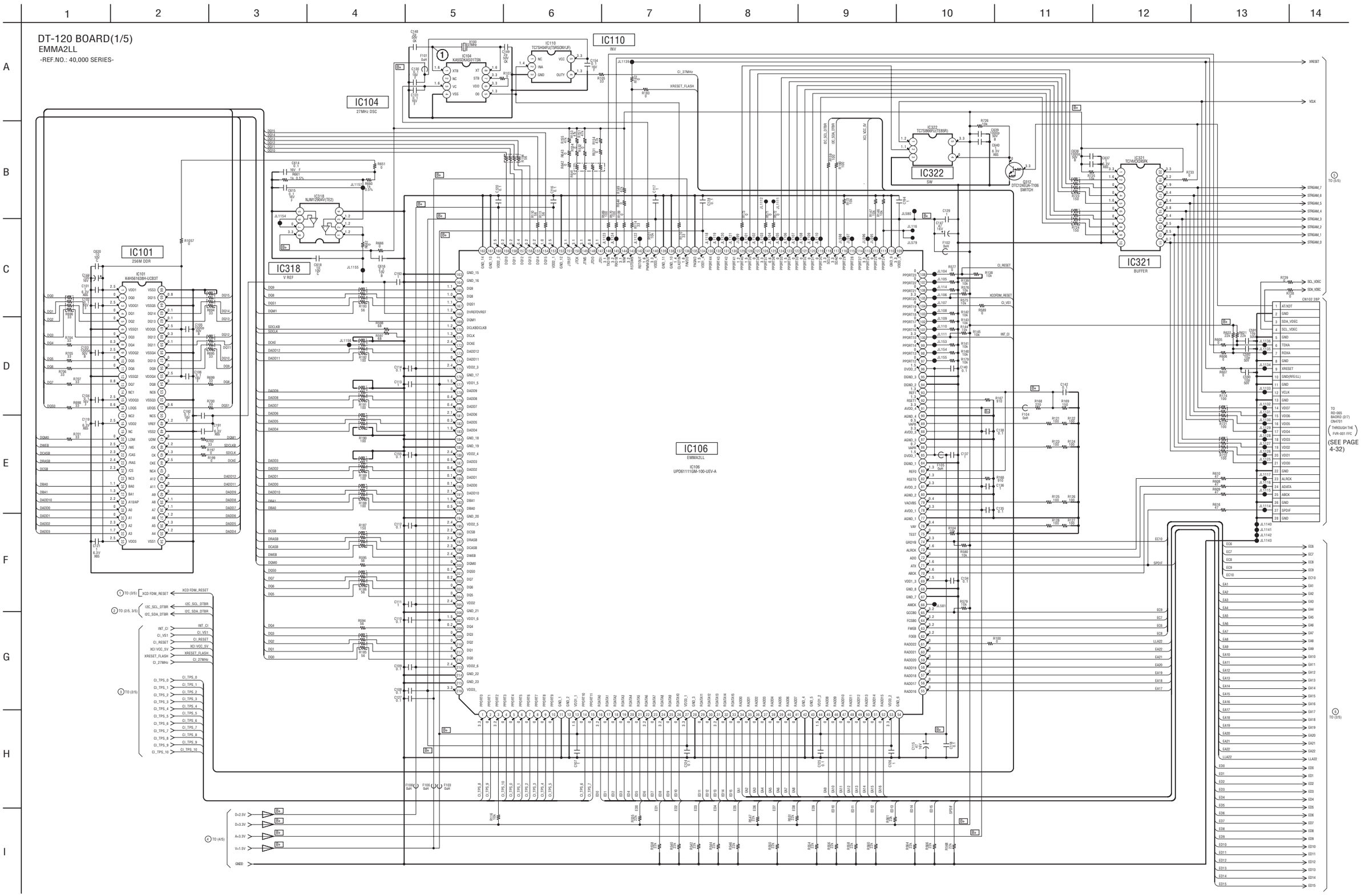


SIGNAL PATH

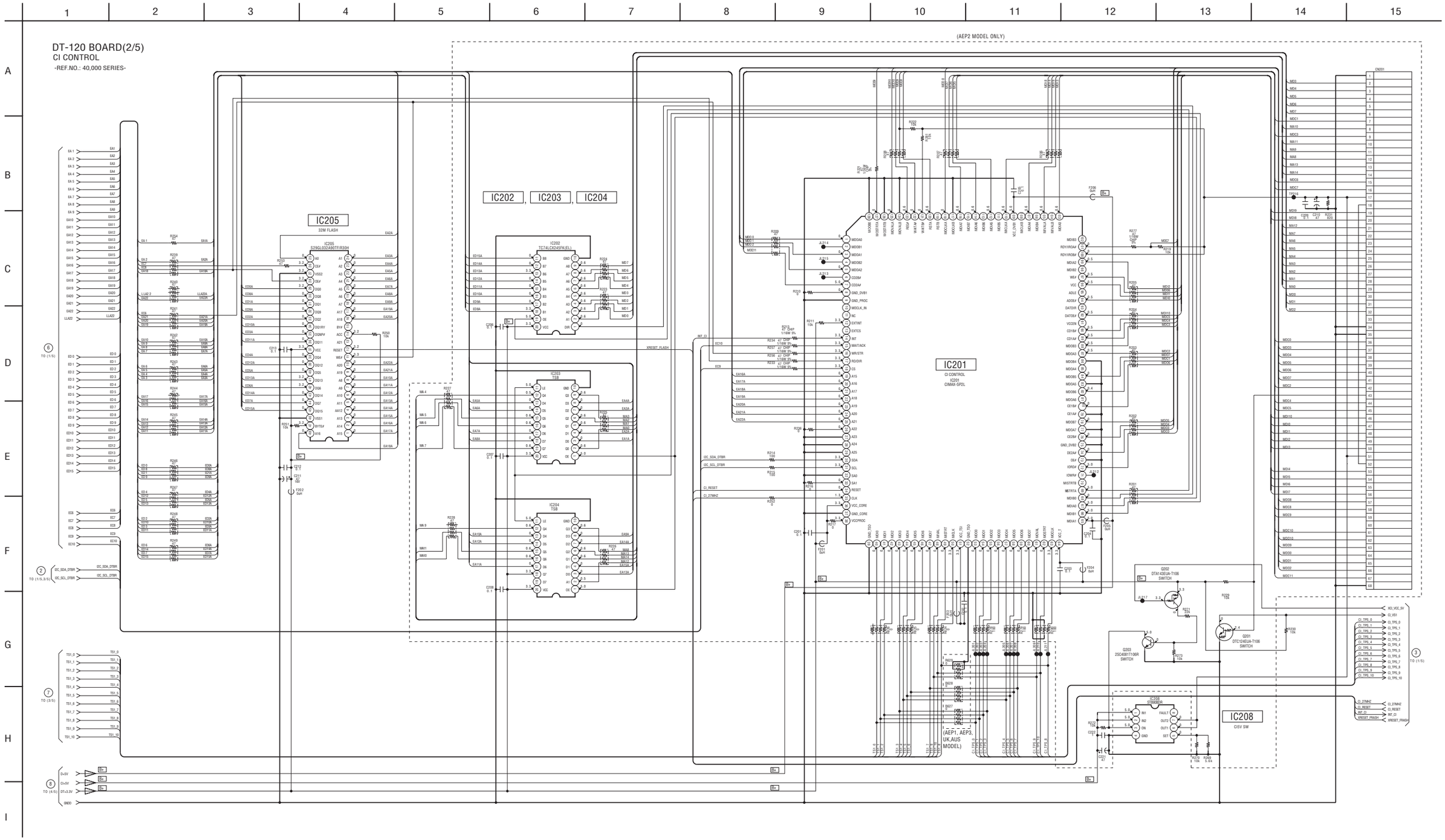
	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC			➡	⇨
PB				

Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

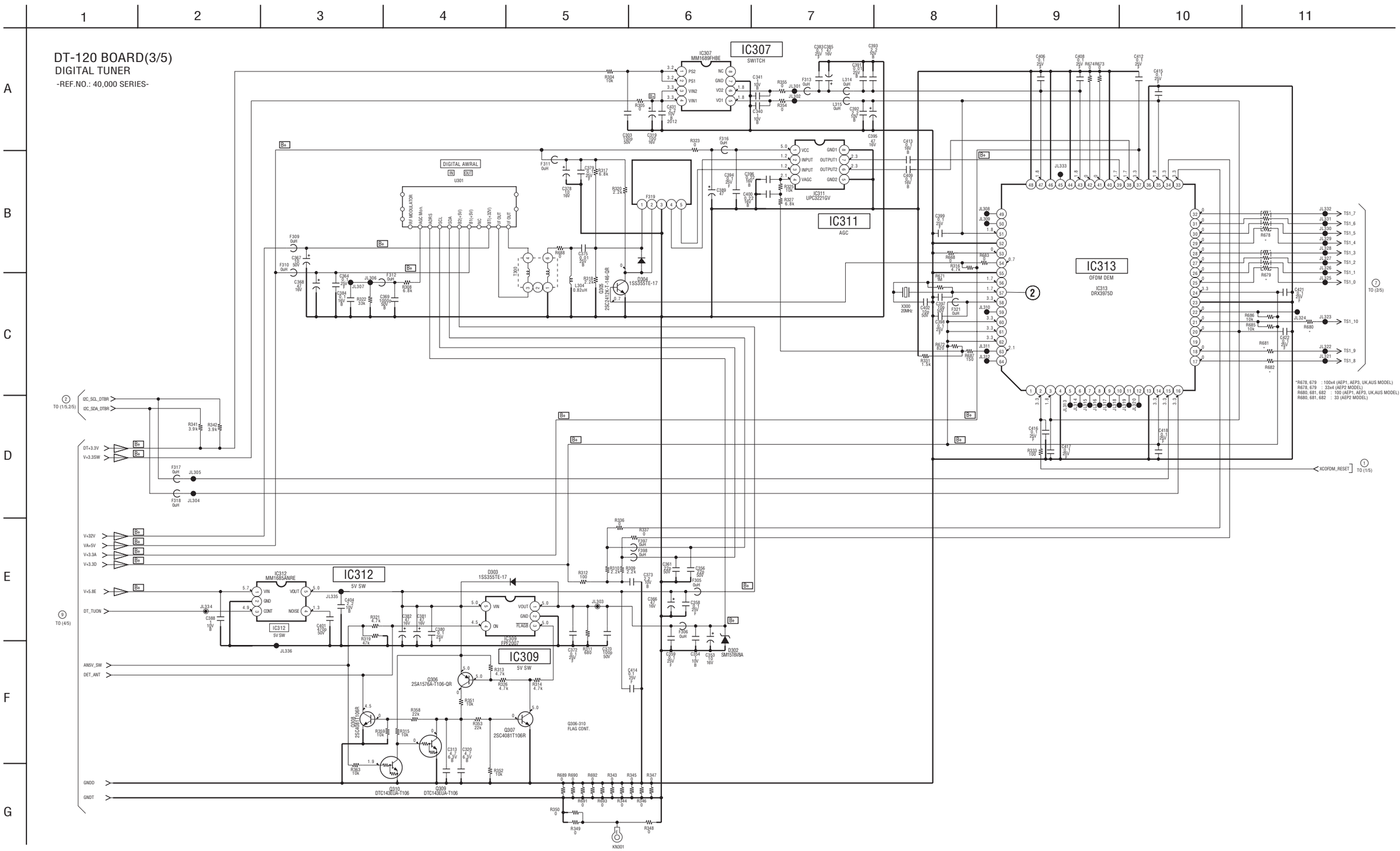
For Schematic Diagram
- Refer to page 4-4 for waveform.
- Refer to page 4-51 for printed wiring board.



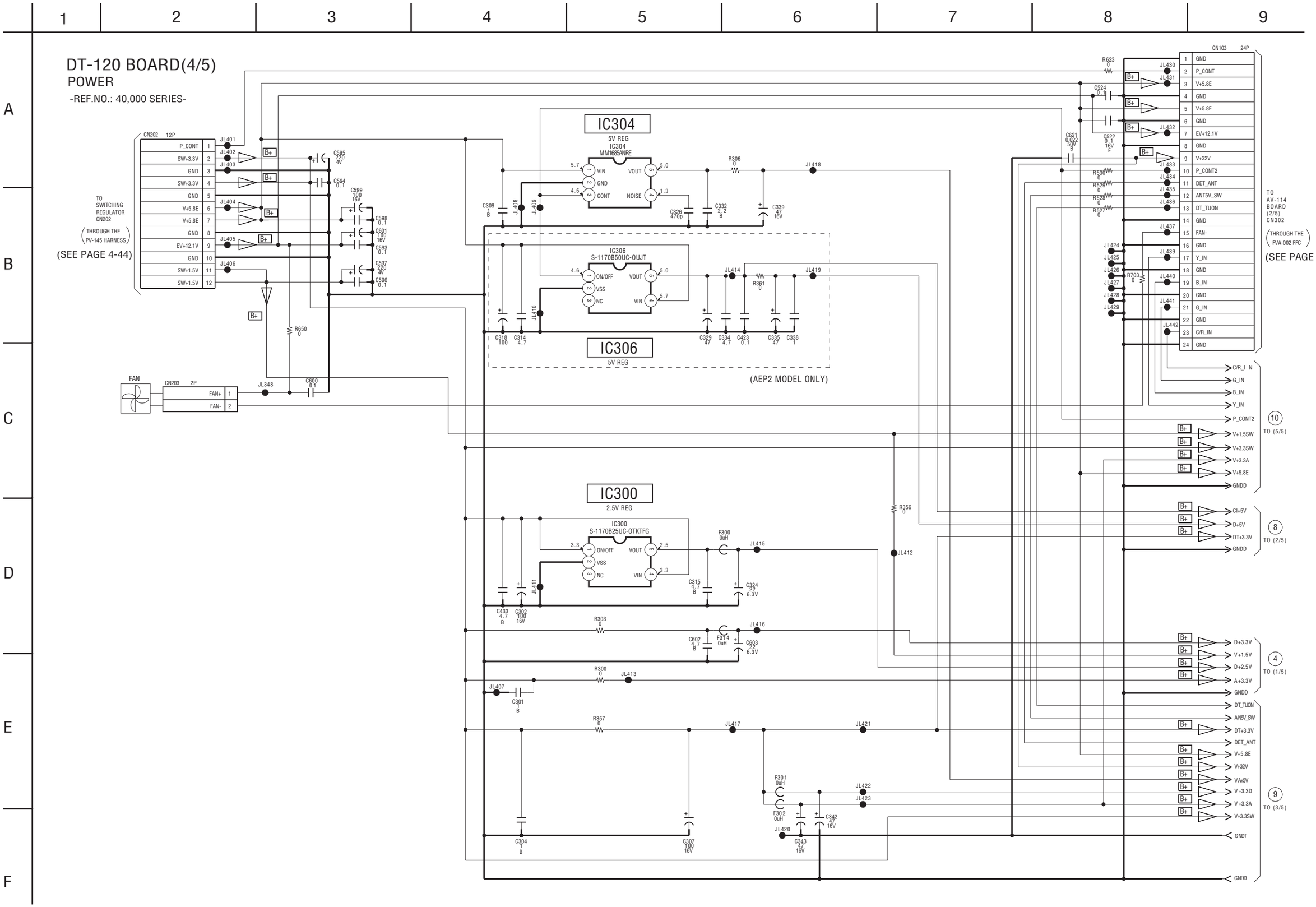
For Schematic Diagram
- Refer to page 4-4 for waveform.
- Refer to page 4-51 for printed wiring board.



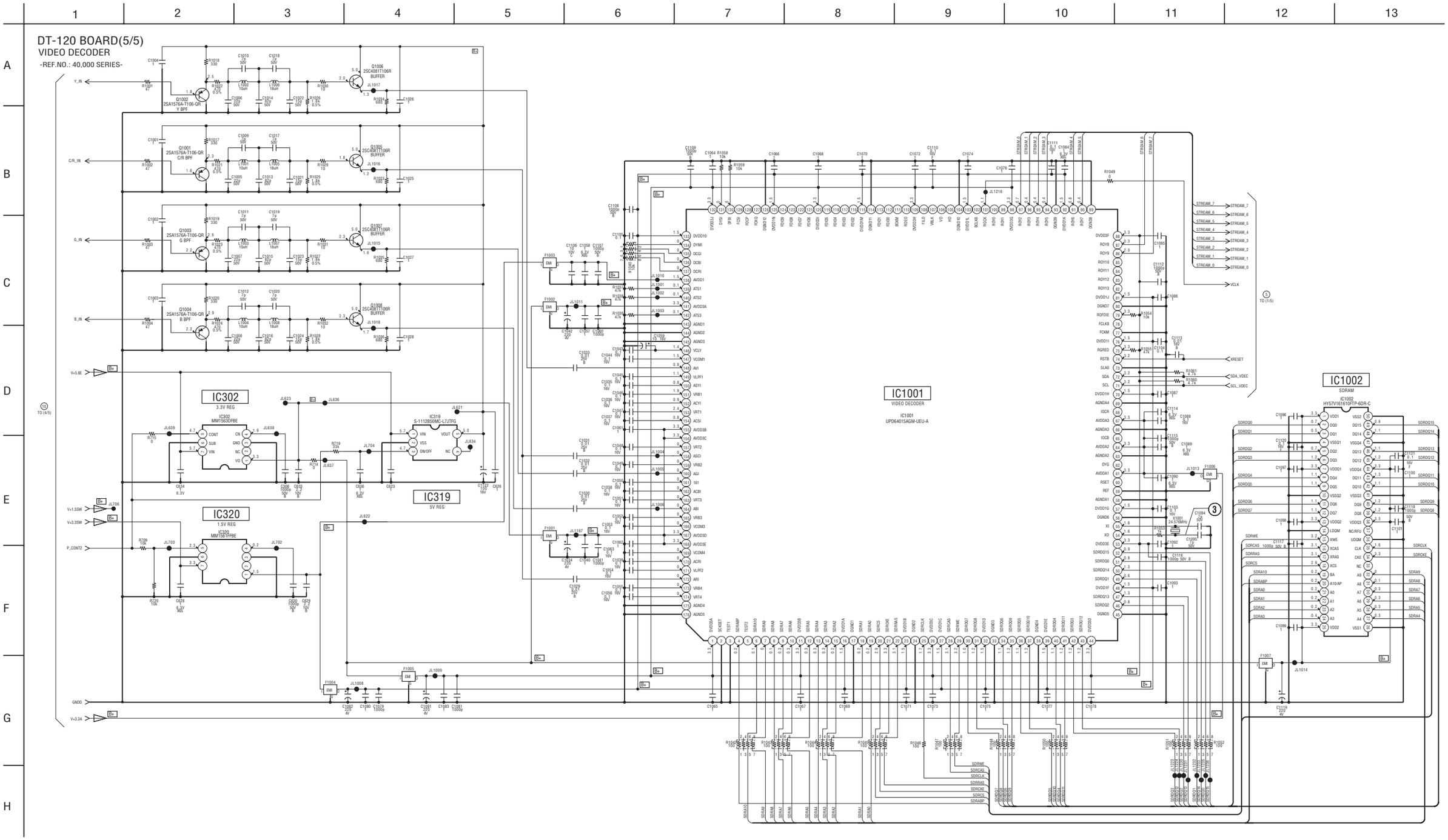
For Schematic Diagram
- Refer to page 4-4 for waveform.
- Refer to page 4-51 for printed wiring board.



For Schematic Diagram
• Refer to page 4-4 for waveform.
• Refer to page 4-51 for printed wiring board.

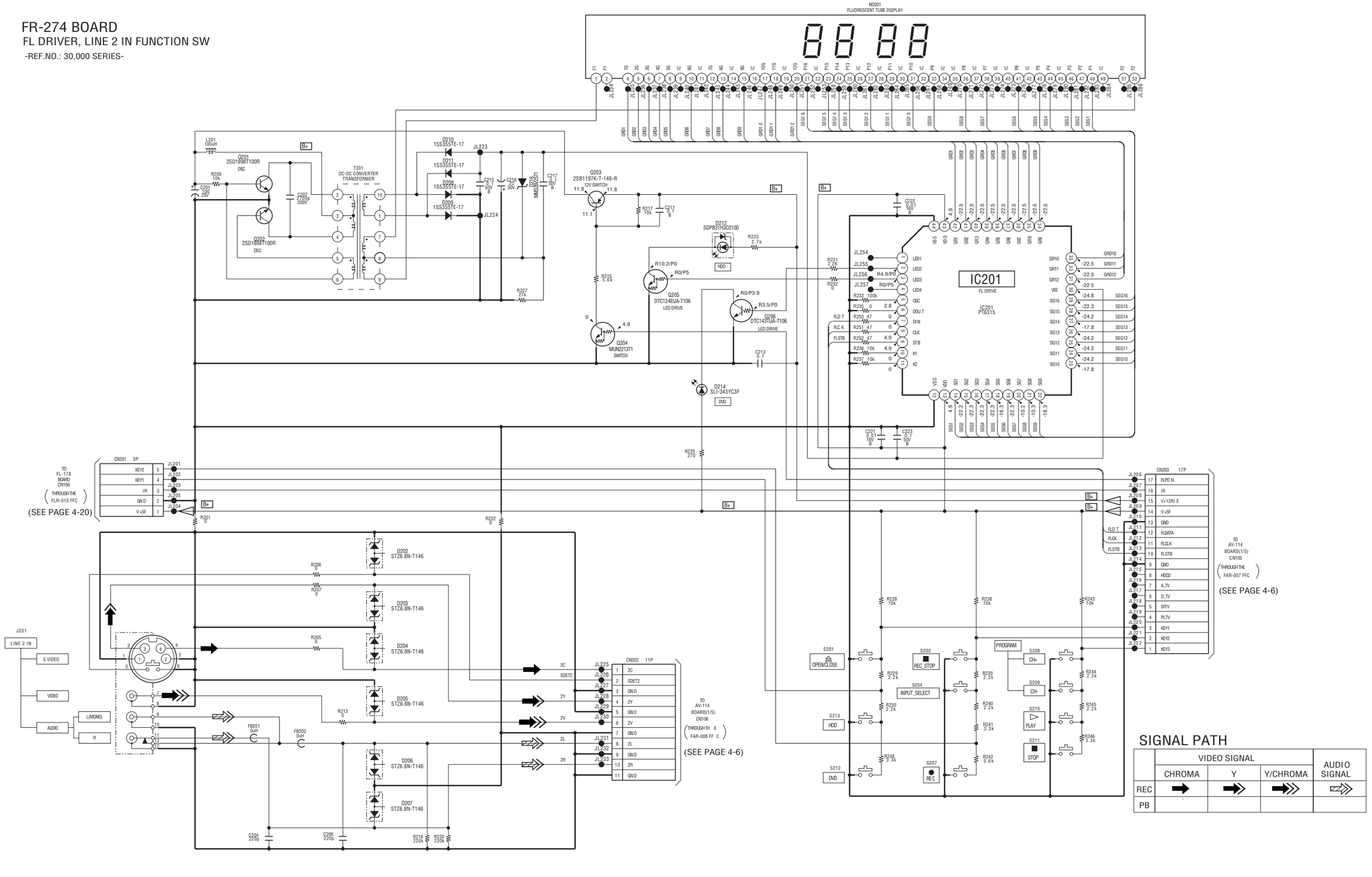


For Schematic Diagram
- Refer to page 4-4 for waveform.
- Refer to page 4-51 for printed wiring board.



For Schematic Diagram
• Refer to page 4-45 for printed wiring board.

FR-274 BOARD
FL DRIVER, LINE 2 IN FUNCTION SW
-REF.NO.: 30,000 SERIES-

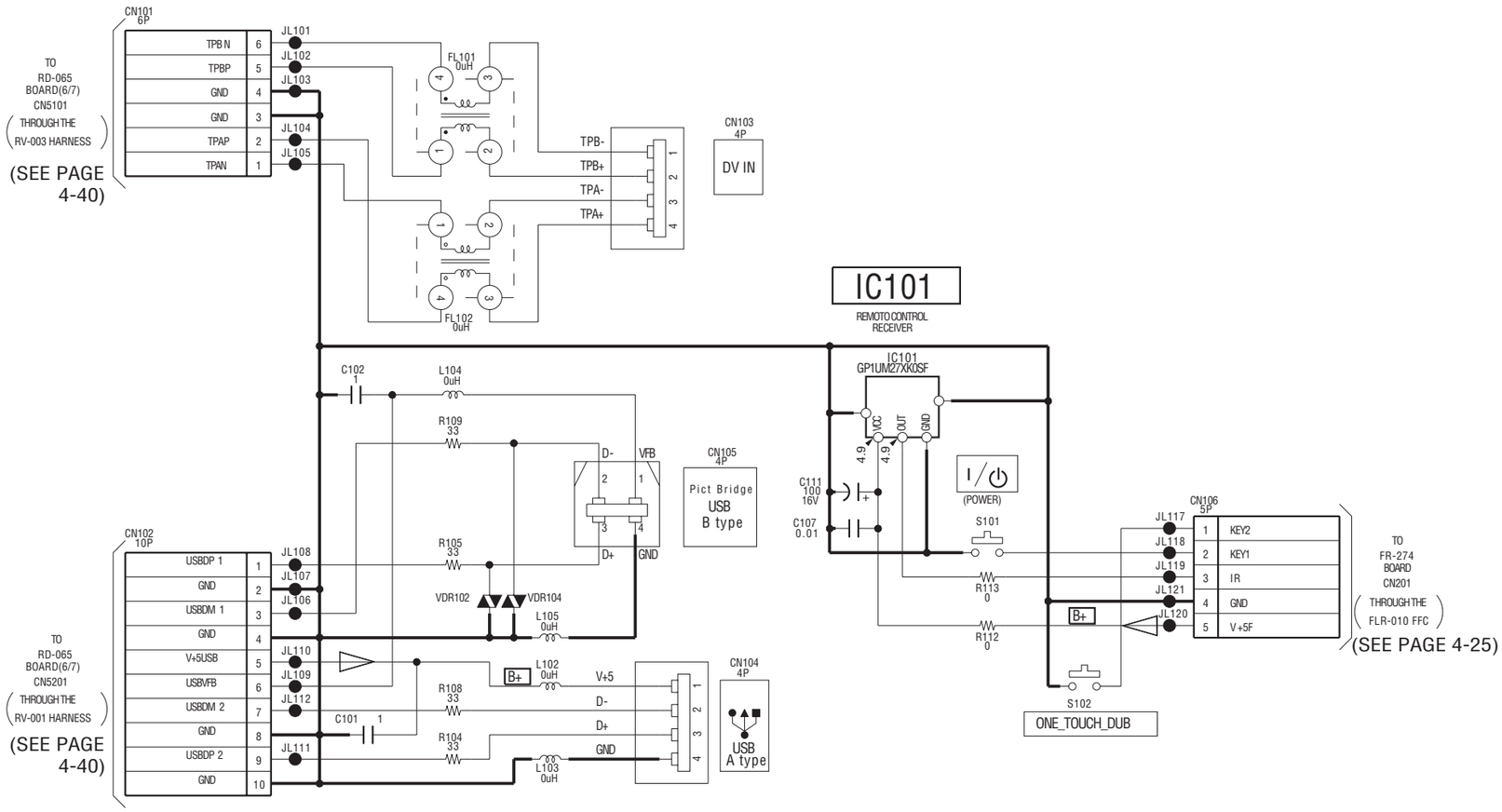


For Schematic Diagram
• Refer to page 4-59 for printed wiring board.

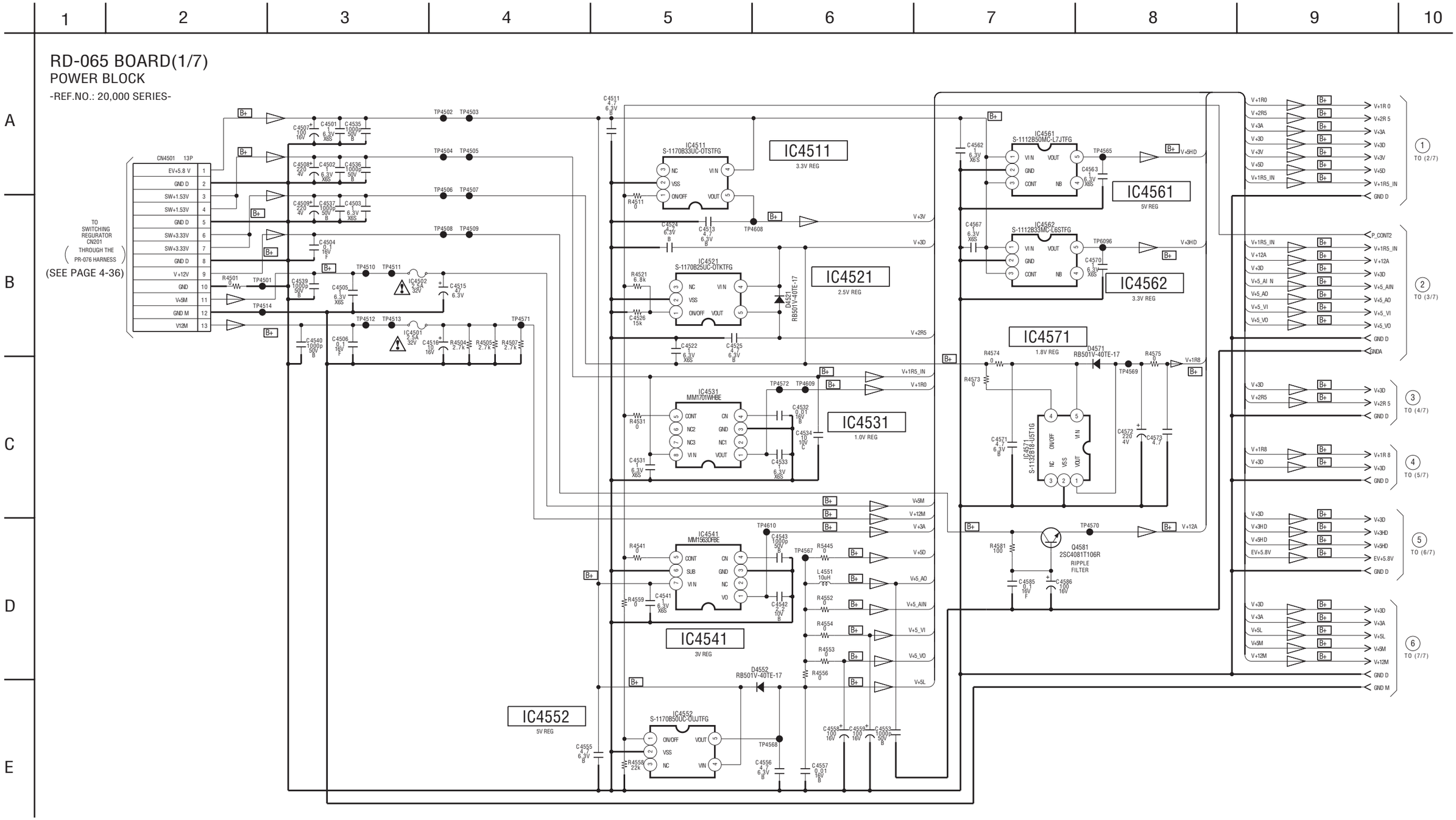
FL-178 BOARD

DV,USB,REMOCON,RECEIVER,POWER,SW

-REF.NO.: 30,000 SERIES-



For Schematic Diagram
• Refer to page 4-55 for printed wiring board.



Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

For Schematic Diagram
• Refer to page 4-55 for printed wiring board.

RD-065 BOARD(2/7)
EMMA BLOCK
-REF.NO.: 20,000 SERIES-

IC1301
VREF V OUT

IC1302
VREF D OUT

SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC	➡	➡	➡	⇨
PB	⇨	⇨		⇨

IC1001 (1/5)
AV ENCODEC
IC1001
MC10050FT-105-LU1-A

IC4702
BUFFER

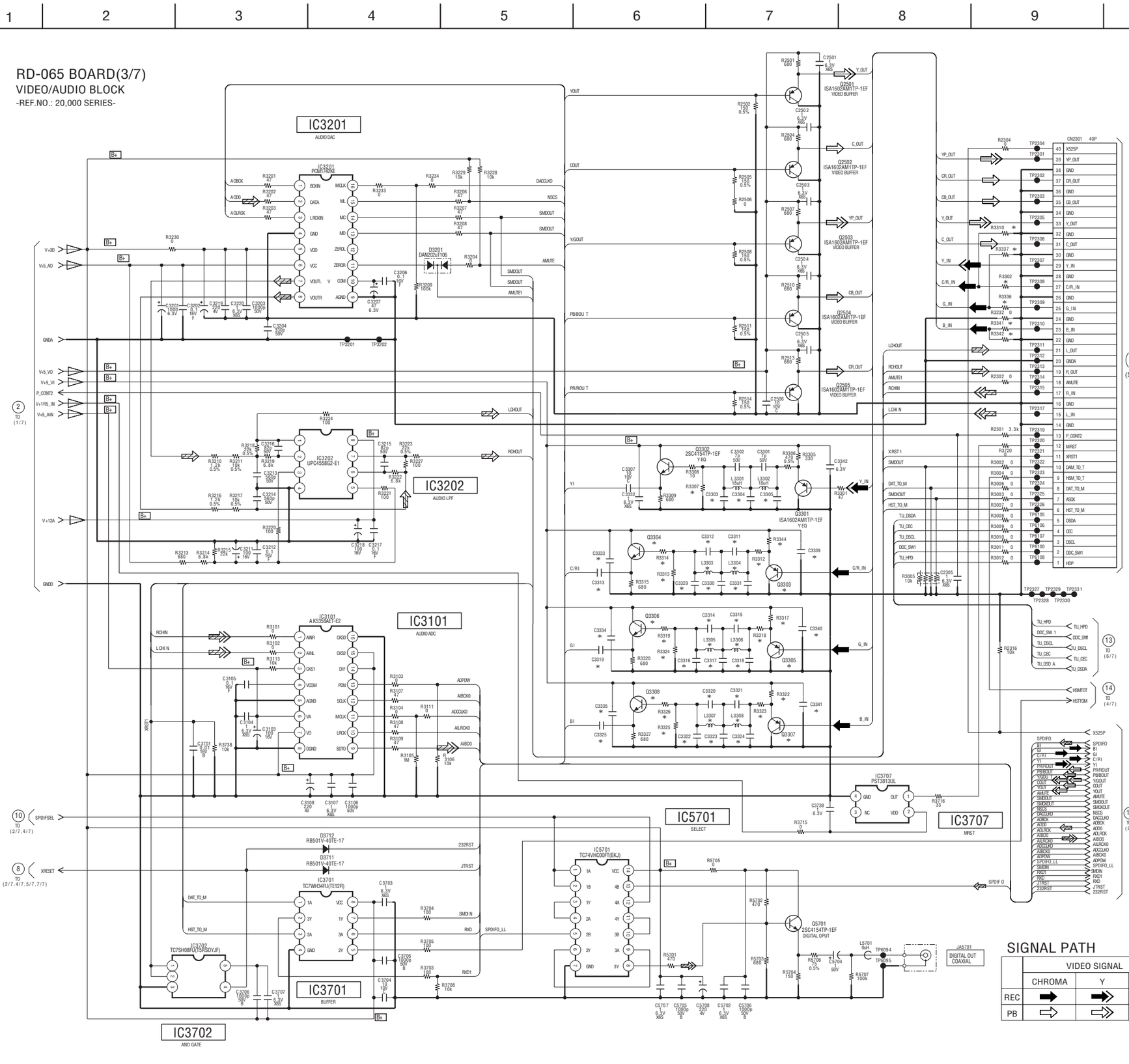
IC4701
BUFFER

IC4703
BUFFER

TO (1/7)
TO (4/7)
TO (3/7, 4/7, 5/7, 7/7)
TO (7/7)
TO (6/7)
TO (3/7, 4/7)
TO (3/7)
TO DT-120 BOARD CN104 THROUGH THE FVR-001 FFC
(SEE PAGE 4-16)
(FOR CHECK)

For Schematic Diagram
• Refer to page 4-55 for printed wiring board.

RD-065 BOARD(3/7)
VIDEO/AUDIO BLOCK
-REF.NO.: 20,000 SERIES-

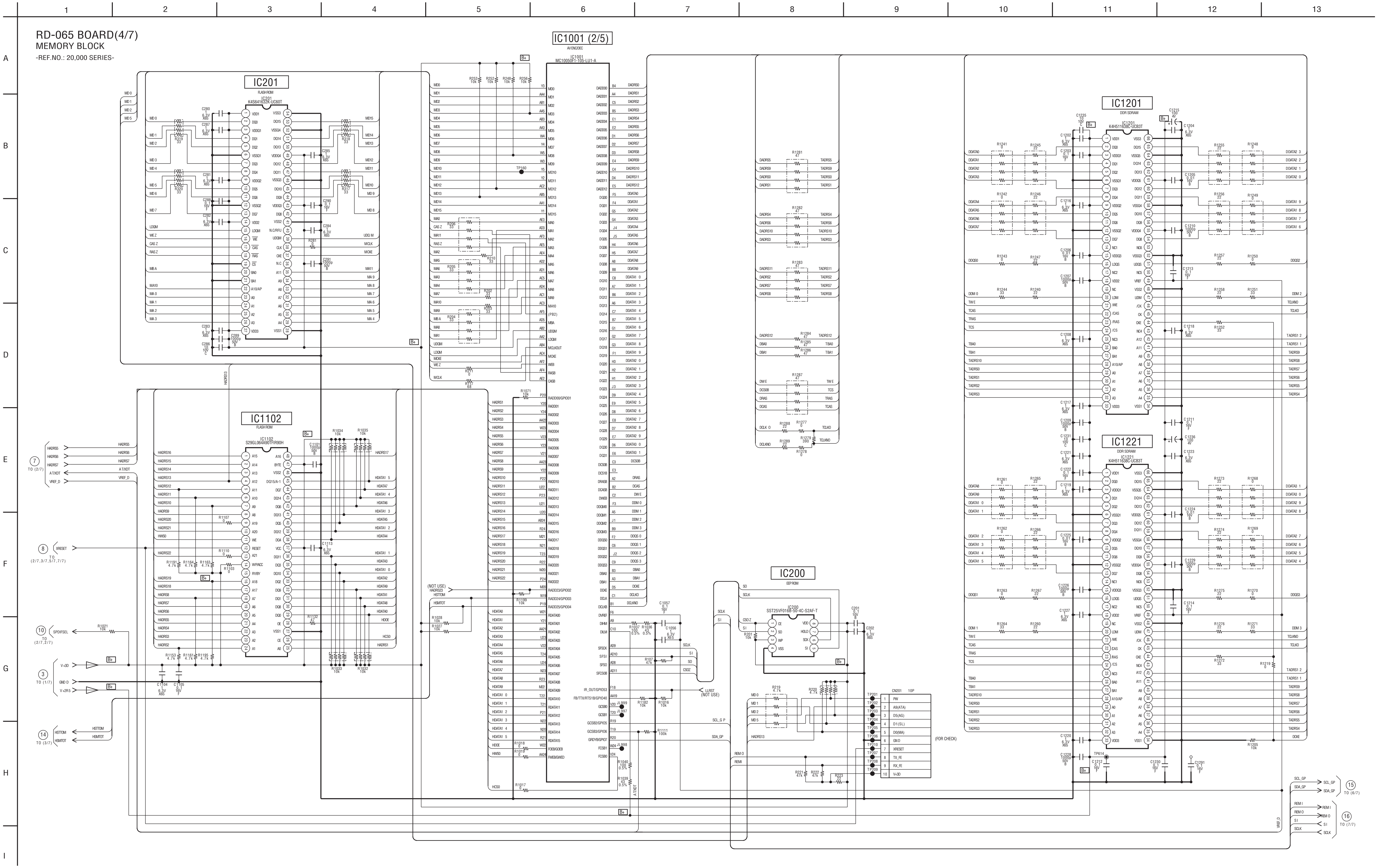


✻ MARKED:MOUNTED TEBLE

	AEP,UK	AUS
C3303	15p/50V	5p/50V
C3304	82p/50V	68p/50V
C3305	22p/50V	15p/50V
C3311	XX	7p/50V
C3312	XX	7p/50V
C3313	0.01u/50V	10u/10V
C3314	XX	7p/50V
C3315	XX	7p/50V
C3316	XX	5p/50V
C3317	XX	68p/50V
C3318	XX	15p/50V
C3319	0.01u/50V	10u/10V
C3320	XX	7p/50V
C3321	XX	7p/50V
C3322	XX	5p/50V
C3323	XX	68p/50V
C3324	XX	15p/50V
C3325	0.01u/50V	10u/10V
C3329	XX	5p/50V
C3330	XX	68p/50V
C3331	XX	15p/50V
C3333	XX	1u/50V
C3334	XX	1u/50V
C3335	XX	1u/50V
C3339	XX	1u/50V
C3340	XX	1u/50V
C3341	XX	1u/50V
L3303	XX	18uH
L3304	XX	10uH
L3305	XX	18uH
L3306	XX	10uH
L3307	XX	18uH
L3308	XX	10uH
Q3303	XX	ISA1602AM1TP-1EF
Q3304	XX	2SC4154TP-1EF
Q3305	XX	ISA1602AM1TP-1EF
Q3306	XX	2SC4154TP-1EF
Q3307	XX	ISA1602AM1TP-1EF
Q3308	XX	2SC4154TP-1EF
R3302	0	47
R3307	1.8k 0.5%	5.6k 0.5%
R3310	10k	XX
R3312	XX	470 0.5%
R3313	XX	5.6k 0.5%
R3314	XX	10
R3317	XX	330
R3318	XX	470 0.5%
R3319	XX	10
R3322	XX	330
R3323	XX	470 0.5%
R3324	XX	5.6k 0.5%
R3325	XX	5.6k 0.5%
R3326	XX	10
R3336	0	47
R3337	10k	XX
R3341	0	47
R3342	10k	XX
R3344	XX	330

For Schematic Diagram

• Refer to page 4-55 for printed wiring board.



For Schematic Diagram

• Refer to page 4-55 for printed wiring board.

RD-065 BOARD(5/7)

SATA/IDE IF

-REF.NO.: 20,000 SERIES-

IC1001 (3/5)

AV ENC/DEC

IC5602

SATA BRIDGE

SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC			▶	▷
PB			▷	▷

For Schematic Diagram

• Refer to page 4-55 for printed wiring board.

RD-065 BOARD(6/7)

HDMI/DV/USB BLOCK

-REF.NO.: 20,000 SERIES-

IC1001 (4/5)

IC5801

IC5802

IC5203

IC5204

IC5202

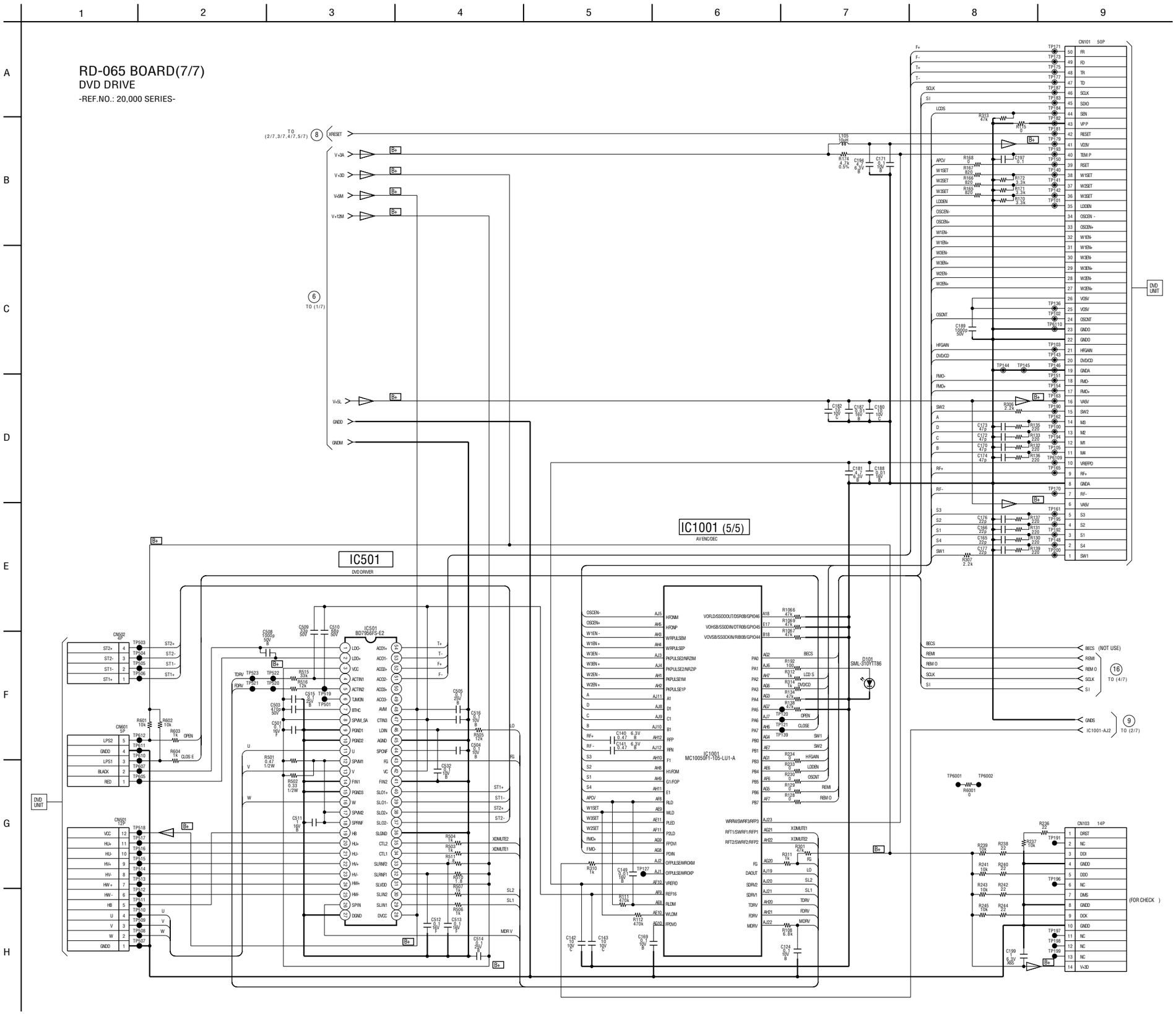
IC5103

Note1: The HDMI block is highly confidential, and prohibited from releasing to public.

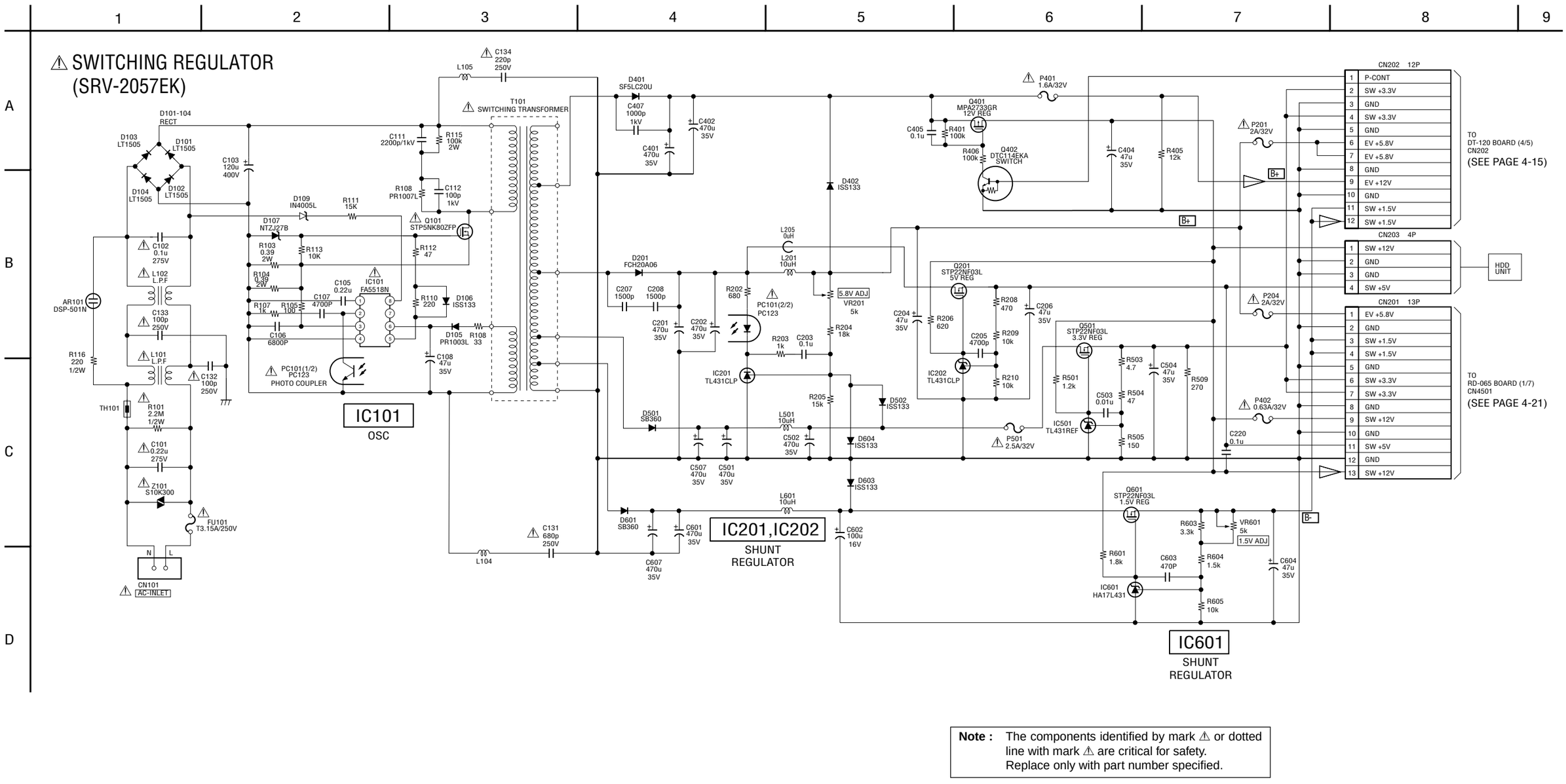
Note2: The components identified by mark ⚠ contain confidential information.
Strictly follow the instructions whenever the components are repaired and/or replaced.

TO (4/7)
TO (2/7)
TO (3/7)
TO (1/7)
TO FL-178 BOARD CN102 THROUGH THE RU-001 HARNESS (SEE PAGE 4-19)
TO FL-178 BOARD CN101 THROUGH THE RU-001 HARNESS (SEE PAGE 4-19)

For Schematic Diagram
• Refer to page 4-55 for printed wiring board.



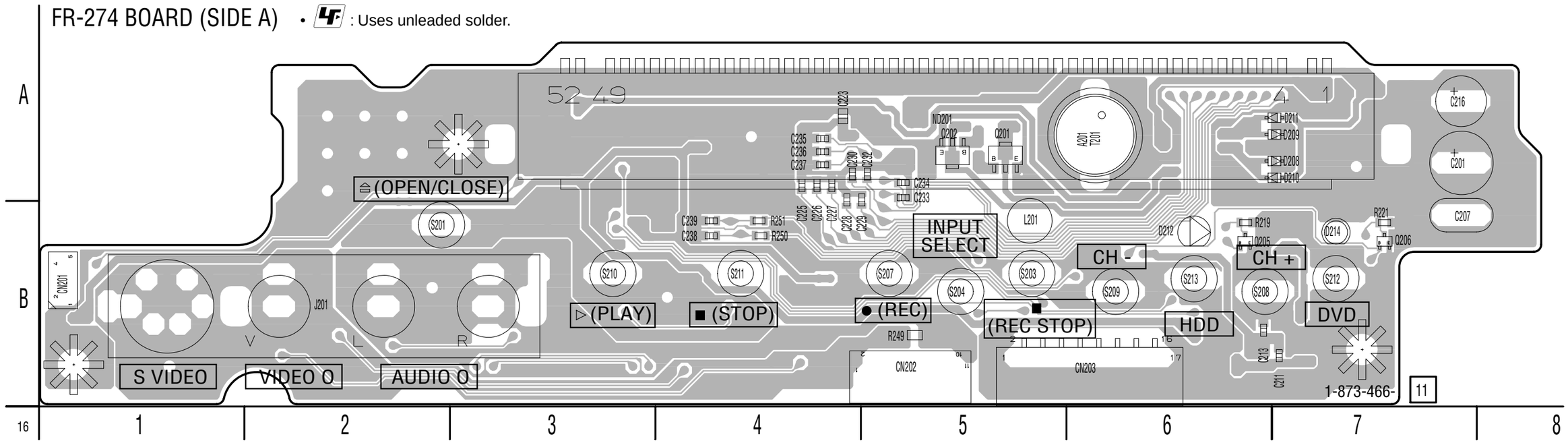
⚠ SWITCHING REGULATOR (SRV-2057EK)



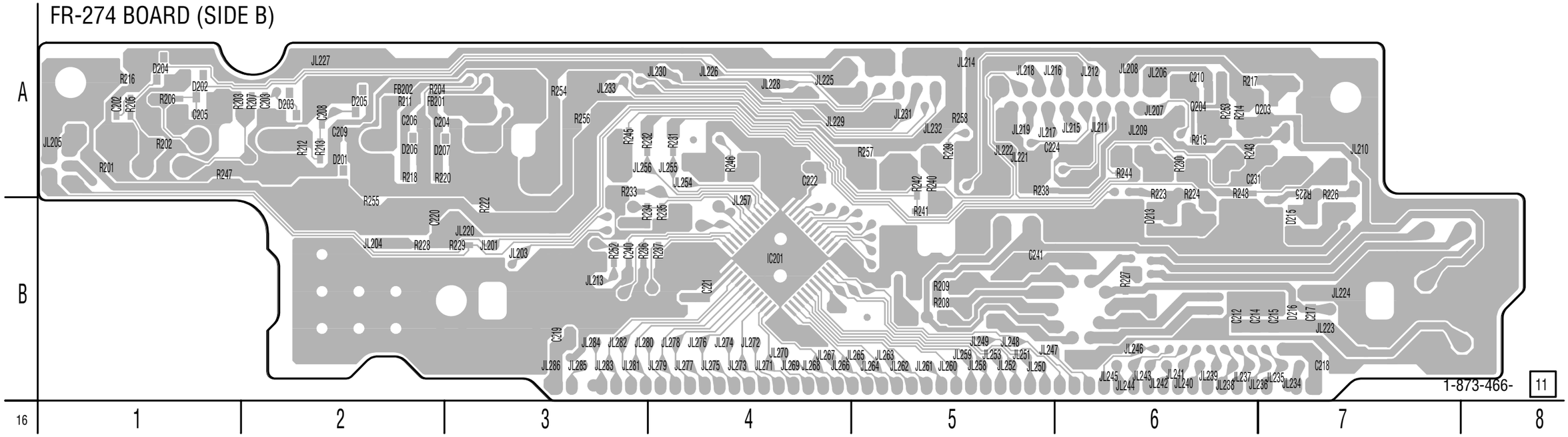
Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

4-3. PRINTED WIRING BOARDS

FR-274 BOARD (SIDE A) • : Uses unleaded solder.



FR-274 BOARD (SIDE B)



FR-274 BOARD (SIDE A)

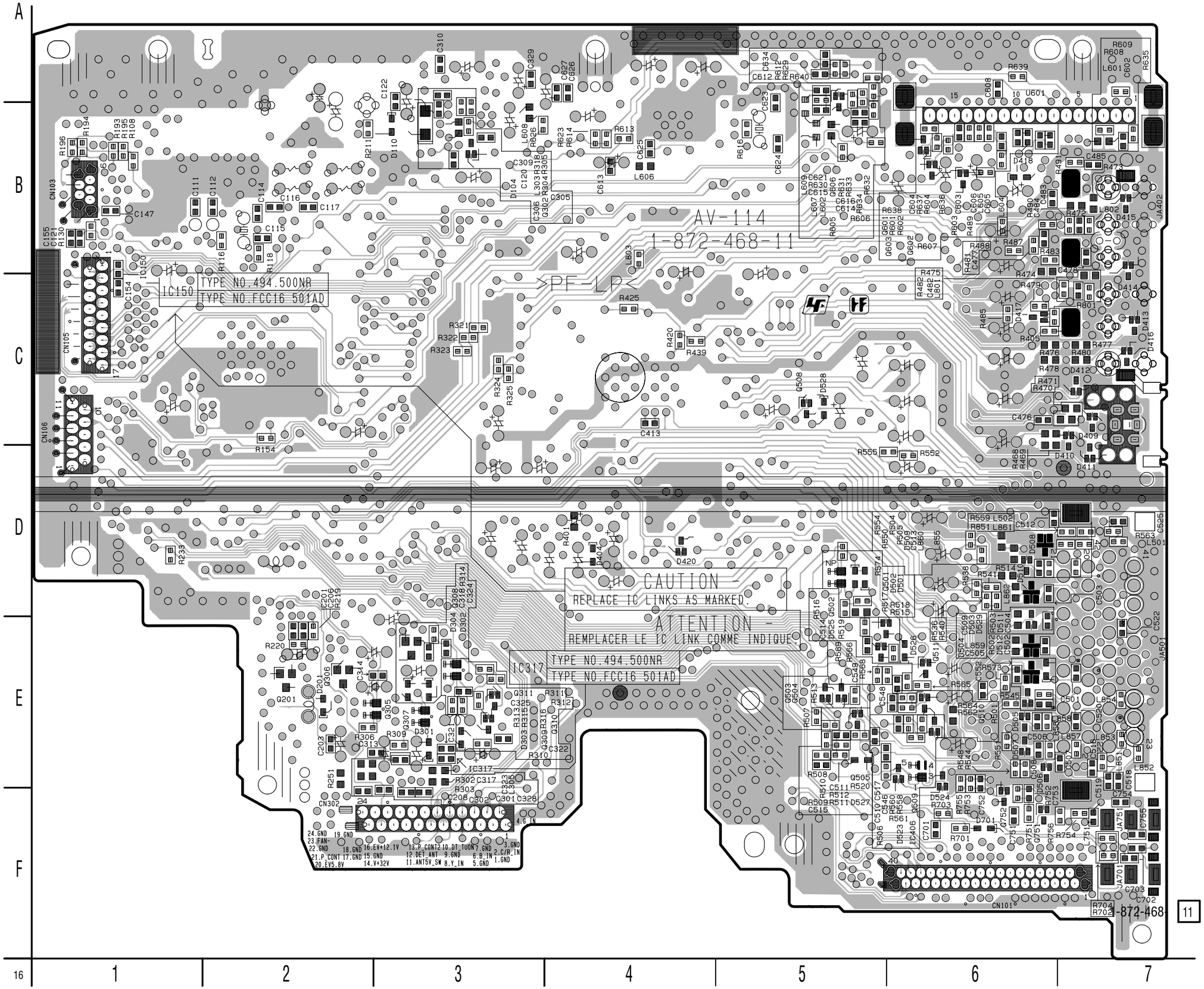
CN201	B-1	D212	B-6
CN202	B-4	D214	B-7
CN203	B-6		
		Q201	A-5
D208	A-7	Q202	A-5
D209	A-7	Q205	B-6
D210	A-7	Q206	B-7
D211	A-7		

FR-274 BOARD (SIDE B)

D202	A-1	D216	B-7
D203	A-2		
D204	A-1	IC201	B-4
D205	A-2		
D206	A-2	Q203	A-7
D207	A-2	Q204	A-6

AV-114 BOARD (SIDE A)

• : Uses unleaded solder.

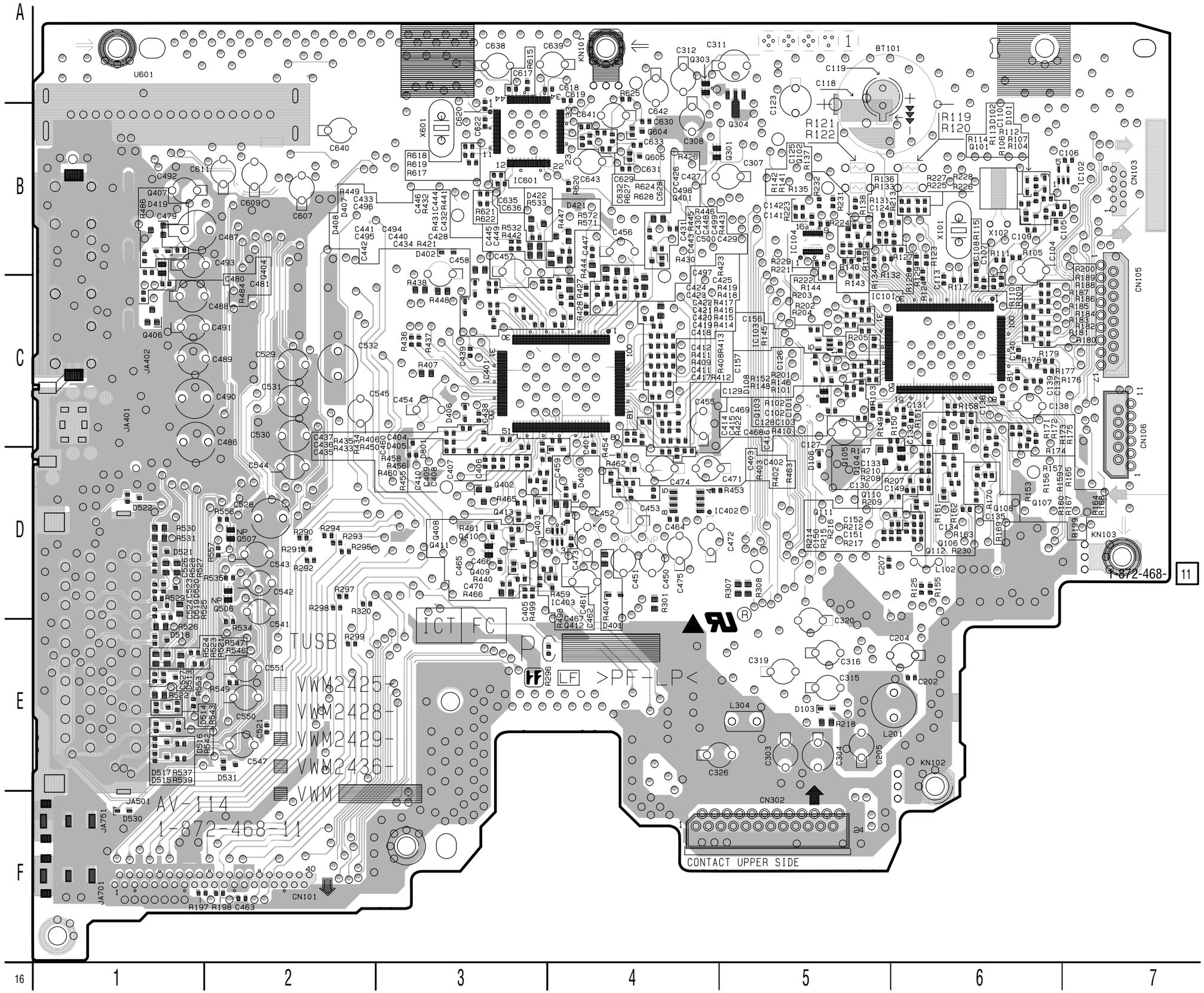


AV-114 BOARD (SIDE A)

CN101	F-2
CN103	B-7
CN105	C-7
CN106	C-7
CN302	F-5
D101	B-6
D102	B-6
D103	E-5
D106	D-5
D108	C-5
D401	D-4
D402	C-3
D419	B-1
D421	B-4
D422	B-3
D513	E-1
D514	E-1
D515	E-1
D516	E-1
D517	E-1
D518	D-1
D519	D-1
D520	D-2
D521	D-1
D522	D-1
D530	F-1
D531	E-2
D801	D-3
IC101	C-6
IC102	B-7
IC103	C-5
IC104	B-5
IC401	C-3
IC402	D-4
IC403	D-4
IC601	B-3
Q101	B-6
Q102	B-5
Q103	C-5
Q104	D-5
Q105	D-5
Q108	D-6
Q110	D-6
Q111	D-5
Q112	D-6
Q301	B-5
Q303	A-4
Q304	B-5
Q401	B-4
Q402	D-3
Q403	D-3
Q404	B-1
Q406	C-1
Q407	B-1
Q408	D-3
Q410	D-3
Q411	D-3
Q413	D-3
Q506	D-2
Q507	D-2
Q604	B-4
Q605	B-4

AV-114 BOARD (SIDE B)

• : Uses unleaded solder.

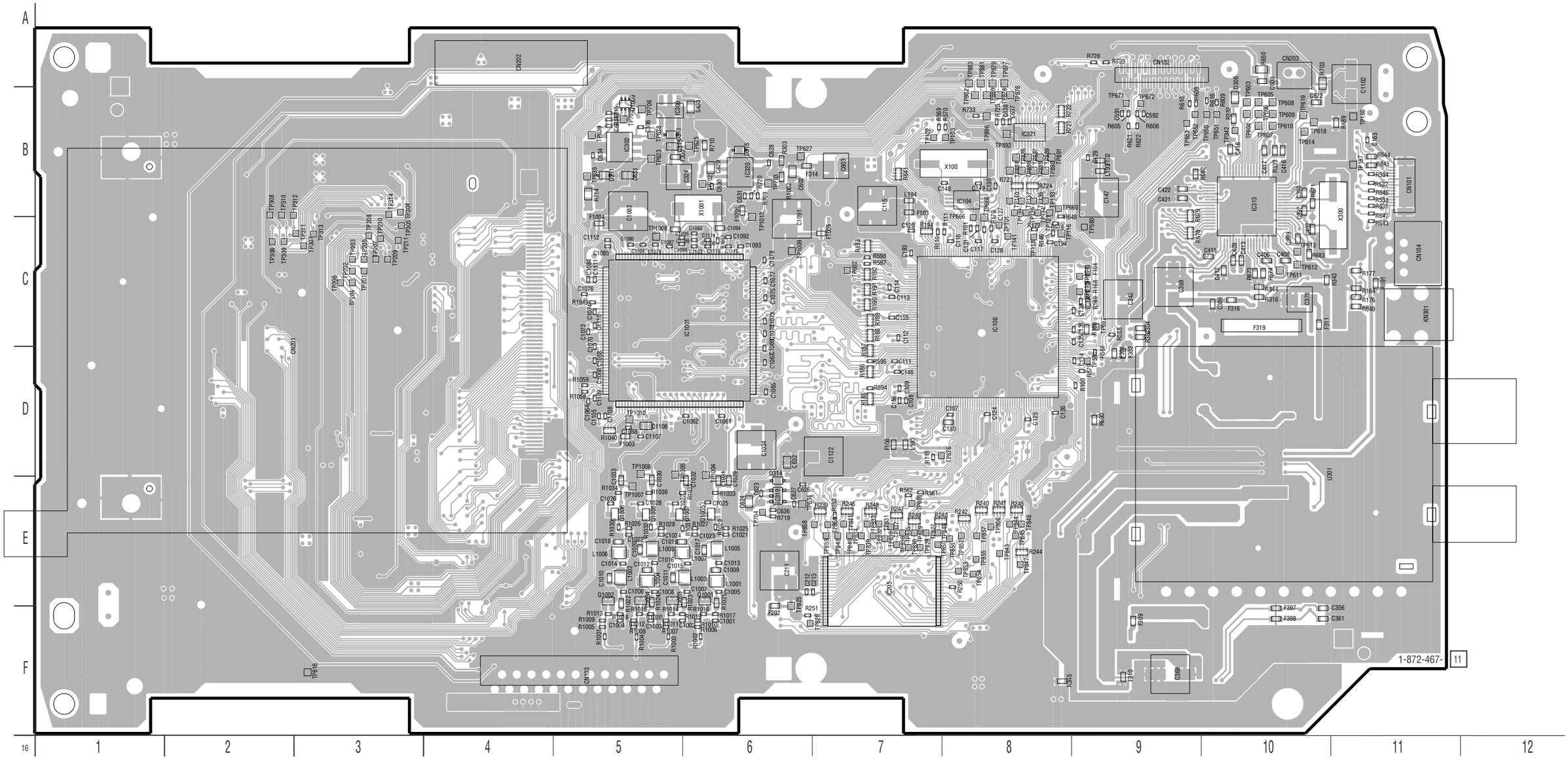


AV-114 BOARD (SIDE B)

D104	B-3
D201	E-2
D301	E-3
D302	E-3
D303	E-3
D304	E-3
D409	C-7
D410	C-7
D413	C-7
D414	C-7
D415	B-7
D416	C-7
D418	B-7
D420	D-4
D501	D-5
D502	D-5
D503	E-6
D504	E-6
D505	E-6
D506	E-6
D507	E-6
D508	D-6
D509	D-6
D510	D-6
D511	E-6
D512	E-6
D523	E-6
D524	E-6
D526	E-6
D527	E-5
D528	C-5
D529	E-6
IC150	B-1
IC317	E-3
IC406	E-6
Q201	E-2
Q302	B-3
Q305	E-2
Q306	E-2
Q307	E-3
Q308	E-3
Q309	E-3
Q310	E-3
Q311	E-3
Q501	D-5
Q502	E-5
Q503	E-5
Q504	E-5
Q505	E-5
Q508	C-5
Q509	E-6
Q510	E-6
Q511	E-6
Q601	B-3
Q602	B-3
Q603	B-3
Q606	B-5
Q751	F-6
Q752	F-6

DT-120 BOARD (SIDE A)

- : Uses unleaded solder.

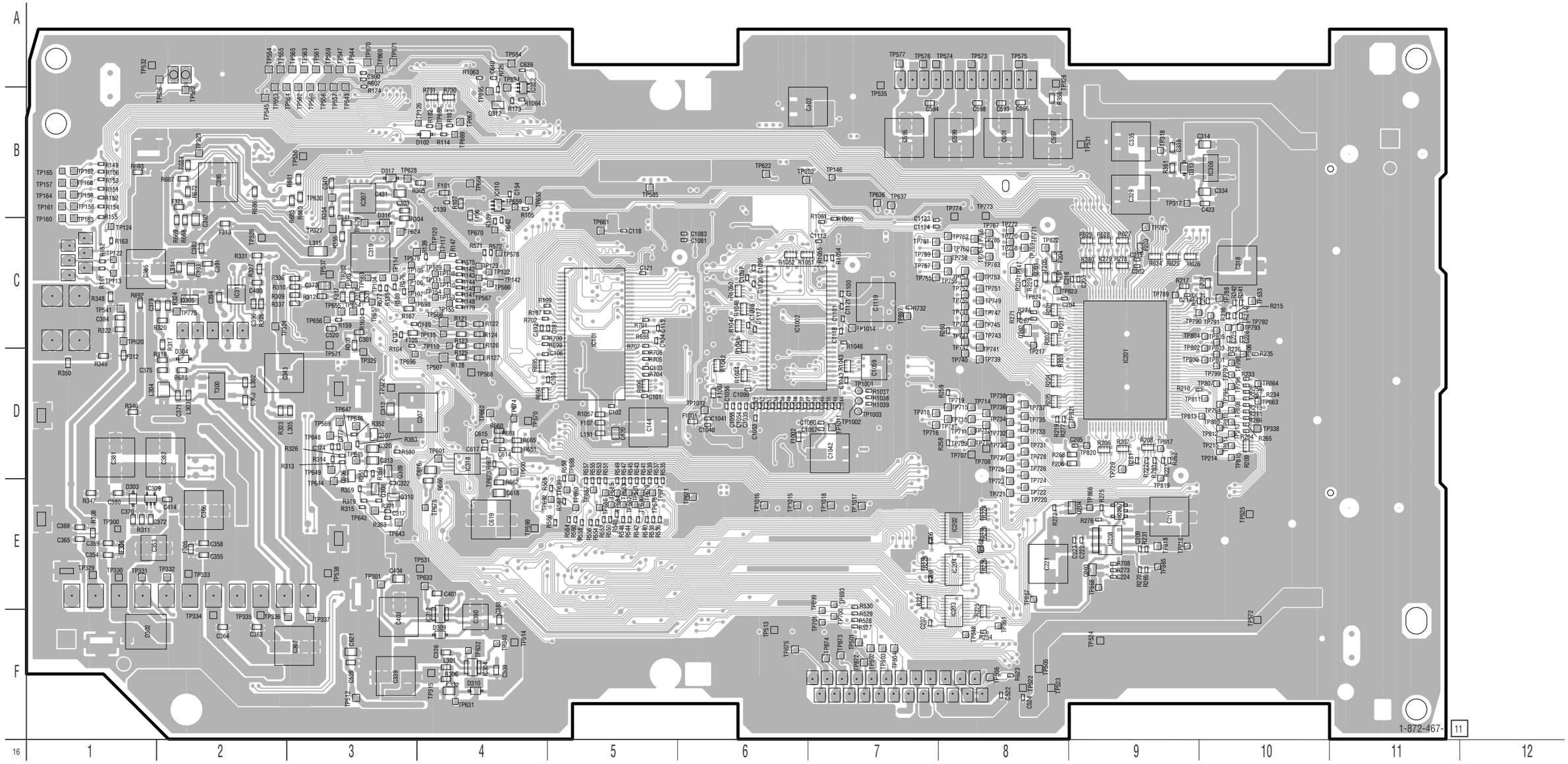


DT-120 BOARD (SIDE A)

CN102	A-9	IC320	B-6
CN103	F-5	IC321	B-8
CN201	C-2	IC1001	C-6
CN202	A-4		
CN203	A-10	Q1001	E-6
		Q1002	E-5
IC104	B-8	Q1003	E-5
IC106	C-8	Q1004	E-5
IC205	E-7	Q1005	E-6
IC300	B-5	Q1006	E-5
IC302	B-5	Q1007	E-5
IC313	B-10	Q1008	E-5
IC319	E-6		

DT-120 BOARD (SIDE B)

• : Uses unleaded solder.



DT-120 BOARD (SIDE B)

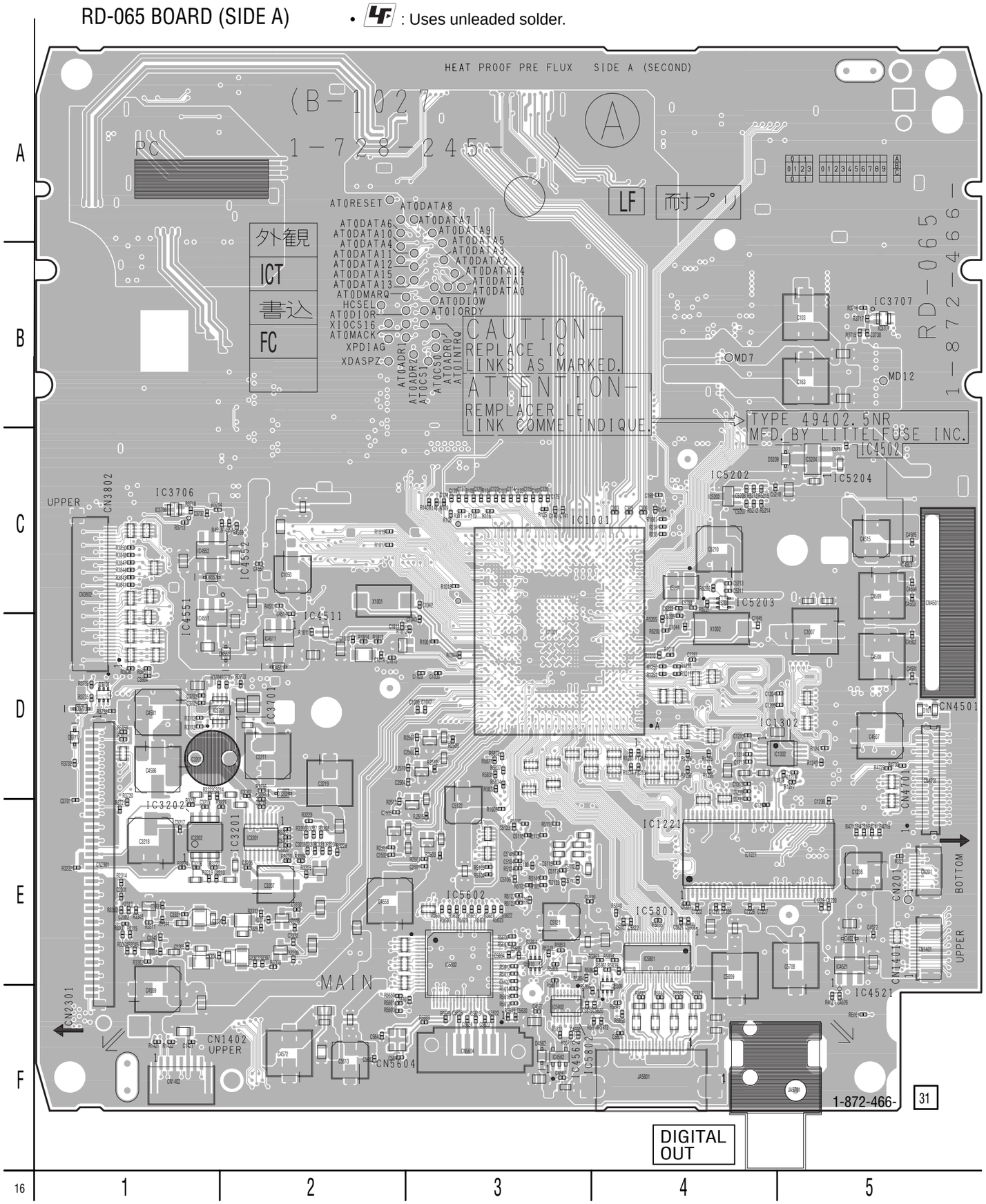
D302	F-1	IC312	F-4
D303	E-1	IC318	D-4
D304	D-2	IC322	B-4
		IC1002	C-6
IC101	C-5		
IC110	B-4	Q201	C-8
IC201	D-9	Q202	C-8
IC202	E-8	Q203	E-9
IC203	E-8	Q305	C-2
IC204	E-8	Q306	D-3
IC208	E-9	Q307	D-3
IC304	F-4	Q308	E-3
IC306	B-10	Q309	D-4
IC307	B-3	Q310	E-3
IC309	E-1	Q312	B-4
IC311	C-2		

RD-065 BOARD (SIDE A)

CN201	E-5
CN1401	E-5
CN1402	F-1
CN2301	E-1
CN3802	C-1
CN4501	D-5
CN4701	D-5
CN5601	
D101	D-5
D3201	E-2
D3711	D-1
D3712	D-1
D4521	E-5
D4552	C-1
IC1001	D-3
IC1221	E-4
IC1302	D-4
IC3201	E-2
IC3202	E-1
IC3701	D-2
IC3707	B-5
IC4501	
IC4502	C-5
IC4511	D-2
IC4521	E-5
IC4552	C-1
IC4562	F-3
IC5202	C-4
IC5203	C-4
IC5204	C-5
IC5602	F-3
IC5801	E-4
IC5802	F-3
Q1811	D-2
Q2501	E-3
Q2502	E-2
Q2503	D-3
Q2504	D-3
Q2505	E-2
Q3301	E-1
Q3302	E-2
Q5805	E-3
Q5809	E-4
Q5810	E-3

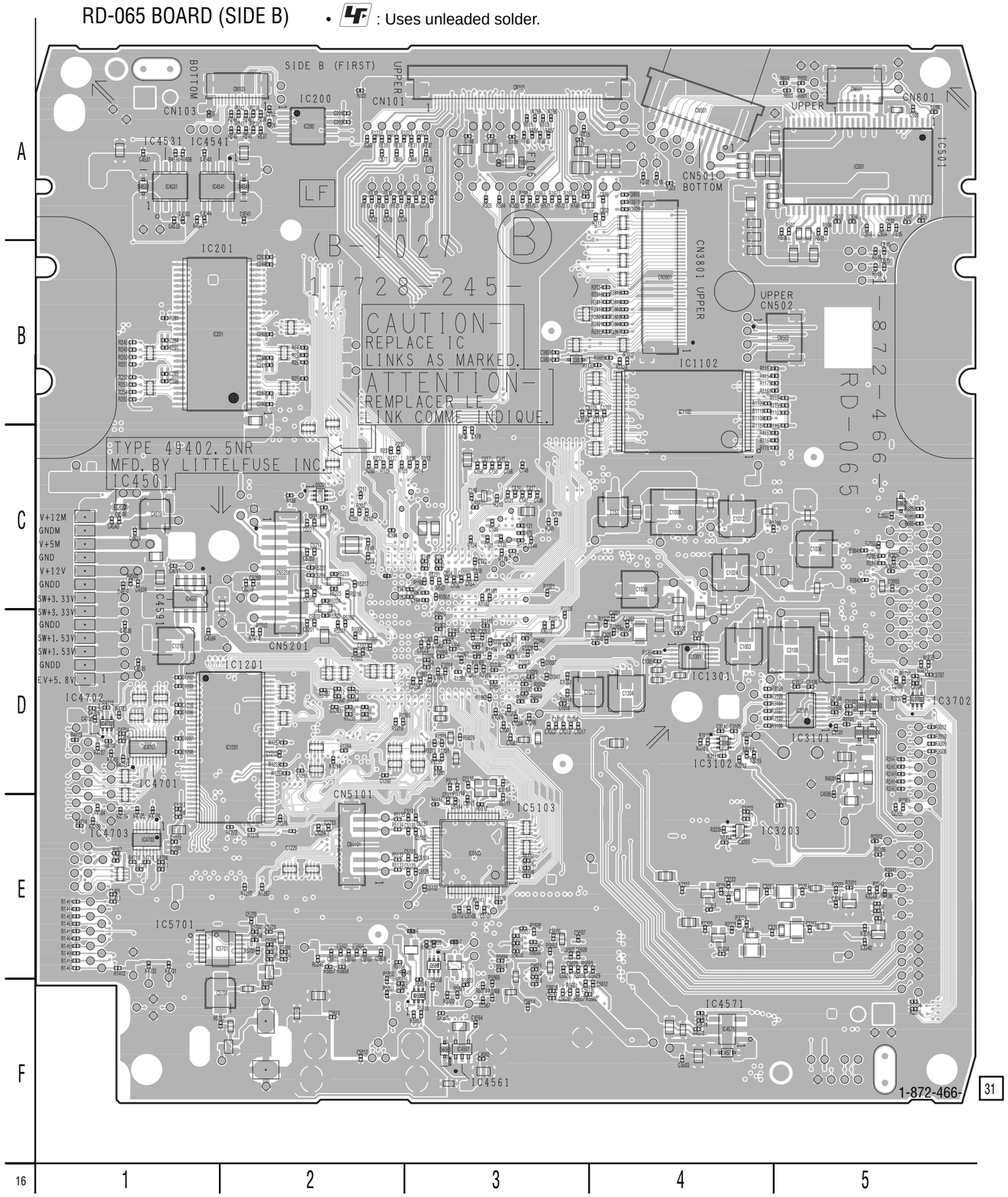
RD-065 BOARD (SIDE A)

• : Uses unleaded solder.



RD-065 BOARD (SIDE B)

• : Uses unleaded solder.



RD-065 BOARD (SIDE B)

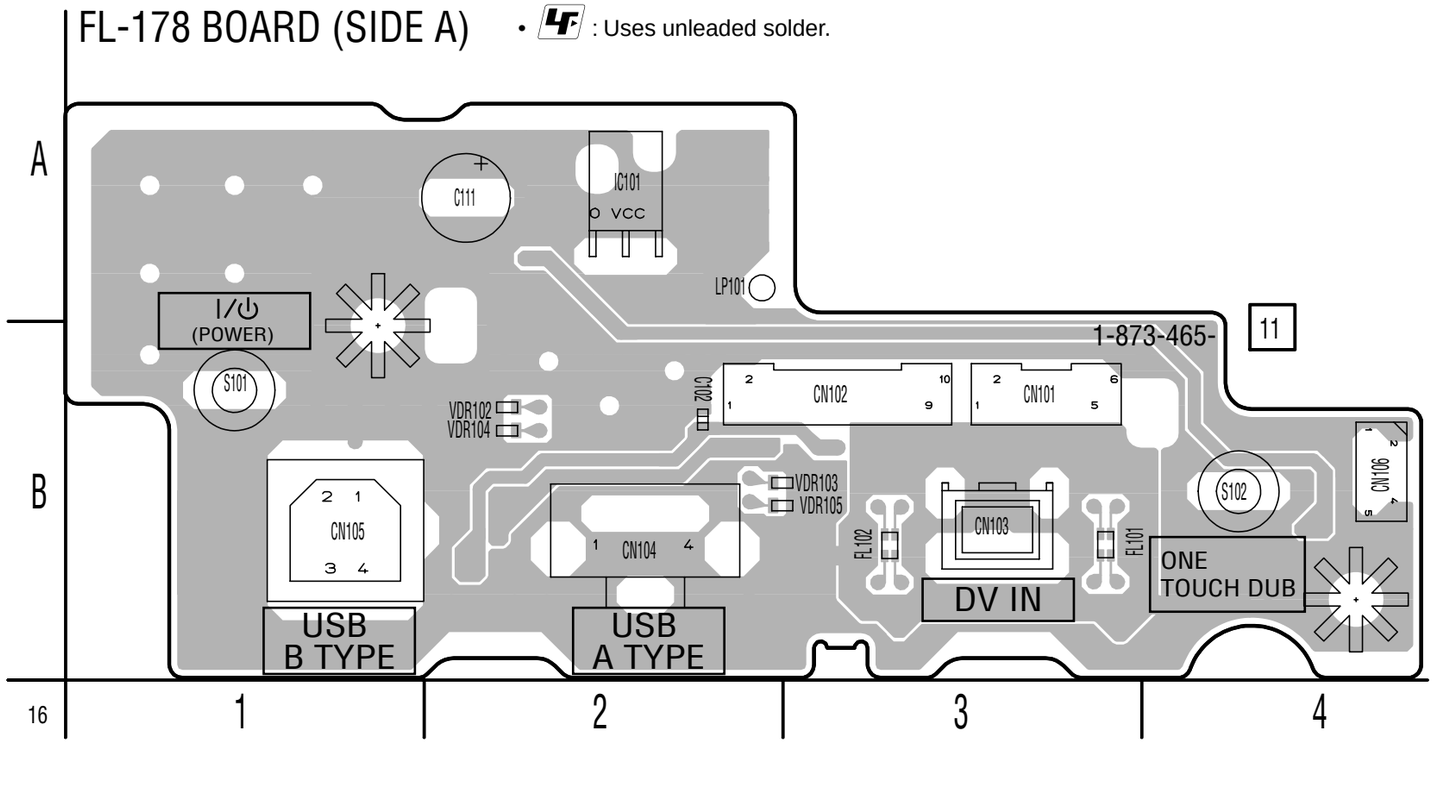
CN101	A-3
CN103	A-2
CN501	A-4
CN502	B-5
CN601	A-5
CN3801	B-4
CN5101	E-2
CN5201	C-2
D4571	F-4
IC200	A-2
IC201	B-2
IC501	A-5
IC1102	B-4
IC1201	D-2
IC1301	D-4
IC3101	D-5
IC3702	D-5
IC4531	A-2
IC4541	A-1
IC4561	F-3
IC4571	F-4
IC4701	D-1
IC4702	D-1
IC4703	E-1
IC5103	E-3
IC5701	E-2
Q102	C-3
Q1801	D-4
Q4581	D-5
Q5701	E-2
Q5801	E-3
Q5802	F-3
Q5804	E-3
Q5808	E-3

FL-178 BOARD (SIDE A)

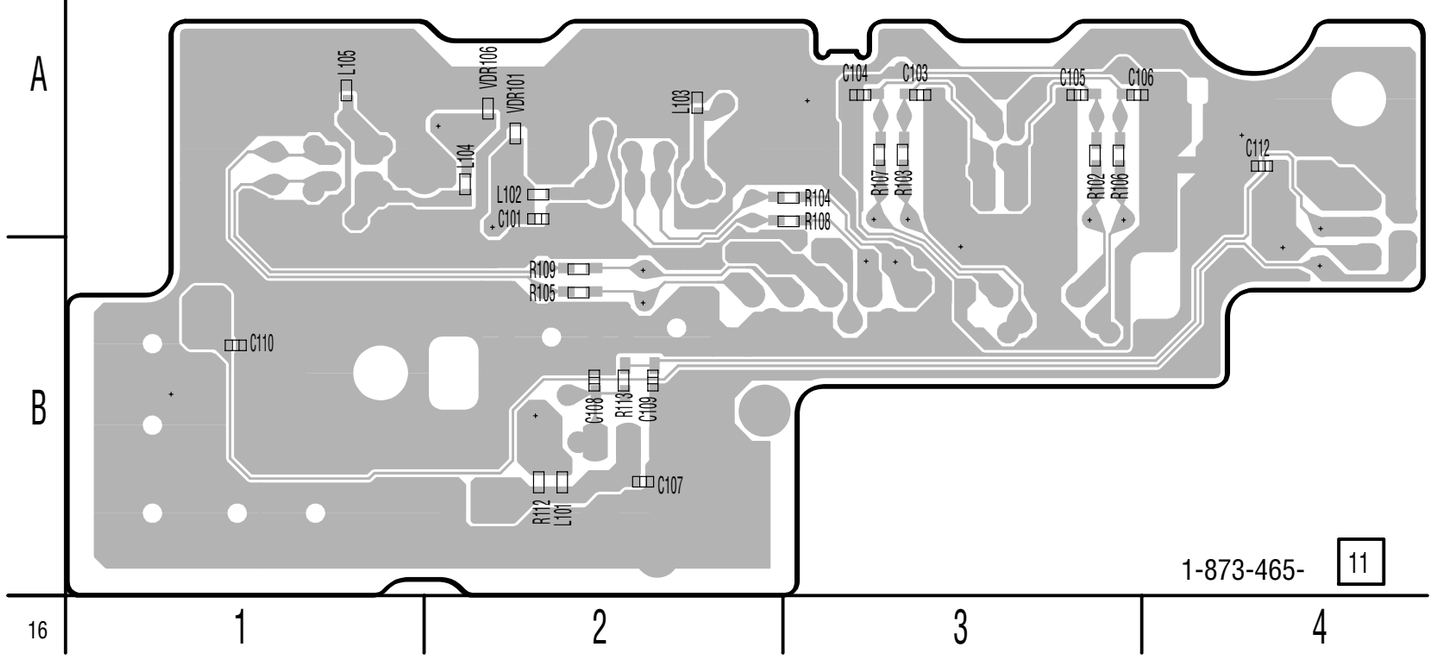
CN101	B-3
CN102	B-3
CN103	B-3
CN104	B-2
CN105	B-1
CN106	B-4
IC101	A-2

FL-178 BOARD (SIDE A)

• : Uses unleaded solder.



FL-178 BOARD (SIDE B)



SECTION 5
IC PIN FUNCTION DESCRIPTION

5-1. IT CONTROL IC (IC101:LC87F06J2A-F58W3-E (AV-114 BOARD))

Pin No.	Pin Name	I/O	Function
1	NC	—	Not used
2	NC	—	Not used
3	NC	—	Not used
4	WDT	—	Fixed at “H”
5	ACDET	I	Input of IC’s VDD detect signal
6	HMS_TO_T	—	Fixed at “H”
7	IR	I	Input of remote control receive signal
8	RESET	I	Input of system reset signal
9	XT1	I	Input of sub-clock (32.768KHz)
10	XT2	O	Output of sub-clock (32.768KHz)
11	VSS1	—	Analog GND
12	CF1	I	Input of main-clock (15MHz)
13	CF2	O	Output of main-clock (15MHz)
14	VDD1	—	Power supply input
15	MODE1	—	Fixed at “L”
16	MODE2	—	Fixed at “L”
17	KEY1	I	Input of function key signal [1]
18	KEY2	I	Input of function key signal [2]
19	KEY3	I	Input of function key signal [3]
20	AGC	I	Input of auto gain control signal
21	BATTDET	—	Fixed at “H”
22	FUNC	I	Input of detection signal for euro-scart
23	SDET3	—	Fixed at “H”
24	SDET2	I	Input of line 2 S-video detection signal
25	SDET1	—	Fixed at “H”
26	AVLOUT	O	Output of n-link switch signal
27	SDA	I/O	Input/output of IIC data signal
28	SCL	O	Output of IIC clock signal
29	XRESET	O	Output of system reset signal for EURO MSP
30	PA3/SO8	—	Not used
31	AFT	I	Input of tuner AFT control signal
32	NC	—	Not used
33	XAMUTE	I	Input of audio muting signal
34	RCSEL2	O	Output of R/C select signal [2]
35	RCSEL1	O	Output of R/C select signal [1]
36	NC	—	Not used
37	DDCSW1	O	Output of DDC IC switching signal [1]
38	DDCSW2	O	Output of DDC IC switching signal [2]
39	VSS4	—	Analog GND
40	VDD4	—	Power supply input
41	FUNC4	O	Output of detection signal for euro-scart
42	SQUEEZE	O	
43	CAPACTIOR	I	Input of IC’s VDD detect signal
44	NC	—	Not used
45	BLAIR	O	Output of transmission pulse for G-Link
46	P_SAVE	O	Output of power save signal for AV select IC’s
47	XSCMUTE	O	Output of SA mute control signal
48	AVLTH	O	Output of N-link switch drive signal
49	FLDATA	O	Output of data signal for FLD drive
50	FLSTB	O	Output of strove signal for FLD driver

Pin No.	Pin Name	I/O	Function
51	FLCLK	O	Output of clock signal for FLD driver
52	RFTHRU	O	Output of tuner power supply control signal
53	NC	—	Not used
54	FANCTL	O	Output of fan direction speed switching signal
55	VDD2	—	Power supply input
56	VSS2	—	Analog GND
57	P_CONT2	O	Output of system power supply control signal
58	MUTECTL	O	Output of SA mute control signal
59	EPGEQ	O	Output of equalizer switching signal
60	TUON	O	Output of tuner block power supply control signal
61	SWVION9V	O	Output of system power supply control signal
62	P_CONT	O	Output of switching regulator control signal
63	FLON	O	Output of FLD grid power supply on signal
64	SWVION5V	O	Output of system power supply control signal
65	MRST	I	Input of system reset signal
66	NC(IN)	—	Fixed at “L”
67	CSYNCIN	I	Input of C-synchronization/composite video signal
68	XCHECKER	—	Not used
69	CEC	I	
70	AVLIN	I	
71	MSPSTAT	I	
72	BLANK	I	Input of blanking signal for euro scart
73	HOTPLUG	I	
74	TU_DCCON	O	Output of tuner power supply control signal
75	TXD1	O	Output of serial TXD signal [1] (Not used)
76	RXD1	O	Output of serial RXD signal [1] (Not used)
77	TXD2	—	Not used
78	RXD2	—	Fixed at “L”
79	HST_TO_M	—	Not used
80	VDDODA	—	Not used
81	CVBSIN	I	Input of composite video signal
82	GND	—	Analog GND
83	FILTSLC	—	Fixed at “L”
84	VDDVCO	—	Power supply input
85	DTBON	—	Not used
86	ANT5V_SW	O	Output of system power supply control signal (Not used)
87	DET_ANT	—	Fixed at “L”
88	VSS3	—	Analog GND
89	VDD3	—	Power supply input
90	DBGP2	I	Checking terminal
91	DBGP1	I	Checking terminal
92	DGBP0	I	Checking terminal
93	LED_PLTB	—	Not used
94	LED_DIVX	—	Not used
95	LED_D_TV	—	Not used
96	LED_A_TV	—	Not used
97	LED_HDD2	—	Not used
98	DAT_TO_M	O	Output of serial data signal to ENC/DEC IC’s
99	DAM_TO_T	I	Input of serial data signal from ENC/DEC IC’s
100	ASCK	I	Input of serial clock signal from ENC/DEC IC’s

5-2. AV ENCODER/DECODER IC (IC1001:MC10050F1-105-LU1-A (RD-65 BOARD))

Pin No.	Pin Name	I/O	Function
A1	DGND	—	Digital GND
A2	DRASB	O	Output of RAS signal
A3	DBA1	O	Output of bank address [1]
A4	DADD01	O	Output of DDRSDRAM address [1]
A5	DDQM1	O	Output of data mask [1]
A6	DQ13	I/O	Input/output of DDRSDRAM data [13]
A7	DQ11	I/O	Input/output of DDRSDRAM data [11]
A8	DQ08	I/O	Input/output of DDRSDRAM data [8]
A9	DIHM	—	Fixed at “L”
A10	Not open to public	O	Output of power down
A11	Not open to public	O	Output of data [10]
A12	Not open to public	O	Output of data [7]
A13	Not open to public	O	Output of l clock
A14	Not open to public	O	Output of data [3]
A15	Not open to public	O	Output of data [0]
A16	Not open to public	O	Output of vertical synchronization
A17	Not open to public	I/O	Input/output of DDC data
A18	GPIO46	—	Not used
A19	DA2_GND	—	GND (for DAC)
A20	VAY	O	Output of DA converter for analog video signal Y
A21	RSET1	—	Fixed at “L”
A22	VAR	O	Output of DA converter for analog video signal red
A23	RSET0	—	Fixed at “L”
A24	VAB	O	Output of DA converter for analog video signal blue
AA1	MD14	I/O	Input/output of buffer memory interface data bus [14]
AA2	LDQM	O	Output of lower byte data I/O mask control
AA3	MD5	I/O	Input/output of buffer memory interface data bus [5]
AA4	MD1	I/O	Input/output of buffer memory interface data bus [1]
AA5	MD3	I/O	Input/output of buffer memory interface data bus [3]
AA6	DVDD15(1.5V)	—	Power supply input
AA19	GPIO40	—	Fixed at “L”
AA20	AIOBCK	I/O	Input/output of audio data clock
AA21	RDATA02	I/O	Input/output of ROM/GIO data [2]
AA22	RADD03	O	Output of ROM/GIO address [3]
AA23	RADD08	O	Output of ROM/GIO address [8]
AA24	FWEB/GWEB	O	Output of ROM/GIO write enable
AB1	MD2	I/O	Input/output of buffer memory interface data bus [2]
AB2	UDQM	O	Output of upper byte data I/O mask control
AB3	MD4	I/O	Input/output of buffer memory interface data bus [4]
AB4	MCLKOUT	O	Output of clock for SDRAM
AB5	MD13	I/O	Input/output of buffer memory interface data bus [13]
AB6	DVDD15(1.5V)	—	Power supply input
AB19	CTS1B	I	Input of clear to send
AB20	VIOCLK	O	Output of video pixel clock
AB21	SP1CLK	—	Fixed at GND
AB22	AIOBD	I/O	Input/output of audio bitstream data
AB23	SP1STRT	—	Fixed at GND
AB24	RADD15	O	Output of ROM/GIO address [15]
AC1	MA9	O	Output of buffer memory interface address bus [9]
AC2	MD12	I/O	Input/output of buffer memory interface data bus [12]
AC3	MA10	O	Output of buffer memory interface address bus [10]
AC4	MCKE	O	Output of SDRAM clock enable control
AC5	MA7	O	Output of buffer memory interface address bus [7]

Pin No.	Pin Name	I/O	Function
AC6	PDIAGB	—	Not used
AC19	MONI3	—	Not used
AC20	SP1EN	—	Fixed at GND
AC21	SP1DAT2	—	Fixed at GND
AC22	VIOD7	I/O	Input/output of digital video data [7]
AC23	SP1DAT7	—	Fixed at GND
AC24	VIOD6	I/O	Input/output of digital video data [6]
AD1	MA6	O	Output of buffer memory interface address bus [6]
AD2	MA5	O	Output of buffer memory interface address bus [5]
AD3	MA1	O	Output of buffer memory interface address bus [1]
AD4	MA8	O	Output of buffer memory interface address bus [8]
AD5	MBA	O	Output of buffer memory interface bank address
AD6	DASPB	—	Not used
AD7	HIOCS16B	—	Not used
AD8	SFSO	O	Output of serial flash interface data
AD9	SFSCK	O	Output of serial flash interface clock
AD10	SFSI	I	Input of serial flash interface data
AD11	SFCS0B	O	Output of serial flash command (address)
AD12	AVDD15	—	Power supply input (Analog 1.5V)
AD13	AVDD33	—	Power supply input (Analog 3.3V)
AD14	AVDD33	—	Power supply input (Analog 3.3V)
AD15	AVDD33	—	Power supply input (Analog 3.3V)
AD16	AVDD33	—	Power supply input (Analog 3.3V)
AD17	TEST1	—	Not used
AD18	MONI1	—	Not used
AD19	MONI2	—	Not used
AD20	SP1ERRB	—	Fixed at GND
AD21	SP1DAT6	—	Fixed at GND
AD22	SP1DAT5	—	Fixed at GND
AD23	VIOD5	I/O	Input/output of digital video data [5]
AD24	VIOD3	I/O	Input/output of digital video data [3]
AE1	XA1	I	Input of clock 16.9344MHz
AE2	CASB	O	Output of buffer memory interface column address strove control
AE3	MA0	O	Output of buffer memory interface address bus [0]
AE4	MA4	O	Output of buffer memory interface address bus [4]
AE5	MA3	O	Output of buffer memory interface address bus [3]
AE6	PB4	—	Not used
AE7	PB1	—	Not used
AE8	RLDM	—	Not used
AE9	WLD	—	Not used
AE10	WLDM	—	Not used
AE11	PLED	—	Not used
AE12	CWAGC	—	Fixed at “L”
AE13	CWHP	—	Fixed at “L”
AE14	CAD	—	Fixed at “L”
AE15	CBC	—	Fixed at “L”
AE16	CTEC	—	Fixed at “L”
AE17	CRC	—	Fixed at “L”
AE18	CBHLPP/CRAPC	—	Fixed at “L”
AE19	ADIN	—	Not used
AE20	AIOLRCK	I/O	Input/output of audio L/R clock
AE21	VIOD2	I/O	Input/output of digital video data [2]
AE22	SP1DAT3	—	Fixed at GND

Pin No.	Pin Name	I/O	Function
AE23	SP1DAT4	—	Fixed at GND
AE24	VIOD1	I/O	Input/output of digital video data [1]
AF1	XA2I	I/O	Input/output of clock 16.9344MHz
AF2	WEB	O	Output of buffer memory interface write enable
AF3	MA2	O	Output of buffer memory interface address bus [2]
AF4	RSAB	O	Output of buffer memory interface row address strove control
AF5	(PB2)	O	Output of buffer memory interface bank address [MA11]
AF6	PB5	—	Not used
AF7	PB7	—	Not used
AF8	RLD	—	Not used
AF9	REF16	—	Not used
AF10	VREFIO	—	Not used
AF11	P2LD	—	Not used
AF12	CADO	—	Fixed at “L”
AF13	CBHWBL/CID	—	Fixed at “L”
AF14	CAMIRR	—	Fixed at “L”
AF15	CBPD	—	Fixed at “L”
AF16	CAGC	—	Fixed at “L”
AF17	CAGC2	—	Fixed at “L”
AF18	CEQDC	—	Fixed at “L”
AF19	FE0	—	Not used
AF20	TE0	—	Not used
AF21	TXD0B	O	Output of transfer data [0]
AF22	RXD0B	I	Input of receive data [0]
AF23	VIOD4	I/O	Input/output of digital video data [4]
AF24	VIOD0	I/O	Input/output of digital video data [0]
AG1	PB3	—	Not used
AG2	PA0	—	Not used
AG3	PA4	—	Not used
AG4	PB0	—	Not used
AG5	PB6	—	Not used
AG6	PA3	—	Not used
AG7	PA5	—	Not used
AG8	PDIN	—	Not used
AG9	FPDVI	—	Not used
AG10	FPDVO	—	Not used
AG11	CREG	—	Fixed at “L”
AG12	CBCO	—	Fixed at “L”
AG13	WALPF	—	Fixed at “L”
AG14	CMIRR	—	Fixed at “L”
AG15	CBBD	—	Fixed at “L”
AG16	REFQOM	O	Output of differential RF signal (-) to EFM comparator
AG17	REFQOP	O	Output of differential RF signal (+) to EFM comparator
AG18	RFO	—	Fixed at “L”
AG19	CDEF	—	Fixed at “L”
AG20	FG	—	Not used
AG21	RFT1/SWRF1/RFP1	—	Not used
AG22	RXD1B	I	Input of receive data [1]
AG23	TXD1B	O	Output of transfer data [1]
AG24	SP1DAT1	—	Fixed at GND
AH1	PKPULSE1M	—	Not used
AH2	PKPULSE1P	—	Not used
AH3	WRPULSEM	—	Not used

Pin No.	Pin Name	I/O	Function
AH4	WRPULSEP	—	Not used
AH5	HFONP	—	Not used
AH6	PA7	—	Not used
AH7	PA2	—	Not used
AH8	H1/FOM	—	Not used
AH9	G1/FOP	—	Not used
AH10	F1	—	Not used
AH11	E1	—	Not used
AH12	REP	—	Not used
AH13	ASY	—	Fixed at “L”
AH14	FCEFM2	—	Fixed at “L”
AH15	PCEFM2	—	Fixed at “L”
AH16	RFI_M	I	Input of differential RF signal (-) to EFM comparator
AH17	RFI_P	I	Input of differential RF signal (+) to EFM comparator
AH18	AGCIN	—	Fixed at “L”
AH19	CDEF2	—	Fixed at “L”
AH20	TDRV	—	Not used
AH21	FDRV	—	Not used
AH22	RFT2/SWRF2/RFP2	—	Not used
AH23	RXD2B	I	Input of receive data
AH24	SP1DAT0	—	Fixed at GND
AJ1	OFPULSE/WRCKP	—	Not used
AJ2	OFPULSE/WRCKM	—	Not used
AJ3	PKPULSE2/NRZIM	—	Not used
AJ4	PKPULSE2/NRZIP	—	Not used
AJ5	HFONM	—	Not used
AJ6	PA1	—	Not used
AJ7	PA6	—	Not used
AJ8	D1	—	Not used
AJ9	C1	—	Not used
AJ10	B1	—	Not used
AJ11	A1	—	Not used
AJ12	RFN	—	Not used
AJ13	EFM	—	Fixed at “L”
AJ14	FCEFM1	—	Read channel frequency comparator
AJ15	FCEFM1	—	Fixed at “L”
AJ16	EXTR	—	Fixed at “L”
AJ17	CEQ	—	Fixed at “L”
AJ18	REQ	—	Fixed at “L”
AJ19	DAOUT	—	Not used
AJ20	SDRV2	—	Not used
AJ21	SDRV1	—	Not used
AJ22	MDRV	—	Not used
AJ23	WRFM/SWRF3/RPF3	—	Not used
AJ24	TXD2B/GPIO43	—	Fixed at GND
B1	DCLKB	O	Output of negative clock for DDRSDRAM
B2	DCASB	O	Output of CAS signal
B3	DBA0	O	Output of bank address [0]
B4	DADD00	O	Output of DDRSDRAM address [0]
B5	DADD03	O	Output of DDRSDRAM address [3]
B6	DQ12	I/O	Input/output of DDRSDRAM data [12]
B7	DQ15	I/O	Input/output of DDRSDRAM data [15]
B8	DQ09	I/O	Input/output of DDRSDRAM data [9]

Pin No.	Pin Name	I/O	Function
B9	DDQM3	O	Output of data mask [3]
B10	Not open to public	I	Input of monitor sense
B11	Not open to public	O	Output of data [11]
B12	Not open to public	O	Output of data [8]
B13	Not open to public	O	Output of data [5]
B14	Not open to public	O	Output of data [2]
B15	Not open to public	O	Output of data enable
B16	Not open to public	O	Output of HDMI TDMS control
B17	Not open to public	I/O	Input/output of DDC clock
B18	SS0CKIN/GPIO44	—	Not used
B19	DA2_VDD3	—	Power supply input (3.3V for DAC)
B20	COMP1	—	Fixed at “L”
B21	VAC	O	Output of DA converter for video signal chrominance
B22	VREF	I	Input of reference voltage
B23	VAG	O	Output of DA converter for analog video signal green
B24	COMP0	—	Fixed at “L”
C1	DCLK	O	Output of positive clock for DDRSDRAM
C2	DWEB	O	Output of command write enable
C3	DCS0B	O	Output of DDRSDRAM chip select [0]
C4	DADD10	O	Output of DDRSDRAM address [10]
C5	DADD02	O	Output of DDRSDRAM address [2]
C6	DDQS1	I/O	Input/output of data strobe [1]
C7	DQ14	I/O	Input/output of DDRSDRAM data [14]
C8	DQ10	I/O	Input/output of DDRSDRAM data [10]
C9	DDQS3	I/O	Input/output of data strobe [3]
C10	DILM	—	Fixed at “H”
C11	Not open to public	O	Output of HDMI TDMS control
C12	Not open to public	O	Output of data [9]
C13	Not open to public	O	Output of data [6]
C14	Not open to public	O	Output of data [4]
C15	Not open to public	O	Output of data [1]
C16	Not open to public	O	Output of horizontal synchronization
C17	Not open to public	I	Input of hot plug detect
C18	SDA1	I/O	Input/output of serial data
C19	AOBCK	O	Output of audio data clock
C20	AIOMCK0	I/O	Input/output of audio master clock [0]
C21	DA1_VDD3	—	Power supply input (3.3V for DAC)
C22	DA1_GND	—	GND (for DAC)
C23	VCOMB	—	Fixed at “L”
C24	VRTB	—	Fixed at “L”
D1	DADD06	O	Output of DDRSDRAM address [6]
D2	DADD07	O	Output of DDRSDRAM address [7]
D3	DADD08	O	Output of DDRSDRAM address [8]
D4	DADD11	O	Output of DDRSDRAM address [11]
D5	DCKE	O	Output of clock enable
D6	DQ30	I/O	Input/output of DDRSDRAM data [30]
D7	DQ28	I/O	Input/output of DDRSDRAM data [28]
D8	DQ26	I/O	Input/output of DDRSDRAM data [26]
D9	DQ24	I/O	Input/output of DDRSDRAM data [24]
D10	PHY_D7	I/O	Input/output of PHY-link data [7] for PHY
D11	PHY_D5	I/O	Input/output of PHY-link data [5] for PHY
D12	PHY_D3	I/O	Input/output of PHY-link data [3] for PHY
D13	PHY_D1	I/O	Input/output of PHY-link data [1] for PHY

Pin No.	Pin Name	I/O	Function
D14	CTL1	I/O	Input/output of PHY/link control [1] for PHY
D15	SCLK	I	Input of link control clock for PHY
D16	LPS	O	Output of link power status
D17	SCL1	I/O	Input/output of serial clock
D18	DCD0B	—	Fixed at “H”
D19	ATX	O	Output of digital audio
D20	AOLRCK	O	Output of audio L/R clock
D21	VCOMY	—	Fixed at “L”
D22	VRTY	—	Fixed at “L”
D23	ABI	I	Input of AD converter for analog video signal green
D24	VRBB	—	Fixed at “L”
E1	DADD04	O	Output of DDRSDRAM address [4]
E2	DADD05	O	Output of DDRSDRAM address [5]
E3	DCS1B	—	Not used
E4	DADD09	O	Output of DDRSDRAM address [9]
E5	DADD12	O	Output of DDRSDRAM address [12]
E6	DQ31	I/O	Input/output of DDRSDRAM data [31]
E7	DQ29	I/O	Input/output of DDRSDRAM data [29]
E8	DQ27	I/O	Input/output of DDRSDRAM data [27]
E9	DQ25	I/O	Input/output of DDRSDRAM data [25]
E10	PHY_D6	I/O	Input/output of PHY-link data [6] for PHY
E11	PHY_D4	I/O	Input/output of PHY-link data [4] for PHY
E12	PHY_D2	I/O	Input/output of PHY-link data [2] for PHY
E13	PHY_D0	I/O	Input/output of PHY-link data [0] for PHY
E14	CTL0	I/O	Input/output of PHY/link control [0] for PHY
E15	LREQ	O	Output of link request for PHY
E16	LINKON	I	Input of LINK on
E17	SS0DIN/GPIO45	I	Input of serial data
E18	AOD0	O	Output of audio bitstream data L/R
E19	AIBCK0	—	Not used
E20	AIBD0	I	Input of audio bitstream data [0]
E21	AIOMCK1	I/O	Input/output of audio master clock [1]
E22	VRBY	—	Fixed at “L”
E23	VCLY	—	Fixed at “L”
E24	AYI	I	Input of AD converter for analog video signal Y
F1	DQ19	I/O	Input/output of DDRSDRAM data [19]
F2	DDQS0	I/O	Input/output of data strobe [0]
F3	DDQM0	O	Output of data mask [0]
F4	DQ01	I/O	Input/output of DDRSDRAM data [1]
F5	DQ00	I/O	Input/output of DDRSDRAM data [0]
F6	DVREF	—	Fixed at “L”
F7	DVDD25(2.5V)	—	Power supply input
F8	DVDD25(2.5V)	—	Power supply input
F9	DVDD25(2.5V)	—	Power supply input
F10	DVDD25(2.5V)	—	Power supply input
F11	DVDD25(2.5V)	—	Power supply input
F12	DGND	—	Digital GND
F13	DGND	—	Digital GND
F14	DGND	—	Digital GND
F15	DGND	—	Digital GND
F16	DGND	—	Digital GND
F17	GPIO54	O	Output of audio mute
F18	IR_OUT	O	Output of IR transmitter

Pin No.	Pin Name	I/O	Function
F19	AILRCK0	I	Input of audio L/R clock [0]
F20	IR_IN	I	Input of IR receiver
F21	JTDI	I	Input of EJTAG data
F22	VRTR	—	Fixed at “L”
F23	ARI	I	Input of AD converter for analog video signal blue
F24	VRBR	—	Fixed at “L”
G1	DQ16	I/O	Input/output of DDRSDRAM data [16]
G2	DQ17	I/O	Input/output of DDRSDRAM data [17]
G3	DQ18	I/O	Input/output of DDRSDRAM data [18]
G4	DQ03	I/O	Input/output of DDRSDRAM data [3]
G5	DQ02	I/O	Input/output of DDRSDRAM data [2]
G6	DVDD25(2.5V)	—	Power supply input
G7	DVDD25(2.5V)	—	Power supply input
G19	JTDO	O	Output of EJTAG data
G20	JTMS	I	Input of EJTAG mode set
G21	VCOMR	—	Fixed at “L”
G22	VRTC	—	Fixed at “L”
G23	VRBC	—	Fixed at “L”
G24	ACI	I	Input of AD converter for video signal chrominance or red
H1	DQ22	I/O	Input/output of DDRSDRAM data [22]
H2	DQ21	I/O	Input/output of DDRSDRAM data [21]
H3	DQ20	I/O	Input/output of DDRSDRAM data [20]
H4	DQ06	I/O	Input/output of DDRSDRAM data [6]
H5	DQ07	I/O	Input/output of DDRSDRAM data [7]
H6	DVDD25(2.5V)	—	Power supply input
H19	EDINT	I	Input of EJTAG DINT
H20	JTRST	I	Input of EJTAG reset
H21	HLCI	I	Input of H lock clock for video decoder
H22	VCOMC	—	Fixed at “L”
H23	AD2_VDD3	—	Power supply input (3.3V for ADC)
H24	AD2_GND	—	GND (for ADC)
J1	DDQM2	O	Output of data mask [2]
J2	DDQS2	I/O	Input/output of data strobe [2]
J3	DQ23	I/O	Input/output of DDRSDRAM data [23]
J4	DQ04	I/O	Input/output of DDRSDRAM data [4]
J5	DQ05	I/O	Input/output of DDRSDRAM data [5]
J6	DVDD25(2.5V)	—	Power supply input
J19	JTCL	I	Input of EJTAG clock
J20	PH_VDD1	—	Power supply input (1.0V for V DEC)
J21	HCBP	—	Fixed at “L”
J22	FCBP	—	Fixed at “L”
J23	PF_GND	—	GND (for V DEC)
J24	FSCI	I	Input of FSC for video decoder
K1	PLL_VDD	—	Power supply input (1.0V for PLL)
K2	CLK27AOUT	O	Output of 27MHz clock A
K3	CLKPWM0	O	Output of PWM for 27MHz VCXO [0]
K4	CLKPWM1	O	Output of PWM for 27MHz VCXO [1]
K5	SMCKOUT	O	Output of serial clock
K6	DVDD25(2.5V)	—	Power supply input
K10	DGND	—	Digital GND
K11	DGND	—	Digital GND
K12	DVDD33(3.3V)	—	Power supply input
K13	DVDD33(3.3V)	—	Power supply input

Pin No.	Pin Name	I/O	Function
K14	DVDD33(3.3V)	—	Power supply input
K15	DVDD33(3.3V)	—	Power supply input
K19	DGNDR	—	GND (for RF)
K20	HLCO	O	Output of H lock clock for video decoder
K21	HC_VDD3	—	Power supply input (3.3V for V DEC)
K22	FC_VDD3	—	Power supply input (3.3V for V DEC)
K23	FSCO	O	Output of FSC for video decoder
K24	PF_VDD1	—	Power supply input (1.0V for V DEC)
L1	CLK27AIN	I	Input of 27MHz clock A
L2	PLL_GND	—	GND (for PLL)
L3	CLK27BIN	I	Input of 27MHz clock B
L4	SMDOUT	O	Output of serial data
L5	SMDIN	I	Input of serial data
L6	DLL_VDD	—	Power supply input (1.0V for DLL)
L10	DGND	—	Digital GND
L11	DVDD33(3.3V)	—	Power supply input
L12	DVDD33(3.3V)	—	Power supply input
L13	DVDD33(3.3V)	—	Power supply input
L14	DVDD33(3.3V)	—	Power supply input
L15	DVDD33(3.3V)	—	Power supply input
L19	HXT_CSDA	I/O	Input/output of serial data for HDMI debug
L20	NMI	—	Fixed at “H”
L21	RSTSWB	I	Input of system reset
L22	PH_GND	—	GND (for V DEC)
L23	AD1_VDD3	—	Power supply input (3.3V for ADC)
L24	CLK24OUT	O	Output of 24MHz clock
M1	USB_DN0	I/O	Input/output of USB D-
M2	USB_DP0	I/O	Input/output of USB D+
M3	USB_H_OCI0	I	Input of USB over-current status
M4	AT1D00	I/O	Input/output of IDE I/F data [0]
M5	AT1INTRQ	I	Input of IRQ signal
M6	DLL_GND	—	GND (for DLL)
M10	TEST_MODE	—	Fixed at GND
M11	FPIND	—	Fixed at GND
M12	LVSPOWD	—	Fixed at GND
M13	DVDD33(3.3V)	—	Power supply input
M14	DVDD33(3.3V)	—	Power supply input
M15	DVDD33(3.3V)	—	Power supply input
M19	SCL0	I	Input of serial clock
M20	GPIO02	—	Fixed at “L”
M21	RADD17	O	Output of ROM/GIO address [17]
M22	RDATA09	I/O	Input/output of ROM/GIO data [9]
M23	AD1_GND	—	GND (for ADC)
M24	CLK24IN	I	Input of 24MHz clock
N1	USB_CLKI	I	Input of USB clock
N2	USB_H_PPON0	O	Output of USB power control
N3	USB_D_VBUS	I	Input of USB VBUS
N4	AT1D13	I/O	Input/output of IDE I/F data [13]
N5	AT1D04	I/O	Input/output of IDE I/F data [4]
N6	DGND	—	Digital GND
N10	DVDD10(1.0V)	—	Power supply input
N11	DVDD10(1.0V)	—	Power supply input
N12	DVDD10(1.0V)	—	Power supply input

Pin No.	Pin Name	I/O	Function
N13	DVDD10(1.0V)	—	Power supply input
N14	DVDD33(3.3V)	—	Power supply input
N15	AVDD33R	—	Power supply input (3.3V for RF)
N19	RADD24/GPIO03	—	Fixed at “H”
N20	RDATA14	I/O	Input/output of ROM/GIO data [14]
N21	RADD18	O	Output of ROM/GIO address [18]
N22	RDATA13	I/O	Input/output of ROM/GIO data [13]
N23	RDATA07	I/O	Input/output of ROM/GIO data [7]
N24	GND	—	Digital GND
P1	USB_D_DN0	I/O	Input/output of USB D-
P2	USB_D_DP0	I/O	Input/output of USB D+
P3	USB_D_CONNECT	O	Connection control of the pull-up resistance of D+
P4	AT1D06	I/O	Input/output of IDE I/F data [6]
P5	AT1D09	I/O	Input/output of IDE I/F data [9]
P6	DGND	—	Digital GND
P10	DVDD10(1.0V)	—	Power supply input
P11	DVDD10(1.0V)	—	Power supply input
P12	DVDD10(1.0V)	—	Power supply input
P13	AT0D06	O	Output of data [06] for IDE I/F
P14	AT0DIOWB	O	Output of DIOW signal for IDE I/F
P15	AT0D10	O	Output of data [10] for IDE I/F
P19	RADD25/GPIO04	—	Fixed at “H”
P20	RADD00/GPIO01	—	Fixed at “H”
P21	RDATA12	I/O	Input/output of ROM/GIO data [12]
P22	RADD10	O	Output of ROM/GIO address [10]
P23	RADD12	O	Output of ROM/GIO address [12]
P24	RADD22	O	Output of ROM/GIO address [22]
R1	AT1D01	I/O	Input/output of IDE I/F data [1]
R2	AT1D03	I/O	Input/output of IDE I/F data [3]
R3	AT1D05	I/O	Input/output of IDE I/F data [5]
R4	AT1D02	I/O	Input/output of IDE I/F data [2]
R5	AT1D11	I/O	Input/output of IDE I/F data [11]
R6	DGND	—	Digital GND
R10	DVDD10(1.0V)	—	Power supply input
R11	DVDD10(1.0V)	—	Power supply input
R12	AT0DIORB	O	Output of DIOR signal for IDE I/F
R13	AT0D08	O	Output of data [08] for IDE I/F
R14	AT0D12	O	Output of data [12] for IDE I/F
R15	AT0D07	O	Output of data [07] for IDE I/F
R19	GCSB2	O	Output of GIO chip select [2]
R20	GRDYB	I	Input of GIO READY
R21	RDATA15	I/O	Input/output of ROM/GIO data [15]
R22	RADD20	O	Output of ROM/GIO address [20]
R23	RDATA08	I/O	Input/output of ROM/GIO data [8]
R24	RADD16	O	Output of ROM/GIO address [16]
T1	AT1D07	I/O	Input/output of IDE I/F data [7]
T2	AT1D08	I/O	Input/output of IDE I/F data [8]
T3	AT1D10	I/O	Input/output of IDE I/F data [10]
T4	AT1CS0B	O	Output of chip select [0] for HDD
T5	AT1DA2	O	Output of IDE I/F address [2]
T6	DGND	—	Digital GND
T10	DVDD10(1.0V)	—	Power supply input
T11	DVDD10(1.0V)	—	Power supply input

Pin No.	Pin Name	I/O	Function
T12	AT0D05	O	Output of data [05] for IDE I/F
T13	AT0IORDY	O	Output of IORDY signal for IDE I/F
T14	AT0D15	O	Output of data [15] for IDE I/F
T15	AT0DMARQ	O	Output of DMARQ signal for IDE I/F
T19	GCSB3	O	Output of GIO chip select [3]
T20	GCSB1	—	Not used
T21	RDATA11	I/O	Input/output of ROM/GIO data [11]
T22	RDATA10	I/O	Input/output of ROM/GIO data [10]
T23	RADD19	O	Output of ROM/GIO address [19]
T24	RDATA05	I/O	Input/output of ROM/GIO data [5]
U1	AT1D12	I/O	Input/output of IDE I/F data [12]
U2	AT1D14	I/O	Input/output of IDE I/F data [14]
U3	AT1DA0	O	Output of IDE I/F address [0]
U4	AT1IORDY	I	Input of I/O ready
U5	AT1DIOWB	O	Output of IDE I/F I/O write for HDD
U6	DGND	—	Digital GND
U10	AT0DA1	O	Output of address [1] for IDE I/F
U11	AT0D01	O	Output of data [01] for IDE I/F
U12	AT0D02	O	Output of data [02] for IDE I/F
U13	AT0D11	O	Output of data [11] for IDE I/F
U14	AT0DA2	O	Output of address [2] for IDE I/F
U15	AT0D13	O	Output of data [13] for IDE I/F
U19	CTS0B	I	Input of clear to send
U20	RADD14	O	Output of ROM/GIO address [14]
U21	RADD13	O	Output of ROM/GIO address [13]
U22	RADD11	O	Output of ROM/GIO address [11]
U23	RDATA03	I/O	Input/output of ROM/GIO data [3]
U24	RDATA06	I/O	Input/output of ROM/GIO data [6]
V1	AT1DIORB	O	Output of IDE I/F I/O read for HDD
V2	AT1DMACKB	O	Output of ACK signal
V3	AT1CS1B	O	Output of chip select [1] for HDD
V4	AT1RESETB	O	Output of HDD I/F reset
V5	AT1DMARQ	I	Input of IRQ signal
V6	DGND	—	Digital GND
V10	AT0D09	O	Output of data [09] for IDE I/F
V11	AT0D04	O	Output of data [04] for IDE I/F
V12	AT0INTRQ	O	Output of INTRQ signal for IDE I/F
V13	AT0RESETB	O	Output of reset signal for IDE I/F
V14	AT0D00	O	Output of data [00] for IDE I/F
V15	AT0DMACKB	O	Output of DMC ACK signal for IDE I/F
V19	RTS0B/GPIO36	—	Not used
V20	GCSB0	—	Not used
V21	RADD07	O	Output of ROM/GIO address [7]
V22	RDATA04	I/O	Input/output of ROM/GIO data [4]
V23	RADD05	O	Output of ROM/GIO address [5]
V24	FCSB0	O	Output of ROM chip select
W1	AT1D15	I/O	Input/output of IDE I/F data [15]
W2	AT1DA1	O	Output of IDE I/F address [1]
W3	MD9	I/O	Input/output of buffer memory interface data bus [9]
W4	MD6	I/O	Input/output of buffer memory interface data bus [6]
W5	MD8	I/O	Input/output of buffer memory interface data bus [8]
W6	DVDD15(1.5V)	—	Power supply input
W10	DGND	—	Digital GND

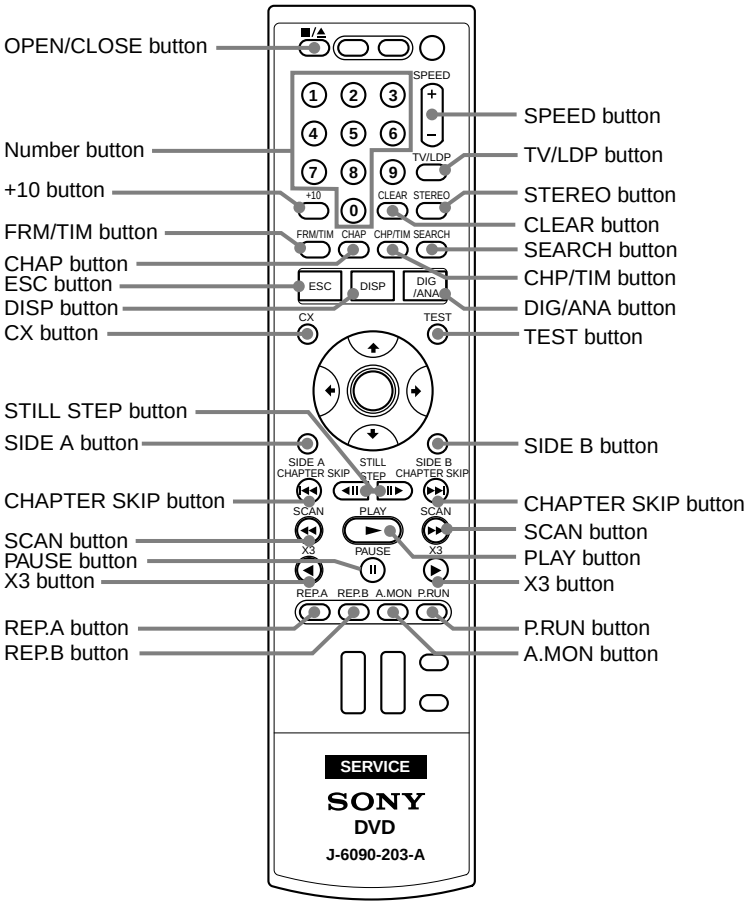
Pin No.	Pin Name	I/O	Function
W11	AT0CS1B	O	Output of chip select signal [1] for IDE I/F
W12	AT0CS0B	O	Output of chip select signal [0] for IDE I/F
W13	AT0D14	O	Output of data [14] for IDE I/F
W14	AT0DA0	O	Output of address [0] for IDE I/F
W15	AT0D03	O	Output of data [03] for IDE I/F
W19	SP1REQB	—	Fixed at GND
W20	RADD21	O	Output of ROM/GIO address [21]
W21	RDATA00	I/O	Input/output of ROM/GIO data [0]
W22	FOEB/GOEB	O	Output of ROM/GIO enable
W23	RADD04	O	Output of ROM/GIO address [4]
W24	FCSB1	—	Not used
Y1	MD15	I/O	Input/output of buffer memory interface data bus [15]
Y2	MD11	I/O	Input/output of buffer memory interface data bus [11]
Y3	MD0	I/O	Input/output of buffer memory interface data bus [0]
Y4	MD7	I/O	Input/output of buffer memory interface data bus [7]
Y5	MD10	I/O	Input/output of buffer memory interface data bus [10]
Y6	DVDD15(1.5V)	—	Power supply input
Y10	DGND	—	Digital GND
Y11	DGND	—	Digital GND
Y12	AGND	—	GND (Analog)
Y13	AGND	—	GND (Analog)
Y14	AGND	—	GND (Analog)
Y15	AGND	—	GND (Analog)
Y19	SP0REQB/GPIO33	—	Fixed at “H”
Y20	RADD01	O	Output of ROM/GIO address [1]
Y21	RDATA01	I/O	Input/output of ROM/GIO data [1]
Y22	RADD09	O	Output of ROM/GIO address [9]
Y23	RADD06	O	Output of ROM/GIO address [6]
Y24	RADD02	O	Output of ROM/GIO address [2]

MEMO

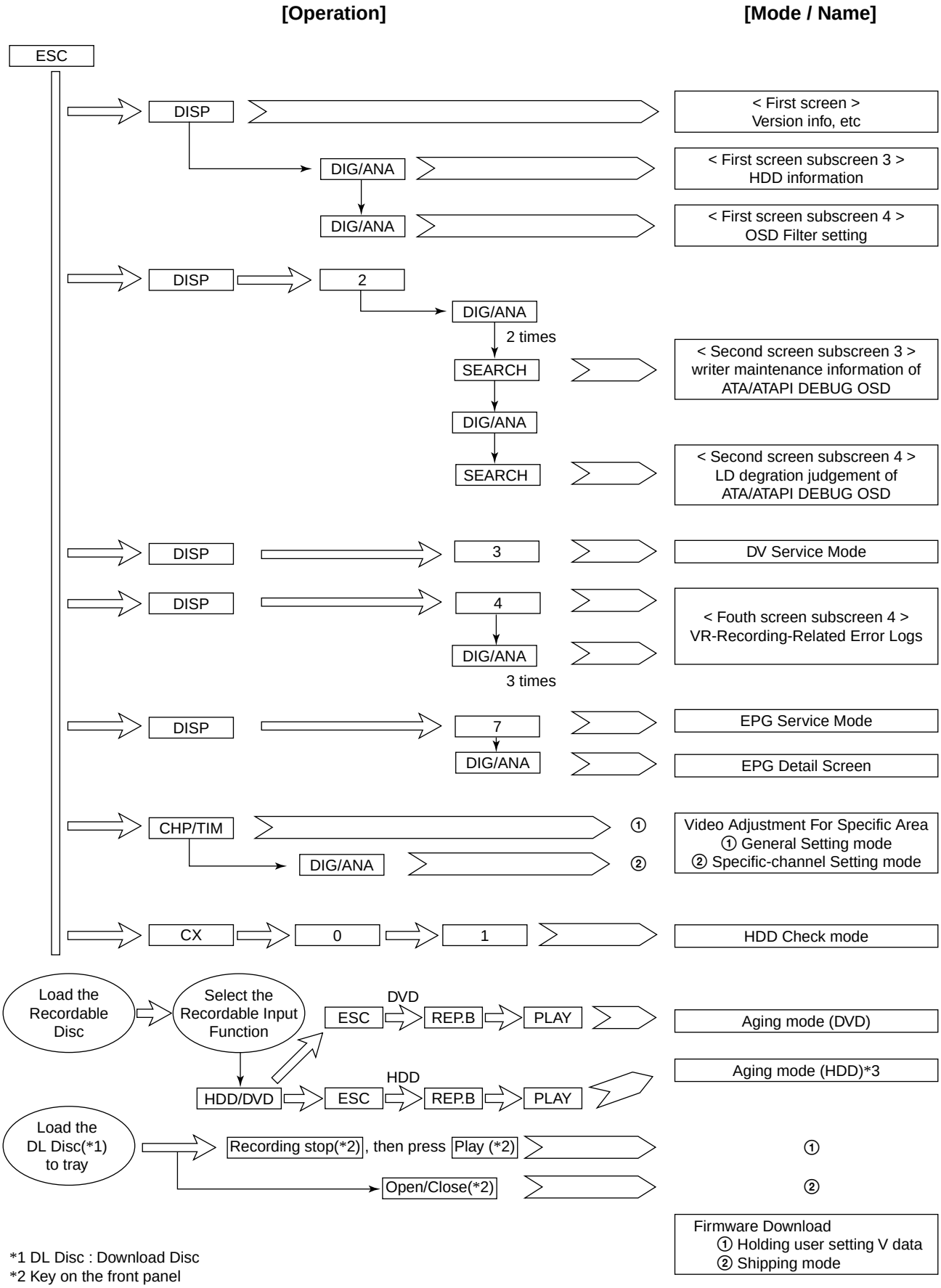
SECTION 6
SERVICE MODE

Prepairing for Service tool

- Color monitor
- Service remote controller
  (Part code: J-6090-203-A)



6-1. SERVICE MODE MAP



*1 DL Disc : Download Disc
*2 Key on the front panel

6-2. Diagnostic Mode

6-2-1. Model Setting

1) Turn of the main power ON.
2) On the screen after exiting all menu screen's, press the following buttons "ESC" ⇨ "CHAP" ⇨ "1" on the service remote controller.
3) Turn of the main power OFF.
4) Turn of the main power ON.

```
[Recorder's Model Setting]
 Input the number using the remote for Service.
>---
 Input No.      Manufacturer
[     1     :          P          ]
[     2     :          S          ]
```

* When the MAIN Assy and/or TUJB Assy that are(is) commonly used with another model are(is) replaced, they(it) must recognize the model of this unit.

* Items to be set:
  The model number, destination, and region No. must be set.

Note: Once the setting has been made, it can never be changed. Be sure to make the setting correctly.
As this setting resets the Assy(s) in question to the factory-preset status, it is recommended that you obtain the customer's consent beforehand.

5) Press four digits properly (Refer to page 5 service remote controller.) by using the according to the screen information.
6) Press the following buttons "ESC" ⇨ "CHAP" ⇨ "1" on the service remote controller.

```
[Recorder's Model Setting]
 Input the number using the remote for Service.

>---

 Input No.      Manufacturer
[ 0101     :                    ]
[ 0201     :                    ]
[ 0102     :                    ]
[ 0202     :                    ]
[ 0103     :                    ]
[ 0203     :                    ]
```

7) Disconnect then reconnect the AC power cord of the unit. Be careful not to impart vibration to the unit immediately after the AC power cord is disconnected.
8) Reset the recorder to all its factory settings.
   (Make sure that the recorder is on. Press and hold "■" (STOP) key and press "⏻" (STANDBY/ON) key on the front panel.)
   The recorder turns off with all settings reset.
9) Turn of the main power ON.
10) Press "ESC" then "DISP" keys by using the service remote controller and then confirm each Model Name.

```
----                  VERSION  : ----
  SYSCON     : RELEASE_100
               Rev      :1.******
TUNERCON   : 198.000                    OK
    DRIVE     : DVD-RW DVR-L11X         OK
               1.00                     OK

 PIC SERIAL : -----
    HDD INT : -----

     DEVICE : -----          FLASH : 64M
     REGION : 2              C : *********
                           HDCP : -----
```

11) Press "ESC". (Returns to the original screen)

6-2-2. Service Mode

1) Turn of the main power ON.
2) On the screen after exiting all menu screen's, press "ESC" on the service remote controller.
3) Press "DISP".
4) Press "DIG/ANA".

Overview and purposes

To be used to check the status of the product and to collect the information for failure diagnosis.
The following information to be used for servicing is displayed:
[1] First screen : Version, HDD information, etc.
[2] Second screen : ATA/ATAPI debug screen (Writer information)
[4] Fourth screen : VR-recording-related error logs

Each screen has sublevel screens.

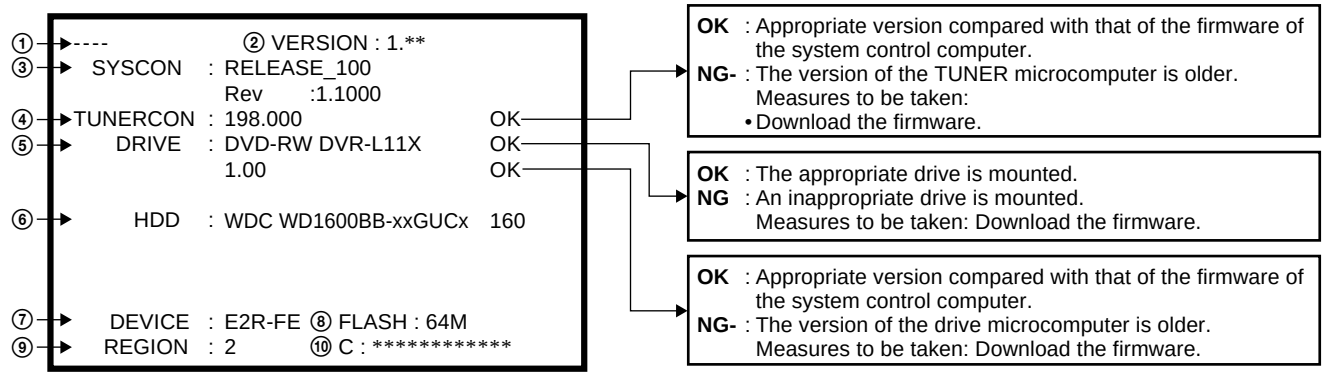
Note: After entering any Service mode screen, to shift to another Service mode screen, first quit that Service mode screen then enter another Service mode screen.

5) Press "ESC". (Returns to the original screen)

6-2-3. Version Information and Other Information (First screen)

1) Turn of the main power ON.
2) On the screen after exiting all menu screens, press "ESC" on the service remote controller.
3) Press "DISP".

* Checking the respective software version numbers and other HDD information.

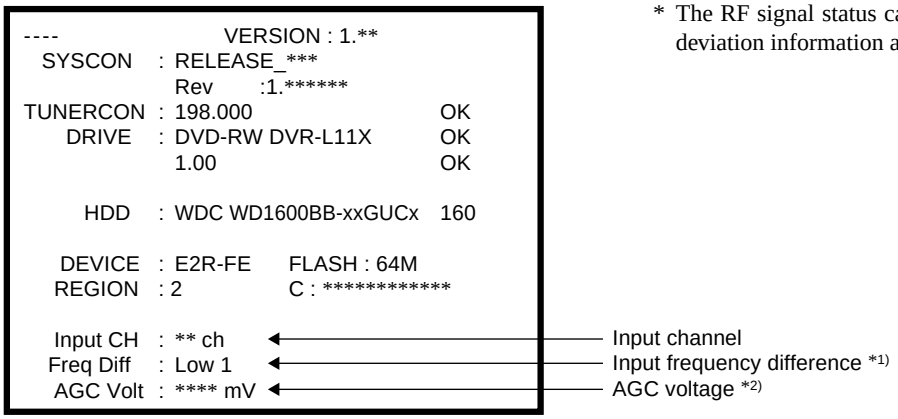


① Model name/destination
② Version of the recorder software
③ Revision No. of the system-control computer software
④ Version No. of the tuner microcomputer
Result of the combination check with system microcomputer
⑤ Information on the built-in drive
(Model name, version No., model type)
⑥ Data of the built-in HDD, capacity of the HDD
⑦ DEVICE information (EMMA type, ES No.)
⑧ FLASH ROM information
⑨ Region No.
⑩ CPRM information (CPRM key No.)

4) Press "ESC". (Returns to the original screen)

6-2-4. RF Level Simplified Diagnosis (Subscreen1)

1) Turn of the main power ON.
2) On the screen after exiting all menu screens, press “ESC” on the service remote controller.
3) Press “DISP”.
4) Press “DIG/ANA”.



* The RF signal status can be obtained from the input frequency deviation information and the AGC voltage.

***1) Frequency Difference (Freg Diff)**

How much tuning is off is monitored, as shown below:

Input Frequency	Display
Faraway	High 7
High (within 200kHz)	High 1-5
Just Tune	Center
Low (within 200kHz)	Low 1-5
Low (over 200kHz)	Low 7

***2) AGC voltage (AGC Volt)**

The gain controlled by the tuner is monitored to infer the input electric field intensity.
(The accuracy of inference differs depending on the product.)

	Field Intensity	AGC Volt
Intense field area (Clear image)	70 dBμ or more	3100 mV or less
Less intense field area (Noise may be generated.)	50 dBμ or more 70 dBμ or less	3100 – 4400mV
Weak field area (Much noise. EPG/VPS/PDC sometimes cannot be obtained.)	30 dBμ or more 50 dBμ of less	4400 mV or more (It is unable to discriminate under the weak field area.)
Very weak field area (Image damaged. EPG/VPS/PDC cannot be obtained.)	30 dBμ or less	4400 mV or more (It is unable to discriminate.)

[Tips]

For good reception, the field intensity must be 50 dBμ or more (AGC Volt 4400 mV or less).
For accurate measurement, use a field intensity meter.

5) Press “ESC”. (Returns to the original screen)

6-2-5. HDD Information for the HDD return sheet (Simplified measurement mode)

HDD Information

• How to start/terminate the diagnostic program

Use the remote control unit for servicing.
How to start: Press “ESC”, “CX”, “0”, and “1” keys simultaneously.
How to terminate: Press “ESC” key.
Do not perform other operations on the unit while HDD diagnosis is in progress.
Although the diagnostic program is designed to function independently from the unit’s functions, operations on the unit during a diagnosis may cause a malfunction.
The following status is recommended during diagnosis: All stop, no timer recording (including auto-recording)

A) Display the menu on the screen.

The menu shown below is displayed when the diagnostic program is started.
To enter each mode, press the corresponding key “1” – “4” on the remote control unit for servicing.

```
HDD CHECK MODE      [1-4]

1  HDD Information
2  S.M.A.R.T Attribute Information
3  S.M.A.R.T DST
4  HDD R/W Check
```

Tests to be executed

① **HDD Information:**
Checks the HDD information.
② **S.M.A.R.T. DST:**
Executes a simplified test or a reading test for all data.
③ **HDD R/W Check:**
Executes a writing/reading test for all data.
All data on the HDD will be erased if this test is executed.

Note: “2. S.M.A.R.T. Attribute....” is not used.

B) Check the HDD information.

Press “1” key on the remote control unit for servicing.
Check the following data:
Model: Is the correct model name of the HDD displayed ?
Recog. No: Is a positive value displayed ?
SMART threshold: Is “not exceeded” displayed ?

```
   HDD Information
   Cylinders   : 0x3FFF   Heads: 0x0010
   Sec/Track   : 0x003F
A  Model       : Maxtor 4R080L0
   Firmware    : RAMC1TU0
D  SN          : R22RRL2SE
   Major No    : ATA/ATAPI-7
E  Life Time   : 33h 10m 30s
B  Recog. No   : -1
C  SMART threshold : not exceeded
```

Detailed description

① **Model:**
For the correct model name, refer to the display of the unit.
② **Recog No:**
Positive value : The HDD has been recognized.
Negative value : The HDD has not been recognized.
③ **SMART threshold:**
exceeded : The has come near the end of its service life.
not exceeded : The HDD has not reached the end of its service life.
④ Check HDD SN.

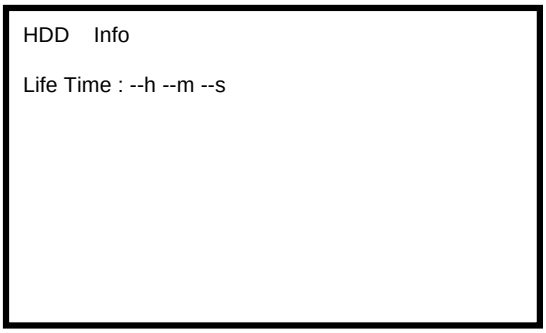
To return to the menu screen, press “Clear” key.

C) How to check the HDD return sheet.

	Symptom ************************************	⇨ **Enter a symptom.**
①	MODEL :***************** not recognize or recognize	⇨ Enter a model name. Refer to “**A**” of the above screen. When the model name is recognized, circle “recognize”.
②	RECOG NO:Positive or Negative	⇨ Check whether “Recog No” is positive or negative. Refer to “**B**” of the above screen.
③	SMART threshold: exceeded or not exceeded	⇨ Check whether “SMART threshold” is “exceeded” or “not exceeded”. Refer to “**C**” of the above screen. **Note:** If the HDD model name and serial number cannot be read, check the HDD label.
④	Check HDD SN:************ not recognize or recognize	⇨ Enter the HDD SN. Refer to “**D**” of the above screen. Check whether the HDD SN is recognized.
⑤	HDD Life Time: ****h** m ** s	⇨ Enter the Life Time. Refer to “**E**” of the above screen. **Note:** If the HDD life time is not found, check it on page 6-7 of Chapter 6, “SERVICE MODE”.
⑥	HDD Status: # / ! / Blank / No Model Name	⇨ Check “HDD Status”. Refer to “SERVICE NOTE”, page 7.
⑦	FL Display E01 / E02 / No Problem	⇨ Check “FL Display”.
⑧	Recording Error history :**************************	⇨ Refer to “SERVICE MODE”, page 6-9.
⑨	ATA/ATAPI History ERR :***********************	⇨ Refer to “SERVICE MODE”, page 6-10.

HDD Information (Simplified measurement mode)

1) Turn on the main power.
2) Press “DISP”.
3) Press “DIG/ANA” three times.



* Checks the HDD power-on time.

[Tips]

• How the cumulative HDD-on time data is processed in memory

Storage place:
FLASH ROM

Timing for referring to the cumulative HDD-on time data:
If the power attempts to turn on but fails, the unit refers to the FLASH ROM.

Timing for updating the cumulative HDD-on time data:
While the HDD is on, the cumulative HDD-on time data in the RAM is updated every 3 seconds, and the data is stored in the Backup SRAM every update. When the power is turned off, the data is stored in the FLASH ROM.

• How to clear the cumulative HDD-on time data

FLASH ROM:
When the HDD Identification Setting is configured, the cumulative HDD-on time data is automatically cleared.
The HDD Identification Setting is automatically configured when the CPRM setting is configured on the CPRM setting screen.
(To display the CPRM setting screen, press the “ESC” key, then the “STEREO” key.)

Note: The cumulative HDD-on time data is not cleared when resetting to default values.
The cumulative HDD-on time data is not cleared when the system-control computer software is downloaded.

4) Press “ESC”. (Returns to the original screen)

6-2-6. Cautions for handling the HDD

(1) Cautions for handling the HDD

- The HDD is very sensitive to shocks and vibrations. Care must be taken especially during operation (when the power is on).
- The HDD is very sensitive to electrostatic charges.
- Rapid change in temperature or humidity may cause deterioration of the HDD.

Note: After receiving damage caused by any above-mentioned factors, the HDD may operate normally for dozens or hundreds of hours, but then suddenly crash. If you are certain you have damaged a new repair part (HDD) while making repairs, do not use the part.

Reference: Main specifications for damage to the HDD

	During operation	During nonoperation
Shock G (acceleration)	Approx. 20 G or more	Approx. 200 G or more
Temperature change	15 °C/hour or more	
Moisture change	20%/hour or more	

← The HDD is about 10 times as sensitive to shock during operation compared to nonoperation.

Reference: Estimated value of falling distance vs. shock (G) when the HDD is dropped without protection

Falling distance \ Landing surface	Granite surface	Concrete floor	Synthetic-resin-coated table	Antistatic sponge
0.5 inch / 12.7 mm	387	217	200	26
1.0 inch / 25.4 mm	595	457	310	37
2.0 inch / 50.8 mm	1133	600	680	70
4.0 inch / 101.6 mm	1795	1040	1050	267

(2) Cautions for handling and examples of dangerous handling for the product that the HDD is mounted on or the HDD repair part

[Cautions for handling the product that the HDD is mounted on]

- The HDD is always in operation while the unit is turned on. Do NOT to apply shock to the unit.

Examples of dangerous handling: while the power is on

- Bumping the case
- Dropping an object, such as a small screwdriver or remote control unit, onto the case or bumping an object against the cabinet
- Physically dragging the unit
- Stacking another product on the unit

  Note: Do NOT to apply shock, such as bumping or hitting a screwdriver against the HDD, during diagnosis with the case open.

Examples of dangerous handling: while the power is off

- Applying strong shock, although the HDD is more resistant to shock when the power is off
- Dropping the unit from a height of several centimeters, or lifting one side of the unit and letting it drop
- Do NOT move the unit immediately after the power is turned off. Wait at least 30 seconds after the indication on the FL display changes from POWER OFF to the clock indication before moving the unit.
  If the AC power cable is accidentally disconnected before turning the unit off, wait at least for one minute before moving the unit.
  In this case, damage to the HDD caused by sudden shutoff may be small because the emergency relief mechanism is activated.
  However, if sudden shutoff occurrs during recording or playback, recorded data may be damaged. Be sure to check the operations.

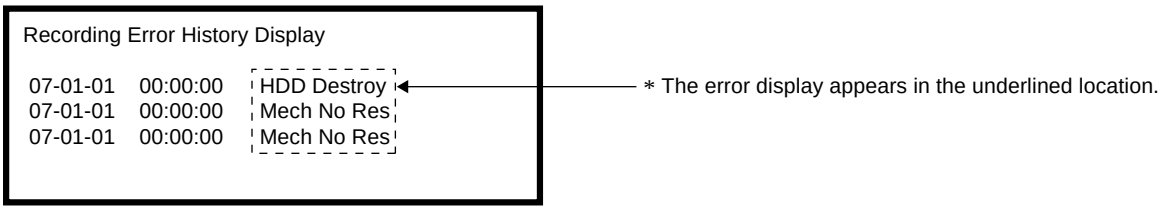
[Caution for handling the HDD repair part]

1. Handle the HDD in a safe environment:
   - Handle the HDD over an antistatic pad that can also absorb shock.
   - Wear wrist bands to prevent electrostatic charges generated in your body from affecting the HDD.

2. Observe the following rules when handling the HDD:
   - Handle one HDD at a time. Do NOT hold several HDDs at the same time.
   - Grip the HDD on both sides so that you do not touch its terminals or circuit boards.
   - Do NOT stack one HDD onto another HDD (even if the HDDs are protected by antistatic bags).
   - Do NOT bump the HDDs against one another.
   - Do NOT bump any tool, such as a screwdriver, or other hard object against the HDD.
   - When a repair part (HDD) is transported and there is a large temperature difference between the outside and inside temperature, leave the HDD in its package for about half a day after it is moved inside to gradually cool or warm it to room temperature before unpacking.

6-2-7. HDD Error Logging

Use the following operations to display “Recording Error History”.
Press “ESC”, “DSP”, and “4” keys, followed by “DIG/ANA” key three times.



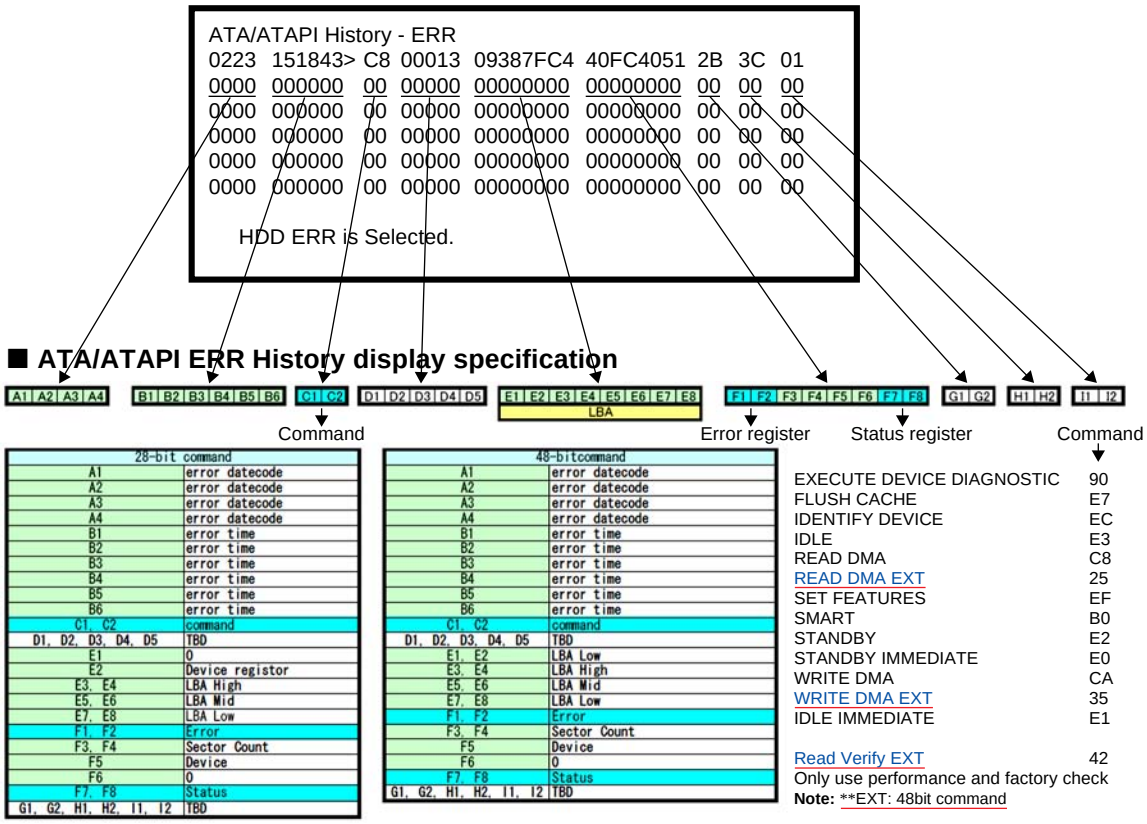
Recording Error History Display

Error related to HDD	
Error Message	**Description**
Buf over flow	Overflow of the Stream Buffer
ESFSYS CORUPT	easyfsys error
ESFSYS INIT	easyfsys initializing
HDD Aging NG	HDD Aging Command failed
HDD DEF DONE	HDD defrag finished
HDD DEF ERR	HDD defrag error
HDD DEL OC TT	Title imported to the HDD deleted
HDD DEL PL	Dubbing list deleted by HDD recovery
HDD DEL TT	Title deleted by HDD recovery
HDD Destroy	HDD is not recognized on the bus
HDD INFO BAD	Incorrect HDD Management Data
HDD Initialize	HDD initialized
HDD IRRG POFF	Abnormal power off
HDD MBR NG	Incorrect MBR data
HDD SIG NG	Incorrect HDD Management Data Magic
HDD SMART NG	Incorrect HDD SMART
HDD unauthor	Incorrect HDD serial No.
HDD Zero WR	Incorrect MBR data
HDD Reset Done	HDD Reset executed
irr astion	Incorrect action
Mech No Res	No response from the mechanical-control computer
STATUS NG	Abnormal status change
Task No Activ	Task has not been activated
TT Rec Over	Title recording time full

Note: Not only the HDD error history, but also the error recovery history are logged in “Recording Error History”.

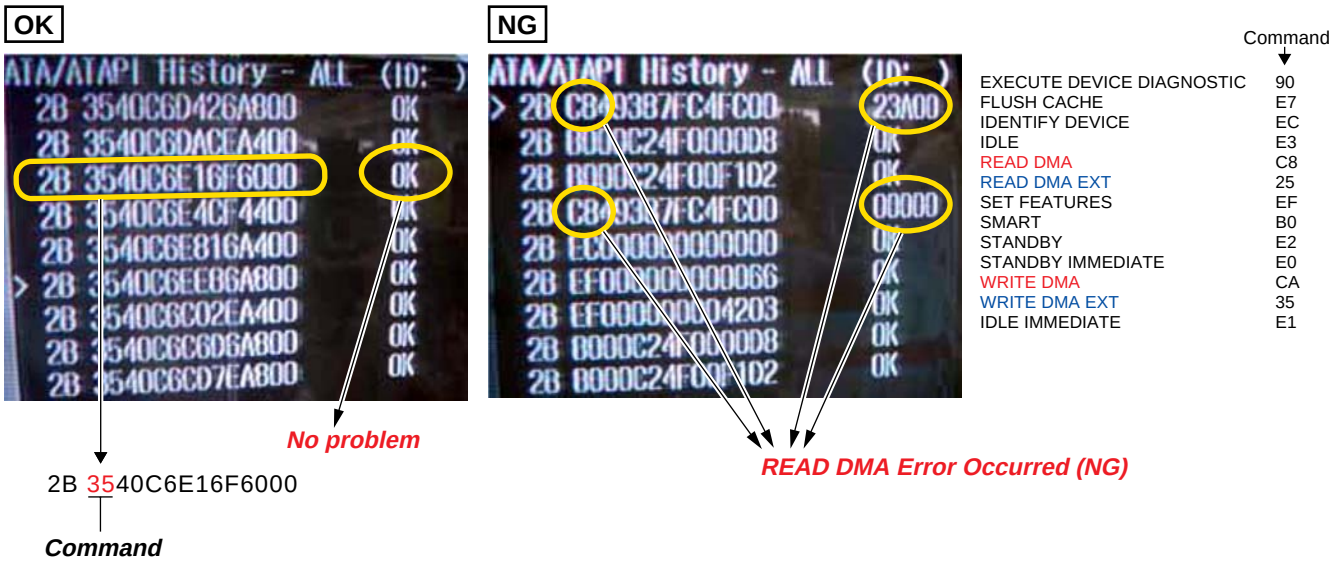
6-2-8. ATA/ATAPI History - ERR

Use the following operations to display “ATA/ATAPI Error History”.
Press “ESC” key, followed by “DSP”, “2”, “DIG/ANA”, and “FRM/TIM” key.



6-2-9. How to confirm HDD Access Flow

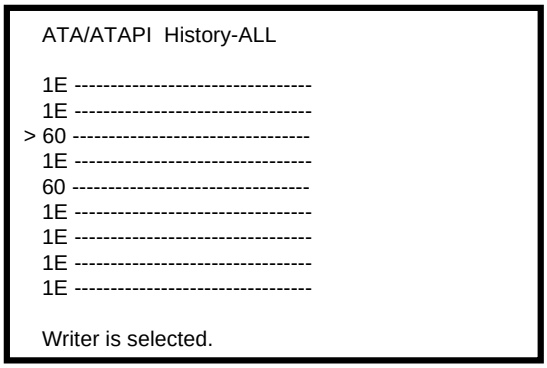
Use the following operations to display “ATA/ATAPI History - All”.
Press “ESC” key, followed by “DSP”, “2”, and “FRM/TIM” key.
Confirm whether the result is OK or NG in the screen below. If it is NG, check the error in the command table to the lower right.



6-2-10. ATA/ATAPI Debugging Screen (Second Screen) and LD Deterioration Judgment (for writer)

1. Writer maintenance information of ATA/ATAPI DEBUG OSD (Subscreen3)

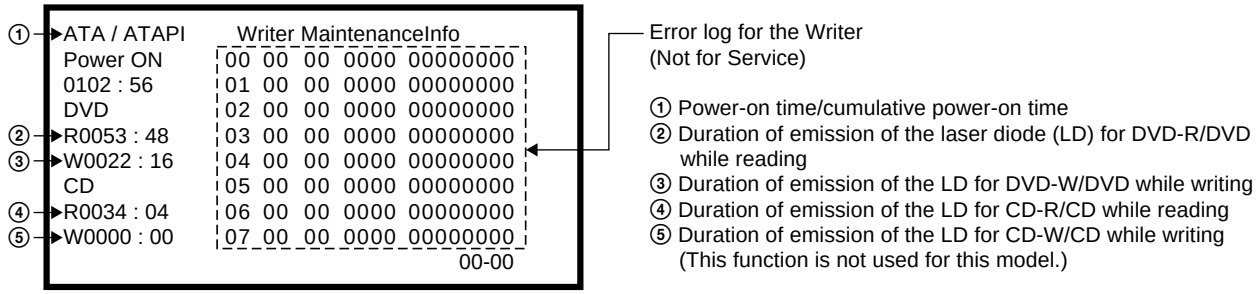
1) Turn of the main power ON.
2) On the screen after exiting all menu screens, press “ESC” on the service remote controller.
3) Press “DISP”.
4) Press “2”.



* Simplified judgment method of optical pickup quality
1. Stains on pickup lens
2. Deterioration of CD-R/DVD-RW laser diode

* Screens are switched when “DIG/ANA” is pressed two times or three times to select the desired menu. Press “SEARCH” to start measurement.

Update the display by pressing the “SEARCH” key while subscreen 3 is displayed.



② If the total hours of duration of emission of the laser diode (LD) for DVDs while reading ② and that of emission of the LD for DVDs while writing ③ exceed 4,700 hours, the LDs may be degraded.
Perform an LD degradation judgment, using subscreen 4.

[Tips]

MTTF hours for each LD
DVD : 4,700 hours
CD : 11,000 hours
The ATA/ATAPI Writer Maintenance Info is obtained each time the power is turned on. Thereafter, the data on the subscreen is updated each time the “SEARCH” key is pressed (the updating command is sent) while this subscreen is displayed. Care must be taken when updating this subscreen, because an undesired command is inserted if it is executed while recording, etc.

[Note on lighting time data for each LD]

Since data on lighting time of each laser diode (LD) are stored in the flash ROM on the MAIN Assy, after the MAIN Assy is replaced, the data will be cleared. However, after the LOADER Assy is replaced, data on lighting time of each LD will be retained in the MAIN Assy. Therefore, before either the MAIN Assy or LOADER Assy is to be replaced, it is recommended that you write down the lighting time data.

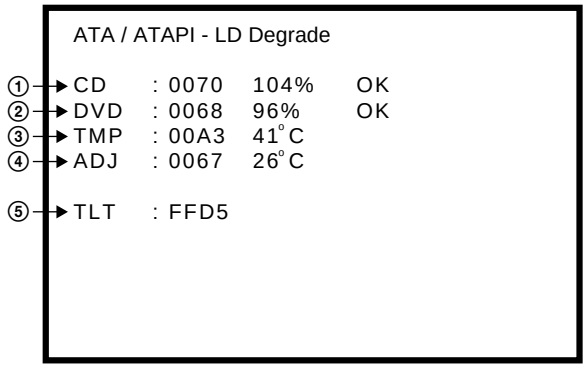
5) Press “ESC”. (Returns to the original screen)

2. LD degration judgment of ATA/ATAPI DEBUG OSD (Subscreen 4)

1) While the User Operation screen is being displayed, press “ESC” on the service remote controller.
2) Press “DISP” on the service remote controller.
3) Press “2” on the service remote controller.
4) Press “DIG/ANA” three times.

Note: For correct measurement of items ① to ④ indicated in the display below, leave the unit at room temperature (25°C) for a while before turning it on, and do not load a disc.

To update the value for each item, press the “SEARCH” key while subscreen 4 is displayed.
For details on each item and the conditions of updating the values, see table below.



Description of each item and conditions for updating data

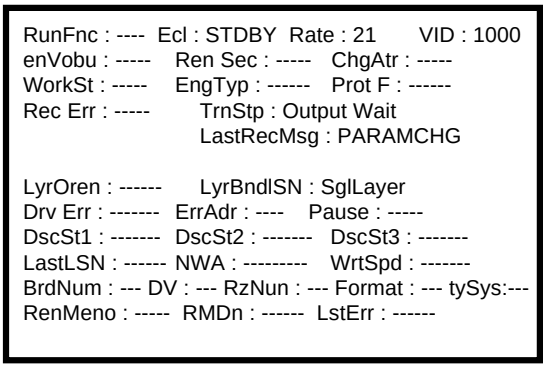
No.	Item	Description	Conditions for updating by pressing the SEARCH key
①	CD	Degradation judgment of LD for CD. Regarded as NG when the value is 120% or higher (same standard as for the PC drive)	No disc inserted in the disc tray
②	DVD	Degradation judgment of LD for DVD. Regarded as NG when the value is 120% or higher (same standard as for the PC drive)	No disc inserted in the disc tray
③	TMP	Current temperature inside the Writer	No disc inserted in the disc tray
④	ADJ	Temperature (approx. 25°C) inside the Writer during adjustment	No disc inserted in the disc tray
⑤	TLT	Writer adjustment data for straight (non-HDD) model (FFFF is diplayed when the writer is not adjusted.)	No condition

If the results of degradation of the LDs for CDs and DVDs are both NG, replace the drive.

5) Press “ESC”. (Returns to the original screen)

6-2-11. History of VR Recording-related Errors

1) Turn of the main power ON.
2) On the screen after exiting all menu screens, press “ESC” on the service remote controller.
3) Press “DISP”.
4) Press “4”.



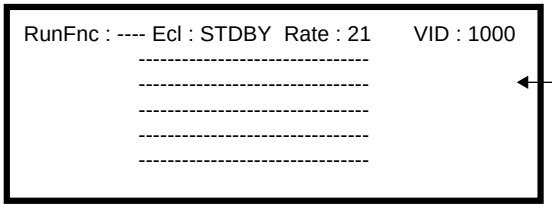
* Used for broadly dividing the poorly-reproducible trouble phenomena.

* Press “DIG/ANA” three times to browse the error log.

5) Press “ESC”. (Returns to the original screen)

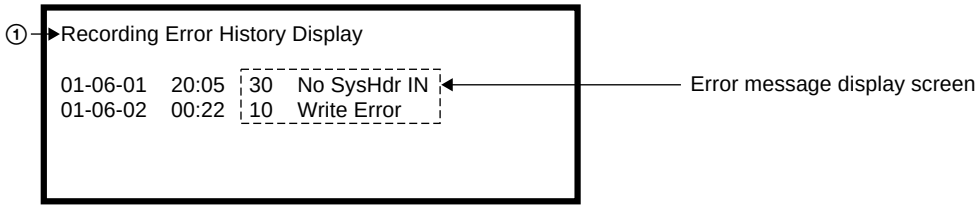
Error Message Check Method

1) Turn of the main power ON.
2) On the screen after exiting all menu screens, press “ESC” on the service remote controller.
3) Press “DISP”.
4) Press “4”.
5) Press “DIG/ANA”. (Select the desired screen.)



* Used for localizing the cause of trouble to an approximate area from the error message information.

Press “DIG/ANA” three times on the above screen to select the desired screen.



① There are two error-log screens, and up to 9 logs are displayed per screen.
(generation time [year-month-day, hour: minute: second], error data in simplified description.)

[Tips]

- The two error-log screens can be switched by pressing the “SPEED+” or “SPEED–” key.
- For details on error messages, see table “Description of VR-recording-related errors” (page 6-14 to 6-16).

6) Subscreen 5 to 11 (These subscreens are not for service use.)
7) Press “ESC”. (Returns to the original screen)

Description of VR-recording-related errors

Error Message Contents

Abbreviations
ECC : 4-byte Code for Error Correction
UDF : Universal Disc Format
PCA : Power Calibration Area
OPC : Optical Power Control
NWA : Next Writable Address
VMG : Video Manager
RMA : Recording Management Area
MKB : Media Key Block
TMP_VMGI : Temporary Video Manager Information
Border : from Lead-in to Lead-out

MPEG Encoder-Related Errors

ERROR MESSAGE	DESCRIPTION
AVEnc Hang	AVEncoder failed
IN Encode*	Changes cannot be made in process of encoding
No SysHdr IN	System packet is not input periodically
Stm Start NG	Failure to start encoding (reasons not clear)
Stream NG	Inappropriate input stream data
Strm Start NG	Timeout waiting for system packet input at the beginning

Note: Any error message with "*" is displayed "RecErr: – – – – – – – –" on the Subscreen1 of the forth screen.

Drive System-Related Errors

ERROR MESSAGE	DESCRIPTION
Bdr Cls NG	Close Border failed
Bdr Opn NG	Open Border failed
BUF Overflow	Overflow of the Stream Buffer
CLS Rzon Fail	Video mode Close Rzone failure
Drive Hang	The Drive is hang up
Drv Err	General error of the Drive
Drv Hard Err	Abnoemality in the drive hardware or filmware
Drv Timeout	Timeout waiting for drive operation
Fail Repair	Repair failed
Format NG	Format failed
Mey Be V mode	Although TMP_VMGI is not written, it may be Video mode disc
Mech No Res	No response from the mechanical-control computer
MKB invalid	Media Key Block reading error
NWA Exhaust	Next Writable Address surpassed and impossible to use
OPC NG	Optical Power Control failed
PCA Full	Power Calibration Area has been used up.
Read Err	Reading failed, ECC (4 byte Code for Error Correction) failed, etc
Read Only Disc*	Because some data are invalid , data cannot be written
RMA Full	Recording Management Area has been used up
Rzn Cls NG	Close Rzone failed
Rzn Rpr NG	Repair Rzone failed
Rzn Rsv NG	Reserve RZone failed
TMP-VMG WrErr	Video mode TMP VMGI Write Error
VTSI_B Wr Err	Video mode VTSI BUP Write Error
VTSI_B2 Wr Err	Video mode VTSI BUP Write Error (After Layer Change)
VTSI Wr Err	Video mod VTSI Write Error
VTSI2 Wr Err	Video mod VTSI Write Error (After Layer Change)
Write Err	The Drive failed to write and could not be recovered
May Be PVR	May be +VR disc, but no RSAT
V Final fail	Abnormal process occurred when finalizing Video mode
DLVR trace NG	Close Rzone failed at dual layer disc

Dubbing-Related Errors

ERROR MESSAGE	DESCRIPTION
H2D CP SomeNG	Other NG HDD → DVD copy
Mem get NG	Video Mode Copy Memory has noe ensured
Strm TransfNG	Video Mode Copy Stream Transefer NG
Tracon Tm NG	Video Mode Copy Tracon tranfer has not been completed
VC Cell Max	Maximum number for Video Mode Copy Cells exceeded
VC CopyCancel	Video Mode Copy Copy Cancel
VC FlushC NG	Video Mode Copy Flush Cache NG
VC HDD C Err	Obtaining Video Mode Copy HDD Cell information failed
VC HDD Inf NG	No information on Video Mode Copy HDD
VC HDD Info NG	Format failed
VC Idling NG	Video Mode Copy idling NG
VC Pck Anl NG	Analizing Video Mode Copy Pack failed
VC Transf Stp	Video Mode Copy Transfer Stop
VC TSO BLK NG	Video Mode Copy TSOBlock transfer has not benn completed
VC VOBU SizeE	Video Mode Copy VOBU Size NG
V Rsv RzoneNG	Video Mode Copy Reserve Rzone failed
V2H APP FL NG	VR→HDD APP FLG is OFF
V2H Aud Ch NG	VR→HDD Audio Channel NG
V2H Aud Md NG	VR→HDD Audio mode NG
V2H Aud Stm N	VR→HDD Audio Stream Number NG
V2H SRC Prot	VR→HDD Copy prohibitted material
V2H Unknown	VR→HDD Other NG
V2H VOBU TMNG	VR→HDD Play back time of each VOBU is different
V2H V Reso NG	VR→HDD Video resolution NG
H2D CP NoSpec	HDD→DVD insufficient free space for copy
H2D TO HDDRD	HDD→DVD(VR) Timeout at HDD playing side
H2D TO SPRP	HDD→DVD(VR) Timeout at internal processing
H2D TO DVDWR	HDD→DVD(VR) Timeout at HDD recording side

HDD-Related Errors

ERROR MESSAGE	DESCRIPTION
Do nothing	Do nothing for demand
ESFSYS CORUPT	easyfsys error
ESFSYS INIT	easyfsys initializing
HDD Buff High	High-level process executed for the HDD Buffer
HDD DEF DONE	HDD deflag finished
HDD DEF ERR	HDD deflag error
HDD Destroy	HDD is not recognized on bus
HDD INFO BAD	Inconsintent HDD Management Data
HDD Initialize	HDD initialized
HDD IRRG POFF	Abnormal Power off
HDD MBR NG	Inconsistent MBR data
HDDReset Done	HDD Reset executed
HDD ROMSUM NG	Rom-code check sum NG
HDD SIG NG	Inconsistent HDD Management Data magic
HDD SMART NG	Inappropriate HDD SMART
HDD Trans Err	DMA error in HDD copy transfer
HDD unauthor	Inconsistent HDD serial No
HDD Zero WR	MBR was written
Task No Activ	Task has not been activated
TT Rec Over	Title recording time full
HDD WRONG TGT	Invalid HDD target No is directed
extHDD lgnore	External HDD is dismounted
HDD PFile NG	Program file installed in HDD is NG
HDD DEL TT	Delete the title by HDD recovery
HDD DEL PT	Delete the dubbing list by HDD recovery
HDD Del OC TT	Delete the title moving on the way inside HDD

Other Errors

ERROR MESSAGE	DESCRIPTION
Abort	Cancellation
Already open	Extension file is already opened
BK BATT Down	Backup RAM Data has been erased
BK FSYS Dirty	Backup RAM Data has not been written on the File Sys
BUG	some Bugs
BusReset Done	Bus Reset has been excecuted
Cell Close NG	Cell Close NG
CPRM IC NG	Inappropriate CPRM IC
Dir Depth Err	Tree of Directory is too deep
Disc Fll*	No further data can be written because the disc is full
DRAM CLR Err	Video Mode DRAM (Stream Buffer) Clear failure
DRAM NG	Abnormality in access to the Work DRAM
Drive Destroy	The Drive has crashed
EncModul Hang	Encorder routine is hung up
F Alrdy Exst	Extension file is already exist
File cansel	Extension file is canseled
FileNot Exist	Extension file is not exist
Format Excec	Formatting has been executed
Invalid Disc*	The disc cannot be recognized
Invalid Param*	Invalid parameter
Invalid TMVMG	Invalid TMP VMGI content
Invalid UDF*	Invalid UDF content
Invalid VMG*	Invalid VMG content
Invalid VTSI	VTSI information of +VR is unusual
Irr Action*	Incorrect action
MKB REVOKED	Error is gaining data
limit Over*	Standard maximum limit exceeded
No More Info*	No more space in the internal work-management area
No Permission*	No permossopn to write to the disc
No Video	No Video input (not locked)
Now busy*	In the process of the emergency processing
NV Pck DMA Er	Inappropriate NaviPack DMA
NV Pck MK Err	Error in creating NaviPack
Ourob Strm NG	Inappropriate Stream data to the Ouroboros input
Over Heat	Abnormal temperature
PARAM NO ACCP	Recording parameter is not matched
Process Over	Process is overfull
Protect Scr*	Source to be recorded is copy-protected
Rec Pause*	No operation permitted during recording pause
Relocation Do	VR-recording data was relocated
Repair Excec	Repairing has been executed
Something*	Undetermined error
SRAM NG	Abnormality in access to the backup Work SRAM
Status NG*	Abnormality in change of statuses
SW PVR	Switch to +VR playback process
SW Vpb mode*	Switching to video playback routine is required
SW Vrec mode*	Switching to video recording routine is required
Unmatch Stamp*	Impossible to modify because of nonmatching time stamp
VBR-SRAM NG	Abnormality in VBR SRAM
V Categ ID NG	Inappropriate category ID
V Cate Inf NG	Inappropriate category information
V Ext MAX Ovr	Count Max exceeded
V ExtToo Big	The extension file is too large
V Ext TY NG	Type NG
Virgin Disc	Virgin Disc
VOBU Info NG	Inapporopriate VOBU information
WaterMark Det	Watermark detected
WM Cracked	WM Cracked
Param Short	Editting Error (Clear A-B)
Invalid VRMI	Information of +VR is NG (VRMI)

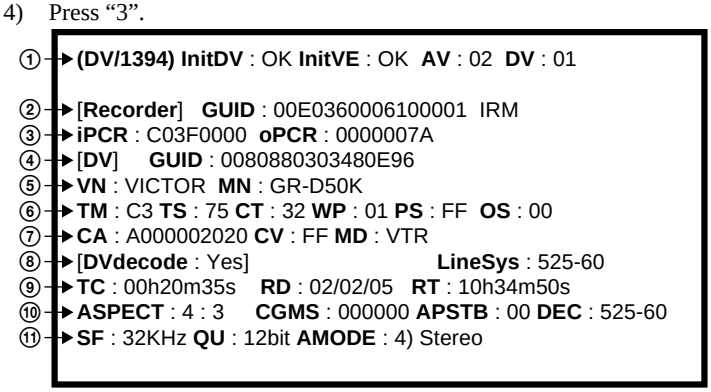
No Error

ERROR MESSAGE	DESCRIPTION
Non Err*	Normal

6-2-12. DV Service Mode

1. DV debug

1) Turn of the main power ON.
2) On the screen after exiting all menu screens, press “ESC” on the service remote controller.
3) Press “DISP”.
4) Press “3”.



* Used when an error exists in connection with the DV equipment.

Boldface alphanumerics : Fixed indications
Nonboldface alphanumerics : Variable indications

No.	Item	Description	Remarks
①	InitDV	Whether the initialization of UPD72893B (1394 LINK and DV codec IC) has been completed (OK) or not (NG).	If NG is displayed, it is considered the communication failure to UPD72893B.
	InitVE	Whether the initialization of ADV7172 (Video Encoder for DV specific) has been completed (OK) or not (NG).	If NG is displayed, it is considered the communication failure to ADV7172.
	AV	Number of AV devices recognizing connection	Identification number of AV devices including D-VHS, Digital Tuner, etc other than DV devices.
	DV	Number of DV devices recognizing connection	If the number does not become 01 even if a DV device is connected, identification of that device fails.
②	GUID	GUID set in ConfigROM of the unit.	GUID : Global Unique ID (Specific ID for DV devices) If the unit is ROOT (IRM), IRM is displayed at the side position of GUID display.
③	iPCR	iPCR value of the unit	
	oPCR	oPCR value of the unit	
④	GUID	GUID set in ConfigROM of the connected DV device.	Data are displayed only if one DV device is identified. If the connected DV device is ROOT (IRM), IRM is displayed at the side position of GUID display.
⑤	VN	Vendor name set in ConfigROM of the connected DV device.	Data are displayed only if one DV device is identified. (Depending on the device, the vendor name may not be set in ConfigROM.)
	MN	Model name set in ConfigROM of the connected DV device.	Data are displayed only if one DV device is identified. (Depending on the device, the model name may not be set in ConfigROM.)
⑥	TM	Transport Mode data obtained from the DV device.	Data are displayed only if one DV device is identified.
	TS	Transport State data obtained from the DV device.	
	CT	Cassette Type data obtained from the DV device.	
	WP	Write-protection data obtained from the DV device.	
	PS	Power-state data obtained from the DV device.	
	OS	Output signal mode data obtained from the DV device.	
⑦	CA	Connect AV data obtained from the DV device.	Data are displayed only if one DV device is identified.
	CV	Camera/Vtr mode data obtained from the DV device.	
	MD	DV device mode	Camera or VTR is displayed only if one DV device is identified.
⑧	[DVdecode: XXX]	Whether Yes (in the process of requesting DV input) or No is indicated in XXX.	Normally, Yes is indicated only when CH is set to DV.
	LineSys	Input Line System setting	
⑨	TC	Time-code data of the DVdecode Stream, or response data of the Time Code command	Stream time-code data are obtained when the tape is played in forward direction. Otherwise, time-code data are obtained through an AV/C command.
	RD	Rec Date of DVdecode Stream	
	RT	Rec Time of DVdecode Stream	
⑩	ASPECT	Aspect Ratio of DVdecode Stream	
	CGMS	CGMS of DVdecode Stream (from left to right, CGMS data of bits 5-4: Audio ch 2, bits 3-2: Audio ch 1, and bits 1-0: Video)	*CGMS (Copy Generation Management System): The two-digit codes added to broadcast programs represent the following: 00: Copy freely, 10: Once copy, 11 : Never copy
	APSTB	APS trigger bit of DV decode stream	
	DEC	With/without DVdecode stream input	With input: Signal type (525-60, 625-50, 1125-60, 1250-50, or Invalid) is indicated, Without input: “No” is indicated.
⑪	SF	Sampling Frequency of DVdecode Stream	If SF is 44 kHz, it is considered that 44.1-kHz audio is input, and sound is muted on the unit.
	QU	QUANTIZATION of DVdecode Stream	
	AMODE	AUDIO MODE of DVdecode Stream	

5) Press “ESC”. (Returns to the original screen)

2. Simple Diagnosis of DV

Symptoms		Location in the Debug Screen	Items to be Checked, and Conditions	Possible causes
No operation for DV input	1	DV①	Check the initDV indication: OK: Initialization of DV related LSI (IC102, IC108) appropriately completed. NG: Initialization of DV related LSI (IC102, IC108) has not been completed properly. Defective communication with DV related LSI (IC102, IC108) and Host u-com. (IC1001)	Defective IC102 (1394Link & DVcodec)/ IC108 (1394PHY), improper connection between IC102 / IC108, defective soldering, defective power supply, etc.
	2	DV①	Check the number of DV devices when one DV device is connected to the recorder: 01 : The connected DV device is correctly identified. Other than 01 : The connected DV device is not correctly identified.	Defective DV terminals, improper connection of the DV-terminal board, defective IC108 (1394PHY), defective cables, an IEEE 1394 device other than the DV device connected.
No picture nor sound for DV input	1	DV⑧	Check of DV decoding when the recorder channel is set to DV: Yes : The recorder is in the process of a DV input operation. No : The recorder is not executing a DV input operation.	Defective IC102 (1394Link & DVcodec), defective soldering, defective power supply, etc.
	2	DV⑩	Check DEC: 525-60 : An NTSC DV signal is input from the DV device. 625-50 : A PAL DV signal is input from the DV device. No : No DV signal is input from the DV device.	Defective DV terminals, improper connection of the DV-terminal board, defective source device defective IC102 (1394Link & DVcodec), IC108 (1394PHY) **Note:** As to a model having the Input Line System setting, if the setting and the actual input signal system do not match, no picture appears.
DV input recording impossible	1	DV⑩	Check CGMS:	Recording cannot be performed for a copy-protected source.
No sound for DV input	1	DV⑪	Check SF: 32 kHz: An audio signal with 32-kHz sampling frequency is being input. 48 kHz: An audio signal with 48-kHz sampling frequency is being input. 44 kHz: An audio signal with 44.1-kHz sampling frequency is being input.	An audio signal with 44.1-kHz sampling frequency is muted.
No picture for DV input	1	DV①	Check the initVE indication: OK: Initialization of DV specific VideoEncoder (IC101) appropriately completed. NG: Defective communication with DV specific VideoEncoder (IC101) and HOST u-com (IC1001). Initialization of DV specific VideoEncoder (IC101) has not been completed properly.	Defective IC101 (DV specific VideoEncoder), defective soldering, defective power supply, etc.

6-2-13. EPG Service Mode

1. Summary screen

1) Turn of the main power ON.
2) On the screen after exiting all menu screens, press “ESC” on the service remote controller.
3) Press “DISP”.
4) Press “7”.

```
    0         1         2         3         4
    01234567890123456789012345678901234567890123456789
00  (EPG EURO)
01  Next Data Download Time : 14:00
02            Duration      : 01h30m
03  Gemster Data Fail Count : 00
04
05
06
07  EPG Data Receive Err Summary
08  Data  Start  End    MD  CH  RcvPkt  TotalErr
09  03/31 13:00  13:30  DL  03  001853  000000
10  03/31 09:00  11:00  DL  03  001192  000000
11  03/31 08:00  08:05  HS  --  000654  000000
12  03/31 00:00  00:00          000000  000000
13  03/31 00:00  00:00          000000  000000
14  03/31 00:00  00:00          000000  000000
```

* Used when the EPG data cannot be acquired.
* The detailed screen appears every time when “DIG/ANA” is pressed.

Lines 01-02	The next download starting time for the EPG data is displayed. Next Data Download Time: Starting time Duration: Duration required for acquiring the EPG data	
Lines 03	The Gemster EPG data cannot be found. Number times of Host Scan and Schedule Download, DT models only (Always 00 except DT model)	
Lines 09-14	The 6 latest error logs when EPG data were received are displayed, with the latest one at the top.	
	Data	: Month/day when reception started
	Start	: Time when reception started
	End	: Time when reception ended
	MD	: Method for acquiring the EPG data (HS: Host scanning process, DL:Downloading process of the EPG data)
	CH	: Data-receiving channel
	RcvPkt	: Total number of received packages. A number 999,999 or greater is displayed as “999999”.
	Total Err	: Total errors during reception. The sum of Hamming Err, Trans Err InvLine Err numbers indicated on the Detail screen. A number 999,999 or greater is displayed as “999999”.

[Tips]

In a case where only “HS” is displayed in the MD column of the logs, the host channel has not been found.
It is necessary to check the country and postal-code settings in the user settings.

5) Press “ESC”. (Returns to the original screen)

2. Detail screens

1) Press the “DIG/ANA” key while the Summary screen is being displayed. (Refer to page 6-19)
2) Each time the “DIG/ANA” key is pressed, the Detail screen scrolls maximum six-Detail screens (1 to 6).
   Each Detail screen of 1 to 6 corresponds to the EPG reception error logs from the top of the Summary screen.

```
    0         1         2         3         4
    01234567890123456789012345678901234567890123456
00  (EPG EURO)
01  EPG Data Receive Err Details - 1
02
03  Data : 03/31
04  Start Time  : 13:00     END Time   : 13:30
05  Host CH     : 03        P-ON Kind  : Download
06
07  Data Receive Part     Total Err : 000000
08  Pkt Rcv Num : 001853 Pkt Snd Num : 001853
09  Inv Line Err : 000000
10  Slice Cont : Auto EQ : OFF LV : -h
11
12  Temporary Buffer Information
13  Pool Num    : 000000    Max Store  : 000000
14  Discard Pkt : 000000    Use Num    : 000000
```

Line	Display item	Description	Remarks
Line 01	EPG Data Receive Err Details-X	The rightmost figure represents the number of the current detail screen. This number corresponds to the order of the EPG reception error log from the top.	
Lines 03-05, Reception conditions	Data Start Time END Time Host CH P-ON Kind	: Month/day when reception started : Time when reception started : Time when reception ended : Data-receiving channel : Methods for acquiring the EPG data (host scanning and downloaing)	Only during initialization, host scanning is automatically executed to find the host broadcast.
Lines 07-10, details on errors during reception	Total Err	: Total numbers of errors during reception. The total number of Hamming Err, Trans Err and InvLine Err indicated on the Detail screen. A number 999,999 or greater is displayed as “999999”.	Total Errors: If the total number of errors reaches two digits or greater, it is likely that EPG data acquisition failed. Display subscreen 1 of the first screen and check the electric field intensity from the AGC level.
	Pkt Rcv Num Pkt Snd Num	: Total number of received packages. A number 999,999 or greater is displayed as “999999”. : Total number of packages that were sent to the application program among all the received packages. A number 999,999 or greater is displayed as “999999”.	If the total numbr of received packages is 0, it is likely that the country and postal-code settings are wrong.
	InvLine Err	: Total number of errors that were generated by receiving data from invalid lines. A number 999,999 or greater is displayed as “999999”.	
	Slice Cont	: Slice level control Auto-Tu Con, Manual - Syscon.	
	EQ	: Equalizer setting (ON, OFF)	
	LV	: Slice level (10-30 hex) (Only when the slice Cont is Manual.)	

Note: The data on lines 12-14 are for software development, not for service use.

5) Press “ESC”. (Returns to the original screen)

6-2-14. Aging Mode

1. Aging for the DVD-RW/DVD-R

1) Turn of the main power ON.
2) Press the “DVD” key to switch to DVD.
3) Load a recordable disc.
4) Select the input function of a recordable source.
5) After disc detection is confirmed, exit all menu screens.
6) Press “ESC” on the service remote controller.
7) Press “REP.B” on the service remote controller.
8) Press “PLAY” to enter the Aging mode.

If symptoms regarding recording/playback of discs and/or the HDD that your customer claimed are difficult to reproduce, they can be reproduced with a long-time test in Aging mode.

Note: • When aging for the DVD-RW/+RW/-RAM and HDD is executed, a recorded data on them will be erased.
• Commands from the remote control unit are accepted during Aging mode.
• If Aging mode is quit using the “ESC” key, indications on the FL display will return to normal display.
• Cancel timer settings before entering Aging mode.
• Set the recording rate beforehand. It cannot be changed during Aging mode.

Aging for the DVD-RW/+RW/-RAM	Aging for the DVD-R/+R
During Aging mode, the following operations are repeated in the order shown below. ① The tray opens. ② The tray closes. ③ Initialization ④ Recording for 60 minutes ⑤ Playback for 45 minutes <DVD-RW> The initialization process in step 3 follows the setting specified in “Setting of the main unit--Recording--Auto initialization of a DVD-RW”. <DVD+RW> The initialization process in step 3 is the same as that described in “Disc setting--Initialization--Initialization of a DVD+RW”. <DVD-RAM> In the initialization process in step 3, physical formatting is performed, if required. During Aging, the number of loops is indicated on the FL display, as shown below. [AGING 0001] If an error is generated, the aging operation stops. **Note:** Indications on the FL display are retained, and this information is also retained as an OSD.	During Aging mode, the following operations are repeated in the order shown below. ① The tray opens. ② The tray closes. ③ Recording for 1 minute ④ Recording pause for 6 minutes ⑤ Recording stops. ⑥ Playback for 1 minute ⑦ Playback pause for 6 minutes ⑧ Playback stops. **Note:** A continuous test of the above operations is possible for approximately 23 hours. After ② the tray closes, disc detection is performed, <DVD-R> In step 2, if the disc is judged to have recorded up to 99 titles, the operation stops at that point. <DVD+R> If the disc is judged to have recorded up to 49 titles, the operation stops at that point. On the FL display, the number of loops is retained. On the OSD display, the error indication is retained. During Aging, the number of loops is indicated on the FL display, as shown below. [AGING 0001] If an error is generated, the aging operation stops. **Note:** Indications on the FL display are retained, and this information is also retained as an OSD. **Note:** Recording time depends on the recording rate set. For example, if the recording rate is MN32, only up to 60 titles can be registered. Check the setting for recording rate before performing aging.

9) Press the “ESC” key on the service remote controller to quit Aging mode and return to Normal mode.

Note: • If during recording: Recording is stopped.
• If during playback: Playback is paused.
• If during initialization: The unit stops after initialization is finished. (aging for ±RW/-RAM only)
• If the tray is being opened/closed: The unit stops after the tray is opened/closed.

2. Aging for the HDD

Caution: Take caution as the all recorded data of HDD is deleted.

1) Turn of the main power ON.
2) Press the “HDD” key to switch to HDD.
3) Press “ESC” on the service remote controller.
4) Press “REP.B” on the service remote controller.
5) Press “PLAY” to the Aging mode.

During Aging mode, the following operations are repeated in the order shown below.

① Erasure of all the memory data from the HDD
② Recording for 60 minutes
③ Playback for 60 minutes

[Tips]

During Aging, the number of loops is indicated on the FL display, as shown below.

[AGING 0001]

If an error is generated, the aging operation stops.

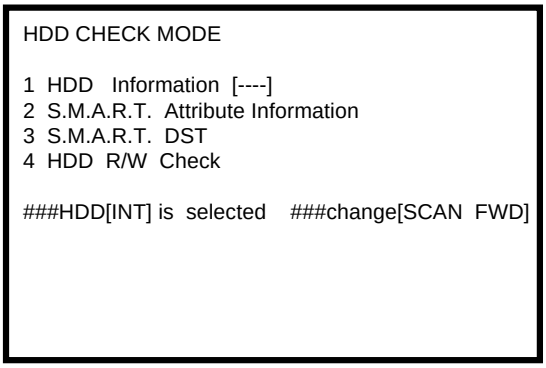
Note: Indications on the FL display are retained, and this information is also retained as an OSD.

6) Press the “ESC” key on the service remote controller to quit Aging mode and return to Normal mode.

Note: • If during recording: Recording is stopped.
• If during playback: Playback is paused.
• If during erasure of all memory data from the HDD, the unit stops after all memory data have been erased.

6-2-15. HDD Check Mode

1) Turn of the main power ON.
2) On the screen after exiting all menu screens, press “ESC” on the service remote controller.
3) Press “CX”.
4) Press “0”.
5) Press “1”.



* Used to check if the HDD has an error or not.
* Press the number of the item you want to check.

6) Press “ESC”. (Returns to the original screen)

6-3. Setup Related Menu

6-3-1. Firmware Downloading

In case of any event as described below, be sure to download the software using the Version Upgrade CD Disc by following the Software Download Method shown below.

1. When engine (RD board or drive) is replaced, or when the AV board is replaced.
2. When HDD is replaced.
3. When the message “NG” is displayed on the Version Information in the Service Mode.

Software Download Method

1) Eject the tray.
2) Place the Version Upgrade disc on the tray.
3) Press “Rec Stop” and “EJECT” key at the same time to start version upgrade.

6-3-2. Area-Specific Channel Setting

When the following trouble symptom is displayed, set the broadcast reception channels as described below.

- When flickering is visible as if horizontal synchronization or vertical synchronization is lost on the broadcast reception screen.

[Entry]

Entry from the normal operating mode <Record/Play, Stop>

1) Turn of the main power ON.
2) Press “ESC” on the service remote controller.
3) Press “FRM/TIM”.

Setting screen

```
VDEC  Specific  Area  Mode  Ver 2.00

        Input -  [LINE]
        Sync  ACC      : --
        H  Threshold  Level   : --
        V  Threshold  Level   : --
```

4) Press “ESC”. (Returns to the original screen)

[Entry from the individual setting mode]

1) Upon completion of the above operation, press “DIG/ANA”.

Setting screen

```
VDEC  Specific  Area  Mode  Ver 2.00

        Input -   [LINE]
        Sync  ACC      : --
        H  Threshold  Level   : --
        V  Threshold  Level   : --

Individual  setting  state

        Input  Channell - [0V]
        Sync  ACC      : --
        H  Threshold  Level   : --
        V  Threshold  Level   : --
```

2) Press “ESC”. (Returns to the original screen)

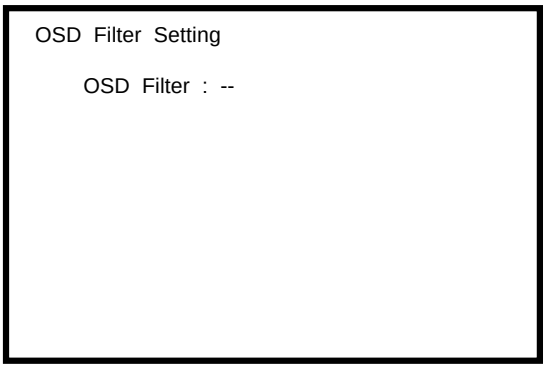
6-3-3. OSD Filter Setting (Subscreen 4)

When the following trouble symptom occurs, correct it by setting the OSD filter as described below.

- Characters on the OSD screen flicker depending on the monitor connected.

[Entry]

1) Turn of the main power ON.
2) Press “ESC” on the service remote controller.
3) Press “DISP”.
4) Press “DIG/ANA” four times.



5) Press “ESC”. (Returns to the original screen)

[Tips]

As the setting value becomes greater, jitter is reduced on a CRT display. However, as lines for characters appear thick, complex characters may become difficult to read. On the contrary, as the setting value becomes smaller, jitter increases on a CRT display. However, as lines for characters become sharper, complex characters become more legible.

Note1: A new setting becomes active as soon as it is made. As a new setting is stored in nonvolatile memory, it will be retrieved when the unit it turned on the next time.

Note2: After the factory-preset values are downloaded, the setting value for the OSD Filter will be the default Value (4).

[Key operation of OSD Filter setting]

Key	Operation	Satting value	Remarks
“Rev x 3”, “SPEED+” “ x 3 Fwd”, “SPEED–”	Changing the setting value for the OSD Filter	0 – 4 (Default value: 4)	“Rev x 3”, “SPEED+” : The setting value increases by1. “ x 3 Fwd”, “SPEED–” : The setting value decreases by1.
“CLEAR”	The setting value is reset to default.	—	
“ESC”	To exit the OSD Filter Setting and clear the screen (Appears the tuner screen.)	—	—

SECTION 7
ADJUSTMENTS

7-1. Video System Adjustment

Preparing for Adjustment

1. Equipments

• Oscilloscope
• Reference Disk
HLX-507 (PAL single layer disc) J-6090-077-A
HLX-506 (PAL dual layer disc) J-6090-078-A

1. Video Output Level Check

<Purpose>

This check is made to satisfy the PAL signal standard, If it is adjusted incorrectly, brightness will be too bright or too dark.

Mode	PLAY
Signal	100% Color bars
Test point	Output (VIDEO) connector (terminated in 75Ω)
Instrument	Oscilloscope
Specification	1.0 V± 0.07 Vp-p

Check method:

1) Insert the PAL reference disc and play back the 100% color bars.
2) Confirm that the video level is 1.0 V±0.07 Vp-p.

Fig. 7-1

2. S-Video Output S-Y Check

<Purpose>

This check confirms that the S-video Y-signal output has the rated amplitude. If it adjusted incorrectly, the playback video signal will not be displayed corrected even when the S-video cable is connected.

Mode	PLAY
Signal	100% Color bars
Test point	S-VIDEO OUTPUT (S-Y) connector (terminated in 75Ω)
Instrument	Oscilloscope
Specification	1.0 V±0.07 Vp-p

Check method:

1) Insert the PAL reference disc and play back the 100% color bars.
2) Confirm that the video level is 1.0 V±0.07 Vp-p.

Fig. 7-2

3. S-Video Output S-C Check

<Purpose>

This check confirms that the S-video output S-C conforms to the PAL standard. If it adjusted incorrectly, the playback color will not be too dark or too thin.

Mode	PLAY
Signal	100% Color bars
Test point	S-VIDEO OUTPUT (S-C) connector (terminated in 75Ω)
Instrument	Oscilloscope
Specification	300 mV±30 mVp-p

Check method:

1) Insert the PAL reference disc and play back the 100% color bars.
2) Confirm that the burst signal level is 300 mV±30 mVp-p.

Fig. 7-3

4. Component Video Output Y Check

<Purpose>

This check confirms that the component Y signal output has the rated amplitude. If this signal level is not correct, brightness of the video signal will not be too dark or too thin when the COMPONENT connector output signal is connected to a projector having COMPONENT input.

Mode	PLAY
Signal	100% Color bars
Test point	COMPONENT VIDEO OUT (Y) connector (terminated in 75Ω)
Instrument	Oscilloscope
Specification	1.0 V±0.07Vp-p

Check method:

Note 1: Do not set RGB OUT to ON.
Note 2: Do not connect the HDMI OUT.

1) Insert the PAL reference disc and play back the 100% color bars.
2) Confirm that the Y signal level is 1.0 V±0.07 Vp-p.

Fig. 7-4

5. Component Video Output B-Y (Pb) Check

<Purpose>

This check confirms that the B-Y signal of the component video conforms to the PAL standard. If this signal level is not correct, color of the video signal will have different color when the COMPONENT connector output signal is connected to a projector having COMPONENT input.

Mode	PLAY
Signal	100% Color bars
Test point	COMPONENT VIDEO OUT (Pb) connector (terminated in 75Ω)
Instrument	Oscilloscope
Specification	700 mV±50 mVp-p

Check method:

Note 1: Do not set RGB OUT to ON.
Note 2: Do not connect the HDMI OUT.

1) Insert the PAL reference disc and play back the 100% color bars.
2) Confirm that the burst signal level is 700 mV±50 mVp-p.

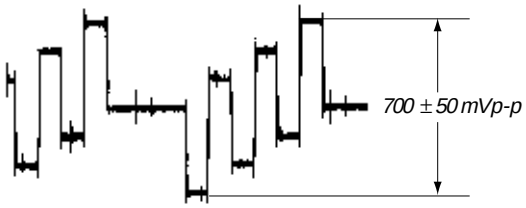


Fig. 7-5

6. Component Video Output R-Y (Pr) Check

<Purpose>

This check confirms that the R-Y signal of the component video conforms to the PAL standard. If this signal level is not correct, color of the video signal will have different color when the COMPONENT connector output signal is connected to a projector having COMPONENT input.

Mode	PLAY
Signal	100% Color bars
Test point	COMPONENT VIDEO OUT (Pr) connector (terminated in 75Ω)
Instrument	Oscilloscope
Specification	700 mV±50 mVp-p

Check method:

Note 1: Do not set RGB OUT to ON.
Note 2: Do not connect the HDMI OUT.

1) Insert the PAL reference disc and play back the 100% color bars.
2) Confirm that the burst signal level is 700 mV±50 mVp-p.

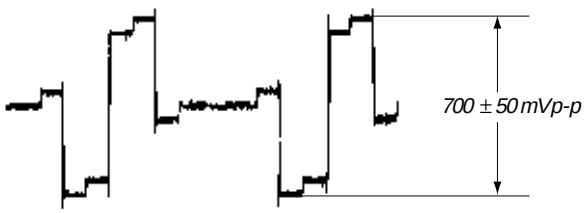


Fig. 7-6

7. Scart Video Output Level Check

<Purpose>

This check is made to satisfy the PAL signal standard, If it is adjusted incorrectly, brightness will be too bright or too dark.

Mode	PLAY
Signal	100% Color bars
Test point	Scart Video output connector pin-⑲ (terminated in 75Ω)
Instrument	Oscilloscope
Specification	1.0 V± 0.07 Vp-p

Check method:

Note: SCART OUT should be set to "Video".

1) Insert the PAL reference disc and play back the 100% color bars.
2) Confirm that the video level is 1.0 V±0.07 Vp-p.

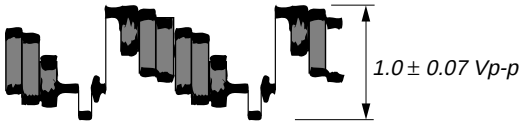


Fig. 7-7

8. Scart Video Output S-Y Check

<Purpose>

This check confirms that the Scart Y-signal output has the rated amplitude. If it adjusted incorrectly, the playback video signal will not be displayed corrected even when the Scart cable is connected.

Mode	PLAY
Signal	100% Color bars
Test point	Scart Video output connector pin-⑲ (terminated in 75Ω)
Instrument	Oscilloscope
Specification	1.0 V±0.07 Vp-p

Check method:

Note: SCART OUT should be set to "S-Video".

1) Insert the PAL reference disc and play back the 100% color bars.
2) Confirm that the video level is 1.0 V±0.07 Vp-p.

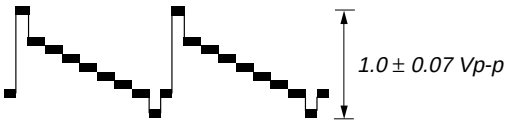


Fig. 7-8

9. Scart Video Output S-C Check

<Purpose>

This check confirms that the Scart output S-C conforms to the PAL standard. If it adjusted incorrectly, the playback color will not be too dark or too thin.

Mode	PLAY
Signal	100% Color bars
Test point	Scart Video output connector pin-⑮ (terminated in 75Ω)
Instrument	Oscilloscope
Specification	300 mV±30 mVp-p

Check method:

Note: SCART OUT should be set to "S-Video".

1) Insert the PAL reference disc and play back the 100% color bars.
2) Confirm that the burst signal level is 300 mV±30 mVp-p.

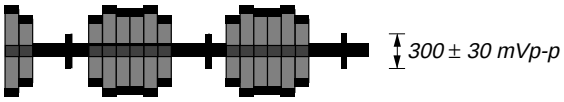


Fig. 7-9

10. Scart Video RGB Output R Check

<Purpose>

This check confirms that the RGB R signal output has the rated amplitude. If this signal level is not correct, brightness of the video signal will not be too dark or too thin when the Scart connector output signal is connected to a projector having Scart input.

Mode	PLAY
Signal	100% Color bars
Test point	Scart Video output R connector pin-⑮ (terminated in 75Ω)
Instrument	Oscilloscope
Specification	700 mV±50 mVp-p

Check method:

Note 1: RGB OUT should be set to ON.

Note 2: Do not connect the HDMI OUT.

1) Insert the PAL reference disc and play back the 100% color bars.
2) Confirm that the R signal level is 700 mV±50 mVp-p.

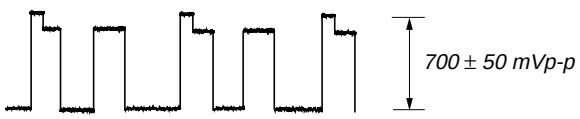


Fig. 7-10

11. Scart Video RGB Output G Check

<Purpose>

This check confirms that G signal of the RGB video conforms to the PAL standard. If this signal level is not correct, color of the video signal will have different color when the Scart connector output signal is connected to a projector having Scart input.

Mode	PLAY
Signal	100% Color bars
Test point	Scart Video output G connector pin-⑪ (terminated in 75Ω)
Instrument	Oscilloscope
Specification	700 mV±50 mVp-p

Check method:

Note 1: RGB OUT should be set to ON.

Note 2: Do not connect the HDMI OUT.

1) Insert the PAL reference disc and play back the 100% color bars.
2) Confirm that the G signal level is 700 mV±50 mVp-p.

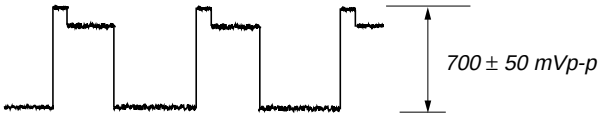


Fig. 7-11

12. Scart Video RGB Output B Check

<Purpose>

This check confirms that the B signal of the RGB video conforms to the PAL standard. If this signal level is not correct, color of the video signal will have different color when the Scart connector output signal is connected to a projector having Scart input.

Mode	PLAY
Signal	100% Color bars
Test point	Scart Video output B connector pin-⑦ (terminated in 75Ω)
Instrument	Oscilloscope
Specification	700 mV±50 mVp-p

Check method:

Note 1: RGB OUT should be set to ON.

Note 2: Do not connect the HDMI OUT.

1) Insert the PAL reference disc and play back the 100% color bars.
2) Confirm that the B signal level is 700 mV±50 mVp-p.

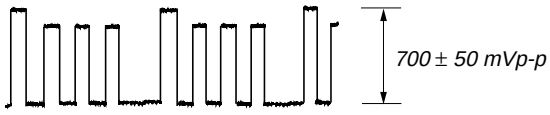


Fig. 7-12

SECTION 8
REPAIR PARTS LIST

8-1. EXPLODED VIEWS

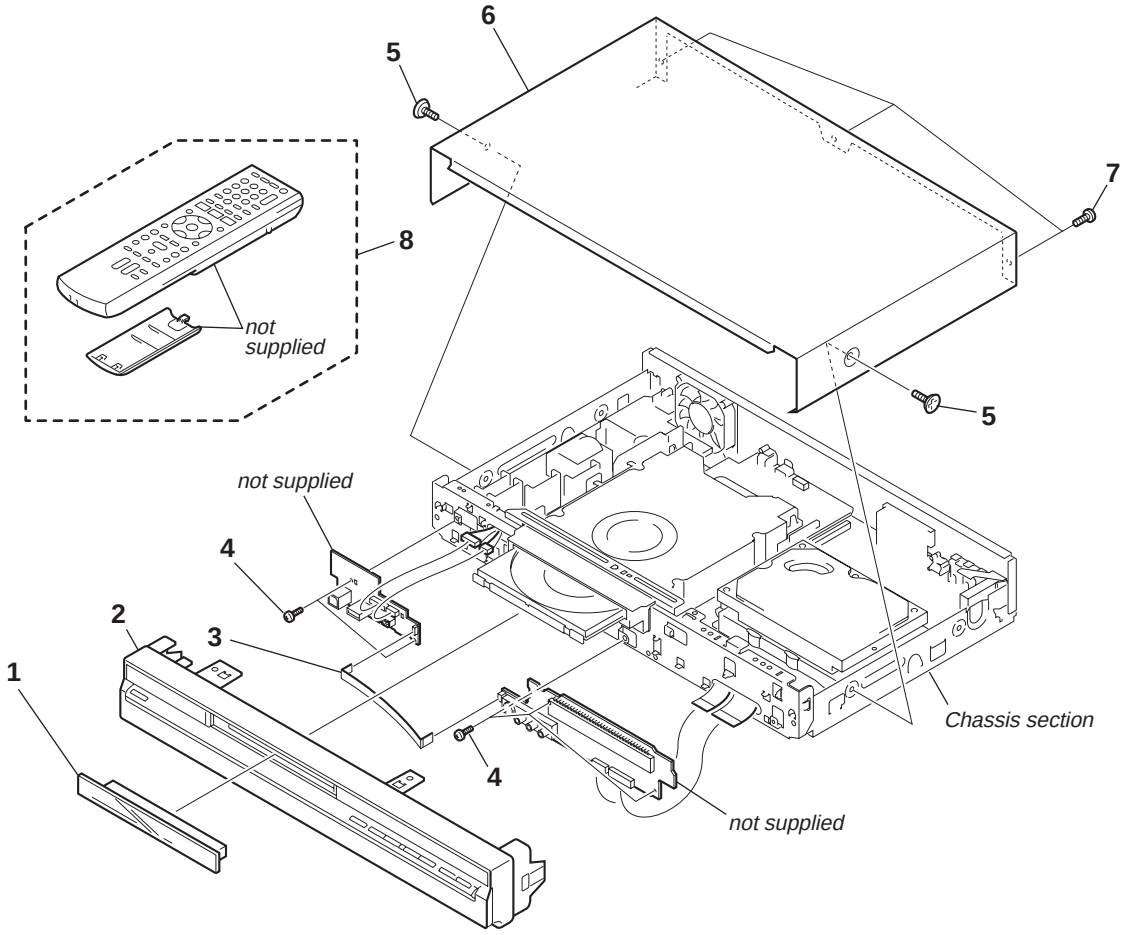
NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE) . . . (RED)
  ↑ ↑
  Parts Color Cabinet's Color

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

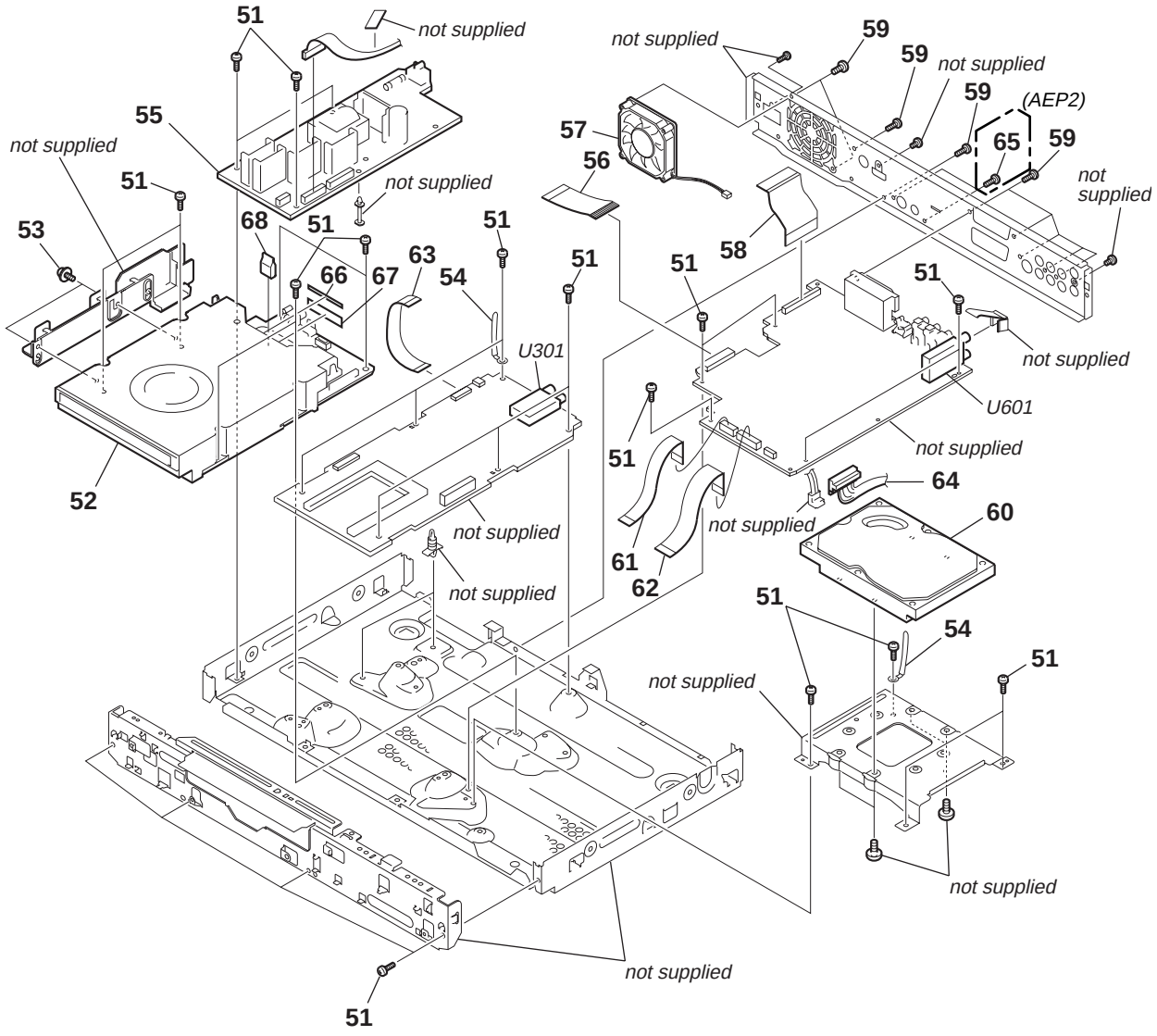
- Abbreviation
  AUS : Australian model

8-1-1. OVERALL SECTION



Ref. No.	Part No.	Description	Remarks
1	X-2176-442-1	COVER ASSY, TRAY (AEP, UK)	
1	X-2177-245-1	COVER ASSY, TRAY (AUS)	
2	A-1259-528-A	PANEL BLOCK ASSY, FRONT (BLACK)	(HXD870(BLACK):AEP1, AEP3, UK)
2	A-1267-797-A	PANEL BLOCK ASSY, FRONT (SILVER)	(HXD870(SILVER):AEP1, AEP3, UK)
2	A-1267-983-A	PANEL BLOCK ASSY, FRONT	(HXD870(BLACK):AEP2)
2	A-1268-004-A	PANEL BLOCK ASSY, FRONT	(HXD870(SILVER):AEP2)
2	A-1268-009-A	PANEL BLOCK ASSY, FRONT	(HXD970:AEP1, AEP3, UK)
2	A-1268-031-A	PANEL BLOCK ASSY, FRONT	(HXD1070:AEP1, UK)
2	A-1268-074-A	PANEL BLOCK ASSY, FRONT (HXD970:AEP2)	
2	A-1268-084-A	PANEL BLOCK ASSY, FRONT (HXD1070:AEP2)	
2	A-1367-716-A	PANEL BLOCK ASSY, FRONT (BLACK)	(HXD870(BLACK):AUS)
2	A-1367-717-A	PANEL BLOCK ASSY, FRONT (SILVER)	(HXD870(SILVER):AUS)
2	A-1367-718-A	PANEL BLOCK ASSY, FRONT (HXD970:AUS)	
* 3	1-834-077-11	CABLE, FLEXIBLE FLAT (FLR-012)	
4	3-077-331-01	+BV3 (3-CR)	
5	3-070-883-41	SCREW, TAPPING (SILVER) (HXD870(SILVER))	
5	3-070-883-71	SCREW, TAPPING, CASE (BLACK)	(HXD870(BLACK):AEP, UK/HXD970(BLACK):AEP, UK/HXD1070)
6	2-899-646-01	CASE (DT), UPPER (BLACK)	(EXCEPT HXD870(SILVER))
6	2-899-646-21	CASE (DT), UPPER (SILVER)	(HXD870(SILVER))
6	A-1382-868-A	CASE (DT), BLOCK ASSY (SERVICE) (BLACK)	(HXD870:AUS/HXD970:AUS)
6	A-1382-874-A	CASE (DT), BLOCK ASSY (SERVICE) (SILVER)	(HXD870:AUS)
7	3-076-563-11	SCREW, SPECIAL FRONT POINT	
8	1-480-167-11	REMOTE COMMANDER (RMT-D248P)	(AEP, UK)
8	1-480-526-11	REMOTE COMMANDER (RMT-D2480) (AUS)	

8-1-2. CHASSIS SECTION



Ref. No.	Part No.	Description	Remarks
51	3-077-331-01	+BV3 (3-CR)	
🔒 52	A-1271-316-A	DRW-U12SO S COMPL	
🔒 52	A-1382-914-A	DRW-U12EM (HDD)ASSY S COMPL (AUS)	
53	7-682-947-01	SCREW +PSW 3X6	
54	4-237-065-01	CLAMP (L35)	
⚠55	1-474-047-11	REGULATOR SWITCHING (SRV2057EK)	
* 56	1-834-073-11	CABLE, FLEXIBLE FLAT (FAD-008)	
57	1-787-624-11	FAN, DC	
58	1-834-075-11	CABLE, FLEXIBLE FLAT (FRA-006)	
59	3-077-331-31	+BV3 (3-CR)	
60	A-1314-555-A	HDD(S-GALAXY-S (250GB)-E)ASSY	(HXD970:AEP, UK)
60	A-1314-556-A	HDD(S-GALAXY-S (500GB)-E)ASSY (HXD1070)	
60	A-1314-557-A	HDD(W-XL160-S (160GB)-GA)ASSY	(HXD870:AUS)
60	A-1317-949-A	HDD(S-GALAXY-S (250GB)-GA)ASSY	(HXD970:AUS)

Ref. No.	Part No.	Description	Remarks
60	A-1318-134-A	HDD(S-TONKA2-S(160GB)-E)ASSY	(HXD870:AEP, UK)
61	1-834-072-11	CABLE, FLEXIBLE FLAT (FAR-006)	
62	1-834-074-11	CABLE, FLEXIBLE FLAT (FAR-007)	
* 63	1-834-168-11	CABLE, FLEXIBLE FLAT (FVR-001)	
64	1-965-191-11	HARNESS (RH-059)	
65	7-621-255-55	SCREW +P 2X8 (AEP2)	
66	2-684-970-01	SHIELD TAPE 1 (A)	
* 67	3-087-220-01	TAPE, NON-HOLOGENE	
68	3-268-333-02	SHIELD, GASKET	
⚠U301	1-693-743-11	TUNER (TUPADTC-D101HB)	
⚠U601	1-693-741-11	TUNER (TMFE2-407A)	

Note : The components identified by mark 🔒 contain confidential information.
Strictly follow the instructions whenever the components are repaired and/or replaced.

Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

8-2. ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- CAPACITORS:
  uF: µF
- RESISTORS
  All resistors are in ohms.
  METAL: metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F: nonflammable
- COILS
  uH: µH
- SEMICONDUCTORS
  In each case, u: µ, for example:
  uA...: µA... , uPA... , µPA... ,
  uPB... , µPB... , uPC... , µPC... ,
  uPD..., µPD...

When indicating parts by reference number, please include the board name.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

- Abbreviation
  AUS : Australian model

Ref. No.	Part No.	Description			Remarks
		AV-114 (CG) BOARD (not supplied) (AEP, UK)			
		AV-114 (AS) BOARD (not supplied) (AUS)			
		(Ref.No.;10000 series)			
		**********			
		< CAPACITOR >			
C104	1-104-662-91	ELECT	22uF	20%	25V
C105	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C106	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C107	1-162-959-11	CERAMIC CHIP	330PF	5%	50V
C109	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C110	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C111	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C112	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C113	1-115-156-11	CERAMIC CHIP	1uF		10V
C114	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C115	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C118	1-115-456-21	DOUBLE LAYER	0.22F		5.5V
C120	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C121	1-115-156-11	CERAMIC CHIP	1uF		10V
C122	1-115-156-11	CERAMIC CHIP	1uF		10V
C123	1-104-655-91	ELECT	470uF	20%	6.3V
C124	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C125	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C126	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C127	1-126-933-11	ELECT	100uF	20%	16V
C131	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C132	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C133	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C134	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C135	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C138	1-126-961-11	ELECT	2.2uF	20%	50V
C139	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C140	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C141	1-115-156-11	CERAMIC CHIP	1uF		10V
C142	1-100-831-91	CERAMIC CHIP	0.001uF	2%	50V
C149	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C150	1-115-156-11	CERAMIC CHIP	1uF		10V
C152	1-115-156-11	CERAMIC CHIP	1uF		10V
C156	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C157	1-107-826-11	CERAMIC CHIP	0.1uF	10%	16V
C202	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C204	1-126-933-11	ELECT	100uF	20%	16V
C205	1-104-662-91	ELECT	22uF	20%	25V
C206	1-164-315-11	CERAMIC CHIP	470PF	5%	50V
C208	1-107-826-11	CERAMIC CHIP	0.1uF	10%	16V

Ref. No.	Part No.	Description			Remarks
C301	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C302	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C303	1-126-933-11	ELECT	100uF	20%	16V
C305	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C306	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C307	1-126-933-11	ELECT	100uF	20%	16V
C308	1-126-933-11	ELECT	100uF	20%	16V
C309	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C310	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C311	1-126-934-11	ELECT	220uF	20%	16V
C312	1-126-933-11	ELECT	100uF	20%	16V
C314	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C315	1-126-933-11	ELECT	100uF	20%	16V
C316	1-126-933-11	ELECT	100uF	20%	16V
C318	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C319	1-126-933-11	ELECT	100uF	20%	16V
C320	1-126-933-11	ELECT	100uF	20%	16V
C322	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C323	1-100-162-91	CERAMIC CHIP	1uF		50V
C324	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C326	1-126-964-11	ELECT	10uF	20%	50V
C328	1-165-621-91	CERAMIC CHIP	0.1uF		50V
C329	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C401	1-115-156-11	CERAMIC CHIP	1uF		10V
C402	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C403	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C404	1-115-156-11	CERAMIC CHIP	1uF		10V
C406	1-107-826-11	CERAMIC CHIP	0.1uF	10%	16V
C407	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C408	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C409	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C410	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C411	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C412	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C413	1-107-826-11	CERAMIC CHIP	0.1uF	10%	16V
C414	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C415	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C418	1-115-156-11	CERAMIC CHIP	1uF		10V
C419	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C420	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C421	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C422	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C423	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C424	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C428	1-107-826-11	CERAMIC CHIP	0.1uF	10%	16V

Ref. No.	Part No.	Description			Remarks
C431	1-107-826-11	CERAMIC CHIP	0.1uF	10%	16V
C432	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C434	1-107-826-11	CERAMIC CHIP	0.1uF	10%	16V
C435	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C436	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C437	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C438	1-115-156-11	CERAMIC CHIP	1uF		10V
C439	1-107-826-11	CERAMIC CHIP	0.1uF	10%	16V
C440	1-107-826-11	CERAMIC CHIP	0.1uF	10%	16V
C441	1-115-156-11	CERAMIC CHIP	1uF		10V
C442	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C443	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C444	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C445	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C446	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C447	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C450	1-107-713-11	ELECT	4.7uF	20%	50V
C451	1-107-713-11	ELECT	4.7uF	20%	50V
C452	1-104-658-91	ELECT	100uF	20%	10V
C453	1-104-658-91	ELECT	100uF	20%	10V
C454	1-104-658-91	ELECT	100uF	20%	10V
C455	1-126-963-11	ELECT	4.7uF	20%	50V
C456	1-126-960-11	ELECT	1uF	20%	50V
C457	1-126-964-11	ELECT	10uF	20%	50V
C458	1-104-658-91	ELECT	100uF	20%	10V
C460	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C461	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C462	1-115-156-11	CERAMIC CHIP	1uF		10V
C463	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C464	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C468	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C469	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C471	1-126-964-11	ELECT	10uF	20%	50V
C472	1-126-964-11	ELECT	10uF	20%	50V
C473	1-126-933-11	ELECT	100uF	20%	16V
C474	1-126-964-11	ELECT	10uF	20%	50V
C475	1-126-964-11	ELECT	10uF	20%	50V
C476	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C478	1-216-864-11	SHORT CHIP	0		
C481	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C482	1-164-315-11	CERAMIC CHIP	470PF	5%	50V
C484	1-164-315-11	CERAMIC CHIP	470PF	5%	50V
C485	1-216-864-11	SHORT CHIP	0		
C486	1-104-655-91	ELECT	470uF	20%	6.3V
C487	1-104-655-91	ELECT	470uF	20%	6.3V
C488	1-104-655-91	ELECT	470uF	20%	6.3V
C489	1-104-655-91	ELECT	470uF	20%	6.3V
C490	1-104-655-91	ELECT	470uF	20%	6.3V
C491	1-126-947-11	ELECT	47uF	20%	35V
C492	1-126-923-91	ELECT	220uF	20%	10V
C493	1-126-947-11	ELECT	47uF	20%	35V
C496	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C497	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C498	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C499	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C500	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C503	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C505	1-100-831-91	CERAMIC CHIP	0.001uF	2%	50V
C506	1-164-315-11	CERAMIC CHIP	470PF	5%	50V
C507	1-100-831-91	CERAMIC CHIP	0.001uF	2%	50V
C508	1-164-315-11	CERAMIC CHIP	470PF	5%	50V
C510	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C511	1-164-230-11	CERAMIC CHIP	220PF	5%	50V
C515	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C516	1-164-315-11	CERAMIC CHIP	470PF	5%	50V
C517	1-164-230-11	CERAMIC CHIP	220PF	5%	50V
C518	1-100-831-91	CERAMIC CHIP	0.001uF	2%	50V
C519	1-164-315-11	CERAMIC CHIP	470PF	5%	50V
C520	1-100-831-91	CERAMIC CHIP	0.001uF	2%	50V
C528	1-104-655-91	ELECT	470uF	20%	6.3V
C529	1-104-655-91	ELECT	470uF	20%	6.3V
C530	1-104-655-91	ELECT	470uF	20%	6.3V
C531	1-104-655-91	ELECT	470uF	20%	6.3V
C532	1-104-655-91	ELECT	470uF	20%	6.3V
C541	1-126-963-11	ELECT	4.7uF	20%	50V
C542	1-126-963-11	ELECT	4.7uF	20%	50V
C543	1-126-963-11	ELECT	4.7uF	20%	50V
C544	1-126-963-11	ELECT	4.7uF	20%	50V
C545	1-126-933-11	ELECT	100uF	20%	16V
C547	1-104-662-91	ELECT	22uF	20%	25V
C550	1-104-662-91	ELECT	22uF	20%	25V
C551	1-104-662-91	ELECT	22uF	20%	25V
C552	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C602	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C603	1-162-966-11	CERAMIC CHIP	0.0022uF	10%	50V
C604	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C605	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C606	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C608	1-125-891-11	CERAMIC CHIP	0.47uF	10%	10V
C609	1-104-658-91	ELECT	100uF	20%	10V
C611	1-126-947-11	ELECT	47uF	20%	35V
C613	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C614	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C615	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C616	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C617	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C618	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C619	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C620	1-115-156-11	CERAMIC CHIP	1uF		10V
C621	1-162-924-11	CERAMIC CHIP	56PF	5%	50V
C622	1-162-924-11	CERAMIC CHIP	56PF	5%	50V
C623	1-162-908-11	CERAMIC CHIP	3PF	0.25PF	50V
C624	1-162-908-11	CERAMIC CHIP	3PF	0.25PF	50V
C625	1-115-156-11	CERAMIC CHIP	1uF		10V
C626	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C627	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C628	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C629	1-164-173-11	CERAMIC CHIP	0.0039uF	10%	50V
C630	1-164-739-11	CERAMIC CHIP	560PF	5%	50V
C631	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C632	1-164-173-11	CERAMIC CHIP	0.0039uF	10%	50V
C633	1-164-739-11	CERAMIC CHIP	560PF	5%	50V
C635	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C636	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C638	1-126-964-11	ELECT	10uF	20%	50V
C639	1-126-962-11	ELECT	3.3uF	20%	50V
C640	1-104-658-91	ELECT	100uF	20%	10V
C641	1-126-964-11	ELECT	10uF	20%	50V
C642	1-104-658-91	ELECT	100uF	20%	10V
C643	1-104-658-91	ELECT	100uF	20%	10V

Ref. No.	Part No.	Description	Remarks
C751	1-164-156-11	CERAMIC CHIP 0.1uF	25V (AEP, UK)
C752	1-162-927-11	CERAMIC CHIP 100PF 5%	50V (AEP, UK)
C753	1-162-927-11	CERAMIC CHIP 100PF 5%	50V (AEP, UK)
C754	1-162-927-11	CERAMIC CHIP 100PF 5%	50V (AEP, UK)
		< CONNECTOR >	
CN103	1-779-277-11	CONNECTOR, FFC (LIF (NON-ZIF)) 9P	
CN105	1-784-496-11	CONNECTOR, FFC/FPC 17P	
CN106	1-568-830-11	CONNECTOR SOCKET 11P	
* CN302	1-784-746-11	CONNECTOR, FFC 24P	
		< DIODE >	
D101	8-719-988-61	DIODE 1SS355TE-17	
D102	8-719-988-61	DIODE 1SS355TE-17	
D103	8-719-988-61	DIODE 1SS355TE-17	
D104	8-719-053-18	DIODE 1SR154-400TE-25	
D106	8-719-988-61	DIODE 1SS355TE-17	
D108	8-719-941-09	DIODE DAP202UT106	
D201	8-719-988-61	DIODE 1SS355TE-17	
D301	8-719-083-83	DIODE UDZSTE-1715B	
D302	8-719-069-60	DIODE UDZSTE-179.1B	
D303	8-719-988-61	DIODE 1SS355TE-17	
D304	8-719-988-61	DIODE 1SS355TE-17	
D401	8-719-083-61	DIODE UDZSTE-1711B	
D402	8-719-978-33	DIODE UDZSTE-176.8B	
D409	8-719-081-42	DIODE UMZ6.8N-T106	
D410	8-719-081-42	DIODE UMZ6.8N-T106	
D413	8-719-081-42	DIODE UMZ6.8N-T106	
D414	8-719-081-42	DIODE UMZ6.8N-T106	
D415	8-719-081-42	DIODE UMZ6.8N-T106	
D416	8-719-081-42	DIODE UMZ6.8N-T106	
D418	8-719-988-61	DIODE 1SS355TE-17	
D419	8-719-988-61	DIODE 1SS355TE-17	
D420	8-719-941-09	DIODE DAP202UT106	
D421	6-501-486-01	DIODE NNCD3.9F-T1B	
D422	6-501-486-01	DIODE NNCD3.9F-T1B	
D501	8-719-069-54	DIODE UDZSTE-175.1B	
D502	8-719-069-54	DIODE UDZSTE-175.1B	
D503	6-501-486-01	DIODE NNCD3.9F-T1B	
D504	8-719-081-42	DIODE UMZ6.8N-T106	
D505	8-719-081-42	DIODE UMZ6.8N-T106	
D506	8-719-081-42	DIODE UMZ6.8N-T106	
D507	8-719-081-42	DIODE UMZ6.8N-T106	
D508	6-501-486-01	DIODE NNCD3.9F-T1B	
D509	8-719-081-42	DIODE UMZ6.8N-T106	
D510	6-501-486-01	DIODE NNCD3.9F-T1B	
D511	8-719-081-42	DIODE UMZ6.8N-T106	
D512	6-501-486-01	DIODE NNCD3.9F-T1B	
D513	8-719-081-42	DIODE UMZ6.8N-T106	
D514	8-719-081-42	DIODE UMZ6.8N-T106	
D515	8-719-081-42	DIODE UMZ6.8N-T106	
D516	8-719-081-42	DIODE UMZ6.8N-T106	
D517	8-719-081-42	DIODE UMZ6.8N-T106	
D518	8-719-081-42	DIODE UMZ6.8N-T106	
D519	8-719-081-42	DIODE UMZ6.8N-T106	
D520	8-719-081-42	DIODE UMZ6.8N-T106	
D521	8-719-081-42	DIODE UMZ6.8N-T106	
D522	8-719-081-42	DIODE UMZ6.8N-T106	

Ref. No.	Part No.	Description	Remarks
* D523	6-501-855-01	DIODE DAN217UT106	
* D524	6-501-855-01	DIODE DAN217UT106	
D526	8-719-988-61	DIODE 1SS355TE-17	
D527	8-719-988-61	DIODE 1SS355TE-17	
D528	8-719-988-61	DIODE 1SS355TE-17	
D529	8-719-083-63	DIODE UDZSTE-1713B	
D530	8-719-083-63	DIODE UDZSTE-1713B	
D531	8-719-081-42	DIODE UMZ6.8N-T106	
D801	8-719-081-42	DIODE UMZ6.8N-T106	
		< FUSE >	
⚠IC150	1-576-863-21	FUSE 0.5A 32V	
⚠IC317	1-576-863-21	FUSE 0.5A 32V	
		< IC >	
IC101	6-807-412-01	IC LC87F06J2A-F58W3-E	
* IC102	6-711-071-01	IC BD4846G-TR	
* IC103	6-711-072-01	IC BU4220G-TR	
* IC104	6-711-188-01	IC TC7MB3257FK (EL)	
* IC401	6-711-073-01	IC HA118326APFR-E	
IC402	8-759-909-71	IC BA4558F	
IC403	6-703-623-01	IC MM1503XNRE	
IC406	8-759-082-60	IC TC7S66FU	
IC601	6-702-714-01	IC MSP3417G-QG-B8V3	
		< JACK >	
JA401	1-794-198-11	CONNECTOR, S TERMINAL	
JA751	1-764-188-31	JACK (SMALL TYPE) (DIA. 3.5) (AEP, UK)	
		< TERMINAL >	
KN101	1-537-771-21	TERMINAL BOARD, GROUND	
KN102	1-537-771-21	TERMINAL BOARD, GROUND	
		< COIL >	
L102	1-410-517-11	INDUCTOR 47uH	
L201	1-412-549-31	INDUCTOR 1mH	
L303	1-500-245-11	INDUCTOR, FERRITE BEAD	
L304	1-408-621-31	INDUCTOR 330uH	
L305	1-500-245-11	INDUCTOR, FERRITE BEAD	
L501	1-414-594-11	INDUCTOR, FERRITE BEAD	
L502	1-414-594-11	INDUCTOR, FERRITE BEAD	
L601	1-500-245-11	INDUCTOR, FERRITE BEAD	
L602	1-500-245-11	INDUCTOR, FERRITE BEAD	
L604	1-414-760-21	INDUCTOR, FERRITE BEAD	
L605	1-414-760-21	INDUCTOR, FERRITE BEAD	
L606	1-500-245-11	INDUCTOR, FERRITE BEAD	
L607	1-412-963-11	INDUCTOR 100uH	
L608	1-500-245-11	INDUCTOR, FERRITE BEAD	
L609	1-412-951-11	INDUCTOR 10uH	
L751	1-414-760-21	INDUCTOR, FERRITE BEAD (AEP, UK)	
L801	1-414-228-11	INDUCTOR, FERRITE BEAD	
L802	1-414-228-11	INDUCTOR, FERRITE BEAD	
L803	1-216-864-11	SHORT CHIP 0	
L851	1-414-228-11	INDUCTOR, FERRITE BEAD	
L852	1-414-228-11	INDUCTOR, FERRITE BEAD	
L853	1-414-228-11	INDUCTOR, FERRITE BEAD	
L854	1-414-228-11	INDUCTOR, FERRITE BEAD	
L855	1-500-283-11	INDUCTOR, FERRITE BEAD	
L856	1-414-228-11	INDUCTOR, FERRITE BEAD	

Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description		Remarks
L857	1-414-228-11	INDUCTOR, FERRITE BEAD		
L858	1-414-228-11	INDUCTOR, FERRITE BEAD		
L859	1-414-228-11	INDUCTOR, FERRITE BEAD		
L860	1-500-283-11	INDUCTOR, FERRITE BEAD		
L861	1-469-876-11	INDUCTOR, FERRITE BEAD		
L862	1-469-796-21	FERRITE, CHIP		
		< TRANSISTOR >		
Q101	8-729-029-06	TRANSISTOR	DTC124EUA-T106	
Q102	8-729-620-13	TRANSISTOR	2SC4154TP-1EF	
Q103	6-550-375-01	TRANSISTOR	UMD2N-TR	
Q104	6-550-375-01	TRANSISTOR	UMD2N-TR	
Q105	8-729-023-22	TRANSISTOR	2SD2114K	
Q108	8-729-029-06	TRANSISTOR	DTC124EUA-T106	
Q110	8-729-028-86	TRANSISTOR	DTA143EUA-T106 (AEP, UK)	
Q111	8-729-620-13	TRANSISTOR	2SC4154TP-1EF	
Q112	8-729-620-13	TRANSISTOR	2SC4154TP-1EF	
Q201	8-729-023-22	TRANSISTOR	2SD2114K	
Q301	6-550-375-01	TRANSISTOR	UMD2N-TR	
Q302	8-729-620-13	TRANSISTOR	2SC4154TP-1EF	
Q303	6-550-375-01	TRANSISTOR	UMD2N-TR	
Q304	8-729-044-09	TRANSISTOR	2SD2153T100V	
Q305	6-550-375-01	TRANSISTOR	UMD2N-TR	
Q306	8-729-901-87	TRANSISTOR	2SC2411K-CQ	
Q307	6-550-375-01	TRANSISTOR	UMD2N-TR	
Q308	8-729-901-87	TRANSISTOR	2SC2411K-CQ	
* Q309	6-551-719-01	TRANSISTOR	2SC5876T106QR	
Q310	8-729-620-13	TRANSISTOR	2SC4154TP-1EF	
Q311	8-729-427-70	TRANSISTOR	XP4401	
Q401	8-729-029-06	TRANSISTOR	DTC124EUA-T106	
Q402	8-729-023-22	TRANSISTOR	2SD2114K	
Q403	6-551-699-01	TRANSISTOR	ISA1602AM1TP-1EF	
Q404	6-550-375-01	TRANSISTOR	UMD2N-TR	
Q406	8-729-023-22	TRANSISTOR	2SD2114K	
Q407	8-729-023-22	TRANSISTOR	2SD2114K	
Q408	8-729-620-13	TRANSISTOR	2SC4154TP-1EF	
Q410	8-729-620-13	TRANSISTOR	2SC4154TP-1EF	
Q411	6-550-375-01	TRANSISTOR	UMD2N-TR	
Q413	8-729-029-06	TRANSISTOR	DTC124EUA-T106	
* Q501	6-551-718-01	TRANSISTOR	UMH1NTN	
Q502	6-551-699-01	TRANSISTOR	ISA1602AM1TP-1EF	
Q503	8-729-620-13	TRANSISTOR	2SC4154TP-1EF	
Q504	8-729-620-13	TRANSISTOR	2SC4154TP-1EF	
Q505	8-729-620-13	TRANSISTOR	2SC4154TP-1EF	
Q506	8-729-013-26	TRANSISTOR	HN1C03FU-TE85R	
Q507	8-729-013-26	TRANSISTOR	HN1C03FU-TE85R	
Q508	8-729-028-83	TRANSISTOR	DTA124EUA-T106	
Q509	8-729-620-13	TRANSISTOR	2SC4154TP-1EF	
Q510	8-729-620-13	TRANSISTOR	2SC4154TP-1EF	
Q511	6-551-699-01	TRANSISTOR	ISA1602AM1TP-1EF	
Q601	6-551-699-01	TRANSISTOR	ISA1602AM1TP-1EF	
Q602	6-551-699-01	TRANSISTOR	ISA1602AM1TP-1EF	
Q604	6-551-699-01	TRANSISTOR	ISA1602AM1TP-1EF	
Q605	6-551-699-01	TRANSISTOR	ISA1602AM1TP-1EF	
Q606	8-729-620-13	TRANSISTOR	2SC4154TP-1EF	
Q751	6-551-699-01	TRANSISTOR	ISA1602AM1TP-1EF	(AEP, UK)
Q752	8-729-620-13	TRANSISTOR	2SC4154TP-1EF (AEP, UK)	

Ref. No.	Part No.	Description			Remarks
		< RESISTOR >			
R101	1-216-809-11	METAL CHIP	100	5%	1/10W
R102	1-216-809-11	METAL CHIP	100	5%	1/10W
R103	1-216-809-11	METAL CHIP	100	5%	1/10W
R104	1-216-841-11	METAL CHIP	47K	5%	1/10W
R105	1-216-809-11	METAL CHIP	100	5%	1/10W
R106	1-216-864-11	SHORT CHIP	0		
R107	1-216-833-11	METAL CHIP	10K	5%	1/10W
R109	1-216-815-11	METAL CHIP	330	5%	1/10W
R110	1-216-809-11	METAL CHIP	100	5%	1/10W
R111	1-216-809-11	METAL CHIP	100	5%	1/10W
R112	1-216-833-11	METAL CHIP	10K	5%	1/10W
R113	1-216-864-11	SHORT CHIP	0		
R116	1-216-864-11	SHORT CHIP	0		
R117	1-216-857-11	METAL CHIP	1M	5%	1/10W
R118	1-216-864-11	SHORT CHIP	0		
R123	1-216-815-11	METAL CHIP	330	5%	1/10W
R124	1-216-815-11	METAL CHIP	330	5%	1/10W
R125	1-216-809-11	METAL CHIP	100	5%	1/10W
R126	1-216-809-11	METAL CHIP	100	5%	1/10W
R127	1-216-833-11	METAL CHIP	10K	5%	1/10W
R129	1-216-815-11	METAL CHIP	330	5%	1/10W
R130	1-216-864-11	SHORT CHIP	0		
R131	1-216-829-11	METAL CHIP	4.7K	5%	1/10W
R132	1-218-867-11	METAL CHIP	6.8K	0.5%	1/10W
R133	1-216-845-11	METAL CHIP	100K	5%	1/10W
R134	1-216-821-11	METAL CHIP	1K	5%	1/10W
R135	1-216-845-11	METAL CHIP	100K	5%	1/10W
R137	1-216-809-11	METAL CHIP	100	5%	1/10W
R138	1-216-817-11	METAL CHIP	470	5%	1/10W
R139	1-218-867-11	METAL CHIP	6.8K	0.5%	1/10W
R140	1-216-809-11	METAL CHIP	100	5%	1/10W
R141	1-218-867-11	METAL CHIP	6.8K	0.5%	1/10W
R142	1-216-809-11	METAL CHIP	100	5%	1/10W
R143	1-216-809-11	METAL CHIP	100	5%	1/10W
R144	1-216-864-11	SHORT CHIP	0		
R145	1-216-833-11	METAL CHIP	10K	5%	1/10W
R146	1-216-809-11	METAL CHIP	100	5%	1/10W
R147	1-216-821-11	METAL CHIP	1K	5%	1/10W
R148	1-216-809-11	METAL CHIP	100	5%	1/10W
R149	1-216-864-11	SHORT CHIP	0		
R150	1-216-864-11	SHORT CHIP	0		
R151	1-216-864-11	SHORT CHIP	0		
R152	1-216-864-11	SHORT CHIP	0		
R153	1-216-809-11	METAL CHIP	100	5%	1/10W
R154	1-216-809-11	METAL CHIP	100	5%	1/10W
R155	1-216-809-11	METAL CHIP	100	5%	1/10W
R156	1-216-809-11	METAL CHIP	100	5%	1/10W
R157	1-216-845-11	METAL CHIP	100K	5%	1/10W
R158	1-216-845-11	METAL CHIP	100K	5%	1/10W
R159	1-216-864-11	SHORT CHIP	0		
R160	1-216-809-11	METAL CHIP	100	5%	1/10W
R161	1-216-864-11	SHORT CHIP	0		
R165	1-216-864-11	SHORT CHIP	0		
R167	1-216-809-11	METAL CHIP	100	5%	1/10W
R168	1-216-812-11	METAL CHIP	180	5%	1/10W

Ref. No.	Part No.	Description			Remarks
R169	1-216-833-11	METAL CHIP	10K	5%	1/10W
R171	1-216-809-11	METAL CHIP	100	5%	1/10W
R172	1-216-809-11	METAL CHIP	100	5%	1/10W
R173	1-216-845-11	METAL CHIP	100K	5%	1/10W
R174	1-216-845-11	METAL CHIP	100K	5%	1/10W
R175	1-216-815-11	METAL CHIP	330	5%	1/10W
R176	1-216-821-11	METAL CHIP	1K	5%	1/10W
R177	1-216-809-11	METAL CHIP	100	5%	1/10W
R178	1-216-809-11	METAL CHIP	100	5%	1/10W
R179	1-216-809-11	METAL CHIP	100	5%	1/10W
R180	1-216-809-11	METAL CHIP	100	5%	1/10W
R181	1-216-809-11	METAL CHIP	100	5%	1/10W
R182	1-216-809-11	METAL CHIP	100	5%	1/10W
R183	1-216-809-11	METAL CHIP	100	5%	1/10W
R184	1-216-809-11	METAL CHIP	100	5%	1/10W
R185	1-216-809-11	METAL CHIP	100	5%	1/10W
R186	1-216-809-11	METAL CHIP	100	5%	1/10W
R187	1-216-809-11	METAL CHIP	100	5%	1/10W
R188	1-216-815-11	METAL CHIP	330	5%	1/10W
R189	1-216-817-11	METAL CHIP	470	5%	1/10W
R193	1-216-845-11	METAL CHIP	100K	5%	1/10W
R194	1-216-845-11	METAL CHIP	100K	5%	1/10W
R195	1-216-845-11	METAL CHIP	100K	5%	1/10W
R196	1-216-809-11	METAL CHIP	100	5%	1/10W
R197	1-216-864-11	SHORT CHIP	0		
R199	1-216-809-11	METAL CHIP	100	5%	1/10W
R200	1-216-815-11	METAL CHIP	330	5%	1/10W
R201	1-216-864-11	SHORT CHIP	0 (AEP, UK)		
R202	1-216-864-11	SHORT CHIP	0		
R203	1-216-864-11	SHORT CHIP	0		
R204	1-216-809-11	METAL CHIP	100	5%	1/10W
R205	1-216-809-11	METAL CHIP	100	5%	1/10W
R207	1-216-817-11	METAL CHIP	470	5%	1/10W
R208	1-216-864-11	SHORT CHIP	0 (AEP, UK)		
R209	1-216-827-11	METAL CHIP	3.3K	5%	1/10W
R210	1-218-845-11	METAL CHIP	820	0.5%	1/10W
R214	1-216-827-11	METAL CHIP	3.3K	5%	1/10W
R215	1-216-819-11	METAL CHIP	680	5%	1/10W
R216	1-218-844-11	METAL CHIP	750	0.5%	1/10W
R217	1-216-821-11	METAL CHIP	1K	5%	1/10W
R218	1-216-295-91	SHORT CHIP	0		
R219	1-216-827-11	METAL CHIP	3.3K	5%	1/10W
R220	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R221	1-216-809-11	METAL CHIP	100	5%	1/10W
R222	1-216-864-11	SHORT CHIP	0		
R223	1-216-809-11	METAL CHIP	100	5%	1/10W
R224	1-216-809-11	METAL CHIP	100	5%	1/10W
R225	1-216-835-11	METAL CHIP	15K	5%	1/10W
R228	1-216-864-11	SHORT CHIP	0		
R233	1-216-845-11	METAL CHIP	100K	5%	1/10W
R251	1-216-295-91	SHORT CHIP	0		
R301	1-216-295-91	SHORT CHIP	0		
R302	1-216-295-91	SHORT CHIP	0		
R303	1-216-295-91	SHORT CHIP	0		
R304	1-216-809-11	METAL CHIP	100	5%	1/10W
R305	1-216-803-11	METAL CHIP	33	5%	1/10W
R306	1-216-803-11	METAL CHIP	33	5%	1/10W
R307	1-216-295-91	SHORT CHIP	0		
R308	1-216-295-91	SHORT CHIP	0		
R309	1-216-823-11	METAL CHIP	1.5K	5%	1/10W
R310	1-216-829-11	METAL CHIP	4.7K	5%	1/10W
R311	1-216-820-11	METAL CHIP	820	5%	1/10W
R312	1-216-833-11	METAL CHIP	10K	5%	1/10W
R313	1-216-848-11	METAL CHIP	180K	5%	1/10W
R314	1-216-837-11	METAL CHIP	22K	5%	1/10W
R315	1-218-895-11	METAL CHIP	100K	0.5%	1/10W
R316	1-218-879-11	METAL CHIP	22K	0.5%	1/10W
R318	1-216-864-11	SHORT CHIP	0		
R401	1-216-295-91	SHORT CHIP	0		
R402	1-216-818-11	METAL CHIP	560	5%	1/10W
R403	1-216-818-11	METAL CHIP	560	5%	1/10W
R404	1-216-295-91	SHORT CHIP	0		
R407	1-216-295-91	SHORT CHIP	0		
R408	1-216-817-11	METAL CHIP	470	5%	1/10W
R413	1-216-817-11	METAL CHIP	470	5%	1/10W
R414	1-216-817-11	METAL CHIP	470	5%	1/10W
R415	1-216-817-11	METAL CHIP	470	5%	1/10W
R416	1-216-817-11	METAL CHIP	470	5%	1/10W
R417	1-216-817-11	METAL CHIP	470	5%	1/10W
R418	1-216-817-11	METAL CHIP	470	5%	1/10W
R419	1-216-817-11	METAL CHIP	470	5%	1/10W
R420	1-216-860-11	METAL CHIP	1.8M	5%	1/10W
R421	1-216-860-11	METAL CHIP	1.8M	5%	1/10W
R422	1-216-833-11	METAL CHIP	10K	5%	1/10W
R425	1-216-845-11	METAL CHIP	100K	5%	1/10W
R428	1-216-864-11	SHORT CHIP	0		
R430	1-216-857-11	METAL CHIP	1M	5%	1/10W
R431	1-216-857-11	METAL CHIP	1M	5%	1/10W
R432	1-216-857-11	METAL CHIP	1M	5%	1/10W
R433	1-216-857-11	METAL CHIP	1M	5%	1/10W
R435	1-216-857-11	METAL CHIP	1M	5%	1/10W
R436	1-216-809-11	METAL CHIP	100	5%	1/10W
R437	1-216-809-11	METAL CHIP	100	5%	1/10W
R438	1-216-295-91	SHORT CHIP	0		
R439	1-216-860-11	METAL CHIP	1.8M	5%	1/10W
R444	1-208-755-11	METAL CHIP	75	0.5%	1/10W
R445	1-208-755-11	METAL CHIP	75	0.5%	1/10W
R447	1-208-755-11	METAL CHIP	75	0.5%	1/10W
R448	1-216-295-91	SHORT CHIP	0		
R453	1-218-869-11	METAL CHIP	8.2K	0.5%	1/10W
R454	1-218-871-11	METAL CHIP	10K	0.5%	1/10W
R455	1-216-805-11	METAL CHIP	47	5%	1/10W
R458	1-216-817-11	METAL CHIP	470	5%	1/10W
R459	1-208-755-11	METAL CHIP	75	0.5%	1/10W
R461	1-216-819-11	METAL CHIP	680	5%	1/10W
R462	1-218-871-11	METAL CHIP	10K	0.5%	1/10W
R463	1-218-869-11	METAL CHIP	8.2K	0.5%	1/10W
R465	1-216-817-11	METAL CHIP	470	5%	1/10W
R468	1-208-754-11	METAL CHIP	68	0.5%	1/10W
R469	1-216-306-11	RES-CHIP	3.9	5%	1/10W
R470	1-208-755-11	METAL CHIP	75	0.5%	1/10W
R471	1-216-295-91	SHORT CHIP	0		
R472	1-208-754-11	METAL CHIP	68	0.5%	1/10W
R473	1-216-306-11	RES-CHIP	3.9	5%	1/10W
R474	1-208-754-11	METAL CHIP	68	0.5%	1/10W
R475	1-216-306-11	RES-CHIP	3.9	5%	1/10W
R476	1-208-754-11	METAL CHIP	68	0.5%	1/10W
R477	1-216-306-11	RES-CHIP	3.9	5%	1/10W
R478	1-208-754-11	METAL CHIP	68	0.5%	1/10W
R479	1-216-817-11	METAL CHIP	470	5%	1/10W

Ref. No.	Part No.	Description			Remarks
R480	1-216-306-11	RES-CHIP	3.9	5%	1/10W
R482	1-216-809-11	METAL CHIP	100	5%	1/10W
R484	1-216-821-11	METAL CHIP	1K	5%	1/10W
R485	1-216-837-11	METAL CHIP	22K	5%	1/10W
R486	1-216-821-11	METAL CHIP	1K	5%	1/10W
R487	1-216-837-11	METAL CHIP	22K	5%	1/10W
R488	1-216-817-11	METAL CHIP	470	5%	1/10W
R490	1-216-809-11	METAL CHIP	100	5%	1/10W
R501	1-208-755-11	METAL CHIP	75	0.5%	1/10W
R502	1-208-755-11	METAL CHIP	75	0.5%	1/10W
R503	1-208-755-11	METAL CHIP	75	0.5%	1/10W
R504	1-208-754-11	METAL CHIP	68	0.5%	1/10W (AEP, UK)
R504	1-216-295-91	SHORT CHIP	0 (AUS)		
R505	1-208-755-11	METAL CHIP	75	0.5%	1/10W (AUS)
R505	1-216-306-11	RES-CHIP	3.9	5%	1/10W (AEP, UK)
R506	1-216-864-11	SHORT CHIP	0		
R507	1-216-829-11	METAL CHIP	4.7K	5%	1/10W
R508	1-216-841-11	METAL CHIP	47K	5%	1/10W
R509	1-216-838-11	METAL CHIP	27K	5%	1/10W
R510	1-216-861-11	METAL CHIP	2.2M	5%	1/10W
R511	1-216-849-11	METAL CHIP	220K	5%	1/10W
R512	1-216-845-11	METAL CHIP	100K	5%	1/10W
R513	1-216-845-11	METAL CHIP	100K	5%	1/10W
R514	1-208-755-11	METAL CHIP	75	0.5%	1/10W
R515	1-216-043-91	RES-CHIP	560	5%	1/10W
R516	1-216-822-11	METAL CHIP	1.2K	5%	1/10W
R517	1-216-823-11	METAL CHIP	1.5K	5%	1/10W
R518	1-216-797-11	METAL CHIP	10	5%	1/10W
R519	1-216-842-11	METAL CHIP	56K	5%	1/10W
R520	1-216-813-11	METAL CHIP	220	5%	1/10W
R521	1-208-754-11	METAL CHIP	68	0.5%	1/10W
R522	1-216-306-11	RES-CHIP	3.9	5%	1/10W
R523	1-208-754-11	METAL CHIP	68	0.5%	1/10W
R524	1-216-306-11	RES-CHIP	3.9	5%	1/10W
R525	1-208-754-11	METAL CHIP	68	0.5%	1/10W
R526	1-216-306-11	RES-CHIP	3.9	5%	1/10W
R527	1-216-295-91	SHORT CHIP	0		
R528	1-208-755-11	METAL CHIP	75	0.5%	1/10W
R529	1-216-845-11	METAL CHIP	100K	5%	1/10W
R530	1-208-755-11	METAL CHIP	75	0.5%	1/10W
R531	1-216-295-91	SHORT CHIP	0		
R532	1-208-755-11	METAL CHIP	75	0.5%	1/10W
R534	1-216-828-11	METAL CHIP	3.9K	5%	1/10W
R535	1-216-828-11	METAL CHIP	3.9K	5%	1/10W
R536	1-216-817-11	METAL CHIP	470	5%	1/10W
R537	1-216-809-11	METAL CHIP	100	5%	1/10W
R538	1-216-817-11	METAL CHIP	470	5%	1/10W
R539	1-216-809-11	METAL CHIP	100	5%	1/10W
R540	1-216-845-11	METAL CHIP	100K	5%	1/10W
R541	1-216-845-11	METAL CHIP	100K	5%	1/10W
R542	1-216-809-11	METAL CHIP	100	5%	1/10W
R543	1-216-809-11	METAL CHIP	100	5%	1/10W
R544	1-216-809-11	METAL CHIP	100	5%	1/10W
R545	1-216-809-11	METAL CHIP	100	5%	1/10W
R546	1-216-845-11	METAL CHIP	100K	5%	1/10W
R547	1-216-845-11	METAL CHIP	100K	5%	1/10W
R548	1-216-845-11	METAL CHIP	100K	5%	1/10W
R549	1-216-845-11	METAL CHIP	100K	5%	1/10W
R550	1-216-817-11	METAL CHIP	470	5%	1/10W
R551	1-216-809-11	METAL CHIP	100	5%	1/10W
R552	1-216-817-11	METAL CHIP	470	5%	1/10W
R553	1-216-809-11	METAL CHIP	100	5%	1/10W
R554	1-216-845-11	METAL CHIP	100K	5%	1/10W
R555	1-216-845-11	METAL CHIP	100K	5%	1/10W
R556	1-216-828-11	METAL CHIP	3.9K	5%	1/10W
R557	1-216-828-11	METAL CHIP	3.9K	5%	1/10W
R558	1-216-833-11	METAL CHIP	10K	5%	1/10W
R559	1-216-864-11	SHORT CHIP	0		
R560	1-216-835-11	METAL CHIP	15K	5%	1/10W
R561	1-216-819-11	METAL CHIP	680	5%	1/10W
R562	1-216-833-11	METAL CHIP	10K	5%	1/10W
R563	1-216-864-11	SHORT CHIP	0		
R564	1-216-835-11	METAL CHIP	15K	5%	1/10W
R565	1-216-819-11	METAL CHIP	680	5%	1/10W
R566	1-216-837-11	METAL CHIP	22K	5%	1/10W
R568	1-216-834-11	METAL CHIP	12K	5%	1/10W
R569	1-216-821-11	METAL CHIP	1K	5%	1/10W
R571	1-208-755-11	METAL CHIP	75	0.5%	1/10W
R573	1-500-283-11	INDUCTOR, FERRITE BEAD			
R574	1-216-864-11	SHORT CHIP	0		
R602	1-216-821-11	METAL CHIP	1K	5%	1/10W
R603	1-216-864-11	SHORT CHIP	0		
R605	1-216-833-11	METAL CHIP	10K	5%	1/10W
R606	1-216-833-11	METAL CHIP	10K	5%	1/10W
R607	1-216-821-11	METAL CHIP	1K	5%	1/10W
R609	1-216-864-11	SHORT CHIP	0		
R616	1-216-864-11	SHORT CHIP	0		
R619	1-216-833-11	METAL CHIP	10K	5%	1/10W
R620	1-216-864-11	SHORT CHIP	0		
R621	1-216-809-11	METAL CHIP	100	5%	1/10W
R622	1-216-809-11	METAL CHIP	100	5%	1/10W
R623	1-216-821-11	METAL CHIP	1K	5%	1/10W
R624	1-216-827-11	METAL CHIP	3.3K	5%	1/10W
R625	1-216-827-11	METAL CHIP	3.3K	5%	1/10W
R626	1-216-821-11	METAL CHIP	1K	5%	1/10W
R627	1-216-827-11	METAL CHIP	3.3K	5%	1/10W
R628	1-216-827-11	METAL CHIP	3.3K	5%	1/10W
R630	1-216-815-11	METAL CHIP	330	5%	1/10W
R631	1-216-829-11	METAL CHIP	4.7K	5%	1/10W
R632	1-216-801-11	METAL CHIP	22	5%	1/10W
R633	1-216-809-11	METAL CHIP	100	5%	1/10W
R634	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R635	1-400-330-21	INDUCTOR, FERRITE BEAD (1608)			
R636	1-400-330-21	INDUCTOR, FERRITE BEAD (1608)			
R637	1-400-330-21	INDUCTOR, FERRITE BEAD (1608)			
R638	1-216-809-11	METAL CHIP	100	5%	1/10W
R701	1-216-849-11	METAL CHIP	220K	5%	1/10W
R703	1-216-864-11	SHORT CHIP	0		
R751	1-216-821-11	METAL CHIP	1K	5%	1/10W (AEP, UK)
R752	1-216-829-11	METAL CHIP	4.7K	5%	1/10W (AEP, UK)
R753	1-216-829-11	METAL CHIP	4.7K	5%	1/10W (AEP, UK)
R754	1-216-811-11	METAL CHIP	150	5%	1/10W (AEP, UK)
R755	1-216-829-11	METAL CHIP	4.7K	5%	1/10W (AEP, UK)
R756	1-216-821-11	METAL CHIP	1K	5%	1/10W (AEP, UK)
R801	1-216-864-11	SHORT CHIP	0		

Ref. No.	Part No.	Description			Remarks
		< TUNER >			
⚠U601	1-693-741-11	TUNER(TMFE2-407A)			
		< VIBRATOR >			
* X101	1-813-965-31	VIBRATOR, CRYSTAL (15MHz)			
X102	1-579-463-11	VIBRATOR, CRYSTAL (32.768kHz)			
* X601	1-813-713-21	VIBRATOR, CRYSTAL (18.432MHz)			
		DT-120 (AG) BOARD (not supplied) (AEP1,AEP3,UK) (Ref.No.;40000 series)			
		DT-120 (BG) BOARD (not supplied) (AEP2)			
		DT-120 (AS) BOARD (not supplied) (AUS) (Ref.No.;40000 series)			
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		< CAPACITOR >			
C101	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C102	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C103	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C104	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C105	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C106	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C107	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C108	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C109	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C110	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C111	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C112	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C113	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C114	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C115	1-126-204-11	ELECT CHIP	47uF	20%	16V
C116	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C117	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C118	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C119	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C120	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C121	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C124	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C125	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C126	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C127	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C128	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C129	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C130	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C131	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C134	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C135	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C136	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C137	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C138	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C140	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C142	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C144	1-117-681-11	ELECT CHIP	100uF	20%	16V
C147	1-126-204-11	ELECT CHIP	47uF	20%	16V
C148	1-164-842-11	CERAMIC CHIP	2PF	0.25PF	50V
C149	1-164-842-11	CERAMIC CHIP	2PF	0.25PF	50V
C154	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C155	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C191	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C192	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C193	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C194	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C201	1-107-820-11	CERAMIC CHIP	0.1uF		16V (AEP2)
C202	1-107-820-11	CERAMIC CHIP	0.1uF		16V (AEP2)
C203	1-107-820-11	CERAMIC CHIP	0.1uF		16V (AEP2)
C204	1-107-820-11	CERAMIC CHIP	0.1uF		16V (AEP2)
C205	1-107-820-11	CERAMIC CHIP	0.1uF		16V (AEP2)
C206	1-107-820-11	CERAMIC CHIP	0.1uF		16V (AEP2)
C207	1-107-820-11	CERAMIC CHIP	0.1uF		16V (AEP2)
C208	1-107-820-11	CERAMIC CHIP	0.1uF		16V (AEP2)
C209	1-107-820-11	CERAMIC CHIP	0.1uF		16V (AEP2)
C210	1-126-204-11	ELECT CHIP	47uF	20%	16V (AEP2)
C211	1-126-204-11	ELECT CHIP	47uF	20%	16V
C212	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C213	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C221	1-126-204-11	ELECT CHIP	47uF	20%	16V (AEP2)
C222	1-114-130-11	CERAMIC CHIP	1uF		6.3V (AEP2)
C301	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C302	1-117-681-11	ELECT CHIP	100uF	20%	16V
C303	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C304	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C306	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C307	1-117-681-11	ELECT CHIP	100uF	20%	16V
C309	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C313	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C314	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V (AEP2)
C315	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C318	1-117-681-11	ELECT CHIP	100uF	20%	16V (AEP2)
C319	1-117-681-11	ELECT CHIP	100uF	20%	16V
C320	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C324	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C326	1-164-315-11	CERAMIC CHIP	470PF	5%	50V
C329	1-126-204-11	ELECT CHIP	47uF	20%	16V (AEP2)
C332	1-125-889-91	CERAMIC CHIP	2.2uF	10%	10V
C334	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V (AEP2)
C335	1-126-204-11	ELECT CHIP	47uF	20%	16V (AEP2)
C338	1-165-908-11	CERAMIC CHIP	1uF	10%	10V (AEP2)
C339	1-126-204-11	ELECT CHIP	47uF	20%	16V
C340	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C341	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C342	1-126-204-11	ELECT CHIP	47uF	20%	16V
C343	1-126-204-11	ELECT CHIP	47uF	20%	16V
C353	1-124-779-00	ELECT CHIP	10uF	20%	16V
C354	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C356	1-162-919-11	CERAMIC CHIP	22PF	5%	50V

Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description			Remarks
C358	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C359	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C361	1-162-919-11	CERAMIC CHIP	22PF	5%	50V
C364	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C366	1-126-204-11	ELECT CHIP	47uF	20%	16V
C367	1-126-197-11	ELECT CHIP	10uF	20%	50V
C368	1-126-204-11	ELECT CHIP	47uF	20%	16V
C369	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C370	1-162-927-11	CERAMIC CHIP	100PF	5%	50V
C372	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C373	1-125-889-11	CERAMIC CHIP	2.2uF	10%	10V
C375	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C378	1-124-779-00	ELECT CHIP	10uF	20%	16V
C379	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C380	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C381	1-126-204-11	ELECT CHIP	47uF	20%	16V
C382	1-126-204-11	ELECT CHIP	47uF	20%	16V
C383	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C384	1-107-826-11	CERAMIC CHIP	0.1uF	10%	16V
C385	1-126-204-11	ELECT CHIP	47uF	20%	16V
C388	1-165-908-11	CERAMIC CHIP	1uF	10%	10V
C389	1-126-204-11	ELECT CHIP	47uF	20%	16V
C391	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C392	1-125-889-11	CERAMIC CHIP	2.2uF	10%	10V
C393	1-125-889-11	CERAMIC CHIP	2.2uF	10%	10V
C394	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C395	1-126-204-11	ELECT CHIP	47uF	20%	16V
C396	1-127-715-91	CERAMIC CHIP	0.22uF	10%	16V
C397	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C398	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C399	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C400	1-127-715-91	CERAMIC CHIP	0.22uF	10%	16V
C401	1-164-315-11	CERAMIC CHIP	470PF	5%	50V
C402	1-162-915-11	CERAMIC CHIP	10PF	0.5PF	50V
C404	1-125-889-11	CERAMIC CHIP	2.2uF	10%	10V
C406	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C408	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C409	1-107-826-11	CERAMIC CHIP	0.1uF	10%	16V
C412	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C413	1-107-826-11	CERAMIC CHIP	0.1uF	10%	16V
C414	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C415	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C416	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C417	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C418	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C421	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C422	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C423	1-164-156-11	CERAMIC CHIP	0.1uF		25V (AEP2)
C431	1-125-889-91	CERAMIC CHIP	2.2uF	10%	10V
C433	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C522	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C524	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C590	1-164-850-11	CERAMIC CHIP	10PF	0.5PF	50V
C591	1-164-850-11	CERAMIC CHIP	10PF	0.5PF	50V
C592	1-164-850-11	CERAMIC CHIP	10PF	0.5PF	50V
C593	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C594	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C595	1-126-210-21	ELECT CHIP	220uF	20%	4V
C596	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C597	1-126-210-21	ELECT CHIP	220uF	20%	4V
C598	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C599	1-117-681-11	ELECT CHIP	100uF	20%	16V
C600	1-164-156-11	CERAMIC CHIP	0.1uF		25V
C601	1-117-681-11	ELECT CHIP	100uF	20%	16V
C602	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C603	1-124-778-00	ELECT CHIP	22uF	20%	6.3V
C614	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C615	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C616	1-125-889-11	CERAMIC CHIP	2.2uF	10%	10V
C618	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C620	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C621	1-163-037-11	CERAMIC CHIP	0.022uF	10%	50V
C623	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C626	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C628	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C629	1-125-889-11	CERAMIC CHIP	2.2uF	10%	10V
C630	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C633	1-125-889-11	CERAMIC CHIP	2.2uF	10%	10V
C634	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C636	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C637	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C638	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C639	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C640	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1001	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1002	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1003	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1004	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1005	1-164-858-11	CERAMIC CHIP	22PF	5%	50V
C1006	1-164-858-11	CERAMIC CHIP	22PF	5%	50V
C1007	1-164-858-11	CERAMIC CHIP	22PF	5%	50V
C1008	1-164-858-11	CERAMIC CHIP	22PF	5%	50V
C1009	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C1010	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C1011	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C1012	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C1013	1-164-872-11	CERAMIC CHIP	82PF	5%	50V
C1014	1-164-872-11	CERAMIC CHIP	82PF	5%	50V
C1015	1-164-872-11	CERAMIC CHIP	82PF	5%	50V
C1016	1-164-872-11	CERAMIC CHIP	82PF	5%	50V
C1017	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C1018	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C1019	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C1020	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C1021	1-164-854-11	CERAMIC CHIP	15PF	5%	50V
C1022	1-164-854-11	CERAMIC CHIP	15PF	5%	50V
C1023	1-164-854-11	CERAMIC CHIP	15PF	5%	50V
C1024	1-164-854-11	CERAMIC CHIP	15PF	5%	50V
C1025	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1026	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1027	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1028	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1029	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C1030	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C1031	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C1032	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C1033	1-162-970-11	CERAMIC CHIP	0.01uF	10%	25V
C1034	1-126-210-21	ELECT CHIP	220uF	20%	4V
C1035	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1036	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1037	1-107-820-11	CERAMIC CHIP	0.1uF		16V

Ref. No.	Part No.	Description			Remarks
C1038	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1039	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1040	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1041	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1042	1-126-210-21	ELECT CHIP	220uF	20%	4V
C1043	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1044	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1045	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1046	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1047	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1048	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1049	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1050	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1051	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1052	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1053	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1054	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1055	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1056	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1057	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1058	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1059	1-124-779-00	ELECT CHIP	10uF	20%	16V
C1060	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1061	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1062	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1063	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1064	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1065	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1066	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1067	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1068	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1069	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1070	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1071	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1072	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1073	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1074	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1075	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1076	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1077	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1078	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1079	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1080	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1081	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1082	1-126-210-21	ELECT CHIP	220uF	20%	4V
C1083	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1084	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1085	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1086	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1087	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1088	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1089	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1090	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1091	1-126-210-21	ELECT CHIP	220uF	20%	4V
C1092	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1093	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1094	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C1095	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C1096	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1097	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1098	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1099	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1100	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1101	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1103	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1104	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1105	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1106	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C1107	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1108	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1109	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1110	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1111	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1112	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1113	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C1114	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1115	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1116	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1117	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1118	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1119	1-126-210-21	ELECT CHIP	220uF	20%	4V
C1120	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1121	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1122	1-117-681-11	ELECT CHIP	100uF	20%	16V

< CONNECTOR >

CN102	1-779-338-51	CONNECTOR, FFC/FPC 28P	
* CN103	1-569-940-11	SOCKET, CONNECTOR 24P	
* CN202	1-564-728-11	PIN, CONNECTOR (SMALL TYPE) 12P	
CN203	1-564-704-41	PIN, CONNECTOR (SMALL TYPE) 2P	

< DIODE >

* D302	6-501-864-01	DIODE	SM15T6V8A
D303	8-719-988-61	DIODE	1SS355TE-17
D304	8-719-988-61	DIODE	1SS355TE-17

< FERRITE BEAD >

F101	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F102	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F103	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F104	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F105	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F106	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F108	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F202	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F203	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	(AEP2)
F204	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	(AEP2)
F205	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	(AEP2)
F206	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	(AEP2)
F300	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F301	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F302	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F305	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F306	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F309	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F310	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F311	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	

Ref. No.	Part No.	Description	Remarks
F312	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F313	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F314	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F316	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F317	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F318	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F321	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F397	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
F398	1-543-949-22	BEAD, FERRITE (CHIP) (1608)	
		< IC >	
IC101	6-705-306-01	IC HYB25DC256160CE-6	
* IC104	6-711-077-01	IC KA5SDKAS01TSN	
IC106	6-711-206-01	IC uPD61111GM-200-UEV-A	
IC110	6-706-484-01	IC TC7SH04FU (T5RSOYJF)	
* IC201	6-711-207-01	IC CIMAX-SP2L (AEP2)	
IC202	6-710-050-01	IC TC74LCX245FK (EL) (AEP2)	
* IC203	6-711-290-01	IC TC74LCX373FK (EL, K) (AEP2)	
* IC204	6-711-290-01	IC TC74LCX373FK (EL, K) (AEP2)	
IC208	6-707-361-01	IC ST890BDR (AEP2)	
IC302	6-702-362-01	IC MM1563DFBE	
* IC304	6-711-026-01	IC MM1685ANRE	
* IC307	6-711-027-01	IC MM1689FHBE	
* IC309	6-711-146-01	IC FPF2007	
* IC311	6-708-075-01	IC uPC3221GV	
* IC312	6-711-026-01	IC MM1685ANRE	
* IC313	6-711-223-01	IC DRX3975D	
IC318	8-759-693-13	IC NJM12904V (TE2)	
IC320	6-708-708-01	IC MM1561FFBE	
IC1001	6-711-285-01	IC uPD64015AGM-UEU-A	
		< COIL >	
L304	1-412-938-61	INDUCTOR 0.82uH	
L314	1-469-110-21	FERRITE, EMI (SMD) (1608)	
L315	1-400-703-21	(3216, EMI FERRITE (SMD)	
L1001	1-412-951-11	INDUCTOR 10uH	
L1002	1-412-951-11	INDUCTOR 10uH	
L1003	1-412-951-11	INDUCTOR 10uH	
L1004	1-412-951-11	INDUCTOR 10uH	
L1005	1-412-954-11	INDUCTOR 18uH	
L1006	1-412-954-11	INDUCTOR 18uH	
L1007	1-412-954-11	INDUCTOR 18uH	
L1008	1-412-954-11	INDUCTOR 18uH	
		< TRANSISTOR >	
Q201	8-729-029-06	TRANSISTOR DTC124EUA-T106 (AEP2)	
Q202	8-729-028-86	TRANSISTOR DTA143EUA-T106 (AEP2)	
Q203	8-729-905-35	TRANSISTOR 2SC4081-R (AEP2)	
Q305	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q306	8-729-026-53	TRANSISTOR 2SA1576A-T106-QR	
Q307	8-729-905-35	TRANSISTOR 2SC4081-R	
Q308	8-729-905-35	TRANSISTOR 2SC4081-R	
Q309	8-729-029-09	TRANSISTOR DTC143EUA-T106	
Q310	8-729-029-09	TRANSISTOR DTC143EUA-T106	
Q312	8-729-029-06	TRANSISTOR DTC124EUA-T106	
Q1001	8-729-026-53	TRANSISTOR 2SA1576A-T106-QR	
Q1002	8-729-026-53	TRANSISTOR 2SA1576A-T106-QR	
Q1003	8-729-026-53	TRANSISTOR 2SA1576A-T106-QR	
Q1004	8-729-026-53	TRANSISTOR 2SA1576A-T106-QR	
Q1005	8-729-905-35	TRANSISTOR 2SC4081-R	
Q1006	8-729-905-35	TRANSISTOR 2SC4081-R	
Q1007	8-729-905-35	TRANSISTOR 2SC4081-R	
Q1008	8-729-905-35	TRANSISTOR 2SC4081-R	
		< RESISTOR >	
R100	1-218-990-81	SHORT CHIP 0	
R101	1-218-965-11	RES-CHIP 10K 5%	1/16W
R104	1-218-965-11	RES-CHIP 10K 5%	1/16W
R105	1-218-935-11	RES-CHIP 33 5%	1/16W
R107	1-216-864-11	SHORT CHIP 0	
R109	1-218-990-81	SHORT CHIP 0	
R110	1-218-938-11	RES-CHIP 56 5%	1/16W
R111	1-218-938-11	RES-CHIP 56 5%	1/16W
R114	1-218-935-11	RES-CHIP 33 5%	1/16W
R116	1-218-965-11	RES-CHIP 10K 5%	1/16W
R121	1-218-823-11	METAL CHIP 100 0.5%	1/10W
R122	1-218-823-11	METAL CHIP 100 0.5%	1/10W
R123	1-218-823-11	METAL CHIP 100 0.5%	1/10W
R124	1-218-823-11	METAL CHIP 100 0.5%	1/10W
R125	1-218-823-11	METAL CHIP 100 0.5%	1/10W
R126	1-218-823-11	METAL CHIP 100 0.5%	1/10W
R127	1-218-823-11	METAL CHIP 100 0.5%	1/10W
R128	1-218-823-11	METAL CHIP 100 0.5%	1/10W
R138	1-218-965-11	RES-CHIP 10K 5%	1/16W
R139	1-218-965-11	RES-CHIP 10K 5%	1/16W
R141	1-218-965-11	RES-CHIP 10K 5%	1/16W
R142	1-218-965-11	RES-CHIP 10K 5%	1/16W
R143	1-218-965-11	RES-CHIP 10K 5%	1/16W
R144	1-218-965-11	RES-CHIP 10K 5%	1/16W
R145	1-218-965-11	RES-CHIP 10K 5%	1/16W
R146	1-218-965-11	RES-CHIP 10K 5%	1/16W
R147	1-218-965-11	RES-CHIP 10K 5%	1/16W
R148	1-218-965-11	RES-CHIP 10K 5%	1/16W
R149	1-218-973-11	RES-CHIP 47K 5%	1/16W
R151	1-218-973-11	RES-CHIP 47K 5%	1/16W
R153	1-218-973-11	RES-CHIP 47K 5%	1/16W
R154	1-218-973-11	RES-CHIP 47K 5%	1/16W
R155	1-218-973-11	RES-CHIP 47K 5%	1/16W
R159	1-218-941-81	RES-CHIP 100 5%	1/16W
R160	1-218-941-81	RES-CHIP 100 5%	1/16W
R166	1-218-846-11	METAL CHIP 910 0.5%	1/10W
R167	1-218-846-11	METAL CHIP 910 0.5%	1/10W
R168	1-218-831-11	METAL CHIP 220 0.5%	1/10W
R169	1-218-827-11	METAL CHIP 150 0.5%	1/10W
R170	1-218-935-11	RES-CHIP 33 5%	1/16W
R172	1-218-965-11	RES-CHIP 10K 5%	1/16W
R173	1-218-990-81	SHORT CHIP 0	
R174	1-218-941-81	RES-CHIP 100 5%	1/16W
R179	1-218-965-11	RES-CHIP 10K 5%	1/16W
R182	1-218-990-81	SHORT CHIP 0	
R183	1-218-990-81	SHORT CHIP 0	
R185	1-234-714-11	RES, NETWORK 56 (1005X4)	
R186	1-234-714-11	RES, NETWORK 56 (1005X4)	
R187	1-234-791-21	RES, NETWORK 150X4 (2010)	
R188	1-234-372-11	RES, NETWORK 100 (1005X4)	
R189	1-234-372-11	RES, NETWORK 100 (1005X4)	
R190	1-234-372-11	RES, NETWORK 100 (1005X4)	
R191	1-234-372-11	RES, NETWORK 100 (1005X4)	
R192	1-234-372-11	RES, NETWORK 100 (1005X4)	
R193	1-234-714-11	RES, NETWORK 56 (1005X4)	

Ref. No.	Part No.	Description			Remarks
R194	1-234-714-11	RES, NETWORK	56 (1005X4)		
R197	1-218-990-81	SHORT CHIP	0		
R199	1-218-990-81	SHORT CHIP	0		
R201	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R202	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R203	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R204	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R205	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R206	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R207	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R208	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R209	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R210	1-218-990-81	SHORT CHIP	0 (AEP2)		
R211	1-218-965-11	RES-CHIP	10K	5%	1/16W (AEP2)
R213	1-218-937-11	RES-CHIP	47	5%	1/16W (AEP2)
R214	1-218-941-81	RES-CHIP	100	5%	1/16W (AEP2)
R215	1-218-941-81	RES-CHIP	100	5%	1/16W (AEP2)
R216	1-218-990-81	SHORT CHIP	0 (AEP2)		
R217	1-216-864-11	SHORT CHIP	0 (AEP2)		
R219	1-218-965-11	RES-CHIP	10K	5%	1/16W (AEP2)
R221	1-218-937-11	RES-CHIP	47	5%	1/16W (AEP2)
R222	1-218-965-11	RES-CHIP	10K	5%	1/16W (AEP2)
R223	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R224	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R225	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R226	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R227	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R228	1-234-371-21	RES, NETWORK	47 (1005X4) (AEP2)		
R229	1-218-965-11	RES-CHIP	10K	5%	1/16W (AEP2)
R230	1-218-965-11	RES-CHIP	10K	5%	1/16W
R231	1-218-952-11	RES-CHIP	820	5%	1/16W (AEP2)
R233	1-218-937-11	RES-CHIP	47	5%	1/16W (AEP2)
R234	1-218-937-11	RES-CHIP	47	5%	1/16W (AEP2)
R236	1-218-990-81	SHORT CHIP	0 (AEP2)		
R239	1-234-371-21	RES, NETWORK	47 (1005X4)		
R240	1-234-371-21	RES, NETWORK	47 (1005X4)		
R241	1-234-371-21	RES, NETWORK	47 (1005X4)		
R242	1-234-371-21	RES, NETWORK	47 (1005X4)		
R243	1-234-371-21	RES, NETWORK	47 (1005X4)		
R244	1-234-371-21	RES, NETWORK	47 (1005X4)		
R245	1-234-371-21	RES, NETWORK	47 (1005X4)		
R246	1-234-371-21	RES, NETWORK	47 (1005X4)		
R247	1-234-371-21	RES, NETWORK	47 (1005X4)		
R248	1-234-371-21	RES, NETWORK	47 (1005X4)		
R249	1-234-371-21	RES, NETWORK	47 (1005X4)		
R250	1-218-965-11	RES-CHIP	10K	5%	1/16W
R251	1-218-965-11	RES-CHIP	10K	5%	1/16W
R252	1-218-990-81	SHORT CHIP	0 (AEP2)		
R253	1-218-937-11	RES-CHIP	47	5%	1/16W
R254	1-218-937-11	RES-CHIP	47	5%	1/16W
R256	1-218-937-11	RES-CHIP	47	5%	1/16W (AEP2)
R257	1-218-937-11	RES-CHIP	47	5%	1/16W (AEP2)
R269	1-218-962-11	RES-CHIP	5.6K	5%	1/16W (AEP2)
R270	1-218-965-11	RES-CHIP	10K	5%	1/16W (AEP2)
R271	1-218-969-11	RES-CHIP	22K	5%	1/16W (AEP2)
R272	1-218-965-11	RES-CHIP	10K	5%	1/16W (AEP2)
R273	1-218-965-11	RES-CHIP	10K	5%	1/16W (AEP2)
R277	1-218-937-11	RES-CHIP	47	5%	1/16W (AEP2)
R278	1-234-372-11	RES, NETWORK	100 (1005X4) (AEP2)		
R279	1-234-372-11	RES, NETWORK	100 (1005X4) (AEP2)		
R280	1-234-372-11	RES, NETWORK	100 (1005X4) (AEP2)		
R281	1-218-965-11	RES-CHIP	10K	5%	1/16W (AEP2)
R300	1-216-864-11	SHORT CHIP	0		
R303	1-216-864-11	SHORT CHIP	0		
R304	1-216-833-11	METAL CHIP	10K	5%	1/10W
R305	1-216-864-11	SHORT CHIP	0		
R306	1-216-864-11	SHORT CHIP	0		
R308	1-218-867-11	METAL CHIP	6.8K	0.5%	1/10W
R309	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R310	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R311	1-216-819-11	METAL CHIP	680	5%	1/10W
R312	1-216-809-11	METAL CHIP	100	5%	1/10W
R313	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R314	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R315	1-218-965-11	RES-CHIP	10K	5%	1/16W
R316	1-216-829-11	METAL CHIP	4.7K	5%	1/10W
R317	1-218-867-11	METAL CHIP	6.8K	0.5%	1/10W
R318	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R319	1-218-973-11	RES-CHIP	47K	5%	1/16W
R320	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R321	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R322	1-216-839-11	METAL CHIP	33K	5%	1/10W
R323	1-216-864-11	SHORT CHIP	0		
R325	1-216-833-11	METAL CHIP	10K	5%	1/10W
R326	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R327	1-218-867-11	METAL CHIP	6.8K	0.5%	1/10W
R331	1-216-823-11	METAL CHIP	1.5K	5%	1/10W
R333	1-216-809-11	METAL CHIP	100	5%	1/10W
R336	1-216-864-11	SHORT CHIP	0		
R337	1-216-864-11	SHORT CHIP	0		
R341	1-218-960-11	RES-CHIP	3.9K	5%	1/16W
R342	1-218-960-11	RES-CHIP	3.9K	5%	1/16W
R343	1-216-864-11	SHORT CHIP	0		
R344	1-216-864-11	SHORT CHIP	0		
R345	1-216-864-11	SHORT CHIP	0		
R346	1-216-864-11	SHORT CHIP	0		
R347	1-216-864-11	SHORT CHIP	0		
R348	1-216-864-11	SHORT CHIP	0		
R349	1-216-864-11	SHORT CHIP	0		
R350	1-216-864-11	SHORT CHIP	0		

Ref. No.	Part No.	Description			Remarks
R351	1-218-965-11	RES-CHIP	10K	5%	1/16W
R352	1-218-965-11	RES-CHIP	10K	5%	1/16W
R353	1-218-969-11	RES-CHIP	22K	5%	1/16W
R354	1-216-864-11	SHORT CHIP	0		
R355	1-216-864-11	SHORT CHIP	0		
R356	1-216-864-11	SHORT CHIP	0		
R357	1-216-864-11	SHORT CHIP	0		
R358	1-218-969-11	RES-CHIP	22K	5%	1/16W
R359	1-218-965-11	RES-CHIP	10K	5%	1/16W
R361	1-216-864-11	SHORT CHIP	0 (AEP2)		
R363	1-218-965-11	RES-CHIP	10K	5%	1/16W
R527	1-218-990-81	SHORT CHIP	0		
R528	1-218-990-81	SHORT CHIP	0		
R529	1-218-990-81	SHORT CHIP	0		
R530	1-218-990-81	SHORT CHIP	0		
R531	1-218-990-81	SHORT CHIP	0		
R532	1-218-990-81	SHORT CHIP	0		
R534	1-218-990-81	SHORT CHIP	0		
R535	1-218-969-11	RES-CHIP	22K	5%	1/16W
R538	1-218-969-11	RES-CHIP	22K	5%	1/16W
R540	1-218-969-11	RES-CHIP	22K	5%	1/16W
R542	1-218-969-11	RES-CHIP	22K	5%	1/16W
R544	1-218-969-11	RES-CHIP	22K	5%	1/16W
R546	1-218-969-11	RES-CHIP	22K	5%	1/16W
R547	1-218-969-11	RES-CHIP	22K	5%	1/16W
R550	1-218-969-11	RES-CHIP	22K	5%	1/16W
R551	1-218-969-11	RES-CHIP	22K	5%	1/16W
R554	1-218-969-11	RES-CHIP	22K	5%	1/16W
R556	1-218-969-11	RES-CHIP	22K	5%	1/16W
R558	1-218-969-11	RES-CHIP	22K	5%	1/16W
R560	1-218-969-11	RES-CHIP	22K	5%	1/16W
R561	1-218-969-11	RES-CHIP	22K	5%	1/16W
R564	1-218-969-11	RES-CHIP	22K	5%	1/16W
R566	1-218-969-11	RES-CHIP	22K	5%	1/16W
R568	1-218-969-11	RES-CHIP	22K	5%	1/16W
R569	1-218-941-81	RES-CHIP	100	5%	1/16W
R570	1-218-941-81	RES-CHIP	100	5%	1/16W
R571	1-218-990-81	SHORT CHIP	0		
R572	1-218-990-81	SHORT CHIP	0		
R575	1-218-965-11	RES-CHIP	10K	5%	1/16W
R576	1-218-965-11	RES-CHIP	10K	5%	1/16W
R577	1-218-990-81	SHORT CHIP	0		
R579	1-218-965-11	RES-CHIP	10K	5%	1/16W
R580	1-218-965-11	RES-CHIP	10K	5%	1/16W
R589	1-218-990-81	SHORT CHIP	0		
R594	1-218-938-11	RES-CHIP	56	5%	1/16W
R595	1-218-938-11	RES-CHIP	56	5%	1/16W
R597	1-218-939-11	RES-CHIP	68	5%	1/16W
R598	1-218-939-11	RES-CHIP	68	5%	1/16W
R605	1-218-990-81	SHORT CHIP	0		
R606	1-218-990-81	SHORT CHIP	0		
R607	1-218-990-81	SHORT CHIP	0		
R608	1-218-937-11	RES-CHIP	47	5%	1/16W
R609	1-218-937-11	RES-CHIP	47	5%	1/16W
R610	1-218-937-11	RES-CHIP	47	5%	1/16W
R616	1-218-937-11	RES-CHIP	47	5%	1/16W
R621	1-218-969-11	RES-CHIP	22K	5%	1/16W
R622	1-218-969-11	RES-CHIP	22K	5%	1/16W
R623	1-218-990-81	SHORT CHIP	0		
R624	1-234-400-21	CONDUCTOR, NETWORK	(1005X4) (AEP2)		

Ref. No.	Part No.	Description			Remarks
R625	1-234-400-21	CONDUCTOR, NETWORK	(1005X4) (AEP2)		
R626	1-234-400-21	CONDUCTOR, NETWORK	(1005X4) (AEP2)		
R627	1-234-400-21	CONDUCTOR, NETWORK	(1005X4) (AEP1,AEP3,UK,AUS)		
R628	1-234-400-21	CONDUCTOR, NETWORK	(1005X4) (AEP1,AEP3,UK,AUS)		
R629	1-234-400-21	CONDUCTOR, NETWORK	(1005X4) (AEP1,AEP3,UK,AUS)		
R641	1-234-400-21	CONDUCTOR, NETWORK	(1005X4)		
R642	1-218-990-81	SHORT CHIP	0		
R643	1-218-990-81	SHORT CHIP	0		
R644	1-216-864-11	SHORT CHIP	0		
R650	1-216-295-91	SHORT CHIP	0		
R651	1-216-864-11	SHORT CHIP	0		
R660	1-218-847-11	METAL CHIP	1K	0.5%	1/10W
R661	1-218-847-11	METAL CHIP	1K	0.5%	1/10W
R662	1-216-864-11	SHORT CHIP	0		
R666	1-216-864-11	SHORT CHIP	0		
R668	1-216-864-11	SHORT CHIP	0		
R671	1-216-857-11	METAL CHIP	1M	5%	1/10W
R672	1-216-820-11	METAL CHIP	820	5%	1/10W
R673	1-216-864-11	SHORT CHIP	0		
R674	1-216-864-11	SHORT CHIP	0		
R678	1-234-372-11	RES, NETWORK	100 (1005X4) (AEP1,AEP3,UK,AUS)		
R678	1-242-963-21	RES, NETWORK	33 (1005X4) (AEP2)		
R679	1-234-372-11	RES, NETWORK	100 (1005X4) (AEP1,AEP3,UK,AUS)		
R679	1-242-963-21	RES, NETWORK	33 (1005X4) (AEP2)		
R680	1-216-809-11	METAL CHIP	100	5%	1/10W (AEP1,AEP3,UK,AUS)
R680	1-216-803-11	METAL CHIP	33	5%	1/10W (AEP2)
R681	1-216-809-11	METAL CHIP	100	5%	1/10W (AEP1,AEP3,UK,AUS)
R681	1-216-803-11	METAL CHIP	33	5%	1/10W (AEP2)
R682	1-216-809-11	METAL CHIP	100	5%	1/10W (AEP1,AEP3,UK,AUS)
R682	1-216-803-11	METAL CHIP	33	5%	1/10W (AEP2)
R683	1-216-864-11	SHORT CHIP	0		
R685	1-216-833-11	METAL CHIP	10K	5%	1/10W
R686	1-216-833-11	METAL CHIP	10K	5%	1/10W
R687	1-216-811-11	METAL CHIP	150	5%	1/10W
R688	1-216-864-11	SHORT CHIP	0		
R689	1-216-864-11	SHORT CHIP	0		
R690	1-216-864-11	SHORT CHIP	0		
R691	1-216-864-11	SHORT CHIP	0		
R692	1-216-864-11	SHORT CHIP	0		
R693	1-216-864-11	SHORT CHIP	0		
R694	1-242-963-21	RES, NETWORK	33 (1005X4)		
R695	1-242-963-21	RES, NETWORK	33 (1005X4)		
R696	1-242-963-21	RES, NETWORK	33 (1005X4)		
R698	1-218-935-11	RES-CHIP	33	5%	1/16W
R699	1-218-935-11	RES-CHIP	33	5%	1/16W
R700	1-218-935-11	RES-CHIP	33	5%	1/16W
R701	1-218-935-11	RES-CHIP	33	5%	1/16W
R702	1-218-935-11	RES-CHIP	33	5%	1/16W
R703	1-216-295-91	SHORT CHIP	0		

Ref. No.	Part No.	Description			Remarks
R704	1-218-935-11	RES-CHIP	33	5%	1/16W
R705	1-218-935-11	RES-CHIP	33	5%	1/16W
R706	1-218-935-11	RES-CHIP	33	5%	1/16W
R707	1-218-935-11	RES-CHIP	33	5%	1/16W
R709	1-218-965-11	RES-CHIP	10K	5%	1/16W
R714	1-216-295-91	SHORT CHIP	0		
R715	1-218-990-81	SHORT CHIP	0		
R719	1-218-971-11	RES-CHIP	33K	5%	1/16W
R720	1-218-965-11	RES-CHIP	10K	5%	1/16W
R721	1-234-372-11	RES, NETWORK	100 (1005X4)		
R722	1-234-372-11	RES, NETWORK	100 (1005X4)		
R723	1-234-791-21	RES, NETWORK	150X4 (2010)		
R724	1-234-791-21	RES, NETWORK	150X4 (2010)		
R725	1-218-965-11	RES-CHIP	10K	5%	1/16W
R726	1-218-965-11	RES-CHIP	10K	5%	1/16W
R728	1-218-990-81	SHORT CHIP	0		
R729	1-218-990-81	SHORT CHIP	0		
R733	1-218-990-81	SHORT CHIP	0		
R1001	1-218-937-11	RES-CHIP	47	5%	1/16W
R1002	1-218-937-11	RES-CHIP	47	5%	1/16W
R1003	1-218-937-11	RES-CHIP	47	5%	1/16W
R1004	1-218-937-11	RES-CHIP	47	5%	1/16W
R1017	1-218-947-11	RES-CHIP	330	5%	1/16W
R1018	1-218-947-11	RES-CHIP	330	5%	1/16W
R1019	1-218-947-11	RES-CHIP	330	5%	1/16W
R1020	1-218-947-11	RES-CHIP	330	5%	1/16W
R1021	1-218-839-11	METAL CHIP	470	0.5%	1/10W
R1022	1-218-839-11	METAL CHIP	470	0.5%	1/10W
R1023	1-218-839-11	METAL CHIP	470	0.5%	1/10W
R1024	1-218-839-11	METAL CHIP	470	0.5%	1/10W
R1025	1-208-893-11	METAL CHIP	1.8K	0.5%	1/16W
R1026	1-208-893-11	METAL CHIP	1.8K	0.5%	1/16W
R1027	1-208-893-11	METAL CHIP	1.8K	0.5%	1/16W
R1028	1-208-893-11	METAL CHIP	1.8K	0.5%	1/16W
R1029	1-218-929-11	RES-CHIP	10	5%	1/16W
R1030	1-218-929-11	RES-CHIP	10	5%	1/16W
R1031	1-218-929-11	RES-CHIP	10	5%	1/16W
R1032	1-218-929-11	RES-CHIP	10	5%	1/16W
R1033	1-218-951-11	RES-CHIP	680	5%	1/16W
R1034	1-218-951-11	RES-CHIP	680	5%	1/16W
R1035	1-218-951-11	RES-CHIP	680	5%	1/16W
R1036	1-218-951-11	RES-CHIP	680	5%	1/16W
R1037	1-218-973-11	RES-CHIP	47K	5%	1/16W
R1038	1-218-973-11	RES-CHIP	47K	5%	1/16W
R1039	1-218-973-11	RES-CHIP	47K	5%	1/16W
R1040	1-234-378-21	RES, NETWORK	10K (1005X4)		
R1042	1-234-372-11	RES, NETWORK	100 (1005X4)		
R1043	1-234-372-11	RES, NETWORK	100 (1005X4)		
R1044	1-234-372-11	RES, NETWORK	100 (1005X4)		
R1045	1-234-372-11	RES, NETWORK	100 (1005X4)		
R1046	1-218-941-81	RES-CHIP	100	5%	1/16W
R1047	1-234-372-11	RES, NETWORK	100 (1005X4)		
R1048	1-234-372-11	RES, NETWORK	100 (1005X4)		
R1049	1-218-990-81	SHORT CHIP	0		
R1050	1-234-372-11	RES, NETWORK	100 (1005X4)		
R1051	1-234-372-11	RES, NETWORK	100 (1005X4)		
R1052	1-234-372-11	RES, NETWORK	100 (1005X4)		
R1053	1-218-953-11	RES-CHIP	1K	5%	1/16W
R1054	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1055	1-218-973-11	RES-CHIP	47K	5%	1/16W

Ref. No.	Part No.	Description			Remarks
R1057	1-216-864-11	SHORT CHIP	0		
R1058	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1059	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1060	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R1061	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
		< TRANSFORMER >			
* T300	1-445-211-11	TRANSFORMER, HIGH-FREQUENCY			
		< TUNER >			
⚠U301	1-693-743-11	TUNER (TUPADTC-D101HB)			
		< VIBRATOR >			
* X300	1-813-966-21	VIBRATOR, CRYSTAL (SMD, 20MHz)			
		FL-178 (BG) BOARD (not supplied) (AEP, UK)			
		FL-178 (1640 HCA) BOARD (not supplied) (AUS)			
		(Ref.No.;30000 series)			
		**********			
		< CAPACITOR >			
C101	1-115-156-11	CERAMIC CHIP	1uF		10V
C102	1-115-156-11	CERAMIC CHIP	1uF		10V
C107	1-107-726-91	CERAMIC CHIP	0.01uF	10%	16V
C111	1-125-972-61	ELECT	100uF	20%	16V
		< CONNECTOR >			
CN103	1-785-828-21	CONNECTOR, SQUARE TYPE 4P			
CN105	1-817-693-11	CONNECTOR, USB (B)			
CN106	1-815-381-11	CONNECTOR, FPC/FFC 5P			
		< IC >			
IC101	6-600-392-01	IC GP1UM27XK0SF			
		< COIL >			
L102	1-400-180-21	INDUCTOR, EMI FERRITE (1608)			
L103	1-400-180-21	INDUCTOR, EMI FERRITE (1608)			
L104	1-400-180-21	INDUCTOR, EMI FERRITE (1608)			
L105	1-400-180-21	INDUCTOR, EMI FERRITE (1608)			
		< RESISTOR >			
R104	1-216-803-11	METAL CHIP	33	5%	1/10W
R105	1-216-803-11	METAL CHIP	33	5%	1/10W
R108	1-216-803-11	METAL CHIP	33	5%	1/10W
R109	1-216-803-11	METAL CHIP	33	5%	1/10W
R112	1-216-864-11	SHORT CHIP	0		
R113	1-216-864-11	SHORT CHIP	0		
		< SWITCH >			
S101	1-771-410-21	SWITCH, TACTILE (**I**/⏻(POWER))			
S102	1-771-410-21	SWITCH, TACTILE (ONE TOUCH DUB)			
		< VARISTOR >			
VDR102	1-802-071-21	VARISTOR, CHIP			
VDR104	1-802-071-21	VARISTOR, CHIP			

Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

FR-274

Ref. No.	Part No.	Description				Remarks
		FR-274 (BG) BOARD (not supplied) (AEP, UK)				
		FR-274 (1640 HCA) BOARD (not supplied) (AUS)				
		(Ref.No.;30000 series)				
		**********				
*	2-319-520-01	SPACER, FL				
		< CAPACITOR >				
	C201	1-128-111-11	ELECT	100uF	20%	25V
	C204	1-164-230-11	CERAMIC CHIP	220PF	5%	50V
	C206	1-164-230-11	CERAMIC CHIP	220PF	5%	50V
*	C207	1-107-377-21	MYLAR	0.0027uF	5%	200V
	C211	1-107-826-11	CERAMIC CHIP	0.1uF	10%	16V
	C213	1-131-992-91	CERAMIC CHIP	100000PF		35V
	C215	1-115-339-11	CERAMIC CHIP	0.1uF	10%	50V
	C216	1-128-131-11	ELECT	22uF	20%	50V
	C217	1-115-339-11	CERAMIC CHIP	0.1uF	10%	50V
	C221	1-107-726-91	CERAMIC CHIP	0.01uF	10%	16V
	C222	1-107-726-91	CERAMIC CHIP	0.01uF	10%	16V
	C223	1-115-339-11	CERAMIC CHIP	0.1uF	10%	50V
		< CONNECTOR >				
	CN201	1-815-381-11	CONNECTOR, FPC/FFC 5P			
	CN202	1-563-614-31	HOUSING, CONNECTOR 11P			
	CN203	1-784-739-11	CONNECTOR, FFC 17P			
		< DIODE >				
	D202	8-719-067-40	DIODE STZ6.8N-T146			
	D203	8-719-067-40	DIODE STZ6.8N-T146			
	D204	8-719-067-40	DIODE STZ6.8N-T146			
	D205	8-719-067-40	DIODE STZ6.8N-T146			
	D206	8-719-067-40	DIODE STZ6.8N-T146			
	D207	8-719-067-40	DIODE STZ6.8N-T146			
	D208	8-719-988-61	DIODE 1SS355TE-17			
	D209	8-719-988-61	DIODE 1SS355TE-17			
	D210	8-719-988-61	DIODE 1SS355TE-17			
	D211	8-719-988-61	DIODE 1SS355TE-17			
*	D212	6-501-884-01	DIODE SDPB31H3C0100			
	D214	6-501-437-01	DIODE SLI-343YC3F			
	D216	8-719-056-82	DIODE MM3Z6V2ST1			
		< FERRITE BEAD >				
	FB201	1-414-228-11	INDUCTOR, FERRITE BEAD			
	FB202	1-414-228-11	INDUCTOR, FERRITE BEAD			
		< IC >				
	IC201	6-701-729-01	IC PT6315			
		< JACK >				
	J201	1-780-049-11	TERMINAL BOARD (S TERMINAL+3P)			
		< COIL >				
	L201	1-411-919-11	INDUCTOR 100uH			
		< FLUORESCENT INDICATOR TUBE >				
	ND201	1-519-964-11	INDICATOR TUBE, FLUORESCENT			

Ref. No.	Part No.	Description			Remarks
		< TRANSISTOR >			
Q201	8-729-052-91	TRANSISTOR	2SD1898T100R		
Q202	8-729-052-91	TRANSISTOR	2SD1898T100R		
Q203	8-729-904-87	TRANSISTOR	2SB1197K-R		
Q204	8-729-421-19	TRANSISTOR	UN2213		
Q205	8-729-029-06	TRANSISTOR	DTC124EUA-T106		
Q206	8-729-029-10	TRANSISTOR	DTC143TUA-T106		
		< RESISTOR >			
R201	1-216-295-91	SHORT CHIP	0		
R205	1-216-864-11	SHORT CHIP	0		
R206	1-216-864-11	SHORT CHIP	0		
R207	1-216-864-11	SHORT CHIP	0		
R209	1-216-833-11	METAL CHIP	10K	5%	1/10W
R213	1-216-864-11	SHORT CHIP	0		
R215	1-216-830-11	METAL CHIP	5.6K	5%	1/10W
R217	1-216-833-11	METAL CHIP	10K	5%	1/10W
R218	1-216-849-11	METAL CHIP	220K	5%	1/10W
R220	1-216-849-11	METAL CHIP	220K	5%	1/10W
R222	1-216-295-91	SHORT CHIP	0		
R223	1-216-826-11	METAL CHIP	2.7K	5%	1/10W
R225	1-216-814-11	METAL CHIP	270	5%	1/10W
R227	1-216-838-11	METAL CHIP	27K	5%	1/10W
R228	1-216-833-11	METAL CHIP	10K	5%	1/10W
R229	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R230	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R231	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R232	1-216-864-11	SHORT CHIP	0		
R233	1-216-845-11	METAL CHIP	100K	5%	1/10W
R235	1-216-864-11	SHORT CHIP	0		
R236	1-216-833-11	METAL CHIP	10K	5%	1/10W
R237	1-216-833-11	METAL CHIP	10K	5%	1/10W
R238	1-216-833-11	METAL CHIP	10K	5%	1/10W
R239	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R240	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R241	1-216-827-11	METAL CHIP	3.3K	5%	1/10W
R242	1-216-830-11	METAL CHIP	5.6K	5%	1/10W
R243	1-216-833-11	METAL CHIP	10K	5%	1/10W
R244	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R245	1-216-825-11	METAL CHIP	2.2K	5%	1/10W
R246	1-216-827-11	METAL CHIP	3.3K	5%	1/10W
R248	1-216-827-11	METAL CHIP	3.3K	5%	1/10W
R250	1-216-805-11	METAL CHIP	47	5%	1/10W
R251	1-216-805-11	METAL CHIP	47	5%	1/10W
R252	1-216-805-11	METAL CHIP	47	5%	1/10W
		< SWITCH >			
S201	1-771-410-21	SWITCH, TACTILE (⏏ (OPEN/CLOSE))			
S203	1-786-726-11	SWITCH, TACTILE (■ (REC STOP))			
S204	1-771-410-21	SWITCH, TACTILE (INPUT SELECT)			
S207	1-786-726-11	SWITCH, TACTILE (● (REC))			
S208	1-771-410-21	SWITCH, TACTILE (CHANNEL +)			
S209	1-771-410-21	SWITCH, TACTILE (CHANNEL -)			
S210	1-786-726-11	SWITCH, TACTILE (► (PLAY))			
S211	1-786-726-11	SWITCH, TACTILE (■ (STOP))			
S212	1-786-726-11	SWITCH, TACTILE (DVD)			
S213	1-786-726-11	SWITCH, TACTILE (HDD)			

Ref. No.	Part No.	Description			Remarks
		< TRANSFORMER >			
* T201	1-445-207-11	TRANSFORMER, DC-DC CONVERTER			
		RD-65 (BS) BOARD (not supplied) (AEP, UK)			
		RD-65 (DS) EM BOARD (not supplied) (AUS)			
		(Ref.No.;20000 series)			
		**********			
		< CAPACITOR >			
C100	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C101	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C103	1-126-210-21	ELECT CHIP	220uF	20%	4V
C104	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C105	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C106	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C107	1-164-936-11	CERAMIC CHIP	680PF	10%	50V
C113	1-100-581-81	CERAMIC CHIP	0.0047uF	10%	50V
C114	1-100-581-81	CERAMIC CHIP	0.0047uF	10%	50V
C115	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C116	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C117	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C120	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C121	1-164-939-11	CERAMIC CHIP	0.0022uF	10%	50V
C122	1-164-939-11	CERAMIC CHIP	0.0022uF	10%	50V
C124	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C125	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C127	1-119-923-11	CERAMIC CHIP	0.047uF	10%	10V
C128	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C129	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C130	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C131	1-137-987-81	CERAMIC CHIP	0.068uF	10%	10V
C133	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C134	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C135	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C136	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C137	1-164-942-11	CERAMIC CHIP	0.0068uF	10%	16V
C140	1-100-415-91	CERAMIC CHIP	0.47uF	10%	6.3V
C141	1-100-415-91	CERAMIC CHIP	0.47uF	10%	6.3V
C142	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C143	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C144	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C145	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C146	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C149	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C152	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C153	1-124-779-00	ELECT CHIP	10uF	20%	16V
C154	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C155	1-100-415-91	CERAMIC CHIP	0.47uF	10%	6.3V
C156	1-165-448-81	CERAMIC CHIP	0.0018uF	10%	50V
C157	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C158	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C159	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C162	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C163	1-126-210-21	ELECT CHIP	220uF	20%	4V
C164	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C165	1-164-858-11	CERAMIC CHIP	22PF	5%	50V
C166	1-164-858-11	CERAMIC CHIP	22PF	5%	50V
C167	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C169	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C170	1-164-866-11	CERAMIC CHIP	47PF	5%	50V
C171	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C172	1-164-866-11	CERAMIC CHIP	47PF	5%	50V
C173	1-164-866-11	CERAMIC CHIP	47PF	5%	50V
C174	1-164-866-11	CERAMIC CHIP	47PF	5%	50V
C176	1-164-858-11	CERAMIC CHIP	22PF	5%	50V
C177	1-164-858-11	CERAMIC CHIP	22PF	5%	50V
C180	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C181	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C182	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C187	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C188	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C189	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C194	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C197	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C199	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C201	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C202	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C280	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C281	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C282	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C283	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C284	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C285	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C286	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C287	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C288	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C289	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C290	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C291	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C501	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C503	1-162-962-11	CERAMIC CHIP	470PF	10%	50V
C504	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C505	1-100-566-91	CERAMIC CHIP	0.1uF	10%	25V
C508	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C509	1-164-862-11	CERAMIC CHIP	33PF	5%	50V
C510	1-164-870-11	CERAMIC CHIP	68PF	5%	50V
C511	1-127-573-11	CERAMIC CHIP	1uF	10%	16V
C512	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C513	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C514	1-100-566-91	CERAMIC CHIP	0.1uF	10%	25V
C515	1-100-566-91	CERAMIC CHIP	0.1uF	10%	25V
C516	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C532	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1001	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1002	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1003	1-126-209-11	ELECT CHIP	100uF	20%	4V
C1004	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1005	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1006	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1007	1-126-210-21	ELECT CHIP	220uF	20%	4V
C1008	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1009	1-126-210-21	ELECT CHIP	220uF	20%	4V
C1010	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1011	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1012	1-126-209-11	ELECT CHIP	100uF	20%	4V
C1013	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1014	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1015	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1016	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V

Ref. No.	Part No.	Description			Remarks
C1017	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1018	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1019	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1020	1-124-779-00	ELECT CHIP	10uF	20%	16V
C1021	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C1022	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1023	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1024	1-126-209-11	ELECT CHIP	100uF	20%	4V
C1025	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1026	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1027	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1028	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1029	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1030	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1031	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1032	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1033	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1034	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1035	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1036	1-126-209-11	ELECT CHIP	100uF	20%	4V
C1037	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1038	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1039	1-126-209-11	ELECT CHIP	100uF	20%	4V
C1040	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1041	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1044	1-164-840-11	CERAMIC CHIP	1P	0.25PF	50V (AUS)
C1044	1-164-842-11	CERAMIC CHIP	2PF	0.25PF	50V (AEP, UK)
C1045	1-164-840-11	CERAMIC CHIP	1P	0.25PF	50V (AUS)
C1045	1-164-842-11	CERAMIC CHIP	2PF	0.25PF	50V (AEP, UK)
C1047	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C1048	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1049	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1050	1-126-209-11	ELECT CHIP	100uF	20%	4V
C1051	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C1052	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1053	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1056	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1057	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1058	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C1059	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1060	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1061	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1062	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1063	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1064	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1065	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1066	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1067	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1068	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1101	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1104	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1105	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1113	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1202	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1203	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1204	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1205	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C1206	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C1207	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1208	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1209	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1210	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1211	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1212	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1213	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1214	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1215	1-126-209-11	ELECT CHIP	100uF	20%	4V
C1216	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1217	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1218	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1219	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1220	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1221	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1222	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1223	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1224	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C1225	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C1226	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1227	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1228	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1229	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C1230	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1231	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C1235	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C1236	1-126-209-11	ELECT CHIP	100uF	20%	4V
C1291	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1301	1-125-889-91	CERAMIC CHIP	2.2uF	10%	10V
C1302	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1303	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1304	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C1312	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1313	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C1315	1-125-889-11	CERAMIC CHIP	2.2uF	10%	10V
C1316	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C1401	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C1421	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1801	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1802	1-125-889-11	CERAMIC CHIP	2.2uF	10%	10V
C1803	1-164-882-11	CERAMIC CHIP	220PF	5%	16V
C1804	1-164-934-11	CERAMIC CHIP	330PF	10%	50V
C1805	1-119-923-11	CERAMIC CHIP	0.047uF	10%	10V
C1811	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C1812	1-125-889-11	CERAMIC CHIP	2.2uF	10%	10V
C1813	1-164-874-11	CERAMIC CHIP	100PF	5%	50V
C1814	1-164-878-11	CERAMIC CHIP	150PF	5%	50V
C1815	1-119-923-11	CERAMIC CHIP	0.047uF	10%	10V
C2305	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C2501	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C2502	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C2503	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C2504	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C2505	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C2506	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C3103	1-117-681-11	ELECT CHIP	100uF	20%	16V
C3104	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C3105	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C3106	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C3107	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C3108	1-126-210-21	ELECT CHIP	220uF	20%	4V

Ref. No.	Part No.	Description			Remarks
C3201	1-126-916-11	ELECT	1000uF	20%	6.3V
C3202	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C3203	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C3204	1-164-934-11	CERAMIC CHIP	330PF	10%	50V
C3206	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C3207	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C3211	1-117-681-11	ELECT CHIP	100uF	20%	16V
C3212	1-107-820-11	CERAMIC CHIP	0.1uF		16V
* C3213	1-100-741-81	CERAMIC CHIP	560PF	5%	50V
* C3214	1-100-741-81	CERAMIC CHIP	560PF	5%	50V
C3215	1-164-872-11	CERAMIC CHIP	82PF	5%	50V
C3216	1-164-872-11	CERAMIC CHIP	82PF	5%	50V
C3217	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C3218	1-117-681-11	ELECT CHIP	100uF	20%	16V
C3219	1-126-210-21	ELECT CHIP	220uF	20%	4V
C3220	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C3301	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C3302	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V
C3303	1-164-845-11	CERAMIC CHIP	5PF		50V (AUS)
C3303	1-164-854-11	CERAMIC CHIP	15PF	5%	50V (AEP, UK)
C3304	1-164-870-81	CERAMIC CHIP	68PF	5%	50V (AUS)
C3304	1-164-872-11	CERAMIC CHIP	82PF	5%	50V (AEP, UK)
C3305	1-164-854-11	CERAMIC CHIP	15PF	5%	50V (AUS)
C3305	1-164-858-11	CERAMIC CHIP	22PF	5%	50V (AEP, UK)
C3307	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C3311	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V (AUS)
C3312	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V (AUS)
C3313	1-100-966-91	CERAMIC CHIP	10uF	20%	10V (AUS)
C3313	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (AEP, UK)
C3314	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V (AUS)
C3315	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V (AUS)
C3316	1-164-845-11	CERAMIC CHIP	5PF		50V (AUS)
C3317	1-164-870-11	CERAMIC CHIP	68PF	5%	50V (AUS)
C3318	1-164-854-11	CERAMIC CHIP	15PF	5%	50V (AUS)
C3319	1-100-966-91	CERAMIC CHIP	10uF	20%	10V (AUS)
C3319	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (AEP, UK)
C3320	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V (AUS)
C3321	1-162-912-11	CERAMIC CHIP	7PF	0.5PF	50V (AUS)
C3322	1-164-845-11	CERAMIC CHIP	5PF		50V (AUS)
C3323	1-164-870-11	CERAMIC CHIP	68PF	5%	50V (AUS)
C3324	1-164-854-11	CERAMIC CHIP	15PF	5%	50V (AUS)
C3325	1-100-966-91	CERAMIC CHIP	10uF	20%	10V (AUS)
C3325	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V (AEP, UK)
C3329	1-164-845-11	CERAMIC CHIP	5PF		50V (AUS)
C3330	1-164-870-11	CERAMIC CHIP	68PF	5%	50V (AUS)
C3331	1-164-854-11	CERAMIC CHIP	15PF	5%	50V (AUS)
C3332	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C3333	1-114-130-11	CERAMIC CHIP	1uF		6.3V (AUS)
C3334	1-114-130-11	CERAMIC CHIP	1uF		6.3V (AUS)
C3335	1-114-130-11	CERAMIC CHIP	1uF		6.3V (AUS)
C3339	1-114-130-11	CERAMIC CHIP	1uF		6.3V (AUS)
C3340	1-114-130-11	CERAMIC CHIP	1uF		6.3V (AUS)
C3341	1-114-130-11	CERAMIC CHIP	1uF		6.3V (AUS)
C3342	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C3701	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C3703	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C3704	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C3705	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C3706	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C3707	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C3738	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C3801	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C3802	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C3803	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C3804	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4501	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4502	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4503	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4504	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C4505	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4506	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C4507	1-117-681-11	ELECT CHIP	100uF	20%	16V
C4508	1-126-210-21	ELECT CHIP	220uF	20%	4V
C4509	1-126-210-21	ELECT CHIP	220uF	20%	4V
C4511	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C4513	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C4515	1-126-205-11	ELECT CHIP	47uF	20%	6.3V
C4516	1-124-779-00	ELECT CHIP	10uF	20%	16V
C4522	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4524	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C4525	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C4526	1-218-967-11	RES-CHIP	15K	5%	1/16W
C4531	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4532	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C4533	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4534	1-100-966-91	CERAMIC CHIP	10uF	20%	10V
C4535	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C4536	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C4537	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C4539	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C4540	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C4541	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4542	1-125-889-11	CERAMIC CHIP	2.2uF	10%	10V

Ref. No.	Part No.	Description			Remarks
C4543	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C4553	1-162-964-11	CERAMIC CHIP	0.001uF	10%	50V
C4555	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C4556	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C4557	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C4558	1-117-681-11	ELECT CHIP	100uF	20%	16V
C4559	1-117-681-11	ELECT CHIP	100uF	20%	16V
C4562	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4563	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4567	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4570	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4571	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C4572	1-126-210-21	ELECT CHIP	220uF	20%	4V
C4573	1-127-760-11	CERAMIC CHIP	4.7uF	10%	6.3V
C4585	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C4586	1-117-681-11	ELECT CHIP	100uF	20%	16V
C4701	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4702	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4703	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C4704	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C4705	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C4706	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C5104	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C5105	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5106	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5107	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5108	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5109	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C5110	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5111	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5112	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5113	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C5114	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C5115	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5116	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5117	1-164-852-11	CERAMIC CHIP	12PF	5%	50V
C5118	1-164-852-11	CERAMIC CHIP	12PF	5%	50V
C5119	1-100-574-81	CERAMIC CHIP	270PF	10%	50V
C5120	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5121	1-126-209-11	ELECT CHIP	100uF	20%	4V
C5122	1-126-209-11	ELECT CHIP	100uF	20%	4V
C5123	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5132	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5133	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5205	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5209	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C5210	1-117-681-11	ELECT CHIP	100uF	20%	16V
C5211	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C5212	1-125-889-11	CERAMIC CHIP	2.2uF	10%	10V
C5213	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5216	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C5217	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5218	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C5219	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C5222	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C5223	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C5601	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5602	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5603	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C5604	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5605	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5606	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5607	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5608	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5609	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5610	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5611	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5612	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C5613	1-126-209-11	ELECT CHIP	100uF	20%	4V
C5614	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5615	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C5616	1-125-777-11	CERAMIC CHIP	0.1uF	10%	10V
C5617	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5622	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5623	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5624	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5625	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5626	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5627	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5628	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5629	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5630	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5631	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5632	1-164-943-81	CERAMIC CHIP	0.01uF	10%	16V
C5640	1-164-854-11	CERAMIC CHIP	15PF	5%	50V
C5641	1-164-854-11	CERAMIC CHIP	15PF	5%	50V
C5702	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5704	1-126-193-11	ELECT CHIP	1uF	20%	50V
C5705	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C5706	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C5707	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5708	1-126-210-21	ELECT CHIP	220uF	20%	4V
C5801	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5802	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C5803	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5804	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C5805	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5806	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5807	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5808	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5809	1-126-210-21	ELECT CHIP	220uF	20%	4V
C5812	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C5813	1-107-820-11	CERAMIC CHIP	0.1uF		16V
C5814	1-164-360-11	CERAMIC CHIP	0.1uF		16V
C5815	1-100-566-91	CERAMIC CHIP	0.1uF	10%	25V
C5816	1-100-566-91	CERAMIC CHIP	0.1uF	10%	25V
C5817	1-100-566-91	CERAMIC CHIP	0.1uF	10%	25V
C5818	1-100-566-91	CERAMIC CHIP	0.1uF	10%	25V
C5819	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C5820	1-114-130-11	CERAMIC CHIP	1uF		6.3V
C5821	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V
C5822	1-164-937-11	CERAMIC CHIP	0.001uF	10%	50V

< CONNECTOR >

CN201	1-817-705-51	CONNECTOR, FPC 10P	
CN501	1-766-767-51	CONNECTOR, FPC 12P	
CN601	1-784-857-51	CONNECTOR, FFC (LIF (NON-ZIF)) 5P	
* CN4501	1-564-729-11	PIN, CONNECTOR (SMALL TYPE) 13P	
CN4701	1-779-338-51	CONNECTOR, FFC/FPC 28P	
CN5101	1-819-414-11	PIN, CONNECTOR (1.5MM) 6P	
CN5201	1-820-176-11	PIN, CONNECTOR (1.5MM) 10P	

Ref. No.	Part No.	Description	Remarks
		< DIODE >	
D101	8-719-077-34	DIODE SML-310YTT86	
D3201	8-719-941-86	DIODE DAN202UT106	
D3711	8-719-058-24	DIODE RB501V-40TE-17	
D3712	8-719-058-24	DIODE RB501V-40TE-17	
D4521	8-719-058-24	DIODE RB501V-40TE-17	
D4552	8-719-058-24	DIODE RB501V-40TE-17	
D4571	8-719-058-24	DIODE RB501V-40TE-17	
		< IC >	
IC1201	6-708-305-01	IC K4H511638C-UCB3T	
IC1221	6-708-305-01	IC K4H511638C-UCB3T	
IC1301	8-759-693-13	IC NJM12904V (TE2)	
IC1302	8-759-693-13	IC NJM12904V (TE2)	
IC3101	6-710-840-01	IC AK5358AET-E2	
IC3202	8-759-100-96	IC uPC4558G2	
IC3701	8-759-679-05	IC TC7WH34FU (TE12R)	
IC3702	6-706-487-01	IC TC7SH08FU (T5RSOYJF)	
IC3707	6-707-472-01	IC PST3813UL	
IC4541	6-702-362-01	IC MM1563DFBE	
IC4702	8-759-592-47	IC TC7SZ08FU (TE85R)	
IC5103	6-706-365-01	IC uPD72852AGB-8EU-A	
IC5202	6-710-887-01	IC R5523N001B-TR-F	
IC5203	6-706-487-01	IC TC7SH08FU (T5RSOYJF)	
IC5602	6-806-103-01	IC 88SA8040-TBC1C000	
IC5701	6-707-858-01	IC TC74VHC00FT (EKJ)	
* IC5802	6-711-188-01	IC TC7MB3257FK (EL)	
		< JACK >	
JA5701	1-793-446-21	JACK, PIN 1P	
JA5801	1-821-450-12	CONNECTOR, HDMI	
		< COIL >	
L105	1-469-967-21	INDUCTOR 10uH	
L1005	1-412-008-31	INDUCTOR 15uH	
L1801	1-412-958-21	INDUCTOR 39uH	
L1811	1-412-953-11	INDUCTOR 15uH	
L3301	1-412-954-11	INDUCTOR 18uH	
L3302	1-412-951-11	INDUCTOR 10uH	
L3303	1-412-954-11	INDUCTOR 18uH (AUS)	
L3304	1-412-951-11	INDUCTOR 10uH (AUS)	
L3305	1-412-954-11	INDUCTOR 18uH (AUS)	
L3306	1-412-951-11	INDUCTOR 10uH (AUS)	
L3307	1-412-954-11	INDUCTOR 18uH (AUS)	
L3308	1-412-951-11	INDUCTOR 10uH (AUS)	
L4551	1-469-967-21	INDUCTOR 10uH	
L5101	1-414-235-22	INDUCTOR, FERRITE BEAD	
L5201	1-456-799-11	COIL, COMMON MODE CHOKE	
L5202	1-456-799-11	COIL, COMMON MODE CHOKE	
L5701	1-400-330-21	INDUCTOR, FERRITE BEAD (1608)	
L5801	1-457-374-21	COMMOM MODE CHOKE COIL	
L5802	1-457-374-21	COMMOM MODE CHOKE COIL	
L5803	1-457-374-21	COMMOM MODE CHOKE COIL	
L5804	1-457-374-21	COMMOM MODE CHOKE COIL	
		< TRANSISTOR >	
Q1801	6-551-699-01	TRANSISTOR ISA1602AM1TP-1EF	
Q1811	6-551-699-01	TRANSISTOR ISA1602AM1TP-1EF	
Q2501	6-551-699-01	TRANSISTOR ISA1602AM1TP-1EF	
Q2502	6-551-699-01	TRANSISTOR ISA1602AM1TP-1EF	
Q2503	6-551-699-01	TRANSISTOR ISA1602AM1TP-1EF	
Q2504	6-551-699-01	TRANSISTOR ISA1602AM1TP-1EF	
Q2505	6-551-699-01	TRANSISTOR ISA1602AM1TP-1EF	
Q3301	6-551-699-01	TRANSISTOR ISA1602AM1TP-1EF	
Q3302	8-729-620-13	TRANSISTOR 2SC4154TP-1EF	
Q3303	6-551-699-01	TRANSISTOR ISA1602AM1TP-1EF (AUS)	
Q3304	8-729-620-13	TRANSISTOR 2SC4154TP-1EF (AUS)	
Q3305	6-551-699-01	TRANSISTOR ISA1602AM1TP-1EF (AUS)	
Q3306	8-729-620-13	TRANSISTOR 2SC4154TP-1EF (AUS)	
Q3307	6-551-699-01	TRANSISTOR ISA1602AM1TP-1EF (AUS)	
Q3308	8-729-620-13	TRANSISTOR 2SC4154TP-1EF (AUS)	
Q4581	8-729-620-13	TRANSISTOR 2SC4154TP-1EF	
Q5701	8-729-620-13	TRANSISTOR 2SC4154TP-1EF	
Q5801	6-550-376-01	TRANSISTOR UMXIN-TN	
Q5804	8-729-029-06	TRANSISTOR DTC124EUA-T106	
Q5805	6-551-699-01	TRANSISTOR ISA1602AM1TP-1EF	
Q5808	8-729-031-34	TRANSISTOR 2SK2034	
Q5809	6-550-375-01	TRANSISTOR UMD2N-TR	
		< RESISTOR >	
R104	1-218-966-11	RES-CHIP 12K 5% 1/16W	
R105	1-218-990-81	SHORT CHIP 0	
R107	1-218-973-11	RES-CHIP 47K 5% 1/16W	
R108	1-218-963-11	RES-CHIP 6.8K 5% 1/16W	
R109	1-208-702-11	METAL CHIP 6.2K 0.5% 1/16W	
R110	1-218-953-11	RES-CHIP 1K 5% 1/16W	
R111	1-218-985-11	RES-CHIP 470K 5% 1/16W	
R112	1-218-985-11	RES-CHIP 470K 5% 1/16W	
R114	1-218-971-11	RES-CHIP 33K 5% 1/16W	
R115	1-218-990-81	SHORT CHIP 0	
R116	1-218-959-11	RES-CHIP 3.3K 5% 1/16W	
R117	1-218-939-11	RES-CHIP 68 5% 1/16W	
R119	1-218-990-81	SHORT CHIP 0	
R124	1-218-990-81	SHORT CHIP 0	
R128	1-218-990-81	SHORT CHIP 0	
R129	1-218-990-81	SHORT CHIP 0	
R130	1-218-945-11	RES-CHIP 220 5% 1/16W	
R131	1-218-945-11	RES-CHIP 220 5% 1/16W	
R132	1-218-945-11	RES-CHIP 220 5% 1/16W	
R133	1-218-945-11	RES-CHIP 220 5% 1/16W	
R134	1-218-973-11	RES-CHIP 47K 5% 1/16W	
R135	1-218-945-11	RES-CHIP 220 5% 1/16W	
R136	1-218-945-11	RES-CHIP 220 5% 1/16W	
R137	1-218-945-11	RES-CHIP 220 5% 1/16W	
R138	1-218-973-11	RES-CHIP 47K 5% 1/16W	
R139	1-218-945-11	RES-CHIP 220 5% 1/16W	
R165	1-218-952-11	RES-CHIP 820 5% 1/16W	
R166	1-218-952-11	RES-CHIP 820 5% 1/16W	
R167	1-218-952-11	RES-CHIP 820 5% 1/16W	
R168	1-218-990-81	SHORT CHIP 0	
R170	1-218-959-11	RES-CHIP 3.3K 5% 1/16W	
R171	1-218-959-11	RES-CHIP 3.3K 5% 1/16W	
R172	1-218-959-11	RES-CHIP 3.3K 5% 1/16W	
R174	1-218-863-11	METAL CHIP 4.7K 0.5% 1/10W	
R192	1-216-809-11	METAL CHIP 100 5% 1/10W	
R193	1-218-990-81	SHORT CHIP 0	
R201	1-218-965-11	RES-CHIP 10K 5% 1/16W	
R202	1-218-935-11	RES-CHIP 33 5% 1/16W	
R203	1-218-935-11	RES-CHIP 33 5% 1/16W	
R204	1-242-963-21	RES, NETWORK 33 (1005X4)	

Ref. No.	Part No.	Description			Remarks
R205	1-242-963-21	RES, NETWORK	33 (1005X4)		
R206	1-242-963-21	RES, NETWORK	33 (1005X4)		
R210	1-218-935-11	RES-CHIP	33	5%	1/16W
R211	1-218-990-81	SHORT CHIP	0		
R219	1-234-377-21	RES, NETWORK	4.7K (1005X4)		
R220	1-234-377-21	RES, NETWORK	4.7K (1005X4)		
R221	1-218-973-11	RES-CHIP	47K	5%	1/16W
R222	1-218-973-11	RES-CHIP	47K	5%	1/16W
R223	1-218-933-11	RES-CHIP	22	5%	1/16W
R230	1-218-990-81	SHORT CHIP	0		
R233	1-218-990-81	SHORT CHIP	0		
R234	1-218-990-81	SHORT CHIP	0		
R236	1-218-933-11	RES-CHIP	22	5%	1/16W
R237	1-218-965-11	RES-CHIP	10K	5%	1/16W
R238	1-218-933-11	RES-CHIP	22	5%	1/16W
R239	1-218-965-11	RES-CHIP	10K	5%	1/16W
R240	1-218-933-11	RES-CHIP	22	5%	1/16W
R241	1-218-965-11	RES-CHIP	10K	5%	1/16W
R242	1-218-933-11	RES-CHIP	22	5%	1/16W
R243	1-218-965-11	RES-CHIP	10K	5%	1/16W
R244	1-218-933-11	RES-CHIP	22	5%	1/16W
R245	1-218-965-11	RES-CHIP	10K	5%	1/16W
R248	1-218-965-11	RES-CHIP	10K	5%	1/16W
R252	1-218-965-11	RES-CHIP	10K	5%	1/16W
R253	1-218-965-11	RES-CHIP	10K	5%	1/16W
R256	1-218-965-11	RES-CHIP	10K	5%	1/16W
R271	1-216-295-91	SHORT CHIP	0		
R273	1-216-295-91	SHORT CHIP	0		
R274	1-216-295-91	SHORT CHIP	0		
R281	1-218-990-81	SHORT CHIP	0		
R301	1-218-973-11	RES-CHIP	47K	5%	1/16W
R306	1-218-957-11	RES-CHIP	2.2K	5%	1/16W
R307	1-218-957-11	RES-CHIP	2.2K	5%	1/16W
R310	1-218-953-11	RES-CHIP	1K	5%	1/16W
R311	1-218-953-11	RES-CHIP	1K	5%	1/16W
R312	1-218-953-11	RES-CHIP	1K	5%	1/16W
R313	1-218-973-11	RES-CHIP	47K	5%	1/16W
R314	1-218-953-11	RES-CHIP	1K	5%	1/16W
R317	1-242-963-21	RES, NETWORK	33 (1005X4)		
R318	1-242-963-21	RES, NETWORK	33 (1005X4)		
R319	1-242-963-21	RES, NETWORK	33 (1005X4)		
R320	1-242-963-21	RES, NETWORK	33 (1005X4)		
R503	1-218-953-11	RES-CHIP	1K	5%	1/16W
R504	1-218-953-11	RES-CHIP	1K	5%	1/16W
R505	1-218-966-11	RES-CHIP	12K	5%	1/16W
R506	1-218-953-11	RES-CHIP	1K	5%	1/16W
R507	1-218-953-11	RES-CHIP	1K	5%	1/16W
R510	1-217-907-11	RES-CHIP	1.8	5%	1/10W
R511	1-217-907-11	RES-CHIP	1.8	5%	1/10W
R515	1-218-971-11	RES-CHIP	33K	5%	1/16W
R516	1-218-966-11	RES-CHIP	12K	5%	1/16W
R601	1-218-965-11	RES-CHIP	10K	5%	1/16W
R602	1-218-965-11	RES-CHIP	10K	5%	1/16W
R603	1-218-953-11	RES-CHIP	1K	5%	1/16W
R604	1-218-953-11	RES-CHIP	1K	5%	1/16W
R1001	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1003	1-218-843-11	METAL CHIP	680	0.5%	1/10W
R1004	1-218-839-11	METAL CHIP	470	0.5%	1/10W
R1005	1-218-967-11	RES-CHIP	15K	5%	1/16W
R1006	1-218-967-11	RES-CHIP	15K	5%	1/16W
R1013	1-218-965-11	RES-CHIP	10K	5%	1/16W

Ref. No.	Part No.	Description			Remarks
R1016	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1017	1-218-990-81	SHORT CHIP	0		
R1018	1-218-990-81	SHORT CHIP	0		
R1019	1-218-990-81	SHORT CHIP	0		
R1021	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1027	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1028	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1029	1-218-940-11	RES-CHIP	82	5%	1/16W
R1030	1-218-937-11	RES-CHIP	47	5%	1/16W (AUS)
R1030	1-218-941-81	RES-CHIP	100	5%	1/16W (AEP, UK)
R1031	1-218-943-11	RES-CHIP	150	5%	1/16W (AUS)
R1031	1-218-945-11	RES-CHIP	220	5%	1/16W (AEP, UK)
R1032	1-234-378-21	RES, NETWORK	10K (1005X4)		
R1033	1-234-378-21	RES, NETWORK	10K (1005X4)		
R1034	1-234-378-21	RES, NETWORK	10K (1005X4)		
R1035	1-234-378-21	RES, NETWORK	10K (1005X4)		
R1036	1-211-984-11	METAL CHIP	43	0.5%	1/10W
R1037	1-218-823-11	METAL CHIP	100	0.5%	1/10W
R1039	1-211-984-11	METAL CHIP	43	0.5%	1/10W
R1040	1-218-823-11	METAL CHIP	100	0.5%	1/10W
R1066	1-218-973-11	RES-CHIP	47K	5%	1/16W
R1067	1-218-973-11	RES-CHIP	47K	5%	1/16W
R1068	1-218-973-11	RES-CHIP	47K	5%	1/16W
R1069	1-218-973-11	RES-CHIP	47K	5%	1/16W
R1071	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1103	1-218-990-81	SHORT CHIP	0		
R1107	1-218-990-81	SHORT CHIP	0		
R1110	1-218-990-81	SHORT CHIP	0		
R1111	1-218-977-11	RES-CHIP	100K	5%	1/16W
R1132	1-218-937-11	RES-CHIP	47	5%	1/16W
R1153	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R1161	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R1163	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R1164	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R1181	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1182	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1191	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R1195	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R1199	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1205	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1219	1-218-990-81	SHORT CHIP	0		
R1240	1-218-933-11	RES-CHIP	22	5%	1/16W
R1241	1-234-400-21	CONDUCTOR, NETWORK	(1005X4)		
R1242	1-234-400-21	CONDUCTOR, NETWORK	(1005X4)		
R1243	1-218-990-81	SHORT CHIP	0		
R1244	1-218-935-11	RES-CHIP	33	5%	1/16W
R1245	1-234-370-21	RES, NETWORK	22 (1005X4)		
R1246	1-234-370-21	RES, NETWORK	22 (1005X4)		
R1247	1-218-933-11	RES-CHIP	22	5%	1/16W
R1248	1-234-400-21	CONDUCTOR, NETWORK	(1005X4)		
R1249	1-234-400-21	CONDUCTOR, NETWORK	(1005X4)		
R1250	1-218-990-81	SHORT CHIP	0		
R1251	1-218-935-11	RES-CHIP	33	5%	1/16W
R1252	1-218-935-11	RES-CHIP	33	5%	1/16W
R1255	1-234-370-21	RES, NETWORK	22 (1005X4)		
R1256	1-234-370-21	RES, NETWORK	22 (1005X4)		
R1257	1-218-933-11	RES-CHIP	22	5%	1/16W
R1258	1-218-933-11	RES-CHIP	22	5%	1/16W

Ref. No.	Part No.	Description			Remarks
R1260	1-218-933-11	RES-CHIP	22	5%	1/16W
R1261	1-234-400-21	CONDUCTOR, NETWORK	(1005X4)		
R1262	1-234-400-21	CONDUCTOR, NETWORK	(1005X4)		
R1263	1-218-990-81	SHORT CHIP	0		
R1264	1-218-935-11	RES-CHIP	33	5%	1/16W
R1265	1-234-370-21	RES, NETWORK	22 (1005X4)		
R1266	1-234-370-21	RES, NETWORK	22 (1005X4)		
R1267	1-218-933-11	RES-CHIP	22	5%	1/16W
R1268	1-234-400-21	CONDUCTOR, NETWORK	(1005X4)		
R1269	1-234-400-21	CONDUCTOR, NETWORK	(1005X4)		
R1270	1-218-990-81	SHORT CHIP	0		
R1271	1-218-935-11	RES-CHIP	33	5%	1/16W
R1272	1-218-935-11	RES-CHIP	33	5%	1/16W
R1273	1-234-370-21	RES, NETWORK	22 (1005X4)		
R1274	1-234-370-21	RES, NETWORK	22 (1005X4)		
R1275	1-218-933-11	RES-CHIP	22	5%	1/16W
R1276	1-218-933-11	RES-CHIP	22	5%	1/16W
R1277	1-218-990-81	SHORT CHIP	0		
R1278	1-218-990-81	SHORT CHIP	0		
R1279	1-218-948-11	RES-CHIP	390	5%	1/16W
R1281	1-234-371-21	RES, NETWORK	47 (1005X4)		
R1282	1-234-371-21	RES, NETWORK	47 (1005X4)		
R1283	1-234-371-21	RES, NETWORK	47 (1005X4)		
R1284	1-218-937-11	RES-CHIP	47	5%	1/16W
R1285	1-218-937-11	RES-CHIP	47	5%	1/16W
R1286	1-218-937-11	RES-CHIP	47	5%	1/16W
R1287	1-234-371-21	RES, NETWORK	47 (1005X4)		
R1288	1-218-933-11	RES-CHIP	22	5%	1/16W
R1289	1-218-933-11	RES-CHIP	22	5%	1/16W
R1301	1-218-839-11	METAL CHIP	470	0.5%	1/10W
R1302	1-218-847-11	METAL CHIP	1K	0.5%	1/10W
R1303	1-218-847-11	METAL CHIP	1K	0.5%	1/10W
R1312	1-218-847-11	METAL CHIP	1K	0.5%	1/10W
R1313	1-218-847-11	METAL CHIP	1K	0.5%	1/10W
R1314	1-216-864-11	SHORT CHIP	0		
R1401	1-218-933-11	RES-CHIP	22	5%	1/16W
R1402	1-218-933-11	RES-CHIP	22	5%	1/16W
R1403	1-218-933-11	RES-CHIP	22	5%	1/16W
R1404	1-218-933-11	RES-CHIP	22	5%	1/16W
R1405	1-218-933-11	RES-CHIP	22	5%	1/16W
R1406	1-218-933-11	RES-CHIP	22	5%	1/16W
R1407	1-218-933-11	RES-CHIP	22	5%	1/16W
R1411	1-234-378-21	RES, NETWORK	10K (1005X4)		
R1412	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1413	1-218-973-11	RES-CHIP	47K	5%	1/16W
R1414	1-218-933-11	RES-CHIP	22	5%	1/16W
R1415	1-218-933-11	RES-CHIP	22	5%	1/16W
R1416	1-218-933-11	RES-CHIP	22	5%	1/16W
R1421	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1422	1-218-965-11	RES-CHIP	10K	5%	1/16W
R1802	1-218-945-11	RES-CHIP	220	5%	1/16W
R1803	1-218-947-11	RES-CHIP	330	5%	1/16W
R1804	1-218-935-11	RES-CHIP	33	5%	1/16W
R1812	1-218-945-11	RES-CHIP	220	5%	1/16W
R1813	1-218-947-11	RES-CHIP	330	5%	1/16W
R1814	1-218-935-11	RES-CHIP	33	5%	1/16W
R2301	1-218-959-11	RES-CHIP	3.3K	5%	1/16W
R2302	1-218-990-81	SHORT CHIP	0		
R2304	1-218-990-81	SHORT CHIP	0		
R2316	1-218-965-11	RES-CHIP	10K	5%	1/16W
R2501	1-218-951-11	RES-CHIP	680	5%	1/16W
R2502	1-218-827-11	METAL CHIP	150	0.5%	1/10W
R2504	1-218-951-11	RES-CHIP	680	5%	1/16W
R2505	1-218-827-11	METAL CHIP	150	0.5%	1/10W
R2506	1-216-864-11	SHORT CHIP	0		
R2507	1-218-951-11	RES-CHIP	680	5%	1/16W
R2508	1-218-827-11	METAL CHIP	150	0.5%	1/10W
R2510	1-218-951-11	RES-CHIP	680	5%	1/16W
R2511	1-218-827-11	METAL CHIP	150	0.5%	1/10W
R2513	1-218-951-11	RES-CHIP	680	5%	1/16W
R2514	1-218-827-11	METAL CHIP	150	0.5%	1/10W
R3002	1-218-990-81	SHORT CHIP	0		
R3003	1-218-990-81	SHORT CHIP	0		
R3004	1-218-990-81	SHORT CHIP	0		
R3005	1-234-378-21	RES, NETWORK	10K (1005X4)		
R3006	1-218-990-81	SHORT CHIP	0		
R3007	1-218-990-81	SHORT CHIP	0		
R3008	1-218-990-81	SHORT CHIP	0		
R3009	1-218-990-81	SHORT CHIP	0		
R3010	1-218-990-81	SHORT CHIP	0		
R3011	1-218-990-81	SHORT CHIP	0		
R3012	1-218-990-81	SHORT CHIP	0		
R3101	1-218-990-81	SHORT CHIP	0		
R3102	1-218-990-81	SHORT CHIP	0		
R3103	1-218-990-81	SHORT CHIP	0		
R3104	1-218-990-81	SHORT CHIP	0		
R3105	1-218-989-11	RES-CHIP	1M	5%	1/16W
R3106	1-218-965-11	RES-CHIP	10K	5%	1/16W
R3107	1-218-937-11	RES-CHIP	47	5%	1/16W
R3108	1-218-937-11	RES-CHIP	47	5%	1/16W
R3109	1-218-937-11	RES-CHIP	47	5%	1/16W
R3111	1-218-990-81	SHORT CHIP	0		
R3113	1-218-965-11	RES-CHIP	10K	5%	1/16W
R3201	1-218-937-11	RES-CHIP	47	5%	1/16W
R3202	1-218-937-11	RES-CHIP	47	5%	1/16W
R3203	1-218-937-11	RES-CHIP	47	5%	1/16W
R3204	1-218-990-81	SHORT CHIP	0		
R3206	1-218-937-11	RES-CHIP	47	5%	1/16W
R3207	1-218-937-11	RES-CHIP	47	5%	1/16W
R3208	1-218-937-11	RES-CHIP	47	5%	1/16W
R3209	1-218-977-11	RES-CHIP	100K	5%	1/16W
R3210	1-218-849-11	METAL CHIP	1.2K	0.5%	1/10W
R3211	1-218-871-11	METAL CHIP	10K	0.5%	1/10W
R3213	1-218-951-11	RES-CHIP	680	5%	1/16W
R3214	1-218-963-11	RES-CHIP	6.8K	5%	1/16W
R3215	1-218-969-11	RES-CHIP	22K	5%	1/16W
R3216	1-218-849-11	METAL CHIP	1.2K	0.5%	1/10W
R3217	1-218-871-11	METAL CHIP	10K	0.5%	1/10W
R3218	1-218-879-11	METAL CHIP	22K	0.5%	1/10W
R3219	1-218-963-11	RES-CHIP	6.8K	5%	1/16W
R3220	1-218-941-81	RES-CHIP	100	5%	1/16W
R3221	1-218-941-81	RES-CHIP	100	5%	1/16W
R3222	1-218-963-11	RES-CHIP	6.8K	5%	1/16W
R3223	1-218-879-11	METAL CHIP	22K	0.5%	1/10W
R3224	1-218-941-81	RES-CHIP	100	5%	1/16W
R3227	1-218-941-81	RES-CHIP	100	5%	1/16W
R3228	1-218-965-11	RES-CHIP	10K	5%	1/16W
R3229	1-218-965-11	RES-CHIP	10K	5%	1/16W
R3230	1-216-295-91	SHORT CHIP	0		
R3232	1-218-990-81	SHORT CHIP	0		
R3233	1-218-990-81	SHORT CHIP	0		
R3234	1-218-990-81	SHORT CHIP	0		

Ref. No.	Part No.	Description			Remarks
R3301	1-218-937-11	RES-CHIP	47	5%	1/16W
R3302	1-218-937-11	RES-CHIP	47	5%	1/16W (AUS)
R3302	1-218-990-81	SHORT CHIP	0 (AEP, UK)		
R3305	1-218-947-11	RES-CHIP	330	5%	1/16W
R3306	1-218-839-11	METAL CHIP	470	0.5%	1/10W
R3307	1-208-893-11	METAL CHIP	1.8K	0.5%	1/16W (AEP, UK)
R3307	1-208-905-11	METAL CHIP	5.6K	0.5%	1/16W (AUS)
R3308	1-218-929-11	RES-CHIP	10	5%	1/16W
R3309	1-218-951-11	RES-CHIP	680	5%	1/16W
R3310	1-218-965-11	RES-CHIP	10K	5%	1/16W (AEP, UK)
R3312	1-218-839-11	METAL CHIP	470	0.5%	1/10W (AUS)
R3313	1-208-905-11	METAL CHIP	5.6K	0.5%	1/16W (AUS)
R3314	1-218-929-11	RES-CHIP	10	5%	1/16W (AUS)
R3315	1-218-951-11	RES-CHIP	680	5%	1/16W
R3317	1-218-947-11	RES-CHIP	330	5%	1/16W (AUS)
R3318	1-218-839-11	METAL CHIP	470	0.5%	1/10W (AUS)
R3319	1-218-929-11	RES-CHIP	10	5%	1/16W (AUS)
R3320	1-218-951-11	RES-CHIP	680	5%	1/16W
R3322	1-218-947-11	RES-CHIP	330	5%	1/16W (AUS)
R3323	1-218-839-11	METAL CHIP	470	0.5%	1/10W (AUS)
R3324	1-208-905-11	METAL CHIP	5.6K	0.5%	1/16W (AUS)
R3325	1-208-905-11	METAL CHIP	5.6K	0.5%	1/16W (AUS)
R3326	1-218-929-11	RES-CHIP	10	5%	1/16W (AUS)
R3327	1-218-951-11	RES-CHIP	680	5%	1/16W
R3336	1-218-937-11	RES-CHIP	47	5%	1/16W (AUS)
R3336	1-218-990-81	SHORT CHIP	0 (AEP, UK)		
R3337	1-218-965-11	RES-CHIP	10K	5%	1/16W (AEP, UK)
R3341	1-218-937-11	RES-CHIP	47	5%	1/16W (AUS)
R3341	1-218-990-81	SHORT CHIP	0 (AEP, UK)		
R3342	1-218-965-11	RES-CHIP	10K	5%	1/16W (AEP, UK)
R3344	1-218-947-11	RES-CHIP	330	5%	1/16W (AUS)
R3703	1-218-941-81	RES-CHIP	100	5%	1/16W
R3704	1-218-941-81	RES-CHIP	100	5%	1/16W
R3705	1-218-941-81	RES-CHIP	100	5%	1/16W
R3708	1-218-965-11	RES-CHIP	10K	5%	1/16W
R3715	1-218-990-81	SHORT CHIP	0		
R3716	1-218-935-11	RES-CHIP	33	5%	1/16W
R3720	1-218-990-81	SHORT CHIP	0		
R3738	1-218-965-11	RES-CHIP	10K	5%	1/16W
R3808	1-218-941-81	RES-CHIP	100	5%	1/16W
R3810	1-242-963-21	RES, NETWORK	33 (1005X4)		
R3811	1-242-963-21	RES, NETWORK	33 (1005X4)		
R3812	1-242-963-21	RES, NETWORK	33 (1005X4)		
R3813	1-242-963-21	RES, NETWORK	33 (1005X4)		
R3814	1-218-933-11	RES-CHIP	22	5%	1/16W
R3816	1-218-940-11	RES-CHIP	82	5%	1/16W
R3817	1-218-940-11	RES-CHIP	82	5%	1/16W
R3818	1-218-933-11	RES-CHIP	22	5%	1/16W
R3820	1-218-940-11	RES-CHIP	82	5%	1/16W
R3821	1-218-933-11	RES-CHIP	22	5%	1/16W
R3823	1-218-940-11	RES-CHIP	82	5%	1/16W
R3824	1-242-962-21	RES, NETWORK	82 (1005X4)		
R3828	1-234-379-21	RES, NETWORK	22K (1005X4)		
R3829	1-234-379-21	RES, NETWORK	22K (1005X4)		
R3830	1-234-379-21	RES, NETWORK	22K (1005X4)		
R3831	1-234-379-21	RES, NETWORK	22K (1005X4)		
R3832	1-234-379-21	RES, NETWORK	22K (1005X4)		
R3833	1-234-379-21	RES, NETWORK	22K (1005X4)		
R3835	1-218-935-11	RES-CHIP	33	5%	1/16W
R3837	1-242-963-21	RES, NETWORK	33 (1005X4)		
R3838	1-242-963-21	RES, NETWORK	33 (1005X4)		
R3839	1-242-963-21	RES, NETWORK	33 (1005X4)		
R3840	1-242-963-21	RES, NETWORK	33 (1005X4)		
R3841	1-218-940-11	RES-CHIP	82	5%	1/16W
R3842	1-218-962-11	RES-CHIP	5.6K	5%	1/16W
R3843	1-218-933-11	RES-CHIP	22	5%	1/16W
R3844	1-218-933-11	RES-CHIP	22	5%	1/16W
R3845	1-218-940-11	RES-CHIP	82	5%	1/16W
R3846	1-218-953-11	RES-CHIP	1K	5%	1/16W
R3847	1-218-933-11	RES-CHIP	22	5%	1/16W
R3848	1-218-940-11	RES-CHIP	82	5%	1/16W
R3849	1-218-965-11	RES-CHIP	10K	5%	1/16W
R3850	1-218-935-11	RES-CHIP	33	5%	1/16W
R3851	1-242-963-21	RES, NETWORK	33 (1005X4)		
R3857	1-218-990-81	SHORT CHIP	0		
R3862	1-218-990-81	SHORT CHIP	0		
R3871	1-218-969-11	RES-CHIP	22K	5%	1/16W
R4501	1-216-295-91	SHORT CHIP	0		
R4504	1-216-059-00	RES-CHIP	2.7K	5%	1/10W
R4505	1-216-059-00	RES-CHIP	2.7K	5%	1/10W
R4507	1-216-059-00	RES-CHIP	2.7K	5%	1/10W
R4511	1-218-990-81	SHORT CHIP	0		
R4521	1-218-963-11	RES-CHIP	6.8K	5%	1/16W
R4531	1-218-990-81	SHORT CHIP	0		
R4541	1-218-990-81	SHORT CHIP	0		
R4552	1-216-295-91	SHORT CHIP	0		
R4553	1-216-295-91	SHORT CHIP	0		
R4554	1-216-295-91	SHORT CHIP	0		
R4556	1-216-295-91	SHORT CHIP	0		
R4558	1-218-969-11	RES-CHIP	22K	5%	1/16W
R4559	1-218-990-81	SHORT CHIP	0		
R4573	1-218-990-81	SHORT CHIP	0		
R4574	1-216-864-11	SHORT CHIP	0		
R4575	1-216-864-11	SHORT CHIP	0		
R4581	1-218-941-81	RES-CHIP	100	5%	1/16W
R4701	1-234-372-11	RES, NETWORK	100 (1005X4)		
R4702	1-234-372-11	RES, NETWORK	100 (1005X4)		
R4703	1-218-941-81	RES-CHIP	100	5%	1/16W
R4704	1-218-990-81	SHORT CHIP	0		
R4705	1-218-990-81	SHORT CHIP	0		
R4706	1-218-990-81	SHORT CHIP	0		
R4707	1-218-965-11	RES-CHIP	10K	5%	1/16W
R4708	1-234-378-21	RES, NETWORK	10K (1005X4)		
R4709	1-234-378-21	RES, NETWORK	10K (1005X4)		
R4710	1-218-965-11	RES-CHIP	10K	5%	1/16W

Ref. No.	Part No.	Description			Remarks
R4711	1-218-965-11	RES-CHIP	10K	5%	1/16W
R4712	1-218-965-11	RES-CHIP	10K	5%	1/16W
R4713	1-218-965-11	RES-CHIP	10K	5%	1/16W
R4714	1-218-990-81	SHORT CHIP	0		
R4721	1-234-372-11	RES, NETWORK	100 (1005X4)		
R4722	1-234-372-11	RES, NETWORK	100 (1005X4)		
R4723	1-218-937-11	RES-CHIP	47	5%	1/16W
R4724	1-218-933-11	RES-CHIP	22	5%	1/16W
R4725	1-218-933-11	RES-CHIP	22	5%	1/16W
R4726	1-218-933-11	RES-CHIP	22	5%	1/16W
R4727	1-218-965-11	RES-CHIP	10K	5%	1/16W
R4728	1-218-965-11	RES-CHIP	10K	5%	1/16W
R4729	1-218-990-81	SHORT CHIP	0		
R4731	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R4732	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R5101	1-234-381-11	RES, NETWORK	100K (1005X4)		
R5102	1-234-381-11	RES, NETWORK	100K (1005X4)		
R5103	1-218-977-11	RES-CHIP	100K	5%	1/16W
R5104	1-218-977-11	RES-CHIP	100K	5%	1/16W
R5105	1-234-702-11	RES, NETWORK	68 (1005X4)		
R5106	1-234-702-11	RES, NETWORK	68 (1005X4)		
R5107	1-218-939-11	RES-CHIP	68	5%	1/16W
R5108	1-218-939-11	RES-CHIP	68	5%	1/16W
R5109	1-218-937-11	RES-CHIP	47	5%	1/16W
R5110	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5111	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5113	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5114	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5115	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5116	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5117	1-218-977-11	RES-CHIP	100K	5%	1/16W
R5118	1-218-870-11	METAL CHIP	9.1K	0.5%	1/10W
R5119	1-211-987-11	METAL CHIP	56	0.5%	1/10W
R5120	1-211-987-11	METAL CHIP	56	0.5%	1/10W
R5121	1-211-987-11	METAL CHIP	56	0.5%	1/10W
R5122	1-211-987-11	METAL CHIP	56	0.5%	1/10W
R5123	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5124	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5125	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5127	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5129	1-218-940-11	RES-CHIP	82	5%	1/16W
R5130	1-218-990-81	SHORT CHIP	0		
R5131	1-218-864-11	METAL CHIP	5.1K	0.5%	1/10W
R5132	1-218-990-81	SHORT CHIP	0		
R5133	1-218-990-81	SHORT CHIP	0		
R5134	1-218-990-81	SHORT CHIP	0		
R5135	1-218-990-81	SHORT CHIP	0		
R5140	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5141	1-218-990-81	SHORT CHIP	0		
R5201	1-218-990-81	SHORT CHIP	0		
R5202	1-218-990-81	SHORT CHIP	0		
R5203	1-218-859-11	METAL CHIP	3.3K	0.5%	1/10W
R5204	1-218-845-11	METAL CHIP	820	0.5%	1/10W
R5205	1-218-939-11	RES-CHIP	68	5%	1/16W
R5207	1-218-990-81	SHORT CHIP	0		
R5212	1-218-990-81	SHORT CHIP	0		
R5213	1-218-990-81	SHORT CHIP	0		
R5214	1-218-973-11	RES-CHIP	47K	5%	1/16W
R5215	1-218-973-11	RES-CHIP	47K	5%	1/16W
R5216	1-218-990-81	SHORT CHIP	0		
R5217	1-218-990-81	SHORT CHIP	0		

Ref. No.	Part No.	Description			Remarks
R5220	1-218-851-11	METAL CHIP	1.5K	0.5%	1/10W
R5221	1-218-973-11	RES-CHIP	47K	5%	1/16W
R5222	1-218-929-11	RES-CHIP	10	5%	1/16W
R5445	1-216-295-91	SHORT CHIP	0		
R5606	1-218-940-11	RES-CHIP	82	5%	1/16W
R5607	1-218-940-11	RES-CHIP	82	5%	1/16W
R5608	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5609	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5610	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5612	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5613	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5614	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5615	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5617	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5618	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5619	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5622	1-218-940-11	RES-CHIP	82	5%	1/16W
R5623	1-218-940-11	RES-CHIP	82	5%	1/16W
R5624	1-218-940-11	RES-CHIP	82	5%	1/16W
R5626	1-218-933-11	RES-CHIP	22	5%	1/16W
R5627	1-218-940-11	RES-CHIP	82	5%	1/16W
R5628	1-218-933-11	RES-CHIP	22	5%	1/16W
R5629	1-218-940-11	RES-CHIP	82	5%	1/16W
R5630	1-218-940-11	RES-CHIP	82	5%	1/16W
R5631	1-218-933-11	RES-CHIP	22	5%	1/16W
R5632	1-242-963-21	RES, NETWORK	33 (1005X4)		
R5638	1-242-963-21	RES, NETWORK	33 (1005X4)		
R5642	1-242-963-21	RES, NETWORK	33 (1005X4)		
R5646	1-242-963-21	RES, NETWORK	33 (1005X4)		
R5650	1-218-940-11	RES-CHIP	82	5%	1/16W
R5651	1-218-873-11	METAL CHIP	12K	0.5%	1/10W
R5652	1-218-941-81	RES-CHIP	100	5%	1/16W
R5657	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5658	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5659	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5661	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5664	1-216-864-11	SHORT CHIP	0		
R5672	1-216-864-11	SHORT CHIP	0		
R5688	1-218-989-11	RES-CHIP	1M	5%	1/16W
R5689	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5690	1-218-990-81	SHORT CHIP	0		
R5692	1-218-990-81	SHORT CHIP	0		
R5693	1-218-990-81	SHORT CHIP	0		
R5701	1-218-949-11	RES-CHIP	470	5%	1/16W
R5702	1-218-949-11	RES-CHIP	470	5%	1/16W
R5703	1-218-951-11	RES-CHIP	680	5%	1/16W
R5704	1-218-943-11	RES-CHIP	150	5%	1/16W
R5705	1-216-864-11	SHORT CHIP	0		
R5706	1-211-990-11	METAL CHIP	75	0.5%	1/10W
R5707	1-218-977-11	RES-CHIP	100K	5%	1/16W
R5803	1-164-360-11	CERAMIC CHIP	0.1uF		16V
R5804	1-218-973-11	RES-CHIP	47K	5%	1/16W
R5805	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R5806	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5807	1-218-962-11	RES-CHIP	5.6K	5%	1/16W
R5808	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R5809	1-218-958-11	RES-CHIP	2.7K	5%	1/16W
R5812	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R5813	1-218-958-11	RES-CHIP	2.7K	5%	1/16W
R5814	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R5815	1-218-958-11	RES-CHIP	2.7K	5%	1/16W

Ref. No.	Part No.	Description			Remarks
R5817	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R5818	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R5821	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R5822	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R5824	1-163-038-91	CERAMIC CHIP	0.1uF		25V
R5825	1-234-370-21	RES, NETWORK	22 (1005X4)		
R5826	1-234-370-21	RES, NETWORK	22 (1005X4)		
R5827	1-234-370-21	RES, NETWORK	22 (1005X4)		
R5828	1-234-370-21	RES, NETWORK	22 (1005X4)		
R5829	1-218-938-11	RES-CHIP	56	5%	1/16W
R5831	1-218-990-81	SHORT CHIP	0		
R5832	1-164-360-11	CERAMIC CHIP	0.1uF		16V
R5833	1-218-933-11	RES-CHIP	22	5%	1/16W
R5834	1-218-933-11	RES-CHIP	22	5%	1/16W
R5836	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5837	1-218-990-81	SHORT CHIP	0		
R5838	1-218-935-11	RES-CHIP	33	5%	1/16W
R5839	1-218-949-11	RES-CHIP	470	5%	1/16W
R5842	1-218-947-11	RES-CHIP	330	5%	1/16W
R5843	1-218-947-11	RES-CHIP	330	5%	1/16W
R5844	1-218-947-11	RES-CHIP	330	5%	1/16W
R5845	1-218-947-11	RES-CHIP	330	5%	1/16W
R5846	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R5848	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R5852	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5853	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5854	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5855	1-234-369-21	RES, NETWORK	10 (1005X4)		
R5856	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5857	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5859	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5861	1-218-965-11	RES-CHIP	10K	5%	1/16W
R5862	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R5863	1-218-951-11	RES-CHIP	680	5%	1/16W
R5864	1-218-953-11	RES-CHIP	1K	5%	1/16W
R5865	1-218-990-81	SHORT CHIP	0		
R5867	1-218-950-11	RES-CHIP	560	5%	1/16W
R5868	1-218-957-11	RES-CHIP	2.2K	5%	1/16W
R5869	1-218-961-11	RES-CHIP	4.7K	5%	1/16W
R5870	1-218-970-11	RES-CHIP	27K	5%	1/16W
R6001	1-218-990-81	SHORT CHIP	0		
		< VIBRATOR >			
X5101	1-813-049-21	VIBRATOR, CRYSTAL (24.576MHz)			
X5201	1-795-904-21	OSCILLATOR, CRYSTAL (48MHz)			
X5502	1-813-052-21	VIBRATOR, CRYSTAL (25MHz)			

Ref. No.	Part No.	Description	Remarks
		ACCESSORIES	
		**********	
	1-480-167-11	REMOTE COMMANDER (RMT-D248P)	(AEP, UK)
	1-480-526-11	REMOTE COMMANDER (RMT-D2480)	(AUS)
⚠	1-575-131-82	CORD, POWER (AEP)	
	1-696-593-11	CORD, CONNECTION (PAL)	
	1-759-586-41	CONTROLLER, VIDEO (AV MOUSE)	
⚠	1-555-074-52	CORD, POWER (AUS)	
⚠	1-827-946-21	CORD, POWER (UK)	
	1-828-145-11	CORD, CONNECTION (AV) (AUS)	
	3-113-760-11	MANUAL, INSTRUCTION (ENGLISH) (UK)	
	3-113-760-21	MANUAL, INSTRUCTION (FRENCH)	(AEP1,AEP3)
	3-113-760-31	MANUAL, INSTRUCTION (GERMAN)(AEP1)	
	3-113-760-41	MANUAL, INSTRUCTION (ITALIAN)(AEP1)	
	3-113-760-51	MANUAL, INSTRUCTION (SPANISH)(AEP1)	
	3-113-760-61	MANUAL, INSTRUCTION (DUTCH)(AEP1)	
	3-196-450-11	MANUAL, INSTRUCTION (DANISH)(AEP2)	
	3-196-450-21	MANUAL, INSTRUCTION (SWEDISH)(AEP2)	
	3-196-450-31	MANUAL, INSTRUCTION (FINNISH)(AEP2)	
	3-196-450-41	MANUAL, INSTRUCTION (DUTCH)(AEP2)	
	3-275-466-11	MANUAL, INSTRUCTION (ENGLISH)(AUS)	

Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Sony Corporation
Home Electronics Network Company

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Revision History

Ver.	Date	History	Contents	S.M. Rev. issued
1.0	2007.05	Official Release	—	—
1.1	2007.10	Revised-1	• Addition of Australian model • Change of service note (Page 7 through Page 11) • Change of block diagrams • Change of schematic diagrams and printed wiring boards • Change of service mode (Pages 6-6, 6-9 and 6-10) • Change of repair parts list	Yes