

SONY.

VIDEOCASSETTE RECORDER

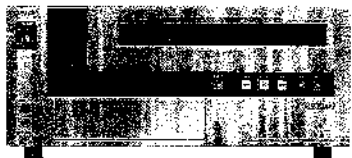
UVW-1800P

VIDEOCASSETTE PLAYER

UVW-1600P

SERVICE MANUAL

Vol.1 1st Edition



BETACAM SP

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Introducing this manual

This manual is the Service Manual Vol. 1 of the video cassette recorder model UVW-1800P and the video cassette player model UVW-1600P.

This manual contains the maintenance information and servicing information necessary for parts replacement and adjustment.

Contents

The sections covered in the manual are summarized below to give you a general understanding of the manual.

- Section 1 OPERATING INSTRUCTION
- Section 2 INSTALLATION
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Related manuals

In addition to this Service Manual Vol. 1, the following manuals are provided.

- **Operation Manual (Supplied with equipment)**

Explains how to operate this equipment.

- **Installation Manual (Not supplied with equipment)**

Contains rack mount information necessary for installation of the equipment, the connector information necessary for connecting the unit with peripherals and others.

- **Service Manual Vol. 2 (Not supplied with equipment)**

Contains the block diagrams, board layouts, schematic diagrams, parts lists.

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SECTION 1 OPERATING INSTRUCTION

This section is extracted from
operation manual.

Introduction

To make the fullest use of the ability capabilities of this unit, note the following important points first.

Reference video input

This unit is designed to be operated with an external reference video signal supplied. Always, therefore, input a composite video signal, synchronized to the signal to be recorded, to the REF VIDEO INPUT connector. This will enable the time base corrector (TBC) to operate correctly, and ensure distortion-free recording.

Input video signal type selection

For recording, it is important that the VIDEO IN switch on the subsidiary control panel is correctly set to match the type of video signal input. In particular, when inputting a composite signal, set this switch to the "Y-R" position, and set the composite signal input connector selection switch on the rear panel to the appropriate position. If these switches are not set correctly, not only will recording not be possible, but the input signal will also not appear on the monitor.

Chassis record prohibition

When the record inhibit plug on the cassette is pushed in, it is not possible to record. Use this feature to prevent unwanted loss of recorded material which you wish to keep.

If the tape transport buttons do not operate

Under NORMAL EMERGENCY mode set to "ALL ENABLE" in the menu, when the REMOTE buttons are pushed in the tape transport buttons are disabled. In other cases, change the menu setting. The factory default setting is "STOP & EJECT".

Features

The UVW-1800H00P is a Betacam SP videocassette recorder, capable of recording and playing back composite video, nonjittered video and audio signals. With its external control unit connected, jog and search functions are available, and the unit can be used as the secondary I/O editing system.

Betacam SP format

Excellent video and audio characteristics

Compared with a conventional format, Betacam SP format provides better video and audio performance, with improved signal-to-noise ratio, frequency characteristics, and detail reproduction, and greatly enhanced overall video and audio quality.

Compatibility with other Betacam SP VTRs

A metal tape cassette recorded on this unit can also be played back on other Betacam SP VTRs. Again, metal tape cassettes recorded on other Betacam SP VTRs can be played back on the UVW-1800H00P. The cassette tape is detented mechanically.

Full range of recording and playback functions

Built-in time code generator and reader

The built-in time code generator allows the user to record time codes (LTC or user bit) simultaneously with the video and audio signals. The built-in time code reader allows the user to read time codes (LTC or user bit) from a tape.

Built-in time base converter (TBC)

The built-in time base converter allows you to obtain a stable playback picture with no horizontal jitter or color fluctuation.

Microprocessor servo system

Four microprocessor-controlled DC motors provide direct drive for the drum, capstan and belts, enabling quiet and accurate tape access.

Audio noise reduction

Longlines audio tracks 1 and 2 use the same Dolby[®] noise reduction as a conventional Betacam SP system. These cassettes are always operating when recording or playing back.

Chapter 1 Overview

This chapter overview lists features of the UVW-1800H00P.

Features 1-2 (E)

D

Dolby noise reduction system 1-2 (E)
Dolby Laboratories Licensing Corporation

Dolby and the Double-D symbol (DD) are trademarks of Dolby Laboratories Licensing Corporation.

Compact, power-saving design

The unit is light and slingshot, and very easy to fit in a case.

Menu-based set-up system

All the initial settings for system operation conditions and so forth are accessed through a simple menu system, from the subsidiary control panel.

Remote control function

The unit can be operated from a remote control unit through the RS-422A serial interface.

It is also possible to use the CONTROL 5 connector on the front panel to connect a single remote control unit (SIRCS) type remote control unit such as an SVREM-1001 to carry out search operations.

Digital hours meter

The digital hours meter keeps cumulative totals of four values: the total hours powered on, the pause rotation time, the tape running time, and the remaining of winding/unwinding operations. These are displayed as superimposed data on the video monitor.

Superimposed test output

The VIDEO 2 (SUPER) OUTPUT connector provides a monitor video output which can have various addresses (user codes, tape speed, system settings, etc.) superimposed on it. The superimposed function can be enabled or disabled as required.

S-Video connectors

With VTRs or other peripheral equipment having S-Video connectors, these connectors provide a high grade interface for video signal transfer.

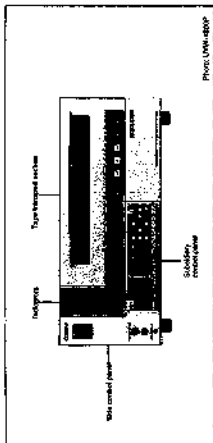
Self-diagnosis functions

If an operating fault occurs, the system attempts to diagnose the problem, and produces an error code on the time counter display and superimposed video output.

Alarm indications

If an erroneous operation or connection is made, the system superimposes information on the monitor screen giving nature of the error and actions to be taken. The cause of the problem is also indicated in the letter counter display.

Front Panel



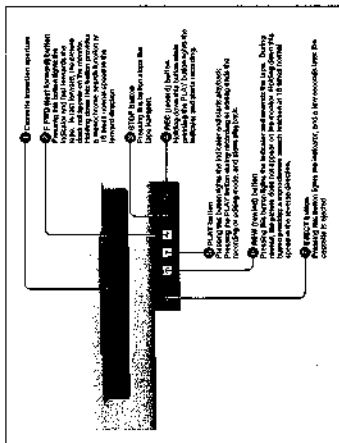
Front Panel

Chapter 2 Identification of Parts and Controls

This chapter lists the names of all the controls and other components used in the operation of the unit.

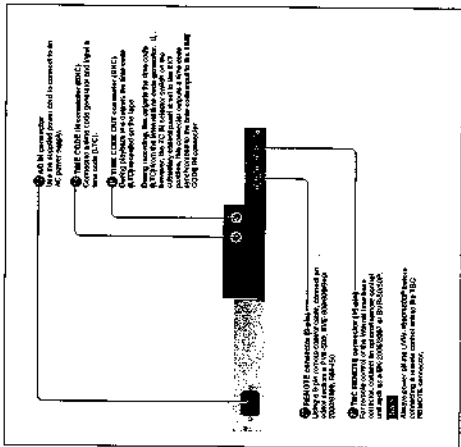
Front Panel	2-2 (E)
Rear Panel	2-5 (E)

Type Keyboard Section



Type Keyboard Section

Power, time code and control signals



Before Use

Safety notes

Power supply

- Ensure that the unit is connected to a power supply of the correct rating.
- Do not place any heavy objects on the power cord, and do not pull it to damage the power cord. (Only a damaged power cord is eligible.)
- When disconnecting the power cord, not pull the cord itself, hold the plug while pulling it out.

Do not dismantle the unit

Do not remove the casing. If you insert your hand there is a danger of electric shock.

Do not drop foreign objects into the casing

If flammable objects, metal objects, water or other undesirable substances enter the casing, this can be a cause of malfunction.

In the event of a malfunction

If there should be a strange sound or smell or smoke emanating from the unit, immediately power off the unit, and describe the power supply and all signal connections, then write to your supplier or Sony service representative.

Notes on operation

Operation and storage conditions

Avoid operation or storage in any of the following places.

- Locations subject to extremes of temperature (operating temperature range: 5 °C to 40 °C (41 °F to 104 °F))
- Locations subject to direct sunlight for long periods, or close to heating appliances (3000 ft or the interior of a car etc.) In summer with the windows closed can exceed 50 °C (122 °F)

Operate the unit in a horizontal position

The unit is designed to be operated in a horizontal position. Do not operate it on its side, or tilted through an excessive angle (exceeding 30°).

Avoid violent impacts

Dropping the unit, or otherwise impacting a violent shock to it, or flexing it can cause it to malfunction.

Do not obstruct ventilation openings

To prevent the unit from overheating, do not obstruct the ventilation openings, by for example wrapping the unit in a cloth while it is in operation.

Care

If the casing or panel is dirty, wipe it gently with a soft dry cloth. In the event of a cleaning job, use a cloth soaked in a neutral detergent to remove the dirt, then wipe with a dry cloth. Applying alcohol, thinner, insecticides, or other volatile solvents may result in softening the casing or damaging the finish.

Shipping

- Always remove the cassette before shipping, the web.
- Pack the unit in its original carton or equivalent packing, and take care not to support vertical shocks in transit.

Chapter 3 Preparations

This chapter describes various preparatory aspects of operation of the DTC-1800/1800C.

Before Use	3-2 (E)
Caution	3-3 (E)
Causes Which Can Be Used Instead of Entering a Channel	3-3 (E)
Record Header Function	3-4 (E)
Reference Video Signals	3-5 (E)

Cassettes

1-10

Cassettes Which Can Be Used

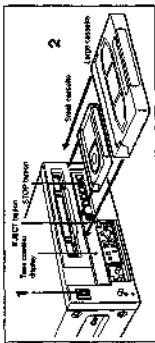
This unit only accepts metal tape.
Use the following 1/2 inch between SP cassettes.

	Metal Tape
Small (S) cassette	AGC-1540/1540A/1540B/1540C/1540D/1540E/1540F/1540G/1540H/1540I/1540J/1540K/1540L/1540M/1540N/1540O/1540P/1540Q/1540R/1540S/1540T/1540U/1540V/1540W/1540X/1540Y/1540Z/1540AA/1540AB/1540AC/1540AD/1540AE/1540AF/1540AG/1540AH/1540AI/1540AJ/1540AK/1540AL/1540AM/1540AN/1540AO/1540AP/1540AQ/1540AR/1540AS/1540AT/1540AU/1540AV/1540AW/1540AX/1540AY/1540AZ/1540BA/1540BB/1540BC/1540BD/1540BE/1540BF/1540BG/1540BH/1540BI/1540BJ/1540BK/1540BL/1540BM/1540BN/1540BO/1540BP/1540BQ/1540BR/1540BS/1540BT/1540BU/1540BV/1540BW/1540BX/1540BY/1540BZ/1540CA/1540CB/1540CC/1540CD/1540CE/1540CF/1540CG/1540CH/1540CI/1540CJ/1540CK/1540CL/1540CM/1540CN/1540CO/1540CP/1540CQ/1540CR/1540CS/1540CT/1540CU/1540CV/1540CW/1540CX/1540CY/1540CZ/1540DA/1540DB/1540DC/1540DD/1540DE/1540DF/1540DG/1540DH/1540DI/1540DJ/1540DK/1540DL/1540DM/1540DN/1540DO/1540DP/1540DQ/1540DR/1540DS/1540DT/1540DU/1540DV/1540DW/1540DX/1540DY/1540DZ/1540EA/1540EB/1540EC/1540ED/1540EE/1540EF/1540EG/1540EH/1540EI/1540EJ/1540EK/1540EL/1540EM/1540EN/1540EO/1540EP/1540EQ/1540ER/1540ES/1540ET/1540EU/1540EV/1540EW/1540EX/1540EY/1540EZ/1540FA/1540FB/1540FC/1540FD/1540FE/1540FF/1540FG/1540FH/1540FI/1540FJ/1540FK/1540FL/1540FM/1540FN/1540FO/1540FP/1540FQ/1540FR/1540FS/1540FT/1540FU/1540FV/1540FW/1540FX/1540FY/1540FZ/1540GA/1540GB/1540GC/1540GD/1540GE/1540GF/1540GG/1540GH/1540GI/1540GJ/1540GK/1540GL/1540GM/1540GN/1540GO/1540GP/1540GQ/1540GR/1540GS/1540GT/1540GU/1540GV/1540GW/1540GX/1540GY/1540GZ/1540HA/1540HB/1540HC/1540HD/1540HE/1540HF/1540HG/1540HH/1540HI/1540HJ/1540HK/1540HL/1540HM/1540HN/1540HO/1540HP/1540HQ/1540HR/1540HS/1540HT/1540HU/1540HV/1540HW/1540HX/1540HY/1540HZ/1540IA/1540IB/1540IC/1540ID/1540IE/1540IF/1540IG/1540IH/1540II/1540IJ/1540IK/1540IL/1540IM/1540IN/1540IO/1540IP/1540IQ/1540IR/1540IS/1540IT/1540IU/1540IV/1540IW/1540IX/1540IY/1540IZ/1540JA/1540JB/1540JC/1540JD/1540JE/1540JF/1540JG/1540JH/1540JI/1540JJ/1540JK/1540JL/1540JM/1540JN/1540JO/1540JP/1540JQ/1540JR/1540JS/1540JT/1540JU/1540JV/1540JW/1540JX/1540JY/1540JZ/1540KA/1540KB/1540KC/1540KD/1540KE/1540KF/1540KG/1540KH/1540KI/1540KJ/1540KK/1540KL/1540KM/1540KN/1540KO/1540KP/1540KQ/1540KR/1540KS/1540KT/1540KU/1540KV/1540KW/1540KX/1540KY/1540KZ/1540LA/1540LB/1540LC/1540LD/1540LE/1540LF/1540LG/1540LH/1540LI/1540LJ/1540LK/1540LL/1540LM/1540LN/1540LO/1540LP/1540LQ/1540LR/1540LS/1540LT/1540LU/1540LV/1540LW/1540LX/1540LY/1540LZ/1540MA/1540MB/1540MC/1540MD/1540ME/1540MF/1540MG/1540MH/1540MI/1540MJ/1540MK/1540ML/1540MM/1540MN/1540MO/1540MP/1540MQ/1540MR/1540MS/1540MT/1540MU/1540MV/1540MW/1540MX/1540MY/1540MZ/1540NA/1540NB/1540NC/1540ND/1540NE/1540NF/1540NG/1540NH/1540NI/1540NJ/1540NK/1540NL/1540NM/1540NN/1540NO/1540NP/1540NQ/1540NR/1540NS/1540NT/1540NU/1540NV/1540NW/1540NX/1540NY/1540NZ/1540OA/1540OB/1540OC/1540OD/1540OE/1540OF/1540OG/1540OH/1540OI/1540OJ/1540OK/1540OL/1540OM/1540ON/1540OO/1540OP/1540OQ/1540OR/1540OS/1540OT/1540OU/1540OV/1540OW/1540OX/1540OY/1540OZ/1540PA/1540PB/1540PC/1540PD/1540PE/1540PF/1540PG/1540PH/1540PI/1540PJ/1540PK/1540PL/1540PM/1540PN/1540PO/1540PP/1540PQ/1540PR/1540PS/1540PT/1540PU/1540PV/1540PW/1540PX/1540PY/1540PZ/1540QA/1540QB/1540QC/1540QD/1540QE/1540QF/1540QG/1540QH/1540QI/1540QJ/1540QK/1540QL/1540QM/1540QN/1540QO/1540QP/1540QQ/1540QR/1540QS/1540QT/1540QU/1540QV/1540QW/1540QX/1540QY/1540QZ/1540RA/1540RB/1540RC/1540RD/1540RE/1540RF/1540RG/1540RH/1540RI/1540RJ/1540RK/1540RL/1540RM/1540RN/1540RO/1540RP/1540RQ/1540RR/1540RS/1540RT/1540RU/1540RV/1540RW/1540RX/1540RY/1540RZ/1540SA/1540SB/1540SC/1540SD/1540SE/1540SF/1540SG/1540SH/1540SI/1540SJ/1540SK/1540SL/1540SM/1540SN/1540SO/1540SP/1540SQ/1540SR/1540SS/1540ST/1540SU/1540SV/1540SW/1540SX/1540SY/1540SZ/1540TA/1540TB/1540TC/1540TD/1540TE/1540TF/1540TG/1540TH/1540TI/1540TJ/1540TK/1540TL/1540TM/1540TN/1540TO/1540TP/1540TQ/1540TR/1540TS/1540TT/1540TU/1540TV/1540TW/1540TX/1540TY/1540TZ/1540UA/1540UB/1540UC/1540UD/1540UE/1540UF/1540UG/1540UH/1540UI/1540UJ/1540UK/1540UL/1540UM/1540UN/1540UO/1540UP/1540UQ/1540UR/1540US/1540UT/1540UU/1540UV/1540UW/1540UX/1540UY/1540UZ/1540VA/1540VB/1540VC/1540VD/1540VE/1540VF/1540VG/1540VH/1540VI/1540VJ/1540VK/1540VL/1540VM/1540VN/1540VO/1540VP/1540VQ/1540VR/1540VS/1540VT/1540VU/1540VV/1540VW/1540VX/1540VY/1540VZ/1540WA/1540WB/1540WC/1540WD/1540WE/1540WF/1540WG/1540WH/1540WI/1540WJ/1540WK/1540WL/1540WM/1540WN/1540WO/1540WP/1540WQ/1540WR/1540WS/1540WT/1540WU/1540WV/1540WW/1540WX/1540WY/1540WZ/1540XA/1540XB/1540XC/1540XD/1540XE/1540XF/1540XG/1540XH/1540XI/1540XJ/1540XK/1540XL/1540XM/1540XN/1540XO/1540XP/1540XQ/1540XR/1540XS/1540XT/1540XU/1540XV/1540XW/1540XX/1540XY/1540XZ/1540YA/1540YB/1540YC/1540YD/1540YE/1540YF/1540YG/1540YH/1540YI/1540YJ/1540YK/1540YL/1540YM/1540YN/1540YO/1540YP/1540YQ/1540YR/1540YS/1540YT/1540YU/1540YV/1540YW/1540YX/1540YY/1540YZ/1540ZA/1540ZB/1540ZC/1540ZD/1540ZE/1540ZF/1540ZG/1540ZH/1540ZI/1540ZJ/1540ZK/1540ZL/1540ZM/1540ZN/1540ZO/1540ZP/1540ZQ/1540ZR/1540ZS/1540ZT/1540ZU/1540ZV/1540ZW/1540ZX/1540ZY/1540ZZ

Inserting and Ejecting a Cassette

Always check that the unit is powered on before attempting to insert or eject a cassette.

Inserting a cassette



Inserting a cassette

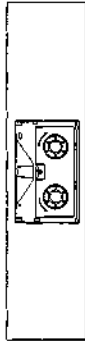
- 1 Turn the POWER switch on.
- 2 Check the following points, then insert the cassette.
 - The cassette must be inserted with the side with the tape in shade uppermost.
 - The cassette must be inserted with the label side up.
 - There must be no markings "RECORD" in the time counter display.

For details of how to remove a cassette from the unit, see the section "Removing a cassette from the unit" page 7.
For details of how to insert a cassette into the unit, see the section "Inserting a cassette into the unit" page 7.

To insert a small cassette, slide it with the shade up the cassette compartment. The cassette is automatically drawn into the unit, and the tape wound around the head drum. The tape is stationary while the level green points, and the STOP button lights.

Cassettes

Removing a cassette from the tape
Carefully rotate one of the reels with your finger in the direction of the arrows until it stops.



Remove one of the reels

No double insertion of cassettes

When you insert a cassette, the orange lock-on plate appears in the cassette compartment to prevent double insertion.

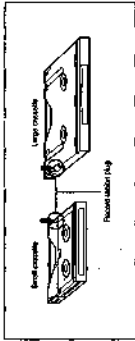
Ejecting the cassette

Press the EJECT button.

The tape is wound back into the cassette (this takes several seconds), and then the cassette is opened from the unit.
If the time counter display is following CTL values, it is reset.

Record Inhibit Function

To prevent recording material which you wish to keep, press on the record-inhibit plug on the cassette.



Record inhibit plug

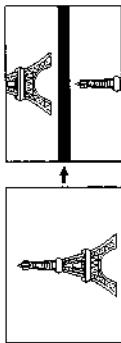
When you insert a cassette with the record inhibit plug pushed in, the cassette compartment, the REC INHIBIT indicator lights, and it is not possible to record.

To re-record on the cassette, rotate the record-inhibit plug to its original position.

Reference Video Signals

When the unit is being used, a composite video signal, synchronized to the signal being used, must be input to the REF VIDEO INPUT connector to stabilize the time base circuit (TBC) in operate correctly, and ensure stable operation.

If no reference video signal is input, then during recording or editing, or in EE mode the monitor screen will tend to drift vertically, as shown in the figure below.



With reference video

No reference video

The monitor screen and the time counter display also show alarm messages (Example: when the VIDEO 2 (SUPER) OUTPUT connector is wired with the "REF ALARM" set to ON in the menu.)



No REF

Time counter display

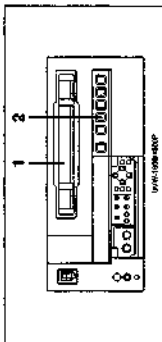
Monitor screen

During playback, a monitor picture is normally stable without a reference video signal input.

For details of changing the menu settings, see the section "Menu Operations" (page 7).

Recording Operation

Playback Operation



- 1 Listen to a cassette.
The STOP button flashes, then a few seconds later this light is ready to start flashing. At this point a still picture appears on the monitor.
Always be sure to use a metal tape.
- 2 Press the PLAY button
Playback begins.
To stop playback
Press the STOP button.
This puts the UUV-16000/1600P into stop mode. This unit automatically enters standby after one minute if it is left in stop mode for eight minutes.
For an change the time to switch to standby, off mode in the TAPE PROTECTION menu. For details, see menu "TAPE PROTECTION" (page 7-6E).

If the tape indicates the end during playback
The tape is automatically returned to the beginning and the unit stops.
You can disable this automatic feature by using the menu.
For details, see "AUTO REW" (page 7-5E).

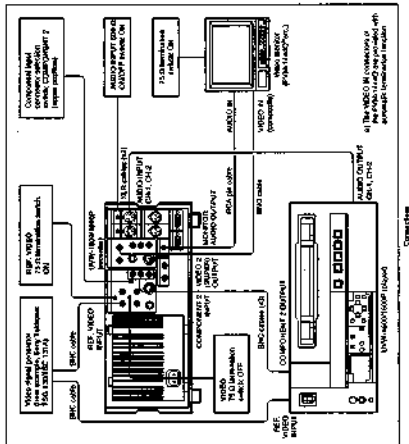
Adjusting the audio playback volume
Carry out one of the methods.

Simple search function
Holding down the F.FWD or REW button provides a search/scan function at 16 times normal speed in the forward or reverse direction, respectively. Press the PLAY button again to return to normal playback.

This section describes the connectors, switch settings, and basic operating procedures for recording a composite video signal and audio signal.

Preparation for Recording

Connect this unit to the recorder and a UUV-16000/1600P as the player as shown in the following figure. To check the video and audio signals being recorded, connect the UUV-16000/1600P to a monitor as described in the Section "High-level Operation" (page 4-2E).



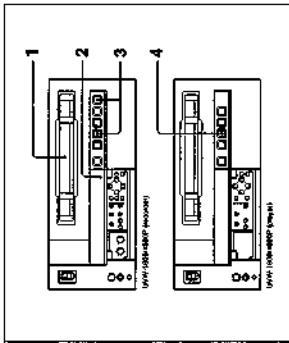
NOTE

If you do not input a reference video signal, the monitor picture will be subject to vertical instability. When carrying out recording, a large input or reference video signal.

For details of reference video signal, see the Section "Reference Video Signal" (page 7-6E).

Recording Operation

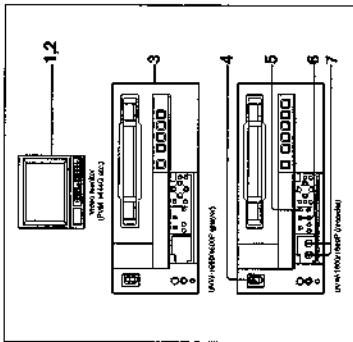
In order to carry out recording of the video and audio signals, check the file you have made the connections and carried out the Audio setting procedure correctly. Then use the following procedure:



Operation

- 1 Insert a cassette in the UVM-1800/1800P.
Always be sure to use a metal tape.
Before inserting the cassette, check that it is not record-protected.
For details see the Section "Special Playback Functions" (page 3-4E2).
- 2 Check that the REC. INHIBIT indicator is not lit.
- 3 Hold down the REC. button, and press the PLAY button.
Recording starts.
- 4 Press the PLAY button on the player.
Playback starts.
To stop recording:
Press the STOP button.

Switch and control settings
After completing the connections, make the switch and control settings as follows.



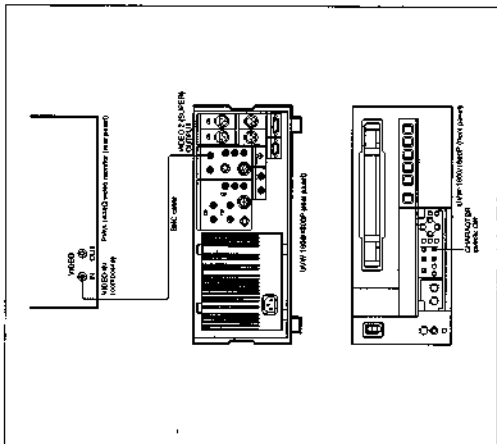
Switch and control settings

- 1 Power on the video amplifier.
- 2 Set the input selector of the monitor to the input connector connected to the UVM-1800/1800P.
- 3 Following the instructions in the appropriate operation manual, and prepare the player for playback.
- 4 Power on the UVM-1800/1800P.
- 5 Set the VIDEO IN selector switch to COMPOSITE.
- 6 Set the video control display selector switch according to the time data to be used.
- 7 Adjust the AUDIO INPUT LEVEL controls so that the audio level meters indicate around 0 PU when the audio signal is at its maximum.

Monitoring the video signals

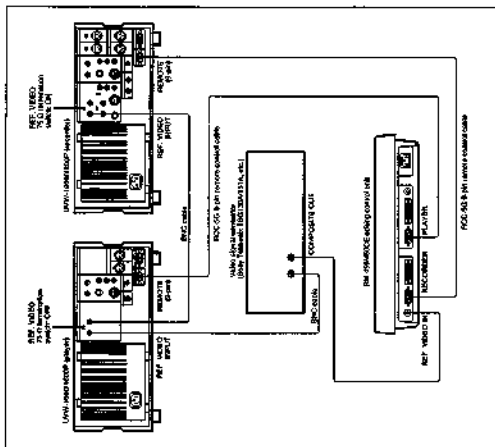
To monitor the video signals, camera monitors as shown in the figure below. The connections are the same for the recorder and player.

To obtain superimposed information on the camera screen, set IIR CHARACTER switch to IIR ON position.



Connecting a camera monitor

Reference video signal and editor connections

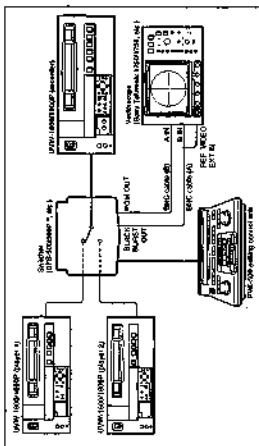


Reference video signal and editor connection

Phase Adjustments

Phase Adjustments

When using two or more players or in an RGB full editing system, phase synchronization of the signals (i.e. system sync) is necessary and (for composite signals only), the subcarrier phase may also be adjusted. If the picture (horizontal) or color break-up may occur as well possible. After configuring the editing system, use a Vectorscope to adjust the sync and subcarrier phase of the monitor and player's Subcarrier phase adjustment is necessary only when editing composite signals.



Connections to phase adjuster

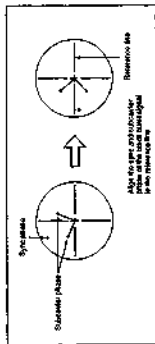
Phase adjustment procedure

- 1 Press the **SCN** button on the Vectorscope.
The Vectorscope window is "SCN" mode.
- 2 Press the **B** channel button on the Vectorscope.
This displays the black burst signal from the switcher.
- 3 Press the **EXT** button on the Vectorscope.
This enables the Vectorscope to external synchronization mode.

Continued

Phase Adjustments

- 4 Adjust the phase synchronization control on the Vectorscope so that the sync and subcarrier phases are close to the reference line.

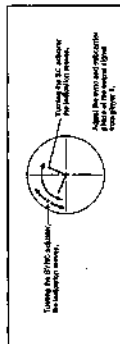


- 5 Output the player 1 signal from the PVE-500.

- 6 Press the **A** channel button on the Vectorscope.

This displays the sync phase and subcarrier phase (composite signal only) of the signal from player 1.

- 7 On the priority control panel of player 1, adjust the **SYNC** and **SC** adjustment controls using a Phillips screwdriver, until the output from player 1 on channel (A) is in correct phase alignment with the black burst signal on channel (B).



Continued

- 8 When composite signals are used the subcarrier phase does not apply.

- 9 Output the player 2 signal from the PVE-500.

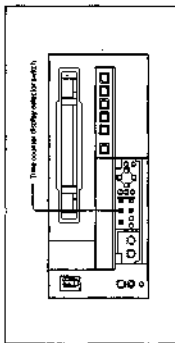
Repeat steps 6 and 7 to adjust the sync and subcarrier phase of the output from player 2.

Displaying Time Data

During recording or playback, you can display the time data selected on this menu on the monitor or the time counter display. During editing, the data displayed is selected by the editor.

On the time counter display

Use the time counter display selector switch to select the data to be displayed on the time counter display.



Resetting the CTL data displayed

Press the RESET button.

The indication in the time counter display is reset to "00:00:00.00".

On the monitor screen

See the section "Supermarket Test Information" (page 4-7(E)).

Chapter 6 Time Data

The time data used by the UVM-BUFFER for book recording and display includes CTL signal count values, longitudinal link codes (LTC), and user bit data. This chapter describes how to display time data, and how to set LTC and user bit values.

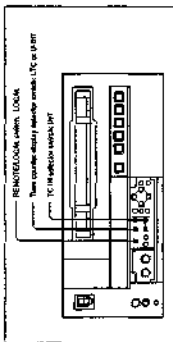
Displaying Time Data 6-2 (E)
Settings for Longitudinal Time Code and User Bits 6-3 (E)
Synchronizing the Inferred Time Code Generator
With an External Time Code Generator 6-5 (E)

Settings for Longitudinal Time Code and User Bits

Using the lineal time code generator, if possible, to generate longitudinal time code (LTC) values to be recorded on this tape to any desired initial value. This section describes how to preset the LTC value, and also how to preset the user bit data, which is also visible on the same track.

Switch and menu settings

Carry out the following switch and menu settings.



Switch settings

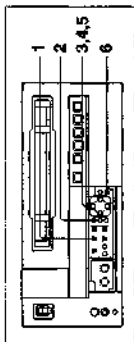
Menu settings

Mode	Setting
LTC MODE (for LTC/USER BITS)	WRITE DATA ON TRACK 10
BIT MODE (for LTC/USER BITS)	RECORDING OFF

For details of the KUM MODE and BIT MODE screens, see under "TIME CODES" page 2-242B.

Settings for Longitudinal Time Code and User Bits

Setting procedure



Setting the user bits for new code or user bits

- 1 Set the time counter display selector switch to LTC or U-BIT, to display the required time data on the monitor and time counter display.
- 2 Press the TC PRESET button.

The current setting is displayed on the monitor screen and the time counter display. At this point the following light flashes.

One of the following displays appears on the monitor screen.



The user bit mode

Set for presetting

NOTE

If you press the TC PRESET button while CTL mode is displayed, the following screen message appears on the monitor screen.



CTL mode!

Set the time counter display selector switch to LTC or U-BIT.

Synchronizing the Internal Time Code Generator With an External Time Code Generator

- Use the **[E]** and **[B]** buttons to set the digit in the value which is flashing.
- Use the **[D]** and **[T]** buttons to adjust the value of the flashing digit. After this step the data values are in hexadecimal (digits 0-F and A-F).
- Repeat steps 2 and 4 as required to set the required value.
- To set the value of 00:00:00:00, press the **RESET (RST)** button.
- Press the **SET (YES)** button.

Either of the two displays shown immediately below appears on the camera screen and the third display shown below in the next camera display.



Once the setting is saved, the monitor screen and time code display return to normal.

NOTE

If you power off this unit while it is in the process of saving the settings, settings may be lost. With each saving is completed before powering the unit off.

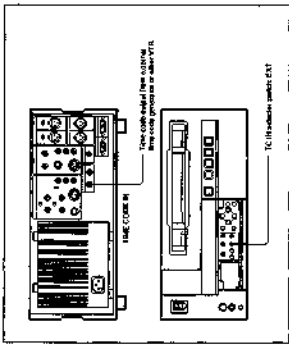
Internal time code generator timing troubles

There are two different modes of operation for the internal time code generator, selected by the **RUN MODE** setting as follows:
"FREE RUN": The time code generator begins to run from the instant the preset "FREE RUN". The time code generator runs only during recording.
"REC RUN": The time code generator runs only during recording.

Presetting the time data value to reflect real time in the menu, set **RUN MODE** to "FREE RUN", and set the time data value to the correct time.

If a time code signal (LTC, video) is input to this unit, the external time code generator is automatically synchronized to the time code value input from an external source. Using this function, it is possible to have a number of VTRs all set to synchronized time codes, and to copy time codes precisely from one tape to another.

Connections and switch settings
 Carry out the following adjustments and switch settings.



When an external time code is input, the running mode of the electrical time code generator is as follows.

RUN MODE: Automatically set to "FREE RUN".
DP MODE (for DVP): Automatically set to either stop frame mode or non-stop mode according to the mode of the input time code.

After setting the TC IN selector switch to EXT position, the external time code generator begins to run in synchrony with the external time code generator. The internal time code generator continues to run in the same way even if the external time code generator is discontinued.

Checking the internal time code generator counting

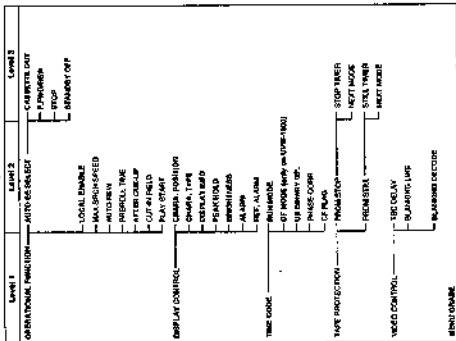
Stop the tape, and press the **FREC** button.
 Check that the same value as the input time code value is displayed.

Menu Organization

Hierarchical Structure

The menu screens are arranged in a three-level tree structure, as shown in the figure below. The top-level selections (level 1) access the main functions of the machine, and except for the MENU ORGANIZE item, the settings themselves are made on levels 2 and 3. The screens are divided into two groups: the basic settings, to which frequent access is normally required, and extended settings, which are less frequently used.

In the following figure, bold lines indicate the basic menu contents, and also lines the extended menu screens.



Chapter 7 Menus

This chapter describes the organization of the principal set-up menus (including the supplementary information on the monitor screen, time code, run mode, etc.) and how to use them.

Menu Organization	7-1 (E)
Hierarchical Structure	7-2 (E)
Menu Screens	7-3 (E)
Menu Operations	7-4 (E)
Buttons Used in Change the Setting	7-5 (E)
Operation Sequence	7-9 (E)

Menu operations (continued)

VIDEO CONTROL: Settings required to video control	Description of settings
<p>TBC DELAY (1-10) (000)</p> <p>When used as the recorder of an analog video signal, the TBC delay is set to 000. When used as the recorder of a digital video signal, the TBC delay is set to 000.</p> <p>VIDEO DELAY (1-10) (000)</p> <p>When used as the recorder of an analog video signal, the video delay is set to 000. When used as the recorder of a digital video signal, the video delay is set to 000.</p> <p>VIDEO DELAY (1-10) (000)</p> <p>When used as the recorder of an analog video signal, the video delay is set to 000. When used as the recorder of a digital video signal, the video delay is set to 000.</p>	<p>TBC DELAY (1-10) (000)</p> <p>The synchronization signal is delayed from the input video signal by the amount specified in the TBC DELAY setting.</p> <p>VIDEO DELAY (1-10) (000)</p> <p>The synchronization signal is delayed from the input video signal by the amount specified in the VIDEO DELAY setting.</p>
<p>BLANKING DECODE (0-255) (000)</p> <p>When used as the recorder of an analog video signal, the blanking decode is set to 000. When used as the recorder of a digital video signal, the blanking decode is set to 000.</p> <p>BLANKING DECODE (0-255) (000)</p> <p>When used as the recorder of an analog video signal, the blanking decode is set to 000. When used as the recorder of a digital video signal, the blanking decode is set to 000.</p>	<p>BLANKING DECODE (0-255) (000)</p> <p>The blanking decode is set to 000. When used as the recorder of an analog video signal, the blanking decode is set to 000. When used as the recorder of a digital video signal, the blanking decode is set to 000.</p>
<p>BLANKING DECODE (0-255) (000)</p> <p>When used as the recorder of an analog video signal, the blanking decode is set to 000. When used as the recorder of a digital video signal, the blanking decode is set to 000.</p> <p>BLANKING DECODE (0-255) (000)</p> <p>When used as the recorder of an analog video signal, the blanking decode is set to 000. When used as the recorder of a digital video signal, the blanking decode is set to 000.</p>	<p>BLANKING DECODE (0-255) (000)</p> <p>The blanking decode is set to 000. When used as the recorder of an analog video signal, the blanking decode is set to 000. When used as the recorder of a digital video signal, the blanking decode is set to 000.</p>

MENU GRADE: Blank screen selection (press 000)	Description of settings
<p>MENU GRADE: Blank screen selection (press 000)</p>	<p>MENU GRADE: Blank screen selection (press 000)</p> <p>The menu grade is set to 000. When used as the recorder of an analog video signal, the menu grade is set to 000. When used as the recorder of a digital video signal, the menu grade is set to 000.</p>

Although the menu screens are divided into basic and extended categories, the method of operation is the same.

This section describes as an example the procedure required to change the setting for the tape protection mode using the disk. Check the location of the setting in the instruction, by referring to the previous section. It is on the level 2 menu screen "TAPE PROTECTION", which is an extended menu screen.

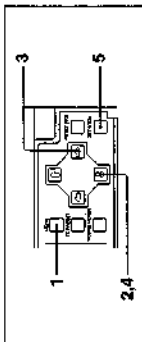
Buttons Used to Change the Setting

This operation uses the following buttons on the subsidiary control panel. Buttons used to change the menu setting and their functions

RIGHT button	<ul style="list-style-type: none"> Entering menu mode Leaving menu mode
DISC button	<ul style="list-style-type: none"> Moving the screen video cursor up and down to choose the function with a menu screen. It is used to move the video cursor to the next screen.
ENTER button	<ul style="list-style-type: none"> The function moves to the menu at the next lower level. The function moves to the menu at the next higher level. If other buttons to hold down, the function will continue to move.
RESET (PUSH) button	<ul style="list-style-type: none"> Returns setting to its factory default. Accesses top level of a function on the menu screen.
EXIT (PUSH) button	<ul style="list-style-type: none"> Continues a changed setting. Accesses top level of a function on the menu screen.

Operation Sequence

Displaying the extended menu



Displaying the extended menu

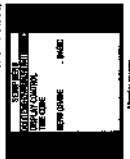
- 1 Press the MENU button.

The level 1 menu appears on the monitor screen. The factory default setting is basic menu screens only.

The video video-once signal the correct selection, as the figure below, this is "OPERATIONAL FUNCTION". The → mark indicates this from the associated submenu.

The time counter display shows the selected item only, often in abbreviated form.

Level 1 menu display (basic menu screen)



The "MENU GRADE" setting has no associated submenu. In such a case, the course setting also appears in abbreviated form to the right of the screen. When the factory default setting is currently selected, the "→" indication precedes the setting. In this case the setting does not appear on the time counter display.

- 2 Press the [D] button to select "MENU GRADE BASIC".

Selecting MENU GRADE BASIC



- 3 Press the [E] button.

This display, all of the settings, and the current selection appears on the monitor screen in reverse video. The → mark indicates the "BASIC" has an associated menu at the next higher level. The "→" indication precedes the factory default setting.

Examining the settings



- 4 Press the [D] button to select "ENHANCED".

Selecting ENHANCED

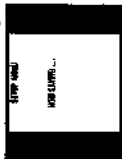


5 Press the SET (YES) button.

The messages shown below appear in the monitor screen and the same counter display, and the new setting is saved in memory.

Messages when saving settings

Setting value
 Saving.....
 Time counter display



Monitor screen

Once the saving operation is completed, both the monitor screen and time counter display return to the normal state.

Notes

- If you power off this unit while it is in the process of saving the settings, settings may be lost. Wait until saving is completed before proceeding the use of.
- If you do not press the SET (YES) button, and press the MENU button, the settings are not saved; the displays shown below appear for 0.5 seconds, and the same screen as forcibly erases. If making more than one setting, be sure to press the SET (YES) button after finishing all the desired settings.

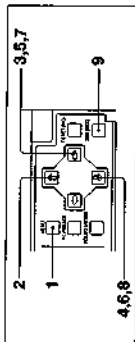
Forcibly erasing the menu

Setting value
 ABORT!

Time counter display



Monitor screen

Changing the "NEXT MODE" setting

Changing the NEXT MODE setting

1 Press the MENU button.

The level 1 extended menu appears on the monitor screen.

- The reverse when cursor shows the cursor selection, "MENU GRADE" + "ENTER" mode in the previous screen. When the cursor is selected setting is set to the factory default setting, the "w" indication instead of the "v" indication precedes that setting.

Level 1 menu display (extended menu screen)



Monitor screen

Menu grade

Time counter display

2 Press the button to select "TAPE PROTECTION".

Selecting TAPE PROTECTION



Monitor screen

Tape protect

Time counter display

9 Press the SET (YES) button.

The "Saving" message appears on the monitor (as shown below), and the new settings is saved in memory.

Messages when saving settings



Monitor screen

Once the saving operation is completed, look the monitor screen and the counter display returns in the normal state.

Notes

- If you power off this unit while it is in the process of saving the settings, settings may be lost. Wait until saving is completed before powering the unit off.
- If you do not press the SET (YES) button, and press the MENU button, the settings are not saved; the display shown before appears. In this example, and the same operation is forcibly ejected. If making more than one setting, be sure to press the SET (YES) button before returning to the next screen.

Factory showing the monitor



Monitor screen

Returning menu settings to the factory default

Returning a specific menu setting to its factory default is one screen for each the setting; press the RESET (NO) button.

In the example above of the "NEXT MODE" setting, press the RESET (NO) button in step 8 to return to the factory default of "STANDARD OFF".

Returning all menu settings to the factory default

- 1 Press the MENU button to display the level 1 menu.
- 2 Press the RESET (NO) button.

The following message appears on the monitor screen, which is identical to ask the user to confirm the reinitialization.

Request for confirmation of reinitialization



Monitor screen

Init setup?

Time counter display

3 Press the SET (YES) button.

This returns all menu settings to their factory defaults. The "Saving" message appears on the monitor, and the new setting is saved in memory.

Notes

- If you power off this unit while it is in the process of saving the settings, the reinitialization may not be completed. Wait until saving is completed before powering the unit off.
- If instead of pressing the SET (YES) button you press the RESET (NO) button, the reinitialization is not carried out, and the display returns to the level 1 menu screen.

Self-Diagnosis Functions

The DVW-1000/100P is provided with self-diagnosis functions with 6 distinct internal levels. If a fault is detected, the DVW-1000/100P displays an error code in the same monitor display and an error message on the monitor screen.

To display error messages on the monitor screen, the monitor must be connected to the VIDEO 2 (SUPER-OUTPUT) connector, and the CHARACTER switch on the subsidiary equip (PANEL) must be in the ON position.

Error08-03A

Error code

Example error code displayed on the front control display



Monitor screen error message

When an error message appears on the monitor screen, follow the direction displayed.

Chapter 8 Maintenance

This chapter describes the self-diagnosis functions with which the DVW-1000/100P is provided. The actions to be taken in the event of completion on the head drum, the signal beam sensor, and the head-cleaning process needed to ensure high video and color reproduction quality.

Self-Diagnosis Functions	8-2 (E)
Condensation	8-3 (E)
Regular Checks and Maintenance	8-4 (E)
Signal Beam Meter	8-4 (E)
Head Cleaning	8-5 (E)

Condensation

If the unit is suddenly moved from a cold to a warm location, or used in a very humid place, condense from the air can collect on the head-drains. If this happens in this state, the tape may stick to the drum, in which case it is highly likely to be damaged. To lessen the risk of this occurring, this unit is fitted with a condensation detection system.

If multiple condenses on the head-drains while the unit is operating the indication "FLUID" appears in the time counter display. The following indication also appears on the monitor.



Condensation warning code

If this happens, the cassette is closed automatically. Before restarting the operation, wait until the alarm message disappears, without turning the unit off.

If the condensation warning appears immediately after powering on, leave the unit powered on and wait until the indication disappears. While the indication is present, it is not possible to insert a cassette. Once the warning indication disappears, the unit is ready for use.

Regular Checks and Maintenance

Digital Hours Meter

The digital hours meter keeps a cumulative count of the total operating time, the drum rotation time, the tape transport operating time, and the number of starting and stopping operations. These counts can be displayed on the monitor and time counter display, use them as guidelines for scheduling maintenance. Consult your Sony service representative about necessary periodic maintenance checks.

Digital hours meter indications

The digital hours meter provides the following four display items

T1: OPERATION

Cumulative total of hours used in units of 10 hours

T2: DRUM ROTATION

Cumulative total of hours of drum rotation with tape inserted, in units of 10 hours

T3: TAPE RUNNINGS

Cumulative total of hours of tape transport operation, in units of 10 hours

C1: THREADING

Cumulative number of tape threading/unthreading operations plus, in units of 10 operation plus

Except for the total operation time, there are two counts for each item: the cumulative total from manufacture, and a "trip" count readable.

Displaying the digital hours meter

Press the HOURS METER button

Monitor display

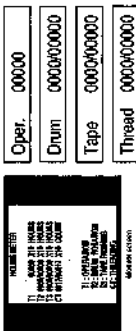
All four counts appear.

The four-digit value to the left of the slash is the readable trip count, and the right value is the cumulative total from manufacture.

Time Counter display
One of the four indicators appears. Use the **CD** and **CD** buttons to change the item displayed.

Initially, only the slip value appears. Press the **EB** button to display the cumulative total to the right of the data, as long as the button is held down.

English language



Ending the display hours meter display

Press the **HOURS METER** button.

Resetting the slip values

Contact your Sony Service representative.

Head Cleaning

Clean both the video and audio heads using the special **BCT-3CLN** cleaning cassette. Follow the instructions for the cleaning cassette carefully, as improper use can damage the heads.

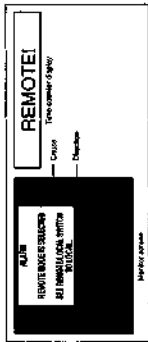
Cleaning procedure

Insert the cleaning cassette, hold down the **PLAY** button and press the **EJECT** button. This causes one a five-second cleaning operation. The **EJECT** indicator flashes during this period, and all tape transport buttons other than the **EJECT** button are disabled.

NOTE

- Up to three consecutive cleaning operations are possible.
- Cleaning above this level may damage the heads.
- Be sure the unit is not left with the cleaning cassette in place, as this can cause damage to the heads.

There are a number of messages which may appear on the emulator screen during operation. CA message also appears in the link counter display.)



These alarm messages indicate maloperational or problems with the unit such as communication or air drive.

To display these messages on the monitor screen, the emulator menu bar connected to the VIDEO 2 (SUPERVISOR CONTROL) window, and the CHARACTER window on the emergency control panel must be in the ON position. It is possible to display the messages in the menu option by setting the ALARM and REF. ALARM items to OFF.

For details of the alarm messages see the service "Alarm Operator" (page 7-342).

If an alarm message is indicated, take appropriate action according to its content.

Chapter 9 Operational Problems

If an alarm message appears on the screen, or the unit operation is not normal, you should check this chapter before consulting your SMD service representative.

Alarm Messages 9-2 (E)
Trouble-Shooting Chart 9-4 (E)

Trouble-Shooting Chart

The alarm messages indications are listed below.

Alarm messages		Alarm messages on the remote screen	
Alarm message	Cause	Direction	Alarm messages on the remote display
ABNORMAL SETTINGS SETUP IN SETUP	SET ITEMS IN THE SETUP APPROPRIATE VALUES CONTACT YOUR DEALER WITH ALARM PREPARES ABOVE PROCEDURE	SET ITEMS IN THE SETUP APPROPRIATE VALUES CONTACT YOUR DEALER WITH ALARM PREPARES ABOVE PROCEDURE	IN SETUP 1
ALARM TRIP HAS BEEN OBTAINED	KEEP THE POWER ON AND WAIT UNTIL THE INDICATION GONE OFF	KEEP THE POWER ON AND WAIT UNTIL THE INDICATION GONE OFF	Hazard 1
REMOTE MODE IS SELECTED	SET REMOTE/LOCAL SWITCH TO LOCAL	SET REMOTE/LOCAL SWITCH TO LOCAL	REMOTE 2 Key-short
KEY IS AWAYED, CHECK THE FOLLOWING KEYS: (SET IN ALTC (R) MODE) (DOWN) (RIGHT) (LEFT) (SET IN ALTC (SET) (MENU) (PROPERTY)			
NO CASSETTE IN VTR			No. Cassette
RECORD INHIBIT PLUS ON THE CASSETTE IS SET TO EJECT			REC INHJ CR, mode 1
CTL MODE IS SELECTED	SET CTL LOCAL SWITCH TO LOCAL	SET CTL LOCAL SWITCH TO LOCAL	CTL, mode 1
NO SIGNAL IS SELECTED	SET TO BURET SWITCH TO CTL	SET TO BURET SWITCH TO CTL	TO EXT 4
SCD FROM MODE IS SET TO REC INH	SET TO ALB HOME SETUP MENU TO PRESS KEY	SET TO ALB HOME SETUP MENU TO PRESS KEY	REC INH 1
REF VIDEO IS NOT DETECTED	SET VTR VIDEO SIGNAL	SET VTR VIDEO SIGNAL	NO REF 1
A BLACKFRAME SIGNAL IS BEING USED FOR REF VIDEO	USE A COLOR SIGNAL	USE A COLOR SIGNAL	BURF REF 1
A FORWARD SIGNAL IS BEING USED FOR REF VIDEO	USE A SIMPOUND SIGNAL	USE A SIMPOUND SIGNAL	REF MORGED
SETUP VIDEO IS NOT OBTAINED	SUPPLY A VIDEO SIGNAL TO VIDEO INPUT	SUPPLY A VIDEO SIGNAL TO VIDEO INPUT	NO INPUT 2

Target problems		Remedy	
Symptoms	Cause	Symptoms	Remedy
Recording is not possible	The record/stop key on the remote is pressed in C	Fill out the stop, or stop a display tape.	
The type language cannot be changed	The REMOTE/LOCAL switch in the REMOTE power, and the LOCAL switch in the REMOTE & LOCAL or "ALL DISPLAY" is not in the correct position	No message is located	Set the REMOTE/LOCAL switch to LOCAL, or change the menu setting to "ALL DISPLAY"
No message is located	No message is located	No message is located	Insert a cassette.

This mode problems		Remedy	
Symptoms	Cause	Symptoms	Remedy
It is not possible to press the stop counter display to an arbitrary value	The TO IN selector switch is in the EXT position	The time counter selector switch is in the EXT position	Set the TO IN selector switch to the EXT position.
Although the tape transport is operating, the counter value does not change	The time counter selector switch is in the EXT position	The time counter selector switch is in the EXT position	Set the time code selector switch to the EXT or LEFT position. (It is not possible to record time counter support)
	The REMOTE/LOCAL switch in the REMOTE power, and the LOCAL switch in the REMOTE & LOCAL or "ALL DISPLAY" is not in the correct position	The REMOTE/LOCAL switch in the REMOTE power, and the LOCAL switch in the REMOTE & LOCAL or "ALL DISPLAY" is not in the correct position	Set the REMOTE/LOCAL switch to LOCAL, or change the menu setting to "ALL DISPLAY"
	The MENU button, TO PRESET button or HOURS (MENU) button has been pressed	The MENU button, TO PRESET button or HOURS (MENU) button has been pressed	Press the button again, to set item menu setting mode, time code pressing the button again, to set item menu setting mode. (In either of these modes, the time counter value does not show (time counter information.)
	The time counter display is showing 00:00	The time counter display is showing 00:00	Set the time code selector switch to the EXT or CTL position

a) In these cases an alarm message appears both on the monitor screen and on the counter display.

Symptom	Cause	Remedy
If it not possible to delete the Dolby noise reduction.	1. On this unit, it is not possible to disable the Dolby noise reduction.	

Symptom	Cause	Remedy
A "Y" appears on the screen	The TRC DELAY menu item is set to "VIDEO DELAY".	Set TRC DELAY to "SYNC DELAY". (The LNRW search has a blank line for cause.) Transitions between video signals of different standards (PAL to NTSC) or different video reference signals (3 lines) are processed by the TRC DELAY setting. This means that when the TRC DELAY setting is "VIDEO DELAY", the video signal appears. However, even if the TRC DELAY item is set to "SYNC DELAY", if the search is synchronized to an external reference, a "Y" also appears. This is not a malfunction.)
The line code for other time counter indication) appears on the screen one frame behind.	A time base error signal is not detected. The video signal is not synchronized to the reference signal.	Input a reference signal which is synchronized to the video signal. The TRC DELAY item is set to "VIDEO DELAY". The VIDEO INPUT connector on the unit is plugged through mode, and connect to the player REF. VIDEO INPUT. In editing mode, the video signal is not detected. The video signal on the input video signal and reference video signal are not synchronized. The time base controller area is not properly processed. The time base controller will not detect the video signal. Therefore, the video signal will not start the quality of the recording.
The time code for other time counter indication) appears on the screen one frame behind.	The time code is being displayed in the top left of the screen.	Move the display position down. (When using a programmed time code, and according to another VTR send the top limit of the count. In the LNRW search, the time code is displayed in the top right, and therefore when above the video line information such as user or title can be displayed with the reference to display. However, since the time code is not detected, the time code display begins to show the top limit of the system. The data from the previous frame appears if the time code is displayed within this area.)
The picture does not appear in video BE mode.	The connector to which the video signal is connected is not the video signal. The video signal is not detected by the video switch.	Make the setting of the VIDEO IN select switch correct. When handling a component signal, also set the component input connector selection switch correctly.
No unresponsive sound on the monitor screen	The Character/Color switch is in the OFF position.	Set the CHARACTER switch to the ON position.
The monitor screen is too bright	The monitor is not connected to the video signal. The video signal is not detected by the video switch.	Connect the monitor to the VIDEO 2 (SIGNAL) connector. When handling a component signal, the monitor must be connected to the VIDEO 2 (COMPONENT) connector.
The monitor screen is too dark	The monitor input connector is not connected to the video signal. The video signal is not detected by the video switch.	Set the monitor input connector 75 Ω termination switch to the ON position, or connect a terminating device.
The video picture is dark when video is composed by video signal.	The 75 Ω termination switch is not connected to the video signal. The video signal is not detected by the video switch.	Set the 75 Ω termination switch of this connector to the ON position. (The connector must be connected by a four-terminal connection to the OFF position.)

*) In this chart, a white rectangle appears on the monitor screen and time counter display.

Audio System

Recording method AC Bias

	Metal tape
Frequency response	50 Hz to 12.5 kHz, -20 dB/-0.0 dB
Distortion (at 3% modulation level for FM)	0.05% or less
Distortion (at 10% modulation level for FM)	0.1% or less
Distortion (at 1 kHz reference level)	1% or less
Wow and flutter	0.08% rms or less

*1 Peak level; -20 dB above quiescent level

Processor adjustment range

Main unit (UVW-1000) (400F)
System subscriber phone 3xR pp
System sync phase ± 300 ns

With BVR-5060P TBC remote control unit connected

Video level 53 dB
Chrominance level 51 dB
UVW-1000: 0 to +15 dB
Black level UVW-1000: 0 to +100 mVSystem subscriber phone 3xR pp
System sync phase -4 to +2.5 μ s (fine adjustment range 300 ns pp)
V/C delay ± 100 ns

Input connectors

Video input
REF. VIDEOBNC x 2 (loop-through connection)
Black level of 1.0 Vp-p, 75 Ω , sync negative
sync negative (286 mV for UVW-1000), 30 mV for UVW-1000P

VIDEO

BNC x 2 (loop-through connection)
Composite video, 1.0 Vp-p, 75 Ω , sync negative
1.5-pin connector (male)
Luminance: 1.0 Vp-p, 75 Ω , sync negative
Chrominance: R-Y: 0.7 Vp-p, 75 Ω
B-Y: 0.7 Vp-p, 75 Ω

COMPONENT 1

BNC x 3
Y: 1.0 Vp-p, 75 Ω , sync negative
R-Y: 0.7 Vp-p, 75 Ω
B-Y: 0.7 Vp-p, 75 Ω
DIN 4-pin x 1

COMPONENT 2

S-VIDEO

DIN 4-pin x 1

Audio input
AUDIO CR-1/2XLR 3-pin x 2 (male)
ON: -4 dBm, 600 Ω , balanced
OFF: -14 dBm, 10 K Ω , balanced
(0 dBm = 0.775 Vrms)

TIME CODE IN

BNC x 1
0.5 to 1.8 Vp-p, 600 Ω , unbalanced

Output connectors

Video output
VIDEO 1/2 (SUPER)BNC x 2
Composite video, 1.0 Vp-p, 75 Ω , sync negative
235 mV for UVW-1000, 300 mV for UVW-1000P
Sync selection on the subsidiary control panel controls
selects level codes and other unemphasized information are output from VIDEO 2 (SUPER)
OUTPUT

COMPONENT 1

1.2-pin male (female)
Luminance: 1.0 Vp-p, 75 Ω , sync negative
Chrominance: R-Y: 0.7 Vp-p, 75 Ω
B-Y: 0.7 Vp-p, 75 Ω

COMPONENT 2

BNC x 3
Y: 1.0 Vp-p, 75 Ω , sync negative
R-Y: 0.7 Vp-p, 75 Ω
B-Y: 0.7 Vp-p, 75 Ω

S-VIDEO

DIN 4-pin x 1

Audio output
AUDIO CR-1/2XLR 3-pin x 2 (male)
+4 dBm (600 Ω load), low impedance, balanced

MONITOR A/DIN

RCA pin jack x 1

TIME CODE OUT

BNC x 1
2.2 Vp-p, 600 Ω , unbalanced

Glossary

HEADPHONES

Standard stereo jack
Maximum -14 dBm, 8 Ω
(0 dBm = 0.775 Vrms)

Remote connectors

TBC REMOTE, 15-pin mini x 1
REMOTE, 9-pin mini x 1
CONTROL S, stereo mini jack x 1

Supplied accessories

Power cord x 1
9-pin remote control cable x 1
Operating Instructions x 1

Optional accessories

RM00130 Rack Mount Adapter
BC130LN Cleaning Cartridge
BC130B2007 TBC Remote Control Unit
BYE-2000/TBC Remote Control Unit
YSC-C5 1/2-pin Debug Cable
SYRM100 Remote Control Unit

Design and specifications are subject to change without notice.

CTL

Abbreviation of control signal. A pulse signal received on a longitudinal track of this tape in units of tracks. Controlling this signal allows the number of frames to be used to adjust the time head bias. It is also used as a control signal to adjust the relationship between the scanning position of the video heads and tape movement (taping playback to match first timing recording).

Drop frame mode

In NTSC format, the frame number of frames per second is approximately 29.97, while that for the time code as specified in V1 Drop frame mode is a mode in which the time code is advanced in such a way that the difference in frame rates between real time and the time code is corrected. In this mode, two frames are skipped in the beginning of each minute, except for every tenth minute, so that the frame rate the time code matches that for real time.

EE mode

Abbreviation of Electronic mode. Video and audio signals are applied to the VTRs (insert details), but not to the recording heads.

External synchronization

Synchronization of the signals and tape movement of a VTR with those of a reference VTR.

IRE

A unit for expressing video level is determined by the format of Photo Engineering. More called the format of Electronic and Electronic Engineering.

LINE recording

Abbreviation of longitudinal recording. A method of recording multi signals by radio frequency head method on the longitudinal track of the tape using the fixed head.

LTC

Abbreviation of Longitudinal Time Code. A time code recorded in a separate track of the edge of the tape.

AVB roll over

An edit in which two or more players are used to make special effects such as dissolve and wipe, and one recorder is used to record the results of the edit. Using an editing controller allows efficient control of the VTRs and very precise editing.

B-Y signal
Chrominance signal determined by subtracting the Y (luminance) signal from the B (Blue) signal. One of the component signals.

Bridging connection

A connection which allows a signal input to an input terminal to pass through the unit and out from an output terminal as input to a second input terminal. Also called loop-through connection.

Capstan

A drive mechanism that moves the tape at a specified speed. Its rotation normally synchronizes with a reference sync signal.

Chrominance signal

Color signal containing color information such as hue and saturation. Also called C signal.

Color frame

The color subcarrier phase, whose one cycle consists of two frames (two fields) in NTSC format and four frames (four fields) in PAL format.

Color framing

Phase-locked to continuity in the color subcarrier phase between the tape and the video, for the purpose of avoiding jitter on the picture.

Composite signal

A video signal consisting of a luminance signal (Y) and two chrominance signals (R-Y, B-Y).

Composite signal

A composite video signal containing video, burst and sync signals.

- VBS**
Abbreviation of Video Burst and Sync. A composite signal consisting of video signal, burst signal and sync signal.
- VTC**
Abbreviation of Vertical Interval Time Code. The portion of the video signal that occurs between the end of one field and the beginning of the next. During this time, the electronic camera and monitors are turned off so that they can reset from the bottom of the screen to the top without showing traces of discontinuity on the screen. When the portion of VTC is transmitted digitally, it is sent consecutively, a horizontal blank line appears on the screen.

V-blanking
The portion of the video signal that occurs between the end of one field and the beginning of the next. During this time, the electronic camera and monitors are turned off so that they can reset from the bottom of the screen to the top without showing traces of discontinuity on the screen. When the portion of V-blanking is transmitted digitally, it is sent consecutively, a horizontal blank line appears on the screen.

Servo lock
Synchronizing the drive rotation plate and tape transport phase with a reference signal during playback and recording so that the video heads scan the tape in the same pattern during playback and recording.

Supergraphics
Text or graphics for use of character sets available so that both can be set at the same time.

Video input connector
A connector that inputs Y (luminance) and C (chrominance) signals separately to reduce interference between Y and C signals, and so help reproduce noiseless images.

Syns signal
A reference signal consisting of vertical and horizontal sync signals used for synchronizing the scanning pattern of the video camera and the monitor.

TBC
Abbreviation of Tape Base Converter. Electronic circuit to electrically stabilize the playback signal by removing color variation and so the playback picture comes by irregularly as drum rotation and tape movement. Time base correction reduces deterioration of picture quality when transmitting or copying playback signal.

Time code
Signals recorded on the tape to supply information on tape position such as the hour, minute, second and frame number. There are two types of time code: LTC and VITC.

Tracking
Electrically controlling the video head to the playback phase matches the recording phase of the tape. Especially when playing back the tape with a VTR other than the one used for recording, adjusting the tracking prevents noise from appearing on the picture.

Time file
Sections of the time code consisting of a total of 32 bits used for recording information such as the year, month and day, tape ID number or a program ID number.

Luminance signal
The signal that determines the brightness of the picture. Also called Y signal. One of the component signals.

Metal tape
Magnetic tape coated with microscopic particles of metal dispersed in a liquid binder. It allows high-density recording.

Multisize combination
Combination of motor on the tape transport mechanism. If multiple cassettes on the heads drive, the tape reflects to the drum and causes malfunction.

Non-drop-frame mode
A mode of advancing the time code in such a way that the difference in frame values between real time and the time code is neglected. Using this mode produces a difference of approximately 10 seconds per day between real time and time code. This occurs primarily when editing programs in a multi-camera system using the number of frames in a reference.

On-tape type
Magnetic tape coated with microscopic particles of ferric oxide dispersed in a liquid binder.

R-Y signal
A chrominance signal determined by subtracting the Y (luminance) signal from the R (red) signal. One of the component signals.

Reference video signal
A video signal consisting of a sync signal or sync and burst signals, used as a reference.

SMPTE
Society of Motion Picture and Television Engineers.

S/N ratio
Abbreviation of Signal-to-Noise ratio. The higher the S/N ratio, the less noise and higher the picture quality.

Search mode
A VTR mode used when searching for specific scenes by viewing the video manual or time codes while playing back the tape, so to speak, in forward or reverse direction.

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<Extra operation>

Set MENU GRADE to ENHANCED. When S201-1 on the SS-53 Board is set to ON (CLOSED, "factory use" on SETUP MENU) is displayed.

(factory use)

* mark : factory setting

PWR. ON UNTH : When the power is turned on while the tape is left inside of the VTR, perform unthreading once and threading again. However, the unthreading operation is unable to be inhibited.

- * ON : UNTHREAD once
- OFF : Do not UNTHREAD. The tape remains.

REPEAT MODE : The tape can be repeatedly played back using the time code, tape head end or the unrecorded portion.

- * OFF : Can not enter Repeat mode.
- ON : Enters Repeat mode.

Note The alarm message is displayed when the power is turned on if the setting has been changed from the factory setting.

Turn this setting on and determine the necessary setting. Press the PLAY button to enter the repeat mode.

If normal editing operation is started while this setting is still on, the operations may not be performed correctly. Turn this setting off unless otherwise specified.

REPEAT TOP : Selection of the repeat starting point.

- * TAPE TOP : Starting point is the tape top
- A POINT : Starting point is when peak the [SET] key and [←] key simultaneously or A PRESET point.

REPEAT END : Selection of the repeat ending point

- * VIDEO END : Ending point is the termination point (unrecorded portion) of the video signal.
- TAPE END : Ending point is the tape end.
- B POINT : Ending point is set when the [SET] key and [←] key are pressed almost concurrently, or set to the B PRESET point.

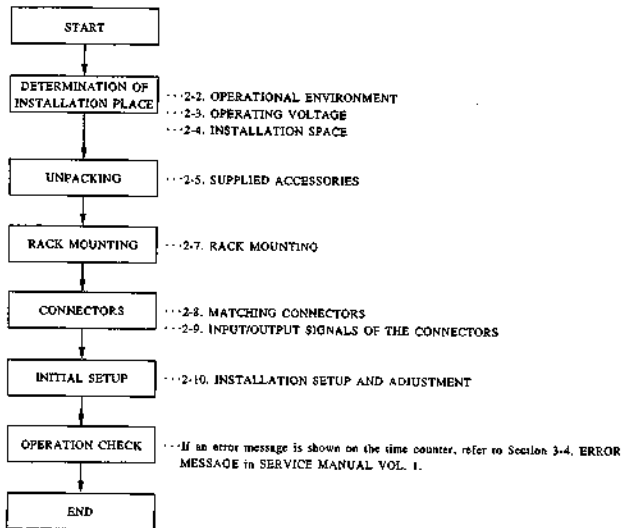
A PRESET : Set the time code data of the repeat starting point at discretion.

B PRESET : Set the time code data of the repeat ending point at discretion.

SECTION 2 INSTALLATION

Be sure to install the UVW-1800P/1600P in location satisfying the required operational environment described below to assure the UVW-1800P/1600P superior performance and to maintain the excellent serviceability and accessibility.

2-1. INSTALLATION PROCEDURE



2-2. OPERATIONAL ENVIRONMENT

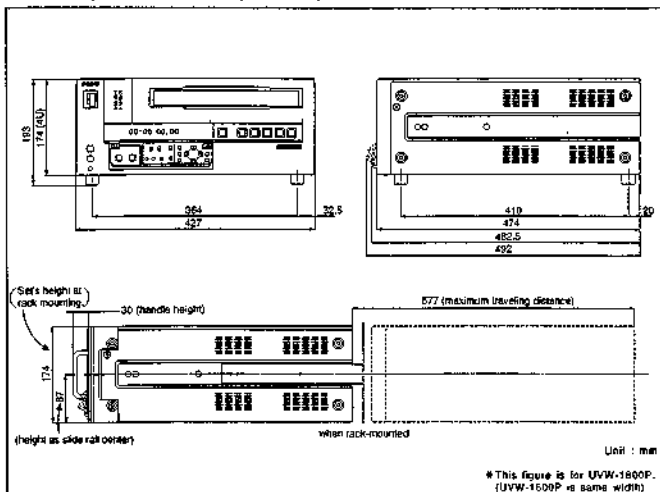
- Operating temperature : +5 °C to +40 °C
- Humidity : 80 % or less
- Storage temperature : -20 °C to +60 °C
- Locations to avoid
 - Areas where the unit will be exposed to direct sunlight or any other strong lights.
 - Dusty areas or areas where it is subject to vibration
 - Areas with strong electric or magnetic fields.
 - Areas near heat sources.
 - (Good air circulation is essential to prevent internal heat build-up. Place the unit in location with sufficient air circulation. Do not block the ventilation holes on the cabinet and the rear panel.)
- Horizontal condition : within ±30°

2-3. OPERATING VOLTAGE

- Power voltage : AC 220 to 240 V
- Power frequency : 50/60 Hz
- Power consumption : 85 W/U/VW-1800P
65 W/U/VW-1600P

2-4. INSTALLATION SPACE

- (1) The rear side must be at least 40 cm away from the walls for ventilation and maintenance.
- (2) When the unit is operated on a desk or similar condition, assure that the clearance above the unit is at least 40 cm to provide accessibility to the printed circuit boards and other mechanical parts. Note that it is not necessary to provide the space when the unit is mounted in a rack since the printed circuit boards can be repaired after it is pulled out.



2-5. SUPPLIED ACCESSORIES

- AC power cord (1)
- RGC-9G 9-pin remote cable (1)
- Operation Manual (1)

2-6. OPTIONAL ACCESSORIES

- TBC remote control unit : BK-2007
 BVR-50P
- Rack mount Kit : RMM-130
(The unit can be mounted in a 19-inch standard rack)
- 12-pin dubbing cable : VDC-C5
- Cleaning cassette tape : BCE-5CLN
- Remote control unit : SVRM-100
- S-video cable : YC-15V

2-7. RACK MOUNTING

The unit can be mounted in a 19-inch standard rack.
It is recommended to use the following list.

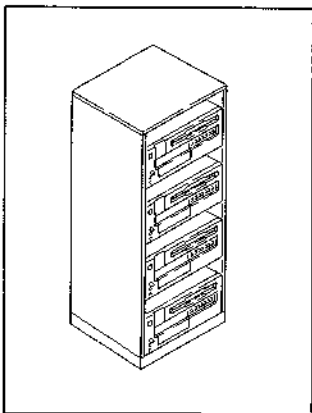
Rack Mount Kit : RMM-130 (optional accessory)

or

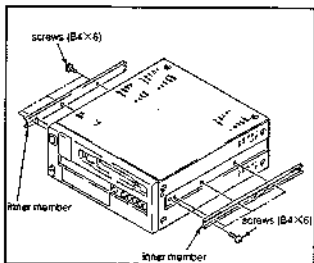
RACK-MOUNT SLIDES MODEL 305
slide length 22 inch
(ACCURIDE)

Note for rack mounting :

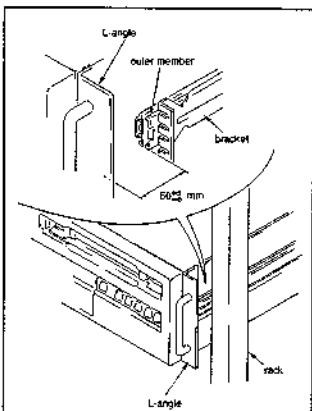
- When several VTRs are mounted in a rack, it is recommended to install a fan for ventilation. Good air circulation is essential to prevent internal heat build-up in a rack (5 °C to 40 °C must be met for all units).
- Never remove an upper panel and lower panel during rack mounting.
- Be sure to secure the rack to the floor to avoid accidents when a unit is pulled out.
- Connect long enough cables on the connector panel, considering that the unit is pulled out.
- This equipment can use with three tiers.
But with four tiers and more, keep the spaces between the each VTRs in the rack 1 unit (about 44 mm) or more.



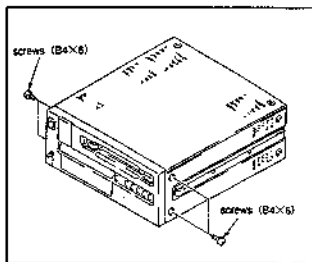
1. Remove the four screws on right and left side panels.
And install the Inner Members of the rails to the right and left side panels with the screws removed.



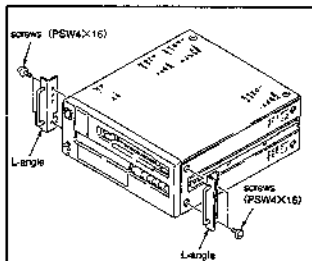
2. Install the Outer Member Brackets of the slide rails to the rack. Adjust the distance from the edge of the slide rail to the outside of the rack so that it meets the required specification.



3. Remove the two screws (B4×6) on the right and left side panels. (Be careful not to lose these four screws.)



4. Install the L-angles to the holes described in step 3 with the supplied screws (PSW4×16) in RMM-130 for these L-angles.



NOTE: Never use screws PSW4×16 to install the right and left side panels without L-angles. Be sure to install the panels with the screws B4×6 removed in step 3. Screws for L-angles are longer than the side panels. Therefore, using the screws PSW4×16 may cause trouble in the unit.

2-8. MATCHING CONNECTORS

When external cables are connected to the connector on a connector panel during maintenance, the hardware listed below (or equivalents) must be used.

For UYW-1800P only	UYW-1800P/1600P side Connector	Matching Connector/Cable	
	Panel Indication	Connector/Cable	Sony Part No.
○	VIDEO INPUT	BNC, MALE	1-560-069-11
	VIDEO		
	REF. VIDEO	PLUG, 12P, FEMALE	1-562-159-00
	COMPONENT 2 (Y, R-Y, B-Y)		
○	COMPONENT 1	YC-15V (1.5 m)	optional accessory
○	S-VIDEO		
○	VIDEO OUTPUT	BNC, MALE	1-560-069-11
	1/2		
	COMPONENT 2 (Y, R-Y, B-Y)	PLUG, 12P, MALE	1-560-995-00
	COMPONENT 1		
○	S-VIDEO	YC-15V (1.5 m)	optional accessory
○	AUDIO INPUT		
○	CH-1/CH-2	XLR, 3P, FEMALE	1-508-083-00
○	AUDIO OUTPUT	XLR, 3P, MALE	1-508-084-00
○	CH-1/CH-2		
○	MONITOR AUDIO	PIN PLUG	Standard Product
○	TIME CODE IN	BNC, MALE	1-560-069-11
○	TIME CODE OUT	BNC, MALE	1-560-069-11
○	TBC REMOTE	CONNECTOR, D-SUB 15P, FEMALE and JUNCTION SHELL, 15P	1-561-610-21 1-561-929-00
○	REMOTE	CONNECTOR, D-SUB 9P, MALE and JUNCTION SHELL, 9P	1-560-651-00 1-561-749-00
		RCC-5G (5 m)	supplied accessory
		RCC-10G (10 m)	optional accessory
		RCC-30G (30 m)	

2-9. INPUT/OUTPUT SIGNALS OF THE CONNECTORS

INPUT

REF VIDEO : BNC×2 (bridging connection)
Black burst or composite video 1.0 Vp-p, 75 Ω (ON/OFF), sync negative

VIDEO INPUT : BNC×2 (bridging connection).
composite video, 1.0Vp-p, 75 Ω (ON/OFF), sync negative

COMPONENT 1 : Circular 12 pin (male)
Y : 1.0 Vp-p, 75 Ω, sync negative
R-Y : 0.7 Vp-p, 75 Ω
B-Y : 0.7 Vp-p, 75 Ω

COMPONENT 2 : BNC×3
Y : 1.0 Vp-p, 75 Ω, sync negative
R-Y : 0.7 Vp-p, 75 Ω
B-Y : 0.7 Vp-p, 75 Ω

S-VIDEO : Circular 4 pin
Y : 1.0 Vp-p, 75 Ω, sync negative
C : 0.30 Vp-p (burst level), 75 Ω

AUDIO INPUT CH-1/2 : XLR 3 pin×2
+4 dBu, 600 Ω or 10 kΩ, balanced
(0 dBu=0.775 Vrms)

TIME CODE IN : BNC
0.5 V to 18 Vp-p, 10 kΩ, unbalanced

OUTPUT

VIDEO OUTPUT 1/2 : BNC×2
composite video, 1.0 Vp-p, 75 Ω, sync negative
Superimposed time code etc. output from VIDEO OUTPUT 2, as specified by CHARACTER switch on a sub-control panel.

COMPONENT 1 : Circular 12 pin (female)
Y : 1.0 Vp-p, 75 Ω, sync negative
R-Y : 0.7 Vp-p, 75 Ω
B-Y : 0.7 Vp-p, 75 Ω

COMPONENT 2 : BNC×3
Y : 1.0 Vp-p, 75 Ω, sync negative
R-Y : 0.7 Vp-p, 75 Ω
B-Y : 0.7 Vp-p, 75 Ω

S-VIDEO : Circular 4 pin
Y : 1.0 Vp-p, 75 Ω, sync negative
C : 0.30 Vp-p (burst level), 75 Ω

AUDIO OUTPUT CH-1/2 : XLR 3 pin×2
+4 dBu (600 Ω load), low impedance, balanced
(0 dBu=0.775 Vrms)

MONITOR AUDIO : PHONE JACK
-6 dBu (47 kΩ load), unbalanced
(0 dBu=0.775 Vrms)

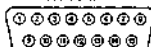
TIME CODE OUT : BNC
2.2 Vp-p, 600 Ω , unbalanced

HEADPHONES : Stereo phone jack
-14 dBu max. (8 Ω load)
(0 dBu=0,775 Vrms)

CONTROLS : Stereo mini jack

TBC REMOTE (D-SUB 15 pin : MALE)

<external view>



Pin No.	Input/Output Signal	Operating Voltage	IN/OUT
1	SYNC CONTROL	-5 to +5 V	IN
2	HUE CONTROL	-5 to +5 V	IN
3	SC CONTROL	-5 to +5 V	IN
4	VIDEO LEVEL CONTROL	-5 to +5 V	IN
5	SET UP CONTROL	-5 to +5 V	IN
6	CHROMA LEVEL CONTROL	-5 to +5 V	IN
7	-9 V	-9 V	OUT
8	GND	---	IN/OUT
9	FRAME GND	---	IN/OUT
10	---	---	---
11	---	---	---
12	---	---	---
13	Y/C DELAY CONTROL	-5 to +5 V	IN
14	---	---	---
15	+9 V	+9 V	OUT

REMOTE (D-SUB 9 pin : FEMALE)

<external view>



Pin No.	Controlling Device	Controlled Device
1	Frame Ground	Frame Ground
2	Receive A	Transmit A
3	Transmit B	Receive B
4	Transmit Common	Receive Common
5	---	---
6	Receive Common	Transmit Common
7	Receive B	Transmit B
8	Transmit A	Receive A
9	Frame Ground	Frame Ground

S-VIDEO (Circular 4 Pin)

Pin No.	Input/Output Signal
1	Y (G)
2	C (G)
3	Y (X)
4	C (X)

external view

**COMPONENT 1 IN (Circular 12 pin : MALE)**

Pin No.	Input/Output Signal
1	DUB Y IN (X)
2	DUB Y IN (G)
3	DUB R-Y IN (X)
4	DUB R-Y IN (G)
5	DUB B-Y IN (X)
6	DUB B-Y IN (G)
7	—
to	
12	

external view

**COMPONENT 1 OUT
(Circular 12 pin : FEMALE)**

Pin No.	Input/Output Signal
1	DUB Y OUT (X)
2	DUB Y OUT (G)
3	DUB R-Y OUT (X)
4	DUB R-Y OUT (G)
5	DUB B-Y OUT (X)
6	DUB B-Y OUT (G)
7	—
8	—
9	DUB REF VIDEO IN (X)
10	DUB REF VIDEO IN (G)
11	—
12	—

external view



2-10. INSTALLATION SETUP AND ADJUSTMENT

2-10-1. Switch Settings on the Connector Panel and Sub Control Panel

When the unit is installed, be sure to perform the following setup and adjustment. If these adjustment is not performed, the unit may not operate properly.

Refer to the operation manual "Chapter 5 Editing" for setup and adjustment.

- | | | |
|--|---|---------------------|
| (1) Audio input level switch setting | : 600 Ω ON/OFF
ON ; +4 dBu, 600 Ω , balanced
OFF ; +4 dBu, 10 k Ω , balanced | } Connector panel |
| (2) Component signal input connector select switch setting | : COMPONENT I/2
1 ; Circular 12 pin
2 ; BNC | |
| (3) 75 Ω termination switch setting | : REF VIDEO 75 Ω ON/OFF
INPUT VIDEO 75 Ω ON/OFF
ON ; When this unit is connected at the end of the line.
OFF ; When other unit is connected in series after this unit. | } Sub control panel |
| (4) VIDEO INPUT select switch setting: | VIDEO IN Y-R, B/COMPOSITE/S VIDEO
Y-R, B : Betacam component signal
COMPOSITE : Ordinary video signal
S VIDEO ; Y/C separation type S Video signal | |

Further, under the applications, perform the following setup and adjustment.

• In case of performing time code editing.

- (1) Time code reader mode setting
- (2) Time code generator mode setting

• In case of using as editing system.

- (1) Put the reference video signal to REF VIDEO IN connector.
- (2) H system phase adjustment
- (3) SC system phase adjustment

2-10-2. On-board Switch Setting

Only the four switches (S2/AP-31, S202/AP-31, S103/AR-14, S203/AR-14) marked by in the following tables require setting in installation.

Do not make any attempt to alter the setting of the remaining switches except for servicing.

If the switch settings changed, perform fail to feature.

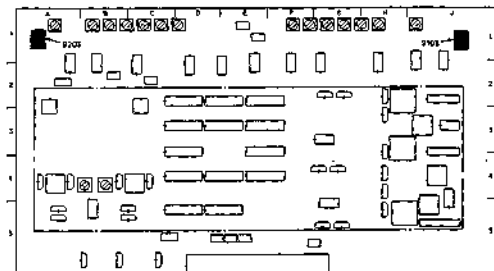
AP-31 Board



Switch No.	Function	Description	FACTORY SETTING
S1	CH-1 AUDIO HEAD TUNE ADJ SW	The high frequency response characteristics (head tuning) of head amplifier is optimized by the combination of RV1 (S1) and RV201 (S201) for channel 1 and 2.	Set to the position based on the adjustment condition.
S2	CH-2 AUDIO HEAD TUNE ADJ SW	Use them only in the audio head tuning adjustment. If the above switch setting is changed other mode, the audio frequency response characteristics is impaired.	

Switch No.	Function	Output Level (dBu)			Description
		+4	0	-6	
S1	1	OFF	ON	OFF	Selects the reference signal level of channel 1 output. Selects among +4 dBu, 0 dBu and -6 dBu.
	2	OFF	OFF	ON	
S202	1	OFF	ON	OFF	Selects the reference signal level of channel 2 output. Selects among +4 dBu, 0 dBu and -6 dBu.
	2	OFF	OFF	ON	
FACTORY SETTING		○			—

AR-14 Board



Switch No.	Function	Input Level (dBu)			Description
		+4	0	-6	
S102	1	OFF	ON	OFF	Selects the reference signal level of channel 1 input. Selects among +4 dBu, 0 dBu and -6 dBu.
	2	ON	OFF	OFF	
S202	1	OFF	ON	OFF	Selects the reference signal level of channel 2 input. Selects among +4 dBu, 0 dBu and -6 dBu.
	2	ON	OFF	OFF	
FACTORY SETTING		○			

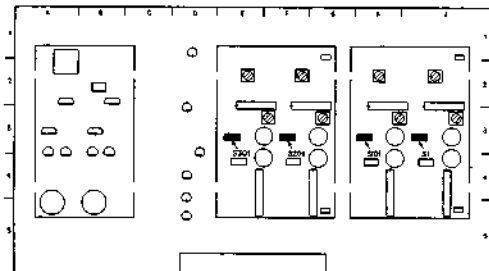
NOTE: Setting the audio input/output level

When connecting Sony VTR, Sony audio mixer "MTP series" or multiple UVM-1800P/1600Ps to each other, using XLR cables directly, select +4 dBu (factory default setting).

When connecting Sony VTR SVO-9600 series and others having the pin-jack type input/output connector, using XLR — pin-jack conversion cable, select -6 dBu normally.

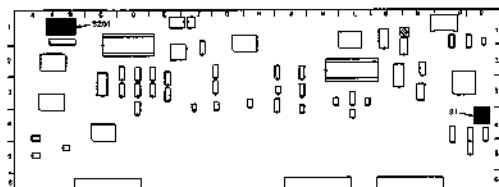
For more detail check the audio reference level of the equipment connected, and select for optimum setup.

RP-70 Board



Switch No.	Function	Description	FACTORY SETTING
S1	Y Ach REC CURRENT BYPASS SW	Set to OFF when a current probe or like is used for record current adjustment of Y signal channel-A (S1) and -B (S101).	ON
S101	Y Bch REC CURRENT BYPASS SW	After the adjustment is completed, this switch should be set to ON. Otherwise, this channel can not be recorded.	
S201	C Ach REC CURRENT BYPASS SW	Set to OFF when a current probe or like is used for record current adjustment of C signal channel-A (S201) and -B (S301).	
S301	C Bch REC CURRENT BYPASS SW	After the adjustment is completed, this switch should be set to ON. Otherwise, this channel can not be recorded.	

SS-53 Board



Switch No.	Function	ON	OFF
S1	1	factory use	factory use
	2	SYSTEM	UVW-1800
	3	ID SW	for J
	4		for UC/EK
		NTSC	PAL

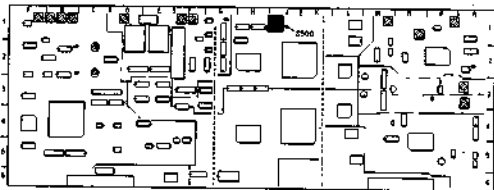
* FACTORY SETTING

S1-2, S1-3, S1-4, is set to the position based on the unit.

If the first switch settings changed, perform fall to feature.

Switch No.	Function	Description	FACTORY SETTING
S201	1	Set this switch to ON (CLOSE) during several adjustment modes. It enables the following function changes. 1. "FACTORY USE" is displayed in the setup menu. The selected menu can be executed. 2. Search speed in LOCAL is changed. PLAY/F FWD pressed simultaneously : FWD search × 5 PLAY/REW pressed simultaneously : REW search × 5 3. Tape speed in F.FWD/REW is displayed on the monitor. 4. VTR type is displayed on the time counter when power is turned on. (example - NTSC (1) EDITOR) 5. Hours meter chain enter reset mode. 6. EEPROM can enter all reset mode. 7. Adjustment switches S300-1/TBC-25, S201/VRA-5 are validated.	OFF (OPEN)
	2	SYSTEM	
	3	DIP SW	
	4	factory use	
	5	When this switch is turned ON (CLOSE), tape protection like slack detection is inhibited. This function is used for mechanism and servo system alignment.	
	6	factory use	
	7	factory use	
	8	factory use	

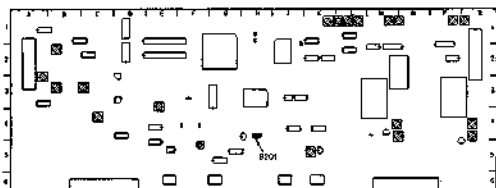
TBC-25 Board



The switches S500-1 become valid only when S201-1/SS-53 is set to ON (CLOSE).

Switch No.	Function	FACTORY SETTING
S500	<p>1 LEVEL REF SW : Used for Y/C level adjustment. When this switch is set ON, the calibration signal having reference level is output. This signal is generated from internal data and used for calibrating the D/A and A/D level. Make sure to set this to off after adjustment.</p>	OFF
	<p>2 Y MUTE SW : Y signal is muted from the TBC output. When this switch is set ON, Y signal is muted in the all video outputs.</p>	
	<p>3 C MUTE SW : R-Y and B-Y signals are muted from the TBC output. When this switch is set ON, the R-Y and B-Y signals are muted in the COMPONENT 1 and 2 outputs. In addition only the chroma signal is muted in the COMPOSITE VIDEO OUT. (The color burst is not muted.)</p>	
	<p>4 No use</p>	

VRA-5 Board



The switch S201 becomes valid only when S201-1/SS-53 (B-1) is set to ON (CLOSE).

Switch No.	Function	Description	FACTORY SETTING
S201	A/D LEVEL ADJ	Used for A/D level adjustment. When this switch is set ON, the calibration signal having reference level is output. This signal is generated from internal data and used for calibrating the A/D level. Set surely to off after adjustment.	OFF

2-10-3. When Connecting an Editor Controller

When an edit controller is connected, perform the edit controller setup as follows.

1. RM-450CE

When UVW-1800P connected to RM-450CE recorder side, RM-450CE setup as follows.

- SYSTEM PRESET SWITCH
LEFT SWITCH

7	6	5	4	3	2	1	0
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

RIGHT SWITCH

7	6	5	4	3	2	1	0
ON	OFF	OFF	ON	OFF	OFF	OFF	OFF

- PREROLL SWITCH : 5 seconds
- SYNCHRO switch : ON
- 9/33 switch : 9 (RECORDER)
- TC/TC/CTL switch : TC (RECORDER)

2. BVE-600, BVE-900, BVE-910, BVE-2000

Open the edit controller setup menu and set the constant as follows.

For details of the setup menu operation, refer to the Operation Manual of the edit controller.

	CONSTANT-1								CONSTANT-2						
	1	2	3	4	5	6	7	8	1 (9)	2 (10)	3 (11)	4 (12)	5 (13)	6 (14)	7 (15)
UVW-1800P	21	51	00	55	05	05	02	84	0A	07	FB	00	80	2A	FF
UVW-1600P	21	50	00	55	05	05	02	84	0A	07	FB	00	80	2A	FF

NOTE : When the version of the edit controller software is what is shown below or higher, setting of the constant is not required.

- BVE-600 : V 1.07 and higher (S/N 10001-11000 for EK)
V 2.02 and higher (S/N 20001 and Higher)
- BVE-900 : V 1.12 and higher
(BKE-900K : V 2.11 and higher)
- BVE-910 : V 2.11 and higher
- BVE-2000 : V 1.20 and higher

3. PVE-500

Because of automatic setup function, no setting is required in equipment connection.

2-10-4. Precautions After Installation

Observe the following precautions when this equipment is used in system setup.

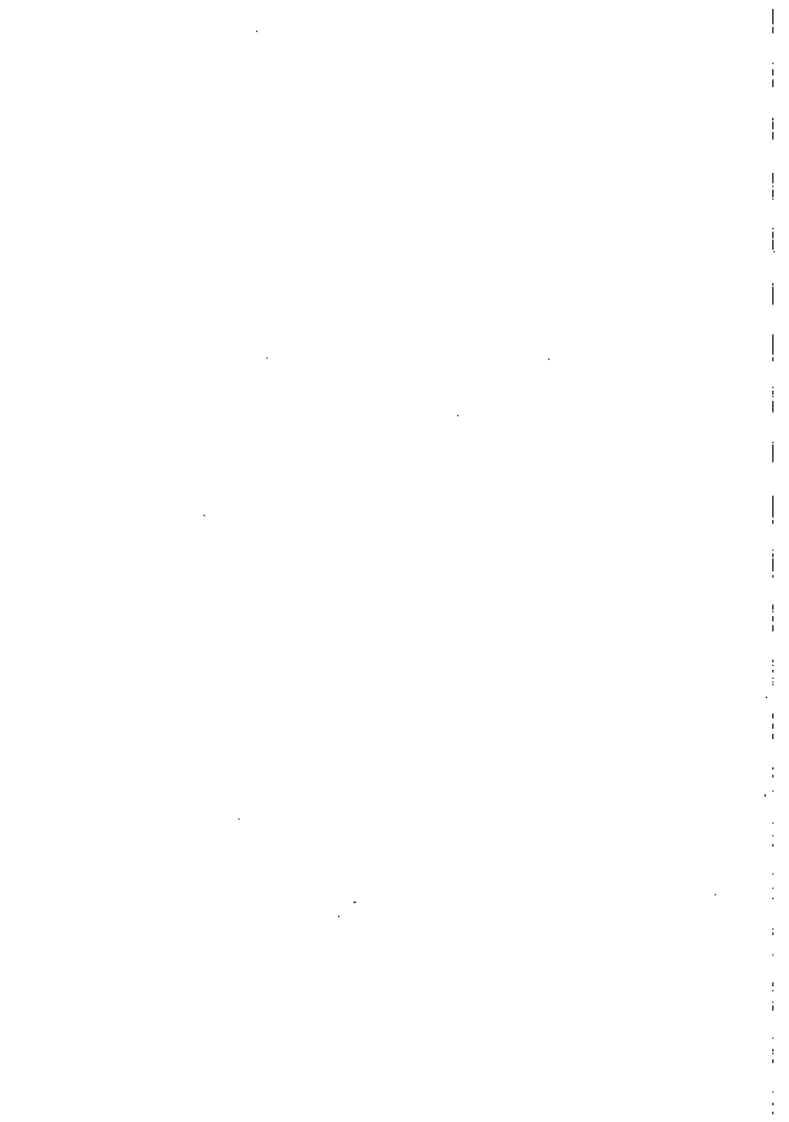
- The REF. VIDEO INPUT requires video signal which complies with CCIR. REP. 624.
- Adjust the sync phase of this equipment to the system sync with [SYNC] control on the sub control panel.
- Adjust the SCH phase of this equipment to the system SCH with [SC] control on the sub control panel.
- When a UVW-1800P is used as the recorder, it's require altering the TBC DELAY (SETUP MENU) in VIDEO CONTROL) setup with some switchers of the system.
- When this equipment is connected to the type of switcher that does not replace the sync signal, the SYNC/BURST level adjustment is required. (Refer Video Alignment Section.)

Menu Level 1	Menu Level 2/3		Factory setting	Setting
DISPLAY CONTROL	CHARA. POSITION			
	CHARA. TYPE		WHITE (with BKGD)	
	DISPLAY INFO		TIME DATA & STATUS	
	PEAK HOLD		OFF	
	BRIGHTNESS		100 %	
	ALARM		ON	
	REF. ALARM		ON (LIMITED): 1800 OFF : 1600	
TIME CODE	RUN MODE		FREE RUN	
	UB BINARY GP		00 : NOT SPECIFIED	
	PHASE CORR.		OFF	
	CF FLAG		OFF	
TAPE PROTECTION	FROM STOP	STOP TIMER	8 MIN	
		NEXT MODE	STANDBY OFF	
	FROM STILL	STILL TIMER	8 MIN	
		NEXT MODE	STEP FWD	
VIDEO CONTROL	TBC DELAY		SYNC DELAY	
	BLANKING LINE	09,322 LINE	MASK	
		10,323 LINE		
		11,324 LINE		
		12,325 LINE		
		13,326 LINE		
		14,327 LINE		
		15,328 LINE		
		16,329 LINE		
		17,330 LINE		
		18,331 LINE		
		19,332 LINE		
		20,333 LINE		
	21,334 LINE			
	22,335 LINE			
	23,336 LINE	HALF		
	BLANKING DECODE	09,322 LINE	BLACK & WHITE	
		10,323 LINE		
		11,324 LINE		
		12,325 LINE		
		13,326 LINE		
		14,327 LINE		
		15,328 LINE		
16,329 LINE				
17,330 LINE				
18,331 LINE				
19,332 LINE				
20,333 LINE				
21,334 LINE				
22,335 LINE				

Menu Level 1	Menu Level 2/3	Factory setting	Setting
factory use	PWR. ON UNTH	ON	
	REPEAT MODE	OFF	
	REPEAT TOP	TAPE TOP	
	REPEAT END	VIDEO END	
	A PRESET	00:00:00:00	
	B PRESET	00:00:00:00	
MENU GRADE		BASIC	

SWITCH ON BOARD

Board	Switch	Factory Setting	Setting
AP-31 board	S1 : CH-1 AUDIO HEAD TUNE ADJ SW	Dependent on adjustment	
	S2 : CH-1 AUDIO OUTPUT REF. LEVEL SELECT SW	All OFF	
	S201 : CH-2 AUDIO HEAD TUNE ADJ SW	Dependent on adjustment	
	S202 : CH-2 AUDIO OUTPUT REF. LEVEL SELECT SW	All OFF	
AR-14 board	S103 : CH-1 AUDIO INPUT REF. LEVEL SELECT SW	S103-1 : OFF S103-2 : ON	
	S203 : CH-2 AUDIO INPUT REF. LEVEL SELECT SW	S203-1 : OFF S203-2 : ON	
RP-70 board	S1 : Y Ach REC CURRENT BYPASS SW	ON	
	S101 : Y Beh REC CURRENT BYPASS SW	ON	
	S201 : C Ach REC CURRENT BYPASS SW	ON	
	S301 : C Beh REC CURRENT BYPASS SW	ON	
S5-53 board	S1 : SYSTEM ID SW	Dependent on model	
	S201 : SYSTEM DIP SW	OFF (OPEN)	
TBC-25 board	S500-1 : LEVEL REF SW	OFF	
	S500-2 : Y MUTE SW	OFF	
	S500-3 : C MUTE SW	OFF	
	S500-4 : No use	OFF	
VRA-5 board	S201 : A/D LEVEL ADJ	OFF	



SECTION 3 SERVICE OVERVIEW

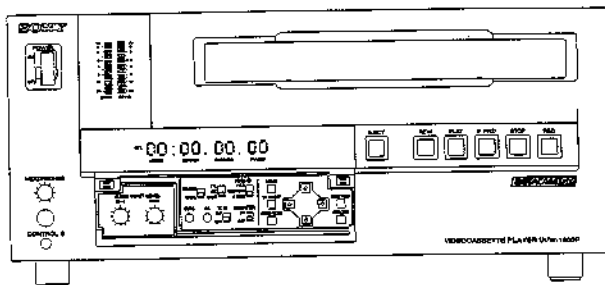
3-1. FUNCTION COMPARISON

UVW-1800P is a video cassette recorder.

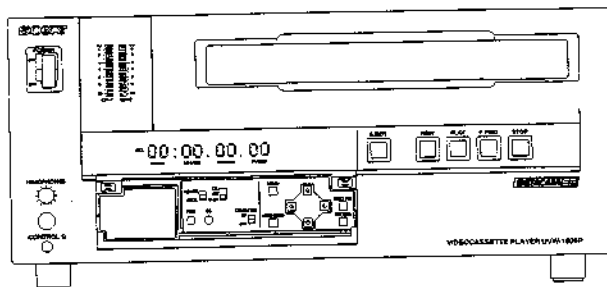
UVW-1600P is a video cassette player.

Front panels of these units are as follows:

- Uvw-1800P

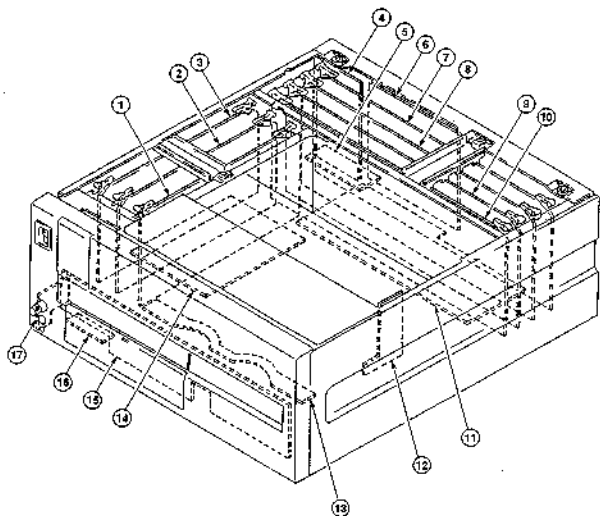


- Uvw-1600P



3-2. MAIN PARTS LOCATION

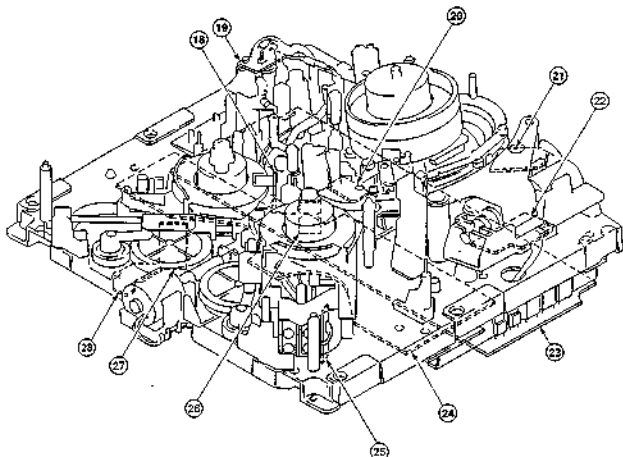
3-2-1. Location of the Printed Circuit Board



- ① RP-70P Board (UVW-1800P)
RP-70AP Board (UVW-1600P)
- ② AP-31P Board (UVW-1800P)
AP-31AP Board (UVW-1600P)
- ③ AR-14P Board (UVW-1800P)
- ④ CP-225P Board (UVW-1800P)
CP-225AP Board (UVW-1600P)
- ⑤ CP-237P Board (UVW-1800P)
CP-237AP Board (UVW-1600P)

- ⑥ CP-225 Board (UVW-1800P)
CP-225A Board (UVW-1600P)
- ⑦ VRA-5P Board (UVW-1800P)
- ⑧ VP-43P Board (UVW-1800P)
VP-43AP Board (UVW-1600P)
- ⑨ TBC-25P Board
- ⑩ SS-53 Board
- ⑪ MB-470P Board (UVW-1800P)
MB-470AP Board (UVW-1600P)

- ⑫ CL-25 Board (Cassette compartment)
- ⑬ FC-62 Board (Cassette compartment)
- ⑭ MB-471 Board (UVW-1800P)
MB-471A Board (UVW-1600P)
- ⑮ KY-249 Board (UVW-1800P)
KY-249A Board (UVW-1600P)
- ⑯ VR-155 Board (UVW-1800P)
- ⑰ HP-61 Board (UVW-1800P)
HP-61A Board (UVW-1600P)

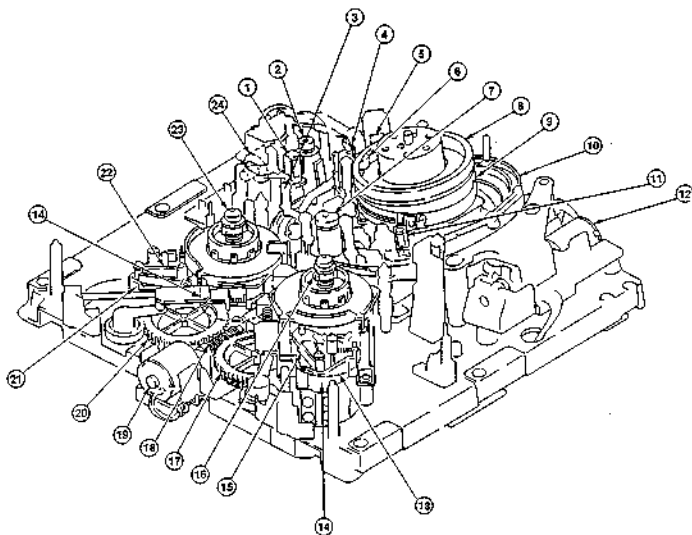


- | | |
|------------------------------|-------------------------------|
| ⑱ SE-207 Board (Supply side) | ⑤ MS-39 Board (UVW-1800P) |
| ⑲ PD-55 Board | MS-39A Board (UVW-1600P) |
| ⑳ TR-84 Board | ㉑ RM-127 Board (Take-up side) |
| ㉑ PTC-68 Board | ㉒ SE-207 Board |
| ㉒ PTC-67 Board | ㉓ RM-126 Board (Supply side) |
| ㉓ DR-214 Board | ㉔ PTC-66 Board |

INDEX

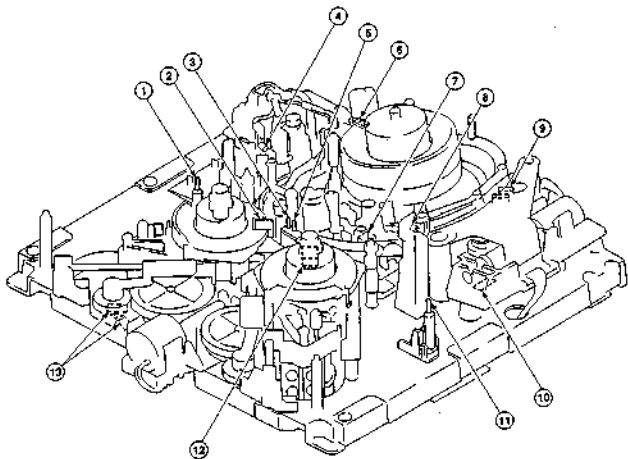
AP-31P Board (UVW-1800P).....	②	MS-39 Board (UVW-1800P).....	⑤
AP-31AP Board (UVW-1600P).....		MS-39A Board (UVW-1600P).....	
AR-14P Board (UVW-1800P).....	③	PC-62 Board (Cassette compartment).....	⑬
CL-25 Board (Cassette compartment).....	⑪	PD-55 Board.....	⑱
CP-225 Board (UVW-1800P).....	⑥	PTC-66 Board.....	㉔
CP-225A Board (UVW-1600P).....		PTC-67 Board.....	㉒
CP-226 Board (UVW-1800P).....	④	PTC-68 Board.....	㉑
CP-226A Board (UVW-1600P).....		RM-126 Board.....	㉓
CP-237 Board (UVW-1800P).....	⑤	RM-127 Board.....	㉑
CP-237A Board (UVW-1600P).....		RP-70P Board (UVW-1800P).....	①
DR-214 Board.....	㉓	RP-70AP Board (UVW-1600P).....	
HP-61 Board (UVW-1800P).....	⑩	SE-207 Board.....	⑱ ㉒
HP-61A Board (UVW-1600P).....		SS-53 Board.....	⑩
KY-249 Board (UVW-1800P).....	⑬	TBC-25P Board.....	⑦
KY-249A Board (UVW-1600P).....		TR-84 Board.....	⑱
MB-470P Board (UVW-1800P).....	⑪	VP-43P Board (UVW-1800P).....	⑧
MB-470AP Board (UVW-1600P).....		VP-43AP Board (UVW-1600P).....	
MB-471 Board (UVW-1800P).....	⑭	VR-155 Board (UVW-1800P).....	⑯
MB-471A Board (UVW-1600P).....		VRA-5 Board (UVW-1800P).....	⑦

3-2-2. Location of the Main Mechanical Parts/Components



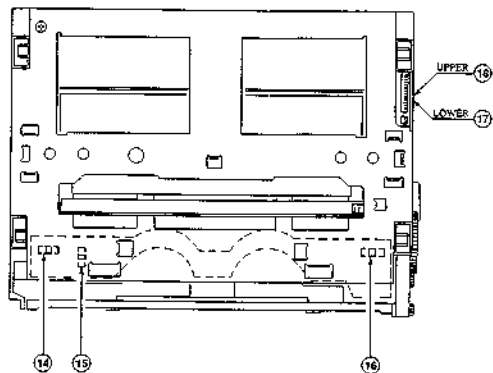
- | | |
|--|-------------------------|
| ① Full erase head assembly/Tape cleaner assembly | ⑩ Reel motor |
| ② Capstan motor | ⑪ RS table (T) assembly |
| ③ Tension regulator arm | ⑫ T break assembly |
| ④ CTL head | ⑬ T reel table assembly |
| ⑤ Audio/TC head | ⑭ T worm wheel |
| ⑥ Cleaning roller | ⑮ Worm gear (LS motor) |
| ⑦ Pinch roller assembly | ⑯ Reel position motor |
| ⑧ Upper drum assembly | ⑰ S worm wheel |
| ⑨ Drum assembly | ⑱ RS table (S) assembly |
| ⑩ Loading ring assembly | ⑲ S break assembly |
| ⑪ AT cleaner | ⑳ S reel table assembly |
| ⑫ Gear box motor | ㉑ Pinch solenoid |

3-2-3. Location of the Sensor (1)



- ① S cassette Miss-REC sensor
This is a record-inhibit sensor for the small cassette of a metal particle tape.
- ② S reel rotation detection sensor
The S reel rotation detection sensor detects the rotation of the S reel table.
The FG output signal of this sensor inputs to the servo circuit, and controls the rotation speed and torque of the reel motor.
- ③ Reel hub diameter detection sensor
The reel hub diameter varies depending on the length of the tape wound on a cassette tape. The reel hub diameter detection sensor detects the reel hub diameter using a tab on the back side of the cassette tape.
The output signal of this sensor inputs to the servo circuit, and controls the rotation speed and torque of the reel motor.
- ④ Tape end sensor
During tape travelling in the FWD direction, the tape end sensor detects the end of tape.
- ⑤ Oxide tape/metal particle tape detection sensor
This sensor detects whether an oxide tape or metal particle tape is being inserted to the unit using a tab on the back side of the cassette tape.
- ⑥ Condensation sensor
This sensor detects whether moisture condensation occurs in the unit or not.
- ⑦ Tension sensor
During recording or playback, the S tension regulator arm activates to maintain constant tape tension.
The tension sensor detects the position of the tension regulator arm.
- ⑧ Tape beginning sensor
During tape travelling in the FWD direction, the tape beginning sensor detects the beginning of tape.
- ⑨ Threading-end/unthreading-end detection sensor
This sensor detects whether the loading ring is the threading-end or unthreading-end position.
- ⑩ Gear box motor rotation detection sensor
The gear box motor rotation detection sensor detects the rotation speed of the gear box motor.
The FG output signal of this sensor inputs to the servo circuit, and controls the threading speed to protect the tape from the excessive tension.
- ⑪ L cassette Miss-REC sensor (For metal particle tape)
This is a record-inhibit sensor for the large cassette of metal particle tape.
- ⑫ T reel rotation detection sensor
The T reel rotation detection sensor detects the rotation of the T reel table.
The FG output signal of this sensor inputs to the servo circuit, and controls the rotation speed and torque of the reel motor.
- ⑬ Reel L/S position sensor
This sensor detects whether the reel table is the correct position according to the size of the inserted cassette tape.

3-2-4. Location of the Sensor (2) Cassette Compartment



⑭ Cassette-in sensor (L)

This sensor detects whether a cassette is being inserted.

⑮ Cassette L/S size detection sensor

This sensor detects whether the inserted cassette tape is an L size or S size.

⑯ Cassette-in sensor (R)

This sensor detects whether a cassette is being inserted.

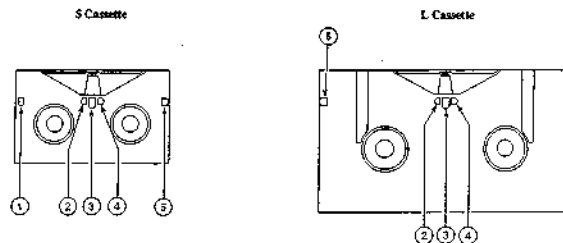
⑰ Cassette-down (2) sensor

⑱ Cassette-down (1) sensor

The (1) and (2) sensor detects the position of the cassette compartment by using the combination of ON/OFF operation of these sensors and cassette-in sensor.

3-3. FUNCTION OF THE CASSETTE PLUG AND TAB

As shown in the figure below, plugs and tabs are provided at the back side of cassette tape.



- ① S cassette Miss-REC tab (for oxide tape) (Note 1)
- ② Video tape thickness detection tab (for oxide tape) (Note 2)
- ③ Oxide/metal particle tape detection tab (Note 3)
- ④ Reel hub diameter detection tab
- ⑤ S cassette Miss-REC plug (for metal particle tape)
- ⑥ L cassette Miss-REC plug

(Note 1) An oxide tape cannot be used for this VTR.

(Note 2) All metal particle tapes have a detection tab, because video tape thickness is one type.

(Note 3) Because of Note 1, if it detects an oxide tape, "TAPE" on and off on the display window on the front panel and displays that an undetectable tape is loaded. And eject the cassette tape automatically.

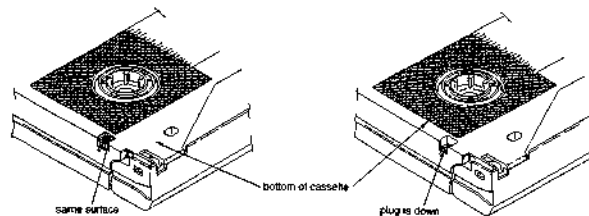


Fig. 1

Fig. 2

The presence or absence of these plugs and tabs determines the cassette status as shown in the table below.

Plug and tab	Cassette status with plugs and tabs	Cassette status without plugs and tabs
S cassette Miss-REC tab (for oxide tape)	Cannot be used	
S cassette Miss-REC plug (for metal particle tape)	can be recorded (refer to Fig. 1)	cannot be recorded (refer to Fig. 2)
L cassette Miss-REC plug	can be recorded (refer to Fig. 1)	cannot be recorded (refer to Fig. 2)
Tape thickness detection tab	A 20 μm thick tape is wound on the cassette.	A 15 μm thick tape is wound on the cassette.
Oxide/metal particle tape detection tab.	An oxide tape is wound on the cassette.	A metal particle tape is wound on the cassette. (Note 3)
Reel hub diameter detection tab	For small hub	For large hub

3-4. ERROR MESSAGE

3-4-1. Alarm

This unit features an alarm display function.

When a problem is detected, an alarm is displayed immediately in the time counter display on the control panel and an alarm and the message are displayed on the video monitor.

To display alarm and the message on the video monitor, the monitor must be connected to the VIDEO 2 (SUPER) OUTPUT connector, and the CHARACTER switch on the sub control panel must be set to ON.

This unit features two types of alarms. One is for operators, and the other is for service persons.

This manual shows alarms only for service persons.

As for operators, refer to operation manual or overview in this manual.

Activating alarm display may influence to the system. For example, when the reference video signal is not used.

Therefore, you can select whether or not to display the alarm from the Setup menu.

However, alarms for service persons are displayed regardless of Setup menu selection.

1. Alarms will be displayed as soon as power is turned on.

Detection : Checks the settings of switch S1 on the SS-58 board and the contents of electrically erasable/programmable ROM (EEPROM).

Operation after detection

: None

Display : Displays until any button is pressed.

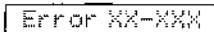


3-4-1. Error Code

This unit features the self-diagnostics to detect any problem. When a problem is detected, an error code is displayed immediately in the time counter display on the control panel and an error code and message are displayed on the video monitor.

To display error code and message on the video monitor, the monitor must be connected to the VIDEO 2 (SUPER) OUTPUT connector, and the CHARACTER switch on the sub control panel must be set to ON.

NOTE : Indicates the error code number steps of XX-XXX on the video monitor.



After any problem is detected, some of error codes enter the unit to AUTO OFF.

(Refer to the tables as shown in page 3-18 and later. However, error code 06-032 is excluded.)

Therefore, when turning off the power once and then turning on, the error code or error code and message are displayed on the time counter or video monitor.

Then, the unit enters to AUTO OFF mode again.

In AUTO OFF mode, press the EJECT key. The unit enters the emergency EJECT mode.

The emergency EJECT mode refers to the mode in which the tape is gently ejected with the available motors under the assumption that a tape slack or device related problem has occurred.

When the unit enters the EJECT mode, the following messages are displayed on the video monitor.

On the time counter, error code is displayed.



When a cassette tape is removed with the emergency **EJECT** mode, the following messages are displayed on the video monitor. On the time counter, error code is displayed.



When a cassette tape cannot be removed with the emergency **EJECT** mode, the following messages are displayed on the video monitor.

On the time counter, error code is displayed.



When a cassette tape cannot be removed with the emergency **EJECT** mode, perform section 3-12.

1. Main code and sub code

• Main code

Main code is shown by two digits which indicates the system where the problem occurred.

Main code 0X : Servo and tape path systems problem

Main code 2X : Mechanical control system problem

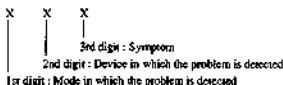
Main code 3X : Sensors problem

Main code 9X : Communication and interface systems problem

• Sub code

Sub code is shown in three digits. Each digit has the following meanings.

When the main code is 0X or 2X:



1st digit : Mode in which the problem is detected

0 : Mode cannot be determined. Or, determination of mode is necessary.

- 1 : Cassette-down mode
- 2 : Threading mode
- 3 : STOP mode
- 4 : F. FWD or REW mode
- 5 : SEARCH mode
- 6 : PLAY or REC mode
- 7 : STANDBY-OFF mode
- 8 : Unthreading mode
- 9 : Cassette-up mode
- 10 : Cassette-out mode
(A cassette tape is removed.)

2nd digit : Device in which the problem is detected

0 : Device cannot be determined. Or, determination of device is not necessary.

- 1 : Cassette up/down motor, or cassette up/down sensor
- 2 : Threading motor, FG or sensor
- 3 : Drum motor or FG
- 4 : Capstan motor or FG
- 5 : S reel motor or FG
- 6 : S reel brake solenoid
- 7 : T reel motor or FG
- 8 : T reel brake solenoid
- 9 : S/T reel motor or FG
- A : Tension regulator
- B : Pitch solenoid
- C : Reel position motor or sensor

3rd digit : Symptom

0 : Determination of mode is not necessary.

- 1 : Operation cannot be completed within specified time.
- 2 : Detects that the speed is not normal.
- 3 : Detects the slack of the tape.
- 4 : FG cannot be detected.
- 5 : Detects FG.
- 6 : Detects the rotation is not normal.
- 7 : Detects the maximum tension.
- 8 : Detects the current is not normal.
- 9 : Full up or end cannot be released.
- A : Retry (Once, unthreading, and then threading.)

When the main code is 3X:

The sub code of main code 3X is 000.

2. How to display the error codes that were previously detected



This unit memorizes the error code in electrically erasable/programmable ROM (EEPROM) when an internal problem is detected. (However, error code 9X-XXX is excluded.)

The error codes of the detected problems are displayed.

The procedures of displaying the error codes are as follows:

1. Press the MENU button while pressing the  button



2. Set the cursor to SERVICE SUPPORT with the  or  button.

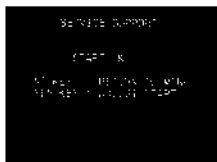
Then, press the  button.



3. Set the cursor to ERROR LOG with the **↑** or **↓** button.
Then, press the **←** button.



4. Set the cursor to the desired error code with the **↑** or **↓** button.
Then, press the **←** button.



5. Press the SET (YES) button.




6. Press the MENU button. The display will return to Step 3.




3. How to look up an error code in this unit

This unit features a dictionary function to look up an error code.




The procedures for looking up an error code are as follows:

1. Press the MENU button while pressing the  button.



2. Set the cursor to SERVICE SUPPORT with the  or  button.
Then, press the  button.



3. Set the cursor to ERROR DIAGNOSTICS with the  or  button.
Then, press the  button.



4. Error code

- Main code 0X : Servo system or tape path system problem

① Main code 02

Sub code	Detection	Operation after detection	Valid mode	Display
058	It is detected that the current of the S reel motor is not normal.	AUTO OFF	EJECT (Emergency EJECT)	
078	It is detected that the current of the T reel motor is not normal.			
154	The S reel FG cannot be detected by FG check when inserting a cassette tape.	Removes cassette tape automatically.	—	Displays until pressing any button or until inserting a cassette tape again.
174	The T reel FG cannot be detected by FG check when inserting a cassette tape.			
194	Neither S reel FG nor T reel FG can be detected by FG check when inserting a cassette tape.			
255	The S reel FG is detected in threading.	AUTO OFF	EJECT (Emergency EJECT)	
274	The T reel FG cannot be detected in threading.			
355	The S reel FG is detected in STOP or STILL mode.			
375	The T reel FG is detected in STOP or STILL mode.			
395	The S reel FG and T reel FG are detected in STOP or STILL mode.			
402	It is detected that the tape does not run at the specified speed in F. FWD or REW mode.	STOP	Error is remedied, then the unit operates normally.	Displays until pressing any button.
403	The slack of the tape is detected in F. FWD or REW mode.	AUTO OFF	EJECT (Emergency EJECT)	Displays until pressing any button or until inserting a cassette tape again.
454	The S reel FG cannot be detected in F. FWD or REW mode.			
474	The T reel FG cannot be detected in F. FWD or REW mode.			
494	Neither S reel FG nor T reel FG can be detected in F. FWD or REW mode.			
496	It is detected that the rotations of S and T reel are not normal in F. FWD or REW mode.			
503	The slack of the tape is detected in SEARCH mode.			
554	The S reel FG cannot be detected in SEARCH mode.			
574	The T reel FG cannot be detected in SEARCH mode.			

Sub code	Detection	Operation after detection	Valid mode	Display
594	Neither S reel FG nor T reel FG can be detected in SEARCH mode.	AUTO OFF	EJECT (Emergency EJECT)	Displays unit pressing any button or not inserting a cassette tape again.
596	It is detected that the rotations of S and T reel are not normal in SEARCH mode.			
603	The slack of the tape is detected in PLAY or REC mode.			
634	The S reel FG cannot be detected in PLAY or REC mode.			
674	The T reel FG cannot be detected in PLAY or REC mode.			
694	Neither S reel FG nor T reel FG can be detected in PLAY or REC mode.			
696	It is detected that the rotations of S reel and T reel are not normal in PLAY or REC mode.			
803	The slack of the tape is detected when unthreading.			
855	The S reel FG is detected when unthreading.			
874	The T reel FG cannot be detected when unthreading.			
A33	The S reel FG is detected during removal of a cassette tape.	Until the error is remedied, inhibits inserting a cassette tape.		
A75	The T reel FG is detected during removal of a cassette tape.			
A95	The S reel FG and T reel FG are detected during removal of a cassette tape.			

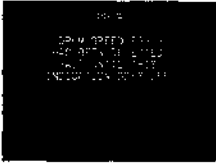
② Main code 06

Sub code	Detection	Operation after detection	Valid mode	Display
6A7	It is detected that the tape tension is not normal in PLAY or REC mode.	Continues operating in the mode in which the problem is detected. When errors other than PLAY or REC mode, AUTO OFF.	The error is remedied, then the unit operates normally. In PLAY or REC mode : Continues operating. In other than PLAY or REC mode : STOP, then EJECT (emergency EJECT)	Displays until the error is remedied and pressing any button.

③ Main code 07

Sub code	Detection	Operation after detection	Valid mode	Display
0A2	It is detected that the speed of the capstan is not normal.	STOP	The error is remedied, then the unit operates normally.	Displays until pressing any button.
1A4	The capstan FG cannot be detected by FG check when inserting a cassette tape.	Removes cassette tape automatically.	—	Displays until inserting a cassette tape again.

④ Main code 08

Sub code	Detection	Operation after detection	Valid mode	Display
03A	It is detected that the speed of the drum is not normal. 	RETRY (Once unthreading, then threading again.)	EJECT	Displays until the error is remedied.
032	The drum speed problem is not remedied.	AUTO OFF	EJECT	Displays until inserting a cassette tape again.

⑨ Main code 09

Sub code	Detection	Operation after detection	Valid mode	Display
028	It is detected that the current of the threading motor is not normal.	AUTO OFF	EJECT (Emergency EJECT)	Displays until pressing any button or until inserting a cassette tape again.
209	When detects full top or end of a tape in the threading state and then performs SHORT FF/SHORT REW, top or end is not released.	Removes cassette tape automatically.	---	
221	Threading is not completed within the specified time.	AUTO OFF	EJECT (Emergency EJECT)	
821	Unthreading is not completed within the specified time.			

• Main code 2X : Mechanical control system problem

⑩ Main code 20

Sub code	Detection	Operation after detection	Valid mode	Display
018	It is detected that the current of the cassette up/down motor is not normal.	AUTO OFF	EJECT (Emergency EJECT)	Displays until pressing any button or until inserting a cassette tape again.
111	The operation of cassette down is not completed within the specified time.	Removes cassette tape automatically.	---	
911	The operation of cassette up is not completed within the specified time.	AUTO OFF	Inhibits all modes.	

⑪ Main code 21

Sub code	Detection	Operation after detection	Valid mode	Display
0C8	It is detected that the current of the reel position motor is not normal.	AUTO OFF	EJECT (Emergency EJECT)	Displays until pressing any button or until inserting a cassette tape again.
1C1	The driving of the reel position is not completed within the specified time.	Removes cassette tape automatically.	---	

• Main code 3X : Sensors problem

The sub code of the main code 3X is 000.

Main code	Detection	Operation after detection	Valid mode	Display
30	Tape-top and tape-end are detected at the same time.	STOP	PLAY, EJECT	Displays until an error is clear up.
31	Tape-top is not released.	STOP	PLAY, FF, EJECT	
32	Tape-end is not released.	STOP	PLAY, REW, EJECT	
33	The reel position sensor detects the L position and S position at the same time.	Inhibits inserting a cassette tape.		

• Main code 9X : Communication and interface systems problem

Main code	Sub code	Detection
91	125	The interface problem between system control and keyboard is detected.
	134	Problem on the hours meter data of EEPROM is detected.
	145	The initialization problem between system control and servo is detected.
	165	The interface problem between system control and TBC is detected.
	436	Problem on the servo adjustment data of EEPROM is detected.
	455	The interface problem between main servo and sub servo is detected.
92	000	1/2 VD signal with input to system control cannot be detected.
93	000	Servo reference sync signal cannot be detected.
94	000	Servo input sync signal cannot be detected.

5. Probable cause of the error code

• Probable cause of the error code

Main code	02												06
Sub code	403	574	554	402	355	058	154	274	594	494	395	496	6A7
Probable cause	503	674	654	454	375	078	174	874	694			596	
	603	803		474			194					696	
							255						
							855						
							A55						
							A75						
							A95						
1. Tape clings to tape path system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				<input type="radio"/>		<input type="radio"/>			<input type="radio"/>
2. Tape winds in disorder.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>						<input type="radio"/>	<input type="radio"/>	
3. Cassette tape stainer is defective. (The cassette compartment is shaky.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
4. Reel motor does not generate the specified torque.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Reel FG is defective.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Tension regulator is defective.	<input type="radio"/>												
7. The splice tape is used.		<input type="radio"/>	<input type="radio"/>		<input type="radio"/>				<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	
8. Tape top/end sensors are defective			<input type="radio"/>	<input type="radio"/>					<input type="radio"/>	<input type="radio"/>			<input type="radio"/>
9. Insufficient pinch roller pressure									<input type="radio"/>			<input type="radio"/>	

• How to check the probable cause, board and devices

Probable cause	How to check	Board, devices
1. Tape clings in tape path system. • Dirt on the tape • Dirt on the tape path system • HUMID	• Check that the tape clings to tape path system and drum or not. • Check that something attaches to the tape or not. • Check that any scratch is on the tape or not. • Check that something attaches to tape path system or not.	
2. Tape winds in disorder • Worn tape is used • Scratched tape is used.	• Check that the tape winds in disorder.	
3. Cassette tape stainer is defective. (The cassette compartment is shaky.)	All four pins on the cassette compartment should be inserted to the holes on the slant table. The cassette compartment stainer should be installed securely. ↓ When the cassette compartment is shaky in inserting a cassette tape, replace the cassette compartment with a new one. ↓ When the cassette compartment is not shaky, the cassette compartment is defective. When it is shaky, drive circuit is defective	DR-214 board, MS-39 board
4. Reel motor does not generate the specified torque • Mechanism of reel brake is defective. • Reel brake solenoid is out. • Drive IC of reel brake solenoid is defective. • Reel motor is defective. • Drive circuit of reel motor is defective. • Harness is defective.	• When S/T reel brake is suspected cause: Perform the S/T reel brake check. S/T reel brake must be released. • When S/T reel motor is suspected cause: Perform the reel FG adjustment. The adjustment must be completed normally.	When S reel brake is suspected cause: DR-214 board, MS-39 board, RM-126 board, S reel brake solenoid When T reel brake is suspected cause: DR-214 board, MS-39 board, RM-127 board, T reel brake solenoid When S reel motor or S reel FG is suspected cause: SS-53 board, DR-214 board, MS-39 board, RM-126 board, SE-207 board, S reel motor, S reel FG sensor GPIA30R
5. Reel FG is defective. • Photo sensor of reel FG is defective. • Harness is defective.	Perform the reel FG adjustment. The adjustment must be completed normally.	When T reel motor or T reel FG is suspected cause: SS-53 board, DR-214 board, MS-39 board, RM-127 board, SE-207 board, T reel motor, T reel FG sensor GPIA30R
6. Tension regulator is defective.	Perform the hook position adjustment. The display must be OK.	TR-84 board, MS-39 board, DR-214 board, SS-53 board, Tension sensor DN4230
7. The splice tape is used.		

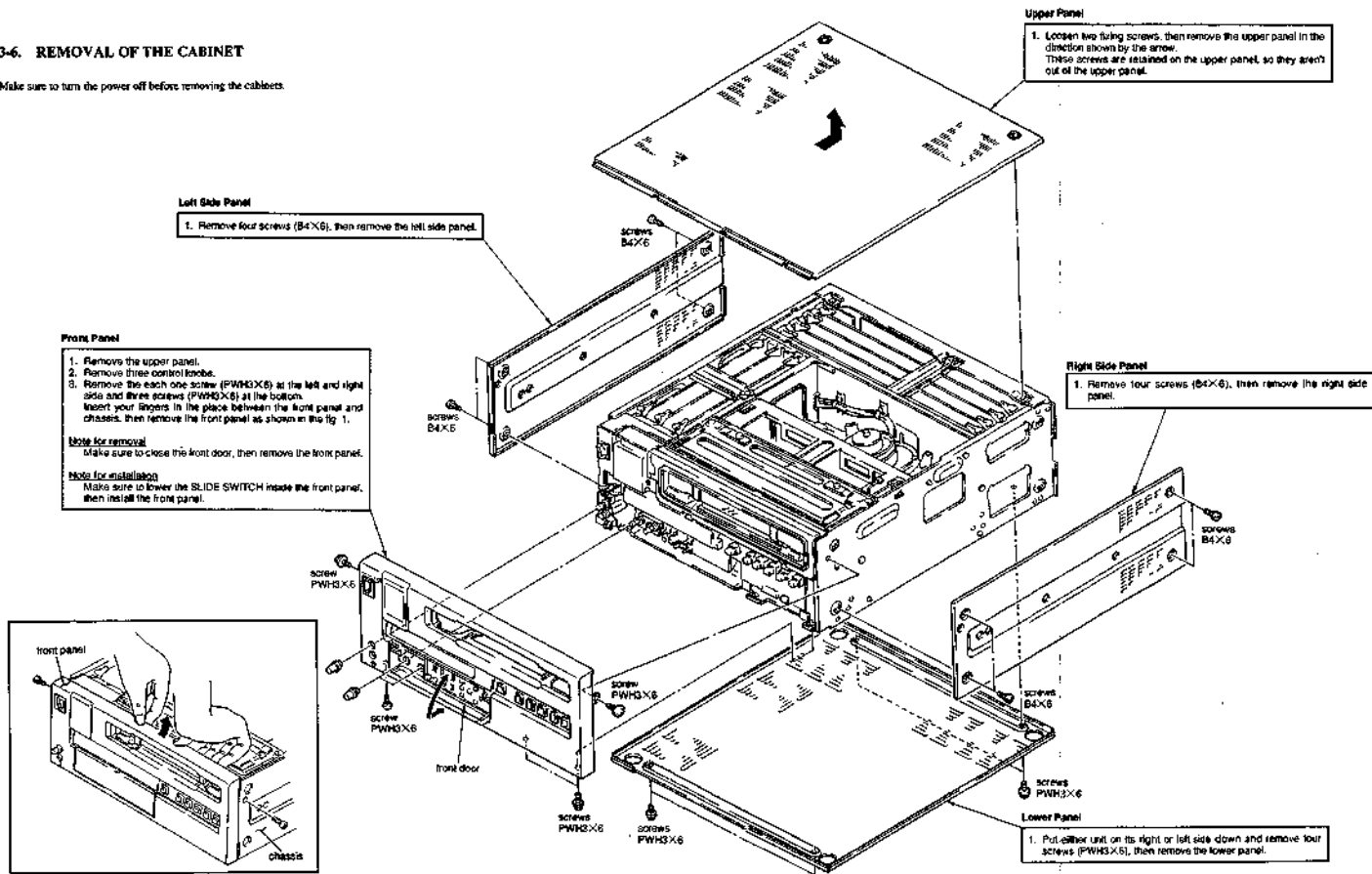
Probable cause	How to check	Board, devices
8. Tape top/end sensors are defective.	Perform the tape top/end check. The tape top/end sensors must be turning on or off normally.	When tape top sensor is suspected cause: PTC-67 board, MS-39 board, DR-214 board, SS-53 board, Tape top sensor When tape end sensor is suspected cause: PD-35 board, MS-39 board, DR-214 board, SS-53 board, tape end sensor
9. Insufficient pinch roller pressure <ul style="list-style-type: none"> • Mechanic of pinch roller is defective. • Pinch solenoid is out. • Drive IC of pinch solenoid is defective 	Perform the pinch roller check. The pinch roller must be pressed to capstan shaft surely.	PD-35 board, MS-39 board, DR-214 board, Pinch solenoid

3-5. PRINTED CIRCUIT BOARD

SYSTEM	BOARD	CIRCUIT FUNCTION	UVW-	UVW+
			1800P	1600P
VIDEO	CP-225	Video Input/Output Connector	○	
	CP-225A	Video Output Connector		○
	VRA-5P	Input Video Selector, Y/C Separator, CTDM (Compressor), Y/C FM Modulator	○	
	RP-70P	RF REC/PB Amplifier, Full Erase Oscillator	○	
	RP-70AP	RF PB Amplifier		○
	VP-43P	Y/C PB Process (PB RF Equalizer, Demodulator, Encoder, Drop-out Detector), Video Output Driver	○	
	VP-43AP	Y/C PB Process (PB RF Equalizer, Demodulator, Encoder, Drop-out Detector), Video Output Driver		○
	TBC-25P	Time Base Corrector, CTDM (Expander)	○	○
AUDIO	CP-226	Audio Input/Output Connector	○	
	CP-226A	Audio Output Connector		○
	VR-155	REC Level Control	○	
	AR-14P	Audio REC Amplifier, LTC REC Amplifier, Audio/TC Erase Oscillator, Audio Bias	○	
	AP-31P	Audio PB Amplifier, LTC PB Amplifier, Meter Amplifier	○	
	AP-31AP	Audio PB Amplifier, LTC PB Amplifier, Meter Amplifier		○
	HP-61	Headphones Jack/Level Control, Remote Control Jack	○	
	HP-61A	Headphones Jack/Level Control, Remote Control Jack		○
	AH-43	Audio Head	○	
AH-46	Audio Head		○	
SERVO/ SYSTEM CONTROL/ TIME CODE	SS-53	System Control, Servo System Control, Time Code Generator/Reader, Character Generator	○	○
	KY-249	Function Key	○	
	KY-249A	Function Key		○
	DR-214	Motor Driver, Sensor Input Amplifier, Tension Sens. Amplifier, Drum FG/PW Amplifier, Capstan FG Amplifier, CTL REC/PB Amplifier, TAPE TOP/END DETECT	○	○
	MS-39	Cassette-in Sensor, Miss-req Sensor, Solenoid Driver, Adjust Dam Storage	○	
	MS-39A	Cassette-in Sensor, Solenoid Driver, Adjust Dam Storage		○
	CL-25	Cassette Compartment (Cassette Loading Begin/Near-end Sensor, PC-62/LP-57 Connection)	○	○
	SE-207	Reel FG Sensor	○	○
	FD-35	Pinch Solenoid	○	○
	PC-62	Cassette In/Large Cassette Sensor	○	○
	TR-84	Tension Regulator Sensor	○	○
	FTC-66	Reel Position Sensor	○	○
	PTC-67	Threading Motor, Threading FG Sensor	○	○
	PTC-68	Thread End/Unthread End Sensor	○	○
	RM-126	Supply Reel Motor	○	○
	RM-127	Take-up Reel Motor	○	○
CP-237	Remote Connector	○		
CP-237A	Remote Connector		○	
OTHERS	MB-470P	Mother Board for SS-53, TBC-25P, VP-43P and VRA-5P Boards	○	
	MB-470AP	Mother Board for SS-53, TBC-25P and VP-43AP Boards		○
	MB-471	Mother Board for RP-70P, AP-31P and AR-14P Boards	○	
	MB-471A	Mother Board for RP-70AP and AP-31AP Boards		○

3-6. REMOVAL OF THE CABINET

Make sure to turn the power off before removing the cabinets.

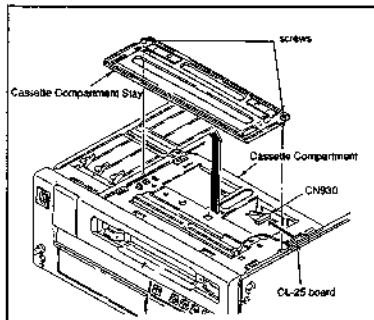


3-7. REMOVAL/INSTALLATION OF CASSETTE COMPARTMENT

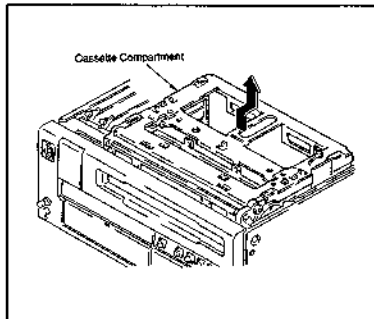
Make sure to turn the power off before removing the cabinets.

Removal

1. Remove the upper panel (Refer to Section 3-6).
2. Loosen the two screws as shown in the figure, then remove the cassette compartment stay.
These screws are retained on the stay, so they aren't out of the stay.
3. Disconnect the connector (CN930) on the CL-25 board at the upper right of the cassette compartment.



4. Lift up the cassette compartment a little. Remove it with sliding it horizontally shown in the direction of the arrow.

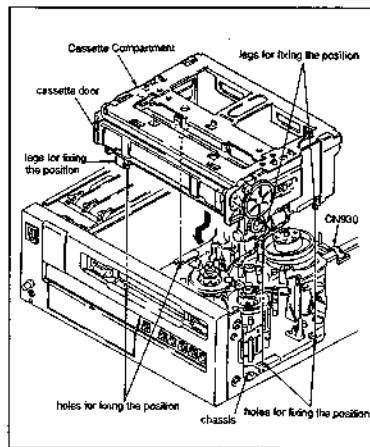


Installation

5. Set the harness of the connector (CN930) disconnected in step (3), so it isn't put between the chassis.
Install the cassette compartment in the reverse order of step 4.

Note: At this time, confirm that the four legs of the cassette compartment for fixing the position are in the holes of the chassis for fixing the position.

6. After confirming that the cassette compartment is fixed to the chassis, install the cassette compartment stay and connect the connector (CN930) of the CL-25 board.

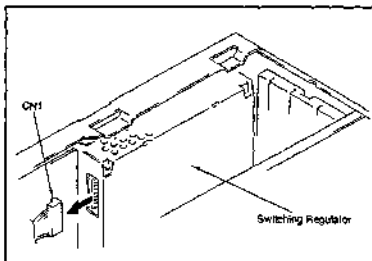


3-8. REMOVAL OF THE SWITCHING REGULATOR

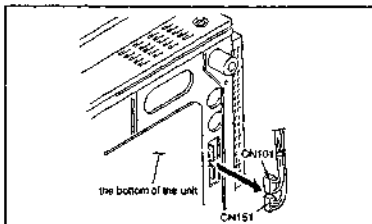
Note :

The switching regulator is primary side circuit. Take precaution and avoid electric shock when removing the switching regulator for replacement or another reason. There is possibility of an electric shock even when the power is turned off. Be sure to remove following more than 10 minutes after the power is turned off.

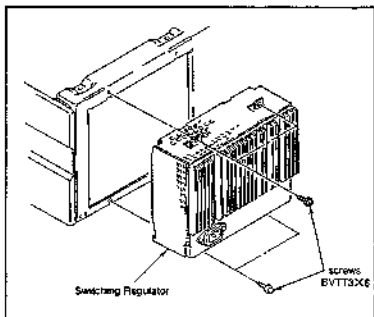
1. Remove the upper panel (Refer to Section 3-6), then remove the VRA-5P, VP-43P and TEC-25P boards (Refer to Section 3-11-11).
2. Disconnect the connector (CN1) of the SOPS-1046 (220V) board (Inside the switching regulator).



3. Remove the lower panel (Refer to section 3-4) and disconnect the two connectors (CN101, CN151) of the SOPS-1046 (AC) board (beside the switching regulator).



- Remove four screws, then remove the switching regulator.



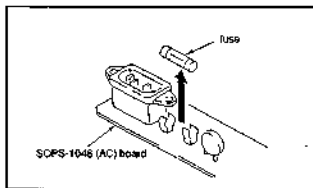
3-9. REPLACEMENT OF FUSE

Note :

A power fuse is mounted on the SOPS-1046 (AC) board of the switching regulator. When some troubles occur and an electric current flows excessively, the fuse is melted. If the fuse has blown, first remedy the cause of trouble, and then replace the fuse.

- Remove the SOPS-1046 (AC) board (Refer to Section 3-11-11.).
- Remove the fuse from the fuse holder, then replace it with a new one.

SONY PARTS NUMBER : 1-576-228-11 (2A, 250V)



3-10. EXTENSION BOARD

Two extension boards are supplied as optional accessory for check and adjustment of some printed circuit boards. Insert the extension board into the chassis of the unit and connect the circuit board to be checked or adjusted to the end of the extension board.

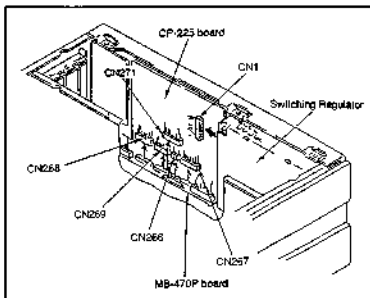
Extension board	Connectable Printed Circuit Boards
EX-278 J-6332-780-A	SS-5S, TBC-25P, VP-43P/AP, VRA-5P
EX-279 J-6332-790-A	RP-70P/AP, AP-31P/AP, AR-14P

3-11. REPLACEMENT OF THE BOARDS

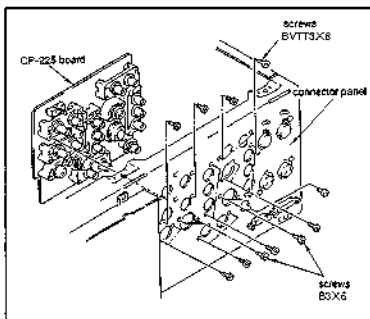
Make sure to turn the power off before removing the boards.

3-11-1. CP-225 Board

1. Remove the upper panel (Refer to Section 3-6).
2. Lift up the SS-53, TBC-25P, VP-43P and VRA-5P boards (Refer to Section 3-11-11.).
3. Disconnect the five connectors (CN266, CN267, CN268, CN269, CN271) of the MB-470 board and the connector (CN1) of the SOPS-1046 (220 V) board (inside the switching regulator).

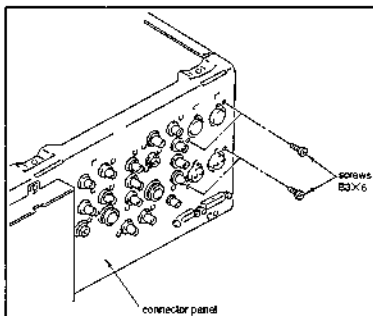


4. Remove twenty-one screws (BVTT3×5) (four out of them are B3×6), then remove the board.

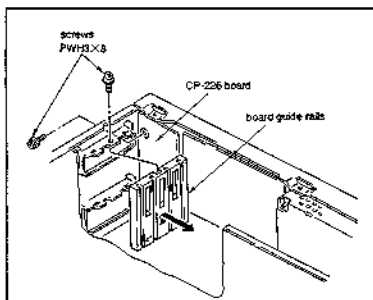


3-11-2. CP-226 Board

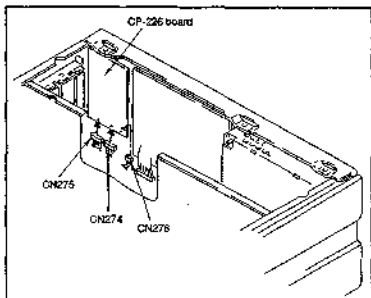
1. Remove the upper panel (Refer to Section 3-6).
2. Lift up the SS-53, TBC-2SP, VP-43P and VRA-5P boards (Refer to Section 3-11-11.).
3. Remove the left side panel (Refer to Section 3-6).
4. Remove four screws (B3×6).



5. Remove the screw (PWH3×8), then remove a board guide rails. Remove the screw (PHW3×8) from the side, then remove the board.

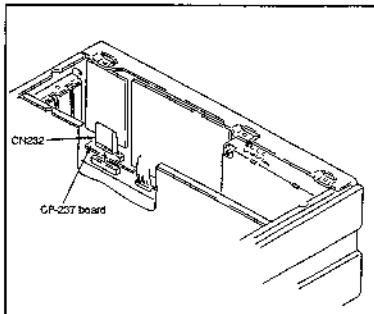


6. Disconnect the three connectors (CN275, CN274, CN276) of the CP-226 board.

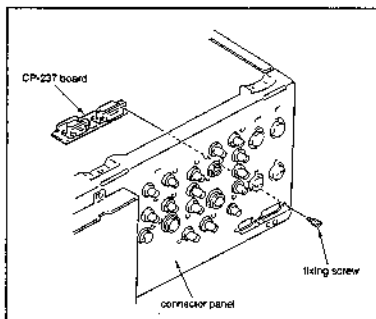


3-11-3. CP-237 Board

1. Remove the upper panel (Refer to Section 3-6).
2. Lift up the VRA-5P, VP-43P and TBC-25P boards (Refer to Section 3-11-1.).
3. Disconnect the connector (CN232) of the MB-470P board.

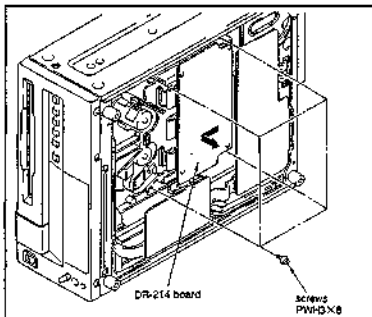


4. Remove the fixing screw, then remove the board.

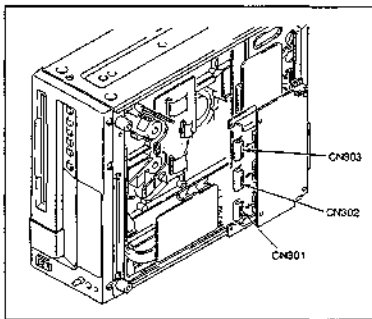


3-11-4. DR-214 Board

1. Remove the lower panel (Refer to Section 3-6).
2. Remove four screws (PW53 × 8), then remove the board in the direction shown by the arrow from the connector (CN214) of the MB-470P board.

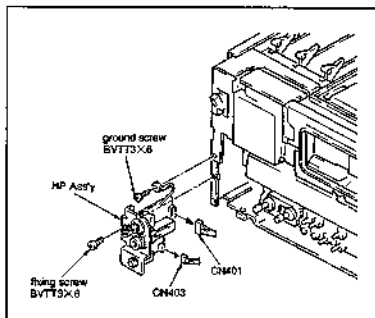


3. Pull out the three flexible card wire (CN301, CN302, CN303) from the connector.

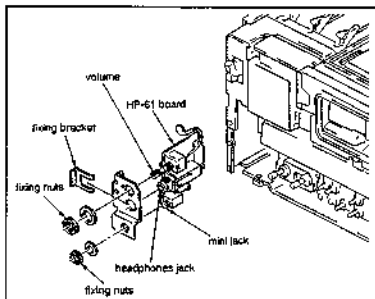


3-11-5. HP-61 Board

1. Remove the front panel (Refer to Section 3-6).
2. Remove the fixing screw (BVTT3×6) and the ground screw (BVTT3×6), then remove the HP Assy.
3. Disconnect the two connectors (CN401, CN403) of the HP-61 board.

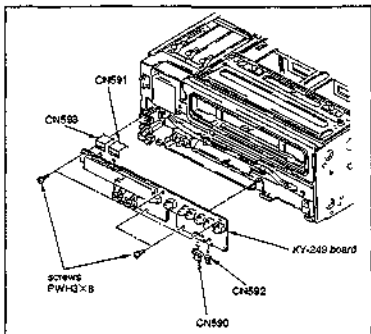


4. Remove the fixing nuts of the mini jack.
5. Remove the volume fixing nuts.
6. Remove the fixing bracket of the headphones jack, then remove the board.



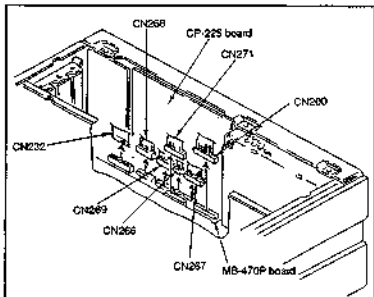
3-11-6. KY-249 Board

1. Remove the front panel (Refer to Section 3-6.).
2. Remove the five screws (PWHQ×8) of the KY-249 board.
3. Disconnect the two connectors (CN590, CN592) of the KY-249 board.
4. Pull out the flexible card wire from the connector.

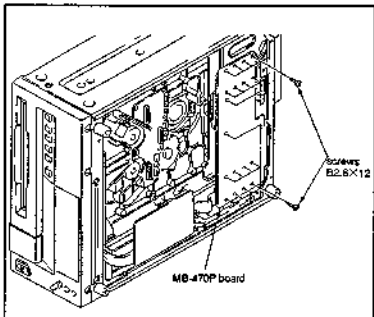


3-11-7. MB-470P Board

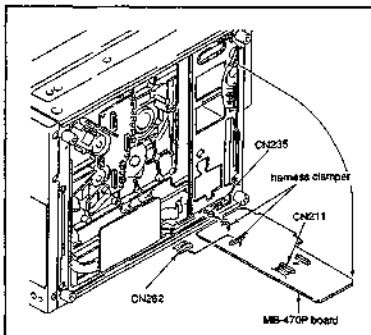
1. Remove the upper panel (Refer to Section 3-6.).
2. Lift up the SS-53, TBC-25P, VP-43P and VRA-5P boards (Refer to section 3-11-1.).
3. Disconnect the seven connectors (CN200, CN232, CN266, CN267, CN268, CN269, CN271) of the MB-470P board.



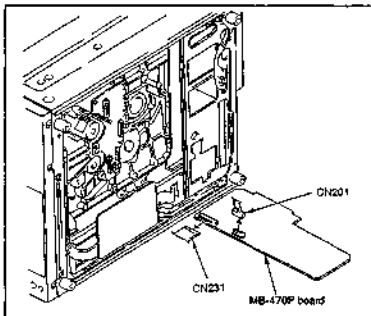
4. Remove the DR-214 board (Refer to Section 3-11-4.).
5. Remove the eighteen screws (B2.6×12) of the MB-470P board.



6. Open the MB-470P board and remove the two harness from the clamper, then disconnect the three connectors (CN211, CN235, CN262).

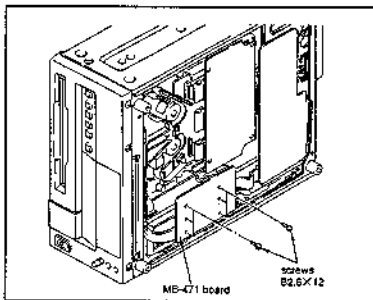


7. Disconnect the connector (CN201) and pull out the flexible card wire (CN231).

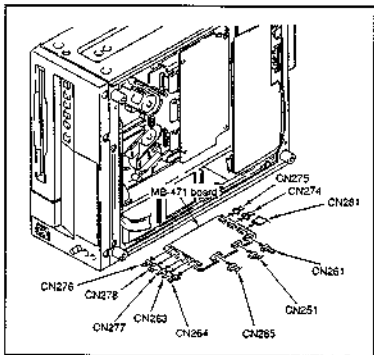


3-11-8. MB-471 Board

1. Remove the upper panel (Refer to Section 3-6.).
2. Lift up the AR-14P, AP-31P and RP-70P boards (Refer to Section 3-11-11.).
3. Remove six screws (B2.6×12) of the MB-471 board.

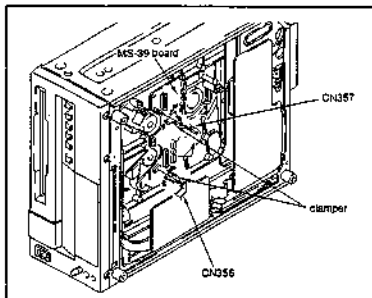


4. Pull out the flexible card wire from the connector.
5. Disconnect the sea connectors (CN251, CN261, CN263, CN264, CN265, CN274, CN275, CN276, CN277, CN278) of the MB-471 board.

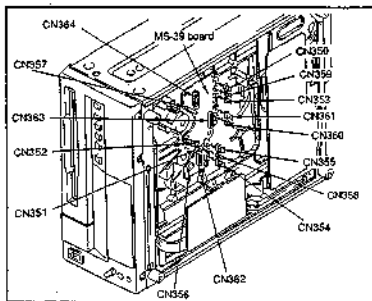


3-11-9. MS-39 Board

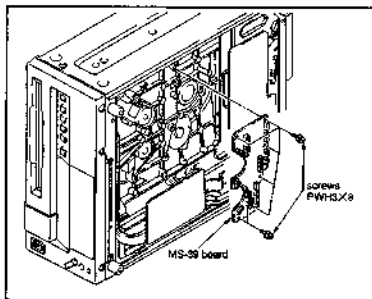
1. Remove the lower panel (Refer to Section 3-6).
2. Remove the DR-214 board (Refer to Section 3-11-4).
3. Remove the clumper, then pull out the flexible card wire



4. Disconnect the thirteen connectors (CN350, CN351, CN352, CN353, CN354, CN355, CN358, CN359, CN360, CN361, CN362, CN363, CN364) of the MS-39 board.

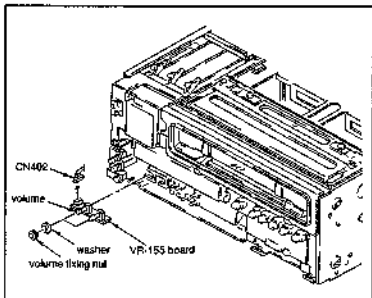


5. Remove seven screws (PW53×8), then remove the board.



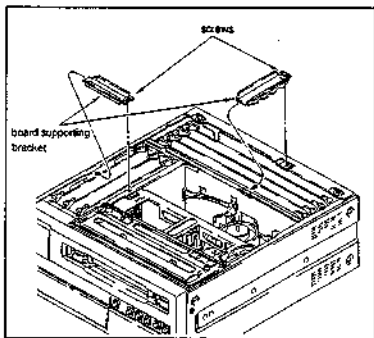
3-11-10. VR-155 Board

1. Remove the front panel (Refer to Section 3-6).
2. Remove two volume fixing nuts, then remove the board.
3. Disconnect the connector (CN402) of the VR-155 board.



3-11-11. Removal of the card board.

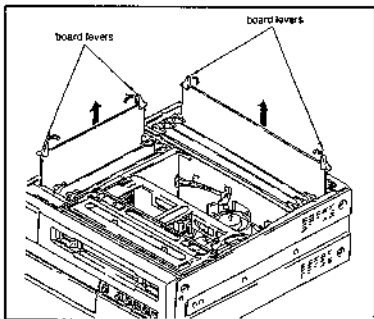
1. Remove the upper panel (Refer to Section 3-6).
2. Loosen the screws as shown in the figure, then remove the board supporting bracket. These screws are retained on the board supporting bracket, so they aren't out of the way.



3. Pull up the board levers in the direction shown by the arrow, then lift up the board.

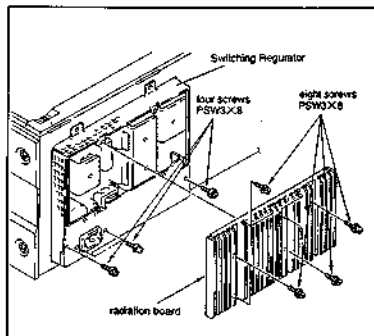
Note for installation

Insert the board along the board guide rails, then push it firmly until it engages with the connector on the mother board.

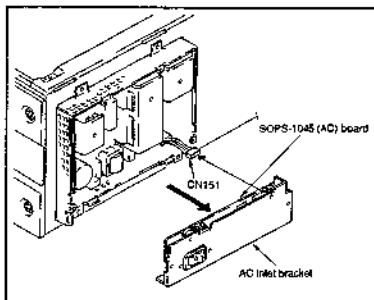


3-11-12. SOPS-1046 (AC) Board, SOPS-1046 (220 V) Board (Inside the switching regulator)

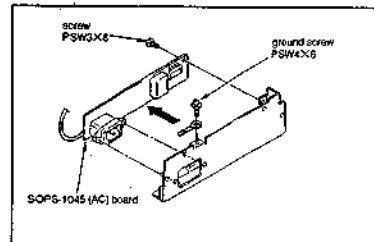
1. Remove eight screws (PSW3×8), then remove the radiation board.
2. Remove the four screws (PSW3×8) as shown in the figure.



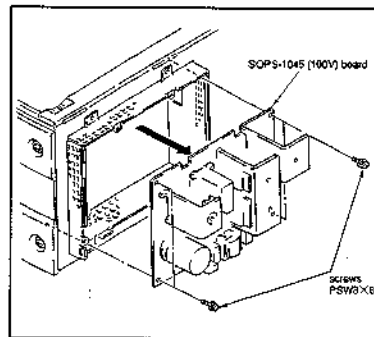
3. Pull out the AC Inlet bracket and the SOPS-1046 (AC) board, then disconnect the connector (CN151).



4. Remove the screw (PSW3×8) tightened the board and the ground screw, then remove the SOPS-1046 (AC) board.



5. Remove four screws, then remove the board SOPS-1046 (220 V).



3-12. TAKE OUT THE CASSETTE TAPE IN SLACKING (MANUAL MODE)

Be more careful not to damage the tape when taking out the cassette tape.

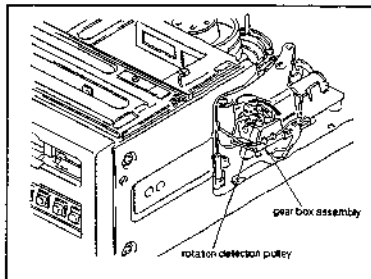
In case ERROR is detected

1. Press the EJECT KEY and put the unit into the EMERGENCY EJECT MODE (Refer to section 2-4-2.), then take out the cassette tape.

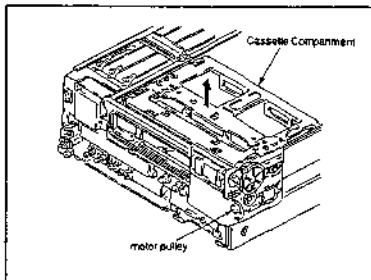
When the cassette tape cannot be taken out with the EMERGENCY EJECT MODE.

2. Referring to (Section 4 MAINTENANCE MENU), put the unit into the SERVICE SUPPORT MODE and select the MANUAL EJECT.
3. Take out the cassette tape by the display on the monitor picture.

- ① In case the message below is displayed on the monitor picture, turn the rotation detection pulley of a gear box assembly in the direction shown by the arrow.

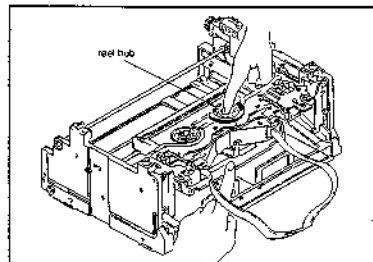
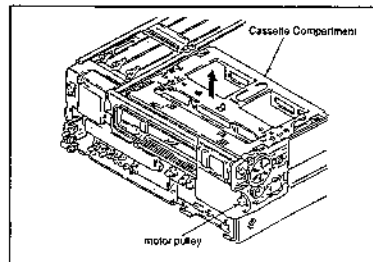


- ② In case the message below is displayed on the monitor picture, turn the motor pulley in the direction shown by the arrow, and the cassette compartment moves up, then take out the cassette tape.



- ③ In case of taking out the cassette tape by the removal of the cassette compartment stay.

1. Turn the power off.
2. Remove the upper panel (Refer to Section 2-6.).
3. Turn the rotation detection pulley in the direction shown by the arrow.
4. Remove the cassette compartment stay.
5. Disconnect the connector (C1990) on the CL-25 board of the cassette compartment.
6. Remove the front panel (Refer to Section 3-6.).
7. Turn the motor pulley as shown in the figure in the direction shown by the arrow.
8. While holding the cassette lid by hand to prevent it from closing so that the cassette compartment moves up (Stop rotating the pulley just before the cassette compartment begins to move to the surface).
9. Take out the cassette compartment slowly from the unit while holding the cassette lid.
10. Wind the tape into the cassette by turning the reel hub with a finger and close the cassette lid.
11. Take out the cassette tape from the cassette compartment.
12. Turn the pulley as described in Step 7 to that the stage of the cassette compartment moves the cassette out position.
13. Install the cassette compartment to the unit.
14. Connect the connector (C1990), then install the cassette compartment stay.



3-13. CLEANING WHEN HEADS ARE CLOGGED

If the video head is clogged, clean the head as described in the following procedures.

• Cleaning with the cleaning cassette

1. Insert the cleaning cassette BCT-SCLN in the unit, and press the EJECT and PLAY buttons immediately (until one second).

Check that the EJECT button blinks and the PLAY button lights on.

Note : • Make sure to use the cleaning cassette BCT-SCLN. If the cleaning is performed by cleaning cassettes other than the BCT-SCLN, abnormal friction or damage of the video head may occur.

- Press the EJECT and PLAY buttons immediately after inserting the cleaning cassette BCT-SCLN in the unit.

2. After the cleaning tape is in play mode for five seconds, the tape is ejected automatically.

Note : Do not use the cleaning cassette with rewind.

3. Confirm that the head clog is clear. If the video head is clogged after Step 2, clean the video head as described in the following procedure.

• Cleaning with the cleaning piece

1. Hold the cleaning piece moistened with cleaning fluid against the heads gently.

2. Slowly rotate the upper drum in the direction of the head's rotation with hand and clean the video head.

Note : • Do not move the cleaning piece in a vertical direction. This will damage the video head.
• Be sure to turn the POWER OFF, when cleaning is performed.

3-14. HOW TO OPERATE THE UNIT WITHOUT CASSETTE TAPE

When some mechanical alignments are performed, the unit may be operated without inserting a cassette tape.

1. Remove a cassette compartment, or disconnect connector CN930 on the cassette compartment.

2. Set S201-1 and S201-4 switches on the SS-53 board (B-1) to on. Then, turn the power ON.

Note : If the S201-4 switch on the SS-53 board (B-1) is not set to on, an error occurs.

The following procedures describe the operation of the unit.

• Threading

After the reel motor and upper drum are rotated, the threading ring begins to move, and the unit enters the threading mode.

The tension arm and threading ring move to the regular positions, and threading is completed.

This threading-completed state is referred to as the STOP mode.

• PLAY

Press the PLAY button.

A pinch roller is pressed to the capstan shaft, and the unit enters the PLAY mode.

If the PLAY button is pressed during the threading, the pinch roller is pressed to a capstan shaft after threading is completed, and the unit enters the PLAY mode.

• FF

Press the F. FWD button.

A pinch roller is pressed to a capstan shaft, and the unit enters the forward search mode. The tape speed is 5 times.

• REW

Press the REW button.

A pinch roller is pressed to a capstan shaft, and the unit enters the rewind search mode. The tape speed is 5 times.

- REC

- A small cassette

- Press the PLAY and REC buttons while pressing the MISS-REC switch for small cassette on the left side of the supply reel table.

- A pinch roller is pressed to a capstan shaft, and the unit enters the REC mode.

- When the MISS-REC switch is released, the unit is not in REC mode.

- A large cassette

- Press the PLAY and REC buttons while pressing the MISS-REC switch for large cassette on the right side of the supply reel table.

- A pinch roller is pressed to a capstan shaft, and the unit enters the REC mode.

- When the MISS-REC switch is released, the unit is not in REC mode.

- Unthreading

- Press the EJECT button.

- A threading ring begins to move, and the unit enters the unthreading mode.

- The threading ring moves to the regular position, and unthreading is completed.

Note : After adjustment is completed, set the S201-1 and S201-4 switches on the SS-53 board (B-1) to off.

3-15. NOTE ON REPAIR PARTS

3-15-1. Notes on Repair Parts

(1) Safety Related Components Warning

Components marked with Δ on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

(2) Standardization of Parts

Repair parts supplied from Sony Parts Center may not be always identical with the parts which actually in use due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".

This manual's exploded views and electrical spare parts list are indicating the part numbers of "the standardized genuine parts as present".

(3) Stock of Parts

Parts marked with "o" SP (Supply Code) column of the spare parts list are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

(4) Units for Capacitors and Resistors

The following units may be assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.

Capacitors : μF

Resistors : Ω

3-15-2. Replacement Procedure for Chip Parts

Required Tools

Soldering iron : 20 W If possible, use a soldering iron tip heat-controller at $270 \pm 10^\circ\text{C}$.

Braided wire : SOLDER TAUL or equivalent

Sony part No. 7-641-300-81

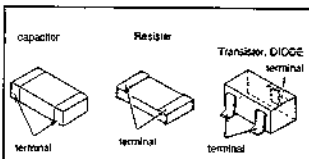
Solder : 0.6 mm dia. is recommended.

Tweezers

Soldering Conditions

Soldering iron temperature : $270 \pm 10^\circ\text{C}$.

Soldering time : less than two seconds per a pin



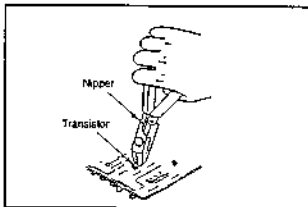
* Resistor and Capacitor Replacement

- (1) Place the soldering iron tip onto the chip part and heat it up until the solder is melted. When the solder is melted, slide the chip part aside.
- (2) Make sure that there is no pattern peeling, damage and/or bridges around the desoldering positions.
- (3) After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
- (4) Place new chip part in the desired position and solder both ends.

Note : Once a chip part has been removed, never use it again.

* Transistor and Diode Replacement

- (1) Cut the terminals of the chip part with a nipper.
- (2) Remove the cut leads.
- (3) Make sure that there is no pattern peeling, damage and/or bridges around the desoldering positions.
- (4) After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
- (5) Place new chip part in the desired position and solder the terminals.



* IC Replacement

- (1) Using the braided wire, "SOLDER TAUL" Sony Part No. 7-641-300-81, remove the solder around the pins of the IC-chip to be removed.
- (2) While heating up the pins, remove the pins one by one using sharp-pointed tweezers.
- (3) Make sure that there is no pattern peeling, damage and/or bridges around the desoldering positions.
- (4) After removing the chip part, presolder the area, in which the new chip part is to be placed, with a thin layer of solder.
- (5) Place new chip part in the desired position and solder the pins.

3-15-3. Replacement of Flexible Card Wires

The following flexible card wires are used on this unit.
When handling a flexible card wire, be very careful not to bend it because this will remarkably reduce its life.

Connection	Number of Pin	Number of Flexible Card Wire
DR-214 Board MS-39 Board	30P	3
KY-249 Board vacuum fluorescent tube display	20P	2
MS-39 Board RM-126 Board	13P	1
MS-39 Board RM-127 Board	13P	1
MB-470P Board MB-471 Board	34P	1
MB-470P Board CP-257 Board	17P	1

<ZIP Type>

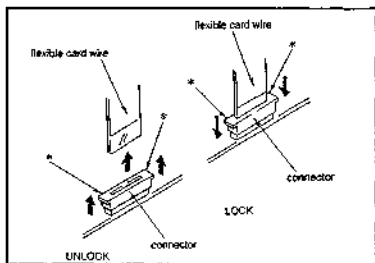
Disconnecting procedure

Pull up the * marked points of connector, then pull out the flexible card wire from the connector.

Installing procedure

Install the flexible card wire as far as it will go (up to the line indicated on the flexible card wire), then push down the * marked points of connector.

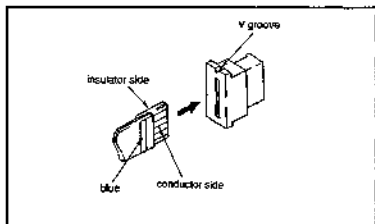
* In case the connector doesn't have the lock structure, install and disconnect the above procedures.



Note :

The flexible card wire consists of the conductor side and insulator side.

Connect the flexible card wire after checking the figure. If it is not properly connected, the circuit will not work.

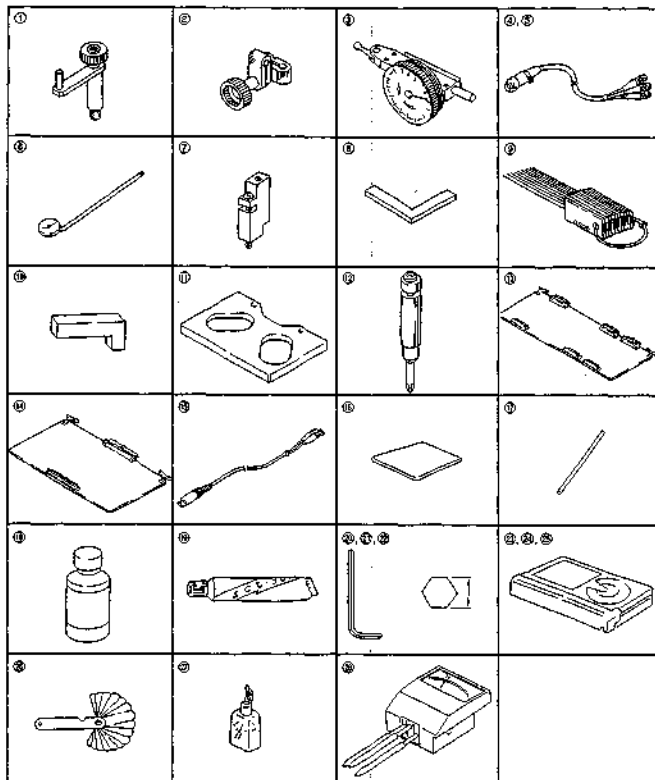


3-16. FIXTURES AND EQUIPMENTS

3-16-1. Fixtures

Fig. No.	Part No.	Description	For use
1	J-6001-820-A	Drum Eccentricity Gauge (1)	Upper drum eccentricity adjustment
2	J-6001-830-A	Drum Eccentricity Gauge (2)	
3	J-6001-840-A or J-6325-530-A	Drum Eccentricity Gauge (1) or Drum Eccentricity Gauge (6)	
4	J-6031-820-A	Midi Connector Cable (D/BNC)	Video adjustment
5	J-6031-830-A	Midi Connector Cable (D/BNC)	
6	J-6080-029-A	Adjustment Mirror	Tape path adjustment
7	J-6087-000-A	Drum Eccentricity Gauge (5)	Upper drum eccentricity adjustment
8	J-6150-960-A	Reel Motor Shaft Slantness Check Fixture	Reel motor shaft slantness check and adjustment
9	J-6152-430-A	Wire Clearance Gauge	Clearance check
10	J-6320-630-A	Reel Table Height Gauge	Reel table height adjustment
11	J-6320-680-A	Cassette Base Plate (L)	Reel table height adjustment
12	J-6321-500-A	Tape Guide Adjustment Driver	Tape guide height adjustment
13	J-6322-780-A	Extension Board, EX-278	Extension board for SS-23, TBC-25P, VP-43P/AP and VRA-5P boards
14	J-6322-790-A	Extension Board, EX-279	Extension board for RP-709P/AP, AP-31P/AP and AR-14P boards
15	J-6321-380-A	S Connector Cable, EW703	
16	2-054-697-00	Cleaning Piece	Cleaning
17	3-703-360-09	Parallel Pin (3 × 32)	Tension regulator magnet position adjustment
18	7-661-018-18	Oil	
19	7-662-010-04	Grease, SGL-505 (20 g)	
20	7-700-736-01	L-Shaped Hexagonal Wrench (d : 1.27 mm)	
21	7-700-736-05	L-Shaped Hexagonal Wrench (d : 1.5 mm)	
22	7-700-736-06	L-Shaped Hexagonal Wrench (d : 0.89 mm)	
23	8-960-096-51	Alignment Tape, CR2-1B PS	Servo and tracking alignments (metal particle tape)
24	8-960-096-91	Alignment Tape, CR5-1B PS	Video, audio and servo alignments (metal particle tape)
25	8-960-096-86	Alignment Tape, CR8-1B PS	Audio alignments (oxide tape)
26	9-911-053-00	Thickness Gauge	Clearance check
27	9-919-573-01	Cleaning Fluid	Cleaning
28	Standard	TENTEL METER (T2-H7-SLC)	Tension adjustment

Note : TENTEL and TENTELOMETER are registered trademark of TENTEL Corp.
4475 Golden Foothill Pkwy El Dorado Hills, CA U.S.A.



3-16-2. Required Equipment

Equipment		Equivalent	Note
Oscilloscope		TEKTRONIX 2445	more than 150 MHz
Signal Generator	Component	TEKTRONIX TSG-909/TSG-131A (OP. 03)	
	Composite	TEKTRONIX TSG-131A (OP. 03)/TSG-271/1411	
	Y/C	TEKTRONIX TSG-131A (OP. 03)	S-VIDEO SG
Waveform Monitor	Component	TEKTRONIX WFM300300A/1781/1765 (OP. 5C)	
	Composite	TEKTRONIX 1751/1781/1765 (OP. 5C)	with SCH meter
Picture Monitor			
Audio Signal Generator		HP 8904	
Audio Level Meter		HP 3400A	
Frequency Counter		ADVANTEST TR5821AK	
Digital Voltmeter		ADVANTEST TR6645	

SECTION 4 MAINTENANCE MENU

This equipment provides the maintenance menu which is necessary when performing maintenance.

The maintenance menu consists of some levels. Checks, settings and adjustments are performed by moving in these levels. Contents of the maintenance menu are displayed on the video monitor which is connected with VIDEO OUTPUT 2 connector and time counter.

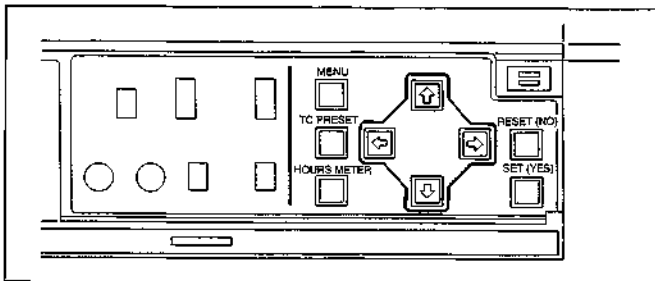
() ...time counter display/ * ...UVW-1800 only

Menu Level 1	Menu Level 2	Menu Level 3
MENU DATA CONTROL (MENU CNT)	MENU STATUS DISPLAY (>MENU STA) SAVE MENU DATA (>Save MENU) LOAD MENU DATA (>Load MENU)	---
* EDIT CHECK (EDIT Check)	* VIDEO INSERT (>VIDEO INS) * A1 INSERT (>A1 INS) * A2 INSERT (>A2 INS) * TC INSERT (>TC INS) * ASSEMBLE (>ASSEMBLE)	---
SERVO CHECK (SV Check)	SENSOR CHECK (>Sensor)	* CASSETTE ID (>>Cass-ID) CASS-COMPARTMENT (>>Cass-COM) TAPE TOP/END (>>Top/End) HUMID (MOISTURE) (>>HUMID) REC INHIBIT (>>REC INHL)
	MOTOR CHECK (>Motor)	S-REEL (>>S-Reel) T-REEL (>>T-Reel) THREADING (>>Threading) CASS-COMPARTMENT (>>Cass-COM) CAPSTAN (>>Capstan) DRUM (>>Drum) REEL POSITION (>>Reel POS.)
	PLUNGER CHECK (>Plunger)	PINCH (>>Pinch) S-REEL BRAKE (>>S-Brake) T-REEL BRAKE (>>T-Brake)
	AUTO CHECK (>Auto)	* WITHOUT A TAPE (>>No tape) WITH A TAPE (>>Tape) WITH ALIGNMENT TAPE (>>Alignment) * WITH A NEW TAPE (>>New tape)
SERVO ADJUST (SV Adjust)	S/T REEL & CAPSTAN (>Reel&Cap) S-REEL ONLY (>S-Reel) T-REEL ONLY (>T-Reel) CAPSTAN ONLY (>Capstan)	---
	TENSION (>Tension)	MAGNET & HOOK POS. (>>Magnet) HOOK POS. (>>HOOK) TENSION (>>Tension)
	RF SWITCHING POSITION (>Switching)	AUTO (>>Auto) MANUAL (>>Manual)

Menu Level 1	Menu Level 2	Menu Level 3
SERVO ADJUST (SV Adjust)	PICTURE SPLITTING (>Splitting)	—
	SAVE/LOAD CONTROL (>Save/Load)	SAVE ADJUSTING DATA (>>Save) LOAD ADJUSTING DATA (>>Load) INITIALIZE (>>Initial)
SERVICE SUPPORT (Support)	ERROR LOG (>Error LOG) ERROR DIAGNOSTICS (>Error DIAG) DEVICE DIAGNOSTICS (>Dev. DIAG) MANUAL EJECT (>Manu. Eject)	—
OTHERS (Others)	SOFTWARE VERSION (>Version) KEYBOARD CHECK (>KY check) CF DATA CHECK (>CF check)	—
	MEMORY DISPLAY (>MEM. check)	SY MEMORY DISPLAY (>>SY MEM.) SV MEMORY DISPLAY (>>SV MEM.)

4-1. OPERATION

Following switches are used so as to execute the maintenance menu.



The MENU/↑/↓/←/→/SET (YES)/RESET (NO) switches on the sub control panel are used.

The maintenance menu consists of some levels. Select an item by moving in these levels.

↑/↓ key Moving in the same level.

←/→ key Moving in the upper or lower level (Ignored if a lower level does not exist).

* Display Monitor : Displayed item is shifted down one column.

Time counter : ">" is displayed on top

} Indicates the level of the menu.

[How to enter the maintenance menu]

1. While pressing the (←) key, press the MENU key.
Then the unit enters into the maintenance menu, and the menu picture is displayed on the monitor.
2. Press the (↑), (↓) keys to select the item to change.
Move the high lighted item to select the item on a monitor display.
3. Press the (→) key as the item to select.
This selects the high lighted item.

[How to close the maintenance menu]

Press the MENU key.

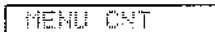
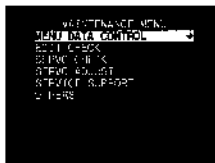
4-2. MENU DATA CONTROL

This item allows SETUP MENU data display and SETUP MENU data save/load.

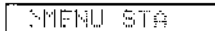
This allows restoring the original setup after maintenance is complete or after ROM version is updated.

(Procedure)

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "MENU DATA CONTROL" on the monitor display using the (↑), (↓) keys.



3. Press the (→) key.
Then "MENU DATA CONTROL" is selected, and the menu of the lower level is displayed.



4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the SET (YES) key at the selected item to display the content of the selected item.
6. Press the (←) key to exit, returning to the menu picture.
7. When closing the maintenance menu, press the MENU key.

MENU STATUS DISPLAY

The contents of the current SETUP MENU data are displayed.

- MENU VERSION : Setup menu version of this unit.
NUMBER OF ITEM : Number of setup menu item.
CHANGED-ITEM : The number of items which are changed from the factory default settings.
DATA CHECK SUM : Data check sum.

SAVE MENU DATA

The user-set setup menu data can be temporarily saved to be used for re-setup at a later time.

1. The current setup menu version is displayed, waiting for the SET (YES) key input.

* Press the RESET or LEFT keys to return to the menu picture.

Press the MENU key to exit the maintenance menu.

2. Press the SET (YES) key.

Memorize the setup menu data to EEPROM.

Confirm that save is performed, and "COMPLETE" is displayed.

Note :

- * The saved setup menu data will not be lost by turning ON/OFF the power, replacing boards or updating the ROM version. But because the saved data is stored in the MS microprocessor, the saved data will be lost when the MS board or the MS microprocessor is replaced.
- * When the setup menu version is revised by updating the ROM version, the following alarm message is displayed. In that case, initialize the SETUP MENU or execute the "LOAD MENU DATA".



>>Menu V0.6



>>Save OK ?



COMPLETE

LOAD MENU DATA

When loading is executed, the saved data is saved as an ordinary setup menu data.

1. The current setup menu and the setup menu version to load are displayed, waiting for the SET (YES) key input.
 - Press the RESET or LEFT keys to return to the menu picture. Press the MENU key to exit the maintenance menu.



>>Load OK ?

2. Press the SET (YES) key.
Memorize the setup menu data to EEPROM.
Confirm that load is performed, and "COMPLETE" is displayed.



Complete!!

In case of NG

If the setup menu data has not been saved yet, or the saved menu has trouble, the load operation will not start.

4-3. EDIT CHECK

This item allows check of edit function without using a remote controller, and so on.

[Procedure]

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "EDIT CHECK" on the monitor display using the (↑), (↓) keys.



EDIT Check

3. Press the (→) key. Then "EDIT CHECK" is selected, and the menu of the lower level is displayed.



>VIDEO INS

4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the SET (YES) key at the selected item to display the content of the selected item.
6. Press the (←) key to exit, returning to the menu picture.
7. When closing the maintenance menu, press the MENU key.

VIDEO INSERT

When the REC and PLAY keys are pressed at the same time, the VIDEO INSERT mode is entered.

A1 INSERT

When the REC and PLAY keys are pressed at the same time, the AUDIO CH-1 INSERT mode is entered.

A2 INSERT

When the REC and PLAY keys are pressed at the same time, the AUDIO CH-2 INSERT mode is entered.

TC INSERT

When the REC and PLAY keys are pressed at the same time, the CODE INSERT mode is entered.

ASSEMBLE

When the REC and PLAY keys are pressed at the same time, the ASSEMBLE mode is entered.

4-4. SERVO CHECK

Servo system is checked automatically or semiautomatically in this item.

[Procedure]

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "SERVO CHECK" on the monitor display using the (↑), (↓) keys.



> Servo Check

3. Press the (←) key. Then "SERVO CHECK" is selected, and the menu of the lower level is displayed.

4. Move the high lighted item to the item to select, using the (↑), (↓) keys.

5. Press the (→) key.
Then the menus of the lower level are displayed.

6. Move the high lighted item to the item to select, using the (↑), (↓) keys.

7. Press the (→) key, and execute the high lighted item.
(Refer to each page of menu item about a method of check.)

8. When check is finished, press the MENU key to return to the menu picture.

Or, press the (←) key to return to the MENU key.

9. If there are other menus or sub menus wishing to be checked, repeat steps 4 to 8

10. When closing the maintenance menu, press the MENU key.



> Sensor

Note: When the MENU key is pressed in executing the check, the check is ended by force. Then, the monitor returns to the menu picture.



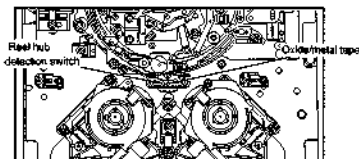
>> Cass-ID

SENSOR CHECK

The items of the "SENSOR CHECK" are explained here.

(1) CASSETTE ID

This mode checks the cassette detection switch.



1. Press the reel hub detection switch with finger and so forth.

Confirm that * is displayed on the "1" which is in the monitor.

2. Press the oxide/metal tape detection switch with finger and so forth.

Confirm that * is displayed on the "2" which is in the monitor.

In case of NG

If * isn't display on the appointed number, check the sensor on the MS-99 board.

```
MAIN MENU MENU
SERVO CHECK
SENSOR CHECK
CASSETTE ID
CASS. COU. SW. 1
TAP. METAL 2
R-DETECT 1
R-DETECT 2
```

```
>> Cass-ID
```

```
SERVO CHECK MENU
CASSETTE SW
SW1: LARGE SMALL HUB
SW2: METAL OXIDE TAPE
1 *
0-DETECT 1 2-DETECT
CANCEL : MENU KEY
```

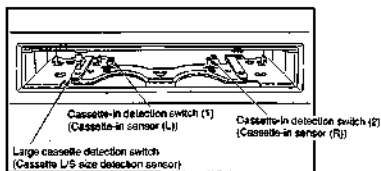
```
CHECKING
```

```
SERVO CHECK MENU
CASSETTE SW
SW1: LARGE SMALL HUB
SW2: METAL OXIDE TAPE
1 *
0-DETECT 1 2-DETECT
CANCEL : MENU KEY
```

```
SERVO CHECK MENU
CASSETTE SW
SW1: LARGE SMALL HUB
SW2: METAL OXIDE TAPE
1 *
0-DETECT 1 2-DETECT
CANCEL : MENU KEY
```


(2) CASSETTE-COMPARTMENT

This item checks the Cassette Compartment switch.



1. Press the cassette-in detection switch (1) (cassette-in sensor (L)) by hand and so on.

Confirm that * is displayed on the "1" which is in the monitor.

2. Press the cassette-in detection switch (2) (cassette-in sensor (R)) by hand and so on.

Confirm that * is displayed on the "2" which is in the monitor.

3. Press the cassette-in detection switch (3) (cassette L/S size detection sensor) by hand and so on.

Confirm that * is displayed on the "3" which is in the monitor.

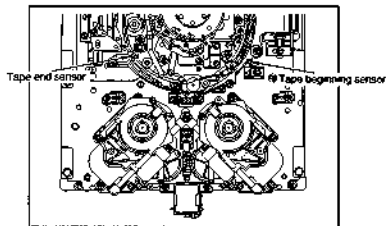
In case of NG

If * isn't displayed on the appointed number, check the sensor on the PTC-62 board and the sensor input circuit (MS-39 board).



(3) TAPE TOP/END

This item checks the tape beginning/end sensor.



1. Draw a screwdriver up to the tape beginning sensor.
Confirm that "TOP SENSOR: OFF" which is in the monitor changes into "TOP SENSOR: ON!"



2. Draw a screwdriver up to the tape end sensor.
Confirm that "END SENSOR: OFF" which is in the monitor changes into "END SENSOR: ON!"

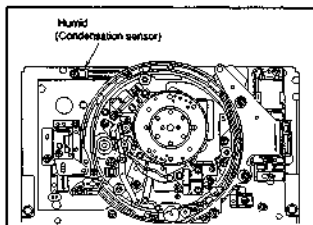


In case of NG

If "OFF" does not change into "ON!", check that the tape beginning/end sensor is normal or not, individually. And check the tape beginning/end sensor circuit (DR-214 board).

(4) HUMID (MOISTURE)

This item checks the humid (condensation) sensor.



1. Touch the humid (moisture) sensor softly with a wet applicator.
Confirm that "DRY" which is in the monitor picture changes into "WET!".

2. Mop the moisture of the humid (moisture) sensor with a dry applicator, or blow the sensor with a blower to evaporate.
Confirm that "WET!" which is in the monitor picture changes into "DRY!"

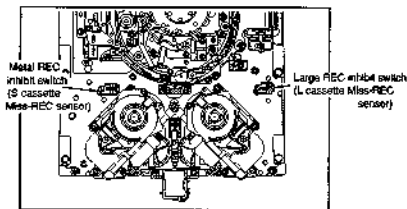
In case of NG

If "DRY" does not change to "WET!" when the humid sensor is damped, check that condensation sensor is normal or not, individually. And check the humid sensor amplifier (SS-59 board).



(5) REC INHIBIT

This item checks the REC inhibit switch.



- 1 Press the metal REC inhibit switch (S cassette MISS-REC sensor).

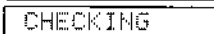
Confirm that * is displayed on the "1" which is in the monitor.

- 2 Press the large REC inhibit switch (L cassette MISS-REC sensor).

Confirm that * is displayed on the "2" which is in the monitor.

In case of NG

If * is not displayed on the appointed number, check the sensor on the MS-39 board.



(3) THREADING

This item checks the threading motor and threading-end/unthreading sensor.

1. After selecting the SET (YES) key, keep pressing the (↑) key to rotate the motor in the FWD direction. Confirm that threading takes place and "THREAD END" is displayed on monitor.

```
SEPCO CHECK MODE
THREADING MOTOR

*** THREAD END ***

THREADING : [↑] KEY
UN-THREADING : [↓] KEY

CANCEL : MENU KEY
```

CHECKING

2. Keep pressing the (↓) key to rotate the motor in REV direction. Confirm that the threading ring is unthreaded and "UNTHREAD END" is displayed.

```
SEPCO CHECK MODE
THREADING MOTOR

*** UN-THREAD END ***

THREADING : [↑] KEY
UN-THREADING : [↓] KEY

CANCEL : YES KEY
```

CHECKING

In case of NG

If the threading motor does not rotate, "....." is displayed on the monitor after finishing threading, or "UNTHREAD END" is not displayed on the monitor after finishing unthreading, confirm that whether the threading motor (DR-214 board), driver circuit (SS-53 board) and sensor on the PTC-66 board are normal or not. Also, check the loading FG amplifier circuit (DR-214 board), and sensor (PTC-67 board).

```
SEPCO CHECK MODE
THREADING MOTOR

*** UN-THREAD END ***

THREADING : [↑] KEY
UN-THREADING : [↓] KEY

CANCEL : MENU KEY
```

CHECKING

```
SEPCO CHECK MODE
THREADING MOTOR

THREADING : [↑] KEY
UN-THREADING : [↓] KEY

CANCEL : MENU KEY
```

CHECKING

(4) CASS-COMPARTMENT

This item checks the cassette compartment motor.

Press the SET (YES) key.

Press the (←) key.

Compartment goes down.

Confirm that cassette compartment goes up when pressing the (→) key.

(Compared with going case, the display on the monitor changes in the reverse order.)

In case of NG

If the display on the monitor doesn't change, check the cassette compartment motor and the sensor input circuit (MS-39 board).



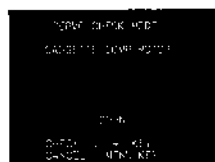
CHECKING



CHECKING



CHECKING



CHECKING

(5) CAPSTAN

This item checks the capstan motor.

Press the SET (YES) key.



1. Press the (←) key.

Confirm that "FORWARD...OK" is displayed on the monitor.



2. Press the (←) key again.

Confirm that "REVERSE...OK" is displayed on the monitor.



In case of NG

If the display on the monitor doesn't change, check the capstan motor and the capstan motor driver circuit (DR-214 board and SS-53 board).

(6) DRUM

This item checks of the drum motor.



CHECKING

After selecting the SET (YES) key,

SPEED : Confirm that the display on the monitor changes into "OK".

PHASE : Confirm that the display on the monitor changes into "LOCK".

PG : Confirm that the display on the monitor changes into "EXIST".



CHECKING

In case of NG

If the display on the monitor doesn't change, check the drum motor, drum motor driver circuit, drum FG amplifier circuit, and drum PG amplifier circuit (DR-214 board and SS-53 board).

(7) REEL POSITION

This mode checks the reel position motor and the reel L/S position sensor.



After selecting the SET (YES) key, and press the (→) key. Confirm that the reel tables moves S-position to L-position, and the display changes.



In case of NG

If the reel table does not move and the display on the monitor does not change, check the reel shift motor, reel L/S position sensor (MS-39 board) and reel position motor driver circuit (DR-214 board).

PLUNGER CHECK

The items of the "PLUNGER CHECK" are explained here.



>> Pinch

(1) PINCH

This mode checks the pinch roller solenoid.

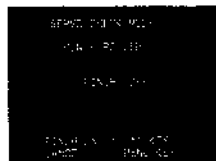
When selecting the SET (YES) key, threading takes place and the pinch solenoid is activated.

When selecting the MENU key, the pinch solenoid is released and unthreading takes place.

And the monitor returns to the menu screen.



CHECKING



(2) S-REEL BRAKE

This item checks of the S reel brake solenoid.

1. Press the SET (YES) key.
S-reel brake solenoid is activated.
2. Press the MENU key.
Then S-reel brake solenoid is released.
And the monitor returns to the menu screen.

In case of NG

If the S brake solenoid does not make the actuating sound, and monitor does not change, check the S-reel brake solenoid and its driver circuit (DR-214 board and MS-39 board).



(3) T-REEL BRAKE

This mode checks of the T reel brake solenoid.

1. Press the SET (YES) key.
T-reel brake solenoid is activated.
2. Press the MENU key.
Then T-reel brake solenoid is released.
And the monitor returns to the menu screen.

In case of NG

If the T brake solenoid does not make the actuating sound, and monitor does not change, check the T-reel brake solenoid and its driver circuit (DR-214 board and MS-39 board).



AUTO CHECK

- (1) WITHOUT A TAPE
- (2) WITH A TAPE
- (3) WITH A ALIGNMENT TAPE
- (4) WITH A NEW TAPE

* This menu is Factory use.

6. Move the high lighted item to the item to select, using the (↑), (↓) keys.
7. Press the (→) key, and execute the high lighted item.
(Refer to each page of item about a method of adjustment.)
8. When adjustment is finished, press the MENU key to return to the menu picture.
Or, press the (←) key to return to the MENU key.
9. If there are other items wishing to be checked, repeat steps 4 to 8.
10. When all the checks are performed, the adjustment data is saved in EEPROM by executing the "SAVE/LOAD CONTROL".

Note : When one item of adjustment is completed, the adjustment data can be saved in EEPROM by executing the "SAVE/LOAD CONTROL". When items of more than two adjustments are completed, the adjustment data can be saved in EEPROM by executing the "SAVE/LOAD CONTROL".
Never turn off the power in the adjustment. If the power is turned off in the adjustment, the adjustment data will be erased.

11. When closing the maintenance menu, press the MENU key.

Note : When the MENU key is pressed in executing the check, the check is ended by force. Then, the monitor returns to the menu picture.

S/T REEL & CAPSTAN

Adjustment related to S-reel, T-reel and capstan are performed automatically.

Confirm that adjustment is performed, and "COMPLETE" is displayed.

Items of adjustment

- s reel fg check
- s reel offset/friction
- s reel torque
- t reel fg check
- t reel offset/friction
- t reel torque
- capstan fg duty
- capstan free speed

In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the reel FG amplifier circuit and the reel motor driver circuit, the capstan motor driver circuit and the capstan FG amplifier circuit (DR-214 board, SS-53 board).



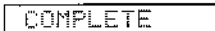
COMPLETE

S-REEL ONLY

Adjustment related to S-reel are performed automatically.
Confirm that adjustment is performed, and "COMPLETE" is displayed.

Items of adjustment

- s reel fg check
- s reel offset/friction
- s reel torque



In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the reel FG amplifier circuit and the reel motor driver circuit (DR-214 board, SS-53 board).

T-REEL ONLY

Adjustment related to T-reel are performed automatically.
Confirm that adjustment is performed, and "COMPLETE" is displayed.

Items of adjustment

- 1 reel fg check
- 1 reel offset/brake
- 1 reel torque



In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the reel FG amplifier circuit and the reel motor driver circuit (DR-214 board, SS-53 board).

CAPSTAN ONLY

Adjustment related to capstan are performed automatically.
Confirm that adjustment is performed, and "COMPLETE" is displayed.

Items of adjustment

- capstan fg duty
- capstan free speed



In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check the capstan motor driver circuit (DR-214 board and SS-53 board) and the capstan FG amplifier circuit (SS-53 board).

TENSION

The item "TENSION" are explained here.

(1) MAGNET & HOOK POS

Tension regulator magnet adjustment and hook position adjustment.

* Refer to section 6-37.

(2) HOOK POS

Tension regulator hook position adjustment only.

* Refer to section 6-38.

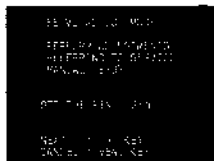
(3) TENSION

Tension adjustment using Tensifemometer.

* Refer to section 6-36.



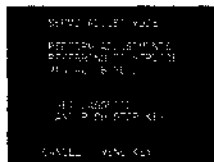
>Magnet



ADJUSTING



ADJUSTING



ADJUSTING

RF SWITCHING POSITION

The sub menus of the "RF SWITCHING POSITION" are explained here.

(1) AUTO

This mode adjusts the RF switching position automatically. Insert an alignment tape CR2-1B, and press the play button.

Note : Be sure to use the alignment tape CR2-1B.
Do not use other alignment tape.

Confirm that adjustment is performed, and "COMPLETE" is displayed.

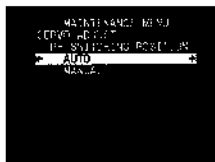
The cassette tape eject automatically.

In case of NG

If "ADJUST INCOMPLETE" and contents of the trouble are displayed on the monitor. In this case, check that the playback alignment tape was CR2-1B or not. And check the DO pulse circuit.

(2) MANUAL

This mode adjusts the RF switching position manually.
* Refer to section 7-13.



AUTO



SET ALIGNMENT TAPE CR2-1B
AND PUSH PLAY KEY.

CANSEL : MENU KEY

ADJUSTING



ADJUST MENU : (X) KEY

COMPLETE

PICTURE SPLITTING

This mode adjusts the picture splitting.

Note: This mode is performed only when the picture splitting large specially.
(If more than 1.5 μ sec., or more than 1/5 of a color bar width)

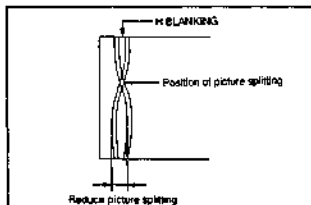
1. Connect the video monitor to TP201 on the VP-43 board using the clip cable.

* Set the monitor as following.

- H DELAY
- APC FAST
- INT SYNC

Note: It is impossible to observe picture splitting with the video monitor which captured the H sync strongly by the AFC circuit in the monitor.

2. Make adjustment according to the instruction shown on screen.



SCREEN ADJUST MODE

PICTURE SPLITTING

PERFORM ADJUSTMENTS
DEPENDENT TO SERVICE
MANUAL (4-25).

RTT
ALIGNMENT TAPE (RPH-H
AND PUSH PLAY KEY)

CANCEL - MENU KEY

ADJUSTING

SCREEN ADJUST MODE

PICTURE SPLITTING

PERFORM ADJUSTMENTS
DEPENDENT TO SERVICE
MANUAL (4-25).

RTT
ALIGNMENT TAPE (RPH-H
AND PUSH PLAY KEY)

CANCEL - MENU KEY

ADJUSTING

SCREEN ADJUST MODE

PICTURE SPLITTING

PERFORM ADJUSTMENTS
DEPENDENT TO SERVICE
MANUAL (4-25).
ALIGNMENT TAPE (RPH-H
AND PUSH PLAY KEY)

NEXT - MENU KEY
CANCEL - MENU KEY

ADJUSTING

SCREEN ADJUST MODE

PICTURE SPLITTING

PERFORM ADJUSTMENTS
DEPENDENT TO SERVICE
MANUAL (4-25).
ALIGNMENT TAPE (RPH-H
AND PUSH PLAY KEY)

NEXT - MENU KEY
CANCEL - MENU KEY

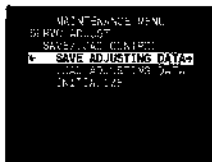
ADJUSTING

3. Confirm that adjustment is performed and "COMPLETE" is displayed.



SAVE/LOAD CONTROL

The sub menus of the "SAVE/LOAD CONTROL" are explained here.



>>Save

(1) SAVE ADJUSTING DATA

Save the adjustment data in EEPROM.
Confirm that Save is performed, and "COMPLETE" is displayed.

Note : After adjustment is completed, make sure to save in this mode.



(2) LOAD ADJUSTING DATA

Load the adjustment data in EEPROM.
Confirm that Load is performed, and "COMPLETE" is displayed.



(3) INITIALIZE

Perform this item only when either MS-39 board or microcomputer on the MS-39 board is exchanged.
Load the initial data of adjustment data from ROM.
Load the initial data of the adjustment data from ROM.
Confirm that Initialize is performed, and "COMPLETE" is displayed.



COMPLETE

4-6. SERVICE SUPPORT

This item has the function to display and diagnose the errors and the error codes that have occurred in the past and also the function to diagnose the devices.

[Procedure]

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "SERVICE SUPPORT" on the monitor display using the (↑), (↓) keys.



Support

3. Press the (→) key.
Then "SERVICE SUPPORT" is selected, and the menu of the lower level is displayed



>Error LOG

4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the (→) key.
Then the menus of the lower level are displayed.
6. Move the high lighted item to the item to select, using the (↑), (↓) keys.
7. Press the (→) key, and execute the high lighted item.
(Refer to each page of item about a method of check.)
8. When check is finished, press the MENU key to return to the menu picture.
9. If there are other items wishing to be checked, repeat steps 4 to 3.
10. When closing the maintenance menu, press the MENU key.

ERROR LOG

This displays the errors that have occurred in the past in this model.

(Maximum eight errors are displayed from the most recent one.)



Select the SET (YES) key, and contents of the trouble are displayed on the monitor.



* The error occurred most recently is displayed on the top.

Note : The errors of servo system are memorized. ERROR-91, 92, 93 and 94 are not memorized.

ERROR DIAGNOSTICS

In this item, error number is displayed.

```
MAIN MENU
SERVING SUPPORT
ERROR SUPPORT
ERROR 00
← ERROR-00-000 →
ERROR-00-000
ERROR-00-001
ERROR-00-002
ERROR-00-003
ERROR-00-004
ERROR-00-005
ERROR-00-006
ERROR-00-007
ERROR-00-008
```

Select the SET (YES) key, and contents of the trouble are displayed on the monitor.

```
MAIN MENU
SERVING SUPPORT
ERROR SUPPORT
ERROR 00
ERROR-00-000
ERROR-00-001
ERROR-00-002
ERROR-00-003
ERROR-00-004
ERROR-00-005
ERROR-00-006
ERROR-00-007
ERROR-00-008
MAIN MENU
```

DEVICE DIAGNOSTICS

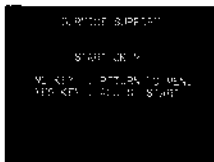
* This menu is Factory use.
DIAGNOSTICS is not supported.

MANUAL EJECT

The operating method to take out the tape when the normal EJECT is impossible is displayed.

Select the SET (YES) key, and the "MANUAL EJECT" is entered.

Take out the tape according to the instruction on screen.



4-7. OTHERS

In this item, it is able to check the SOFT version, CF data and display contents of memory, etc.

[Procedure]

1. The unit enters into the maintenance menu.
2. Move the high lighted item to the "SERVO ADJUST" on the monitor display using the (↑), (↓) keys.



Others

3. Press the (←) key.
Then "SERVO ADJUST" is selected, and the menu of the lower level is displayed.



>Version

4. Move the high lighted item to the item to select, using the (↑), (↓) keys.
5. Press the (←) key.
Then the menus of the lower levels are displayed.
6. Move the high lighted item to the item to select, using the (↑), (↓) keys.
7. Press the (←) key, and execute the high lighted item.
(Refer to each page of item about a method of check.)
8. When check is finished, press the MENU key to return to the menu picture.
9. If there are other menus or sub menus wishing to be checked, repeat steps 4 to 8.
10. When closing the maintenance menu, press the MENU key.

SOFTWARE VERSION

Press the (←) key or RESET key to return to the maintenance menu.

PAL	: PAL, For EK
EDITOR	: Recorder and player of EDIT/1800P
FEEDER	: Player of EDIT/1600P
SYSCON	: Version of IC4 on the SS-53 board
SERVO	: Version of IC212 on the SS-53 board
MENU	: Version of initial setup menu



- * The content of display on the time counter can be changed by pressing the (↑) and (↓) keys.
Returns to the maintenance menu using the (←) key or RESET key.

KEYBOARD CHECK

In this mode, it is able to check the key on the keyboard, slide switch and time counter.

1. Press the SET (YES) key, to enter into the KEYBOARD CHECK.

Note: Once a machine enters the KEYBOARD CHECK mode, it cannot exit without turning off the power.

2. The monitor displays settings of all switches on the sub control panel. All dots of the time counter light.



>KY Check



REC

3. If any key is pressed or switch setting is changed, the condition that all displays are lighting is canceled.

Information about the changed switch or the pressed key is displayed.

If two or more switches are pressed at the same time, "DOUBLE KEYIN" is displayed.

* Turn OFF the power to stop this mode.



Double!!

[The symptoms which seem to be defective.]

- ① Display function of the time counter is defective
 - There is a segment which does not light even in the mode of all lamps lighting.
 - There is an abnormally bright or dark segment.
 - When any key is not pressed, no display is expected, but a segment is lighting.
- ② Key enter is defective.
 - Any key is not pressed, but a key name or "DOUBLE" is displayed.
(When key setting is changed, the switch name is kept displayed. This is not trouble.)
 - A key is pressed, but the key name is not displayed.
- ③ Key illumination is defective.
 - A key is pressed, but the key is not illuminated.
 - Any key is not pressed, but a key is illuminated.
- ④ Switch input is defective.
 - A switch setting is changed, but the setting name is not displayed.

CF DATA CHECK

In this mode video signal and CF data is displayed.
Select the appropriate time counter item with the (↑), (↓) keys.

CF data: 0, 1, 2, 3 (field)

- * Due to the display timings, only the even fields are displayed.
- **DIFF OF REF** : Display of field number only is not enough for identification of relative phase relationship. The difference from the REF VIDEO ID is displayed in ().

REF VIDEO ID : The CF field Number of REF video signal
INPUT VIDEO ID : The CF field number of the input VIDEO signal.

The signals other than the composite signal has no CF information.
"0" is displayed.

When the input video signal is the composite signal, the STANDARD/NONSTANDARD information of the input signal is also displayed.
(only on the monitor)

PB VIDEO ID : The signals other than the composite signal has no CF information.

In VIDEO EE mode, the CF field number of the input video signal is displayed.

REC VIDEO ID : The CF field number of the video signal to be recorded on tape during record mode.

TCR VIDEO ID : "0" is displayed. Playback TC signal.

TCG ID : The CF field number of the TC data generated by TC generator.



MEMORY DISPLAY

* This menu is Factory use.

SECTION 5 PERIODIC MAINTENANCE AND INSPECTION

5-1. HOURS METER

The data values of the hours meter are displayed on the monitor and time counter display. Therefore, the hours meter values are not displayed unless power of the unit is turned on. It is recommended to use this hours meter as the reference of the periodic maintenance.

HOURS METER

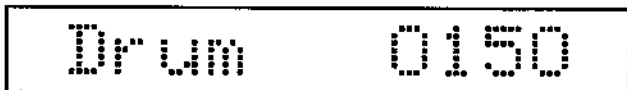


There are 4 display modes in this hours meter, and each mode displays the total hours or total number of the movements. T2, T3 and CT have two types of meters; one meter can be reset and the other can not be reset.

Note : The actual hours or number of the movements are ten times of the displayed number.

Mode	Contents Displayed
T1 : OPERATION	Total hours while the power is turned on.
T2 : DRUM ROTATION	Total hours while the drum is rotating in the thread-end mode.
T3 : TAPE RUNNING	Total hours while the tape is running in each mode of fast forward, rewind, playback, search, recording and editing. (Except for the still picture mode during searching.)
CT : THREADING	Total number of times of threading and unthreading.

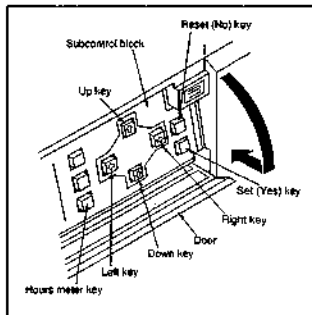
Example : The following indicates that the total hours of drum rotation is 1500 hours in the threading end status.



X10

5-1-1. Hours Meter Display

1. Open the door of the subcontrol block as illustrated in the figure.



2. Press the hours meter key.
3. The monitor screen displays the hours meter values of T1, T2, T3 and CT.
4. The time counter only displays one of T1, T2, T3 or CT. However, it is possible to display the other item's value by pressing the up or down key.
5. In the mode selection of T2, T3 or CT, the hours meter value which can be reset is displayed at first.
6. The hours meter value which cannot be reset is displayed on the right while the right key is held down.

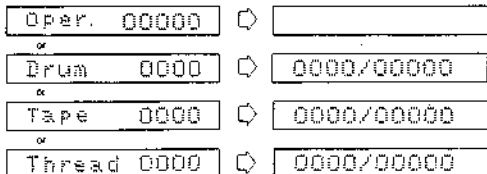
[Monitor Screen]



Note : If the hours meter value exceeds the limit of the display, "-----" will be displayed.

7. Press the hours meter key to return to the initial mode.

[Counter Display]



5-1-2. Hours Meter RESET

1. Turn on the switch S201-1 on the SS-53 board.
(Refer to section 5-1.)
2. Press the hours meter key while holding down the left key.
3. Select the items to be reset with the up or down key.
4. Press the reset key. "0000" appears on the display and flashes.
5. Press the set key. The monitor screen confirms whether it is permitted to reset or not.
6. If it is permitted to reset, press the setkey again to terminate the hours meter display mode.

Precaution : While data is being saved, the following message is displayed.

If the power is turned off while this message is displayed, the unit may not be reset. Do not turn off the power until the message disappears



Reset OK ?

7. Turn off the switch S201-1 on the SS-53 board.
(Refer to section 5-1.)



Savng

5-2. MAINTENANCE AFTER SERVICING UNIT

After servicing the unit, perform the following maintenance regardless of the hours that the unit is used.

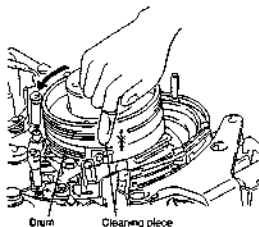
1. Cleaning of the video head or stationary heads.
(For how to clean, refer to sections 5-2-1 and 5-2-2.)
2. Cleaning of the tape contacting surface.
(For how to clean, refer to section 5-2-3.)

Precaution: Insert the cassette tape after the cleaning fluid is completely dried.

5-2-1. Video Head Cleaning

Put the cleaning piece moistened with the cleaning fluid to the head lightly, and slowly rotate the drum manually to clean the head.

Do not move the cleaning piece vertically.



Precaution: Do not move the cleaning piece vertically to the drum rotating direction (vertical direction to the drum) during cleaning.
Turn off the power during cleaning.

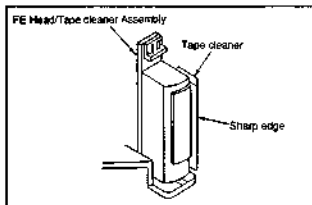
5-2-2. STATIONARY Head Cleaning

Clean the Audio/TC Head, CTL Head and FE Head/Tape cleaner Assembly with the cleaning piece moistened with the cleaning fluid.

5-2-3. Tape Contacting Surface Cleaning

Clean the parts which contact the tape, such as Tape Guides, Upper/Lower Drums, Capstan, Pinch Roller, Tape Cleaner, with the cleaning piece moistened with the cleaning fluid.

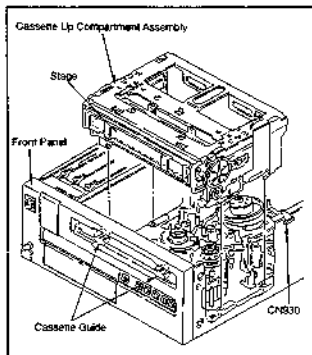
Precaution: When cleaning the tape cleaner, be careful of the sharp edge of the tape cleaner.



5-2-4. Cassette Up Compartment Entrance Cleaning

Clean the cassette guides and their surroundings and the entire stage of the Cassette Up Compartment with the cleaning piece moistened with the cleaning fluid.

Precaution: Before cleaning, remove the Cassette Up Compartment so as not to drop some parts into the unit.



5-3. PERIODIC INSPECTION TABLE

The hours shown in the table are not the period of guarantee. Refer to this table in order to operate the functions and optimum performance of the unit and extend the life of the unit and tapes when planning the maintenance schedule. The time of the parts replacement depends on the environment and condition that the unit is used.

☆ : Replace the parts ◇ : Check (Adjustment)

	Maintenance Parts			Hours Meter	Maintenance Time (H)							Exploded View Page	Remarks				
	Maintenance Item	Parts No.	Q'TY		Display Mode	754	1590	2250	3400	3750	4500		5250	6000	Replacement Procedure	Application/Remarks	
Drum Block	Upper Drum Assembly	A-8260-975-	1	T2	☆	☆	☆	Note 2	☆	☆	☆	Note 2	18-10	Refer to section 6-2.	For UVW-1800P.		
	Upper Drum Assembly	A-8260-979-	1	T2	☆	☆	☆	Note 2	☆	☆	☆	Note 2	18-10	Refer to section 6-2.	For UVW-1600P.		
	Drum Assembly	A-8260-974-	1	T2	—	—	—	—	☆	—	—	—	18-10	Refer to section 6-3.	For UVW-1800P.		
	Drum Assembly	A-8260-976-	1	T2	—	—	—	—	☆	—	—	—	18-10	Refer to section 6-3.	For UVW-1600P.		
Screw Block	Pinch Soleusod	1-434-938-11	1	T2	—	—	—	—	—	—	—	—	☆	18-14	Refer to section 6-17		
	Lining Assembly (S and T)	X-3167-231-	2	T2	—	—	—	◇	—	—	—	—	◇	18-4, 8	Refer to section 6-13	No problem when there is a clearance.	
	Reel Motor (S and T)	1-698-231-11	2	T2	—	—	—	—	—	—	—	—	◇	18-4, 8	Refer to section 6-9.		
	Gear Box Block Lumber Rubber	3-180-653-	1	CT	Replace at 100,000 times							18-6	—				
Tape Roll Block	CTL Head	8-825-554-83	1	T2	—	—	—	◇	—	—	—	—	☆	18-14	Refer to section 6-22.		
	Audio/Time Code Head	8-825-778-91	1	T2	—	—	—	◇	—	—	—	—	◇	18-14	Refer to section 6-24.	For UVW-1600P.	
	Audio/Time Code Head	8-825-778-81	1	T2	—	—	—	◇	—	—	—	—	◇	18-14	Refer to section 6-24.	For UVW-1800P.	
	Cassette Motor	1-698-179-11	1	T2	—	—	—	—	—	—	—	—	☆	18-10	Refer to section 6-21.		
	Pinch Roller Arm Assembly	X-3717-215-	1	T2	☆	☆	☆	☆	☆	☆	☆	☆	☆	18-6	Refer to section 6-15.		
	Tape Threading Guide Assembly	X-3167-224-	1	T2	—	—	—	—	—	—	—	—	—	◇	18-6	Refer to section 6-30.	
	Tape Threading Guide Upper Flange	3-182-340-	1	T2	—	—	—	—	—	—	—	—	—	☆	18-6	Refer to section 6-31.	
	Tension Regulator Roller Assembly	X-3679-851-	1	T2	—	—	—	—	◇	—	—	—	—	◇	18-10	Refer to section 6-35.	
	Tension Regulator Roller Upper Flange	3-677-752-	1	T2	—	—	—	—	—	—	—	—	—	☆	18-10	Refer to section 6-34.	
	Guide Roller Assembly	X-3167-225-	3	T2	—	—	—	—	◇	—	—	—	—	◇	18-6	Refer to section 6-32.	
Cleaning	Cleaning Roller	X-3167-232-	1	T2	☆	☆	☆	☆	☆	☆	☆	☆	☆	18-6	Refer to section 6-26.		
	AT Cleaner	3-182-389-	1	CT	Replace at 100,000 times							18-6	Refer to section 6-25.				
Others	Cassette Up Compartment Linner Rubber	3-181-431-	1	CT	Replace at 200,000 times							18-16	—				

T1 : OPERATION

T2 : DRUM ROTATION

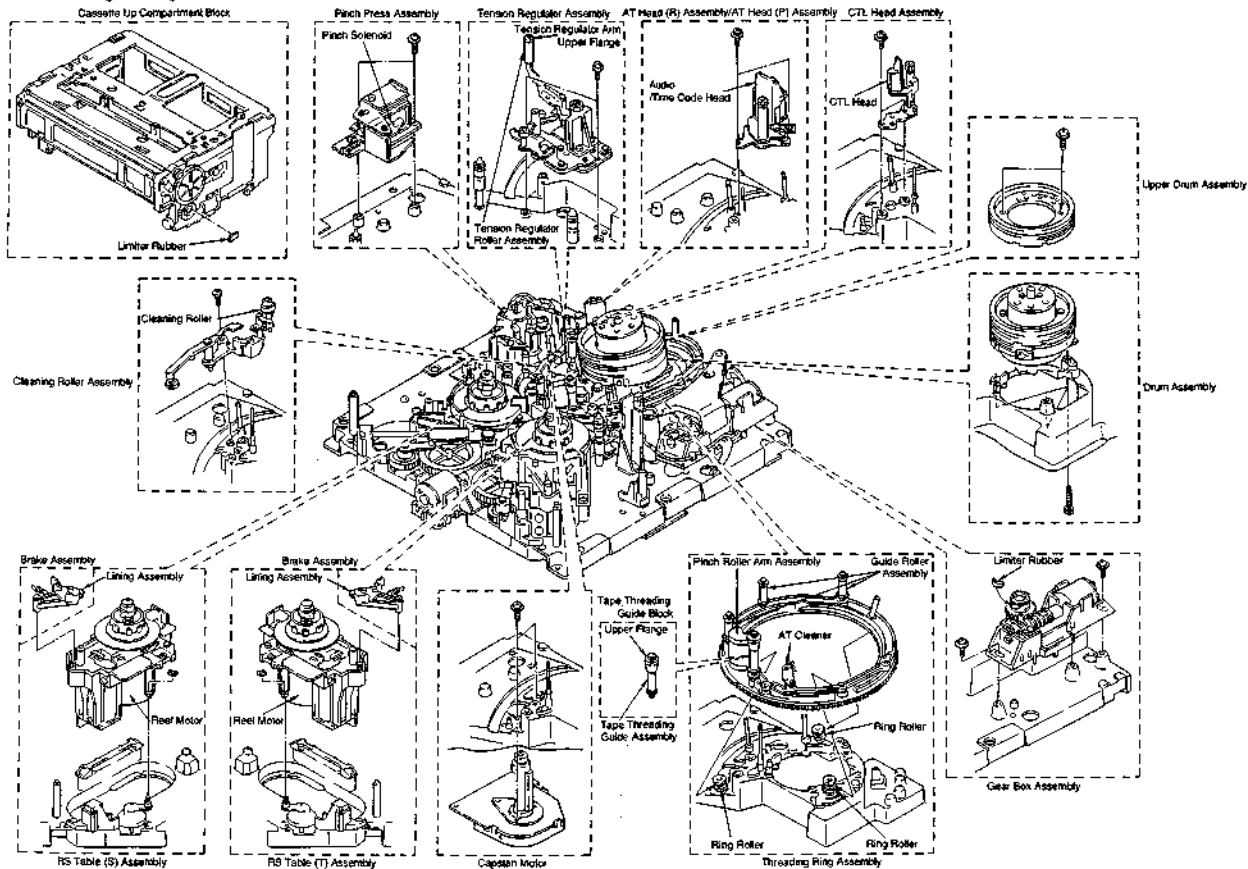
T3 : TAPE RUNNING

CT : THREADING

Note 1 : The life of the heads may be shortened when the unit is used in the place where there is high temperature, humidity or dusty. Therefore, use the unit in an air conditioned room and not in dusty areas. It is recommended to stock the tape at normal temperature and humidity.

Note 2 : When the Drum Assembly is replaced, the Upper Drum Assembly is also replaced.

5-3-1. Maintenance Item Configuration Figure



SECTION 6 REPLACEMENT OF MECHANICAL PARTS

6-1. GENERAL INFORMATION FOR PARTS REPLACEMENT/ADJUSTMENT

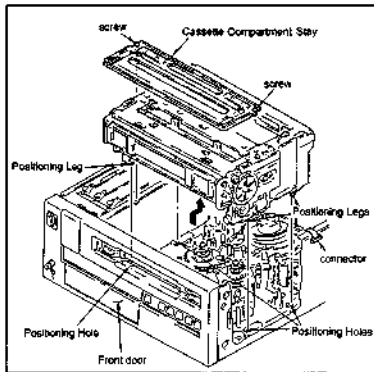
6-1-1. Preparation Before Parts Replacement

1. Use of cassette compartment

When replacing mechanical parts and adjusting the mechanism, remove the cassette compartment from the unit unless otherwise specified.

Cassette compartment removal

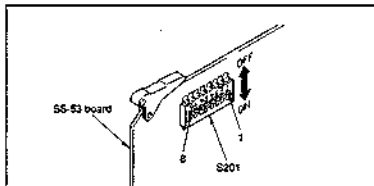
- 1) Remove the top panel.
- 2) Unplug the connectors connected to the cassette compartment.
- 3) Loosen the two screw fixing the cassette compartment stay. The stays have the drop-safe metals of the screws so the screws cannot be removed from the cassette compartment stays.
- 4) Remove the cassette compartment from the unit.



2. How to operate the VTR without cassette compartment.

When the connectors are unplugged from the cassette compartment, the protection circuit works. To operate the VTR without cassette compartment, perform the followings.

- 1) Set the switch S201-4 on the SS-53 board to on. This disables the function of the protection circuit. The VTR can be operated without cassette compartment or without a cassette tape inserted in the unit.
- 2) Set the switch S201-1 on the SS-53 board to on to enter the adjustment mode. Switching of L and S positions of RS table becomes possible.



The procedure for this selection is as follows. Open the front door and press the Right key once to move the RS table to slider S cassette or L cassette position. When pressed again, it returns to the original position.

Precaution : After the adjustment is completed, be sure to set the switches S201-1 and -4 on the SS-53 board to off positions.

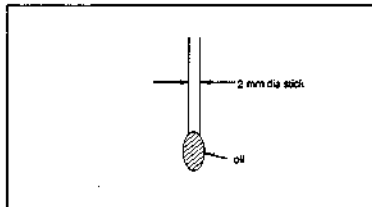
3. Oil

Sony parts no. 7-661-018-18

Use the specified oil for parts replacement and others. Different type of oil has the different viscosity and ingredients. It can cause severe troubles in the unit.

Do not use oil containing dust, etc., that may injure spindles and bearings. It can cause severe troubles. A drop of oil is defined as follows.

The amount of oil on the tip of a stick having 2 mm diameter.



4. Grease

Sony parts no. 7-662-010-04

(grease type SGL-505)

Use the specified grease applied to the movable parts. Different type of grease has the different viscosity and ingredients. It can cause severe troubles in the unit.

Do not use grease containing dust, etc., that may injure spindles and bearings. It can cause severe troubles.

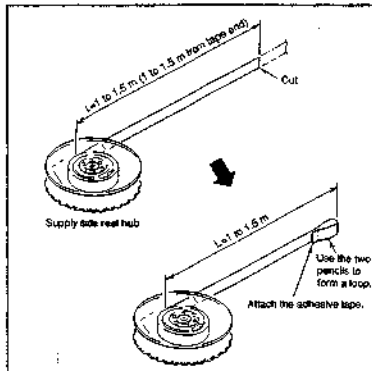
Amount of Grease to Apply

Apply grease so that a thin film is form on the surface.

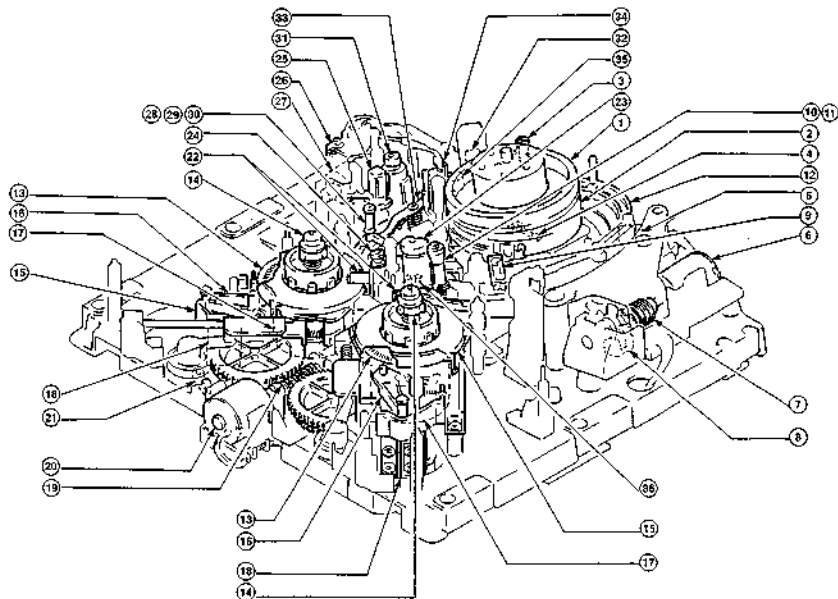
Wipe the extra grease bulged outside the coating surface with soft cloth.

5. Fabricating the Tension Adjustment Tape.

Disassemble the S cassette tape (20 minute or 30 minute use). Obtain the supply side reel hub. Fabricate the tension adjustment tape as shown in the figure. This tape is used for tension measurement.



6-1-2. REPLACEMENT PARTS INDEX



No.	Parts Name	Section No.	Page	Exploded View Page
1	Upper Drum	6-2	6-3	18-10
2	Drum Assembly	6-3	6-8	18-10
3	Guide Roller Assembly (three points)	6-32	6-64	18-6
4	Guide Shaft Grounding Assembly	6-4	6-12	18-10
5	Ring Position Detecting Element (PTC-68 M's)	6-28	6-60	18-10
6	Gear Box Motor	6-18	6-44	18-6
7	Worm Gear (gear box)	6-19	6-47	18-6
8	Gear Box Motor Rotation Detecting Element (PTC-67 M's)	6-20	6-49	18-6
9	AT Cleaner	6-25	6-57	18-6
10	Tape Threading Guide	6-30	6-62	18-6
11	Tape Threading Guide Upper Flange	6-31	6-63	18-6
12	Threading Ring Assembly	6-33	6-65	18-6
13	Reel Disc (S, T)	6-7	6-18	18-4, 8
14	Reel Table Assembly	6-5	6-13	18-4, 8
15	RS Table (S, T) Assembly	6-8	6-20	18-4, 8
16	Brake Lining Assembly (S, T)	6-13	6-24	18-4, 8
17	Reel Motor (S, T)	6-9	6-25	18-4, 8
18	Brake Solenoid (S, T)	6-14	6-38	18-4, 8
19	Worm Gear (LS motor)	6-11	6-32	18-8
20	Reel Position Motor	6-10	6-30	18-8
21	Reel Position Detecting Element (PTC-66 M's)	6-12	6-33	18-12
22	Reel Rotation Detecting Element (SE-207 M's)	6-6	6-17	18-4, 8
23	Finch Roller Assembly	6-15	6-39	18-6
24	Ring Roller (three points)	6-29	6-61	18-6
25	FE Head Block/Tape Cleaner Assembly	6-23	6-54	18-14
26	Finch Press Assembly	6-16	6-41	18-14
27	Finch Solenoid	6-17	6-42	18-14
28	Tension Regulator Assembly	6-36	6-70	18-10
29	Tension Regulator Roller Assembly	6-35	6-69	18-10
30	Tension Regulator Arm Upper Flange	6-34	6-68	18-10
31	Capstan Motor	6-21	6-50	18-10
32	Audio/TC Head	6-24	6-55	18-14
33	Roller for Cleaning Roller	6-27	6-59	18-6
34	CTL Head	6-22	6-52	18-14
35	Cleaning Roller	6-26	6-58	18-6
36	Tension Regulator Return Arm Assembly	6-38	6-82	18-10

6-2. UPPER DRUM REPLACEMENT

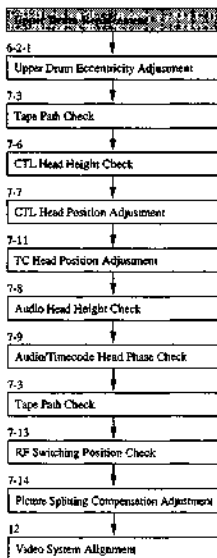
- The Upper Drum is the periodic replacement parts. Replace it referring to the periodic replacement list.
- When the video head has worn out or is damaged, replace the Upper Drum Assembly.
- When the upper drum is removed and a shim is found on the flange, be sure to leave it on the flange. If the shim should be lost or replaced with a thicker one, video head height from the reference plane will be incorrect, resulting in loss of interchangeability.

Tools :

Cleaning piece : 2-034-697-00

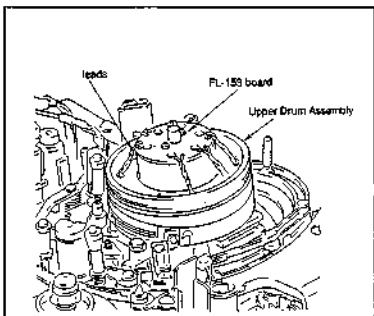
Cleaning fluid : 9-919-573-01

Replacement flow chart



Removal

1. Unsolder the 12 leads (UVW-1800P) or the 8 leads (UVW-1600P) connected to the FL-153 board in the center of the drum.

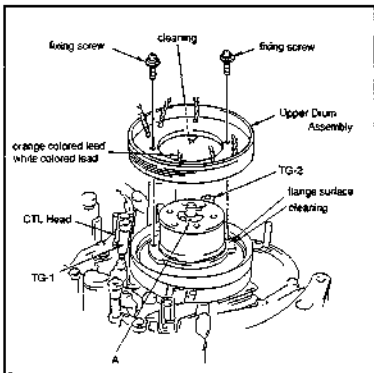


2. Remove the two screws fixing the Upper Drum. Remove the Upper Drum upward paying utmost care not to injure the TG-1 and CTL head. The wooden washers and flar washers are also taken out at the same time.

Precaution 1: When removing the Upper Drum, NEVER contact the Upper Drum with TG-1, TG-2, CTL head and Cleaning Roller.

Installation

3. Clean the Lower Drum flange surface and the contacting surface of the new Upper Drum with cleaning piece moistened with cleaning fluid.
4. While paying utmost care not to contact with TG-1 and CTL head, install the new Upper Drum so that the orange and white leads of the Upper Drum come close to the printed letter "A" on the FL-153 board.



Precaution 1: When installing the Upper Drum on the flange, pay utmost care not to injure the tape running surface of the Upper Drum or the video head.

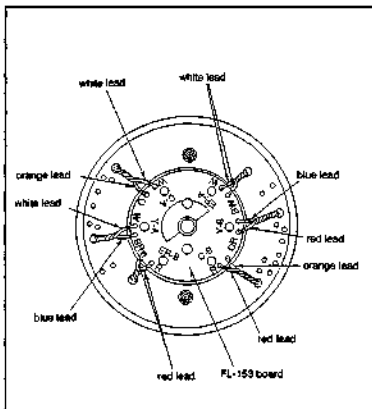
Precaution 2: When installing the Upper Drum on the flange, NEVER contact the Upper Drum with TG-1, TG-2, CTL head and Cleaning Roller.

Precaution 3: When installing the Upper Drum, pay attention not to reverse the mounting position.

5. Solder the 12 or 8 leads of the Upper Drum to the FL-153 board.

Reference :

Markings on FL-153 board	Color of Upper Drum leads
C · A · O	orange
C · A · W	white
Y · A · W	white
Y · A · B	blue
ER-B · R	red (UVW-1800P only)
ER-B · R	red (UVW-1800P only)
C · B · O	orange
C · B · R	red
Y · B · R	red
Y · B · B	blue
ER-A · W	white (UVW-1800P only)
ER-A · W	white (UVW-1800P only)



Adjustment after replacement

6. Perform the Upper Drum Eccentricity adjustment. (Refer to section 6-2-1.)
7. Tape Path Check. (Refer to section 7-3.)
8. Perform the CTL Head Height Check. (Refer to section 7-5.)
9. Perform the CTL Head Position Adjustment. (Refer to section 7-7.)
10. Perform the TC Head Position Adjustment. (Refer to section 7-11.)
11. Perform the Audio Head Height Check. (Refer to section 7-8.)
12. Perform the Audio/Timocode Head Phase Check. (Refer to section 7-9.)
13. Perform the Tape Path Check. (Refer to section 7-3.)
14. Perform the RF Switching Position Adjustment. (Refer to section 7-13.)
15. Perform the Picture Splitting Compensation Adjustment. (Refer to section 7-14.)
16. Perform the video system Alignment. (Refer to section 12.)

6-2-1. Upper Drum Eccentricity Adjustment

- When the Upper Drum is replaced, be sure to perform the Upper Drum eccentricity adjustment.

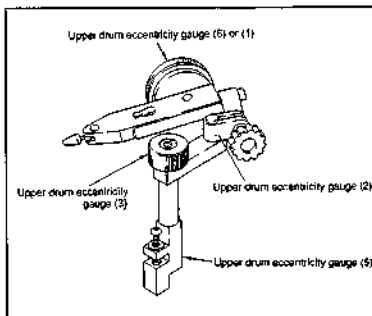
Tools :

Upper drum eccentricity gauge (2)	: J-6001-830-A
Upper drum eccentricity gauge (3)	: J-6001-820-A
Upper drum eccentricity gauge (5)	: J-6087-000-A
Upper drum eccentricity gauge (6)	: J-6325-530-A
	or (1) : J-6001-840-A
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01

Assemble the upper drum eccentricity gauges as shown.

For Reference :

The drum eccentricity gauge (J-6080-038-A) and the dial gauge holder (J-6080-039-A) can be used instead of the upper drum eccentricity gauge (2), (3) and (5).

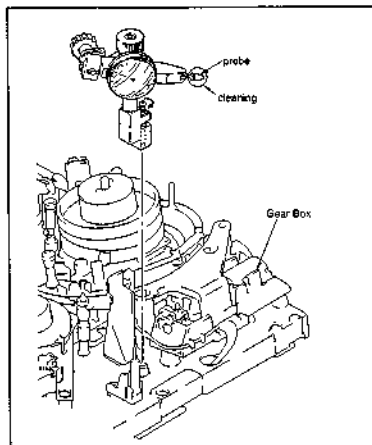


Adjustment procedure

1. Clean the probe of the assembled upper drum eccentricity gauge with cleaning piece soaked with cleaning fluid.

Precaution : If a probe is employed with dust attached to it, it may injure the tape contacting surface of the Upper Drum.

2. Install the assembled eccentricity gauge in the hole on the Chassis near Gear Box.



- Adjust the gauge position so that its probe is positioned about 5 mm from the top edge of the Upper Drum.

Precaution : Pay attention that the probe should not contact the video head.

- Rotate the Upper Drum slowly clockwise. Check that the gauge reading deflection satisfies the specification.

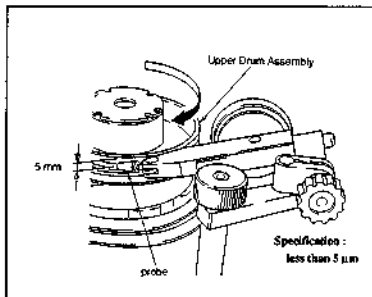
When the specification is satisfied, perform the step (6) and later.

If it does not satisfy the specification, perform the step (5) and later.

- Adjustment required only when the specification is not satisfied.
 - Rotate the Upper Drum slowly clockwise. Check the gauge reading deflection.
 - Rotate the Upper Drum slowly clockwise and stop rotating at the point which gives the maximum deflection.
 - Push the top of the Upper Drum contacting the probe with finger for 1/2 of the deflection. If the deflection will not move, loosen the two fixing screws and then make adjustment. If the deflection moves too easily, tighten the screws.
 - Check again that the specification is satisfied.
- Tighten the two screws alternately. Tightening torque : 0.8N·m (8 kgf·cm).
- Check again that the amount of upper drum eccentricity satisfies the specification.
- Remove the upper drum eccentricity gauge.

Precaution : Pay attention that the probe should not contact the video head.

- Clean the video head and the tape contacting surface of the Upper Drum with cleaning piece soaked by cleaning fluid. After cleaning, wipe the cleaning surface a few times with dry cloth.



6-3. DRUM ASSEMBLY REPLACEMENT

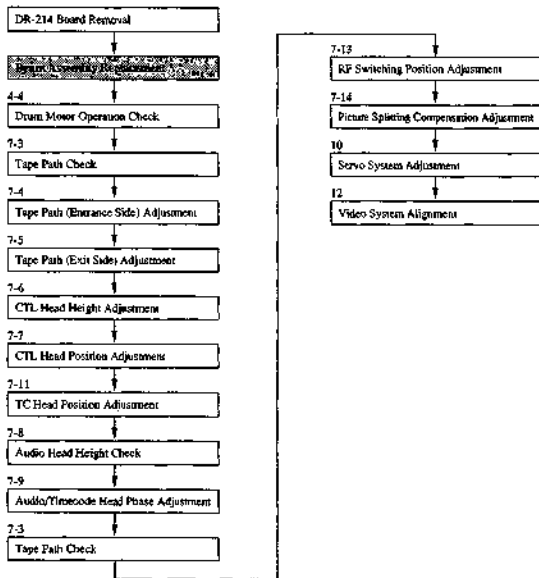
- The Drum Assembly is the periodic replacement parts. It is recommended to replace referring to the periodic replacement table.
- Replace the Drum Assembly in the following cases.
 - (1) When the rubber guide of the lower drum has worn out, and the correct RF envelope cannot be obtained by the tape path adjustment.
 - (2) When the rubber guide or tape contacting surface of the lower drum is injured.
 - (3) When the drum rotation is abnormal and the performance as a VTR cannot be maintained due to noise or jitter.
- The Drum Assembly includes the Upper Drum Assembly. When the Drum Assembly is replaced, the Upper Drum Assembly is also replaced at the same time.

Tools :

Cleaning piece : 2-034-697-00

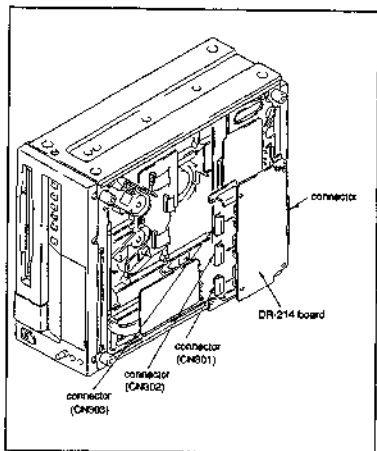
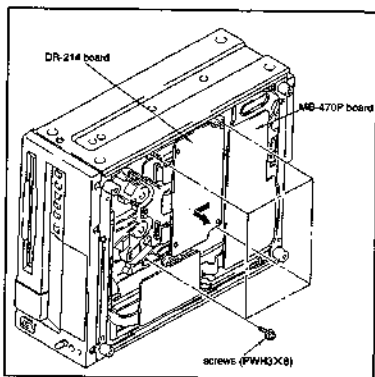
Cleaning fluid : 9-919-573-01

Replacement flow chart



Removal

1. Stand the unit with the left side bottom.
2. Remove the four screws securing the DR-214 board brackets.
3. Unplug the connector connecting the DR-214 And MB-470P boards.
4. Remove the three flexible card wires connected to the DR-214 board. (CN301, CN302, CN303)

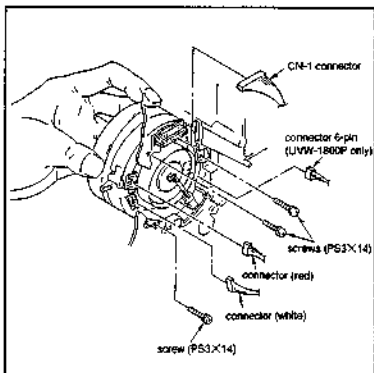


5. Remove the four connectors (UVW-1800P) or the three connectors (UVW-1600P) connected to the Drum Assembly.
6. While holding the Drum Assembly with hand from the front of the unit, remove the three screws securing the Drum Assembly from the rear of the unit.

Precaution 1 : Hold the Drum Assembly so as not to drop it.

Precaution 2 : Pay utmost attention not to injure the guides around the Drum Assembly.

7. Remove the Drum Assembly taking care so that the Drum Assembly does not contact the TG-1, TG-2, CTL head and cleaning roller.



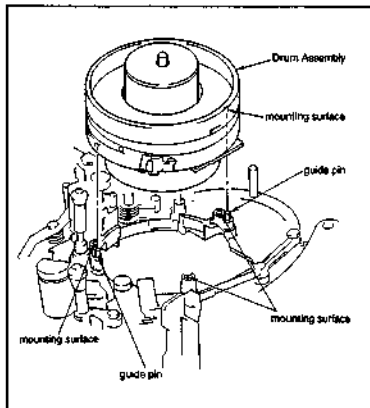
Installation

8. Clean the mounting surface of the new Drum Assembly and the drum mounting surface of the chassis with the cleaning piece soaked with cleaning fluid.
9. Insert a new Drum Assembly in the following procedure. Make sure the Drum Assembly does not come into contact with TG-1, TG-2, CTL Head and Cleaning Roller during the course of Drum Assembly installation. Align the guide holes of the new Drum Assembly to the two guide pins of the chassis. Install the new Drum Assembly to the chassis.

Precaution 1 : Pay utmost care not to injure the tape running surface of the Upper Drum, video head, tape contacting surface and rabbit guide of the lower drum.

Precaution 2 : Pay utmost care not to contact or injure the guides and heads around the drum.

10. Secure the new Drum Assembly with three screws.
11. Insert the connectors of the four (UVW-1800P) or three (UVW-1600P) harnesses to the Drum Assembly having the same colors.
12. Perform the works reversing the steps 4 through 1
13. Clean the tape contacting surface of the Drum Assembly with cleaning piece soaked with cleaning fluid. After cleaning, wipe the cleaned surface a few times with dry cloth.



Adjustment after replacement

14. Perform the Drum Motor operation check
(Refer to section 4-4.)
15. Tape Path Adjustment
(Refer to section 7-3, 7-4, 7-5.)
16. Perform the CTL Head Height Check.
(Refer to section 7-6.)
17. Perform the CTL Head Position Adjustment.
(Refer to section 7-7.)
18. Perform the TC Head Position Adjustment.
(Refer to section 7-11.)
19. Perform the Audio Head Height Check.
(Refer to section 7-8.)
20. Perform the Audio/Timecode Head Phase Check
(Refer to section 7-9.)
21. Perform the Tape Path Check.
(Refer to section 7-3.)
22. Perform the RF Switching Position Check.
(Refer to section 7-13.)
23. Perform the Picture Splitting Compensation Adjustment. (Refer to section 7-14.)
24. Perform the Servo System Adjustment.
25. Perform the Video System Alignment.

6-4. DRUM SHAFT GROUNDING ASSEMBLY REPLACEMENT

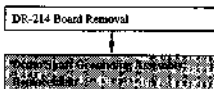
- When the Shaft Grounding Assembly worn out, the white scattered noise may appear on the monitor. Then replace the Shaft Grounding Assembly.
- Do not apply force on the Shaft Grounding Assembly nor bend it forcibly.

Tools:

Cleaning piece : 2-034-697-00

Cleaning fluid : 9-019-573-01

Replacement flow chart



Removal

1. Stand the unit with the left side bottom.
2. Remove the four screws securing the DR-214 board bracket. (Refer to section 6-3.)
3. Unplug the connector connecting the DR-214 And MB-470P boards.
4. Remove the screw fixing the Drum Shaft Grounding Assembly and remove it.

Installation

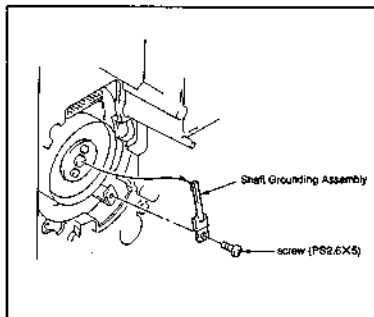
5. Clean the protruding tip at the top of new Drum Shaft Grounding Assembly with cleaning piece moistened with cleaning fluid. After cleaning, wipe the cleaned surface a few times with dry cloth.

Precaution : During cleaning, do not apply force on the Shaft Grounding Assembly nor bend it forcibly.

6. Clean the Shaft Grounding Assembly and its contacting surface of the Drum Assembly with cleaning piece soaked with cleaning fluid.
7. Install the Shaft Grounding Assembly so that the protruding tip at the top of Drum Shaft Grounding Assembly is positioned in the center of the contacting surface on the bottom of the Drum Assembly.

Precaution : During installation, do not apply force on the Shaft Grounding Assembly nor bend it forcibly.

8. Perform the works reversing the steps 3 through 1.



6-5. REEL TABLE ASSEMBLY REPLACEMENT

- The Reel Table Assembly replacement procedure is common to the take-up reel table and supply reel table.

Tools :

Cleaning piece	: 2-034-097-00
Cleaning fluid	: 9-919-573-01
Allen wrench (1.5 mm diagonally)	: 7-700-736-05

Replacement flow chart

6-5-1

Reel Cover Removal

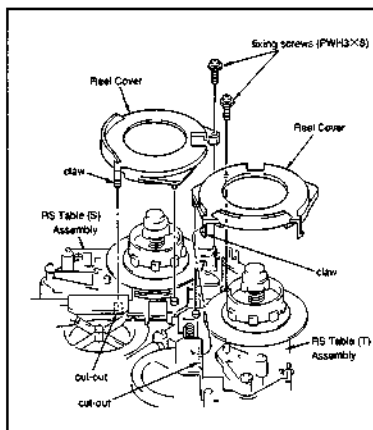
Reel Table Assembly Replacement

6-5-2

Reel Table Height Check/Adjustment

6-5-1. Reel Cover Removal

1. Remove the screw fixing the Reel Cover.
2. Unlock the Reel Cover claw from the out-let of the RS Table (S, T) Assembly. Remove it upward.



Removal

1. As viewed, the Reel Table Assembly from the top, insert a L shaped wrench from the side into the square holes (two points). Loosen the set screws (two points) of the Reel Table.

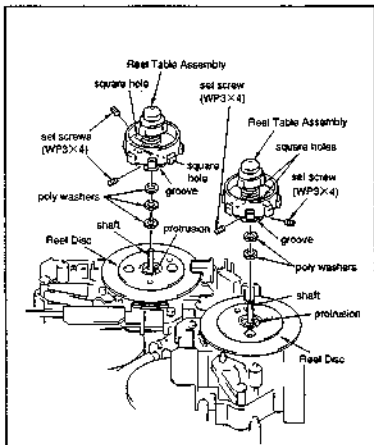
Precaution: Poly slider washers are inserted at the bottom of Reel Table bearing. This is for height adjustment of Reel Table. When removing a reel table, the poly slider washer may adhere to the bottom of the Reel Table. Take care not to lose the poly slider washers.

2. Remove the Reel Table Assembly with finger.
3. Perform the same procedure as the step 1 on the other Reel Table. Loosen the set screw and remove the Reel Table.

Installation

4. Insert a new Reel Table Assembly into the shaft to match the Reel Disc protrusion with the groove of the new Reel Table Assembly.

Precaution: Tighten the set screws of each Reel Table Assembly after reel height is confirmed.



6-5-2. Reel Table Height Check / Adjustment

- When a Reel Motor is replaced or a Reel Table is removed or replaced, perform this item.
- For stable tape run, the supply reel table is positioned 0.25 mm higher than what is adjusted by the reel table height gauge. The take up reel table is positioned 0.13 mm higher than what is adjusted by the reel table height gauge.
- The reel table height adjustment establishes the references of tape path system. Pay utmost attention in this adjustment.

Tools :

Cassette reference plate (L)	: J-6320-680-A
Reel table height gauge	: J-6320-680-A
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
L shaped wrench (across flat has 1.5 mm)	: 7-700-736-05

Check procedure

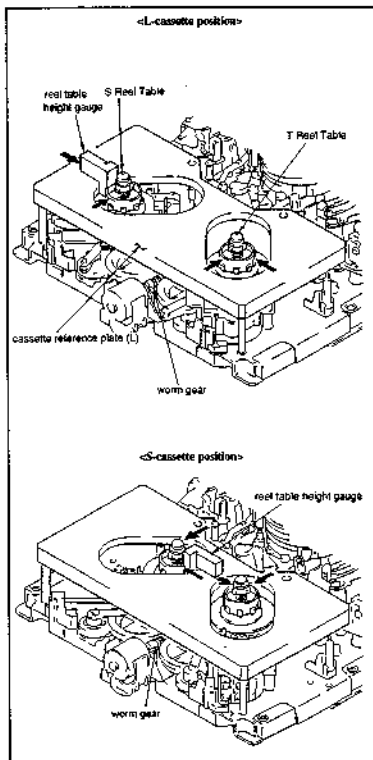
1. Confirm that the machine is in the outthreaded end position.
2. Rotate the worm gear with finger to set the Reel Table in the L-cassette position.
3. Clean the surface of the cassette reference plate (L) with cleaning piece moistened with cleaning fluid.
4. Place the cassette reference plate in the position where a cassette is loaded.
5. Clean the surface of the reel table height gauge with cleaning piece moistened with cleaning fluid.
6. Move the reel table height gauge from the two directions as shown by the arrow toward the supply or take-up reel tables to check that the specifications are satisfied.

Specifications 1 : The * marked portion of the gauge passes the flange of the reel table.

Specifications 2 : The ** marked portion of the gauge is blocked by the flange of the reel table.

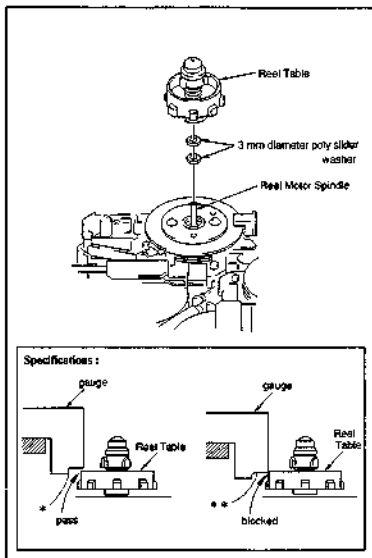
7. Rotate the worm gear with finger to set the Reel Table in the S-cassette position.
8. Perform the step 6 again. Confirm that the specifications are satisfied.

If any of the specification is not satisfied, perform the adjustment shown in step 9 and later until the specifications are satisfied in both L- and S-cassette positions. When the specifications in both L- and S-cassette positions are satisfied, go to step 11 and later.



Adjustment procedure

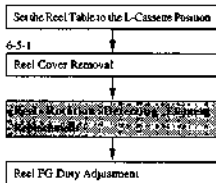
9. Remove the Reel Table.
10. Exchange the poly slider washer inserted in the reel motor spindle. Select combination of appropriate thickness of poly slider washers until the specifications in both L- and S-cassette positions are satisfied.
adjustment poly slider washers (3 mm diameter)
0.13 mm thick : 3-701-439-01
0.25 mm thick : 3-701-439-11
0.5 mm thick : 3-701-439-21
11. After the step 10 is completed, remove the supply reel table once. Add a poly slider washer of 0.25 mm thick under the reel table.
12. After the step 10 is completed, remove the take-up reel table once. Add a poly slider washer of 0.13 mm thick under the reel table.
13. While pushing the supply and take-up reel tables downward, tighten the two reel table fixing screws with L shaped wrench.



6-6. REEL ROTATION DETECTING ELEMENT REPLACEMENT

- The Reel Rotation Detecting Element replacement procedure is common to take-up side and supply side.

Replacement flow chart



Removal

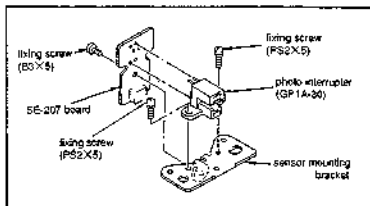
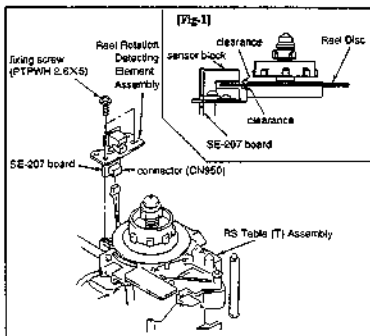
1. Set the Reel Table to the L-cassette position. (Refer to section 6-5.)
2. Remove the reel cover. (Refer to section 6-5-1.)
3. Remove the two screws fixing the Reel Rotation Detecting Element. Remove it not to collapse with the reel disc.
4. Unplug the connector (CN950) which is connected to the Reel Rotation Detecting Element.
5. Remove a screw fixing SE-207 board.
6. Remove the two fixing screws. Remove SE-207 board from the sensor mounting bracket.
7. Unsolder the photo interrupter which is soldered on the SE-207 board.

Installation

8. Connect by soldering the new photo interrupter (GPLA-30) on the SE-207 board.
9. Attach the photo interrupter to the sensor mounting bracket using two screws.
10. Attach the SE-207 board to the sensor mounting bracket using a screw.
11. Confirm that clearance exists between the sensor block and the reel disc. (Refer to Fig-1)

Adjustment after replacement

12. Reel FG Duty Adjustment. (Refer to section 4-5.)



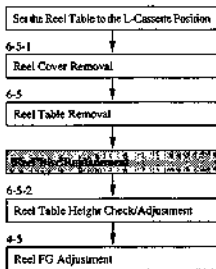
6-7. REEL DISC REPLACEMENT

- When a Reel Disc is injured or deformed, replace the reel disc.
- The Reel Disc replacement procedure is common to take-up side and supply side.

Tools :

L shaped wrench (across flat has 1,5 mm)	: 7-700-736-05
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01

Replacement flow chart



Removal

1. Rotate the worm of the LS motor to set the L-Reel Table to the L-cassette position. (Refer to section 6-5-1.)
2. Remove the reel cover. (Refer to section 6-5-1.)
3. Remove the Reel Table. (Refer to section 6-5.)

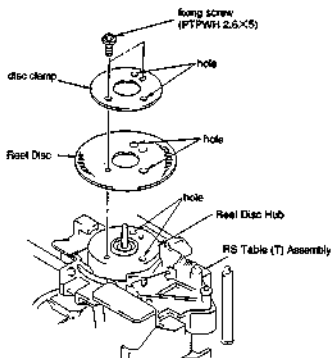
- Remove the two screws fixing the Reel Disc. Remove the Reel Disc from the reel hub.

Installation

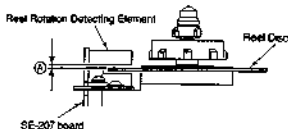
- Install a new Reel Disc onto the reel disc hub together with the disc clamp aligning the holes. Take care not to deform the new Reel Disc during installation.
- Clearance between the Reel Rotation Detecting Element and Reel Disc must satisfy the specifications. (Refer to Fig-1)
- Install the Reel Table. (Refer to section 6-5.)

Adjustment after replacement

- Check the reel height. (Refer to section 6-5.)
- Perform the Reel FG Duty Adjustment. (Refer to section 4-5.)
- Attach the Reel Cover. (Refer to section 6-5-1.)



[Fig-1] Specifications : $\phi 3 \text{ mm} \pm \text{A} \leq 0.7 \text{ mm}$



6-S. RS TABLE ASSEMBLY REPLACEMENT

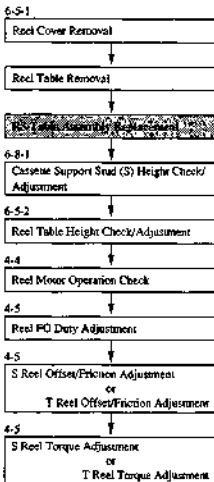
- The Reel Motor Plate replacement procedure is common to take-up side and supply side.

Mode : Unthreaded end condition

Tools :

L shaped wrench (across flats has 1.5 mm)	
	: 7-700-736-05
Grease (SGL-505)	: 7-602-010-04
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01

Replacement flow chart



Removal

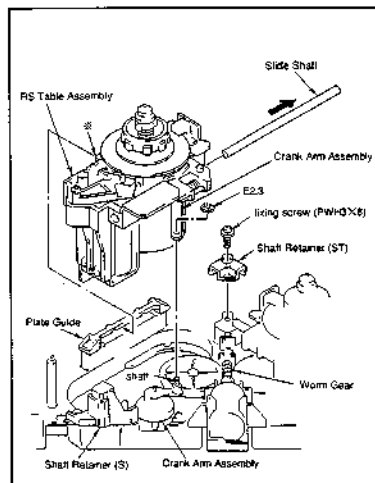
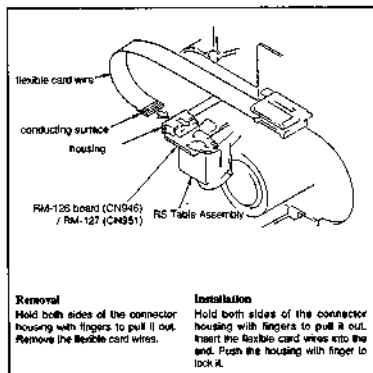
1. Stand the machine in vertical position with its slide in the bottom. Remove the flexible card wire from CN946 (supply side) of RM-126 board or CN951 (take-up side) of RM-127 board of the RS Table Assembly.
2. Return the machine into horizontal position. Rotate the worm gear with flange as shown to move the Reel Table in between the S-cassette and L-cassette positions.
(Rotating clockwise as viewed from front of the machine moves it toward S-cassette position. Rotating counter-clockwise move toward the L-cassette position.)
3. Remove the Reel Cover.
(Refer to section 6-5-1.)
4. Remove the E-rings (E2.3) securing RS Table Assembly and Crank Arm Assembly.
5. Remove the screw as shown to remove the Shaft Retainer (ST).
6. Loosen the two screws securing the Shaft Retainer (S) or (T) to extract the Slide Shaft from the Shaft Retainer (S) or (T).

Precaution : Pay utmost care not to injure the Slide Shaft when extracting the Shaft.

7. Remove the RS Table Assembly and the Slide Shaft together.
8. Push the Slide Shaft in the direction of arrow to remove it from the RS Table Assembly.

Installation

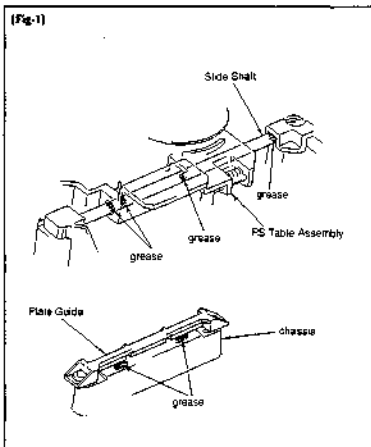
9. Clean the bore of the new RS Table Assembly where the Slide Shaft passes. Clean the area below the * marked portion. Use the cleaning piece soaked with cleaning fluid.
10. Clean the Slide Shafts with the cleaning piece soaked with cleaning fluid.



11. Insert the Slide Shaft into the hole of the RS Table Assembly.
12. Insert the * marked portion of the RS Table between the Plate Guide and chassis. Insert the Slide Shaft between the Shaft Retainer (S) or (T).
13. Fix the opposite end of the Slide Shaft using the Shaft Retainer (ST) and fixing screw. The Slide Shaft is now fixed.
14. Tighten the two screws fixing the Shaft Retainer (S) or (T).
15. Move the RS Table Assembly with finger to the right and left. Check that it moves freely.
16. Fix the arm of the RS Table Assembly onto the Crank Arm Assembly using E-ring.
17. Apply grease on the Slide Shaft and chassis. (Fig-1)
18. Stand the machine in vertical position with the side in the bottom. Insert the flexible card wire to CN946 (supply side) of RM-126 board or CN951 (take-up side) of RM-127 board of the RS Table Assembly.

Adjustment after replacement

19. Perform the Cassette Support Stud (S) Height Check/Adjustment
(Refer to section 6-8-1.)
20. Perform the Reel Table Height Check/Adjustment
(Refer to section 6-5-2.)
21. Install the Reel Cover.
(Refer to section 6-5-1.)
22. Check the Reel Motor operation.
(Refer to section 4-4.)
23. Perform the Reel FG Duty Adjustment.
(Refer to section 4-5.)
24. Perform the S Reel Offset/Friction Adjustment or T Reel Offset Friction Adjustment
(Refer to section 4-5.)
25. Perform the S Reel Torque/T Reel Torque Adjustment
(Refer to section 4-5.)



6-8-1. Cassette Support Stud (S) Height Check/Adjustment

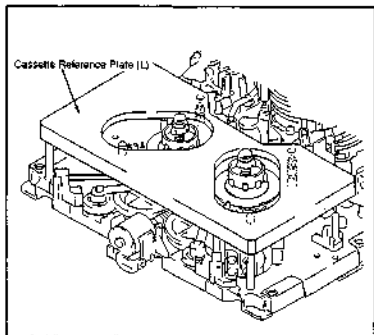
- This item is usually not necessary. When the RS Table Assembly is replaced, be sure to perform this item.

Tools :

Cassette reference plate (L)	: J-6320-880-A
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Adjustment mirror	: J-6090-029-A
L shaped wrench (across flat has 1.5 mm)	: 7-700-736-05

Check procedure

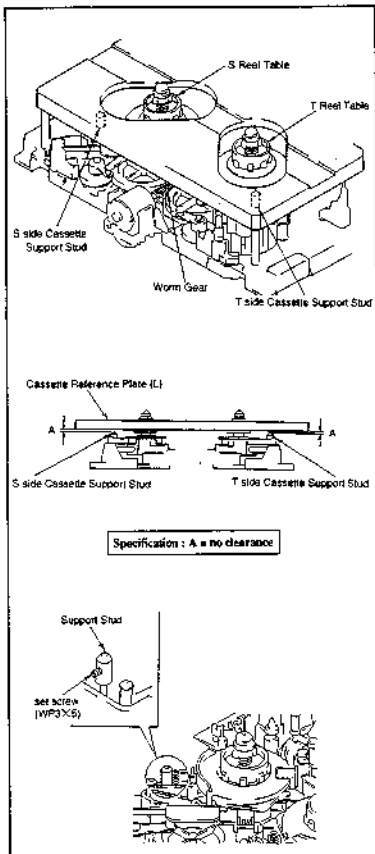
1. Confirm that the machine is in the unthreaded end position.
2. Clean the surface of the cassette reference plate with cleaning piece soaked with cleaning fluid.
3. Place the cassette reference plate (L) in the position where cassette is positioned.



4. Rotate the worm gear with finger so that the Reel Table is positioned in the middle between the S-cassette position and L-cassette position.
(Rotating clockwise as viewed from the front of the machine moves the Reel Table toward the S-cassette position. Rotating counter-clockwise moves toward the L-cassette position.)
Confirm that the S side Cassette Support Stud and the T side Cassette Support Stud are located under the Cassette Reference Plate (L). (The S side Cassette Support Stud and the T side Cassette Support Stud must not be visible from the top of the machine.)
5. Turn the Cassette Reference Plate (L) upside down and place it in the position where cassette is placed.
6. Confirm that there is no clearance between the Cassette Reference Plate (L) and S side Cassette Support Stud, and also between the Cassette Reference Plate (L) and the T side Cassette Support Stud, using Adjustment mirror.
If the specification is not satisfied, perform the following step 7 and later.

Adjustment procedure

7. Loosen the screws fixing the T side Cassette Support Stud/T side Cassette Support Stud, by 1/2 to 1 turn using L shaped wrench.
8. Lift up the S side Cassette Support Stud and the T side Cassette Support Stud to contact with the Cassette Reference Plate (L). Tighten the screw with L shaped wrench.
9. Check that the specification is satisfied.



6-9. REEL MOTOR REPLACEMENT

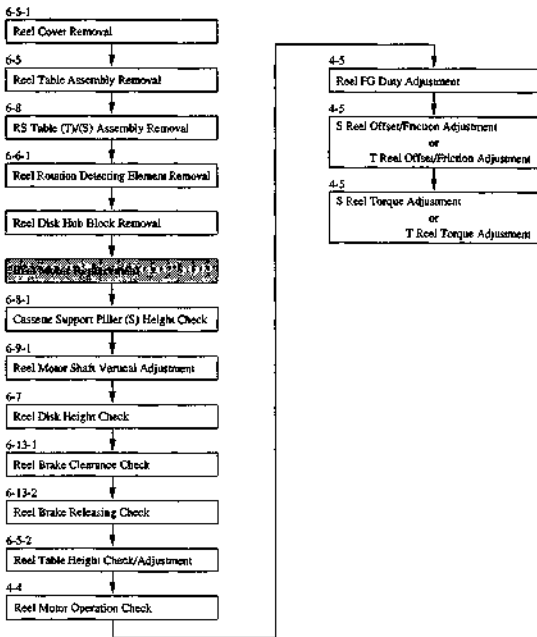
- Replace the Reel Motors on the T side and S side in the same procedure.

Mode : Unthreading end mode

Tools :

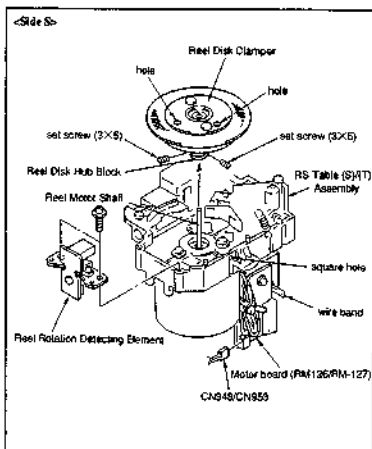
- L shaped wrench (across flat has 1.5 mm) : 7-700-736-03
- Cleaning piece : 2-034-697-00
- Cleaning fluid : 9-919-575-01

Replacement flow chart



Removal

1. Rotate the Worm Gear of the LS Motor manually so that the RS Table Assembly (TMS) is centered between the L and S cassette positions.
(When the gear is turned clockwise as viewed from the front of the unit, the RS Table (T)/(S) Assembly is moved to the S cassette position, and when the gear is turned counterclockwise, the RS Table (TMS) Assembly is moved to the L cassette position.)
2. Remove the Reel Cover.
(Refer to section 6-5-1.)
3. Remove the Reel Table.
(Refer to section 6-5.)
4. Remove the RS Table (TMS) Assembly.
(Refer to section 6-8.)
5. Remove the Reel Rotation Detecting Element.
(Refer to section 6-6-1.)
6. Using the holes (two points) of the Reel Disk Clamp as a guide, put the L shaped wrench into the square hole of the RS Table (TMS) Assembly to turn the two set screws on the Reel Disk Hub Block a 1/2 or 1 rotation and remove the Reel Disk Hub Block from the motor shaft.
7. Cut the wire band.
8. Disconnect the RM-126 (CN948 for RS Table (S) Assembly) or RM-127 (CN953 for RS Table (T) Assembly) connector from the motor board.



9. Remove the three set screws from the Reel Motor Plate Assembly and remove the Reel Motor.

Precaution :

Do not lose the Reel Motor Shaft Vertical Adjustment Spacers when removing the Reel Motor.

When attaching the motor again, restore the same number of Spacers to the same positions, and perform the Reel Motor Shaft Vertical Adjustment. There are two kinds of Spacers which have different thickness.

Installation

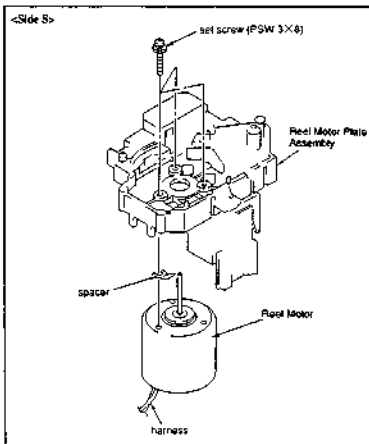
10. Clean the surfaces of the new Reel Motor and Reel Motor Plate Assembly with the cleaning piece moistened with the cleaning fluid.
11. Install the Reel Motor to the Reel Motor Plate Assembly in the direction as illustrated in the figure with three screws.

Precaution :

- Restore the spacers as they were.
 - Tighten the three screws with the same torque.
12. Connect the connector of the Reel Motor Harness to RM-126 (CN948) or RM-127 (CN953).
13. Fasten the Reel Motor harness with another harnesses using the wire band.
14. Install the RS Table (T)(S) Assembly.
(Refer to section 6-8.)

Adjustment after Replacement

15. Check the Cassette Support Pillar (S) Height.
(Refer to 6-8-1.)
16. Perform the Reel Motor Shaft Vertical Adjustment.
(Refer to 6-9-1.)



6-9-1. Reel Motor Shaft Vertical Adjustment

- The procedure of the Reel Motor Shaft vertical adjustments of side S and side T are the same
- Perform this Reel Motor Shaft vertical adjustment whenever the Reel Motor is replaced.
- If this adjustment is not performed properly, the reel tub touches the case in the cassette tape and the noise occurs or the tape may be damaged because the tape is not passed properly.

Mode : Unthreading end mode

Tools :

Cassette reference plate (L)	: J-6320-880-A
Reel motor shaft slantness check jig	: J-6150-960-A
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Wire clearance check gauge	: J-6152-450-A

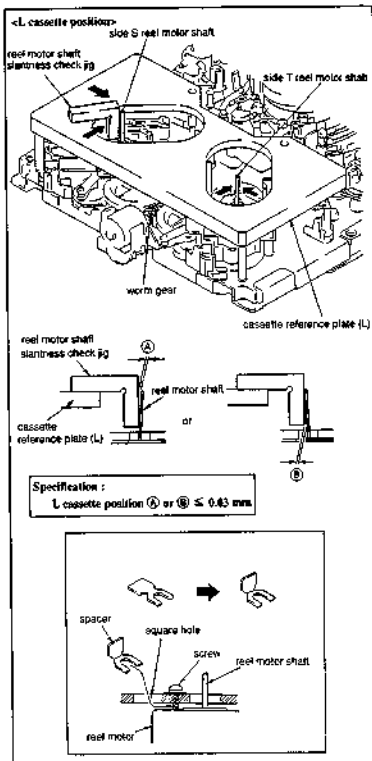
Adjustment Procedure

1. Rotate the Worm Gear manually to locate the Reel Motor Axis to the L cassette position.
2. Put the cassette reference plate (L) to where the cassette is located.
3. Put the reel motor shaft slantness check jig to the side S or side T Reel Motor Shaft from the directions of the two arrows in the figure, and check that the clearance between the Reel Motor Axis and adjustment tool satisfies specification A or B.
4. If the specification is not satisfied, rotate the screw fixing the Reel Motor one or two rotations to loosen. Adjust the number of the spacers in the plate where the Reel Motor is attached to satisfy the specification.
5. Bent a spacer as illustrated in the figure. Pick the spacer up with the tweezers, and insert the spacer between the chassis and motor through the square hole of the Reel Motor Plate Assembly.

Spacer

3-182-285-01	Thickness : 0.02 mm
3-182-285-11	Thickness : 0.05 mm

6. Tighten the three screws fixing the Reel Motor with the same torque.



6-10. REEL POSITION MOTOR REPLACEMENT

Tool :

L shaped wrench (across flats has 1.5 mm) : 7-700-736-01

Replacement flow chart

3-6

Front Panel Removal

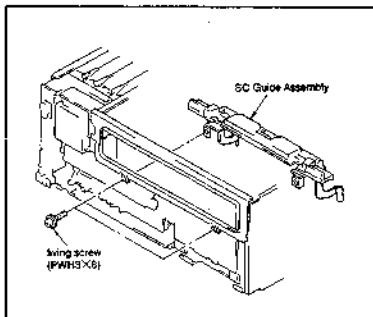
Reel Position Motor Replacement

4-4

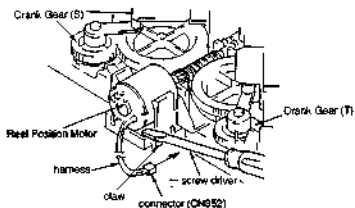
Reel Position Motor Operation Check

Removal

1. Remove the Front Panel. (Refer to section 3-6.)
2. Remove the two screws fixing the SC Guide Assembly.



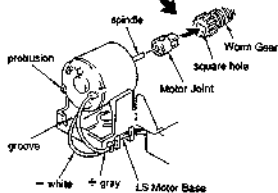
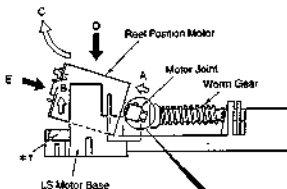
3. Cut the tie band clamping the harnesses of CN351 and CN352 of the MS-39 board from the rear of the unit and remove CN352 from MS-39 board.
4. Release the motor harness from the two claws of the base.
5. Loosen the set screw (2.6×3) fixing the motor joint 1/4 to 1/2 turn.



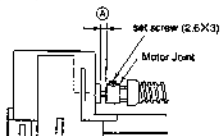
6. While pushing the motor joint fully in the direction A, insert a flat (→) head screw driver tip in the *1 marked portion to raise in the direction B.
7. Extract the Reel Position Motor in the direction of arrow C.
8. Unsolder the harness connected to the reel position motor.

Installation

9. Connect the harness to a new Reel Position Motor by soldering.
10. Insert a motor joint into the Reel Position Motor spindle. Hold them with hand and slant them. Align the motor protrusion with the groove of the LS Motor Base. Push them in from the direction of arrow D.
11. Align the motor joint with the square hole of the Worm Gear. Push in the Reel Position Motor from the direction of arrow E.
12. Fix the motor joint with set screw at the position satisfying the specification as shown.
13. Rotate the motor joint with finger and check that it rotates light.
14. Hook the harness on the two claws on the base.
15. Connect the CN352 to MS-39 board on the rear of the unit. Tie the harness with the CN352 harness.



Specification : $\textcircled{A} = 2 \pm 0.1 \text{ mm}$



Adjustment after replacement

16. Perform the Reel Position Motor Operation Check. (Refer to section 4-4.)

6-11. WORM GEAR REPLACEMENT (REEL POSITION MOTOR)

Mode : Untread end mode

Tools :

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Sony grease (SGL-505)	: 7-622-010-04
Sony oil (NT-68)	: 7-661-018-18

Replacement flow chart

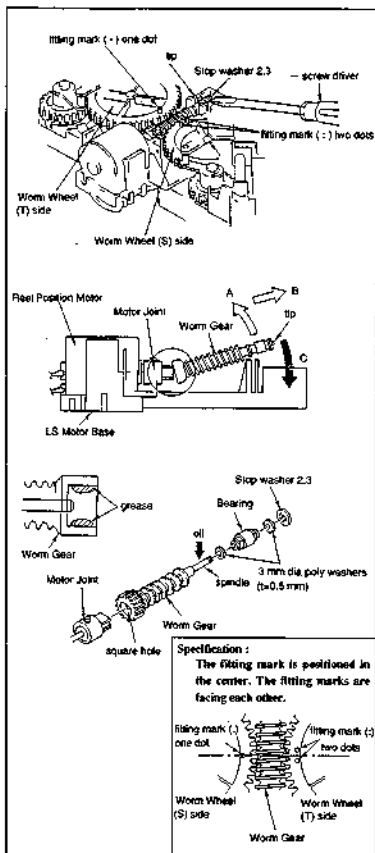
Worm Gear Replacement

Removal

1. Slant a flar (-) head screw driver and insert it into the tip of the Worm Gear as shown. Raise the Worm Gear in the direction of arrow A.
2. Extract the Worm Gear in the direction of arrow B.
3. Remove the Stop washer 2.3 from the Worm Gear. Remove 3 mm dia poly washer (± 0.5 mm) and bearing.

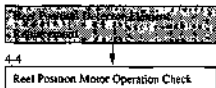
Installation

4. Clean shaft of a new Worm Gear with a cleaning piece moistened with cleaning fluid.
5. Apply a drop of Sony oil between the Worm Gear bearings as shown. Coat Sony grease thin on the square hole of the Worm Gear.
6. Rotate the Worm Wheel with flinger until the fitting mark on the supply side Worm Wheel and that on the take-up side are facing each other.
7. Slant the Worm Gear so that the motor joint fits the square hole of the Worm Gear.
8. Push in the tip of the Worm Gear with flinger in the direction of arrow C until it locks.
9. Check that the fitting marks on the supply side Worm Wheel and that on the take-up side satisfy the specification.



6-12. REEL POSITION DETECTOR ELEMENT REPLACEMENT

Replacement flow chart



Removal

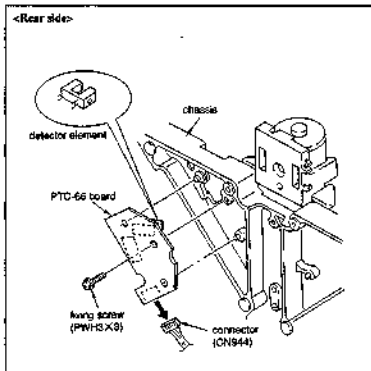
1. Remove the screw securing the board (PTC-66) on which reel position detector element is mounted from the rear of the unit.
2. Remove the harness coming from PTC-66 board from the connector (CN944).
3. Unsolder the detector element to remove it from the PTC-66 board.

Installation

4. Solder a new reel position detector element fitting with the polarity printed on the PTC-66 board.
5. Insert the harness into the connector (CN944) on the PTC-66 board, install the PTC-66 board to the chassis.

Adjustment after replacement

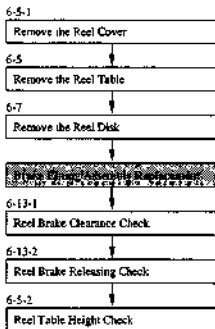
6. Perform the Reel Position Motor Operation Check. (Refer to section 4-4.)



6-13. BRAKE LINING ASSEMBLY REPLACEMENT

- When power is turned ON or OFF, the T reel brake lining and S reel brake lining are pressed against the T and S reel tables.
- When a cassette is inserted with the power switch turned ON, the T and S brake linings are detached from the reels. Only the Supply reel brake lining is pressed against the S reel table during threading, unthreading mode and while threading ring is rotating.
- Both the T and S reel brake linings are kept detached in the PLAY, STOP, REW, F.FWD, SEARCH and REV modes.
- When EJECT button is pressed, the EJECT mode is started. In a few seconds after EJECT mode is completed, the T and S reel brake linings are pressed against the reel tables.

Replacement flow chart



Removal

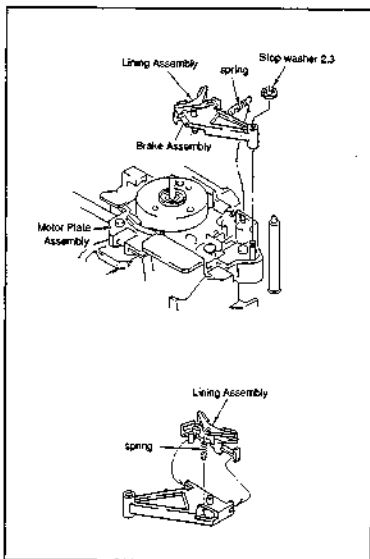
1. Remove the Reel Cover. (Refer to section 6-5-1.)
2. Remove the Reel Table. (Refer to section 6-5.)
3. Remove the Reel Disk. (Refer to section 6-7.)
4. Remove the spring of the Brake Assembly from the Motor Plate Assembly as shown.
5. Remove the Stop washer 2.3 fixing the Brake Assembly. Remove the Brake Assembly.
6. Remove the spring of the Lining Assembly from the Brake Assembly.

Installation

7. Install a new Brake Lining Assembly by reversing the steps 5 and 6.

Adjustment after replacement

8. Perform the Reel Brake Clearance Check. (Refer to section 6-13-1.)
9. Perform the Reel Brake Releasing Check. (Refer to section 6-13-2.)
10. Perform the Reel Table Installation. (Refer to section 6-5.)
11. Perform the Reel Table Height Check. (Refer to section 6-5-2.)

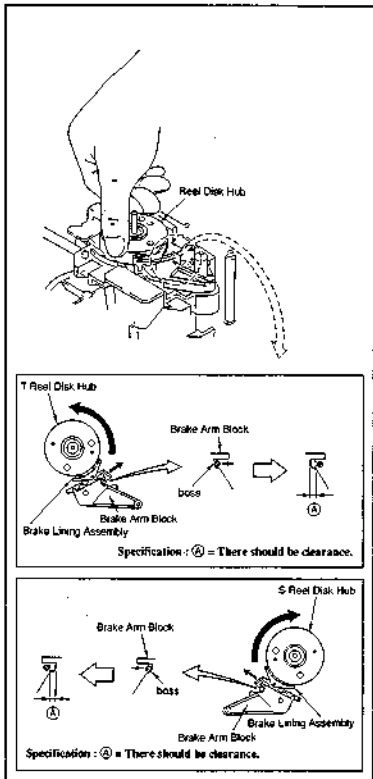


6-13-1. Reel Brake Clearance Check

• When Brake Assembly, Lining Assembly or Reel Disk Hub is replaced, be sure to perform the Reel Brake Clearance Check.

Check procedure

1. Hold the takeup reel Disk Hub with finger. Check that there is clearance between Brake Arm Block and boss when the Disk Hub is rotated counter-clockwise.
If there is no clearance replace the new Brake Lining Assembly.
2. Hold the supply reel Disk Hub with finger. Check that there is clearance between Brake Arm Block and boss when the Disk Hub is rotated clockwise.
If there is no clearance replace the new Brake Lining Assembly.

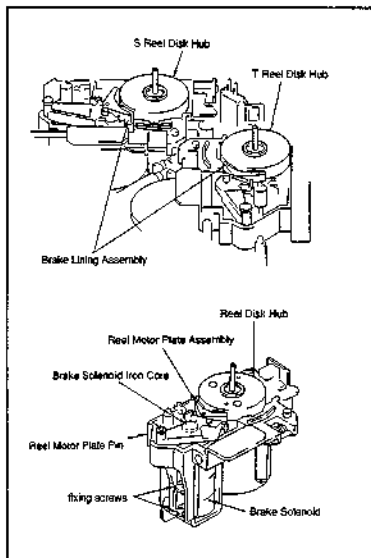


6-13-2. Reel Brake Releasing Check

- When a Brake Assembly, Lining Assembly or Reel Disk Hub is replaced, be sure to perform the Reel Brake Releasing Check.
- When a Brake Solenoid Block is replaced or adjusted, be sure to perform the Reel Brake Releasing Check.

Check procedure

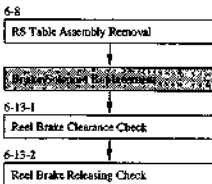
1. Turn off the power.
2. Check that the Brake Lining Assembly is not contacting with the take-up reel table when take-up reel is rotating.
If this specification is not satisfied, check the Brake Assembly and Brake Solenoid Block.
3. Check that the Brake Lining Assembly is not contacting with the supply reel table when supply reel is rotating.
If this specification is not satisfied, replace the Brake Assembly and Brake Solenoid Block.



6-14. BRAKE SOLENOID REPLACEMENT

* The Brake Solenoid replacement procedure is common to take-up side and supply side.

Replacement flow chart



Removal

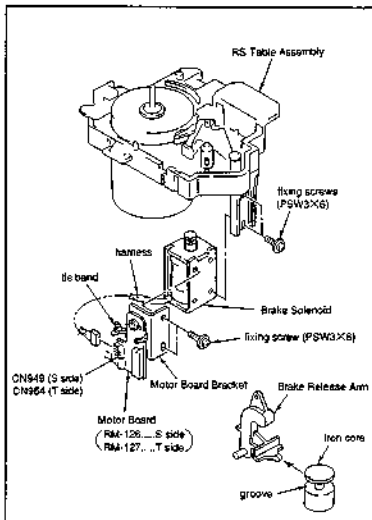
- 1 Remove the RS Table from the unit following the "RS Table Assembly Replacement". (Refer to section 6-8.)
- 2 Cut the tie band holding the Motor Board RM-126 (S side) or RM-127 (T side).
- 3 Unplug the harness coming from the Brake Solenoid from the Motor Board connector CN949 (S side) or CN945 (T side).
- 4 Remove the two screws from the Motor Board bracket. Remove the Motor Board.
- 5 Remove the two screws fixing the Brake Solenoid from the RS Table Assembly. Remove the Brake Solenoid.

Installation

- 6 Insert the groove of the new Brake Solenoid's iron core to the Brake Release Arm. Secure it with the two fixing screws.
- 7 Reverse the steps 4 through 1 of the removal for installation.

Adjustment after replacement

- 8 Perform the Reel Brake Clearance check. (Refer to section 6-13-1.)
- 9 Perform the Reel Brake Releasing Check. (Refer to section 6-13-2.)



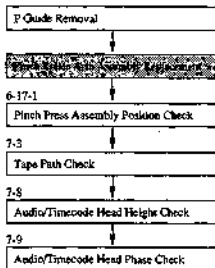
6-15. PINCH ROLLER ARM ASSEMBLY REPLACEMENT

- When the Pinch Roller has worn out or is damaged, replace it as the Pinch Roller Arm Assembly.
- The Pinch Roller is the periodic replacement part. It is recommended to use the periodic inspection table.

Tools :

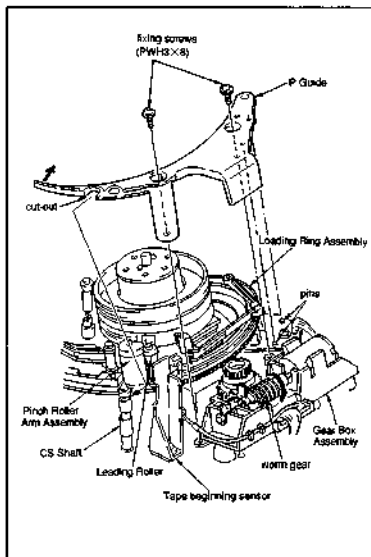
- Cleaning piece : 2-034-697-00
- Cleaning fluid : 9-919-573-01

Replacement flow chart



Removal

1. Remove two fixing screws. Remove the P Guide from the CS shaft by pulling its out-out in the direction of arrow.
2. Rotate the worm gear of the Gear Box Assembly with finger until the Leading Roller of the Loading Ring Assembly comes beside to the tape beginning sensor.



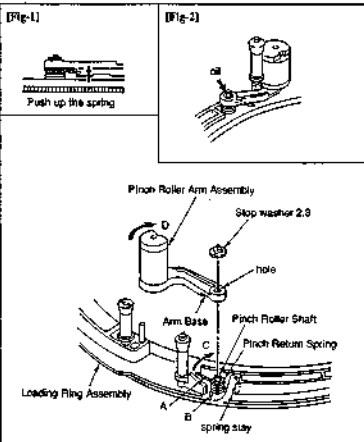
- Remove the Stop washer 2.3 from the top of the Pinch Roller Assembly. Remove the Pinch Roller Assembly from the Loading Ring Assembly.

Installation

- Apply a drop of the Sony oil on the surface of Pinch Roller Shaft. (Refer to Fig-2)
- Install the Pinch Return Spring to the Pinch Roller Shaft of the Loading Ring Assembly with its longer end on the top. Push fully the portion "A" of the spring toward the direction of the arrow C.
- Install a new Pinch Roller Arm Assembly to the Pinch Roller Shaft as shown so that the portion "A" of the Pinch Return Spring is hooked on the Arm Base. (Refer to Fig-1)
- Push up the portion "B" of the Pinch Return Spring to hook it on the spring stay of the Loading Ring Assembly.
- Secure the Pinch Roller Arm Assembly with the Stop washer 2.3.
- Move the Pinch Roller Arm Assembly in the direction of arrow D. Check that it returns to the home position smoothly when it is unhandled.

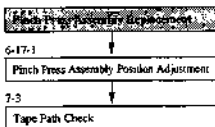
Adjustment after replacement

- Perform the Pinch Press Assembly Position Adjustment (Refer to section 6-17-1.)
- Perform the Tape Path Check (Refer to section 7-3.)
- Perform the Audio/Timcode Head Height Check. (Refer to section 7-8.)
- Perform the Audio/Timcode Head Phase Check (Refer to section 7-9.)



6-16. PINCH PRESS ASSEMBLY REPLACEMENT

Replacement flow chart



Removal

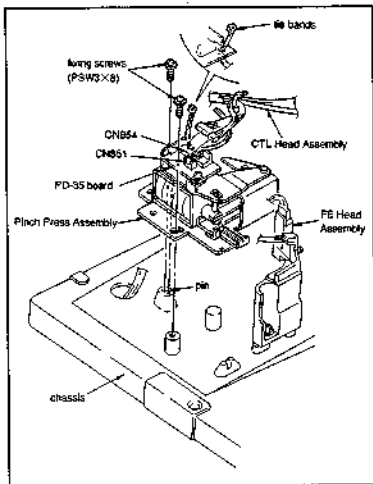
1. Cut the tie band holding the PD-35 board.
2. Unplug the two connectors (CN851, CN854) from the PD-35 board.
3. Remove the two screws securing the Pinch Press Assembly. Remove the Pinch Press Assembly from chassis.

Installation

4. Align the hole of a new Pinch Press Assembly with the pin on the chassis and install it with two fixing screws.
5. Insert the two connectors (CN851, CN854) to the mating connectors of the PD-35 board.
6. Clamp the harnesses of the Pinch Press Assembly, CTL Head Assembly and FE Head Assembly on the PD-35 board with tie band.

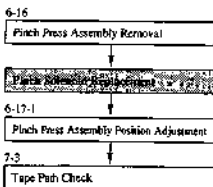
Adjustment after replacement

7. Perform the Pinch Press Assembly Position Adjustment. (Refer to section 6-17-3.)
8. Perform the Tape Path Check. (Refer to section 7-3.)



6-17. PINCH SOLENOID REPLACEMENT

Replacement flow chart



Removal

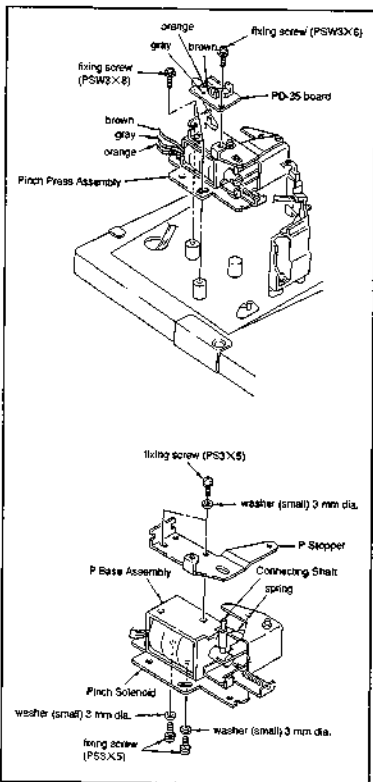
1. Remove the Pinch Press Assembly.
(Refer to section 6-16.)
2. Remove the screw securing the PD-35 board. Unsolder the three leads (orange, gray, brown) coming from the Pinch Solenoid to the PD-35 board.
3. Remove the two screws (PS3×5) and washers as shown and remove the P Stopper.
4. Extract the Connecting Shaft.
5. Remove the two screws and washers and remove the Pinch Solenoid from the P Base Assembly.

Installation

6. Install a new Pinch Solenoid on the P Base Assembly using the screws (PS3×5) via washers (small) as shown.
7. Reverse the above steps 4 through 1 of removal to install a new Pinch Solenoid.

Adjustment after replacement

8. Perform the Pinch Press Assembly Position Adjustment. (Refer to section 6-17-1.)
9. Perform the Tape Path Check. (Refer to section 7-3.)



6-17-1. Pinch Press Assembly Position Adjustment.

Mode : Thread the unit without inserting a cassette. Keep the PLAY mode.

(The mode in which the Pinch Roller is pressed.)

Tool :

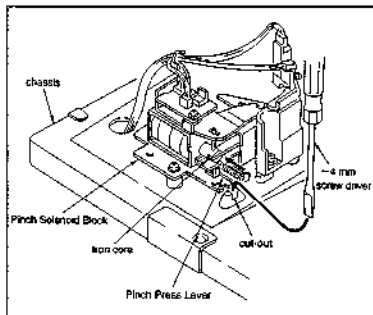
Thickness gauge : 9-9f1-053-00

Check procedure

1. Check that the clearance between the Pinch Press Lever and Pinch Limiter satisfies the specification. (Refer to Fig-1)

Adjustment

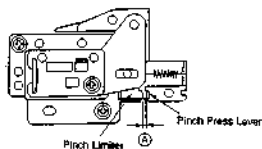
2. Loosen the two screws securing the Pinch Solenoid Assembly by 1/4 to 1/2 turn. (Refer to Fig-2)
3. Insert a 4 mm flat screw driver tip into the cut-out between the Pinch Press Assembly and chassis. Adjust position of the Pinch Press Assembly to satisfy the specification.
4. After tightening the screws, check the specification again following the above check procedure.



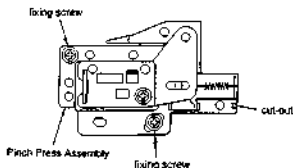
[Fig-1]

Specification :

Ⓐ = 0.7 ± 0.1 mm



[Fig-2]

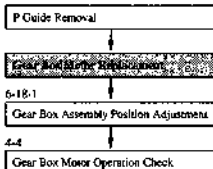


6-18. GEAR BOX MOTOR REPLACEMENT

Tools :

- L shaped wrench (across flat has 1.27 mm)
: 7-700-736-01
- Thickness gauge : 9-911-053-00

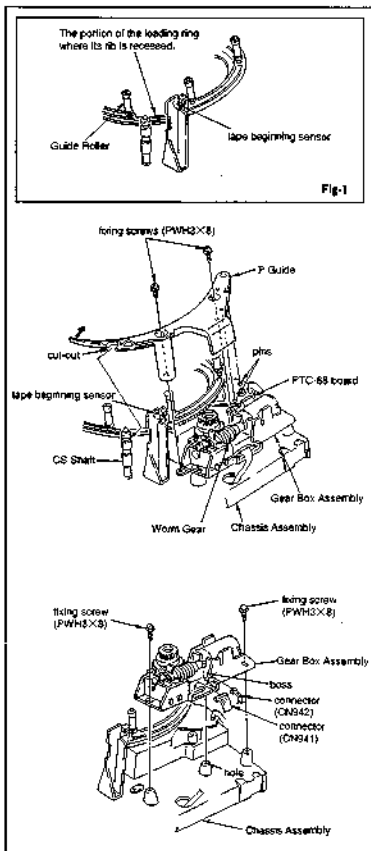
Replacement flow chart



Removal

Precaution : When removing the P Guide, do not contact with the tape beginning sensor.

1. Rotate the worm of the Gear Box with finger until the Loading Ring arrives at the position shown in the figure. (Refer to Fig-1)
2. Remove the two fixing screws. Remove the P Guide from the CS Shaft by pulling its cut-out in the direction of arrow.
3. Unplug the two connectors (CN941, CN942) connected to the Gear Box Assembly.
4. Remove the two fixing screws securing the Gear Box Assembly. Remove the Gear Box Assembly from the Chassis Assembly.



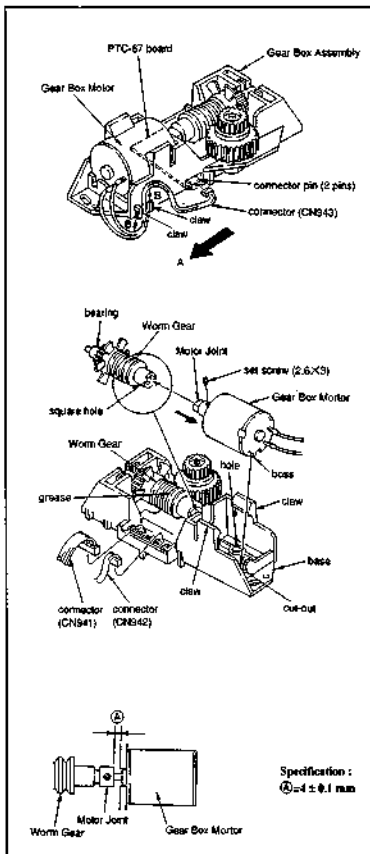
- Remove the Gear Box Motor harness from the two claws of the Gear Box Assembly.
- Unplug the Gear Box connector (CN943) from the PTC-67 board.
- Loosen the set screw securing the motor joint by $1/4$ to $1/2$ turn. Push the motor joint in the direction of arrow.
- Pull the Gear Box Motor upward strongly, or push the Gear Box Motor out from the hole of the base. Remove the Gear Box Motor from the Gear Box Block.
- Extract the motor joint from the Gear Box Motor.

Installation

- Insert the motor joint into the new Gear Box Motor.
- Align the boss of the Gear Box Motor with the cut-out of the Gear Box Assembly. Push the Gear Box Motor strongly until it is locked with two claws of the Gear Box Assembly.
- Align the motor joint with the square hole of the worm gear, and slide it. Tighten the set screw at the position where the motor joint position satisfies the specification.
- Insert the Gear Box Motor connector (CN943) into the PTC-67 board.
- Remove play of the Gear Box Motor harness in the A direction. Push the harness into the two claws from the direction of arrow B.
- Align the boss of the Gear Box Assembly with the hole of the Chassis Assembly. Secure them with two fixing screws.
- Insert the two connectors (CN942, CN941) to the Gear Box Block.

Adjustment after replacement

- Perform the Gear Box Assembly Position Adjustment. (Refer to section 6-18-1)
- Perform the Gear Box Motor Operation Check. (Refer to section 4-4)
- Install the P Guide. Secure it with the two fixing screws.



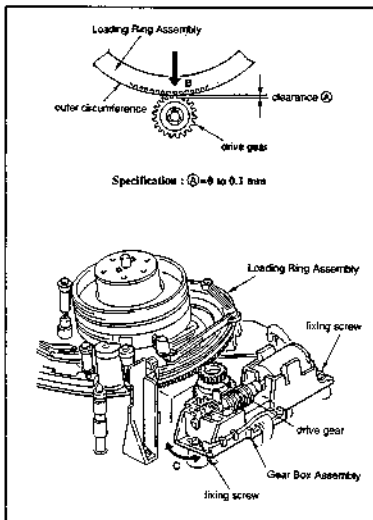
6-18-1. Gear Box Assembly Position Adjustment

Mode : Unthreading end mode

Tool : Wire clearance check gauge
I-6152-450-A

Adjustment Procedure

1. Loosen the two fixing screws by 1/2 to 1 turn.
2. Pull the Loading Ring Assembly fully in the direction of arrow B to remove play.
3. Move the position of the Gear Box Assembly in the direction of arrow C until the clearance ② between the outer circumference of the Loading Ring and the bottom end of the Drive Gear tooth satisfies the specification. Tighten the two screws.
4. Check that the clearance ② satisfies the specification.

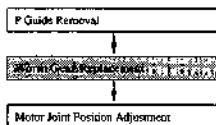


6-19. WORM GEAR REPLACEMENT (GEAR BOX)

Tools :

L shaped wrench (across flat has 1.27 mm)	: 7-700-736-01
Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Sony grease (SGL-505)	: 7-662-011(1-04)
Sony oil (NT-68)	: 7-661-018-18
Thickness gauge	: 9-911-053-00

Replacement flow chart

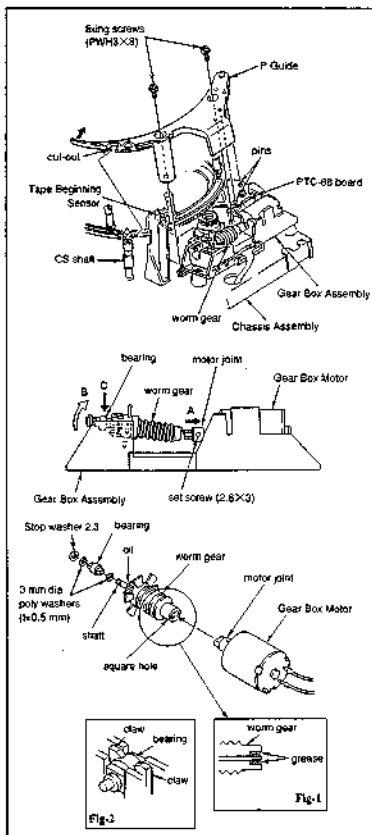


Removal

1. Remove two fixing screws. Remove the P Guide from the CS shaft by pulling its cut-out in the direction of arrow.
2. Loosen the set screw (2.6×3) by 1/4 to 1/2 turn holding the Motor Joint. Push the Motor Joint in the direction A.
3. Raise the bearing of the Worm Gear in the direction B to remove the Worm Gear.
4. Remove the stop washer 2.3 of the Worm Gear. Remove the two 3 mm dia poly washer (=0.5 mm) and bearing.

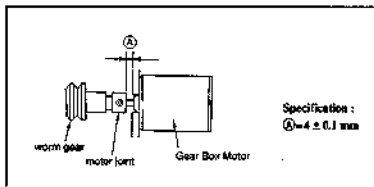
Installation

5. Clean the shaft of new Worm Gear with cleaning piece moistened with cleaning fluid.
6. Insert two 3 mm dia poly washers and bearing on the Worm Gear shaft, as shown. Secure them with stop washer.
7. Apply a drop of Sony oil between the Worm Gear and bearing. Coat Sony grease this on the square hole of Worm Gear. (Refer to Fig. 1)
8. Push the Worm Gear bearing all the way into the Gear Box Assembly from the direction C until the claw locks. (Refer to Fig. 2)



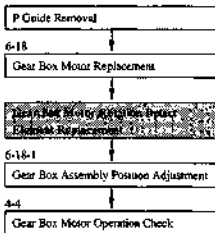
Adjustment after replacement

9. Align the Motor Joint with the square hole of the Worm Gear. Tighten the set screw so that the Motor Joint position satisfies the specification.
10. Install the P Guide with fixing screw.



6-20. GEAR BOX MOTOR ROTATION DETECT ELEMENT REPLACEMENT

Replacement flow chart



Removal

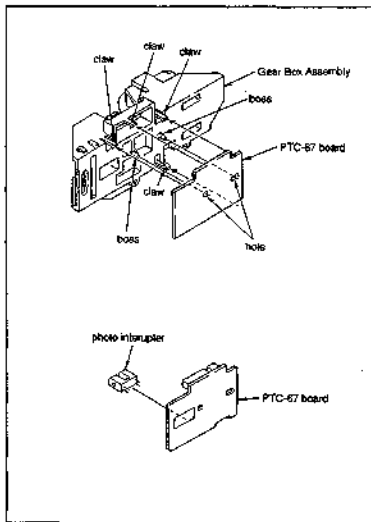
1. Remove the P. Guide referring to the Gear Box Motor Replacement. (Refer to section 6-18.)
2. Remove the Gear Box Assembly referring to the Gear Box Motor Replacement. (Refer to section 6-18.)
3. Remove the PTC-67 board by unlocking the four claws of the Gear Box Assembly.
4. Unsolder the photo interrupter which is soldered to the PTC-67 board.
5. Install a new photo interrupter to the PTC-67 board by soldering.

Installation

6. Align the PTC-67 board with the two bosses of the Gear Box Assembly as shown. Push it into the four claws.
7. Install the Gear Box Assembly by reversing the procedures of installation. (Refer to section 6-18.)

Adjustment after replacement

8. Perform the Gear Box Assembly Position Adjustment. (Refer to section 6-18-1.)
9. Perform the Gear Box Motor Operation Check. (Refer to section 4-4.)
10. Install the P Guide referring to the Gear Box Motor Replacement. (Refer to section 6-18.)



6-21. CAPSTAN MOTOR REPLACEMENT

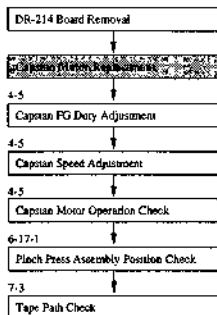
Mode : Rotate the worm of the Gear Box with finger to rotate the Loading Ring until the Cleaning Roller is pressed against the Drum.

Tools :

Cleaning piece : 2-034-697-00

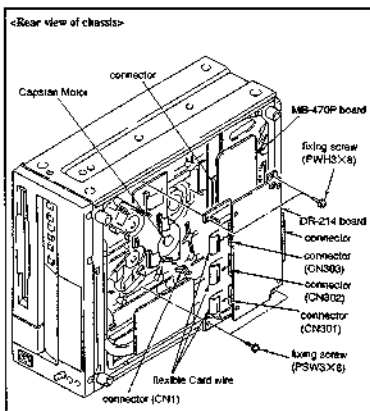
Cleaning fluid : 9-919-573-01

Replacement flow chart



Removal

1. Stand the unit with the left side bottom.
2. Remove the four screws holding the DR-214 board.
3. Unplug connectors from DR-214 and MB-470P boards.
4. Remove the three flexible card wire (CN301, CN302, CN303) from the DR-214 board.
5. Unplug the connector (CN1) from the Capstan Motor.



6. While holding the Capstan Motor with finger from the rear of the Chassis, remove the two screws holding the Capstan Motor from the front of the Chassis. Remove the Capstan Motor.

Precaution 1: Hold the Capstan Motor with hand so as not to drop it.

Precaution 2: Pay utmost attention not to injure the Tape Guides around the Capstan Motor.

Installation

7. Clean the mounting surface of the new Capstan Motor, and the mounting surface of the Chassis with cleaning piece moistened with cleaning fluid.
8. Insert the Capstan Motor from the rear of the Chassis. Tighten the two fixing screws to install the Capstan Motor.

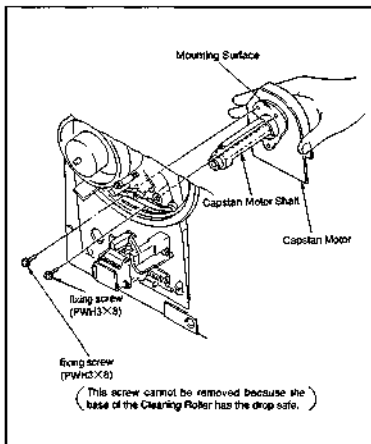
Precaution 1: Pay utmost attention not to injure the Capstan Motor Shaft.

Precaution 2: Pay utmost attention not to injure the Tape Guides around the Capstan Motor.

9. Connect the connector (CN1) to the Capstan Motor.
10. Connect the three flexible card wire (CN301, CN302, CN303) to the DR-214 board.
11. Connect the DR-214 board connector to the MB-470P board.
12. Install the DR-214 board with four fixing screws.

Adjustment after replacement

13. Perform the Capstan FG Dirty Adjustment.
(Refer to section 4-5.)
14. Perform the Capstan Speed Adjustment.
(Refer to section 4-5.)
15. Perform the Capstan Motor Operation Check.
(Refer to section 4-5.)
16. Perform the Pinch Press Assembly Position Check.
(Refer to section 6-17-1.)
17. Perform the Tape Path Check.
(Refer to section 7-3.)



6-22. CTL HEAD REPLACEMENT

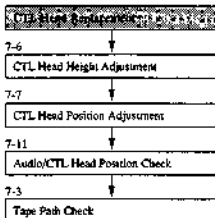
Mode : Unbreasing end mode

Tools :

Cleaning piece : 2-054-697-00

Cleaning fluid : 9-919-573-01

Replacement flow chart

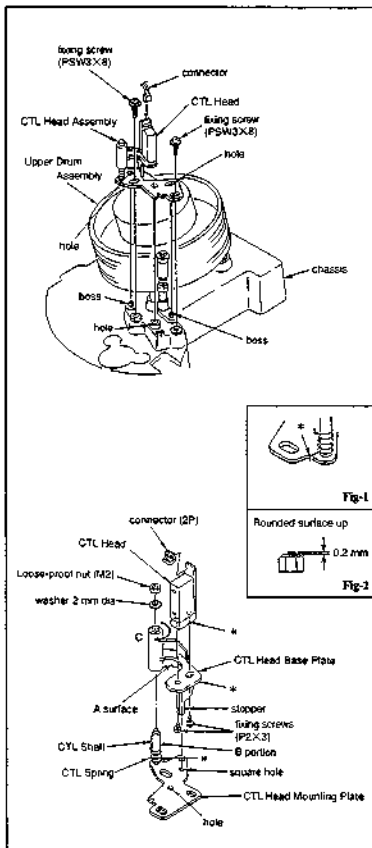


Removal

1. Rotate the Upper Drum Assembly with finger so that the video head is positioned far from the CTL head.
2. Unplug the connector from the CTL Head

Precaution : When removing the CTL Head Assembly, NEVER touch the CTL Head Assembly with the Upper Drum Assembly.

3. Remove the two screws holding the CTL Head Assembly
4. Remove the loose-proof nut (M2) and washer (2 mm dia) holding the CTL Head Base Plate. Remove the CTL Head Base Plate.
5. Remove the two fixing screws (P2×3) holding the CTL Head from the bottom. Remove the CTL Head from the CTL Head Base Plate.
6. Unsolder the connector (2 pins) of the CTL Head. Remove the CTL Head.



Installation

7. Connect the connector (2 pins) to a new CTL Head.
8. Clean the mounting surface of the CTL Head and the mounting surface of the CTL Head Base Plate with cleaning piece moistened with cleaning fluid.
9. Install the CTL Head to the CTL Head Base Plate with $\#$ marked positions in parallel each other using two screws. (Refer to Fig-1)
10. Hook the CTL Spring on the $\#$ marked position of the CTL Head Mounting Plate. (Refer to Fig-1)
11. Insert the CTL Head Base Plate into the CTL Shaft of the CTL Head Mounting Plate. Hook the B portion of the CTL Spring on the plane A of the CTL Head Base Plate.
12. While rotating the CTL Head Base Plate in the direction C, insert the stopper of the CTL Head Base Plate into the square hole of the CTL Head Mounting Plate.
13. Install washer to the CTL Shaft as shown, and screw in the loose-proof nut until the CTL Shaft protrudes about 0.2 mm above the rounded surface. (Refer to Fig-2)
14. Align the hole of the CTL Head Mount Plate and that of the chassis. Secure them with two fixing screws.
15. Connect the connector to the CTL Head.

Adjustment after replacement

16. Perform the CTL Head Height Adjustment. (Refer to section 7-6.)
17. Perform the CTL Head Position Adjustment. (Refer to section 7-7.)
18. Perform the Audio/Tape code Head Position Check. (Refer to section 7-11.)
19. Perform the Tape Path Check. (Refer to section 7-3.)

6-23. FE HEAD ASSEMBLY/TAPE CLEANER ASSEMBLY REPLACEMENT

Tools:

Cleaning piece : 2-034-607-00

Cleaning fluid : 9-919-573-01

Replacement flow chart

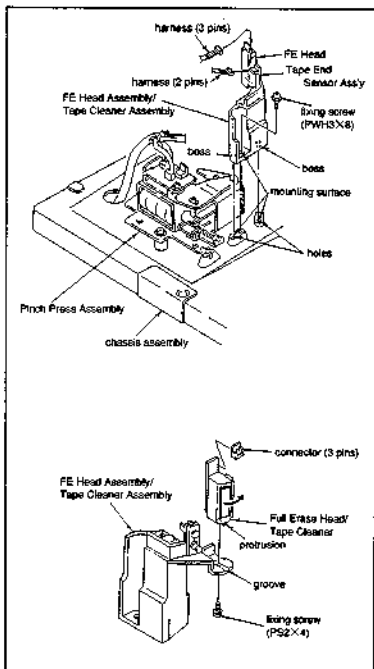


Removal

1. Unplug the connectors from the Tape End Sensor Assembly and the Full Erase Head Assembly.
(Only Tape End Sensor Assembly in UVW-1600P)
2. Remove the screw holding the FE Head Assembly or the Tape Cleaner Assembly. Remove the FE Head Assembly or the Tape Cleaner Assembly from chassis.
3. Remove the screw assembling the FE Head Assembly or the Tape Cleaner Assembly. Remove the FE Head or the Tape Cleaner Assembly from their Assembly.
4. Unsolder the connector (3 pins) from the Full Erase Head. (UVW-1800P only)

Installation

5. Solder the connector (3 pins) to a new Full Erase Head. (UVW-1800P only)
6. Clean the respective mounting surfaces with cleaning piece moistened with cleaning fluid.
7. Align the protrusion of the Full Erase Head or Tape Cleaner Assembly, with the groove on the mounting surface. Push it in the direction of arrow and assemble them.
8. Align the boss of the FE Head Assembly or Tape Cleaner Assembly, with the holes of the slant chassis. Install it with a screw.
9. Connect the two harnesses to the Full Erase Head and Tape End Sensor Assembly.
(Only Tape End Sensor Assembly in UVW-1600P)



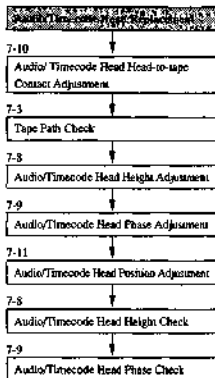
6-24. AUDIO/TIMECODE HEAD REPLACEMENT

Tools :

Cleaning piece : 2-034-097-00

Cleaning fluid : 9-919-573-01

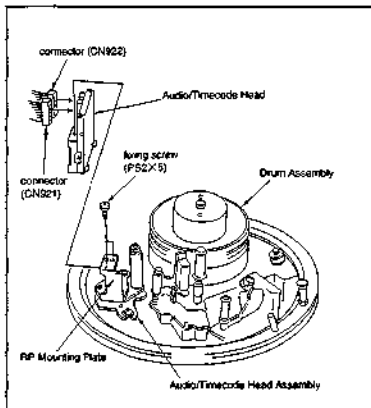
Replacement flow chart



Removal

1. Unplug the two-connectors (UVW-1600P: CN921, CN922) from the Audio/Timecode Head Assembly (Only CN922 in UVW-1600P).
2. Remove the two screws holding the Audio/Timecode Head. Remove the Audio/Timecode Head Assembly from the RP Mounting Plate.

Precaution : When removing the Audio/Timecode Head, pay utmost attention not injure the tape contacting surface of the Drum Assembly nor respective tape guides.



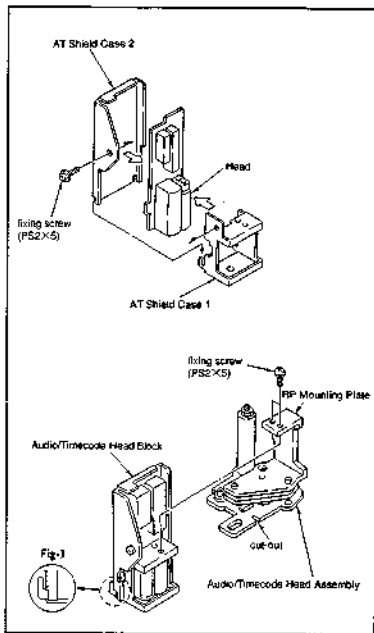
- Remove the screw assembling the AT Shield Case 1 and AT Shield Case 2. Remove the head.

Installation

- Clean both the mounting surfaces of a new head and RP Mounting Plate with cleaning piece moistened with cleaning fluid.
- Assemble the head, AT Shield Case 1 and AT Shield Case 2 with a fixing screw. (Refer to Fig-1.)
- Install the assembled Audio/Timecode head on the RP Mounting Plate of the Audio/Timecode Head Assembly with two screws.

Adjustment after replacement

- Perform the Audio/Timecode Head Head-to-tape Contact Adjustment. (Refer to section 7-10.)
- Perform the Tape Path Check. (Refer to section 7-3.)
- Perform the Audio/Timecode Head Height Adjustment. (Refer to section 7-8.)
- Perform the Audio/Timecode Head Phase Adjustment. (Refer to section 7-9.)
- Perform the Audio/Timecode Head Position Adjustment. (Refer to section 7-11.)
- Perform the Audio/Timecode Head Height Check. (Refer to section 7-2.)
- Perform the Audio/Timecode Head Phase Check. (Refer to section 7-9.)



6-25. AT CLEANER REPLACEMENT

Mode : Unthreading end mode

Replacement flow chart

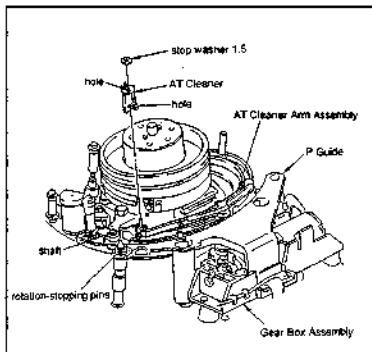


Removal

1. Remove the stop washer 1.5 holding the AT Cleaner on the AT Cleaner Arm Assembly. Remove the AT Cleaner.

Installation

2. Install a new AT Cleaner into the shaft of AT Cleaner Arm Assembly while aligning the respective holes and rotation-stopping pins.
3. Secure the AT Cleaner with a stop washer 1.5.



6-26. CLEANING ROLLER REPLACEMENT

Mode : Unthreading end mode

Tools :

Cleaning piece : 2-034-697-00

Cleaning fluid : 9-919-573-01

Replacement flow chart



Removal

1. Remove the stop washer 1.5 holding the Cleaning Roller using tweezers taking care not to damage the drum surface. Remove the Cleaning Roller from the Cleaning Roller Assembly.

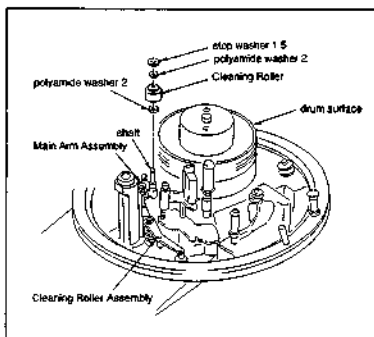
Precaution : The polyamide washers are above and below the Cleaning Roller.

Pay attention not to lose them during replacement.

Installation

2. Clean the shaft of a new Cleaning Roller Assembly with cleaning piece moistened with cleaning fluid.
3. Install a new Cleaning Roller into the shaft of Cleaning Roller Assembly in the order as shown. Fix them with a stop washer 1.5.

Note : If rotation of Cleaning Roller shows any abnormality, for instance if rotation is not smooth, or any sound comes out during rotation, replace both the Main Arm Assembly and Cleaning Roller at the same time.



6-27. REPLACEMENT OF CLEANING DRIVE ARM ROLLER

Mode : Unthreading end mode

Tools :

Cleaning piece : 2-034-697-00

Cleaning fluid : 9-919-573-01

Replacement flow chart



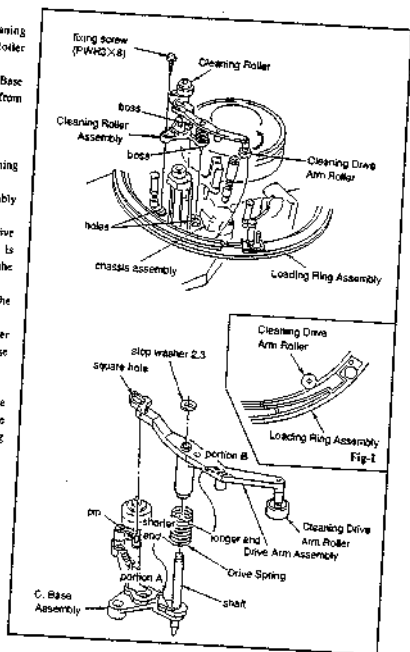
Removal

1. Remove the fixing screw holding the Cleaning Roller Assembly. Remove the Cleaning Roller Assembly from chassis.
2. Remove the stop washer 2.3 on top of the C. Base Assembly. Remove the Drive Arm Assembly from the shaft.

Installation

3. Clean the shaft of C. Base Assembly with cleaning piece moistened with cleaning fluid.
4. Install the Drive Spring into the C. Base Assembly with the direction as shown.
5. Insert a new Drive Arm Assembly into the Drive Spring and then to the shaft while the pin is inserted in the hole as shown. Secure them with the stop washer 2.3.
6. Hook the shorter end of the Drive Spring on the portion A, and the longer end on the portion B.
7. Align the two protrusions of the Cleaning Roller Assembly with the two holes on the Slant Base Assembly. Secure them with fixing screw.

Precaution : When assembling in step 7, the roller of the Drive Arm Assembly must be located at the specified position of the Loading Ring Assembly as shown in Fig-1.



6-28. REPLACEMENT OF RING POSITION DETECTOR ELEMENT

Mode : In the middle of threading

Replacement flow chart

6-18

P. Guide Removal

Replacement of Ring Position Detector Element

4-4

Operation Check of the Ring Position Detector Element

Retrieval

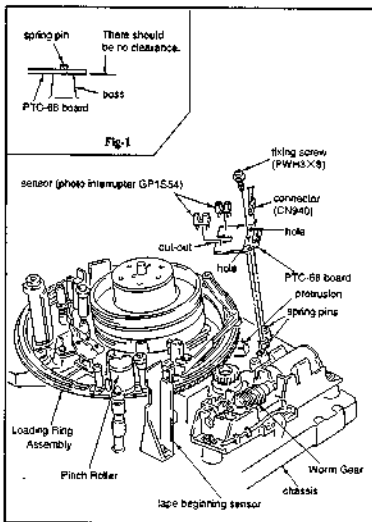
1. Remove the P. Guide. (Refer to section 6-18.)
2. Unplug the connector (CN940) from the PTC-68 board.
3. Rotate the Worm Gear of the Gear Box to rotate the Loading Ring until the Pinch Roller comes in front of the tape beginning sensor.
4. Remove a screw fixing the PTC-68 board. Remove the PTC-68 board from the spring pins (two points).
5. Unsolder and remove the two sensors (photo interrupter GP1554, 2 pcs) from the board.

Installation

6. Install and solder the two new sensors on the PTC-68 board.
7. Align the two holes of the PTC-68 board with two spring pins on the chassis. Fix them with a fixing screw.
8. Check for no clearance between PTC-68 board and protrusion. (Refer to Fig.1)

Adjustment after replacement

9. Perform the operation check of the Ring Position Detector Element. (Refer to section 4-4.)
10. Install the P. Guide. (Refer to section 6-18)



6-29. RING ROLLER REPLACEMENT

Mode : In the middle of threading

Tools :

Cleaning piece : 2-034-097-00

Cleaning fluid : 9-919-573-01

Replacement flow chart

6-18

P. Guide Removal

Disengaging the gears of the Gear Box Assembly



6-33-1

Position Adjustment of the Adjustment Ring Roller/Position Adjustment of Gear Box Assembly

Removal

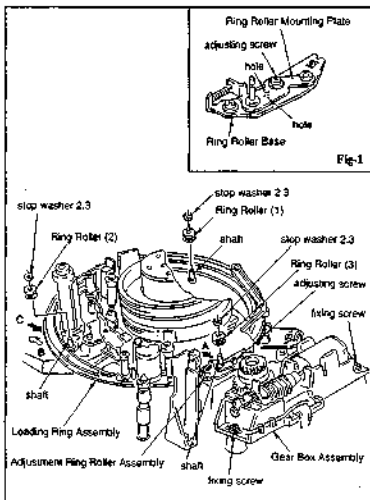
1. Remove the P. Guide. (Refer to section 6-18.)
2. Loosen the two fixing screws securing the Gear Box Assembly which disengages with the Loading Ring Assembly, but snugly tighten them.
3. Loosen the adjusting screw of the Adjustment Ring Roller Assembly. Push the Ring Roller in the direction of arrow A until the hole of the Ring Roller Mounting Plate (Refer to Fig-1) and the hole of the Ring Roller Base agree. Tighten the adjusting screw.
4. Push the Loading Ring in the direction of arrow B, and remove the stop washer 2.3 (three points). Remove the Ring Rollers (1), (2) and (3). (Refer to Fig-1)

Installation

5. Clean the Ring Roller shaft with cleaning piece moistened with cleaning fluid.
6. Install the new Ring Rollers (3 pos) in respective shafts. Fix them with stop washers 2.3.
7. Push the Loading Ring Assembly in the direction of arrow C so that it engages with the Ring Rollers (1) and (2).

Adjustment after replacement

8. Perform the Position Adjustment of the Adjustment Ring Roller and the position Adjustment of the Gear Box Assembly. (Refer to section 6-33-1.)
9. Install the P. Guide. (Refer to section 6-18.)



6-30. TAPE THREADING GUIDE REPLACEMENT

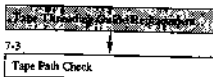
Mode : Unthreading end mode

Tools :

Cleaning piece : 2-034-697-00

Cleaning fluid : 9-919-573-01

Replacement flow chart



Removal

1. Remove the loose-proof nut (M2) from the Ring Roller shaft on the Loading Ring Assembly.
2. Remove the upper flange of the Tape Threading Guide.
3. Remove the Tape Threading Guide with spacer (2×6.5).

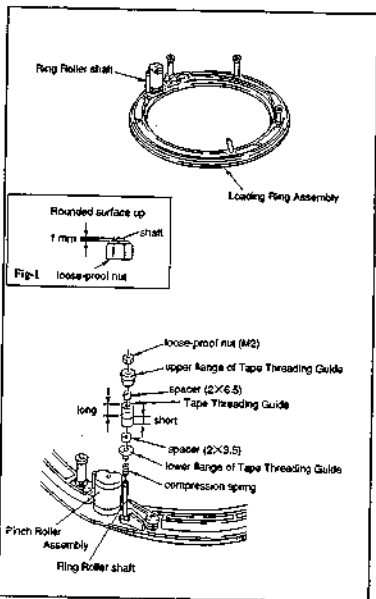
Precaution : Spacer (2×3.5) inserted underneath can be removed together. Take care not to lose it.

Installation

4. Clean the outside surface of the Ring Roller shaft on the Loading Ring Assembly with cleaning piece moistened with cleaning fluid.
5. Install a new Tape Threading Guide into the Ring Roller shaft in the direction as shown.
6. Insert the spacer (2×6.5) into the Ring Roller shaft.
7. Insert the upper flange of the Tape Threading Guide in the Ring Roller shaft with the smaller diameter tip down.
8. Screw in the loose-proof nut until the shaft protrudes about 1 mm above the rounded surface. (Refer to Fig-1)

Adjustment after replacement

9. Perform the Tape Path Check. (Refer to section 7-3.)



6-31. REPLACEMENT OF TAPE THREADING GUIDE UPPER FLANGE

Mode : Unthreading end mode

Replacement flow chart



7-3

Tape Path Check

Removal

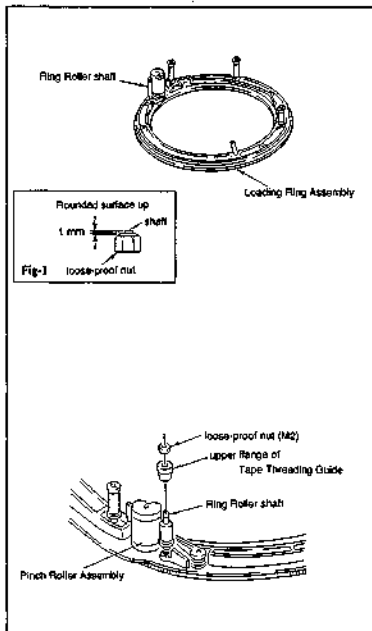
1. Remove the loose-proof nut (M2) from the Ring Roller shaft in the Loading Ring Assembly.
2. Remove the upper flange of the Tape Threading Guide.

Installation

3. Install a new upper flange of the Tape Threading Guide in the Ring Roller shaft with the smaller diameter up down.
4. Screw in the loose-proof nut until the shaft protrudes about 1 mm above the rounded surface. (Refer to Fig-1)

Adjustment after replacement

5. Perform the Tape Path Check. (Refer to section 7-3.)



6-32. GUIDE ROLLER ASSEMBLY REPLACEMENT

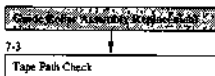
Mode : In the middle of threading

Tools :

Thickness gauge : 9-911-063-00

Flat head 4 mm screw driver : 7-700-730-03

Replacement flow chart



Removal

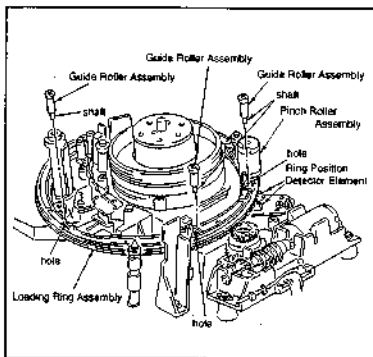
1. Rotate the Loading Ring Assembly until the Pinch Roller Assembly comes in front of the Ring Position Detector Element
2. Unscrew the Guide Roller Assemblies (3 pcs) from the Loading Ring Assembly until they become loose. Remove them.

Installation

3. Install the shaft of the new Guide Roller Assemblies into the corresponding holes of the Loading Ring Assembly. (Refer to Fig.1)
4. Screw in the Guide Roller shafts until they satisfy the specification ⑤.

Adjustment after replacement

5. Perform the Tape Path Check. (Refer to section 7-3.)



Specification :

⑤=0.8 to 0.9 mm

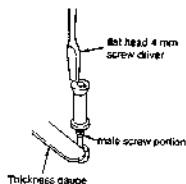
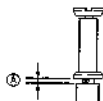


Fig-1

6-33. LOADING RING ASSEMBLY REPLACEMENT

Mode : In the middle of threading

Tools :

Cleaning piece : 2-034-697-00

Cleaning fluid : 9-919-573-01

Replacement flow chart

6-26

Cleaning Roller Assembly Removal

6-23

FE Head Assembly/ Tape Cleaner
Assembly Removal

6-18

P. Guide Removal

Loading Ring Assembly Replacement

6-33-1

Position Adjustment of Adjustment Ring Roller
Position Adjustment of Gear Box Assembly

6-17-1

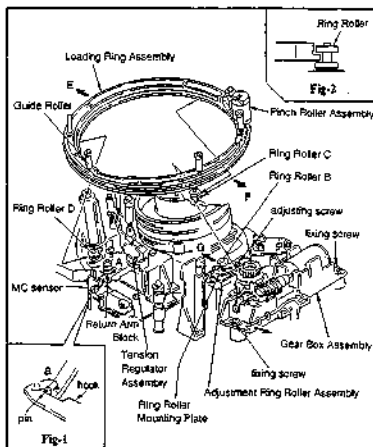
Pinch Press Assembly Position Adjustment

7-3

Tape Path Check

Removal

1. Remove the Cleaning Roller Assembly. (Refer to section 6-27.)
2. Remove the FE Head Assembly/Tape Cleaner Assembly. (Refer to section 6-23.)
3. Remove the P. Guide. (Refer to section 6-18.)
4. Loosen the two fixing screws of the Gear Box Assembly to disengage the gear from the Loading Ring. When disengaged, snugly tighten the two fixing screws.
5. Rotate the Loading Ring with finger until the Guide Roller on the Loading Ring comes in front of the MC sensor.
6. Rotate the Return Arm of the Tension Regulator Assembly in the direction A and lock the pin of the Return Arm on the hook a. (Refer to Fig-1.)
7. Loosen the adjusting screw of the Adjustment Ring Roller Assembly. Push the Ring Roller Mounting Plate in the direction G and snugly tighten the adjusting screw.
8. While pushing the Loading Ring Assembly in the direction of arrow E, remove the Loading Ring Assembly from the Ring Rollers C and D.

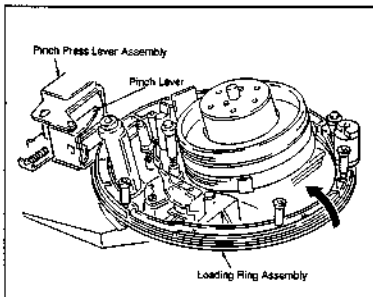


9. Slant the Loading Ring Assembly in the arrow direction as shown in order to escape the mechanism of the Pinch Press Lever, and remove the Loading Ring Assembly.

Precaution : Pay utmost attention not to injure the Drum Assembly, Head, Capstan shaft, Tape Guide shafts, etc.

Installation

10. Clean the three Ring Rollers with cleaning piece moistened with cleaning fluid.
11. Slant a new Loading Ring Assembly as shown, insert it under the Pinch Lever and install it.
12. Install the Loading Ring Assembly in the direction as shown into the Ring Rollers C and D.
13. While pushing the Loading Ring Assembly in the direction F, loosen the adjusting screw, and engage the Ring Roller with the Loading Ring Assembly. Tighten the adjusting screw with no play. (Refer to Fig-2.)
14. Rotate the Loading Ring Assembly in the clockwise direction with finger until it comes to the unthread end position.



Adjustment after replacement

15. Perform the Position Adjustment of the Adjustment Ring Roller, and Position Adjustment of the Gear Box Assembly. (Refer to section 6-33-1.)
16. Perform the P. Guide Installation. (Refer to section 6-18.)
17. Perform the FE Head Assembly/Tape Cleaner Assembly Installation. (Refer to section 6-23.)
18. Perform the Pinch Press Position Adjustment. (Refer to section 6-17-1.)
19. Perform the Tape Path Check. (Refer to section 7-3.)

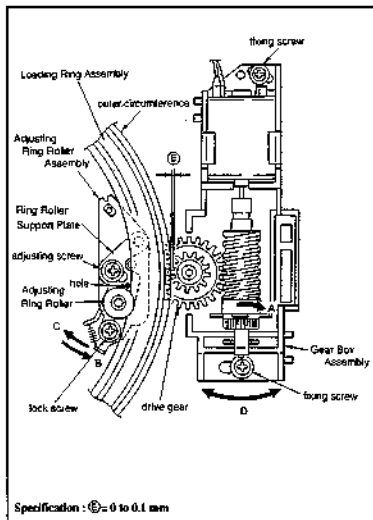
6-33-1. Position Adjustment of the Adjusting Ring Roller/Position Adjustment of the Gear Box Assembly

Tool :

Wire clearance check gauge: J-6152-450-A

Adjustment procedure

1. Rotate the worm gear of the Gear Box Assembly by one to two turns in the direction of Arrow A from the unthreaded end position.
2. Loosen the two fixing screws of the Gear Box Assembly to disengage the gear from the Loading Ring Assembly. Slightly tighten the screws.
3. Loosen the adjusting screw of the Ring Roller Support Plate by 1/4 to 1/2 turn.
4. Loosen the lock screw of the Adjusting Ring Roller Assembly. Push it fully in the direction of Arrow B and tighten the screw.
5. Push the Adjusting Ring Roller fully to the Loading Ring Assembly and tighten the adjusting screw.
6. Move the Gear Box Assembly in the direction D until the clearance (E) between the tooth bottom of the Drive Gear on the Gear Box Assembly and outer circumference of Loading Ring Assembly satisfies the specification. When satisfied, tighten the screws.
7. Loosen the lock screw of the Adjusting Ring Roller Assembly. Push the Adjusting Ring Roller fully in the direction of arrow C and tighten the fixing screw.
8. Move the Loading Ring Assembly with finger and check that there is play.



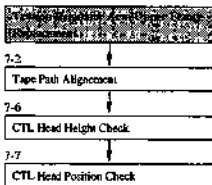
6-34. TENSION REGULATOR ARM UPPER FLANGE REPLACEMENT

Mode : Unthreading end mode

Tool :

L shaped wrench (acroww flat has 0.89 mm) : 7-700-736-06

Replacement flow chart



Removal

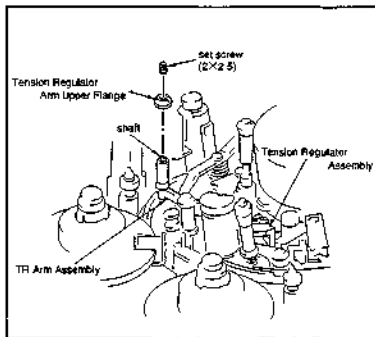
1. Loosen the set screw fixing the Tension Regulator Arm Upper Flange, and remove it.
2. Loosen the Tension Regulator Arm Upper Flange, and remove it.

Installation

3. Screw in the new Tension Regulator Arm Upper Flange into the shaft of the Tension Regulator Arm Assembly by 4 to 5 turns.
4. Install the set screw on the Tension Regulator Arm Upper Flange.

Adjustment after replacement

5. Perform the Tape Path Alignment. (Refer to section 7-2.)
6. Perform the CTL Head Height Check. (Refer to section 7-6.)
7. Perform the CTL Head Position Check. (Refer to section 7-7.)



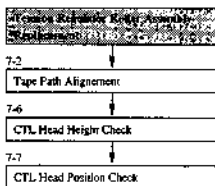
6-35. TENSION REGULATOR ROLLER ASSEMBLY REPLACEMENT

Mode : Unthreading end mode

Tools :

L shaped wrench (across flat has 0.89 mm) ; 7-700-736-06

Replacement flow chart



Removal

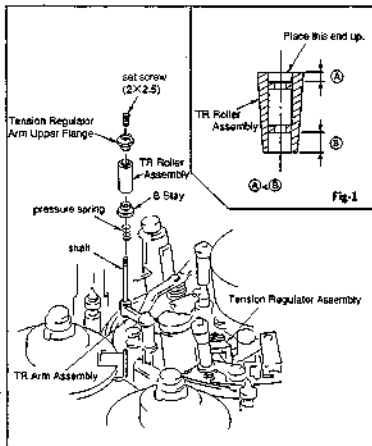
1. Loosen the set screw from the TR Arm Assembly.
2. Loosen the Tension Regulator Arm Upper Flange, and remove the TR Roller Assembly.

Installation

3. Install the pressure spring and B Stay to the shaft of the TR Arm Assembly.
4. Install a new TR Roller Assembly in the TR Arm Assembly shaft in the direction shown in Fig. 1.
5. Screw in the Tension Regulator Upper Flange into the TR Arm Assembly shaft 4 to 5 turns.
6. Install the set screw into the Tension Regulator Upper Flange.

Adjustment after replacement

7. Perform the Tape Path Alignment (Refer to section 7-2.)
8. Perform the CTL Head Height Check. (Refer to section 7-6.)
9. Perform the CTL Head Position Check. (Refer to section 7-7.)



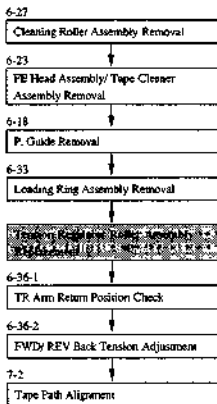
6-36. TENSION REGULATOR ASSEMBLY REPLACEMENT

Mode : Unbredding end mode

Tools :

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Cassette Reference Plate (L)	: J-6320-880-A
Thickness gauge	: J-6041-670-A

Replacement flow chart



Removal

1. Remove the Cleaning Roller Assembly. (Refer to section 6-27.)
2. Remove the FE Head Assembly/ Tape Cleaner Assembly. (Refer to section 6-23.)
3. Remove the P. Guide. (Refer to section 6-18.)
4. Remove the Loading Ring Assembly. (Refer to section 6-33.)

Precaution : Rotate the Upper Drum with finger and stop at the position where video head will not contact the parts to remove.

5. Unplug the connector from TR-84 board.
6. Remove the two fixing screws of Tension Regulator Assembly and remove it from chassis assembly.

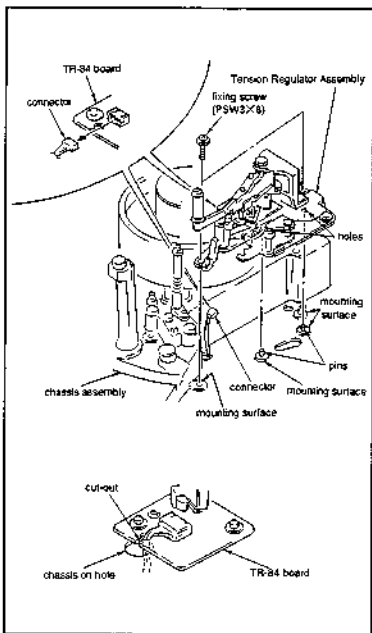
Precaution : Pay utmost attention not to injure tape covering surface of the Upper Drum or guides etc.

Installation

7. Clean the mounting surface of new Tension Regulator Assembly and chassis Assembly with Cleaning piece moistened with cleaning fluid.
8. Align the two holes of Tension Regulator Assembly with the two pins of the chassis Assembly. Assemble with two fixing screws.
9. Insert the connector to TR-84 board. Place the harness on the cut-out of TR-84 board. Remove slack of harness.
10. Install the new Tension Regulator Assembly by reversing the steps from 4 through 1.

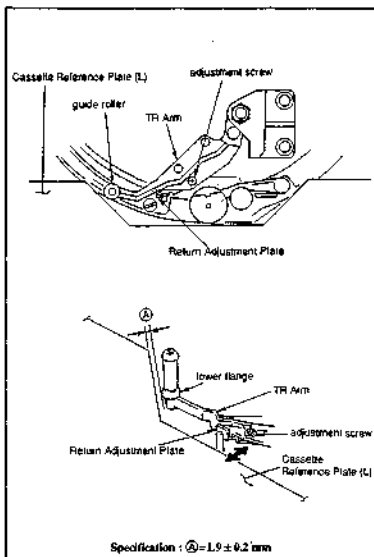
Adjustment after replacement

11. Perform the TR Arm Return Position Check (Refer to section 6-36-1.)
12. Perform the FWD/REV Back Tension Adjustment (Refer to section 6-36-2.)
13. Perform the Tape Path Alignment (Refer to section 7-2.)



6-36-1. TR Arm Return Position Adjustment

1. Turn on the power. Press STOP button to go through threading. Press EJECT button to go through unthreading and put the mechanism in the unthread end mode.
2. Place the Cassette Reference Plate.
3. Check that the clearance between the Cassette Reference Plate and the outer circumference of the lower flange of the TR Arm Guide Roller, satisfies the specification.
4. If the specification is not satisfied, loosen the adjustment screw, move the Return Adjustment Plate in the direction of arrow as shown, until the specification is satisfied. Tighten the adjusting screw.



Adjustment after replacement

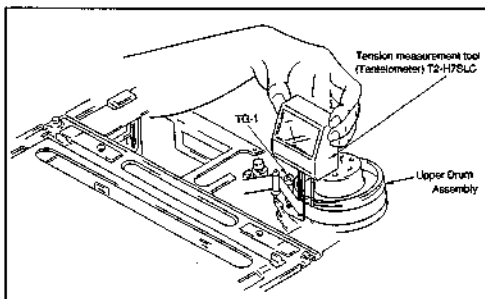
10. Thread a tape and press stop button.



11. Hold the Tenselometer (tension measurement tool) with hand resting on the Cassette Up Compartment as shown. Insert it between the TG-1 and Upper Drum as shown.

Precaution : If the tension measurement tool happens to contact with the Upper Drum Assembly, it may give permanent damage to head tip and drum which will be unusable any more. Pay utmost attention not to contact.

12. Press the right key to display the following screen.
(Machine enters PLAY mode automatically)



13. Keep pressing the Up/Down key until pointer of the tension measurement tool indicates 45 ± 3 g.

14. When the adjustment is complete, press the right key.

15. Keep pressing the Up/Down key until pointer of the tension measurement tool indicates 25 ± 3 g.

16. When the adjustment is complete, press the right key.

17. Confirm that pointer of the tension measurement tool indicates 45 ± 5 g.

18. Press the right key to display the following screen.

(Machine enters REV mode automatically.)

19. Keep pressing the Up/Down key so that the REV back tension becomes 30 ± 3 g.

20. Press the right key to display the following screen.

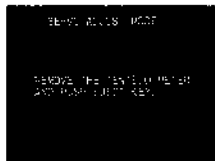
```
REV2 ADJUST MODE  
  
ADJUST TENSION  
WITH UP/DN KEY  
IN RANGE OF 42 ~ 36  
  
NEXT : RT KEY  
CANCEL : MENU KEY
```

```
REV2 ADJUST MODE  
  
ADJUST TENSION  
WITH UP/DN KEY  
IN RANGE OF 42 ~ 36  
  
NEXT : RT KEY  
CANCEL : MENU KEY
```

```
REV3 ADJUST MODE  
  
ADJUST TENSION  
IN RANGE OF 45 ~ 36  
  
NEXT : RT KEY  
CANCEL : MENU KEY
```

```
REV3 ADJUST MODE  
  
ADJUST TENSION  
WITH UP/DN KEY  
IN RANGE OF 30 ~ 36  
  
NEXT : RT KEY  
CANCEL : MENU KEY
```

21. Remove the tension measurement tool paying utmost care not to contact with the drum.
22. Press the EJECT button to eject the cassette tape.

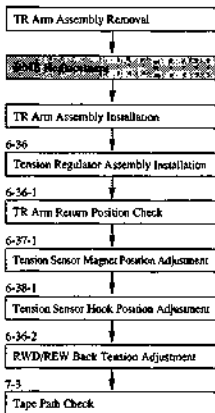


23. Confirm that "COMPLETE" is displayed on monitor screen.



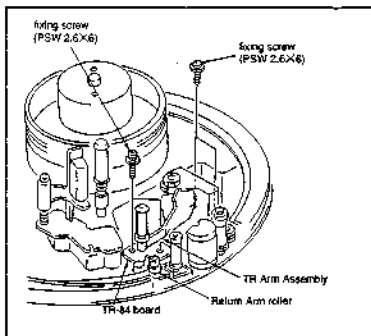
6-37. TENSION SENSOR AND DME REPLACEMENT

Replacement flow chart



Removal

1. Rotate the worm of the Gear Box with finger until roller of the Return Arm comes to the position shown in the figure.
2. Remove the two screws holding the TR Arm Assembly. Remove the TR Arm Assembly.



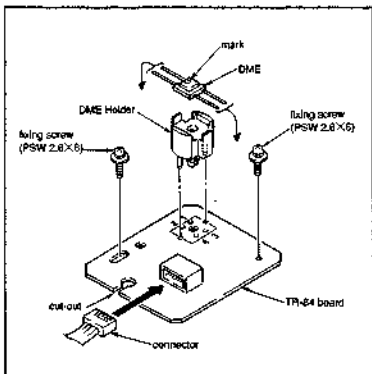
3. Unplug the connector from the TR-84 board.
4. Remove the two screws holding the TR-84 board. Remove the TR-84 board.
5. Unsolder the DME, and remove the DME and DME Holder from the TR-84 board.

Installation

6. Install a new DME into the DME Holder tightly without play. Bend legs of the DME.

Note : Align the \bigcirc marked leg of the DME with the pin No.1 of TR-84 board.

7. Secure the new DME Holder into the TR-84 board tightly. Connect them by soldering.
8. Install the TR-84 board with two fixing screws.
9. Connect the harness to the TR-84 board connector. Place the harness to the cut-out of the TR-84 and remove slack of harness.
10. Install the TR Arm Assembly with two fixing screws.
11. Install the Tension Regulator Assembly with two fixing screws. (Refer to section 6-36.)
12. Perform the TR Arm Return Position Check. (Refer to section 6-36-1.)
13. Perform the Tension Sensor Magnet Position Adjustment. (Refer to section 6-37-1.)
14. Perform the Tension Sensor Hook Position Adjustment. (Refer to section 6-38-1.)
15. Perform the RWD/REV Back Tension Adjustment. (Refer to section 6-36-2.)
16. Perform the Tape Path Check. (Refer to section 7-3.)



6-37-1. Tension Sensor Magnet Position Adjustment

Mode : Threading end mode

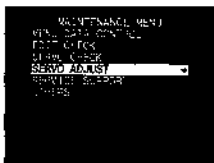
Tools :

- TR Arm Position Adjustment Tool Parallelism part 3×12 : 3-703-360-09
- Eccentric screw driver : 3-702-890-02
- or
- Flat head 3 mm screw driver : 7-700-750-01

Preparation :

Connect a video monitor to the VIDEO OUTPUT 2 connector to display the characters.

1. Remove the Cassette Up Compartment.
2. After power is turned ON, press the eject key.
3. Display the "MAINTENANCE MENU" on the monitor screen. (Refer to section 4.)
4. Select "SERVO ADJUST" from the menu by Up/Down key.
5. Press the right key to display the following screen.



6. Select "TENSION" from the servo adjustment menu by Up/Down key
7. Press the right key to display the following screen.



8. Select "MAGNET & HOOK POS." from the Tension Servo Adjustment menu by Up/Down key.
9. Press the right key to display the following screen.

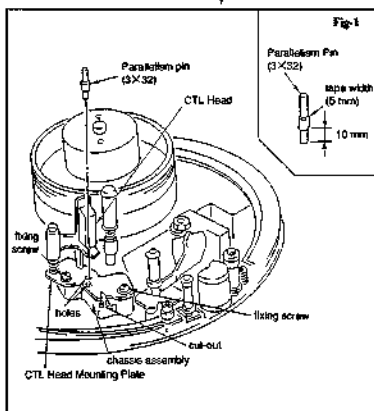


10. When preparation is ready, press YES key to start the adjustment.



Adjustment after replacement

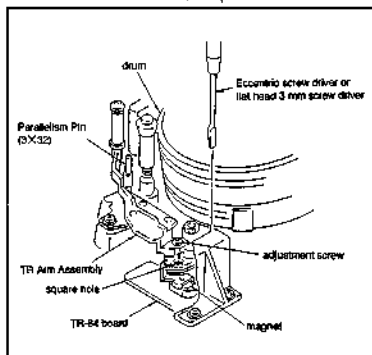
11. Wrap a 5 mm width vinyl tape 1 to 2 mm around the Parallelism Pin at the position of 10 mm from its end. (Refer to Fig-1)
12. Loosen the two fixing screws 1/2 to 1 mm holding the CTL Head Assembly.
13. Insert a flat (head) screw driver tip into the cut-out of the CTL Head Mounting Plate. Adjust the position so that the hole of the CTL Head Mounting Plate and the hole of the chassis are aligned.
14. Insert Parallelism Pin seeing the TR Arm Position passing through the hole of the CTL Head Mounting Plate and the hole of the chassis.



15. Press the right key to display the following screen.
16. Loosen the adjustment screw of the TR Arm Assembly.
17. Insert a flat (head) screw driver tip into the square hole of the TR Arm Assembly. Adjust the position by rotating the magnet so that the HIGH/LOW is changed to "OK" on the monitor display.

Note 1: Magnet position is very delicate. Adjust with enough attention.

Note 2: Pay utmost attention not to contact the tools with drum.



18. Press the right key to display the following screen.
19. Remove the Parallelism Pin.
20. Press the right key to display the following screen.
21. Perform the Tension Sensor Hook Position Adjustment. (Refer to 6-36-1.)

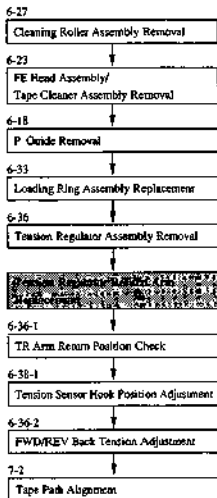


6-38. TENSION REGULATOR RETURN ARM REPLACEMENT

Tools:

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Sony grease (SGL-505)	: 7-662-010-04

Replacement flow chart



Removal

1. Remove the Cleaning Roller Assembly.
(Refer to section 6-27.)
2. Remove the PE Head Assembly/Tape Cleaner Assembly (Refer to section 6-23.)
3. Remove the P. Guide (Refer to section 6-18.)
4. Remove the Loading Ring Assembly.
(Refer to section 6-23.)
5. Remove the Tension Regulator Assembly.
(Refer to section 6-36.)
6. Remove the tension coil spring hooked on the Return Arm.
7. Remove the two fixing screws from the TR Arm Assembly. Remove the leaf spring and protector together.
8. Remove the E-ring 2.3 from the shaft of Tension Regulator Assembly. Remove the Return Arm.

Installation

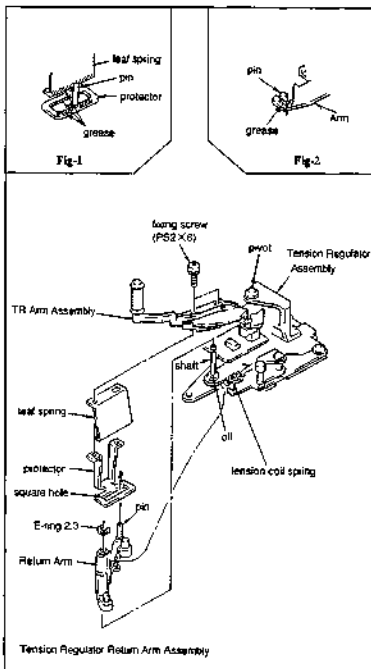
9. Clean the shaft of the Tension Regulator Assembly with cleaning place moistened with cleaning fluid. Apply a drop oil on the shaft surface.
10. Install a new Return Arm into the shaft and secure it with E-ring 2.3.
11. Assemble the leaf spring and protector as shown. Install them to the TR Arm Assembly while the Return Arm Pin enters the square hole of the protector, as shown. Secure them with two screws.

Precaution : When securing them, do not apply force to the pivot of the TR Arm Assembly.

12. Hook the tension coil spring on the Return Arm.
13. Coat grease thin on the protector, leaf spring and Arm. (Refer to Fig-1, Fig-2)
14. Install the Tension Regulator Assembly.
(Refer to section 6-36.)

Adjustment after replacement

15. Perform the TR Arm Return Position Check.
(Refer to section 6-36-1.)
16. Perform the Tension Sensor Hook Position Adjustment. (Refer to section 6-38-1.)
17. Perform the FWD/REV Back Tension Adjustment.
(Refer to section 6-36-2.)
18. Perform the Tape Path Alignment.
(Refer to section 7-2.)



6-38-1. Tension Sensor Hook Position Adjustment.

Mode : Threading end mode

Tool : Tension Sensor Adjustment Tape Tool
(Refer to section 6-1.)
(Hook Position Adjustment Tape Tool)

Preparation :

Connect a video monitor to the VIDEO OUTPUT 2 connector to display the characters.

Replacement flow chart

1. Remove the Cassette Up Comparison.
2. After power is turned ON, press the eject key.
3. Display the "MAINTENANCE MENU" on the monitor screen. (Refer to section 4.)
4. Select "SERVO ADJUST" from the menu by Up/Down key.
5. Press the right key to display the following screen.
6. Select "TENSION" from the servo adjustment menu by Up/Down key
7. Press the right key to display the following screen.

8. Select "HOOK POS." from the Tension Servo Adjustment menu by Up/Down key.
9. Press the right key to display the following screen.

10. When preparation is ready, press YES key to start the adjustment.



SERVO ADJUST MODE

PERFORM ADJUSTMENTS
REFERRING TO SERVICE
MANUAL (6-38)

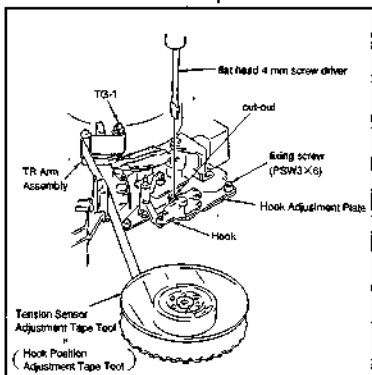
FOR THE HOOK POSITION
ADJUSTMENT, THE
SPRINGS ARE ON

NEXT: [RIGHT] KEY
CANCEL: [LEFT] KEY

Adjustment after replacement

11. Place the Tension Sensor Adjustment Tape Tool on the supply reel as shown. Hook its top loop on TG-1.

Thread the tape in the normal tape path as shown.



12. Press the right key to display the following screen.
13. Loosen slightly the fixing screw of the Hook Adjustment Plate.
14. Insert a flat head screw driver tip into the cut-out of the Hook Adjustment Plate so that the HIGH/LOW is changed to "OK" on the monitor display.
15. Press the right button to display the following screen.

SERVO ADJUST MODE

ADJUST THE POSITION OF
THE HOOK SUCH THAT THE
INDICATION BEARS "OK"

OK

NEXT: [RIGHT] KEY
CANCEL: [LEFT] KEY

16. Remove the Tension Sensor Adjustment Tape Tool.
17. Press the EJECT button.
18. Set the switches on SS-53 board S201-1 and -4 to off. (Refer to section 6-3.)



SECTION 7 TAPE PATH ALIGNMENT

7-1. GENERAL INFORMATION FOR TAPE PATH ADJUSTMENT

1. ALIGNMENT TAPE

The following alignment tapes are used in the tape path adjustment:

- CR2-1B PS : 8-960-096-51
- CR5-1B PS : 8-960-096-91
- CR8-1B PS : 8-960-096-86

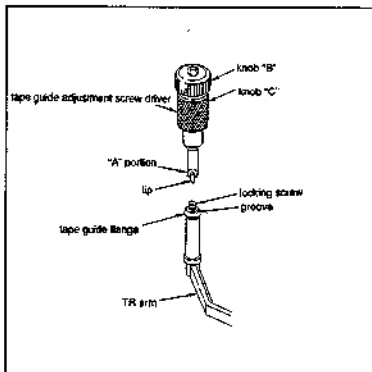
2. TAPE GUIDE ADJUSTMENT SCREW DRIVER

: J-6321-500-A

This tape guide adjustment screw driver is used to rotate the upper flange of the TR arm guide roller during tape path (entrance side) alignment. Operating procedure of this tape guide adjustment screw driver is described below.

- (1) Align the "A" portion with the groove of tape guide.
- (2) Hold the knob "C" and rotate the knob "B" which loosens the locking screw.
- (3) Align the knob "B" up with the hole of the tape guide locking screw. Hold the knob "B" and rotate the knob "C" which rotates the upper flange of the tape guide.
- (4) To tighten the locking screw of the tape guide flange, hold the knob "C" and rotate the knob "B" which tightens the locking screw.

Tightening torque : 0.1 to 0.12 N · m
(1.0 to 1.2 kgf · cm)



3. OTHER TAPE GUIDE ADJUSTMENT SCREW DRIVER

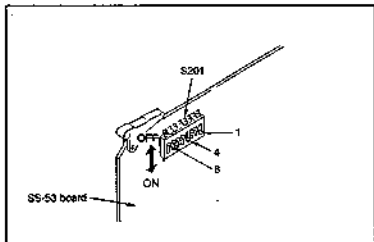
Use the box driver with 4.5 mm diagonal size

4. USE OF CASSETTE COMPARTMENT

Attach the cassette compartment during the tape path alignment. It enables more accurate adjustments.

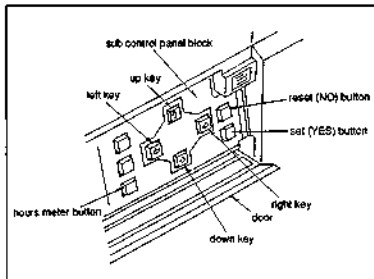
5. USE OF VIDEO TRACKING CONTROL

- (1) The Video Tracking Control potentiometer is not equipped in this unit. The video tracking can be changed by setting the SS-53 board switch S201-1 to on and pressing the Left key or Right key on the Sub Control Panel.
(The S201 switches are all set to off when shipped from factory.)
- (2) When the RESET (NO) button is pressed, the video tracking is reset to the tracking center position.
When the power is turned off, the video tracking is reset to the tracking center position.



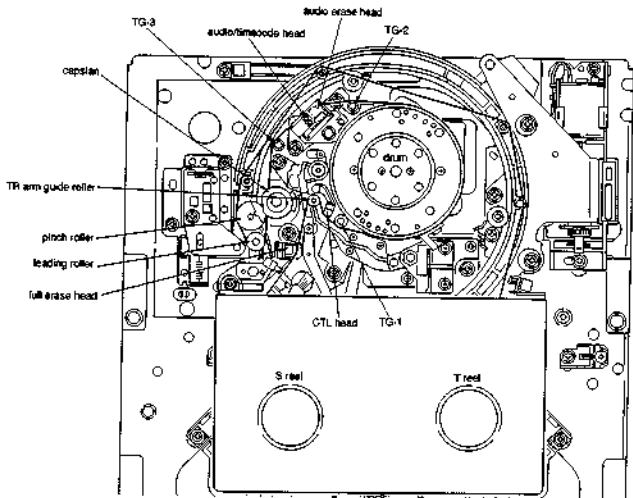
6. TAPE PATH ALIGNMENT PREPARATION

- (1) Set the SS-53 board switch S201-1 to on.
- (2) Clean the tape contacting surface of tape guides, drum, video head, etc., with cleaning piece soaked with cleaning fluid.
- (3) REV mode cannot be established with this unit alone. Use a remote control unit (SYRM-100) or controller (RM-150 and others) to establish REV mode.

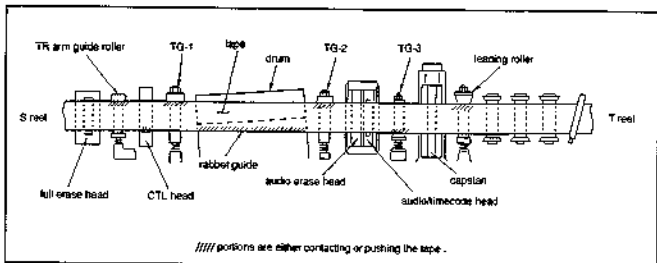


7. LOCATION OF HEADS AND TAPE GUIDES

Location of heads and tape guides referred to in the alignment procedure is shown below.



8. TAPE PATH DIAGRAM



9. LIST OF MEASUREMENT POINTS/SIGNALS FOR ADJUSTMENT

SIGNAL NAME	BOARD NAME	TP TERMINAL (ADDRESS)	MARKING ON BOARD
VIDEO RF Y-Ach	VP-43P/VP-43AP	TP101 (L-2)	YA
VIDEO RF Ycb	VP-43P/VP-43AP	TP103 (L-1)	Y RF
VIDEO RF C cb	VP-43P/VP-43AP	TP301 (H-1)	C RF
SWICHING PULSE Ycb	VP-43P/VP-43AP	TP102 (P-1)	Y SW
GND	VP-43P/VP-43AP	E102 (N-1)	GND
CTL SIGNAL	SS-53	TP225 (C-1)	CTL SKO
CTL PULSE	SS-53	TP203 (D-1)	CTL PULSE
GND	SS-53	E201 (D-1)	GND
AUDIO OUT CH-1	AP-31P/AP-31AP	TP5 (G-1)	DLVL 1
GND	AP-31P/AP-31AP	E2 (G-1)	GND
AUDIO OUT CH-2	AP-31P/AP-31AP	TP205 (D-1)	DLVL 2
GND	AP-31P/AP-31AP	E202 (E-1)	GND
TIME CODE	AP-31P/AP-31AP	TP403 (D-1)	LTC EQ

7-2. TAPE PATH ALIGNMENT

The tape path alignment is very important adjustment to run a tape in the optimum conditions.

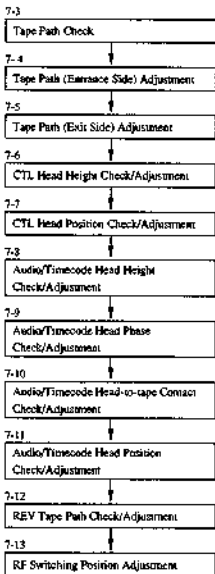
If this alignment is incorrect, tape may be injured.

Pay utmost attention when performing this adjustment.

Attach the cassette compartment when performing the tape path alignment.

It enables more accurate adjustments.

Adjustment flow chart



Caution: When any one of the adjustments is performed, check all the subsequent items in the order of flow chart.

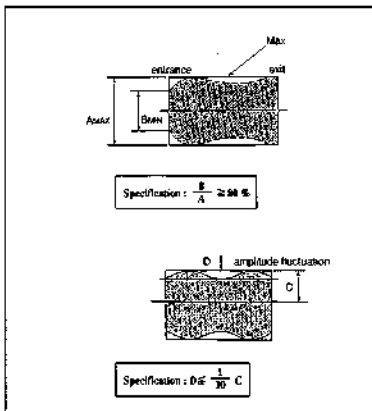
7-3. TAPE PATH CHECK

Tools :

- Cleaning piece : 2-034-697-00
- Cleaning fluid : 9-919-573-01
- Alignment tape CR2-1B PS : 8-960-096-51
- Adjustment inspection mirror : J-6080-029-A
- Dual trace oscilloscope

Check procedure

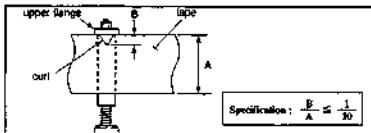
1. Connect an oscilloscope.
 - CH-1 : TP101/VP-43P, VP-43AP board (L-2)
 - CH-2 : TP102/VP-43P, VP-43AP board (P-1)
 - TRIG : CH-2
2. Playback the alignment tape CR2-1B PS.
3. Press the Left or Right key on the sub control panel for the maximum RF envelope.
4. This envelope must satisfy the specifications of B/W versus A/MAX amplitude ratio.
5. Amplitude fluctuation of this RF envelope must satisfy the specifications at entrance, center and exit.



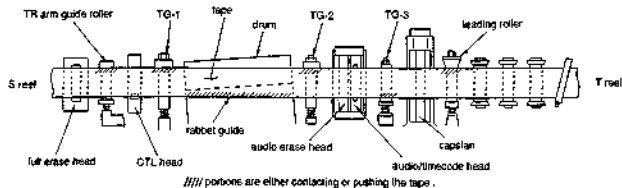
6. The RF envelope must satisfy the specifications of steps 4 and 5, and at the same time must satisfy the tape curl specifications at each guide.

• Tape curl specifications:

- (1) Amount of tape curl at the upper flanges of the TR arm guide roller, TG-1, TG-2 and the leading guide must be less than 1/10 of tape width.
- (2) Tape curl must not exist at drum rubber guide (entrance and exit) and TG-3.

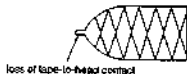


Tape path condition



Specification: Any partial loss of tape-to-head contact must not occur.

7. The RF envelope must not have any partial loss of tape-to-head contact in FF and REW modes.



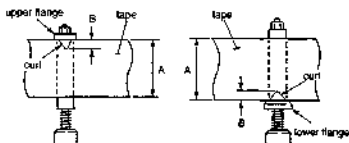
8. Tape path in FF and REW modes must satisfy the following tape path specifications at each guide.

• Tape curl specifications:

- (1) Amount of tape curl at the upper flanges of the TR arm guide roller, TG-1, TG-2 and the leading guide roller must be less than 1/10 of tape width. That at the lower flange of TG-3 must meet this specifications too.
 - (2) Tape curl must not exist at drum rubber guide (entrance and exit).
9. If the tape path does not satisfy the specifications from steps 4 through 8, perform the section "7-4. Tape Path (Entrance Side) Adjustment" and "7-5. Tape Path (Exit Side) Adjustment".

Specifications of tape curl at the upper flange

Specifications of tape curl at the lower flange



Specification: $\frac{B}{A} \leq \frac{1}{10}$

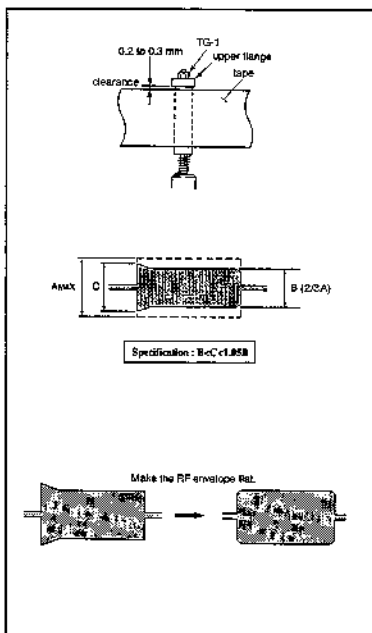
7-4. TAPE PATH (ENTRANCE SIDE) ADJUSTMENT

Tools :

Cleaning piece	: 2-034-697-00
Cleaning fluid	: 9-919-573-01
Alignment tape CR2-1B PS	: 8-960-096-51
Tape guide adjustment screw driver	
	: J-6321-500-A
Adjustment inspection mirror	: J-6080-029-A
Dual trace oscilloscope	
Box driver (diagonal length 4.5 mm)	

Adjustment procedure

1. Connect an oscilloscope.
CH-1 : TP101/VP-43P, VP-43AP board (L-2)
CH-2 : TP102/VP-43P, VP-43AP board (P-1)
TRIG : CH-2
2. Playback the alignment tape CR2-1B PS.
3. While running a tape in play mode, loosen the TG-1 nut so that a clearance is generated between TG-1 upper flange and tape.
4. Press the Left key on the sub control panel so that RF signal amplitude is decreased to 2/3.
5. Loosen the screw fixing the TR arm guide roller upper flange. Adjust height of the upper flange until the specifications is satisfied. After adjustment, tighten the fixing screw.
6. Adjust height of TG-1 using the nut until the RF envelope is flat.
7. The tape cut at the upper flanges of the TR arm guide roller and TG-1 must be less than 1/10 of tape width.
8. Establish REV \times 1 tape speed. The tape cut at the upper flanges of the TR arm guide roller and TG-1 must be less than 1/10 of tape width.



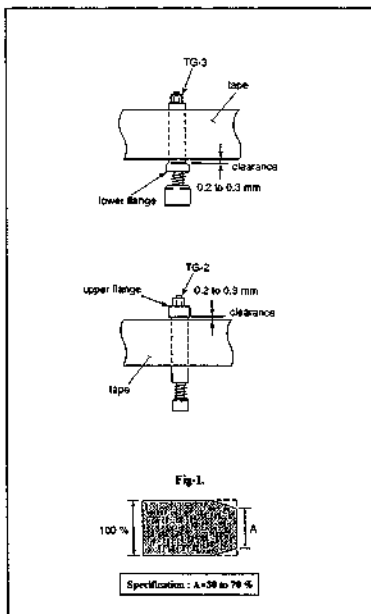
7-5. TAPE PATH (EXIT SIDE) ADJUSTMENT

Tools :

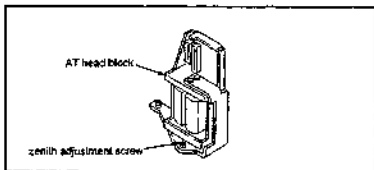
- Cleaning piece : 2-034-697-00
- Cleaning fluid : 9-919-573-01
- Alignment tape CR2-1B PS : 8-960-096-51
- Adjustment inspection mirror : J-6080-029-A
- Dual trace oscilloscope
- Box driver (diagonal length 4.5 mm)
- 2 mm screw driver

Adjustment procedure

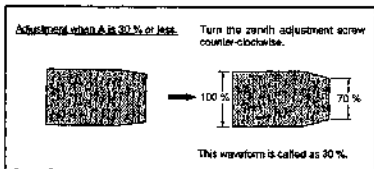
1. Connect an oscilloscope.
 - CH-1 : TP101/VP-43P, VP-43AP board (L-2)
 - CH-2 : TP102/VP-43P, VP-43AP board (P-1)
 - TRIG : CH-2
2. Playback the alignment tape CR2-1B.
3. While running the tape in play mode, loosen the TG-3 nut so that a clearance is generated between TG-3 lower flange and tape.
4. Press the Left and Right key on the sub control panel for the maximum RF envelope.
5. Loosen the TG-2 nut so that a clearance is generated between TG-2 upper flange and tape.
6. The RF envelope must satisfy the specifications shown. (Refer to Fig-1.)



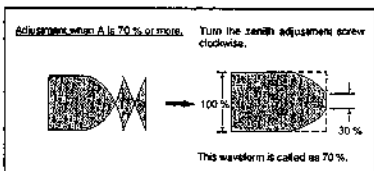
7. If the specifications A in step 6 is not satisfied, adjust the zenith adjustment screw of the AT head.



- (1) If the specifications A is 30% or less, turn the zenith adjustment screw of the AT head counter-clockwise as shown.



- (2) If the specifications A is 70% or more, turn the zenith adjustment screw of the AT head clockwise as shown.



8. (1) While the tape top is contacting with the TG-2 upper flange, adjust the TG-2 nut so that the RF signal amplitude becomes 2/3 of the maximum amplitude.

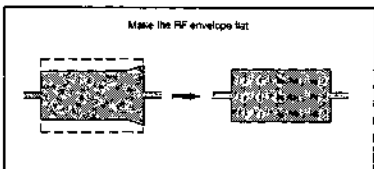
(2) Adjust for the flat RF envelope as exit.

9. Loosen and adjust the TG-3 nut to remove and not to make clearance between tape bottom edge and TG-3 lower flange.

10. The amount of tape curl in the play mode must satisfy the conditions below.

(1) Amount of tape curl at the TG-2 upper flange must be less than 1/10 of tape width.

(2) There must exist no tape curl at TG-3 lower flange.



7-6. CTL HEAD HEIGHT CHECK/ADJUSTMENT

Tools :

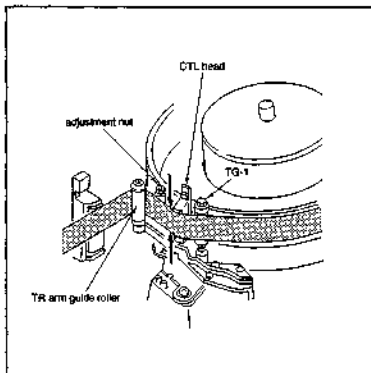
- Alignment tape CR8-1B PS : 8-960-096-86
- Dual trace oscilloscope
- Box driver (diagonal length 4.5 mm)

Check procedure

1. Connect an oscilloscope
CH-1 : TP225/SS-53 board (C-1)
2. Playback the 1 kHz recorded segment 1 kHz, 0 VU (8:00 to 10:00) on the CTL track of the alignment tape CR8-1B PS.
3. Press the tape (between the CTL head and TR arm guide roller) as shown with finger, and check that the RF signal level decreases.

Adjustment procedure

4. In the case that the signal level increases when the tape is pushed up, turn the adjustment nut as shown in clockwise for the maximum output.
5. In the case that the signal level increases when the tape is pressed down, turn the adjustment nut as shown in counter-clockwise for the maximum output.



7-7. CTL HEAD POSITION CHECK/ADJUSTMENT

Tools:

Alignment tape CR2-(BFS) 8-960-096-51

Dual trace oscilloscope

Box driver (diagonal length 4.5 mm)

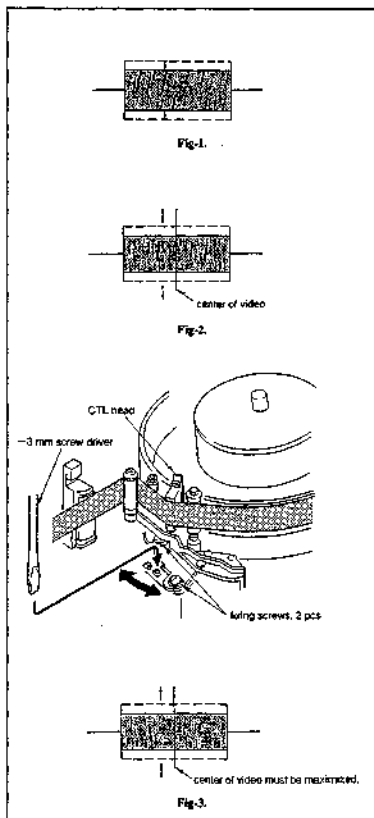
-3 mm screw driver

Check procedure

1. Connect an oscilloscope.
CH-1 : TP101/VP-43P, VP-43AP board (L-2)
CH-2 : TP102/VP-43P, VP-43AP board (P-1)
TRIG : CH-2
2. Playback the alignment tape CR2-1B.
3. Running the tape in play mode, press the RESET button on the sub control panel to set the video tracking in the center position.
4. Press the Left and Right keys on the sub control panel which shift the video tracking. Check that the RF signal amplitude decreases when the video tracking is off tracking. (Refer to Fig-1.)
5. Press the RESET (NO) button on the sub control panel. Check that the center of the RF envelope has the maximum amplitude. (Refer to Fig-2.)
6. If the requirements in steps 4 and 5 are not satisfied, perform the next adjustment.

Adjustment procedure

7. Loosen the two screws fixing the CTL head ax'y about 1/2 turn. Insert -3 mm screw driver tip into the cut-out of the base. Move the CTL head in the direction shown by arrow to obtain the maximum amplitude at the center of the RF envelope. (Refer to Fig-3.)



7-8. AUDIO/TIMECODE HEAD HEIGHT CHECK/ADJUSTMENT

Tools:

Alignment tape CR8-1B PS : 8-960-096-86

Dual trace oscilloscope

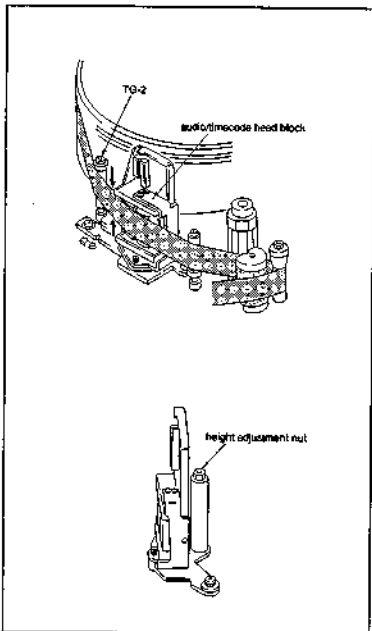
Box driver (diagonal length 4.5 mm)

Check procedure

1. Connect an oscilloscope.
CH-1 : TP5/AP-31P, AP-31AP board (G-1)
CH-2 : TP205/AP-31P, AP-31AP board (D-1)
2. Set the SS-53 board switch S201-5 to on.
3. Playback the 1 kHz, 0 VU (8:00 to 10:00) segment which is the last segment of the alignment tape CR8-1B PS.
4. Press down the portion of the tape as shown (between audio/timecode head and TG-2 tape guide), or push up and check that audio level decreases in both cases.
If the level does not decrease, perform the following adjustment.

Adjustment procedure

5. Adjust the height adjustment nut using the boxing driver for the maximum level of both CH-1 and CH-2.
After completing the adjustment, be sure to perform the following check/adjustment items.
6. Perform the Audio / Timecode Head Phase Check / Adjustment. (Refer to section 7-9.)
7. Perform the Audio / Timecode Head-to-tape contact Check / Adjustment.
(Refer to section 7-10.)
8. Perform the Audio / Timecode Head Position Check / Adjustment. (Refer to section 7-11.)
9. Perform the Audio / Timecode Head Height Check / Adjustment. (Refer to section 7-8.)
10. Set the SS-53 board switch S201-5 to off.



7-9. AUDIO/TIMECODE HEAD PHASE CHECK/ADJUSTMENT

Preparation

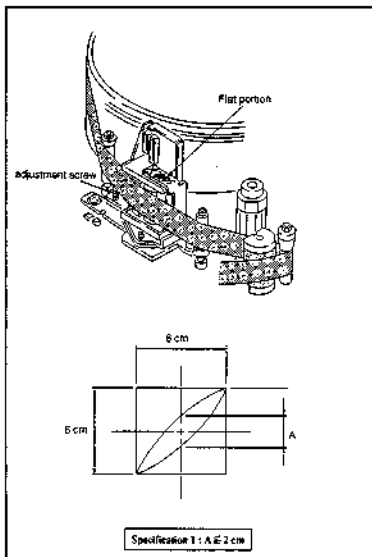
Set switch S201-2 (DOLBY switch) on SS-53 board to ON. (Refer to section 6-1.)

Tools:

Alignment tape CR8-1B PS : S-960-096-86
Dual trace oscilloscope
-2 mm screw driver

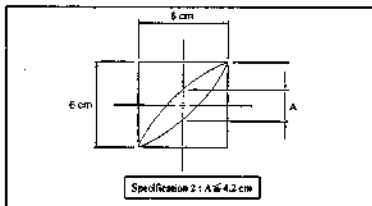
Check procedure

1. Connect an oscilloscope.
CH-1 : TP5/AP-31P, AP-31AP board (G-1)
CH-2 : TP20S/AP-31P, AP-31AP board (D-1)
2. Playback the audio 10 kHz, -10 VU (3:00 to 4:55) segment of the alignment tape CR8-1B PS.
3. Obtain the Lissajous waveform on the oscilloscope. Set the vertical and horizontal amplitudes to 6 mm respectively.
4. The vertical amplitude at the center of horizontal direction must satisfy the specifications.



Adjustment procedure

5. If the specifications is not satisfied, turn the adjustment screw shown to satisfy the specification 1.
After completing this adjustment, be sure to perform the following items.
6. Tap then the flat portion of the head with screw driver tip as shown. Check that the phase specification 2 is satisfied.
7. Perform the Audio / Timecode Head Height Check/Adjustment. (Refer to section 7-8.)
8. Perform the Audio / Timecode Head Phase Check / Adjustment. (Refer to section 7-9.)
9. Perform the Audio / Timecode Head-to-tape contact Check / Adjustment. (Refer to section 7-10.)
10. Perform the Audio / Timecode Head Position Check / Adjustment. (Refer to section 7-11.)



7-10. AUDIO/TIMECODE HEAD-TO-TAPE CONTACT CHECK/ADJUSTMENT

Tools :

- Alignment tape CR8-1B PS . 8-960-096-86
- Dual trace oscilloscope
- 2 mm screw driver

Check procedure

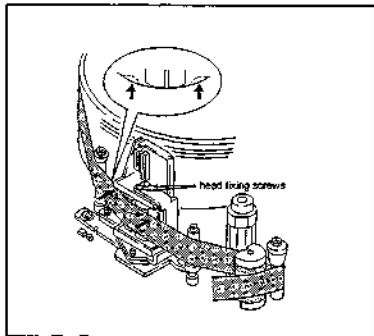
1. Connect an oscilloscope.
 - CH-1 : TP5/AP-31P, AP-31AP board (G-1)
 - CH-2 : TP205/AP-31P, AP-31AP board (D-1)
2. Playback the audio 10 kHz, -10 VU (3:00 to 4:55) segment of the alignment tape CR8-1B PS.
3. Press down the tape at both sides of the audio/timecode head lightly and check that audio level does not increase.
If the level increases, perform the following adjustment.

Adjustment procedure

4. Turn the two head fixing screws as shown by 1/4 to 1/2 turn to rotate the head so that the maximum playback level is obtained in both channels.
5. Tighten the head fixing screw
Tightening torque: 0.2 to 0.3 N · m
(2 to 3 kgf · cm)
6. Press down the tape at both sides of the audio/timecode head lightly and check that audio level of both channels do not increase.

After completing this adjustment, be sure to perform the following steps:

7. Perform the Audio / Timecode Head Height Check / Adjustment. (Refer to section 7-8.)
8. Perform the Audio / Timecode Head Phase Check / Adjustment. (Refer to section 7-9.)
9. Perform the Audio / Timecode Head-to-tape contact Check / Adjustment. (Refer to section 7-10.)
10. Perform the Audio / Timecode Head Position Check / Adjustment. (Refer to section 7-11.)



7-11. AUDIO/TIMECODE HEAD POSITION CHECK/ADJUSTMENT

Tools :

- Alignment tape CR2-1B PS : 8-960-096-51
- Dual trace oscilloscope
- +3 mm screw driver
- 3 mm screw driver

Check procedure

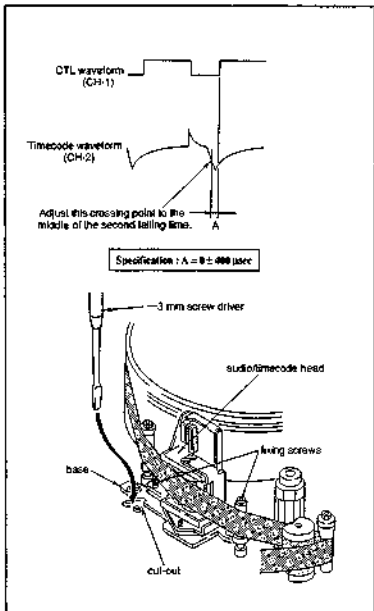
1. Connect an oscilloscope.
CH-1 : TP203/SS-53 board (D-1)
CH-2 : TP403/AP-31P, AP-31AP board (D-1)
TRIG : CH-1
2. Playback the alignment tape CR2-1B PS.
3. Check that the timecode waveform time difference with respect to CTL waveform satisfies the specifications.
If the specifications is not satisfied, perform the following adjustment.

Adjustment procedure

4. Loosen the two head fixing screws as shown by 1/4 to 1/2 turn.
5. Insert -3 mm screw driver tip into the cut-out of base. Adjust to satisfy the specifications.
6. Tighten the head fixing screw.

After completing this adjustment, be sure to perform the following items.

7. Perform the Audio / Timecode Head Height Check / Adjustment. (Refer to section 7-8.)
8. Perform the Audio / Timecode Head Phase Check / Adjustment. (Refer to section 7-9.)
9. Perform the Audio / Timecode Head-to-tape contact Check / Adjustment. (Refer to section 7-10.)
10. Perform the Audio / Timecode Head Position Check / Adjustment. (Refer to section 7-11.)



7-12. REV TAPE PATH CHECK/ADJUSTMENT

Tools :

Alignment tape CR5-1B PS : 8-960-096-91

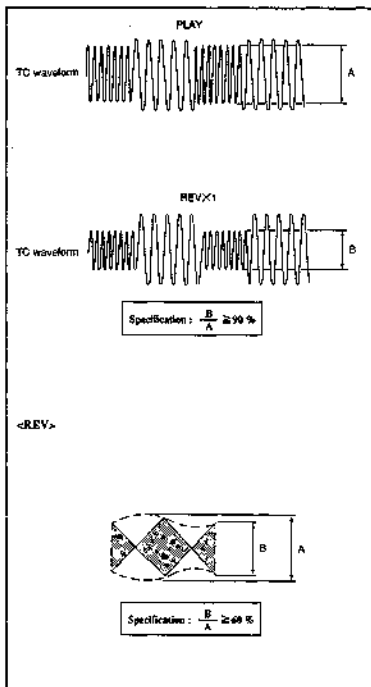
Alignment tape CR2-1B PS : 8-960-096-51

Dual trace oscilloscope

Box driver (4.5 mm diagonally)

Check procedure

1. Connect an oscilloscope.
CH-1 : TP403/AP-31P, AP-31AP board (D-1)
2. Playback the alignment tape CR5-1B PS and establish the play mode. Take note of the timecode output level "A".
3. Establish the REV $\times 1$ mode. Compare the timecode output level "B" with that of play mode. Check that the specifications is satisfied.

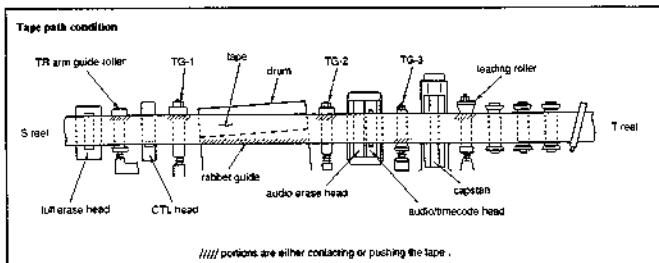


4. Connect an oscilloscope
CH-1 : TP101/VP-43P, VP-43AP board (L-2)
CH-2 : TP102/VP-43P, VP-43AP board (P-1)
TRIG : CH-2
5. Playback the alignment tape CR2-1B PS in REV $\times 1$ mode. Check that RF waveform satisfies the specifications.

6. (1) The tape curl at the upper flanges of the TR arm guide roller, TG-1, TG-2, TG-3 and leading roller must be less than 1/30 of tape width.
- (2) There must not exist tape curl at drum rabbit guide (entrance and exit).
7. Switch the mode from play to REV $\times 1$ tape speed. Check that the tape wrinkle disappears within one second between the leading roller - capstan - TG-3.
8. If the specifications in steps 3, 6 and 7 are not satisfied, perform the following adjustment

Adjustment procedure

9. Adjust height of the leading roller to remove the tape wrinkle between the leading roller - capstan - TG-3, when switching between play - REV $\times 1$ is repeated. The timecode output level must satisfy the step 5 specifications.
10. If the specifications in step 5 is not satisfied, check the following tape path.



7-13. RF SWITCHING POSITION ADJUSTMENT

After the tape path alignment (refer to section 7-2), make sure to perform the RF switching adjustments.

RF switching pulse has the AUTO and MANUAL mode adjustments.

Perform this adjustment in AUTO mode first. If the adjustment in AUTO cannot generate satisfactory result, perform this adjustment in MANUAL mode.

Preparation

Connect the video monitor to the VIDEO OUTPUT 2 connector on the rear panel in order to display the characters.

Tools :

Alignment tape CR2-1B PS : 8-960-096-51

[AUTO Adjustment]

1. Display "MAINTENANCE MENU" on the monitor.
 - (1) Press the menu key while holding down the left arrow key on the subcontrol panel to display "MAINTENANCE MENU".
 2. Press the up or down arrow key to select "SERVO ADJUST".
 3. Press the right arrow key to display screen ①.
 4. Press the up or down arrow key to select "RF SWITCHING POSITION".
 5. Press the right arrow key to display screen ②.
 6. Press the up or down arrow key to select "AUTO".



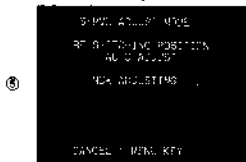
7. Press the right arrow key to display screen ② "START OK".



8. Press the YES key.



9. Play back alignment tape CR2-1B PS. The unit enters the automatic adjustment mode of the RF switching position.



10. The adjustment is completed, and ⑧ "COMPLETE" is displayed.

Note : When the "ADJUSTMENT INCOMPLETE" is displayed on the monitor, check that the alignment tape is CR2-1B PS.

11. The alignment tape is automatically ejected after the adjustment is completed.
12. Press the left arrow key twice to return to screen ①.
13. To save the adjustment data, execute "SAVE ADJUSTING DATA" of "SAVE/LOAD CONTROL".
14. Press the menu key to display "MAINTENANCE MENU".



[MANUAL Adjustment]

1. Connect an oscilloscope.
CH-1 : TP-103/VP-43P and VP-43AP board (L-1)
CH-2 : TP-102/VP-43P and VP-43AP board (P-1)
TRIG : CH-2
2. Display "MAINTENANCE MENU" on the monitor.
(1) Press the menu key while holding down the left key of the subcontrol panel to display MAINTENANCE MENU. Then the modes are displayed on the monitor.
3. Press the up or down arrow key to select "SERVO ADJUST".



4. Press the right arrow key to display screen ①.
5. Press the up or down arrow key to select "RF SWITCHING POSITION".

①



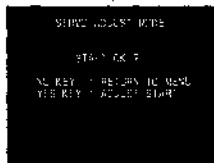
6. Press the right arrow key to display screen ②.
7. Press the up or down key to select "MANUAL".

②



8. Press the right key to display screen ③ "START OK?".
9. Press the YES key.

③



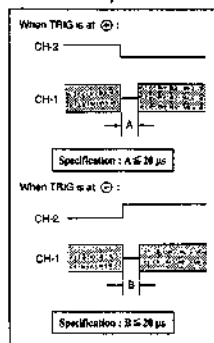
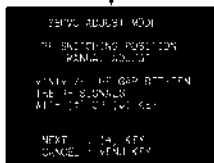
10. Play back alignment tape CR2-LB PS.

④



11. Press the up or down arrow key so that the RF switching position is within the specification.

⑤



12. Press the right arrow key to display screen ③.
13. The adjustment is completed, and "COMPLETE" is displayed.
14. The alignment tape is automatically ejected after the adjustment is completed.
15. Press the left key twice to return to screen ①.
16. To save the adjustment data, execute "SAVE ADJUSTING DATA" of "SAVE/LOAD CONTROL".
17. Press the menu key to display "MAINTENANCE MENU".

③



7-14. PICTURE SPLITTING COMPENSATION ADJUSTMENT

This adjustment is not required usually.

Perform this adjustment only if there is picture splitting.

The "picture splitting" is a phenomenon as illustrated on the right :

Tools :

Alignment tape CR5-1B PS : 8-960-096-91

Two video monitors :

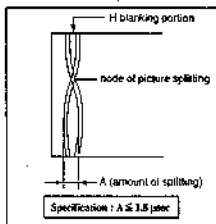
(It may not be possible to monitor a picture splitting on the monitor which uses a strong AFC.)

Checking Method

1. Connect one of the video monitors to VIDEO OUTPUT 2 on the rear panel.
2. Connect the other monitor as follows :
 - (1) Use the BNC cable tied together, etc. to connect the video monitor to TP201(P-1) on the VP-43P board.
 - (2) Set up the video monitor as follows :
 - H DELAY
 - AFC FAST
 - INT SYNC
3. Insert alignment tape CR5-1B PS to the set, and play back the color bar signal.
4. Check that whether there is picture splitting or not.

Specification : $A \leq 1.5 \mu\text{sec}$

(1/5 of a color bar width or less)



Adjustment Method

5. If the specification is not satisfied, perform the next adjustment.
6. Display "MAINTENANCE MENU" on the monitor.
 - (1) Press the menu key while holding down the left arrow key to display "MAINTENANCE MENU".
7. Press the up or down arrow key to select "SERVO ADJUST".
8. Press the right arrow key to display screen ①.
9. Press the up or down arrow key to select "PICTURE SPLITTING".



①

10. Press the right arrow key to display screen ② "START OK?".

11. Press the YES key.

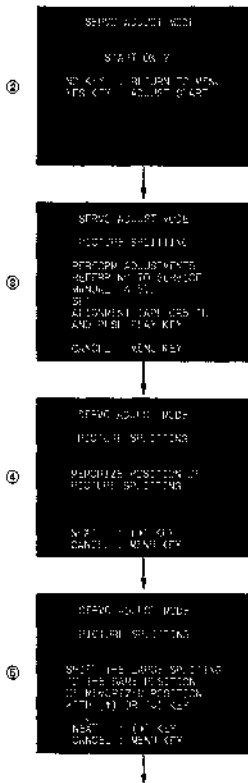
12. Play back the color bar signals (14:00 to 17:00) of alignment tape CR5-1B PS.

13. Check the position of the node of the picture spinning on the monitor.

(It is recommended to mark the position using a tape on the position.)

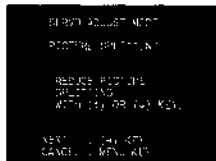
14. Press the right arrow key to display screen ④.

15. Press the up or down key to align the positions of the node marked in step 13 and the node on the display.



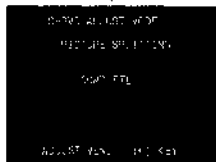
16. Press the right arrow key to display screen ⑥.
17. Press the up or down key to decrease the amount of the splitting to the minimum level.

⑥



18. Press the right arrow key to display screen ⑦.
19. The adjustment is completed, and "COMPLETE" is displayed.
20. The alignment tape is automatically ejected after the adjustment is completed.
21. Press the left key twice to return to screen ⑤.
22. To save the adjustment data, execute "SAVE ADJUSTING DATA" of "SAVE/LOAD CONTROL".
23. Press the menu key to display "MAINTENANCE MENU".

⑦



SECTION 8 ELECTRICAL ALIGNMENT OVERVIEW

8-1. ADJUSTMENT COMPONENT INDEX

As to UVW-1600P, perform the adjustments marked with Ⓞ.

As to UVW-1800P, perform all adjustments as shown below.

AP-31/A board

ⓄRV1	CH-1 PB DOLBY OFF FREQ. RESP. (UVW-1600P)	11-9, 13-19
	CH-1 PB DOLBY OFF FREQ. RESP. (UVW-1800P)	11-11, 13-21
ⓄRV2	CH-1 PB DOLBY OFF FREQ. RESP. (UVW-1600P)	11-9, 13-19
	CH-1 PB DOLBY OFF FREQ. RESP. (UVW-1800P)	11-11, 13-21
ⓄRV3	CH-1 PB LEVEL (UVW-1600P)	11-10, 13-20
	CH-1 PB LEVEL (UVW-1800P)	11-12, 13-22
ⓄRV4	CH-1 PB LEVEL (UVW-1600P)	11-10, 13-20
	EE OUTPUT LEVEL (UVW-1800P)	11-13, 13-23
ⓄRV5	AUDIO METER (UVW-1600P)	11-10, 13-20
	AUDIO METER (UVW-1800P)	11-12, 13-22
ⓄRV201	CH-2 PB DOLBY OFF FREQ. RESP. (UVW-1600P)	11-9, 13-19
	CH-2 PB DOLBY OFF FREQ. RESP. (UVW-1800P)	11-11, 13-21
ⓄRV202	CH-2 PB DOLBY OFF FREQ. RESP. (UVW-1600P)	11-9, 13-19
	CH-2 PB DOLBY OFF FREQ. RESP. (UVW-1800P)	11-11, 13-21
ⓄRV203	CH-2 PB LEVEL (UVW-1600P)	11-10, 13-20
	CH-2 PB LEVEL (UVW-1800P)	11-12, 13-22
ⓄRV204	CH-2 PB LEVEL (UVW-1600P)	11-10, 13-20
	EE OUTPUT LEVEL (UVW-1800P)	11-13, 13-23
ⓄRV205	AUDIO METER (UVW-1600P)	11-10, 13-20
	AUDIO METER (UVW-1800P)	11-12, 13-22

AR-14 board

LV101	CH-1 BIAS TRAP	11-14, 13-24
LV201	CH-2 BIAS TRAP	11-14, 13-24
LV301	CH-1 ERASE TUNE	11-18
LV311	CH-2 ERASE TUNE	11-18
LV321	TC ERASE TUNE	11-18
RV105	CH-1 OVERALL LEVEL	11-14, 13-25
RV107	CH-1 OVERALL FREQ. RESP.	11-14, 13-26
RV108	CH-1 INSERT CROSSTALK	11-17, 13-26
RV109	CH-1 INSERT CROSSTALK	11-17, 13-26
RV110	CH-1 INSERT CROSSTALK	11-17, 13-26
RV111	CH-1 TC INSERT CROSSTALK	11-16, 13-26
RV112	CH-1 TC INSERT CROSSTALK	11-16, 13-26
RV206	CH-2 OVERALL LEVEL	11-14, 13-25
RV207	CH-2 OVERALL FREQ. RESP.	11-14, 13-26
RV208	CH-2 INSERT CROSSTALK	11-17, 13-27
RV209	CH-2 INSERT CROSSTALK	11-17, 13-27
RV210	CH-2 INSERT CROSSTALK	11-17, 13-27
RV211	CH-2 TC INSERT CROSSTALK	11-16, 13-26
RV212	CH-2 TC INSERT CROSSTALK	11-16, 13-26
RV301	CH-1 BIAS CURRENT	11-14, 13-24
RV302	CH-1 BIAS CURRENT	11-14, 13-24

SS-53 board

ⓄCV1	CHARACTER SIZE	9-3
------	----------------------	-----

RP-70 board

RV1	YA REC CURRENT	12-64, 13-32
RV2	YA REC CURRENT FREQ. RESP.	12-63, 13-31
RV101	YB REC CURRENT	12-64, 13-32
RV102	YB REC CURRENT FREQ. RESP.	12-63, 13-31
RV201	CA REC CURRENT	12-68, 13-36
RV202	CA REC CURRENT FREQ. RESP.	12-67, 13-35
RV301	CB REC CURRENT	12-68, 13-36
RV302	CB REC CURRENT FREQ. RESP.	12-67, 13-35

TBC-25 board

CV700	INTERNAL SC FREQ.	12-22
CV701	HCK VCO CENTER	12-23
LV300	Y WCK NORMAL VCO CENTER	12-23
LV400	C WCK NORMAL VCO CENTER	12-23
RV100	PB Y A/D INPUT LEVEL	12-27
RV200	PB C A/D INPUT LEVEL	12-28
RV300	PB VIDEO PHASE	12-44, 13-43
RV301	Y WCK FREQ.	12-24
RV400	PB COMPOSITE Y/C DELAY	12-46, 13-45, 13-56
RV401	C WCK FREQ.	12-25
RV500	PB COMPONENT Y LEVEL	12-27, 13-38, 13-48
RV501	PB COMPONENT B-Y LEVEL	12-28, 13-38, 13-49
RV502	PB COMPONENT R-Y LEVEL	12-29, 13-39, 13-50
RV700	PB COMPOSITE ENCODE AXIS	12-30, 13-40, 13-51
RV701	INTERNAL SC PHASE	12-31, 13-46
RV702	PB COMPOSITE ENCODE AXIS	12-30, 13-40, 13-51
RV703	REF CP PHASE	12-32

VRA-5 board

CV301	BURST LOCK LOOP VCO CENTER	12-40
LV301	H LOCK LOOP VCO CENTER	12-48
RV101	COMPOSITE S-C A/D INPUT LEVEL	12-52
RV102	COMPONENT R-Y A/D INPUT LEVEL	12-51
RV103	OA COMPONENT C-C DELAY	12-79, 13-66
RV104	COMPONENT B-Y A/D INPUT LEVEL	12-51
RV105	OA S-Y LEVEL	12-54
RV201	OA COMPOSITE Y LEVEL	12-52, 12-73, 13-60
RV202	OA COMPOSITE C LEVEL	12-53, 12-74, 13-61
RV203	OA COMPONENT C LEVEL	12-51, 12-72, 13-59
RV301	BURST LOCK LOOP PHASE ERROR CENTER	12-49
RV302	OA VIDEO PHASE	12-55, 12-77, 13-64
RV303	OA COMPOSITE Y/C DELAY	12-81, 13-68
RV304	OA COMPOSITE Y/C DELAY	12-79, 13-66
RV305	OA S Y/C DELAY	12-82, 13-69
RV306	COMPOSITE SCH DETECT	12-57
RV301	OA COMPONENT Y LEVEL	12-50, 12-71, 13-58
RV502	Y DEVIATION	12-58, 12-59
RV503	Y CARRIER SET	12-58, 12-59
RV602	C DEVIATION	12-60, 12-61
RV603	C CARRIER	12-60, 12-61

VP-43A board

RV101	PB COMPONENT Y FREQ. RESP.	12-20, 13-47
RV102	PB COMPONENT Y FREQ. RESP.	12-20, 13-47
RV103	PB Y RF LEVEL	12-17
RV201	PB Y DEMOD. OUTPUT LEVEL	12-19
RV301	PB COMPONENT C FREQ. RESP.	12-21, 13-48
RV302	PB COMPONENT C FREQ. RESP.	12-21, 13-48
RV303	PB C RF LEVEL	12-18
RV401	PB C DEMOD. OUTPUT LEVEL	12-19
RV501	PB COMPOSITE SYNC LEVEL	12-37
RV502	PB COMPONENT Y SYNC LEVEL	12-34
RV503	PB COMPONENT Y LEVEL	12-34
RV504	PB COMPOSITE 1 LEVEL	12-37
RV505	PB S-Y LEVEL	12-41
RV506	PB COMPOSITE 2 LEVEL	12-37
RV601	PB COMPOSITE SC LEAK	12-38, 13-52
RV602	PB COMPOSITE SC LEAK	12-38, 13-52
RV603	PB COMPOSITE 1 BURST LEVEL	12-39, 13-55
RV604	PB COMPOSITE 1 C LEVEL (R-Y)	12-39, 13-54
RV605	PB COMPOSITE 1 C LEVEL (B-Y)	12-39, 13-54
RV606	PB S-C LEVEL	12-42, 13-55
RV701	PB COMPONENT Y/C DELAY	12-47, 13-57
RV702	PB COMPONENT Y/C DELAY	12-47, 13-57
RV703	PB COMPONENT R-Y LEVEL	12-35
RV704	PB COMPONENT B-Y LEVEL	12-36

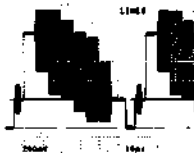
8-2. REQUIRED EQUIPMENT

Equipment		Equivalent	Note
Oscilloscope		TEKTRONIX 2445	more than 150 MHz
Signal Generator	Component	TEKTRONIX TSG-309TSG-131A (OP. 03)	
	Composite	TEKTRONIX TSG-131A (OP. 03)/1-11	
	Y/C	TEKTRONIX TSG-131A (OP. 03)	S-VIDEO 5G
Waveform Monitor	Component	TEKTRONIX WFM300300A/1781/1765 (OP. SC)	
	Composite	TEKTRONIX 1751/1781/1765 (OP. SC)	with SCH meter
Picture Monitor			
Audio Signal Generator		HP 8904	
Audio Level Meter		HP 3400A	
Frequency Counter		ADVANTEST TR5821AK	
Digital Voltmeter		ADVANTEST TR6845	

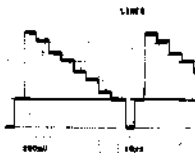
8-3. TEST SIGNAL

1. 100% COLOR BARS

COMPOSITE



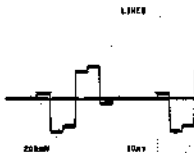
V, S-Y



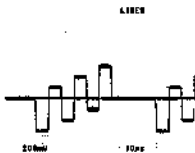
S-C



R-Y

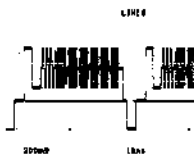


B-Y

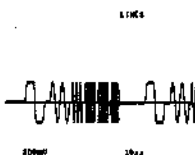


2. 60% MULTI BURST

Y

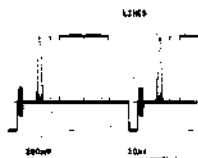


C

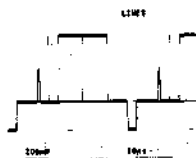


3. PULSE & BAR

COMPOSITE

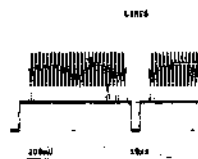


Y

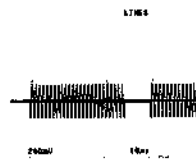


4. 50% BOWTIE

Y



C



8-4. MAINTENANCE MENU

The servo alignment is done by Servo system is adjusted automatically or semiautomatically in the maintenance menu, SERVO ADJUST. For details, refer to section 4-5, SERVO ADJUST.

How to enter the maintenance menu

1. While pressing the **[←]** key, press the MENU key.
Then the unit enters into the maintenance menu, and the menu picture is displayed on the monitor.
2. Press the **[↑]**, **[↓]** keys to select the item to change.
Move the high lighted item to select the item on a monitor display.
3. Press the **[→]** key at the item to select.
This selects the high lighted item.

How to close the maintenance menu

Press the MENU key.

SECTION 9 POWER SUPPLY AND SYSTEM CONTROL ALIGNMENT

[Equipments Required]

- Digital Voltmeter (ADVANTEST TR6845)
- Picture Monitor
- Alignment Tape CR5-1B PS (Part No. 8-960-094-91)

Contents

TIME min. s	VIDEO TRACK	AFTM
0 : 00	RF Sweep	No-Signal
2 : 00	Marker 1, 2, 4, 6, 8, 10, 12 MHz	
5 : 00	60 % H-Sweep (CTDM) Marker 0.5, 1, 2, 3, 4, 5 MHz	
8 : 00	Pulse & Bar (CTDM)	
11 : 00	60 % Multi Burst Y : 0.5, 1, 2, 4, 5, 5.5 MHz C : 0.2, 0.5, 1, 1.5, 2 MHz	
14 : 00	Pulse & Bar	
16 : 30	100 % Color Bars	400 Hz Sine Wave 25 kHz Deviation 75 kHz Deviation
17 : 00	50 % Bowtie & 10T	No-Signal
19 : 00	Line 17A Signal	
22 : 00	Quad Phase	
24 : 00	50 % Flat Field	
26 : 00	100 % Color Bars with Dropout	
28 : 00	Composite H-Sweep with VISC	
30 : 00		

9-1. SWITCHING REGULATOR VOLTAGE ADJUSTMENT (+5 V)

[NOTE]

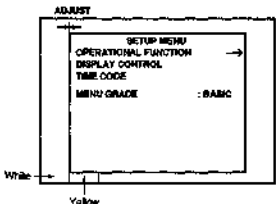
- Avoid alignment of the power supply unless it is positive that alignment is necessary.

Preparations for Adjustment	Adjustments • Specification
• Set the \odot RV201/switching regulator to mechanical center position. NOTE: When checking, be careful not to short between connector pins.	CN3-6 pin/SS-53 (P-1) \odot RV201/switching regulator spec. : $+5.0 \pm 0.1$ V dc

9-2. SWITCHING REGULATOR VOLTAGE CHECK

Preparations for Adjustment	Adjustments • Specification
NOTE: When checking, be careful not to short between connector pins.	(Voltage checks) CN3-1pin/SS-53 (P-1) $+12.0 \pm 0.75$ V dc CN3-2pin/SS-53 (P-1) $+6.5^{+0.25}_{-0.25}$ V dc CN3-4pin/SS-53 (P-1) $+8.5 \pm 0.5$ V dc CN3-5pin/SS-53 (P-1) $+12.5 \pm 1$ V dc CN3-6pin/SS-53 (P-1) $+5.0 \pm 0.25$ V dc CN3-8pin/SS-53 (P-1) $+5.25 \pm 0.35$ V dc +5 V specification: When performing only the voltage check, the specification shown in not section 9-1 ($+5.0 \pm 0.1$ V) but section 9-2 ($+5.0 \pm 0.25$ V) must be satisfied.

9-3. CHARACTER POSITION ADJUSTMENT

Preparations for Adjustment	Adjustments - Specification
<ul style="list-style-type: none"> • CHARACTER switch (sub control panel) : ON • Press the MENU button on the sub control panel once. • PB mode Color-bar/CR5-1B PS (14:00 - 17:00) <ul style="list-style-type: none"> • After adjustment is completed, press the MENU button and display the original picture. 	<p>VIDEO 2 (SUPER) OUTPUT connector (Terminated at 75 ohm)</p> <p>⊙ CV1SS-53 (N-1)</p> <p>Adjust the setup menu display, and position the left side frame at the boundary between the white and yellow signals of the color bars signal. Then, position the all sides frames at the center of the monitor.</p> <div style="text-align: center;">  </div>

SS-53 BOARD



SECTION 10 SERVO ALIGNMENT

Servo system is adjusted automatically or semiautomatically in the maintenance menu.

For details, refer to section 4-5, SERVO ADJUST.

SECTION 11 AUDIO / TIME CODE SYSTEM ALIGNMENT

[EQUIPMENT]

- Oscilloscope (TEKTRONIX 2445 or equivalent)
- Audio Signal Generator (HP 8904 or equivalent)
- Audio Level Meter (HP 3400A or equivalent)
- Blank Tape (metal) BCT-200A or equivalent

NOTE: "Blank Tape" indicates a cassette tape on which no video / audio signals are recorded.

- Alignment Tape CRS-1B PS (Part No. 8-960-096-85)

Contents

TIME min. s	AUDIO TRACK
0 : 00	1 kHz / 0 VU
3 : 00	15 kHz / 0 VU
5 : 00	1 kHz / -20 VU
6 : 00	40 kHz / -20 VU
6 : 30	7 kHz / -20 VU
7 : 00	10 kHz / -20 VU
7 : 30	15 kHz / -20 VU
8 : 00	15 kHz / -20 VU

- * 1. When this tape is reproduced in the audio reference level check or adjustment, the output level (0 dB) should be corrected according to the correction value as follows.

example) Correction value = - 0.5 dB

Output level = 0 dB - 0.5 dB = - 0.5 dB

[SWITCH / VOLUME / SETUP MENU SETTING]

This setting should be changed in position unless otherwise specified.

<Connector Panel>

AUDIO INPUT CH-1 600 Ω : ON

AUDIO INPUT CH-2 600 Ω : ON

<Sub Control Panel>

TC INPUT EXT / INT : INT

CTL / LTC / U-BIF : LTC

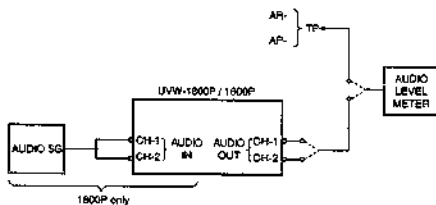
CHARACTER : ON

REMOTE / LOCAL : LOCAL

<Switch Setting on Printed Circuit Board>

S201-2 / S5-S3 : CLOSE (ON) ----- NR OFF

[CONNECTION]



[PRECAUTION AND NOTES ON ALIGNMENT]

Precaution

Cleaning of stationary heads

Clean three stationary heads by the cleaning piece moistened with cleaning fluid.

After the fluid blow off, wipe off the heads by a non-wetted cloth or cleaning piece.

Making the Tape which not Record Audio Signals

Sub Control Panel switch setting

TC INPUT EXT / INT : INT

Level volume setting

CH-1 / CH-2 REC VR : MIN

Recording

Record the blank tape BCT-20MA (or equivalent) from the top to the end.

(The tape which recorded CTL and TC without audio signals is completed, under the above-mentioned operation.)

Notes for Alignment

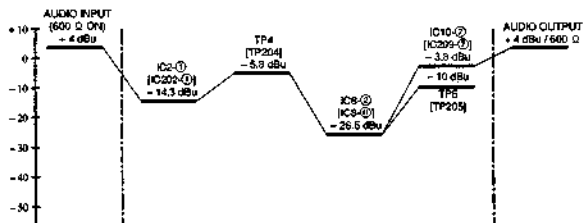
- AUDIO MONITOR is terminated by 47 k Ω .
- AUDIO OUTPUT are terminated by 600 Ω . (except designated in particular)
- When the alignment tape is played back, specification should be corrected according to the correction value mentioned in the tape level.
- The alignment tape is used within the limits of about 50 times and recommend to manage by marking.

[LEVEL DIAGRAMS]

AUDIO SYSTEM LEVEL DIAGRAM

REC / EE MODE

REC LEVEL CONTROL : SET +4 dBu ON OUTPUT

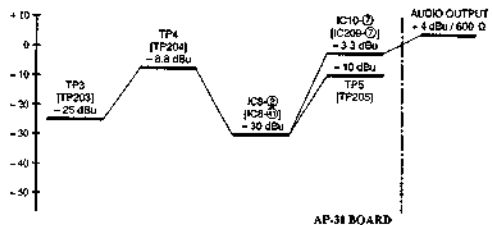


AP-31 BOARD

BOARD	TEST POINT	LEVEL		MODE
		dBu	mV rms	
AP-31	AUDIO IN	+4	1227.7	REC / EE
	TP4 [TP204]	-5.5	420.8	REC / EE
	AUDIO OUT	+4*	1227.7	REC / EE

[] CH-2, * ... 600 Ω TERMINATED

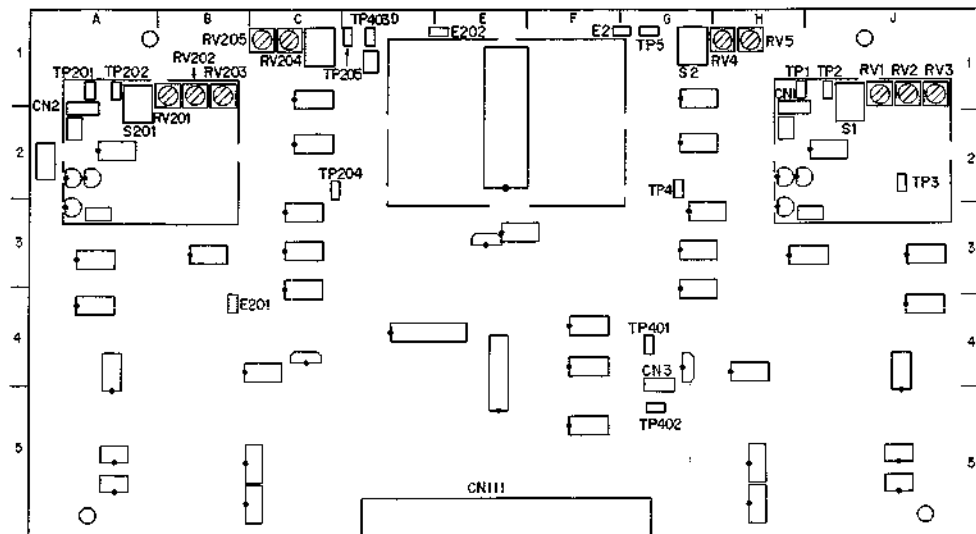
PB MODE (CRS-18 PS : 1 kHz, 0 VU PORTION)



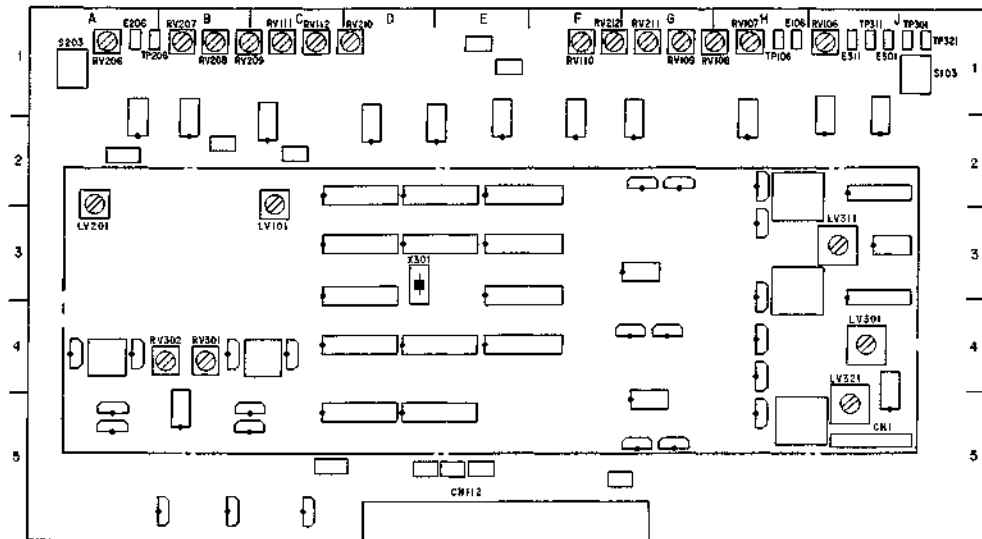
BOARD	TEST POINT	LEVEL		MODE
		dBu	mV rms	
AP-31	TP3 {TP203}	-25	43.6	PB
	TP4 {TP204}	-8.8	281.2	PB
	TP5 {TP205}	-10	245.0	PB
	AUDIO OUT	+4 *	1227.7	PB

[]CH-2, *600 Ω TERMINATED

AP-31 / 31A. Board (A side)



AR-14 Board (A side)



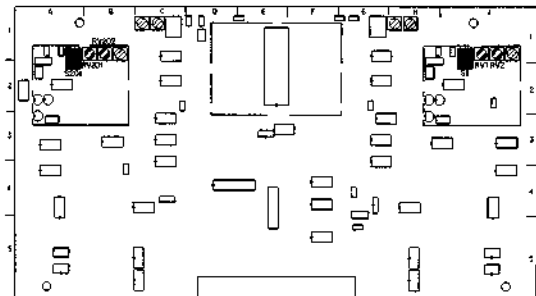
UVW-1600P

11-1. PB MODE ADJUSTMENT

11-1-1. PB Dolby off Frequency Response Adjustment

Conditions for adjustment	Adjustment point - Specifications										
• PB mode 1 kHz, 7 kHz, 10 kHz, 15 kHz, -20 VU / CRS-1B FS (5:00 - 8:00)	AUDIO OUTPUT CH-1 / 2 CH-1 Ⓞ RV1 (10 kHz) / AP-31A (D-1) Ⓞ RV2 (7 kHz) / AP-31A (J-1)										
	CH-2 Ⓞ RV201 (10 kHz) / AP-31A (J-1) Ⓞ RV202 (7 kHz) / AP-31A (I-1)										
	Adjust alternately If the specification of the high frequency is not satisfied, change the following switches and adjust again. CH-1 S1 / AP-31A (G-1) CH-2 S201 / AP-31A (A-1)										
	Spec. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>FREQUENCY [Hz]</th> <th>OUTPUT LEVEL [dB]</th> </tr> </thead> <tbody> <tr> <td>1 k</td> <td>0 (REF)</td> </tr> <tr> <td>7 k</td> <td>0 ± 0.2</td> </tr> <tr> <td>10 k</td> <td>0 ± 0.2</td> </tr> <tr> <td>15 k</td> <td>-0.3 ± 0.3</td> </tr> </tbody> </table>	FREQUENCY [Hz]	OUTPUT LEVEL [dB]	1 k	0 (REF)	7 k	0 ± 0.2	10 k	0 ± 0.2	15 k	-0.3 ± 0.3
FREQUENCY [Hz]	OUTPUT LEVEL [dB]										
1 k	0 (REF)										
7 k	0 ± 0.2										
10 k	0 ± 0.2										
15 k	-0.3 ± 0.3										

AP-31A BOARD (A side)



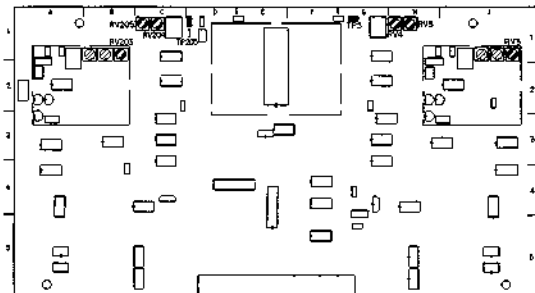
11-1-2. FB Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 1 kHz, 0 VU / CR3-1B PS (0:00 - 3:00)	Step 1 CH-1 TPS / AP-31A (G-1) Ⓞ RV3 / AP-31A (J-1)
	CH-2 TP205 / AP-31A (D-1) Ⓞ RV203 / AP-31A (B-1)
	Spec. -10.0 ± 0.1 dBu
	Step 2 AUDIO OUTPUT CH-1 / 2
	CH-1 Ⓞ RV4 / AP-31A (H-1)
	CH-2 Ⓞ RV204 / AP-31A (C-1)
	Spec. $+4.0 \pm 0.2$ dBu

11-1-3. Audio Meter Adjustment

Conditions for adjustment	Adjustment point • Specifications
• PB mode 1 kHz, 0 VU / CR3-1B PS (0:00 - 3:00)	Audio meter Ⓞ RV5 / AP-31A (I-1)
	Ⓞ RV205 / AP-31A (C-1)
	Spec. The segment one step above 0 VU should be dimly lit

AP-31A BOARD (A side)



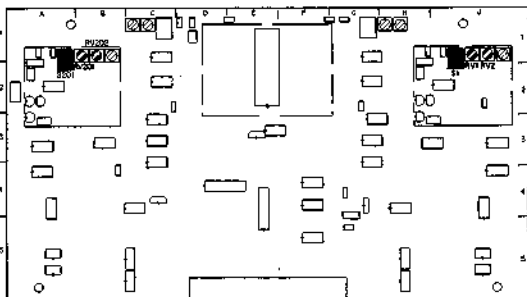
UVW-1800P

11-1. PB MODE ADJUSTMENT

11-1-1. PB Dolby off Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications															
<ul style="list-style-type: none"> • PB mode 1 kHz, 7 kHz, 10 kHz 15 kHz, -20 VU / CRS-1B PS (5:00-8:00) 	<p>AUDIO OUTPUT CH-1 / 2</p> <p>CH-1</p> <ul style="list-style-type: none"> ⊙ RV1 (10 kHz) / AP-31 (J-1) ⊙ RV2 (7 kHz) / AP-31 (J-1) <p>CH-2</p> <ul style="list-style-type: none"> ⊙ RV201 (10 kHz) / AP-31 (B-1) ⊙ RV202 (7 kHz) / AP-31 (B-1) <p>Adjust alternately</p> <p>If the specification of the high frequency is not satisfied, change the following switches and adjust again.</p> <p>CH-1 S1 / AP-31 (J-1)</p> <p>CH-2 S203 / AP-31 (A-1)</p> <table border="1"> <thead> <tr> <th>Spec.</th> <th>FREQUENCY [Hz]</th> <th>OUTPUT LEVEL [dB]</th> </tr> </thead> <tbody> <tr> <td></td> <td>1 k</td> <td>0 (REF)</td> </tr> <tr> <td></td> <td>7 k</td> <td>0 ± 0.2</td> </tr> <tr> <td></td> <td>10 k</td> <td>0 ± 0.2</td> </tr> <tr> <td></td> <td>15 k</td> <td>-0.5 ± 0.5</td> </tr> </tbody> </table>	Spec.	FREQUENCY [Hz]	OUTPUT LEVEL [dB]		1 k	0 (REF)		7 k	0 ± 0.2		10 k	0 ± 0.2		15 k	-0.5 ± 0.5
Spec.	FREQUENCY [Hz]	OUTPUT LEVEL [dB]														
	1 k	0 (REF)														
	7 k	0 ± 0.2														
	10 k	0 ± 0.2														
	15 k	-0.5 ± 0.5														

AP-31 BOARD (A side)




11-1-2. PB Level Adjustment

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • PB mode 1 kHz, 0 VU / CR6-1B FS (0:00 - 3:00) 	<p>CH-1 TP5 / AP-31 (G-1) Ⓞ RV3 / AP-31 (F-1)</p> <p>CH-2 TP205 / AP-31 (D-1) Ⓞ RV203 / AP-31 (B-1)</p> <p>Spec. -10.0 ± 0.1 dBu</p> <p>[Check] AUDIO OUTPUT CH-1 / 2</p> <p>Spec. $+4.0 \pm 0.2$ dBu</p>

11-2. EE MODE ADJUSTMENT

11-2-1. EE Input Level / Audio Meter Adjustment

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • AUDIO INPUT CH-1 / 2; 1 kHz, +4.00 dBu • EE mode 	<p>Step 1</p> <p>CH-1 TP5 / AP-31 (G-1) Ⓞ REC VR / Sub-control Panel</p> <p>CH-2 TP205 / AP-31 (D-1) Ⓞ REC VR / Sub-control Panel</p> <p>Spec. -10.00 ± 0.05 dBu</p> <p>Step 2</p> <p>AUDIO METER</p> <p>Ⓞ RV5 / AP-31 (H-1)</p> <p>Ⓞ RV205 / AP-31 (C-1)</p>  <p>Spec. The segment one step above 0 VU should be dimly lit</p>

11-3. REC MODE ADJUSTMENT

11-3-1. Bias Trap Adjustment

Conditions for adjustment	Adjustment point • Specifications	
• AUDIO INPUT CH-1/2; No signal • REC mode Blank tape	CH-1 TP106 / AR-14 (H-1) GND : E106 (H-1) ⊙ LV101 / AR-14 (C-2)	CH-2 TP206 / AR-14 (A-1) GND : E206 (A-1) ⊙ LV201 / AR-14 (A-2)
	Spec. The leak of bias → Minimize (≤ -30 dBu)	

11-3-2. Bias Current Adjustment

Conditions for adjustment	Adjustment point • Specifications
• AUDIO INPUT CH-1/2; No signal • RBC mode Blank tape	Step 1 TP1 / AP-31 (H-1) TP201 / AP-31 (A-1) GND : TP2 (J-1) GND : TP202 (A-1) ⊙ T101 / AR-14 (C-4) ⊙ T201 / AR-14 (A-4) Spec. Bias current → Maximize
	Step 2 TP1 / AP-31 (H-1) TP201 / AP-31 (A-1) GND : TP2 (J-1) GND : TP202 (A-1) ⊙ RV301 / AR-14 (B-4) ⊙ RV302 / AR-14 (B-4) Spec. 16 ± 1 mV rms

11-4. OVERALL ADJUSTMENT

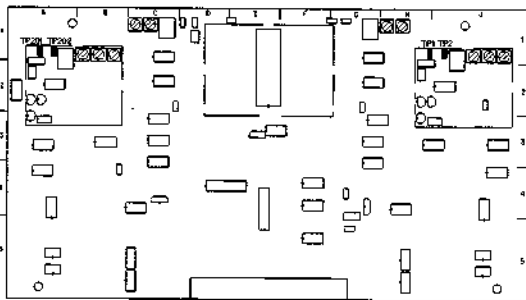
11-4-1. Overall Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
Step 1 • AUDIO INPUT CH-1/2: 1 kHz, +4 dBu • Playback the recorded portion. Blank tape	AUDIO OUTPUT CH-1/2 Spec. $+4.0 \pm 0.5$ dBu When specification is not satisfied → Step 2
Step 2 • AUDIO INPUT CH-1/2: 1 kHz, +4 dBu • REC mode Blank tape	CH-1 TP106 / AR-14 (H-1) TP206 / AR-14 (A-1) ⊙ RV106 / AR-14 (J-1) ⊙ RV206 / AR-14 (A-1) Correct the difference level from the center value in Step 1. After the adjustment, check that perform Step 1.

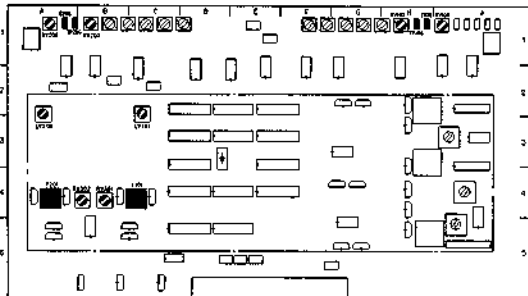
11-4-2. Overall Frequency Response Adjustment (Delby on)

Conditions for adjustment	Adjustment point - Specifications		
Step 1 • AUDIO INPUT CH-1/2; 12.5 kHz, +4 dBu • S201-2/SS-53 (B-1); OPEN (OFF) -----NR ON • Playback the recorded portion. Blank tape	AUDIO OUTPUT CR-1/2 Spec: $+3.5 \pm 0.5$ dBu When specification is not satisfied → Step 2		
Step 2 • AUDIO INPUT CH-1/2; 12.5 kHz, +4 dBu • S201-2/SS-53 (B-1); OPEN (OFF) -----NR ON • REC mode Blank tape	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> CH-1 TP106 / AR-14 (H-1) Ⓞ RV107 / AR-14 (I-1) </td> <td style="width: 50%; border: none; vertical-align: top;"> CH-2 TP206 / AR-14 (A-1) Ⓞ RV207 / AR-14 (A-1) </td> </tr> </table> <p style="text-align: center;">Correct the difference level X0.8 from the center value in Step 1.</p> <p style="text-align: center;">After the adjustment, check that perform Step 1.</p>	CH-1 TP106 / AR-14 (H-1) Ⓞ RV107 / AR-14 (I-1)	CH-2 TP206 / AR-14 (A-1) Ⓞ RV207 / AR-14 (A-1)
CH-1 TP106 / AR-14 (H-1) Ⓞ RV107 / AR-14 (I-1)	CH-2 TP206 / AR-14 (A-1) Ⓞ RV207 / AR-14 (A-1)		

AP-3L BOARD (A side)



AR-14 BOARD (A side)

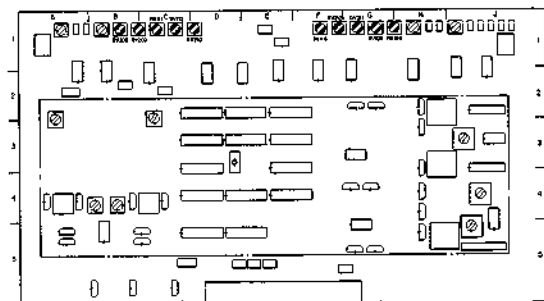


11-5. INSERT CROSS TALK ADJUSTMENT

11-5-1. TC Insert Crosstalk Adjustment

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • AUDIO INPUT CH-1/2; • No signal • TC insert mode • Tape which not recorded audio signal <p>[Putting the unit into TC insert mode] Select TC INSERT or EDIT CHECK on Maintenance mode, and push the REC and PB simultaneously.</p> <p>After adjustment, cancel TC insert mode</p> <p>[Cancel of TC insert mode] Press the STOP KEY.</p>	<p>AUDIO OUTPUT CH-1/2</p> <p>CH-1</p> <ul style="list-style-type: none"> ○ RV111 / AR-14 (C-1) ○ RV112 / AR-14 (C-1) <p>CH-2</p> <ul style="list-style-type: none"> ○ RV211 / AR-14 (G-1) ○ RV212 / AR-14 (F-1) <p>Spec The leak of TC signal → Minimize (≦ -16 dBu)</p> <p>Adjust CH-1 and CH-2 by the each two RVs alternately</p>

AR-14 BOARD (A side)



11-5-2. Audio CH-1 Insert Crosstalk Adjustment

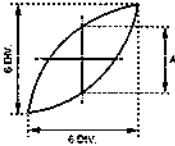
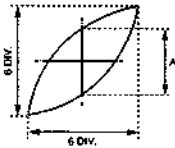
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • AUDIO INPUT CH-1 : 15 kHz, + 4.0 dBu • AUDIO INPUT CH-2 : No signal • AUDIO CH-1: Insert mode Tape which not recorded audio signal <p>[Putting the unit into AUDIO CH-1 insert mode] Select A1 INSERT of EDIT CHECK on Maintenance mode, and push the REC and PB simultaneously.</p> <p>After adjustment, cancel AUDIO CH-1 insert mode.</p> <p>[Cancel of AUDIO CH-1 mode] Press the STOP KEY.</p>	<p>AUDIO OUTPUT CH-2</p> <ul style="list-style-type: none"> ⊗ RV108 / AR-14 (H-1) ⊗ RV109 / AR-14 (G-1) ⊗ RV110 / AR-14 (F-1) <p style="text-align: center;">Spec. The leak of CH-1 → Minimize (± - 14 dBu)</p> <p style="text-align: center;">Adjust three RVs alternately</p>

11-5-3. Audio CH-2 Insert Crosstalk Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • AUDIO INPUT CH-1 : No signal • AUDIO INPUT CH-2 : 15 kHz, + 4.0 dBu • AUDIO CH-2: Insert mode Tape which not recorded audio signal <p>[Putting the unit into AUDIO CH-2 insert mode] Select A2 INSERT of EDIT CHECK on Maintenance mode, and push the REC and PB simultaneously.</p> <p>After adjustment, cancel AUDIO CH-2 insert mode.</p> <p>[Cancel of AUDIO CH-2 mode] Press the STOP KEY.</p>	<p>AUDIO OUTPUT CH-1</p> <ul style="list-style-type: none"> ⊗ RV208 / AR-14 (B-1) ⊗ RV209 / AR-14 (B-1) ⊗ RV210 / AR-14 (D-1) <p style="text-align: center;">Spec. The leak of CH-1 → Minimize (± - 14 dBu)</p> <p style="text-align: center;">Adjust three RVs alternately</p>

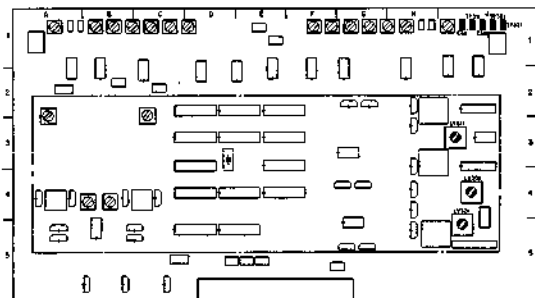
11-6. ERASE ADJUSTMENT

11-6-1. AU/TC Erase Tune Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • AUDIO INPUT CH-1 / 2; • No signal • REC mode • Blank tape 	<p>Step 1</p> <p>TP311 / AR-14 (H-2) GND : E311 (J-1) ⊙ LV311 / AR-14 (J-3)</p> <p style="text-align: right;">Spec. level → maximize</p>
	<p>Step 2</p> <p>TP311 / AR-14 (H-2) GND : E311 (J-1) TP301 / AR-14 (H-3) GND : E301 (J-1) ⊙ LV301 / AR-14 (C-2)</p> <p>Oscilloscope, X-Y mode</p>  <p>phase difference between TP311 and TP301 Spec. $A \approx 0 \pm 10^\circ$ (1 DIV.)</p>
	<p>Step 3</p> <p>TP311 / AR-14 (H-2) TP321 / AR-14 (H-5) GND : E311 (J-1) ⊙ LV321 / AR-14 (C-2)</p> <p>Oscilloscope, X-Y mode</p>  <p>phase difference between TP311 and TP321 Spec. $A \approx 0 \pm 10^\circ$ (1 DIV.)</p>

Conditions for adjustment	Adjustment point - Specifications			
<ul style="list-style-type: none"> • AUDIO INPUT CH-1 / 2 ; • No signal • REC mode • Blank tape 	<p>Step 4</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>CH-1</p> <p>TP301 / AR-14 (J-1)</p> <p>GND : E301 (J-1)</p> </td> <td style="width: 50%; vertical-align: top;"> <p>CH-2</p> <p>TP311 / AR-14 (J-1)</p> <p>GND : E311 (J-1)</p> </td> </tr> </table> <p style="text-align: center;">TC</p> <p>TP321 / AR-14 (J-1)</p> <p>GND : E311 (J-1)</p> <p style="text-align: center;">Spec. 150 ± 15 mV rms</p>		<p>CH-1</p> <p>TP301 / AR-14 (J-1)</p> <p>GND : E301 (J-1)</p>	<p>CH-2</p> <p>TP311 / AR-14 (J-1)</p> <p>GND : E311 (J-1)</p>
<p>CH-1</p> <p>TP301 / AR-14 (J-1)</p> <p>GND : E301 (J-1)</p>	<p>CH-2</p> <p>TP311 / AR-14 (J-1)</p> <p>GND : E311 (J-1)</p>			

AR-14 BOARD (A side)



SECTION 12 VIDEO SYSTEM ALIGNMENT

(EQUIPMENT)

- Oscilloscope (TEKTRONIX 2445 or equivalent)
 - Signal Generator
 - Component SG (TEKTRONIX TSG-300 / TSG-131A op. 03 or equivalent)
 - Composite SG (TEKTRONIX TSG-131A op. 03 / 1411 or equivalent)
 - Y / C (TEKTRONIX TSG-131A op. 03 or equivalent)
 - Waveform Monitor (WFM)
 - Component (TEKTRONIX WFM300 / 300A / 1781 / 1765 op. SC or equivalent)
 - Composite (TEKTRONIX 1751 / 1781 / 1765 op. SC or equivalent)
 - Spectrum Analyzer (ADVANTEST R4131 B / D or equivalent)
 - Sweep Generator (SHIBASOKU VS-12CX or equivalent)
 - Picture Monitor
 - Deviation Checker (SONY EW-580)
 - Frequency Counter
 - Current Probe (TEKTRONIX P6022 or equivalent)
 - Blank Tape (metal) BCT-20MA or equivalent
- Note: "Blank Tape" indicates a cassette tape on which no video / audio signals are recorded.
- Alignment Tape CR5-1B PS (Part No. 8-960-096-91)

Contents

TIME Min. s	VIDEO TRACK	AFM
0 : 00	RF Sweep Marker 1, 2, 4, 6, 8, 10, 12 MHz	No-Signal
2 : 00	60 % H-Sweep (CTDM) Marker 0.5, 1, 2, 3, 4, 5 MHz	
5 : 00	Pulse & Bar (CTDM)	
8 : 00	60 % Multi Burst Y : 0.5, 1, 2, 4, 5, 5.5 MHz C : 0.2, 0.5, 1, 1.5, 2 MHz	
11 : 00	Pulse & Bar	
14 : 00		
16 : 30	100 % Color Bars	400 Hz Sine Wave 25 kHz Deviation 75 kHz Deviation
17 : 00	50 % Bowtie & 10T	No-Signal
19 : 00	Line 17A Signal	
22 : 00	Quad Phase	
24 : 00	50 % Flat Field	
26 : 00	100 % Color Bars with Dropout	
28 : 00	Composite H-Sweep with VISC	
30 : 00		

[SWITCH / SETUP MENU SETTING]

This setting should be changed in position unless otherwise specified.

<Sub Control Panel>

INPUT SELECT : COMPOSITE
REMOTE / LOCAL : LOCAL
CTL / LTC / U-BIT : LTC
CHARACTER : ON
TC INPUT EXT / INT : INT

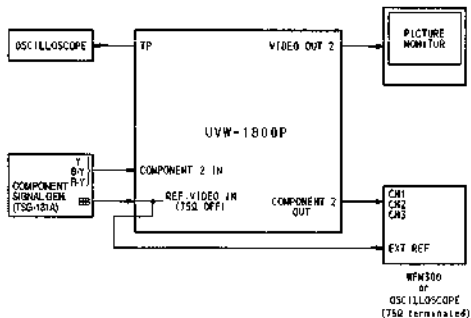
<Connector Panel>

Component 1/2 : 2

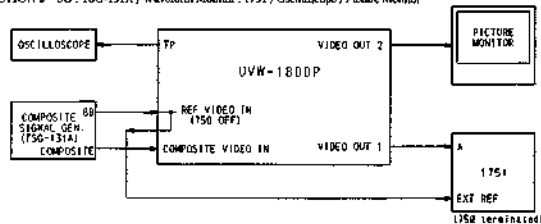
[CONNECTION]

Connect some equipment as following unless otherwise specified.

CONNECTION 1 SG : TSG-131A / Waveform Monitor . WFM-300 / Oscilloscope / Picture Monitor



CONNECTION 2 SG : TSG-131A / Waveform Monitor . 1751 / Oscilloscope / Picture Monitor



[PREPARATIONS AND NOTES ON ALIGNMENT]

Making the cable for measuring S-VIDEO input / output level.

S-terminal (Y / C) convert cable (BNC×2) is necessary to measuring S-VIDEO input / output level.

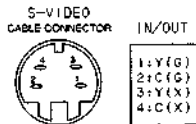
Preparation : S-S terminal connection cable about 5 meters in length (standard product) (SONY YC-50KV)



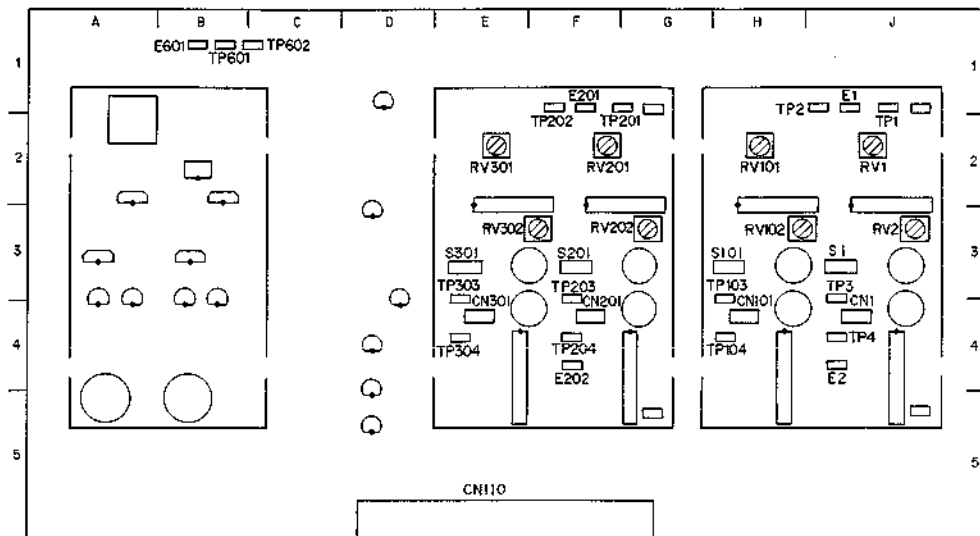
1. Cut the cable in half.
2. Tear and strip the cover of the cable with a cutter.
3. Strip the cover of the shield wire with a nipper.
4. Check the Y / C core wire with a tester.
5. Solder the BNC terminal for Y signal to the shield wire of Y signal in the cable and the BNC terminal for C signal to the shield wire of C signal.

signal.

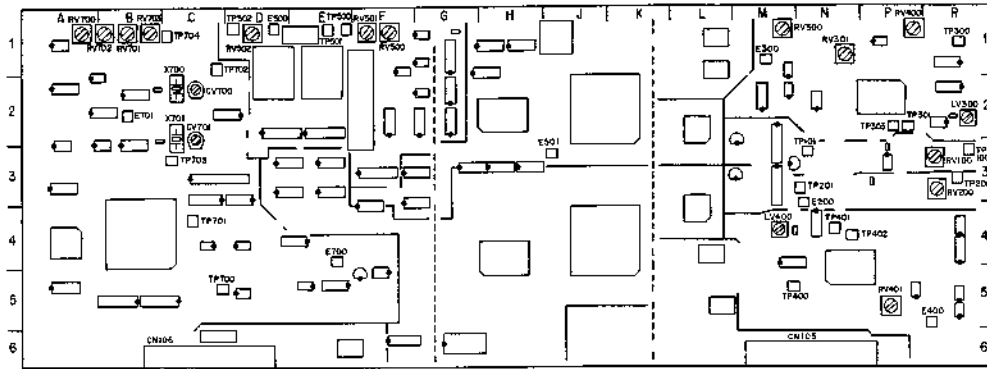
(Check the continuity with a tester.)



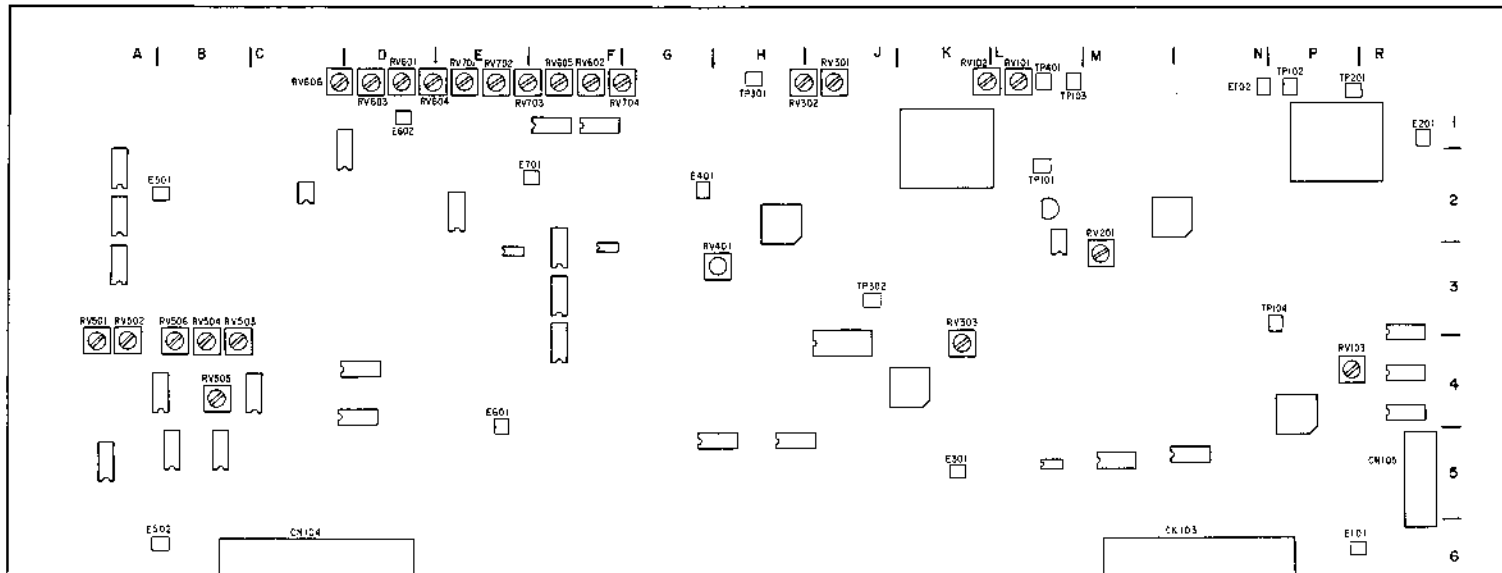
RP-70 board (A side)



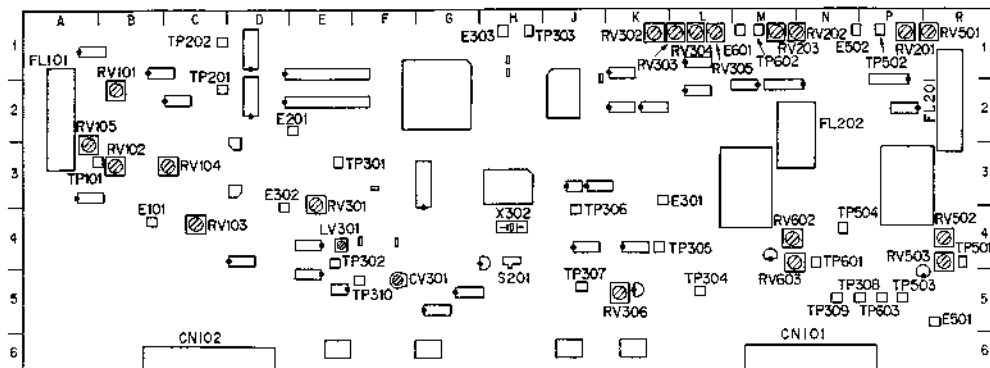
TBC-25 board (A side)



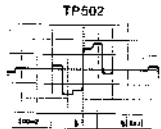
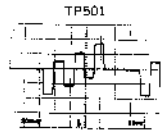
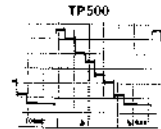
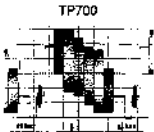
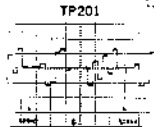
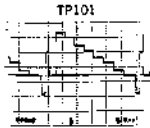
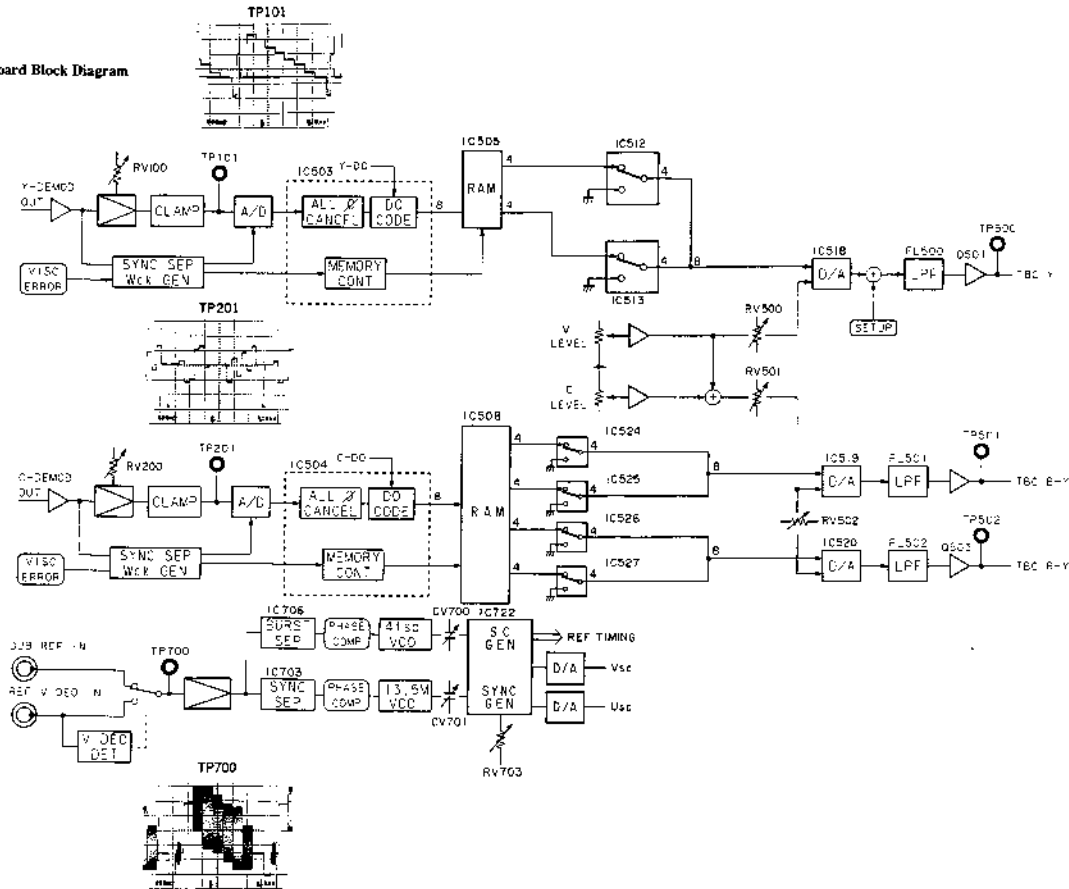
VP-43 board (A side)



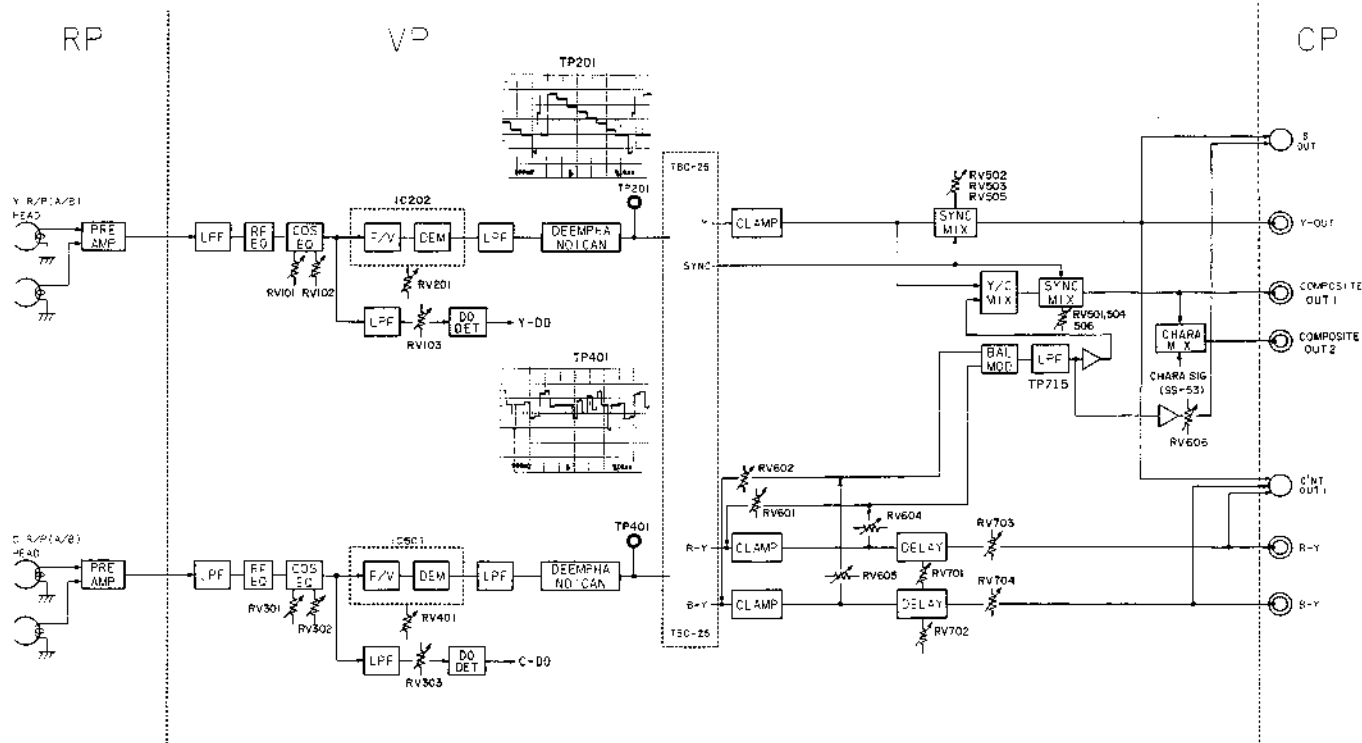
VRA-5 board (A side)



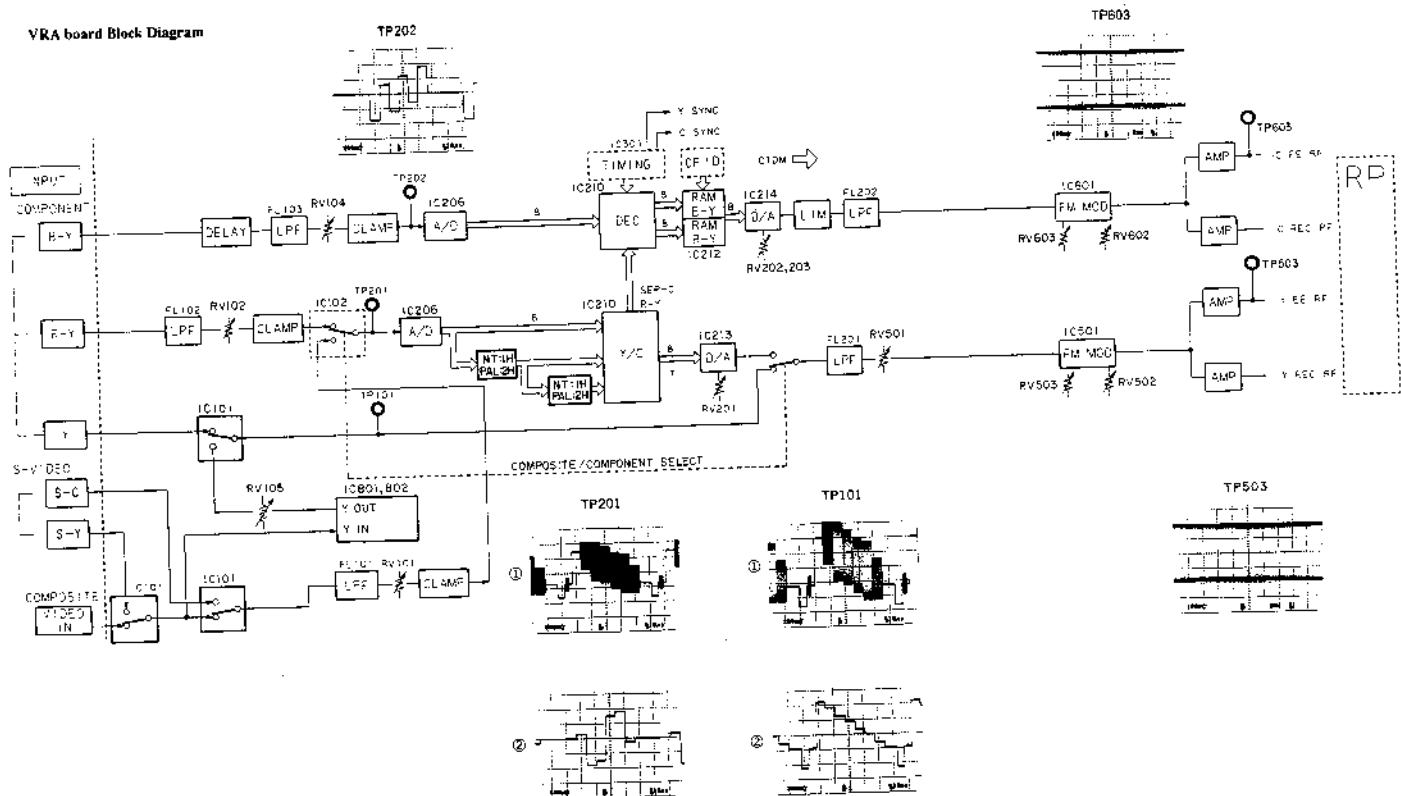
TBC board Block Diagram



VP board Block Diagram



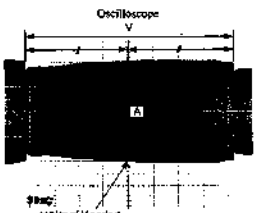
VRA board Block Diagram



REC system
 Input : 100 % color bars (PAL)
 : 75 % color bars (NTSC)
 ① : Composite signal input only
 : Component signal input only
 no marking : ① and ②

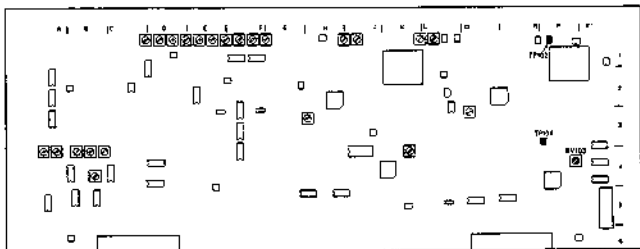
12-1. VP BOARD (RF, DM SYSTEM) ADJUSTMENT

12-1-1. Y PB RF Level Adjustment

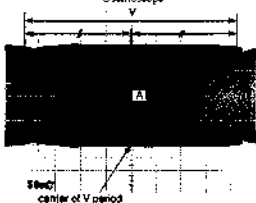
Conditions for adjustment	Adjustment point - Specifications
• PB mode Bar field / CR5-1B PS (24:00 - 26:00)	TP104 / VP-43 (P-3) ● RV103 / VP-43 (P-4) TRIG: TP102 / VP-43 (P-1) Oscilloscope  Spec. $A = 0.20 \pm 0.01$ V

CONNECTION 1

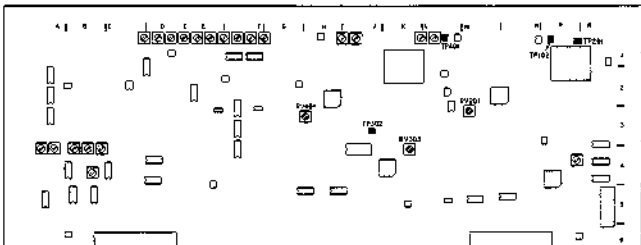
VP-43 board (A side)



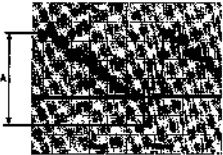
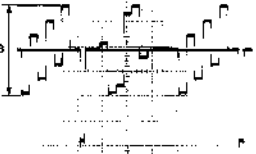
12-1-2. C PB RP Level Adjustment

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • PB mode flat field / CRS-1B PS (24:00 - 26:00) <p>CONNECTION I</p>	<p>TP202 / VP-43 (J-3) Ⓞ RV303 / VP-43 (K-4)</p> <p>TRIG: TP102 / VP-43 (P-1)</p> <p>Oscilloscope V</p>  <p>Spec. $A = 0.20 \pm 0.01 V$</p>

VP-43 board (A side)



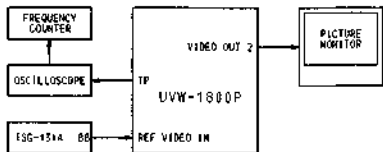
12-1-3. Y and C Demodulator Adjustment

Conditions for adjustment	Adjustment point • Specifications
<p>• PE mode 100% color bar / CR5-1B P5 (14:00 - 17:00)</p>	<p>(A) Y DM GAIN TP201 / VP-43 (P-1) ⊙ RV201 / VP-43 (M-3)</p> <p>TRIG : TP201 / VP-43 (P-1)</p> <p>Oscilloscope</p>  <p>Spec. A = 0.90 ± 0.02 V_{p-p}</p>
<p>CONNECTION 1</p>	<p>(B) C DM GAIN TP401 / VP-43 (L-1) ⊙ RV401 / VP-45 (H-3)</p> <p>TRIG : TP401 / VP-43 (L-1)</p> <p>Oscilloscope</p>  <p>200ns</p> <p>Spec. A = 0.933 ± 0.02 V</p>

12-2. TBC BOARD ADJUSTMENT

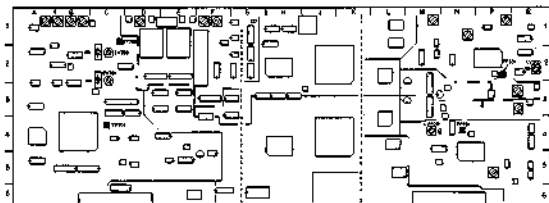
12-2-1. INT SC Frequency Adjustment

[CONNECTION]

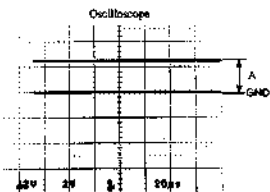


Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> EE mode REF. VIDEO INPUT; No signal 	<p>TP701 / TBC-25 (C-4)</p> <p>TRIG: TP701 / TBC-25 (C-4)</p> <p>Oscilloscope</p> <p>Spec. $A = 5.0 \pm 0.2$ V</p>
	<p>4FSCFREQ</p> <p>TP701 / TBC-25 (C-4)</p> <p>CV700 / TBC-25 (C-2)</p> <p>Frequency counter</p> <p>Spec. $f = 4,433,618 \pm 10$ Hz</p>

TBC-25 board (A side)

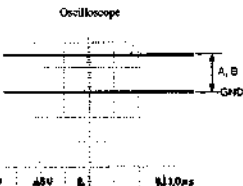


12-2-2. HCK Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • EE mode 	<p>TP702 / TBC-25 (C-1) Ⓞ CV701 / TBC-25 (C-2)</p> <p>Oscilloscope</p>  <p>20V 2μ 20ps</p> <p>Spec. $A = +2.50 \pm 0.05$ Vdc</p>

CONNECTION I

12-2-3. Y and C Normal VCO Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • PB mode 100 % color bar / CR5-1B PS (14:00 - 17:00) 	<p>(A) Y ERR VOLT TP301 / TBC-25 (P-2) Ⓞ LV300 / TBC-25 (R-2)</p> <p>(B) C ERR VOLT TP401 / TBC-25 (N-4) Ⓞ LV400 / TBC-25 (M-4)</p> <p>Oscilloscope</p>  <p>20 40V 2 10ps</p> <p>Spec. $A = B = +2.50 \pm 0.05$ Vdc</p>



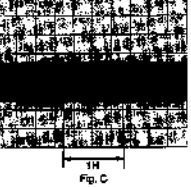
CONNECTION I

TBC-25 board (A side)

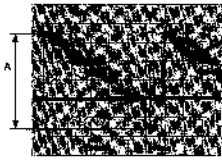
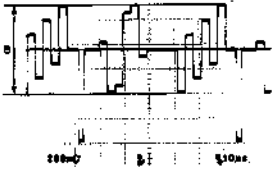
APPLICATION : 12-2-4.



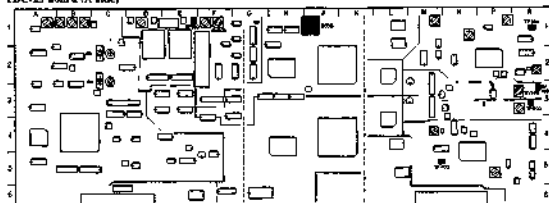
12-2-4. Y and C WCK Frequency Adjustment

Conditions for adjustment	Adjustment point • Specifications								
<ul style="list-style-type: none"> • EE mode • COMPONENT 2 INPUT ; 100 % color bar • REF. VIDEO INPUT , Black burst • INPUT SELECT switch / Sub control panel ; Y-R, B 	<p>Y WCK</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">(A) Phase adjustment</td> <td style="width: 50%;">(B) Frequency adjustment</td> </tr> <tr> <td>CH-1 : TP703 / TBC-25 (C-3)</td> <td>CH-1 : TP703 / TBC-25 (C-3)</td> </tr> <tr> <td>CH-2 : TP309 / TBC-25 (P-2)</td> <td>CH-2 : TP309 / TBC-25 (P-2)</td> </tr> <tr> <td>⊗ SYNC control / Sub control panel</td> <td>⊗ RV301 / TBC-25 (N-1)</td> </tr> </table> <p style="text-align: center;">TRIG - TP309 / TBC-25 (R-1)</p> <p style="text-align: center;">Oscilloscope</p> <p style="text-align: center;">CH-1 and CH-2 (INVERT) ADD waveform</p>	(A) Phase adjustment	(B) Frequency adjustment	CH-1 : TP703 / TBC-25 (C-3)	CH-1 : TP703 / TBC-25 (C-3)	CH-2 : TP309 / TBC-25 (P-2)	CH-2 : TP309 / TBC-25 (P-2)	⊗ SYNC control / Sub control panel	⊗ RV301 / TBC-25 (N-1)
(A) Phase adjustment	(B) Frequency adjustment								
CH-1 : TP703 / TBC-25 (C-3)	CH-1 : TP703 / TBC-25 (C-3)								
CH-2 : TP309 / TBC-25 (P-2)	CH-2 : TP309 / TBC-25 (P-2)								
⊗ SYNC control / Sub control panel	⊗ RV301 / TBC-25 (N-1)								
	<div style="text-align: center;">  <p>Fig. A</p> </div>								
	<div style="text-align: center;"> <p>↓ (A)</p>  <p>Fig. B</p> </div>								
	<div style="text-align: center;"> <p>↓ (B)</p>  <p>Fig. C</p> </div>								
	<p>Spec (A) Make smaller the amplitude and let appear several lateral stripes clearly, as shown in the progress to Fig. B from Fig. A, by the SYNC control on the sub control panel</p> <p>(B) Equalize the frequency of CH-2 to CH-1 with RV301 as shown in Fig. C. (When the lateral stripes become straight lines, the both frequencies are equal.)</p>								

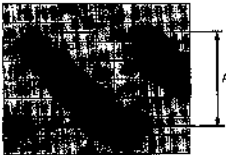
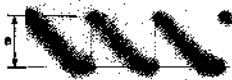
12-2.5. Y and C TBC Input Level Check

Conditions for adjustment	Adjustment point + Specifications
<ul style="list-style-type: none"> • PB mode 100 % color bar / CR5-1B PS (14 : 00 - 17 : 00) 	<p>(A) Y IN TP100 / TBC-25 (R-3)</p> <p>TRIG : TP300 / TBC-25 (R-1)</p> <p>Oscilloscope</p>  <p>Spec. A = 0.8 ± 0.1 Vp-p</p>
	<p>(B) C IN TP200 / TBC-25 (R-5)</p> <p>TRIG : TP400 / TBC-25 (M-5)</p> <p>Oscilloscope</p>  <p>Spec. A = 0.933 ± 0.1 V</p>

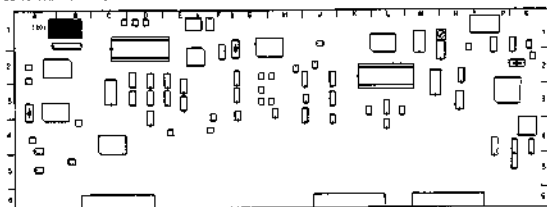
TBC-25 board (A side)



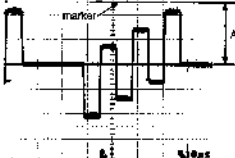
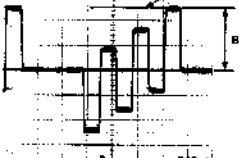
12-2-6. Y TBC Output and Gain Adjustment

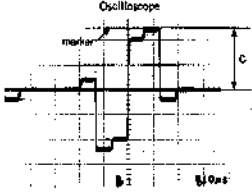
Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • PB mode 100 % color bar / CR5-1B PS (14:00 - 17:00) • S201-1 (MAINTENANCE MODE) / S5-53 (B-1): CLOSE (ON) • S500-1 (LEVEL REF) / TBC-25 (G-1): CLOSE (ON) 	<p>Step 1</p> <p>(A) VIDEO LEVEL TP500 / TBC-25 (E-1) ⊙ RV500 / TBC-25 (F-1)</p> <p>TRIG: VIDEO OUT Oscilloscope</p>  <p>Spec. $A = 0.80 \pm 0.01 \text{ Vp-p}$</p>
<p>• After adjustment is completed, set S201-1 / S5-53 and S500-1 / TBC-25 to OFF.</p> <p>CONNECTION I</p>	<p>Step 2</p> <p>(B) Y GAIN TP500 / TBC-25 (E-1) ⊙ RV100 / TBC-25 (R-3)</p> <p>TRIG: VIDEO OUT Oscilloscope</p>  <p>Spec. Set the B level to marker (Ref. $B = 0.50 \pm 0.01 \text{ Vp-p}$)</p>

SS-53 board (A side)

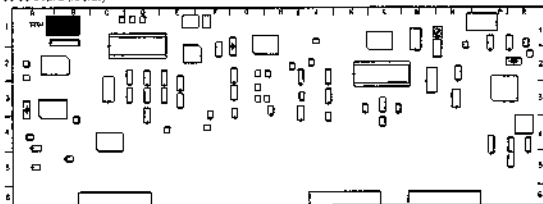


12-2-7. C TBC Output and Gain Adjustment

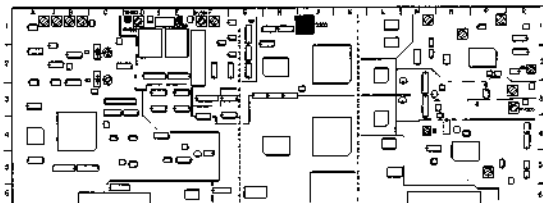
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • PB mode 100 % color bar / CR5-1B PS (14:00 - 17:00) • S201-L (MAINTENANCE MODE) / SS-53 (B-1); CLOSE (ON) • S506-L (LEVEL REF) / TBC-25 (J-1); CLOSE (ON) 	<p>Step 1</p> <p>(A) CHROMA LEVEL TP501 / TBC-25 (E-1) Ⓞ RV501 / TBC-25 (F-1)</p> <p>TRIG : VIDEO OUT</p> <p>Oscilloscope</p>  <p>Spec. $A = 0.333 \pm 0.01 \text{ V}$</p>
<p>CONNECTION 1</p>	<p>Step 2</p> <p>(B) C GAIN TP501 / TBC-25 (E-1) Ⓞ RV200 / TBC-25 (R-3)</p> <p>TRIG : VIDEO OUT</p> <p>Oscilloscope</p>  <p>Spec. Set the B level to marker (Ref. $B = 0.333 \pm 0.01 \text{ V}$)</p>

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • PB mode 100% color bar / CR5-1B-PS (14:00 - 17:00) • S201-1 (MAINTENANCE MODE) / SS-53 (B-1) : CLOSE (ON) • S500-1 (LEVEL REF) / TBC-25 (J-1) : CLOSE (ON) <p style="margin-top: 20px;">• After adjustment is completed, set S201-1 / SS-53 and S500-1 / TBC-25 to OFF.</p> <p>CONNECTION 1</p>	<p>S4ep 3</p> <p>(C) CHROMA LEVEL TP502 / TBC-25 (D-1) O BV502 / TBC-25 (D-1)</p> <p>TRIG : VIDEO-OUT</p>  <p>Spec. C = 0.333 ± 0.01 V</p>

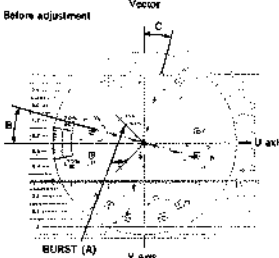
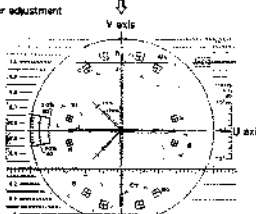
SS-53 board (A side)



TBC-25 board (A side)

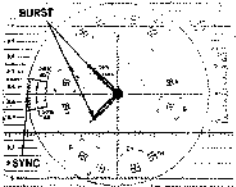


12-2-8. U-V Axis Phase (B-Y, R-Y Phase) Adjustment

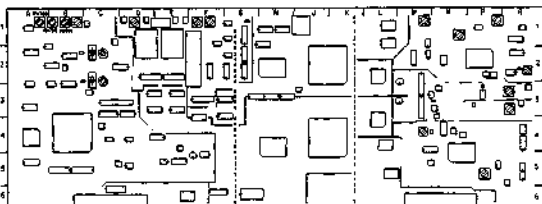
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode QUAD PHASE / CR5-1B PS (21:00 - 24:00) 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>(A) Burst <input type="checkbox"/> PHASE control / Vector</p> <p>(B) U axis (HUE) <input type="checkbox"/> RV702 / TBC-25 (B-I)</p> <p>(C) V axis (U / V OFFSET) <input type="checkbox"/> RV700 / TBC-25 (A-I)</p> <p>TRIO : REF. VIDEO</p> <div style="text-align: center;"> <p>Vector</p> <p>Before adjustment</p>  <p>BURST (A)</p> <p>After adjustment</p>  </div> <p>Spec. (A) Set the dot of the burst on the right position on the scale.</p> <p>(B) Set the dots of the B-Y on the U axis of the vector. $B = 0 \pm 1^\circ$</p> <p>(C) Set the dots of the R-Y on the V axis of the vector. $C = 0 \pm 1^\circ$</p>

CONNECTION 2

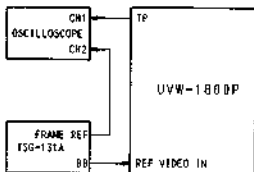
12-2-9. SCH Phase Adjustment

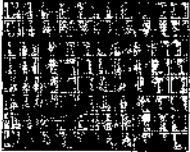
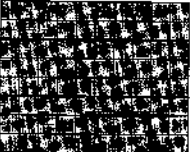
Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode • 100 % color bar (CR5-1B / P5) (14:00 - 17:00) • REF. VIDEO INPUT; No signal • Use the Waveform Vector (1751) on SC-H mode. <p>After adjustment is completed, connect the REF. VIDEO INPUT connector.</p> <p>CONNECTION 2</p>	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>(A) Burst Adjustment ● PHASE control / Vector</p> <p>(B) INT SC ● RV70L / TBC-25 (B-1)</p> <p>TRIO: INT / WFM</p> <p>SC-H mode</p>  <p>The diagram shows a circular vector scale for SC-H mode. A central point is labeled 'BURST'. A vector line extends from the center to the 'BURST' label. Another vector line extends from the center to a point labeled 'SYNC'. The scale is marked with various values and degrees.</p> <p>Spec. (A) Set the dot of the burst on the normal position on the scale.</p> <p>(B) The SYNC should be in the center of the burst (SCH = 0°)</p>



TBC-25 board (A side)



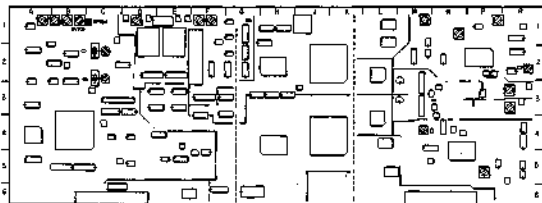
12-3-10. Reference CF Phase Adjustment
(CONNECTION)





Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • EE mode 	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>CH-1 TP704 / TBC-25 (C-1) ⊙ RV703 / TBC-25 (B-1)</p> </div> <div style="width: 45%;"> <p>CH-2 FIELD PULSE / TSG-131A</p> </div> </div> <p style="text-align: center;">TRIG : FIELD PULSE (CH-2)</p> <p style="text-align: center;">Oscilloscope</p> <div style="text-align: center;">  </div> <p style="text-align: center;">↓</p> <div style="text-align: center;">  </div>

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • EE mode 	<p>Spec. (1) Turn RV703 counterclockwise fully.</p> <p>(2) When RV703 is turned clockwise gradually, the phase condition between CH-1 and CH-2 changes from NG to OK or OK to NG.</p> <p>(3) In case of the pattern of change is started from NG as shown in the following illustration, set RV703 to mechanical center of range of first OK.</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 20px;"> <p>NG → OK → NG → OK</p> <p>↑</p> <p>the mechanical center of this range</p> </div> <div style="text-align: center;"> <p>this point</p>  <p>RV703</p> </div> </div> <p>(4) In case of the pattern of change is started from OK as shown in the following illustration, set RV703 to mechanical center of range of first OK.</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 20px;"> <p>OK → NG → OK → NG</p> <p>↑</p> <p>the mechanical center of this range</p> </div> <div style="text-align: center;"> <p>this point</p>  <p>RV703</p> </div> </div> <p>* If the range of firm OK is extremely narrow, set to mechanical center of range of second OK.</p>

TBC-25 board (A side)

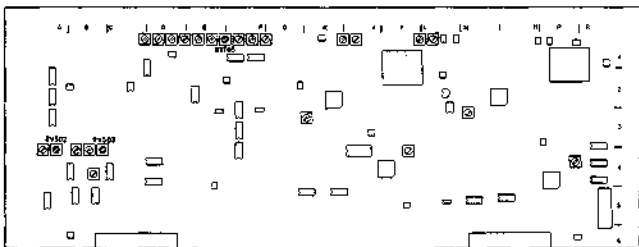


12-3-2. Component 2 and 1 R-Y OUT Level Adjustment



Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • PB mode 100% color bar / CR5-1B PS (14:00 - 17:00) 	<p>Step 1</p> <p>COMPONENT 2 R-Y OUT (75 Ω terminated)</p> <p>⊙ RV703 / VP-43 (E-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p style="text-align: center;">200ns 10µs</p> <p style="text-align: center;">Spec. A = 0.700 ± 0.014 Vp-p</p>
	<p>Step 2 (Check)</p> <p>COMPONENT 1 (R-Y) OUT (75 Ω terminated)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p style="text-align: center;">200ns 10µs</p> <p style="text-align: center;">Spec. A = 0.700 ± 0.014 Vp-p</p>

CONNECTION 1

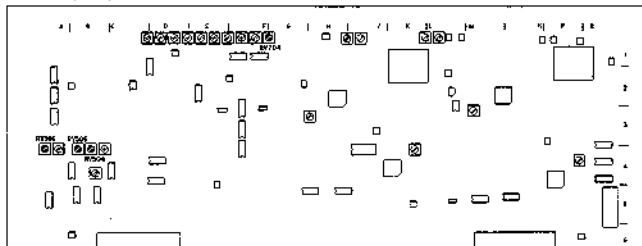
VP-43 board (A side)




12-3-3. Component 2 and 1 B-Y OUT Level Adjustment

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • PB mode 100 % color bar / CR5-1B PS (14:00 - 17:00) 	<p>Step 1</p> <p>COMPONENT 2 B-Y OUT (75 Ω terminated)</p> <p>⊙ RV704 / VP-43 (G-I)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>200ns</p> <p>10mV</p> <p>Spec. $A = 0.700 \pm 0.014$ Vp-p</p>
<p>CONNECTION 1</p>	<p>Step 2 (Check)</p> <p>COMPONENT 1 (B-Y) OUT (75 Ω terminated)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>200ns</p> <p>10mV</p> <p>Spec. $A = 0.700 \pm 0.014$ Vp-p</p>


VP-43 board (A side)



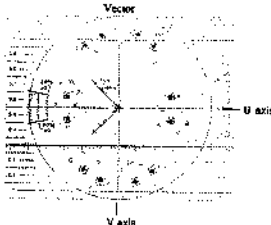
12-3-4. VIDEO OUT 1 Y Level Adjustment

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • PB mode 100 % color bar / CR5-1B PS (14 : 00 - 17 : 00) 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>(A) VIDEO 1 Ⓞ RV504 / VP-43 (B-4)</p> <p>(B) VIDEO SYNC Ⓞ RV501 / VP-43 (A-4)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec: A = 0.700 ± 0.014 V B = 0.300 ± 0.007 V</p>
CONNECTION 2	

12-3-5. VIDEO OUT 2 Y Level Adjustment

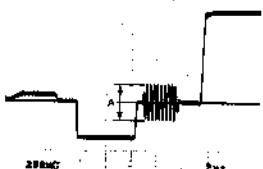
Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • PB mode 100 % color bar / CR5-1B PS (14 : 00 - 17 : 00) 	<p>VIDEO OUT 2 (75 Ω terminated)</p> <p>(A) VIDEO 2 Ⓞ RV506 / VP-43 (B-4)</p> <p>(B) VIDEO SYNC Check</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec: A = 0.700 ± 0.014 V B = 0.300 ± 0.014 V</p>
CONNECTION 2	

12-3-7. VIDEO OUT 1 C Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode 100 % color bar / CR5-1B PS (14 : 00 - 17 : 00) 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>(A) Burst <input checked="" type="radio"/> PHASE control / Vector</p> <p>(B) V axis (ENC R-Y) <input checked="" type="radio"/> RV604 / VP-43 (D-1)</p> <p>(C) U axis (ENC B-Y) <input checked="" type="radio"/> RV605 / VP-43 (E-1)</p> <div style="text-align: center;"> <p>TRIG : REF. VIDEO</p>  </div> <p>Spec. (A) Set the dot of the burst on the right position on the scale. All dots should be inside the "田" mark on the vector by adjustment RV604 and RV605 alternately.</p>

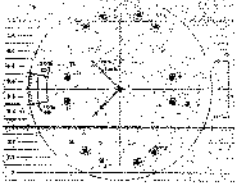

CONNECTION 2

12-3-8. VIDEO OUT Burst Level Adjustment

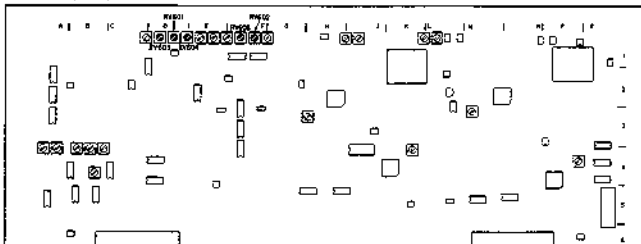
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode 100 % color bar / CR5-1B PS (14 : 00 - 17 : 00) 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p><input checked="" type="radio"/> RV603 / VP-43 (D-1)</p> <div style="text-align: center;"> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  </div> <p>Spec. A = 0.300 \pm 0.007 V</p>

CONNECTION 2

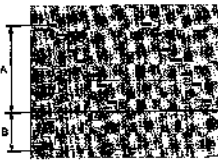
12-3-8. VIDEO OUT 2 C Level and Burst Level Check

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • PB mode 100% color bar / CR5-1B PS (14:00 - 17:00) <p>Step 1</p> <ul style="list-style-type: none"> • Use the Waveform Vector (1751) as a vectorscope, set the dot of the burst on the right position on the scale by PHASE control. 	<p>VIDEO OUT 2 (75 Ω terminated)</p> <p>TRIG : REF. VIDEO</p> <p>VECTOR mode</p>  <p>CONNECTION 2</p> <p>Spec. All dots should be inside the "E" mark on the Vector.</p>
<p>Step 2</p> <ul style="list-style-type: none"> • Use the Waveform Vector (1751) on WFM mode. 	<p>VIDEO OUT 2 (75 Ω terminated)</p> <p>TRIG : REF. VIDEO</p> <p>WFM mode</p>  <p>CONNECTION 2</p> <p>Spec. $A = 0.380 \pm 0.01 V$</p>

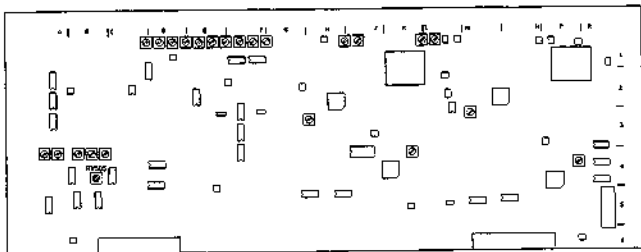
VP-43 board (A side) APPLICATION : 12-3-6 to 8.



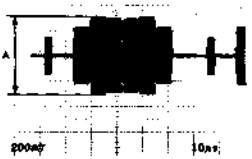
12-3-10. S-VIDEO OUT Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • PB mode 100 % color bar / CR5-1B PS (14 : 00 - 17 : 00) <p>CONNECTION)</p>	<p>S-VIDEO (Y) OUT</p> <p>(A) S / Y LEVEL Ⓞ RV505 / VP-43 (B-4)</p> <p>(B) S-SYNC Check</p> <p>TRIG : REF, VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. A = 0.700 ± 0.014 V B = 0.390 ± 0.014 V</p>

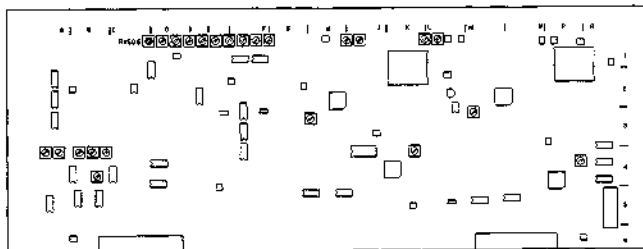
VP-43 board (A site)



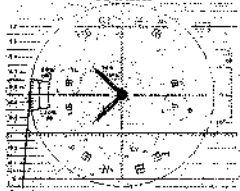
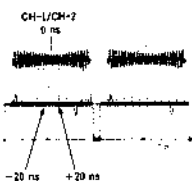
12-3-11. PB S-VIDEO C Level Adjustment

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode • 100% color bar / CR3-1B PS (14:00 - 17:00) 	<p>S-VIDEO (C) OUT (75 Ω terminated)</p> <p>RV606 / VP-43 (C-1)</p> <p>TRIG: REF VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. A = 0.885 ± 0.01 Vp-p</p>

VP-43 board (A side)



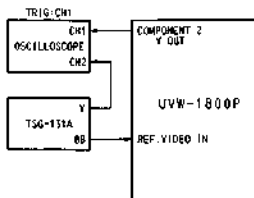
12-4-1. PB Video Phase Adjustment (Continued)

Conditions for adjustment	Adjustment point - Specifications
<p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • PB mode 50% BOWTIE & 10T / CRS-1B PS (17:00 - 19:00) • COMPONENT 2 INPUT; 50% BOWTIE • Use the Waveform Vector (1751) on SC-H mode. 	<p>COMPONENT 2 Y OUT (75 Ω terminated)</p> <p>⊙ SYNC control / Sub control panel</p> <p style="text-align: center;">TRIG : EXT / WFM</p> <p style="text-align: center;">SC-H mode</p>  <p style="text-align: center;">SYNC CH-A - CH-B</p> <p>Spec. Use PHASE control of 1751 for adjustment the SYNC phase of CH-A as shown above. Change CH-A to CH-B of 1751. Then make the SYNC phase of CH-B coincides with the SYNC phase of CH-A with the SYNC control on the sub control panel. (Note : The dot position should be adjust in the direction of the shortest movement.)</p>
<p>Step 3</p> <ul style="list-style-type: none"> • Do not use the extension board. • PB mode 50% BOWTIE & 10T / CRS-1B PS (17:00 - 19:00) • INPUT SELECT switch / Sub control panel ; Y-R, B • WFM300 ; BOWTIE mode (WFM) 	<p>COMPONENT 2 Y OUT (75 Ω terminated)</p> <p>⊙ RV300 / TBC25 (M-1)</p> <p style="text-align: center;">TRIG : EXT / WFM</p> <p style="text-align: center;">WFM</p>  <p style="text-align: center;">CH-1/CH-2 0 ns</p> <p style="text-align: center;">-20 ns +20 ns</p> <p>Spec. Set the BOWTIE DIP points (cross points of the CH-1 and CH-2) on the center marker. $0 \pm 20 \text{ nsec}$</p>

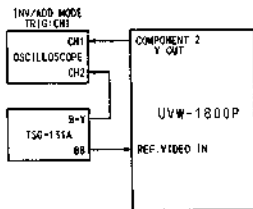
[Reference]

If not prepare the WPM300 / 1751, connect the oscilloscope following figure and adjust Step 1 and 3.

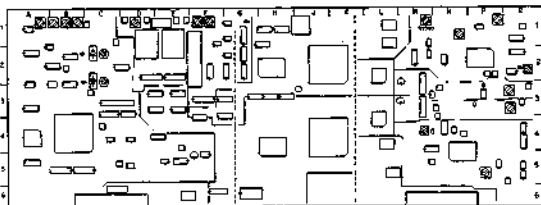
[CONNECTION for Step 1]



[CONNECTION for Step 3]

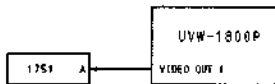


TBC-25 board (A side)



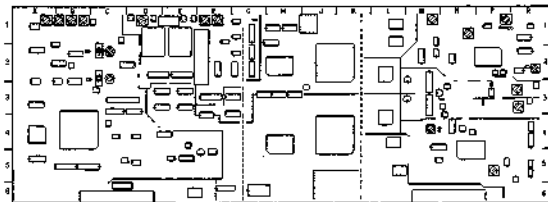
12-4-2. PB Composite Y / C Delay Adjustment

[CONNECTION]



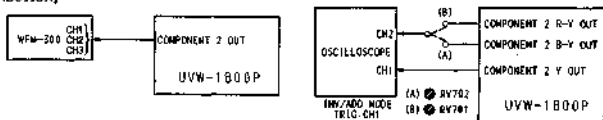
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • Do not use the execution board. • PB mode Line 17A / CR5-1B PS (19:00 - 22:00) 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>● RV400 / TBC-25 (P-1)</p> <p>TRIG: INT / WFM</p> <p>WFM</p> <p>Before adjustment</p> <p>10T portion</p> <p>To Minimize</p> <p>After adjustment</p> <p>Spec. Flat</p>

TBC-25 board (A side)



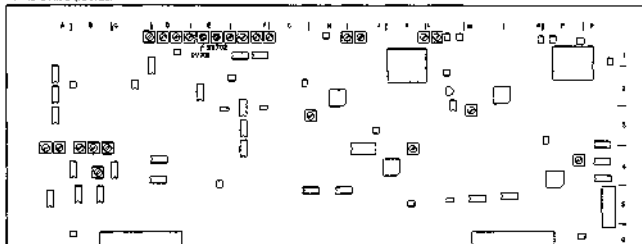
12-4.3. PB Component Y/C Delay Adjustment

[CONNECTION]



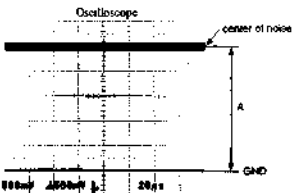
Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> Do not use the extension board. PB mode 50% BOWTIE & 10T / CR5-1B PS (17:00-19:00) WFM300; BOWTIE mode. (WFM) 	<p>COMPONENT 2 OUT (75 Ω terminated)</p> <p>(A) B-Y DELAY <input checked="" type="radio"/> RV702 / VP-43 (E-1)</p> <p>(B) R-Y DELAY <input checked="" type="radio"/> RV701 / VP-43 (E-1)</p> <p>TRIG: EXT / WFM</p> <p>WFM</p> <p>CH-1/CH-2 (A) 0 ns CH-1/CH-3 (B) 0 ns</p> <p>-20 ns +20 ns -20 ns +20 ns</p> <p>Spec. Set the each BOWTIE DIP point of (A) and (B) on the center marker.</p> <p>± 20 nsec</p>

VP-43 board (A side)



12-5. VRA BOARD ADJUSTMENT

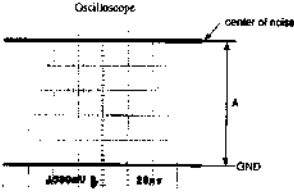
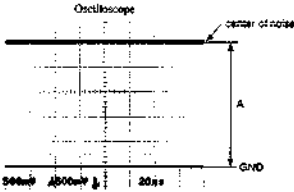
12-5-1. COMPONENT H Lock Loop

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • EE mode • COMPONENT 2 INPUT ; 100 % color bar • INPUT SELECT switch / Sub control panel ; Y-R, B <p>CONNECTION 1</p>	<p>TP902 / VRA-5 (E-4) Ⓞ LV301 / VRA-5 (E-4)</p>  <p>Spec. $A = 2.5 \pm 0.1 \text{ Vdc}$</p>

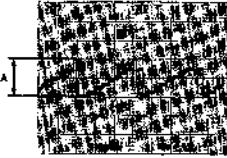
VRA-5 board (A Side)



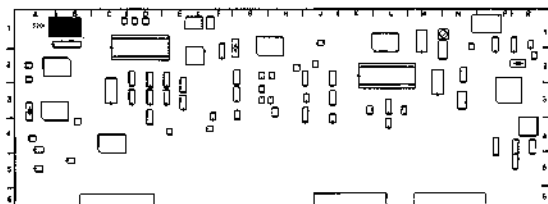
12-5-2. COMPOSITE 4 Fsc Lock Loop DC Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • EE mode • VIDEO INPUT: 100% color bar • INPUT SELECT switch / Sub control panel; COMPOSITE 	<p>TP310 / VRA-5 (F-5) Ⓞ CV301 / VRA-5 (F-5)</p>  <p style="text-align: center;">Spec. $A = 2.0 \pm 0.1 \text{ Vdc}$</p>
<p>CONNECTION 2</p>	<p>TP301 / VRA-5 (E-3) Ⓞ RV301 / VRA-5 (E-3)</p>  <p style="text-align: center;">Spec. $A = 2.5 \pm 0.1 \text{ Vdc}$</p>

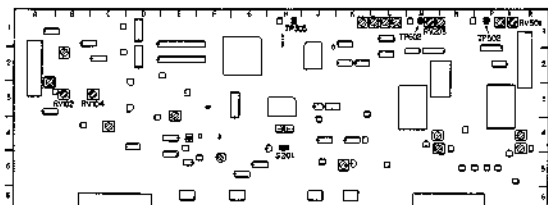
12-5.3. COMPONENT Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • BE mode • COMPONENT 2 INPUT ; • 100 % color bar • INPUT SELECT switch / • Sub control panel : Y-R, B 	<p>TP502 / VRA-5 (P-1) Ⓞ RV501 / VRA-5 (R-1)</p> <p>TRIG : TP303 / VRA-5 (H-1)</p> <p>Oscilloscope</p>  <p>CONNECTION 1</p> <p>Spec. $A = 1.00 \pm 0.01$ Vp-p</p>

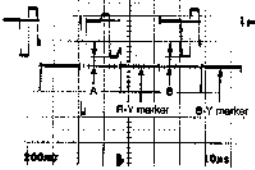
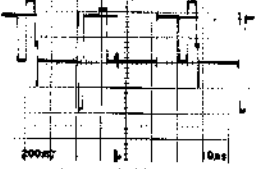
SS-53 board (A Side)



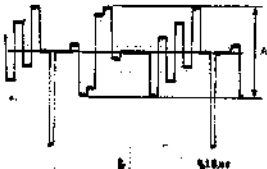
VRA-5 board (A Side)



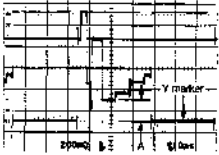

12-5-4. COMPONENT A / D R-Y, B-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • EE mode • COMPONENT 2 INPUT : 100 % color bar • INPUT SELECT switch / Sub control panel : Y-R, B • S201-1 (MAINTENANCE MODE) / SS-53 (B-1) : CLOSE (ON) • S201 (AD LEVEL REF) / VRA-5 (H-4) : CLOSE (ON) <p style="margin-top: 20px;">• After adjustment is completed, set S201-1 / SS-53 and S201 / VRA-5 to OFF.</p> <p>CONNECTION 1</p>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>(A) A / D R-Y TP602 / VRA-5 (M-1) ⊗ RV103 / VRA-5 (B-3)</p> </div> <div style="width: 45%;"> <p>(B) A / D B-Y TP602 / VRA-5 (M-1) ⊗ RV104 / VRA-5 (C-3)</p> </div> </div> <p style="text-align: center;">TRIG : TP303 / VRA-5 (H-1)</p> <p style="text-align: center;">Oscilloscope</p> <p style="text-align: center;">Before adjustment</p>  <p style="text-align: center;">After adjustment</p>  <p style="text-align: center;">Spec. A = 0 ± 0.01 V B = 0 ± 0.01 V</p>

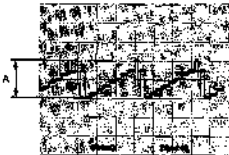
12-5-5. COMPONENT D / A R-Y, B-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • EE mode • COMPONENT 2 INPUT : 100 % color bar • INPUT SELECT switch / Sub control panel : Y-R, B <p>CONNECTION 1</p>	<p>TP602 / VRA-5 (M-1) ⊗ RV203 / VRA-5 (M-1)</p> <p style="text-align: center;">Oscilloscope</p>  <p style="text-align: center;">Spec. A = 0.933 ± 0.01 V</p>

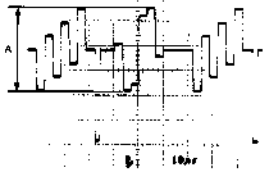
12-5-6. COMPOSITE A / D Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • EE mode • VIDEO INPUT ; 100 % color bar • INPUT SELECT switch / Sub control panel : COMPOSITE • S201-1 (MAINTENANCE MODE) / SS-53 (B-1) ; CLOSE (ON) • S201 (AD LEVEL REF) / VRA-5 (H-4) ; CLOSE (ON) <p>• After adjustment is completed, set S201-1 / SS-53 and S201 / VRA-5 to OFF.</p> <p>CONNECTION 2</p>	<p>TP502 / VRA-5 (P-1) ○ RV101 / VRA-5 (B-2)</p> <p>TRIG : TP303 / VRA-5 (H-1)</p> <p>Oscilloscope</p> <p>before adjustment</p>  <p style="text-align: center;">↓</p> <p>after adjustment</p>  <p style="text-align: center;">Spec. A = 0 ± 0.01 Vp-p</p>

12-5-7. COMPOSITE B / A Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • EE mode • VIDEO INPUT ; 100 % color bar • INPUT SELECT switch / Sub control panel : COMPOSITE <p>CONNECTION 2</p>	<p>TP502 / VRA-5 (P-1) ○ RV201 / VRA-5 (P-1)</p> <p>TRIG : TP303 / VRA-5 (H-1)</p> <p>Oscilloscope</p>  <p style="text-align: center;">Spec. A = 1.00 ± 0.01 Vp-p</p>

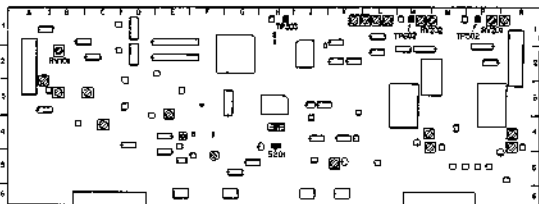
12-5-8. COMPOSITE D/A C Level Adjustment

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • EE mode • VIDEO INPUT; 100 % color bar • INPUT SELECT switch / Sub control panel; COMPOSITE <p>CONNECTION 2</p>	<p>TP602 / VRA-5 (M-1) ⓪ RV202 / VRA-5 (N-1)</p> <p>TRIG: TP602 / VRA-5 (M-1)</p> <p>Oscilloscope</p>  <p>Spec. $A = 0.933 \pm 0.01 V$</p>

SS-53 board (A Side)

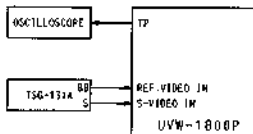



VRA-5 board (A Side)



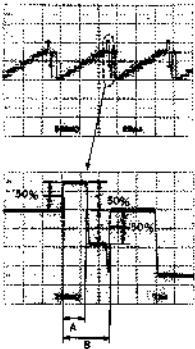
12-5-9. S-VIDEO Y Level Adjustment

[CONNECTION]

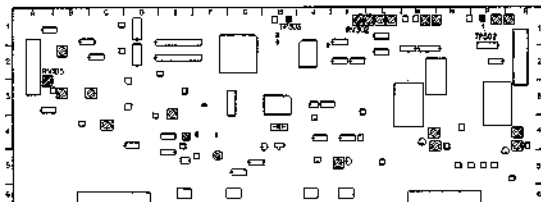


Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • EE mode • S-VIDEO INPUT : 100 % color bar • INPUT SELECT switch / Sub control panel ; S-VIDEO 	<p>TP502 / VRA-5 (P-1) Ⓞ RV105 / VRA-5 (A-2)</p> <p>TRIG : TP503 / VRA-5 (H-1)</p> <p>Oscilloscope</p>  <p>Spec. A = 1.00 ± 0.01 Vp-p</p>

12-5-10. Y REF SYNC Timing and Pulse Width Adjustment

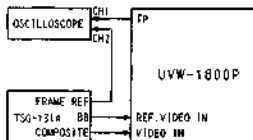
Conditions for adjustment	Adjustment point • Specifications	
<ul style="list-style-type: none"> • EE mode • COMPONENT 2 INPUT ; 100 % color bar • INPUT SELECT switch / Sub control panel ; Y-R, B 	<p>(A) Timing TP302 / VRA-5 (P-1) Ⓞ RV302 / VRA-5 (K-1)</p>	<p>(B) Pulse Width Check</p>
<p>Note : Final adjustment of RV302 is performed at overall video phase adjustment (Section 12-7), so it may change the value of A.</p>	<p style="text-align: center;">TRIG : TP303 / VRA-5 (H-1)</p> <p style="text-align: center;">Oscilloscope</p>  <p style="text-align: center;">Spec. A = $2.65 \pm 0.05 \mu s$ B = $5.8 \pm 0.1 \mu s$</p>	
<p>CONNECTION I</p>		

VRA-5 board (A Side)

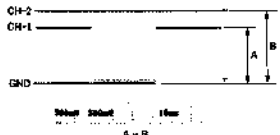



12-5-11. COMPOSITE SCH Detect Circuit Adjustment

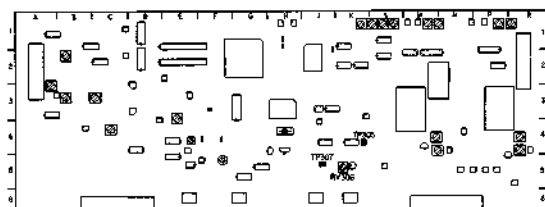
[CONNECTION for Step 1, 2]



Conditions for adjustment	Adjustment point - Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • EE mode • VIDEO INPUT ; 100 % color bar (SCH = 0°) • INPUT SELECT switch / Sub control panel ; COMPOSITE 	<p>(A) Check</p> <p>CH-1 : TP305 / VRA-5 (K-4)</p> <p>CH-2 : FRAME PULSE / TSG-131A</p> <p style="text-align: center;">TRIG : CH-1</p> <p style="text-align: center;">Oscilloscope</p> <p style="text-align: center;">Spec. A = 1.5 ± 0.5 Vdc</p>

Conditions for adjustment	Adjustment point • Specifications
<p>Step 2</p> <ul style="list-style-type: none"> • EE mode • VIDEO INPUT ; 100 % color bar (SCH = 0°) • INPUT SELECT switch / Sub control panel : COMPOSITE 	<p>(B) SCH</p> <p>CH-1 : TP305 / VRA-5 (K-4) CH-2 : TP307 / VRA-5 (I-5) Ⓞ RV306 / VRA-5 (K-5)</p> <p>TRIG : CH-1</p> <p>Oscilloscope</p> <p>Before adjustment</p>  <p>After adjustment</p>  <p>Spec. $A - B = 0 \pm 0.05 \text{ Vdc}$</p>

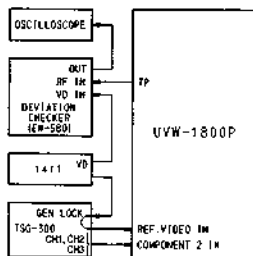
VRA-5 board (A Side)



12-5-12. Y Deviation Adjustment

(1) Adjusting procedure using a deviation checker.

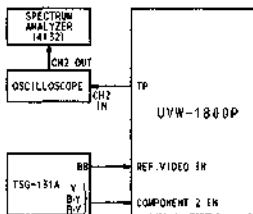
[CONNECTION]



Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • EE mode • COMPONENT 2 INPUT; 100% color bar • INPUT SELECT switch / Sub control panel; Y-R, B • Set the switches of the deviation checker following. NTSC / PAL : PAL METAL / OXIDE : METAL Y / C : Y • Connect the TP503 / VRA-5 (P-5) to RF IN / deviation checker. 	<p>EW-580 / OUT</p> <p>(A) Y CARRIER ⊙ RV583 / VRA-5 (R-4)</p> <p>(B) Y DEVIATION ⊙ RV582 / VRA-5 (R-4)</p> <p>TRIG: TP303 / VRA-5 (H-1)</p> <p>Oscilloscope</p> <p>Spec. (A) Pedestal and A portion should be in line. (B) B portion and the WHITE peak level, C portion and the SYNC TIP level should be in line.</p>

(2) Adjusting procedure using a spectrum analyzer.

[CONNECTION]



Conditions for adjustment	Adjustment point • Specifications	
<ul style="list-style-type: none"> • EE mode • COMPONENT 2 INPUT; Pulse & bar • INPUT SELECT switch / Sub control panel; Y-R, B 	<p>(A) Y CARRIER TP503 / VRA-5 (P-5) ⊙ RV503 / VRA-5 (R-4)</p>	<p>(B) Y DEVIATION TP503 / VRA-5 (P-5) ⊙ RV502 / VRA-5 (R-4)</p>
	<p>Spectrum analyzer</p> <p>Spec. (A) The center peak level should be 7.4 MHz. (B) The interval between the two peak levels (7.4 MHz and 8.8 MHz) should be 1.4 MHz.</p>	

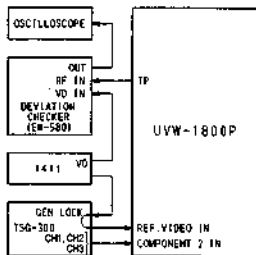
VRA-5 board (A Side)



12-5-13. C Deviation Adjustment

(1) Adjusting procedure using a deviation checker.

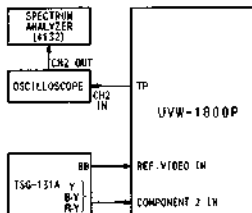
[CONNECTION]



Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • EE mode • COMPONENT 2 INPUT ; 100% color bar • INPUT SELECT switch / Sub control panel ; Y-R, B • Set the switches of the deviation checker following. <ul style="list-style-type: none"> NTSC / PAL : PAL METAL / OXIDE : METAL Y / C : C • Connect the TP603 / VRA-5 (P-5) to REF IN / deviation checker. 	<p>EW-580 / OUT</p> <p>(A) C CARRIER <input checked="" type="radio"/> RV603 / VRA-5 (M-4)</p> <p>(B) C DEVIATION <input checked="" type="radio"/> RV602 / VRA-5 (M-4)</p> <p>TRIG. TP603 / VRA-5 (H-1)</p> <p>Oscilloscope</p> <p>Spec. (A) Pedestal and A portion should be in line. (B) B portion and the high level, C portion and the low level should be in line.</p>

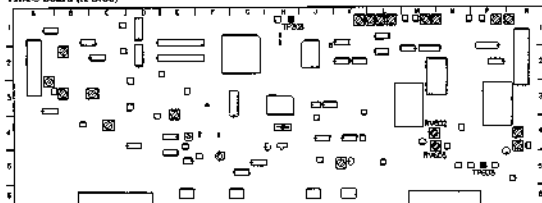
(2) Adjusting procedure using a spectrum analyzer.

[CONNECTION]



Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • EE mode • COMPONENT 2 INPUT: 100% color bar • INPUT SELECT switch / Sub control panel: Y-R, B 	<p>(A) C CARRIER TP603 / VRA-5 (P-5) ⊙ RV603 / VRA-5 (M-4)</p> <p>(B) C DEVIATION TP603 / VRA-5 (P-5) ⊙ RV602 / VRA-5 (M-4)</p> <p>TRIG: TP303 / VRA-5 (H-1)</p> <p>Spectrum analyzer</p> <p>Spec. (A) The outer peak level should be 6.1 MHz. (B) The interval between the two peak levels (5.43 MHz and 6.76 MHz) should be 1.33 MHz.</p>

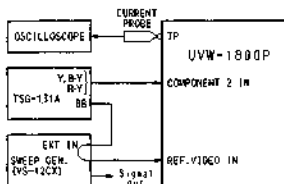
VRA-5 board (A Side)



12-6. RP BOARD ADJUSTMENT

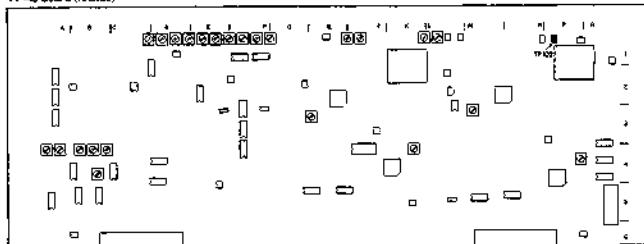
12-6-1. Y REC Current Adjustment

[CONNECTION for Step 1, 2]



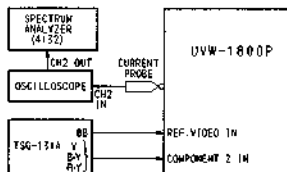
Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • EE mode • Connect TP (E1 / RP-70 (J-1)) (J-1) with a shorting clip. • Connect the HOT side of a sweep generator output to TP3 / RP-70 (J-1) and the GND side to TP1 (J-1). 	<p>TP2 / RP-70 (J-1)</p> <p>⊗ Level control / sweep generator</p> <p>TRIG : TP102 / VP-43 (P-1)</p> <p>Oscilloscope</p> <p>Spec. $A = 0.40 \pm 0.02$ Vp-p at 5 MHz</p>

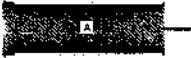
VP-43 board (A Side)

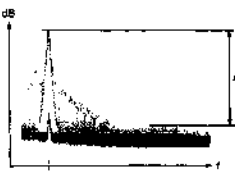


12-4-L. Y REC Current Adjustment (Continued)

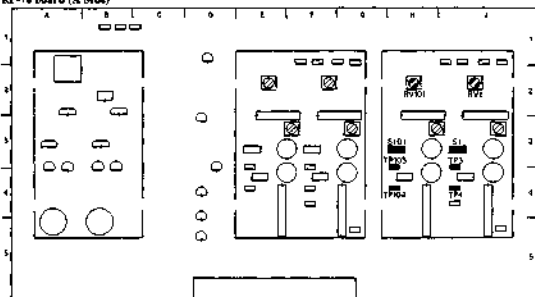
[CONNECTION for Step 3, 4]



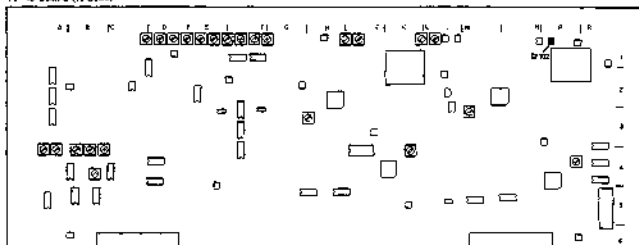
Conditions for adjustment	Adjustment point - Specifications
<p>Step 3</p> <ul style="list-style-type: none"> • COMPONENT 2 INPUT ; 50 % flat field • INPUT SELECT switch (sub control panel) : Y-R, B • REC mode Blank tape 	<p>YA TP3-TP4 / RP-70 (J-3) (J-4) ⊗ RVE / RP-70 (J-2)</p> <p>YB TP103-TP104 / RP-70 (H-3) (H-4) ⊗ RV101 / RP-70 (H-2)</p> <p>TRIG : TP102 / VP-43 (P-1)</p> <p>Oscilloscope</p>  <p>20mV : 2ns</p> <p>Spec A = 45 ± 10 mA</p>

Conditions for adjustment	Adjustment point • Specifications
<p>Step 4 (Check)</p> <ul style="list-style-type: none"> • REC mode Blank tape <p>• After adjustment is completed, remove the shoring clip and the current probe.</p> <p>• Set the S1, S101 / RP-70 to ON.</p>	<p>Oscilloscope / OUT Both YA and YB</p> <p>Spectrum analyzer</p>  <p>Spec. A ≥ 35 dB</p>

RP-70 board (A Side)

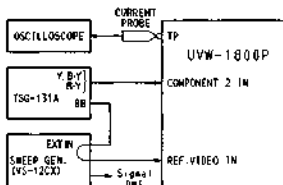


YP-43 board (A Side)



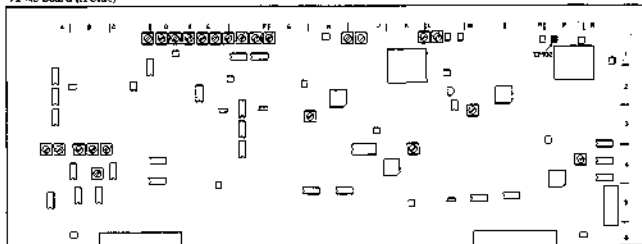
12-6-2. C REC Current Adjustment

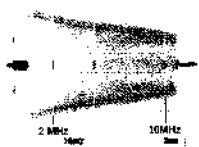
(CONNECTION for Step 1, 2)



Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • EE mode • Short TP201 - E201 / RP-70 (G-1) (F-1) with a short clip. • Connect the HOT side of a sweep generator output to TP202 / RP-70 (F-1) and the GND side to TP201 (G-1). 	<p>TP202 / RP-70 (F-1)</p> <p>⊗ Level control / sweep generator</p> <p>TRIG : INT</p> <p>Oscilloscope</p> <p>Spec. $A = 0.48 \pm 0.02$ Vp-p at 5 MHz</p>

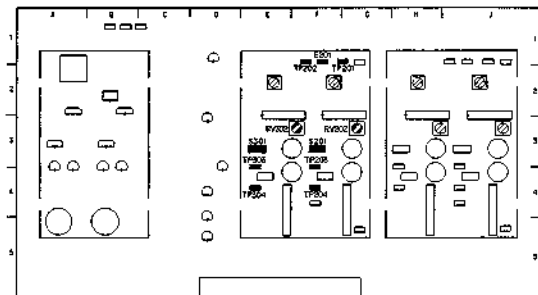
VP-43 board (A Side)



Conditions for adjustment	Adjustment points - Specifications	
<p>Step 2</p> <ul style="list-style-type: none"> S201, S304 / RP-70 (F-3) (E-3) ; OPEN (OFF) Connect TP203 - TP204 / RP-70 (F-3) (F-4) and TP303 - TP304 / RP-70 (E-3) (E-4) with shorting clip and measure with current probe. Supply the sweep signal from the sweep generator connected between TP201 - TP202 / RP-70 (G-1) (F-1). REC mode Blank tape <p>After adjustment is completed, remove the shorting clip connected between TP201-E201 and sweep signal input.</p>	<p>CA TP203-TP204 / RP-70 (F-3) (F-4) RV202 / RP-70 (G-3)</p>	<p>CB TP303-TP304 / RP-70 (E-3) (E-4) RV302 / RP-70 (F-3)</p>
<p>TRIG : TP102 / VP-43 (F-1)</p> <p>Oscilloscope</p>  <p>Spec. 2 MHz reference (100%), 10 MHz = 60% ±</p>		

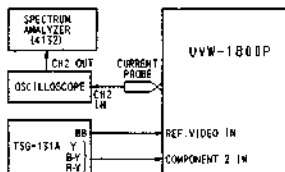
Continues to the next page.


RP-70 board (A Side)



12-6-2. C REC Current Adjustment (Continued)

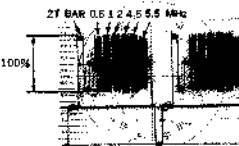
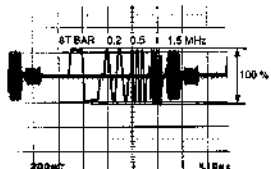
(CONNECTION for Step 3, 4)



Conditions for adjustment	Adjustment point • Specifications
<p>Step 3</p> <ul style="list-style-type: none"> • COMPONENT 2 INPUT ; 50 % flat field • INPUT SELECT switch / Sub control panel ; Y-R, B • REC mode Blank tape 	<p>CA TP203-TP204 / RP-70 (F-3) (F-4) Ⓞ RV281 / RP-70 (F-2)</p> <p>CB TP203-TP204 / RP-70 (E-3) (E-4) Ⓞ RV301 / RP-70 (E-2)</p> <p>TRIG : TP102 / VP-43 (P-1)</p> <p>Oscilloscope</p>  <p>1mV 100ns</p> <p>Spec A = 50 ± 10 mA</p>

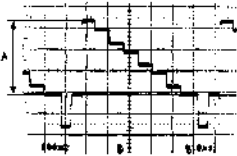
12-7. OVERALL CHECK AND ADJUSTMENT

12-7-1. COMPONENT Y and C Overall Frequency Response Check

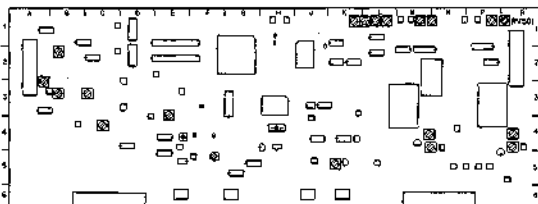
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • COMPONENT 2 INPUT: 60 % multi burst signal • INPUT SELECT switch / Sub control panel : Y-R, B • Playback the recorded portion. Blank tape 	<p>COMPONENT 2 Y OUT (75 Ω terminated)</p> <p style="text-align: center;">TRIG : REF. VIDEO</p> <p style="text-align: center;">WFM or Oscilloscope</p>  <p>Spec. (1) Check the levels for following frequencies.</p> <p>2f BAR reference 100 % (or 0 dB)</p> <p>0.5 MHz = 100 % (107 thru 94 %) (0 \pm 0.6 dB)</p> <p>1 MHz = 100 % (107 thru 94 %) (0 \pm 0.6 dB)</p> <p>2 MHz = 100 % (107 thru 94 %) (0 \pm 0.6 dB)</p> <p>4 MHz = 91 % (98 thru 85 %) (- 0.3 \pm 0.6 dB)</p> <p>5 MHz = 79 % (94 thru 67 %) (- 2 \pm 1.5 dB)</p> <p>(2) Check that both waveforms of CH-A and CH-B satisfied with the specification.</p> <p>(3) Flicker should not be on the monitor picture.</p> <p>(4) When specification is not satisfied, performed the "12-6-1. Y REC current adjustment Step 3" finely.</p>
	<p>COMPONENT 2 R-Y OUT / B-Y OUT (75 Ω terminated)</p> <p style="text-align: center;">TRIG : REF. VIDEO</p> <p style="text-align: center;">WFM or Oscilloscope</p>  <p>Spec. (1) Check the levels for following frequencies.</p> <p>8f BAR reference 100 % (or 0 dB)</p> <p>0.2 MHz = 100 % (107 thru 94 %) (0 \pm 0.6 dB)</p> <p>0.5 MHz = 100 % (107 thru 94 %) (0 \pm 0.6 dB)</p> <p>1 MHz = 100 % (107 thru 94 %) (0 \pm 0.6 dB)</p> <p>1.5 MHz = 87 % (94 thru 78 %) (- 1.2 \pm 1.5 dB)</p> <p>(2) Check that both waveforms of CH-A and CH-B satisfied with the specification.</p> <p>(3) When specification is not satisfied, performed the "12-6-2. C REC current adjustment Step 3" finely.</p>

CONNECTION 1

12-7-2. Overall Component Y Level Adjustment

Conditions for adjustment	Adjustment point - Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode • COMPONENT 2 INPUT ; 100 % color bar • INPUT SELECT switch / Sub control panel ; Y-R, B <p>CONNECTION 1</p>	<p>COMPONENT 2 Y OUT (75 Ω terminated)</p> <p>⊙ RV501 / VRA-5 (R-I)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. $A = 0.70 \pm 0.02$ V</p>
<p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • COMPONENT 2 INPUT ; 100 % color bar • INPUT SELECT switch / Sub control panel ; Y-R, B • Playback the recorded portion. Blank tape <p>CONNECTION 1</p>	<p>Spec. Satisfied the spec. referring Step 1.</p>

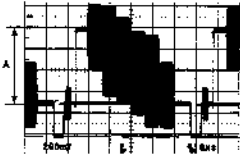
VRA-5 board (A Side)



12-7-3. Overall Component R-Y / B-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode • COMPONENT 2 INPUT ; 100 % color bar • INPUT SELECT switch / Sub control panel ; Y-R, B 	<p>COMPONENT 2 B-Y / R-Y OUT (75 Ω terminated)</p> <p>(A) • (B) CNT-C LEVEL Ⓞ RV203 / VRA-5 (M-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p> <p>200ns 10ns</p> <p>200ns 10ns</p> <p>Spec. $A = B = 0.79 \pm 0.02$ Vp-p</p>
<p>CONNECTION 1</p> <p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • COMPONENT 2 INPUT ; 100 % color bar • INPUT SELECT switch / Sub control panel ; Y-R, B • Playback the recorded portion. Blank tape <p>CONNECTION 1</p>	<p>Spec. Satisfied the spec. referring Step 1, B-Y and R-Y.</p>

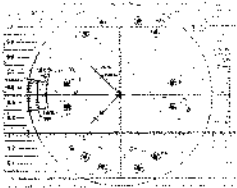
12-7-4. Overall Composite Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode • VIDEO INPUT ; • 100 % color bar • INPUT SELECT switch / • Sub control panel ; COMPOSITE <p>CONNECTION 2</p>	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>⊙ RV201 / VRA-5 (P-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. A = 0.70 ± 0.02 V</p>
<p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • VIDEO INPUT ; • 100 % color bar • INPUT SELECT switch / • Sub control panel ; COMPOSITE • Playback the recorded portion. • Blank tape <p>CONNECTION 2</p>	<p>Spec. Satisfied the spec. referring Step 1.</p>

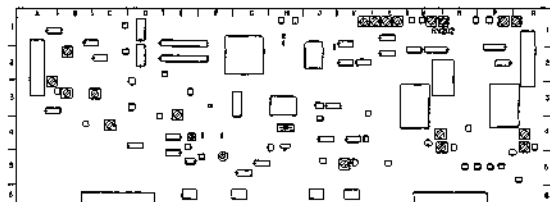
VRA-5 board (A Side)



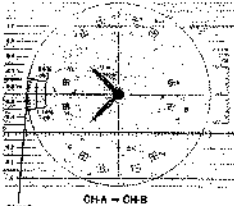
12-7-5. Overall Composite C Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode VIDEO INPUT : 100 % color bar • INPUT SELECT switch / Sub control panel ; COMPOSITE <p>CONNECTION 2</p>	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>(A) Burst ○ PHASE control / Vector</p> <p>(B) C ST-C LEVEL ○ RV202 / VRA-5 (N-1)</p> <p>TRIG : REF. VIDEO</p> <p>Vector</p>  <p>Spec. (A) Set the dot of the burst on the right position on the scale. (B) All dots should be inside the "□" mark on the vector.</p>
<p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • VIDEO INPUT : 100 % color bar • INPUT SELECT switch / Sub control panel ; COMPOSITE • Playback the recorded portion. Blank tape <p>CONNECTION 2</p>	<p>Spec. Satisfied the spec. referring Step 1.</p>

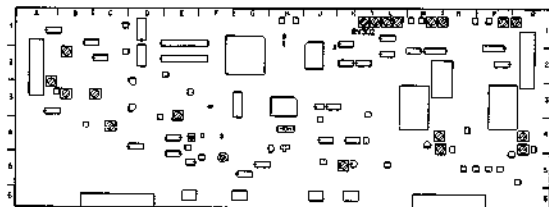
VRA-5 board (A Side)

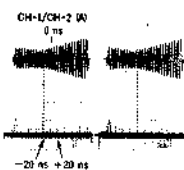
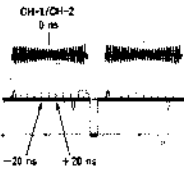


12-7-4. Overall Video Phase Adjustment (Continued)

Conditions for adjustment	Adjustment point • Specifications
<p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode • COMPONENT 2 INPUT : 50 % BOWTIE • Use the Waveform Vector (1751) on SC-H mode. 	<p>COMPONENT 2 Y OUT (75 Ω terminated)</p> <p>⊗ SYNC control / Sub control panel</p> <p>TRIG : EXT / WFM</p> <p>SC-H mode</p>  <p>Spec. Use PHASE control of 1751 for adjustment the SYNC phase of CH-A as shown above. Change CH-A to CH-B of 1751. Then make the SYNC phase of CH-B coincides with the SYNC phase of CH-A with the SYNC control on the sub control panel. (Note : The dot position should be adjust in the direction of the shortest movement.)</p>

YRA-5 board (A Side)



Conditions for adjustment	Adjustment point - Specifications
<p>Step 3</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode • COMPONENT 2 INPUT ; • 50 % BOWTIE • INPUT SELECT switch / Sub-control panel ; Y-R, B • WFM300 ; • BOWTIE mode (WFM) 	<p>COMPONENT 2 Y OUT (75 Ω terminated)</p> <p>⊙ RV302 / VRA-5 (K-1)</p> <p>TRIG. EXT / WFM</p> <p>WFM</p> <p>Before adjustment</p>  <p>CH-1/CH-2 (W)</p> <p>0 ns</p> <p>-20 ns +20 ns</p> <p>↓</p> <p>After adjustment</p>  <p>CH-1/CH-2</p> <p>0 ns</p> <p>-20 ns +20 ns</p> <p>Spec. Set the BOWTIE DIP point (cross point of the CH-1 / CH-2) on the corner marker.</p>
<p>Step 4</p> <ul style="list-style-type: none"> • Do not use the extension board. • COMPONENT 2 INPUT ; • 50 % BOWTIE • INPUT SELECT switch / Sub-control panel ; Y-R, B • Playback the recorded portion. Blank tape 	<p>Spec. difference on BOWTIE DIP point $\rightarrow 0 \pm 20$ nsec</p> <p>When specification is not satisfied \rightarrow Adjust Step 3 again and check that perform Step 4</p>

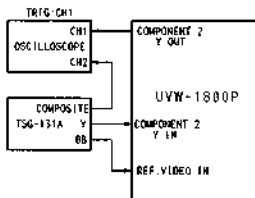
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12-7-6. Overall Video Phase Adjustment (Continued)

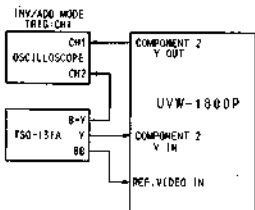
[Reference]

If not prepare the WEM300/1751, connect the oscilloscope following figure and adjust Step 1, 3 and 4.

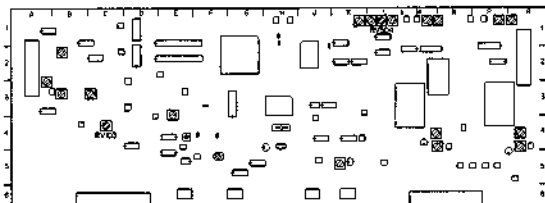
[CONNECTION for Step 1]



[CONNECTION for Step 3/4]

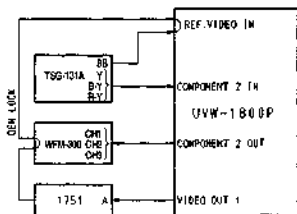


VRA-5 board (A Side)



12-7-7. Overall Component Y / C Delay Adjustment

(CONNECTION)



Conditions for adjustment	Adjustment point - Specifications
<p>Step 1</p> <ul style="list-style-type: none"> EE mode COMPONENT 2 INPUT; 50% BOWTIE INPUT SELECT switch / Sub control panel; Y-R, B WFM300; BOWTIE mode (WFM) <p>Note: Perform the CH-1 / CH-3 (B) adjust before the CH-1 / CH-2 (A) adjust.</p>	<p>COMPONENT 2 OUT (75 Ω terminated)</p> <p>(A) C-C DELAY <input checked="" type="radio"/> RV103 / VRA-5 (C-4)</p> <p>(B) CAV Y / C DELAY <input checked="" type="radio"/> RV304 / VRA-5 (L-1)</p> <p>TRIG: EXT / WFM</p> <p>WFM</p> <p>Before adjustment</p> <p>After adjustment</p> <p>Spec. Set the each BOWTIE DIP point of (A) and (B) on the center marker. 0 ± 10 nsec</p>

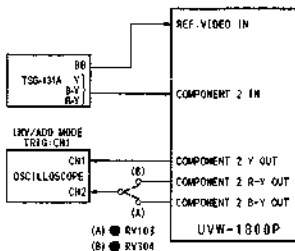
Continues to the next page.

12-7-7. Overall Component Y/C Delay Adjustment (Continued)

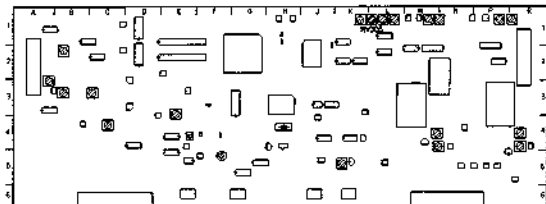
Conditions for adjustment	Adjustment point - Specifications
Step 2 • COMPONENT 2 INPUT; 50% BOWTIE • INPUT SELECT switch / Sub control panel: Y-P, B • Play back the recorded portion. Blank tape	Spec. difference on BOWTIE DIP point — 0 ± 20 nsec When specification is not satisfied — Adjust Step 1 again and check this perform Step 2.

[Reference]

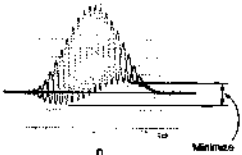

If not prepare the WFM300, connect the oscilloscope following figure for adjust.



YRA-8 board (A Side)

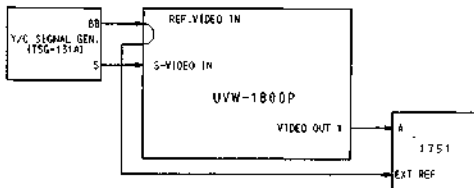


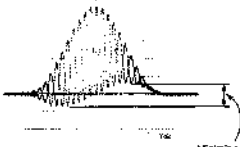
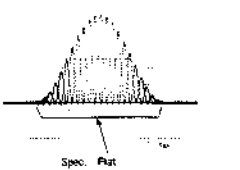
12-7-8. Overall Composite Y / C Delay Adjustment

Conditions for adjustment	Adjustment point - Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode • VIDEO INPUT ; PULSE & BAR • INPUT SELECT switch / Sub control panel ; COMPOSITE 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>⊙ RV30S / VRA-5 (L-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or oscilloscope</p> <p>Before adjustment</p>  <p style="text-align: right;">to</p> <p style="text-align: right;">Minimize</p> <p style="text-align: center;">↓</p> <p>After adjustment</p>  <p style="text-align: center;">Spec. Flat</p> <p>(If the readjustment is performed after Step 2, compensate the deviation measured in Step 2.)</p>
<p>CONNECTION 2</p> <p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • VIDEO INPUT ; PULSE & BAR • INPUT SELECT switch / Sub control panel ; COMPOSITE • Play back the recorded portion. Blank tape <p>CONNECTION 2</p>	<p>Spec. Difference from center = 0 ± 30 usec</p> <p>When specification is not satisfied -- Adjust Step 1 again and check that perform Step 2.</p>

12-7-9. Overall S-VIDEO Y / C Delay Adjustment

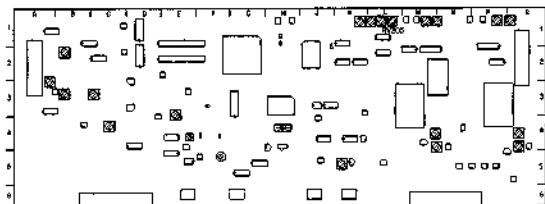
[CONNECTION]

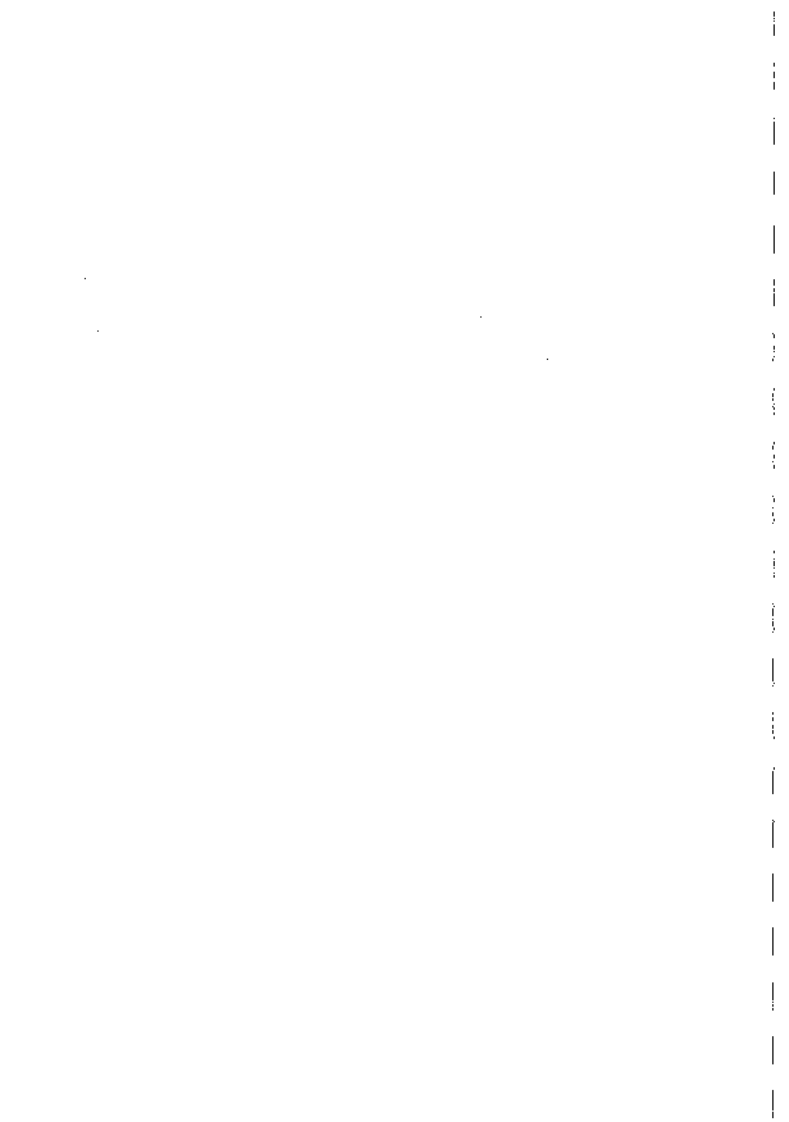


Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode • S-VIDEO INPUT; PULSE & BAR • INPUT SELECT switch / Sub control panel ; S-VIDEO 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>RV305 / VRA-5 (L-1)</p> <p>TRIG : EXT / WFM</p> <p>WFM or Oscilloscope</p> <p>Before adjustment</p>  <p style="text-align: center;">↓</p> <p>After adjustment</p> 

Conditions for adjustment	Adjustment point - Specifications
<p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • S-VIDEO INPUT ; PULSE & BAR • INPUT SELECT switch / Sub control panel ; S-VIDEO • Play back the recorded portion, Blank tape 	<p style="text-align: center;">Spec. difference from center → 0 ± 20 nsec</p> <p style="text-align: center;">When specification is not satisfied → Adjust Step 1 again and check that perform Step 2.</p>

VRA-5 board (A Side)





SECTION 13

ELECTRICAL ALIGNMENT AFTER REPLACEMENT BOARDS

Electrical adjustments are greatly simplified when circuit board is replaced. Refer to this section, not sections 9 through 12, for adjustment when circuit board is replaced which requires adjustment and / or setting.

This section provides the minimum but sufficient adjustment procedure for this purpose.

Some circuit boards require adjustment and / or resetting using the maintenance mode even though any electrical adjustment devices are not mounted on the circuit boards.

[EQUIPMENT]

- Oscilloscope (TEKTRONIX 2445 or equivalent)
- Signal Generator
 - Audio SG (HP 8904 or equivalent)
 - Component SG (TEKTRONIX TSG-300 / TSG-131A or equivalent)
 - Composite SG (TEKTRONIX TSG-131A op. 03 or equivalent)
 - Y / C (TEKTRONIX TSG-131A)
- Audio Level Meter (HP 3400A or equivalent)
- Waveform Monitor (WFM)
 - Component (TEKTRONIX WFM300 / 300A / 1781 / 1765 op. SC or equivalent)
 - Composite (TEKTRONIX 1751 / 1781 / 1765 op. SC or equivalent)
- Spectrum Analyzer (ADVANTEST R-4131 B / D or equivalent)
- Sweep Generator (SHIBASOKU VS-12CX or equivalent)
- Picture Monitor
- Frequency Counter
- Current Probe (TEKTRONIX P6023 or equivalent)
- Blank Tape (metal) BCT-20MA or equivalent
 - Note: "Blank Tape" indicates a cassette tape on which no video / audio signals are recorded.
- Alignment Tape CR5-1B PS (Part No. 8-960-096-91)
- Alignment Tape CR8-1B PS (Part No. 8-960-096-86)

Alignment Tape CRS-1B PS (Part No. B-960-096-91)

Contents

TIME min. s	VIDEO TRACK	APM
0 : 00	RF Sweep Marker 1, 2, 4, 6, 8, 10, 12 MHz	No-Signal
2 : 00	60 % H-Sweep (CTDM) Marker 0.5, 1, 2, 3, 4, 5 MHz	
5 : 00	Pulse & Bar (CTDM)	
8 : 00	60 % Multi Burst Y : 0.5, 1, 2, 4, 5, 5.5 MHz C : 0.2, 0.5, 1, 1.5, 2 MHz	
11 : 00	Pulse & Bar	
14 : 00		
16 : 30	100 % Color Bars	400 Hz Sine Wave 25 kHz Deviation
17 : 00		75 kHz Deviation
19 : 00	50 % Bowtie & 10T	No-Signal
22 : 00	Line 17A Signal	
24 : 00	Quad Phase	
26 : 00	50 % Flat Field	
28 : 00	100 % Color Bars with Dropout	
30 : 00	Composite H-Sweep with VISC	

Contents

TIME min. s	AUDIO TRACK
0:00	1 kHz / 0 VU
3:00	15 kHz / 0 VU
5:00	1 kHz / -20 VU
6:00	40 kHz / -20 VU
6:30	7 kHz / -20 VU
7:00	10 kHz / -20 VU
7:30	15 kHz / -20 VU
8:00	

- *1. When this tape is reproduced in the audio reference level check or adjustment, the output level (0 dB) should be corrected according to the correction value as follows.

example) Correction value = -0.5 dB

Output level = 0 dB - 0.5 dB = -0.5 dB

[SWITCH / SETUP MENU SETTING]

This setting should be changed in position unless otherwise specified.

<Sub Control Panel>

INPUT SELECT : COMPOSITE
 REMOTE / LOCAL : LOCAL
 CTL / LTC / U-BIT : LTC
 CHARACTER : ON
 TC INPUT EXT / INT : INT

<Connector Panel>

AUDIO INPUT CH-1 600Ω : ON
 AUDIO INPUT CH-2 600Ω : ON
 Component 1 / 2 : 2

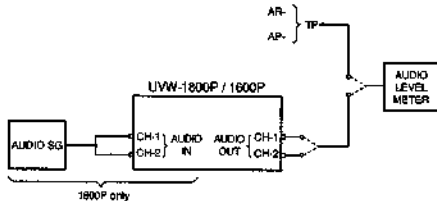
<Switch Setting on Printed Circuit Board>

S201-2 / SS-53 : CLOSE (ON) ---- NR OFF

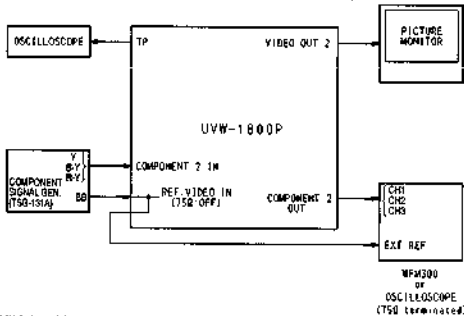
[CONNECTION]

Connect some equipment as following unless otherwise specified.

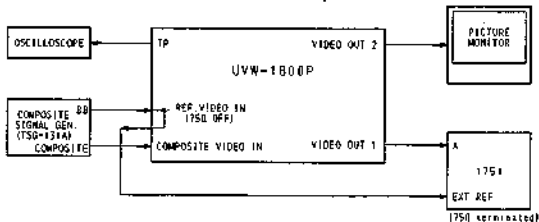
CONNECTION 1 Audio SG HP8904 / Audio Level Meter HP3400A



CONNECTION 2 SC : TSG-131A / Waveform Monitor : WFM-300 / Oscilloscope / Picture Monitor



CONNECTION 3 SC : TSG-131A / Waveform Monitor : 1751 / Oscilloscope / Picture Monitor



[AP, AR Board Preparations and Notes on Alignment]

Preparations

Cleaning of stationary heads

Clean three stationary heads by the cleaning piece molsonated with cleaning fluid.
After the fluid blow off, wipe off the heads by a non-wearred cloth or cleaning piece.

Making the Tape which not Recorded Audio Signals

Sub control panel switch setting

TC INPUT EXT / INT : INT

Level volume setting

CH-1 / CH-2 REC VR : MIN

Recording

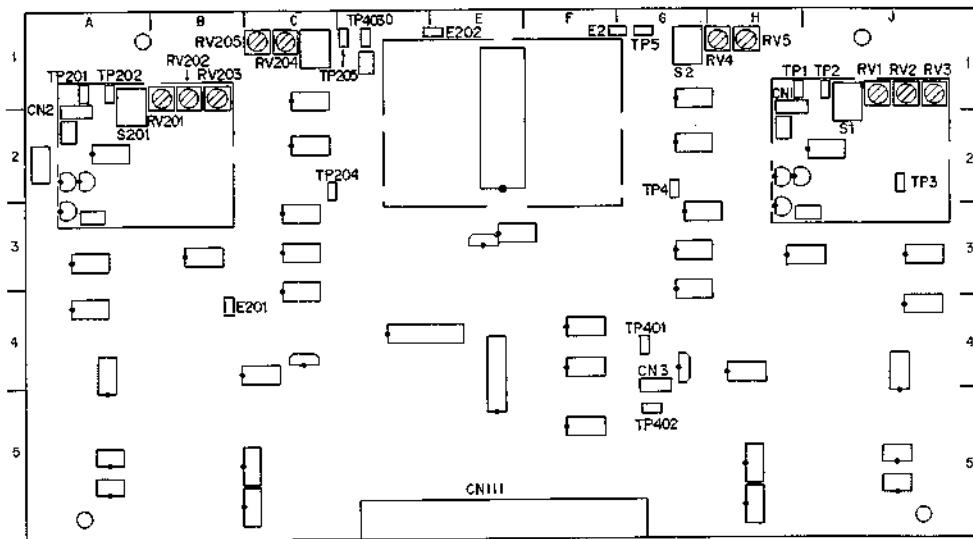
Record the blank tape BCT-20MA (or equivalent) from the top to the end.

(The tape which recorded CTL and TC without audio signals is completed, under the above-mentioned operation.)

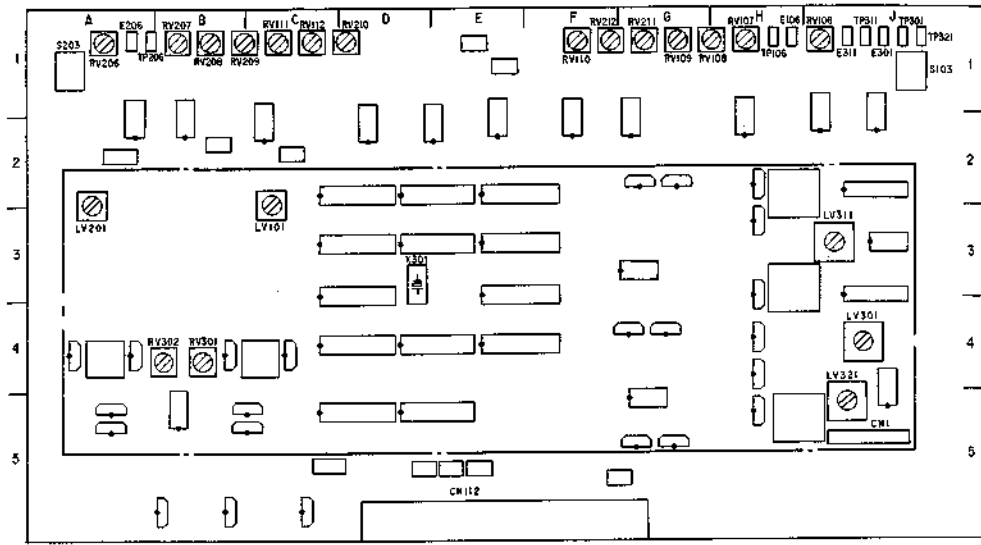
Notes for alignment

- AUDIO MONITOR is terminated by 47 k Ω .
- AUDIO OUTPUT is terminated by 600 Ω (except designated in particular).
- When the alignment tape is played back, specification should be corrected according to the correction value mentioned in the tape level.
- The alignment tape is used within the limits of about 50 times and recommend to manage by marking.

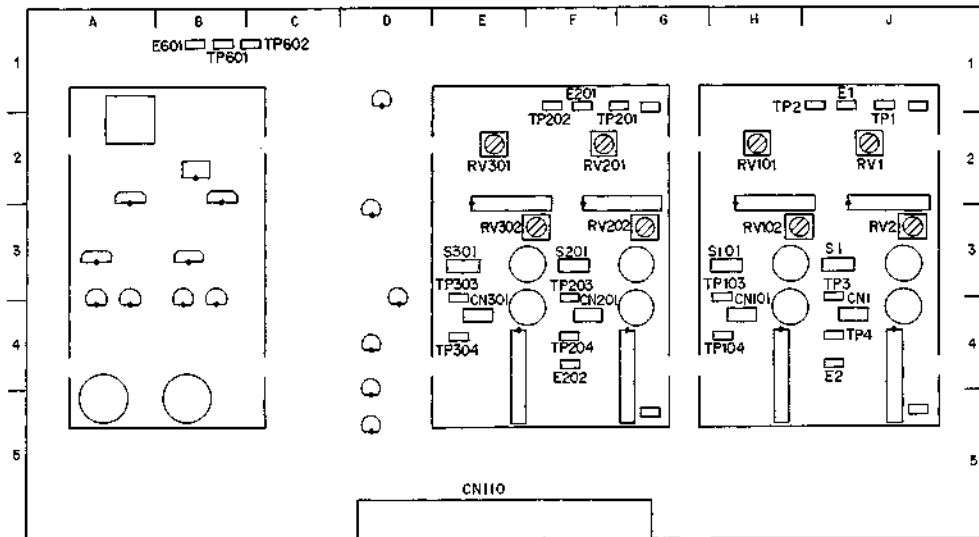
AP-31 / 31A board (A Side)



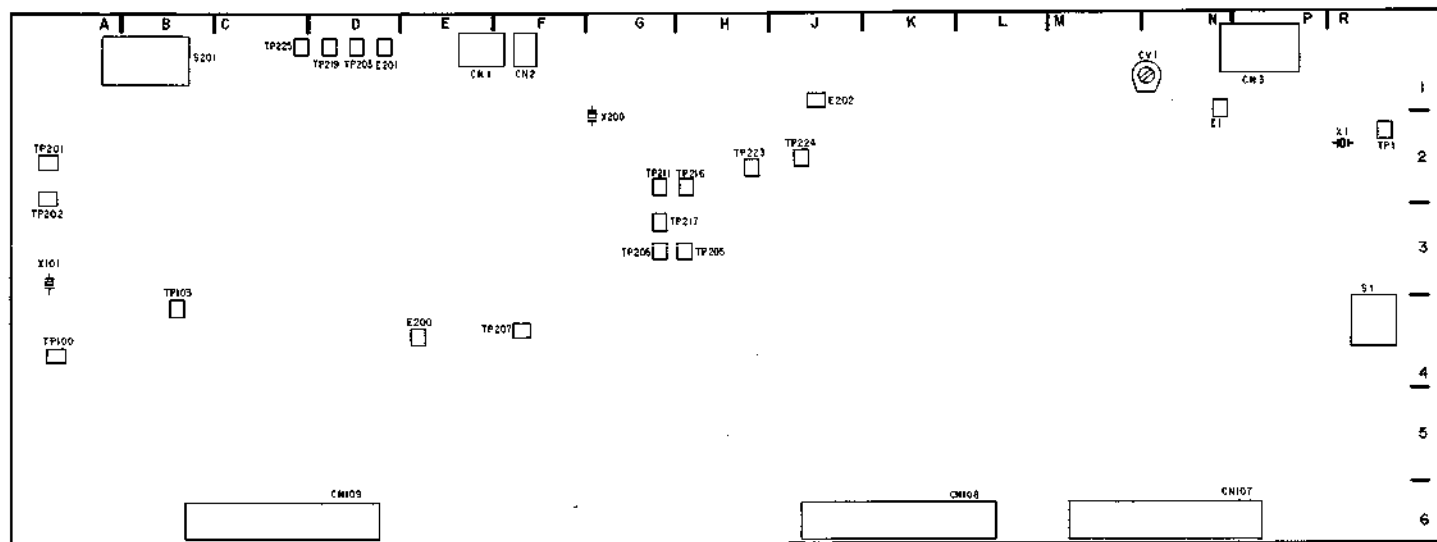
AR-14 board (A Side)



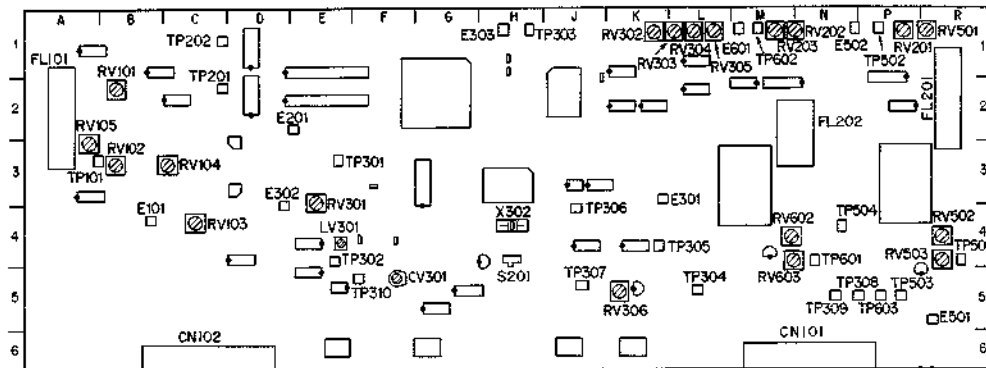
RP-70 board (A Side)



SS-53 board (A Side)



VRA-5 board (A Side)



UVW-1600P

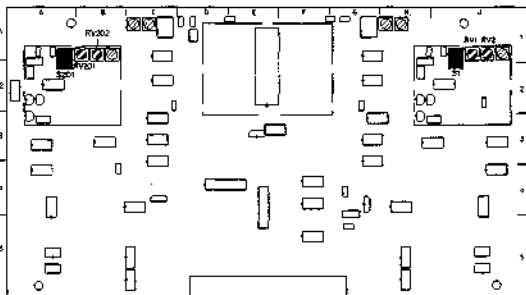
AP-31A BOARD

1. PB MODE ADJUSTMENT

1-1. PB Dolby off Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications										
• PB mode 1 kHz, 7 kHz, 10 kHz, 15 kHz, -20 VU / CR8-1B PS (5:00 - 8:00)	AUDIO OUTPUT CH-1 / 2 CH-1 ○ RV1 (10 kHz) / AP-31A (J-1) ○ RV2 (7 kHz) / AP-31A (J-1) CH-2 ○ RV201 (10 kHz) / AP-31A (J-1) ○ RV202 (7 kHz) / AP-31A (J-1) Adjust alternately If the specification of the high frequency is not satisfied, change the following switches and adjust again. CH-1 S1 / AP-31A (J-1) CH-2 S201 / AP-31A (A-1) Spec. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>FREQUENCY (kHz)</th> <th>OUTPUT LEVEL (dB)</th> </tr> </thead> <tbody> <tr> <td>1 k</td> <td>0 (REF)</td> </tr> <tr> <td>7 k</td> <td>0 ± 0.2</td> </tr> <tr> <td>10 k</td> <td>0 ± 0.2</td> </tr> <tr> <td>15 k</td> <td>-0.5 ± 0.5</td> </tr> </tbody> </table>	FREQUENCY (kHz)	OUTPUT LEVEL (dB)	1 k	0 (REF)	7 k	0 ± 0.2	10 k	0 ± 0.2	15 k	-0.5 ± 0.5
FREQUENCY (kHz)	OUTPUT LEVEL (dB)										
1 k	0 (REF)										
7 k	0 ± 0.2										
10 k	0 ± 0.2										
15 k	-0.5 ± 0.5										


AP-31A board (A Side)



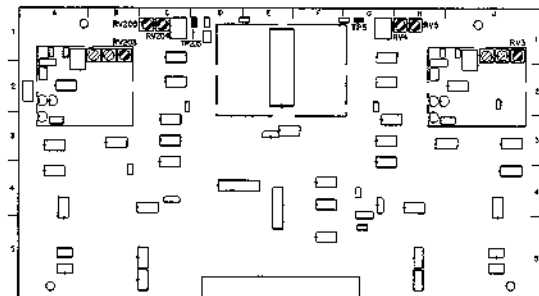
1-2. PB Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • PB mode 1 kHz, 0 VU / CR8-1B PS (0:00 - 3:00) 	<p>Step 1</p> <p>CH-1 TP5 / AP-31A (G-1) Ⓞ RV3 / AP-31A (J-1)</p> <p>CH-2 TP205 / AP-31A (D-1) Ⓞ RV203 / AP-31A (B-1)</p> <p>Spec. -10.0 ± 0.1 dBu</p>
	<p>Step 2</p> <p>AUDIO OUTPUT CH-1 / 2</p> <p>CH-1 Ⓞ RV4 / AP-31A (H-1)</p> <p>CH-2 Ⓞ RV204 / AP-31A (C-1)</p> <p>Spec. $+4.0 \pm 0.2$ dBu</p>

1-3. Audio Meter Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • PB mode 1 kHz, 0 VU / CR8-1B PS (0:00 - 3:00) 	<p>Audio meter Ⓞ RV5 / AP-31A (H-1) Ⓞ RV205 / AP-31A (C-1)</p>  <p>Spec. The segment one step above 0 VU should be dimly lit</p>

AP-31A board (A Side)



UVW-1800P

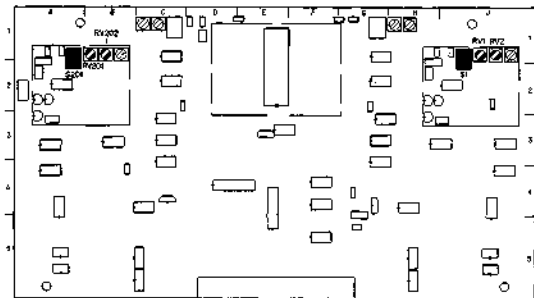
AP-31 BOARD

I. PB MODE ADJUSTMENT

1-1. PB Dolby off Frequency Response Adjustment

Conditions for adjustment	Adjustment point • Specifications										
• PB mode 1 kHz, 7 kHz, 10 kHz, 15 kHz, -20 VU / CR8-1B PS (5:00 - 8:00)	AUDIO OUTPUT CH-1 / 2 CH-1 Ⓞ RV1 (10 kHz) / AP-31 (J-1) Ⓞ RV2 (7 kHz) / AP-31 (J-1) CH-2 Ⓞ RV201 (10 kHz) / AP-31 (B-1) Ⓞ RV202 (7 kHz) / AP-31 (B-1) Adjust alternately If the specification of the high frequency is not satisfied, change the following switches and adjust again. CH-1 S1 / AP-31 (J-1) CH-2 S201 / AP-31 (A-1) Spec. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>FREQUENCY (Hz)</th> <th>OUTPUT LEVEL (dB)</th> </tr> </thead> <tbody> <tr> <td>1 k</td> <td>0 (REF)</td> </tr> <tr> <td>7 k</td> <td>0 ± 0.2</td> </tr> <tr> <td>10 k</td> <td>0 ± 0.2</td> </tr> <tr> <td>15 k</td> <td>-0.5 ± 0.5</td> </tr> </tbody> </table>	FREQUENCY (Hz)	OUTPUT LEVEL (dB)	1 k	0 (REF)	7 k	0 ± 0.2	10 k	0 ± 0.2	15 k	-0.5 ± 0.5
FREQUENCY (Hz)	OUTPUT LEVEL (dB)										
1 k	0 (REF)										
7 k	0 ± 0.2										
10 k	0 ± 0.2										
15 k	-0.5 ± 0.5										

AP-31 board (A Side)




1-2. PB Level Adjustment

Conditions for adjustment	Adjustment point - Specifications	
<ul style="list-style-type: none"> • PB mode 1 kHz, 0 VU / CRS-1B PS (0:00-3:00) 	CH-1 TP5 / AP-31 (G-1) Ⓞ RV3 / AP-31 (J-1)	CH-2 TP205 / AP-31 (D-1) Ⓞ RV203 / AP-31 (B-1)
	Spec. -10.0 ± 0.1 dBu	
	[Check] AUDIO OUTPUT CH-1 / 2	
	Spec. $+4.0 \pm 0.2$ dBu	

2. EE MODE ADJUSTMENT

2-1. EE Input Level / Audio Meter Adjustment

Conditions for adjustment	Adjustment point - Specifications	
<ul style="list-style-type: none"> • AUDIO INPUT CH-1 / 2: 1 kHz, +4.00 dBu • EE mode 	Step 1 CH-1 TP5 / AP-31 (G-1) Ⓞ REC VR / Sub Control Panel	CH-2 TP205 / AP-31 (D-1) Ⓞ REC VR / Sub Control Panel
	Spec. -10.00 ± 0.05 dBu	
	Step 2 AUDIO METER Ⓞ RV5 / AP-31 (H-1)	
	Ⓞ RV205 / AP-31 (C-1)	
		
	Spec. The segment one step above 0 VU should be dimly lit	

AR-14 BOARD

3. REC MODE ADJUSTMENT

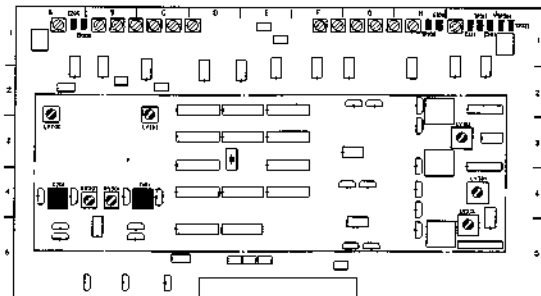
3-1. Bias Trap Adjustment

Conditions for adjustment	Adjustment point • Specifications		
<ul style="list-style-type: none"> AUDIO INPUT CH-1/2; No signal REC mode Blank tape 	<table border="0"> <tr> <td style="vertical-align: top;"> CH-1 TP106 / AR-14 (H-1) GND : E106 (H-1) Ⓞ LV107 / AR-14 (C-2) </td> <td style="vertical-align: top;"> CH-2 TP206 / AR-14 (A-1) GND : E206 (A-1) Ⓞ LV207 / AR-14 (A-2) </td> </tr> </table> <p style="text-align: center;">Spec. Bias leak → Minimize (≤ -30 dBu)</p>	CH-1 TP106 / AR-14 (H-1) GND : E106 (H-1) Ⓞ LV107 / AR-14 (C-2)	CH-2 TP206 / AR-14 (A-1) GND : E206 (A-1) Ⓞ LV207 / AR-14 (A-2)
CH-1 TP106 / AR-14 (H-1) GND : E106 (H-1) Ⓞ LV107 / AR-14 (C-2)	CH-2 TP206 / AR-14 (A-1) GND : E206 (A-1) Ⓞ LV207 / AR-14 (A-2)		

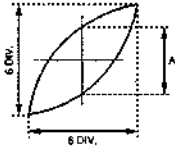
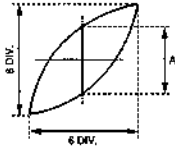
3-2. Bias Current Adjustment

Conditions for adjustment	Adjustment point • Specifications		
<ul style="list-style-type: none"> AUDIO INPUT CH-1/2; No signal REC mode Blank tape 	<p>Step 1</p> <table border="0"> <tr> <td style="vertical-align: top;"> TP1 / AP-31 (H-1) GND : TP2 (H-1) Ⓞ T101 / AR-14 (C-4) </td> <td style="vertical-align: top;"> TP201 / AP-31 (A-1) GND : TP202 (A-1) Ⓞ T201 / AR-14 (A-4) </td> </tr> </table> <p style="text-align: center;">Spec. Bias current → Maximize</p>	TP1 / AP-31 (H-1) GND : TP2 (H-1) Ⓞ T101 / AR-14 (C-4)	TP201 / AP-31 (A-1) GND : TP202 (A-1) Ⓞ T201 / AR-14 (A-4)
	TP1 / AP-31 (H-1) GND : TP2 (H-1) Ⓞ T101 / AR-14 (C-4)	TP201 / AP-31 (A-1) GND : TP202 (A-1) Ⓞ T201 / AR-14 (A-4)	
<p>Step 2</p> <table border="0"> <tr> <td style="vertical-align: top;"> TP1 / AP-31 (H-1) GND : TP2 (H-1) Ⓞ RV301 / AR-14 (B-4) </td> <td style="vertical-align: top;"> TP201 / AP-31 (A-1) GND : TP202 (A-1) Ⓞ RV302 / AR-14 (B-4) </td> </tr> </table> <p style="text-align: center;">Spec. 16 ± 1 mV rms</p>	TP1 / AP-31 (H-1) GND : TP2 (H-1) Ⓞ RV301 / AR-14 (B-4)	TP201 / AP-31 (A-1) GND : TP202 (A-1) Ⓞ RV302 / AR-14 (B-4)	
TP1 / AP-31 (H-1) GND : TP2 (H-1) Ⓞ RV301 / AR-14 (B-4)	TP201 / AP-31 (A-1) GND : TP202 (A-1) Ⓞ RV302 / AR-14 (B-4)		

AR-14 board (A Side)



4. AU / TC ERASE TUNE ADJUSTMENT

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • AUDIO INPUT CH-1 / 2 ; • No signal • REC mode • Blank tape 	<p>Step 1</p> <p>TP311 / AR-14 (H-2) GND : E311 (J-1) ⊙ LV311 / AR-14 (I-3)</p> <p style="text-align: right;">Spec. level — maximize</p>
	<p>Step 2</p> <p>TP311 / AR-14 (H-2) GND : E311 (J-1) TP301 / AR-14 (H-3) GND : E301 (J-1) ⊙ LV301 / AR-14 (C-2)</p> <p>Oscilloscope ; X-Y mode</p>  <p>phase difference between TP311 and TP301 Spec. $A \leq 0 \pm 10^\circ$ (1 DIV.)</p>
	<p>Step 3</p> <p>TP311 / AR-14 (H-2) TP321 / AR-14 (H-5) GND : E311 (J-1) ⊙ LV321 / AR-14 (C-2)</p> <p>Oscilloscope ; X-Y mode</p>  <p>phase difference between TP311 and TP321 Spec. $A \leq 0 \pm 10^\circ$ (1 DIV.)</p>

Continues to the next page.

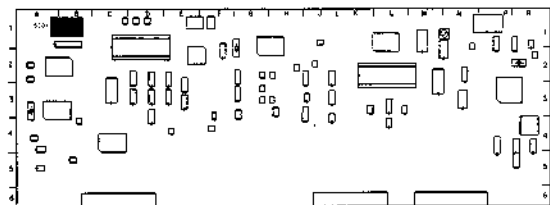
4. AU / TC ERASE TUNE ADJUSTMENT (Continued)

Conditions for adjustment	Adjustment point • Specifications		
<ul style="list-style-type: none"> • AUDIO INPUT CH-1 / 2 ; • No signal • REC mode • Blank tape 	<p style="text-align: center;">Step 4</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;"> <p>CH-1</p> <p>TP301 / AR-14 (J-1)</p> <p>GND : E301 (J-1)</p> </td> <td style="width: 50%; border: none; vertical-align: top;"> <p>CH-2</p> <p>TP311 / AR-14 (J-1)</p> <p>GND : E311 (J-1)</p> </td> </tr> </table> <p style="text-align: center;">TC</p> <p style="text-align: center;">TP321 / AR-14 (J-1)</p> <p style="text-align: center;">GND : E311 (J-1)</p> <p style="text-align: center;">Spec. 150 ± 15 mV rms</p>	<p>CH-1</p> <p>TP301 / AR-14 (J-1)</p> <p>GND : E301 (J-1)</p>	<p>CH-2</p> <p>TP311 / AR-14 (J-1)</p> <p>GND : E311 (J-1)</p>
<p>CH-1</p> <p>TP301 / AR-14 (J-1)</p> <p>GND : E301 (J-1)</p>	<p>CH-2</p> <p>TP311 / AR-14 (J-1)</p> <p>GND : E311 (J-1)</p>		

AR-14 board (A Side)



SS-53 board (A Side)



5. OVERALL ADJUSTMENT

5-1. Overall Level Adjustment

Conditions for adjustment	Adjustment point • Specifications						
Step 1 • AUDIO INPUT CH-1 / 2; 1 kHz, +4 dBu • Playback the recorded portion, Blank tape	AUDIO OUTPUT CH-1 / 2 Spec. +4.0 ± 0.5 dBu When specification is not satisfied → Step 2						
Step 2 • AUDIO INPUT CH-1 / 2; 1 kHz, +4 dBu • REC mode Blank tape	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">CH-1</td> <td style="width: 50%; border: none;">CH-2</td> </tr> <tr> <td style="border: none;">TP106 / AR-14 (H-1)</td> <td style="border: none;">TP206 / AR-14 (A-1)</td> </tr> <tr> <td style="border: none;">⊙ RV106 / AR-14 (J-1)</td> <td style="border: none;">⊙ RV206 / AR-14 (A-1)</td> </tr> </table> Correct the difference level from the center value in Step 1. After the adjustment, check that perform Step 1.	CH-1	CH-2	TP106 / AR-14 (H-1)	TP206 / AR-14 (A-1)	⊙ RV106 / AR-14 (J-1)	⊙ RV206 / AR-14 (A-1)
CH-1	CH-2						
TP106 / AR-14 (H-1)	TP206 / AR-14 (A-1)						
⊙ RV106 / AR-14 (J-1)	⊙ RV206 / AR-14 (A-1)						

5-2. Overall Frequency Response Adjustment (Dolby on)

Conditions for adjustment	Adjustment point • Specifications						
Step 1 • AUDIO INPUT CH-1 / 2; 12.5 kHz, +4 dBu • S201-2 / SS-53 (B-1); OPEN (OFF) ···· NR ON • Playback the recorded portion Blank tape	AUDIO OUTPUT CH-1 / 2 Spec. +3.5 ± 0.5 dBu When specification is not satisfied → Step 2						
Step 2 • AUDIO INPUT CH-1 / 2; 12.5 kHz, +4 dBu • S201-2 / SS-53 (B-1); OPEN (OFF) ···· NR ON • REC mode Blank tape	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">CH-1</td> <td style="width: 50%; border: none;">CH-2</td> </tr> <tr> <td style="border: none;">TP106 / AR-14 (H-1)</td> <td style="border: none;">TP206 / AR-14 (A-1)</td> </tr> <tr> <td style="border: none;">⊙ RV107 / AR-14 (H-1)</td> <td style="border: none;">⊙ RV207 / AR-14 (B-1)</td> </tr> </table> Correct the difference level ×0.8 from the center value in Step 1. After the adjustment, check that perform Step 1.	CH-1	CH-2	TP106 / AR-14 (H-1)	TP206 / AR-14 (A-1)	⊙ RV107 / AR-14 (H-1)	⊙ RV207 / AR-14 (B-1)
CH-1	CH-2						
TP106 / AR-14 (H-1)	TP206 / AR-14 (A-1)						
⊙ RV107 / AR-14 (H-1)	⊙ RV207 / AR-14 (B-1)						

6. INSERT CROSSTALK ADJUSTMENT

6-1. TC Insert Crosstalk Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> AUDIO INPUT CH-1 / 2 : No signal TC insert mode Tape which not recorded audio signal <p>[Putting the unit into TC insert mode] Select TC INSERT of EDIT CHECK on Maintenance mode, and push the REC and PB simultaneously.</p> <p>After adjustment, cancel TC insert mode.</p> <p>[Cancel of TC insert mode] Press the STOP KEY.</p>	<p>AUDIO OUTPUT CH-1 / 2</p> <p>CH-1</p> <ul style="list-style-type: none"> RV111 / AR-14 (C-1) RV112 / AR-14 (C-1) <p>CH-2</p> <ul style="list-style-type: none"> RV211 / AR-14 (G-1) RV212 / AR-14 (F-1) <p>Spec. The leak of TC signal → Minimize (≦ -16 dBu)</p> <p>Adjust CH-1 and CH-2 by the each two RVs alternately</p>

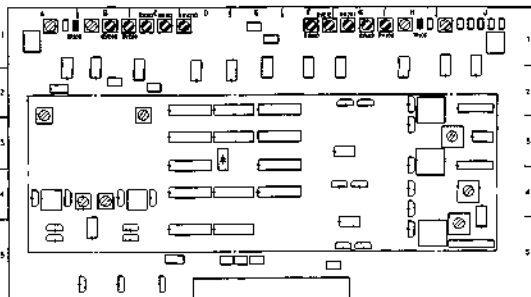
6-2. Audio CH-1 Insert Crosstalk Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> AUDIO INPUT CH-1 : 15 kHz, • 4.0 dBu AUDIO INPUT CH-2 : No signal AUDIO CH-1 : Insert mode Tape which not recorded audio signal <p>[Putting the unit into AUDIO CH-1 insert mode] Select A1 INSERT of EDIT CHECK on Maintenance mode, and push the REC and PB simultaneously.</p> <p>After adjustment, cancel AUDIO CH-1 insert mode.</p> <p>[Cancel of AUDIO CH-1 mode] Press the STOP KEY.</p>	<p>AUDIO OUTPUT CH-2</p> <ul style="list-style-type: none"> RV106 / AR-14 (B-1) RV109 / AR-14 (G-1) RV110 / AR-14 (F-1) <p>Spec. The leak of CH-1 → Minimize (≦ -14 dBu)</p> <p>Adjust three RVs alternately</p>

6-3. Audio CH-2 Insert Crosstalk Adjustment

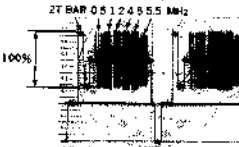
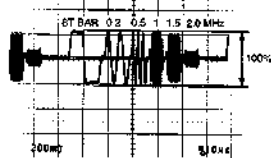
Conditions for adjustment	Adjustment points • Specifications
<ul style="list-style-type: none"> • AUDIO INPUT CH-1 ; No signal • AUDIO INPUT CH-2 ; 15kHz, +4.0 dBu • AUDIO CH-2; Insert mode Tape which not recorded audio signal <p>[Putting the unit into AUDIO CH-2 (insert mode) Select A2 INSERT of EDIT CHECK on Maintenance mode, and push the REC and PB simultaneously.</p> <p>After adjustment, cancel AUDIO CH-2 insert mode.</p> <p>[Cancel of AUDIO CH-2 mode] Press the STOP KEY.</p>	<p>AUDIO OUTPUT CH-1</p> <ul style="list-style-type: none"> ○ RV208 / AR-14 (B-1) ○ RV209 / AR-14 (B-1) ○ RV210 / AR-14 (D-1) <p style="text-align: center;">Spec. The leak of CH-1 → Minimize (± -14 dBu)</p> <p style="text-align: center;">Adjust three RVs alternately</p>

AR-14 board (A Side)



RP-76 BOARD

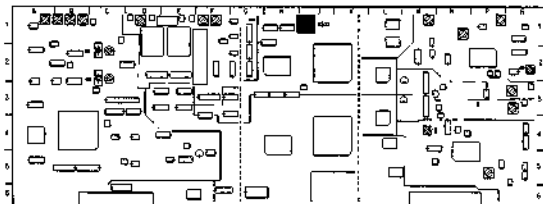
1. Component Y and C Overall Frequency Response Check

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • COMPONENT 2 INPUT ; 60 % multi burst signal • INPUT SELECT switch / Sub control panel ; Y-R, B • Playback the recorded portion. Blank tape 	<p>COMPONENT 2 Y OUT (75 Ω terminated)</p> <p style="text-align: center;">TRIG : REF. VIDEO</p> <p style="text-align: center;">WFM or Oscilloscope</p>  <p>Spec. (1) Check the levels for following frequencies.</p> <p>2T BAR reference 100 % (or 0 dB)</p> <p>0.5 MHz = 100 % (107 thru 94 %) (0 \pm 0.6 dB)</p> <p>1 MHz = 100 % (107 thru 94 %) (0 \pm 0.6 dB)</p> <p>2 MHz = 100 % (107 thru 94 %) (0 \pm 0.6 dB)</p> <p>4 MHz = 91 % (98 thru 85 %) (-0.8 \pm 0.6 dB)</p> <p>5 MHz = 79 % (94 thru 67 %) (-2.0 \pm 1.5 dB)</p> <p>(2) Check that both waveforms of CH-A and CH-B satisfied with the specification.</p> <p>(3) Flicker should not be on the monitor picture.</p> <p>(4) When specification is not satisfied, performed the "1. Y REC current adjustment Step 3" fully.</p>
<p>CONNECTION 2</p>	<p>COMPONENT 2 R-Y OUT / B-Y OUT (75 Ω terminated)</p> <p style="text-align: center;">TRIG : REF. VIDEO</p> <p style="text-align: center;">WFM or Oscilloscope</p>  <p>Spec. (1) Check the levels for following frequencies.</p> <p>8T BAR reference 100 % (or 0 dB)</p> <p>0.2 MHz = 100 % (107 thru 94 %) (0 \pm 0.6 dB)</p> <p>0.5 MHz = 100 % (107 thru 94 %) (0 \pm 0.6 dB)</p> <p>1 MHz = 100 % (107 thru 94 %) (0 \pm 0.6 dB)</p> <p>1.5 MHz = 87 % (94 thru 78 %) (-1.2 \pm 1.2 dB)</p> <p>(2) Check that both waveforms of CH-A and CH-B satisfied with the specification.</p> <p>(3) When specification is not satisfied, performed the "4. C REC current adjustment Step 2" fully.</p>

2. Component Y and C Overall Over Modulation Check

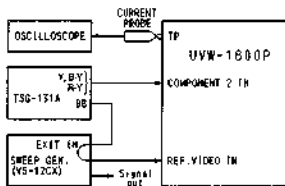
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • COMPONENT 2 INPUT : H sweep signal (125 %) • INPUT SELECT switch / Sub control panel ; Y-R, B • Connect a color monitor to VIDEO OUT 2 • Playback the recorded portion. Blank tape 	<p>VIDEO OUT 2</p> <p>Spec. (1) Playback : Over modulation should not be on the monitor picture (2) Still : Over modulation should not be on the center of the monitor picture.</p> <p>When specification is not satisfied → Perform the head friction check. Head friction is not serious, perform the check in Section 12-5-12. Y Deviation Adjustment, Section 12-5-13.C Deviation Adjustment.</p> <p>The check was normally, perform 3. Y REC Current Adjustment Step 3, 4. C REC Current Adjustment Step 3. And performing increase or decrease within the specification.</p>
<ul style="list-style-type: none"> • COMPONENT 2 INPUT : H sweep signal (100 %) • INPUT SELECT switch / Sub control panel ; Y-R, B • S500-2 / TBC-25 (1-1) , CLOSE (ON) ••• Y MUTE • Connect a color monitor to VIDEO OUT 2 • Playback the recorded portion. Blank tape • After check is completed, set S500- 2 / TBC-25 to OFF. 	<p>VIDEO OUT 2</p> <p>Spec. (1) Playback : Over modulation should not be on the monitor picture (2) Still : Over modulation should not be on the center of the monitor picture.</p>

TBC-25 board (A Side)



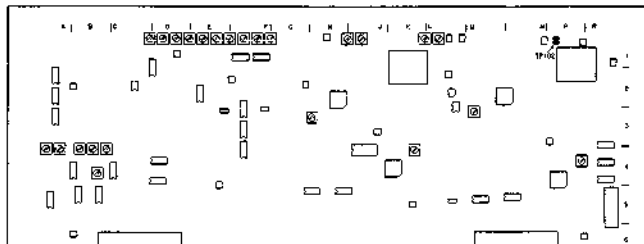
3. Y REC Current Adjustment

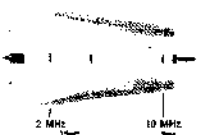
[CONNECTION for Step 1, 2]



Conditions for adjustment	Adjustment point - Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • EE mode • Connect TP1-B1 / RP-70 (J-1) (J-1) with a shorting clip. • Connect the HOT side of a sweep generator output to TP2 / RP-70 (J-1) and the GND side to TP1 (J-1). 	<p>TP2 / RP-70 (J-1)</p> <p>⊗ Level control / sweep generator</p> <p>TRIC : TP102 / VP-43 (P-1)</p> <p>Oscilloscope</p> <p>Spec. $A = 0.40 \pm 0.02$ Vp-p at 5 MHz</p>

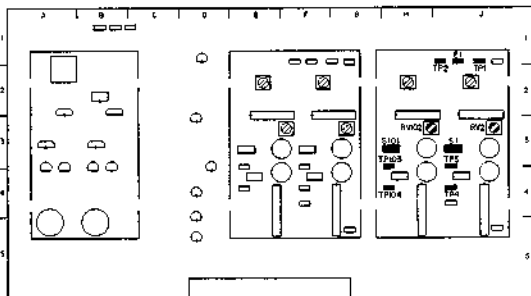
VP-43 board (A Side)



Conditions for adjustment	Adjustment point - Specifications	
<p>Step 2</p> <ul style="list-style-type: none"> • SL S101 / RP-70 (J-3) (H-3); OPEN (OFF) • Short TP3-TP4 / RP-70 (J-3) (J-4) and TP103-TP104 / RP-70 (H-3) (H-4) with shunting clip and measure with current probe. • Supply the sweep signal from the sweep generator connected between TP2-TP1 / RP-70 (J-1) (J-1). • REC mode Blank tape <p>• After adjustment is completed, remove the shunting clip connected between TP1-E1 and sweep signal input.</p>	<p>YA</p> <p>TP3-TP4 / RP-70 (J-3) (J-4) Ⓞ RV2 / RP-70 (J-3)</p>	<p>YB</p> <p>TP103-TP104 / RP-70 (H-3) (H-4) Ⓞ RV102 / RP-70 (H-3)</p> <p>TRIG : TP102 / VP-43 (P-1)</p> <p>Oscilloscope</p>  <p>Spec. 2 MHz reference (100%), 10 MHz = 45 ± 2 %</p>

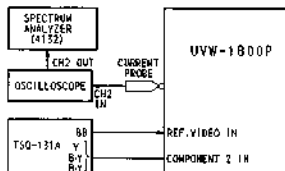
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RP-70 board (A Side)



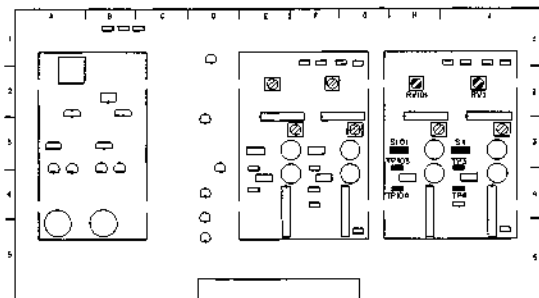
3. Y REC Current Adjustment (Continued)

[CONNECTION for Step 3]

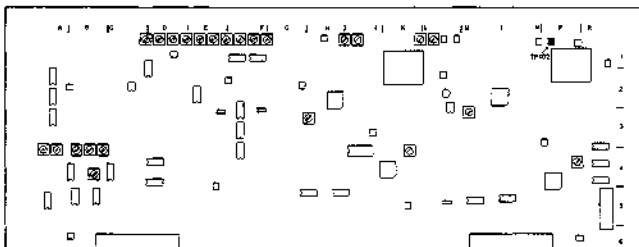


Conditions for adjustment	Adjustment point • Specifications
Step 3 • COMPONENT 2 INPUT; 50 % flat field • INPUT SELECT switch (sub control panel); Y-R, B • REC mode Blank tape	YA TP3-TP4 / RP-70 (J-3) (J-4) Ⓞ RVL / RP-70 (J-2)
	YB TP103-TP104 / RP-70 (H-3) (H-4) Ⓞ RV101 / RP-70 (H-2)
	TRIG : TP102 / VP-43 (P-1)
	Oscilloscope
	20mV 2μs
	Spec. A = 45 ± 10 mA

RP-70 board (A Side)

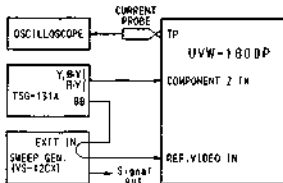


VP-43 board (A Side)



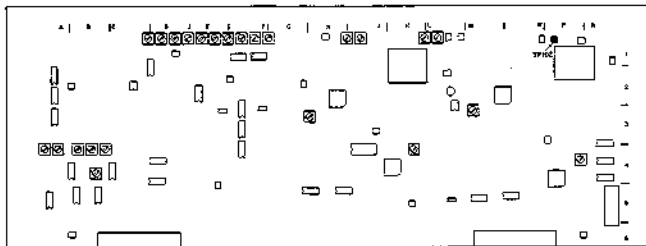
4. CREC Current Adjustment

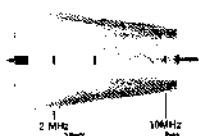
(CONNECTION for Step 1, 2)



Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • EE mode • Short TP201 - E201 / RP-70 (G-1) (F-1) with a short clip. • Connect the HOT side of a sweep generator output to TP202 / RP-70 (F-1) and the GND side to TP201 (G-1). 	<p>TP202 / RP-70 (F-1)</p> <ul style="list-style-type: none"> • Level control / sweep generator <p>TRIG: INT</p> <p>Oscilloscope</p> <p>Spec. A = 0.40 ± 0.02 V-p-p at 5 MHz</p>

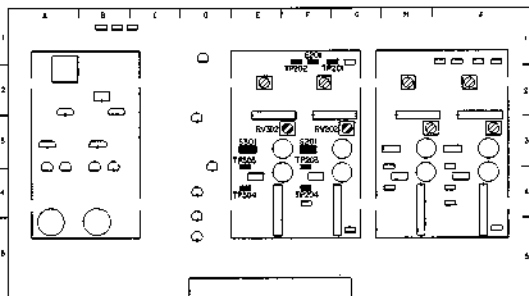
VP-43 board (A Side)



Conditions for adjustment	Adjustment point - Specifications
<p>Step 2</p> <ul style="list-style-type: none"> S201, S301 / RP-70 (F-3) (E-3) ; OPEN (OFF) Connect TP203 - TP204 / RP-70 (F-3) (F-4) and TP303 - TP304 / RP-70 (E-3) (E-4) with shorting clip and measure with current probe. Supply the sweep signal from the sweep generator connected between TP201 - TP202 / RP-70 (G-1) (F-1). REC mode Blank tape After adjustment is completed, remove the shorting clip connected between TP201-E201 and sweep signal input. 	<p>CA TP203-TP204 / RP-70 (F-3) (F-4) RV202 / RP-70 (G-3)</p> <p>CB TP303-TP304 / RP-70 (E-3) (E-4) RV302 / RP-70 (F-3)</p> <p>TRIG : TP102 / VP-43 (P-1)</p> <p>Oscilloscope</p>  <p>Spec. 2 MHz reference (100%), 10 MHz = 60 ± 3 %</p>

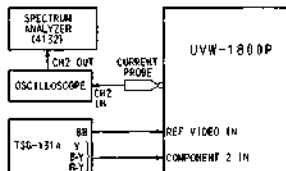
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RP-70 board (A Side)



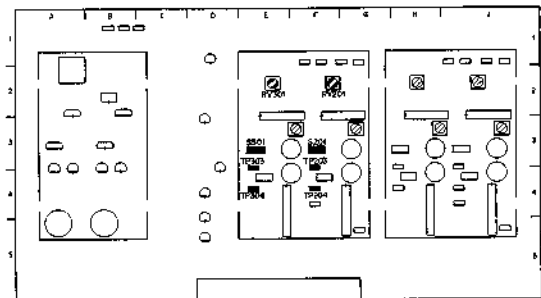
4. C REC Current Adjustment (Continued)

[CONNECTION for Step 3]

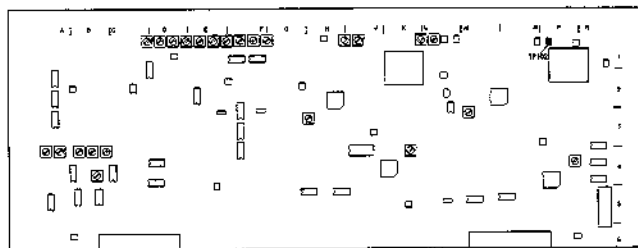


Conditions for adjustment	Adjustment point - Specifications
<p>Step 3</p> <ul style="list-style-type: none"> COMPONENT 2 INPUT ; 50 % Rec field INPUT SELECT switch / Sub control panel ; Y-R, B REC mode Blank tape 	<p>CA TP203-TP204 / RP-70 (F-3) (E-4) RV201 / RP-70 (F-2)</p> <p>CB TP303-TP304 / RP-70 (E-3) (E-4) RV301 / RP-70 (E-2)</p> <p>TRIG ; TP102 / VP-43 (P-1)</p> <p>Oscilloscope</p>  <p>10uV 2ms</p> <p>Spec. A = 50 ± 10 mA</p>

RP-70 board (A Side)

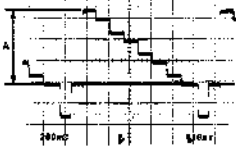


VP-43 board (A Side)

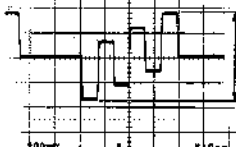


TBC-25 BOARD

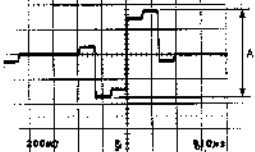
1. PB Component Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode 100 % color bar / CR5-1B PS (14:00 – 17:00) 	<p>COMPONENT 2 Y OUT (75 Ω Terminated)</p> <p>COMPONENT Y</p> <p>⊙ RV500 / TBC-25 (F-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>CONNECTION 2</p> <p style="text-align: right;">Spec. A = 0.700 ± 0.007 V</p>

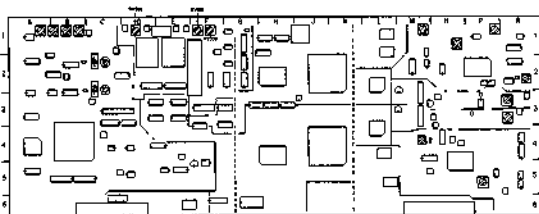
2. PB Component B-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode 100 % color bar / CR5-1B PS (14:00 – 17:00) 	<p>COMPONENT 2 B-Y OUT (75 Ω Terminated)</p> <p>⊙ RV501 / TBC-25 (F-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>CONNECTION 2</p> <p style="text-align: right;">Spec. A = 0.700 ± 0.007 V</p>

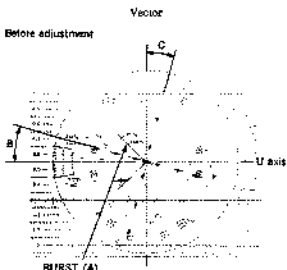
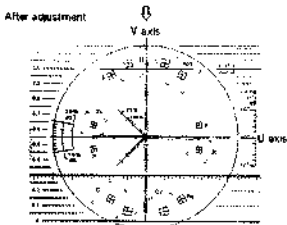
3. PB Component R-Y Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode • 100 % color bar / CR5-1B PS (14:00 – 17:00) <p>CONNECTION 2</p>	<p>COMPONENT 2 R-Y OUT (75 Ω Terminated)</p> <p>⊗ RV502 / TBC-25 (D-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. $A = 0.700 \pm 0.007$ V</p>

TBC-25 board (A Side)

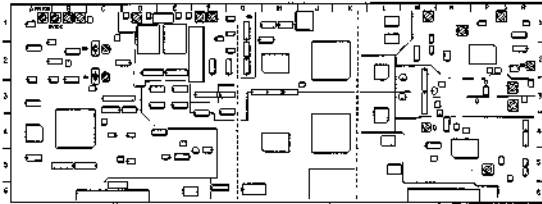


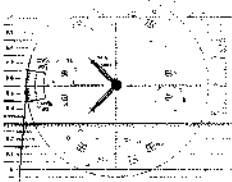
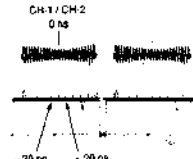
4. U-V Axis Phase (B-Y, R-Y Phase) Adjustment

Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode QUAD PHASE / CR5-1.8 PS (22:00 - 24:00) 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>(A) Burst axis <input type="checkbox"/> PHASE control / Vector</p> <p>(B) U axis (HUE) <input type="checkbox"/> RV702 / TBC-25 (B-1)</p> <p>(C) V axis (U / V OFFSET) <input type="checkbox"/> RV780 / TBC-25 (A-1)</p> <p>TRIG : REF. VIDEO</p> <p>Vector</p> <p>Before adjustment</p>  <p>After adjustment</p>  <p>Spec. (A) Set the dot of the burst on the right position on the scale.</p> <p>(B) Set the dots of the B-Y on the U axis of the vector. $B = 0 \pm 1^\circ$</p> <p>(C) Set the dots of the R-Y on the V axis of the vector. $C = 0 \pm 1^\circ$</p>

CONNECTION 3

TBC-25 board (A Side)



Conditions for adjustment	Adjustment point • Specifications
<p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • PB mode 50 % BOWTIE & 10T / CR5-1B PS (17:00 - 19:00) • COMPONENT 2 INPUT ; 50 % BOWTIE • Use the Waveform Vector (175t) on SC-H mode. 	<p>COMPONENT 2 Y OUT (75 Ω terminated)</p> <p>⊗ SYNC control / Sub control panel</p> <p>TRIG. EXT / WFM</p> <p>SC-H mode</p>  <p>Spec. Use PHASE control of 1751 for adjustment the SYNC phase of CH-A as shown above. Change CH-A to CH-B of 1751. Then make the SYNC phase of CH-B coincides with the SYNC phase of CH-A with the SYNC control on the sub control panel. (Note : The dot position should be adjust in the direction of the shortest movement.)</p>
<p>Step 3</p> <ul style="list-style-type: none"> • Do not use the extension board. • PB mode 50 % BOWTIE & 10T / CR5-1B PS (17:00 - 19:00) • INPUT SELECT switch / Sub control panel ; Y-R, B • WFM300 ; BOWTIE mode (WFM) 	<p>COMPONENT 2 Y OUT (75 Ω terminated)</p> <p>⊗ RV300 / TBC-25 (M-1)</p> <p>TRIG. EXT / WFM</p> <p>WFM</p> <p>CH-1 / CH-2 0 ns</p>  <p>Spec. Set the BOWTIE DMP points (cross points of the CH-1 and CH-2) on the center marker. ± 20 nsec</p>

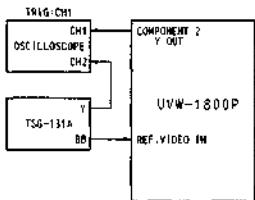
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5. PB Video Phase Adjustment (Continued)

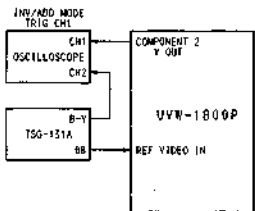
[Reference]

If not prepare the WFM300/175T, connect the oscilloscope following figure and adjust Step 1 and 3.

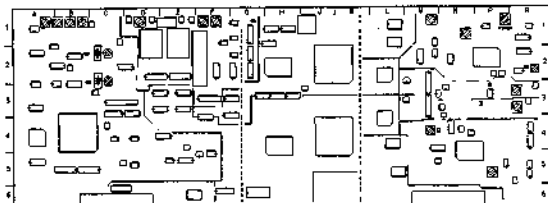
[Connection for Step 1]



[Connection for Step 3]

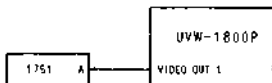


TBC-25 board (A Side)



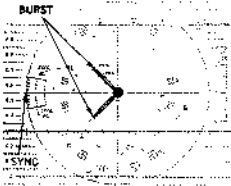
6. PB Composite Y / C Delay Adjustment

[CONNECTION]

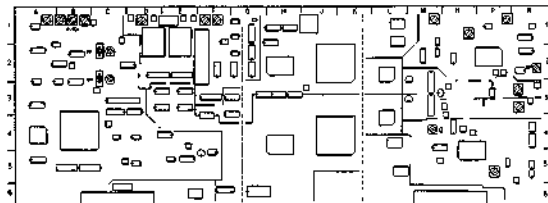


Conditions for adjustment	Adjustment points - Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode LDNE 17A / CR5-1B PS (19:00 - 22:00) 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>RV400 / TBC-25 (P-1)</p> <p>TRIG : INT / WFM</p> <p>WFM</p> <p>Before adjustment</p> <p>10T portion</p> <p>↓</p> <p>After adjustment</p> <p>Spec. Flat</p>

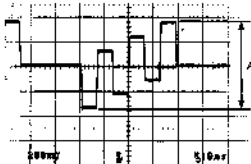
7. INT SCH Phase Adjustment

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode • 100 % color bar (CR5-1B P5) (14:00 - 17:00) • REF. VIDEO INPUT: No signal • Use the Waveform Vector (1751) on SC-H mode. <p style="margin-top: 20px;">• After adjustment is completed, connect the REF. VIDEO INPUT connector.</p> <p>CONNECTION 3</p>	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>(A) Burst Adjustment Ⓞ PHASE control / Vector</p> <p>(B) INT SC Ⓞ RV701 / TBC-25 (B-1)</p> <p>TRIG : INT / WPM</p> <p>SC-H mode</p>  <p>Spec. (A) Set the dot of the burst on the normal position on the scale.</p> <p>(B) The SYNC should be in the center of the burst. (SCH = 0°)</p>

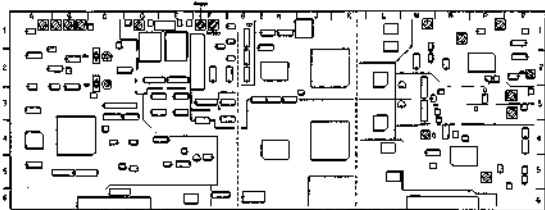
TBC-25 board (A Side)



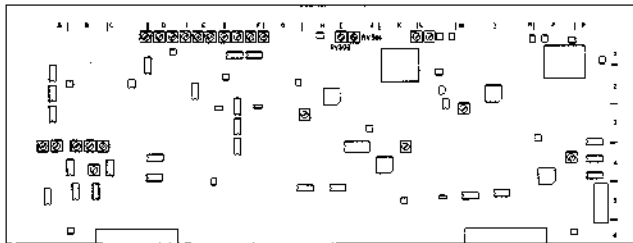
4. PB Component B-Y Level Adjustment <TBC-25 Board>

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode • 100% color bar / CRS-1B PS (14:00 - 17:00) <p>CONNECTION 2</p>	<p>COMPONENT 2 B-Y OUT (75 Ω terminated)</p> <p>◇ RV501 / TBC-25 (F-1)</p> <p>TRIG: REF VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. A = 0.700 \pm 0.007 Vp-p</p>

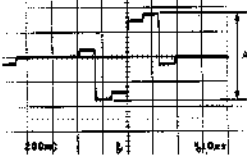
TBC-25 board (A side)



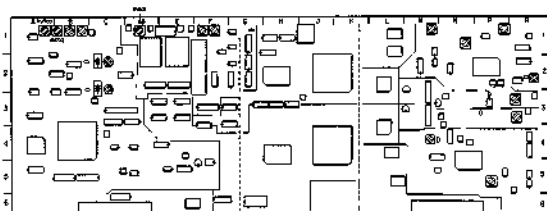
VP-43 board (A side)



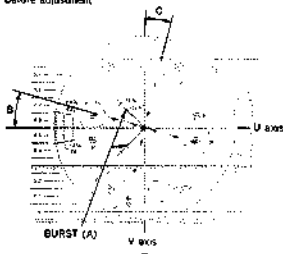
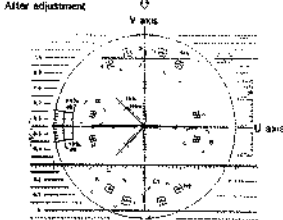
5. PB Component R-Y Level Adjustment <TBC-25 Board>

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • Do not use the attention board. • PB mode 100 % color bar / CRS-FB PS (14:00 - 17:00) <p>CONNECTION 2</p>	<p>COMPONENT 2 R-Y OUT (75 Ω terminated)</p> <p>○ RV502 / TBC-25 (D-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p style="text-align: center;">Spec. $A = 0.700 \pm 0.007$ Vp-p</p>

TBC-25 board (A side)

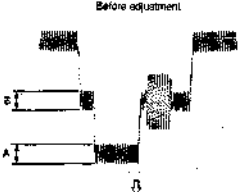



6. U-V Axis Phase (B-Y, R-Y Phase) Adjustment <TBC-25 Board>

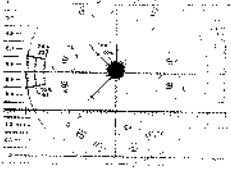
Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode QUAD PHASE / CR5-1B PS (22:00 - 24:00) 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>(A) Burst <input checked="" type="checkbox"/> PHASE control / Vector</p> <p>(B) U axis (HUE) <input checked="" type="checkbox"/> RV702 / TBC-25 (B-1)</p> <p>(C) V axis (U / V OFFSET) <input checked="" type="checkbox"/> RV700 / TBC-25 (A-1)</p>
	<p style="text-align: center;">TRIG: REF. VIDEO.</p> <p style="text-align: center;">Vector</p> <p>Before adjustment</p>  <p>After adjustment</p> 
	<p>Spec. (A) Set the dot of the burst on the right position on the scale.</p> <p>(B) Set the dots of the B-Y on the U axis of the vector. $B = 0 \pm 1^\circ$</p> <p>(C) Set the dots of the R-Y on the V axis of the vector. $C = 0 \pm 1^\circ$</p>

CONNECTION 3

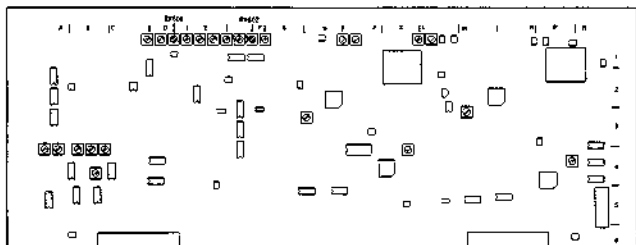
7. PB Composite SC Leak Adjustment

Conditions for adjustment	Adjustment point - Specifications
<p>Step 1</p> <ul style="list-style-type: none"> Do not use the extension board. PB mode Flat field / CR-5-1B PS (24:00 - 26:00) Use the Waveform Vector (1751) on WFM mode. Set the time axis of the WFM to magnification mode 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>(A) U SC LEAK \odot RV602 / VP-43 (F-1)</p> <p>(B) V SC LEAK \odot RV601 / VP-43 (D-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM mode</p> <p>Before adjustment</p>  <p>After adjustment</p>  <p>Spec. Minimize the A. (A \leq 0.01 V) Minimize the B. (A \leq 0.01 V) Adjust alternately.</p>

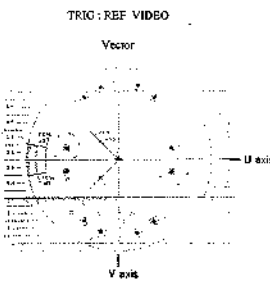
CONNECTION 3

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode Flux field / CR5-LB PS (24:00 - 26:00) • Use the Waveform Vector (1751) on VECTOR mode. 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p style="text-align: center;">TRIG: REF. VIDEO</p> <p style="text-align: center;">Vector mode</p>  <p>CONNECTION 3</p> <p style="text-align: right;">Spec. Maximum the gain of the Vector and check the dot is at center.</p>

VP-43 board (A side)

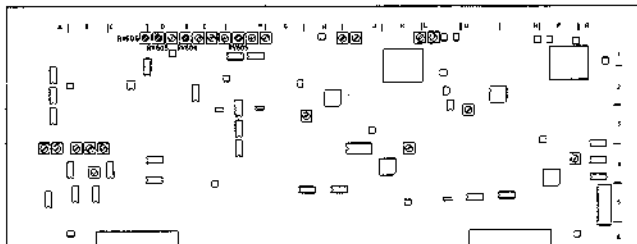


5. PB Composite C Level Adjustment

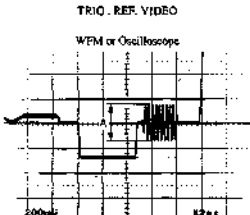
Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode • 100 % color bar / CRS-1B PS (14:00 - 17:00) 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>(A) Burst ○ PHASE control / Vector</p> <p>(B) V axis (ENC R-Y) ○ RV604 / VP-43 (D-1)</p> <p>(C) U axis (ENC B-Y) ○ RV605 / VP-43 (F-1)</p> <div style="text-align: center;"> <p>TRIG : REF VIDEO</p> <p>Vector</p>  </div> <p>Spec. (A) Set the dot of the burst on the right position on the scale. All dots should be inside the "□" mark on the vector by adjustment RV604 and RV605 alternately.</p>

CONNECTION 3

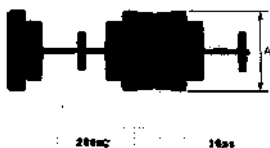
VP-43 board (A side)



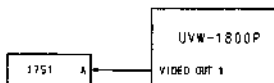
9. PB Composite Burst Level Adjustment

Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode • 100 % color bar / CR5-1B PS (14:00 - 17:00) <p>CONNECTION 3</p>	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>RV603 / VP-43 (D-1)</p> <p>TRIG. REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. $A = 0.300 \pm 0.007$ V</p>

10. PB S-VIDEO C Adjustment

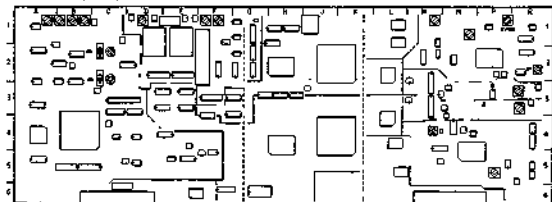
Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode • 100 % color bar / CR5-1B PS (14:00 - 17:00) <p>CONNECTION 3</p>	<p>S-VIDEO (C) OUT 1 (75 Ω terminated)</p> <p>RV606 / VP-43 (C-1)</p> <p>TRIG. REF. VIDEO</p> <p>WFM or Oscilloscope</p>  <p>Spec. $A = 0.885 \pm 0.01$ Vp-p</p>

11. PB Composite Y/C Delay Adjustment <TBC-25 Board>
 [CONNECTION]



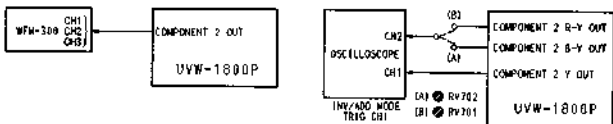
Conditions for adjustment	Adjustment point • Specifications
<ul style="list-style-type: none"> • Do not use the extension board. • PB mode LINE 17A / CRS-1B PS (19:00—22:00) 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>● RV400 / TBC-25 (P-1)</p> <p>TRAO : INT / WFM</p> <p>WFM</p> <p>Before adjustment</p> <p>10T portion</p> <p>↓</p> <p>After adjustment</p> <p>Spec. Flat</p>

TBC-25 board (A side)



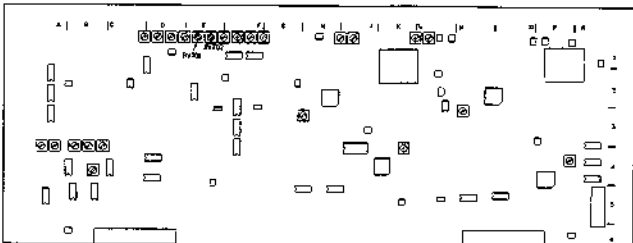
12. PB Component Y / C Delay Adjustment

[Connection]




Conditions for adjustment	Adjustment point - Specifications
<ul style="list-style-type: none"> Do not use the extension board. PB mode 50 % BOWTIE & 10T / CR5-1B PS (17:00 - 19:00) WFM300; BOWTIE mode. (WFM) 	<p>COMPONENT 2 OUT (75 Ω terminated)</p> <p>(A) B-Y DELAY <input type="radio"/> RV702 / VP-43 (E-1)</p> <p>(B) R-Y DELAY <input type="radio"/> RV701 / VP-43 (E-1)</p> <p>TRIG: EXT / WFM</p> <p>WFM</p> <p>CH-1 / CH-2 (A) 0 ns CH-1 / CH-3 (B) 0 ns</p> <p>Spec. Set the each BOWTIE D/P point of (A) and (B) on the center marker. ± 20 nsec</p>

VP-43 board (A side)

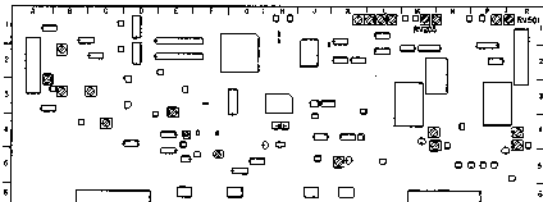


VRA-5 BOARD

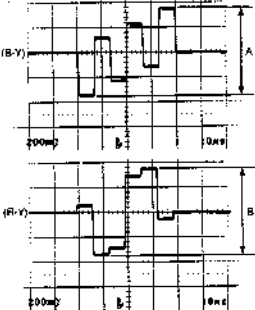
1. Overall Component Y Level Adjustment

Conditions for adjustment	Adjustment point - Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode • COMPONENT 2 INPUT ; 100 % color bar • INPUT SELECT switch / Sub control panel : Y-R, B <p>CONNECTION 2</p>	<p>COMPONENT 2 Y OUT (75 Ω terminated)</p> <p>RV501 / VRA-5 (R-1)</p> <p>TRIG. REF. VIDEO</p> <p>WFM or oscilloscope</p>  <p>Spec. $A = 0.70 \pm 0.02 \text{ V}$</p>
<p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • COMPONENT 2 INPUT ; 100 % color bar • INPUT SELECT switch / Sub control panel : Y-R, B • Playback the recorded portion. Blank tape <p>CONNECTION 2</p>	<p>Spec. Satisfied the spec. referring Step 1.</p>


VRA-5 board (A side)



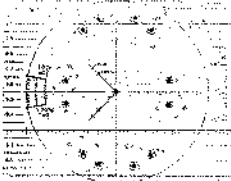
2. Overall Component R-Y / B-Y Level Adjustment

Conditions for adjustment	Adjustment point - Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode • COMPONENT 2 INPUT: 100% color bar • INPUT SELECT switch / Sub control panel; Y-R, B <p>CONNECTION 2</p>	<p>COMPONENT 2 B-Y / R-Y OUT (75 Ω terminated)</p> <p>(A) - (B) CNT-C LEVEL Ⓞ RV203 / VRA-5 (M-1)</p> <p>TRIG . REF. VIDEO</p> <p>WFM or oscilloscope</p>  <p>Spec. $A = B = 0.76 \pm 0.02$ Vp-p</p>
<p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • COMPONENT 2 INPUT; 100% color bar • INPUT SELECT switch / Sub control panel; Y-R, B • Playback the recorded portion. Blank tape <p>CONNECTION 2</p>	<p>Spec. Satisfied the spec. referring Step 1, B-Y and R-Y</p>

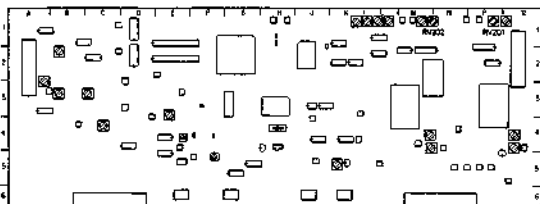
3. Overall Composite Y Level Adjustment

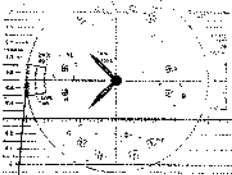
Conditions for adjustment	Adjustment point - Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode • VIDEO INPUT; 100 % color bar • INPUT SELECT switch / Sub-control panel ; COMPOSITE 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>⊙ RV201 / VRA-5 (P-1)</p> <p>TRIG - REF. VIDEO</p> <p>WFM or oscilloscope</p>  <p>Spec. $A = 0.70 \pm 0.02$ V</p>
<p>CONNECTION 3</p> <p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • VIDEO INPUT; 100 % color bar • INPUT SELECT switch / Sub-control panel ; COMPOSITE • Playback the recorded portion. Blank tape <p>CONNECTION 3</p>	<p>Spec. Satisfied the spec. referring Step 1.</p>

4. Overall Composite C Level Adjustment

Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode VIDEO INPUT: 100 % color bar • INPUT SELECT switch / Sub control panel ; COMPOSITE <p>CONNECTION 3</p>	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>(A) Burst <input checked="" type="checkbox"/> PHASE control / Vector</p> <p>(B) CST-C LEVEL <input checked="" type="checkbox"/> RV202 / VRA-5(N-1)</p> <p>TRIG : REF. VIDEO</p> <p>Vector</p>  <p>Spec. (A) Set the dot of the burst on the right position on the scale.</p> <p>(B) All dots should be inside the "田" mark on the vector.</p>
<p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • VIDEO INPUT, 100 % color bar • INPUT SELECT switch / Sub control panel ; COMPOSITE • Playback the recorded portion. Blank tape <p>CONNECTION 3</p>	<p>Spec. Satisfied the spec. referring Step 1.</p>

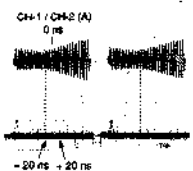
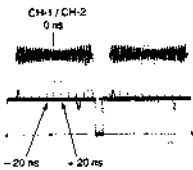
VRA-5 board (A side)



Conditions for adjustment	Adjustment point • Specifications
<p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode • COMPONENT 2 INPUT ; 50 % BOWTIE • Use the Waveform Vector (1751) on SC-H mode. 	<p>COMPONENT 2 Y OUT (75 Ω terminated)</p> <p>☉ SYNC control / Sub control panel</p> <p style="text-align: center;">TRIG · EXT / WFM</p> <p style="text-align: center;">SC-H mode</p>  <p style="text-align: center;">SYNC CH-A - CH-B</p> <p>Spec. 1. Use PHASE control of 1751 for adjustment the SYNC phase of CH-A as shown above.</p> <p>2. Change CH-A to CH-B of 1751. Then make the SYNC phase of CH-B coincides with the SYNC phase of CH-A with the SYNC control on the sub control panel. (Note : The dot position should be adjust in the direction of the shortest movement.)</p>

Continues to the next page.

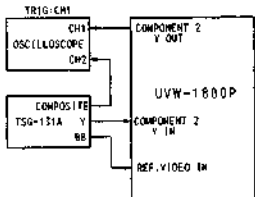
5. Overall Video Phase Adjustment (Continued)

Conditions for adjustment	Adjustment point • Specifications
<p>Step 3</p> <ul style="list-style-type: none"> • Do not use the extension board. • BE mode • COMPONENT 2 INPUT ; 50 % BOWTIE • INPUT SELECT switch / Sub control panel ; Y-R, B • WFM300 ; BOWTIE mode (WFM) 	<p>COMPONENT 2 Y OUT (75 Ω terminated)</p> <p>⊙ RV302 / VRA-5 (K-1)</p> <p>TRIG : EXT / WFM</p> <p>WFM</p> <p>Before adjustment</p>  <p>CH-1 / CH-2 (A) 0 ns</p> <p>-20 ns +20 ns</p> <p>↓</p> <p>After adjustment</p>  <p>CH-1 / CH-2 0 ns</p> <p>-20 ns +20 ns</p> <p>Spec. Set the BOWTIE DIP points (cross points of the CH-1 and CH-2) on the center marker.</p>
<p>Step 4</p> <ul style="list-style-type: none"> • Do not use the extension board. • COMPONENT 2 INPUT ; 50 % BOWTIE • INPUT SELECT switch / Sub control panel ; Y-R, B • Play back the recorded portion. Blank tape 	<p>Spec. Difference on BOWTIE DIP point \leftrightarrow 0 \pm 20 μsec</p> <p>When specification is not satisfied \leftrightarrow Adjust Step 3 again and check that performs Step 4</p>

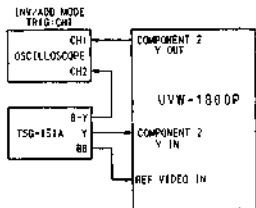
[Reference]

If not prepare the WFM300/1751, connect the oscilloscope following figure and adjust Step 1, 3 and 4.

[Connection for Step 1]



[Connection for Step 3/4]

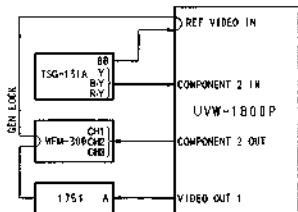


YRA-5 board (A side)



6. Overall Component Y/C Delay Adjustment

[CONNECTION]

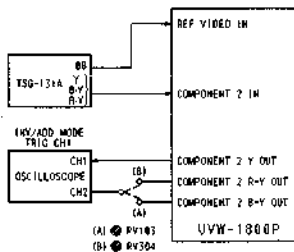


Conditions for adjustment	Adjustment point - Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • ES mode • COMPONENT 2 INPUT; 50% BOWTIE • INPUT SELECT switch / Sub control panel; Y-R, B • WFM300; BOWTIE mode (WFM) <p>Note: Perform the CH-1 / CH-3 (B) adjust before the CH-1 / CH-2 (A) adjust.</p>	<p>COMPONENT 2 OUT (75 Ω terminated)</p> <p>(A) C-C DELAY \odot RV103 / VRA-5 (C-4)</p> <p>(B) CAV Y/C DELAY \odot RV304 / VRA-5 (L-1)</p> <p>TRIG: EXT / WFM</p> <p>WFM</p> <p>Before adjustment</p> <p>CH-1 / CH-2 (A) 0 ns CH-1 / CH-3 (B) 0 ns</p> <p>-20 ns +20 ns -20 ns +20 ns</p> <p>After adjustment</p> <p>CH-1 / CH-2 0 ns CH-1 / CH-3 0 ns</p> <p>-20 ns +20 ns -20 ns +20 ns</p> <p>Spec. Set the each BOWTIE D/P point of (A) and (B) on the center marker. 0 ± 10 nsec</p>

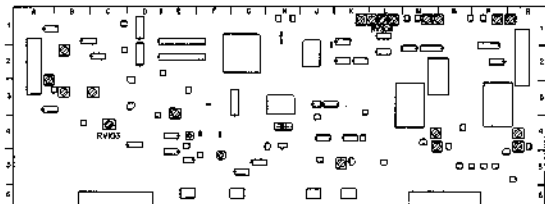
Conditions for adjustment	Adjustment point - Specifications
Step 2 • COMPONENT 2 INPUT; 50 % BOWTIE • INPUT SELECT switch / Sub control panel; Y-R, B • Play back the recorded poronce. Blank tape	Spec. Difference on BOWTIE DIP point — 0 ± 20 nsec When specification is not satisfied — Adjust Step 1 again and check that perform Step 2.

[Reference]

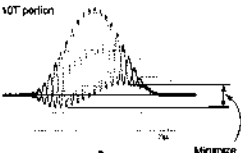
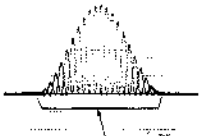
If not prepare the WFM300, connect the oscilloscope following figure for adjust.



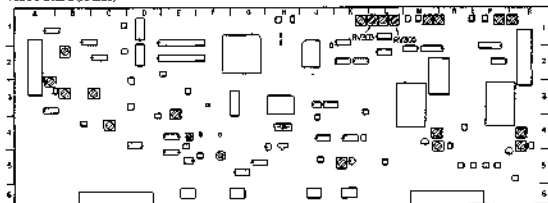
VRA-S board (A side)



7. Overall Composite Y / C Delay Adjustment

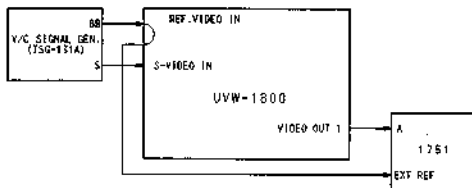
Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode • VIDEO INPUT : PULSE & BAR • INPUT SELECT switch / Sub control panel : COMPOSITE 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>RY303 / VRA-5 (L-1)</p> <p>TRIG : REF. VIDEO</p> <p>WFM or oscilloscope</p> <p>Before adjustment</p>  <p>After adjustment</p>  <p>Spec. Flat</p> <p>(Compensate the difference of Step 2 after adjustment second time)</p>
<p>CONNECTION 3</p> <p>Step 2</p> <ul style="list-style-type: none"> • Do not use the extension board. • VIDEO INPUT : PULSE & BAR • INPUT SELECT switch / Sub control panel : COMPOSITE • Play back the recorded portion. Blank tape 	<p>Spec. Difference from at center $\rightarrow 0 \pm 30$ usec</p> <p>When specification is not satisfied \rightarrow Adjust Step 1 again and check that perform Step 2.</p>

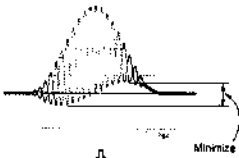
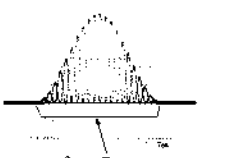
VRA-5 board (A side)



8. Overall S-VIDEO Y/C Delay Adjustment

[CONNECTION]



Conditions for adjustment	Adjustment point • Specifications
<p>Step 1</p> <ul style="list-style-type: none"> • Do not use the extension board. • EE mode • S-VIDEO INPUT ; PULSE & BAR • INPUT SELECT switch / Sub control panel ; S-VIDEO 	<p>VIDEO OUT 1 (75 Ω terminated)</p> <p>● RV305 / VRA-5 (L-1)</p> <p>TRIG. EXT / WFM</p> <p>WFM or oscilloscope</p> <p>Before adjustment</p>  <p>↓</p> <p>After adjustment</p> 

Continues to the next page.

8. Overall S-VIDEO Y / C Delay Adjustment (Continued)

Conditions for adjustment	Adjustment point • Specifications
<p>Step 2</p> <ul style="list-style-type: none">• Do not use the extension board.• S-VIDEO INPUT; PULSE & BAR• INPUT SELECT switch / Sub control panel; S-VIDEO• Play back the recorded portion. Blank tape	<p>Spec. Difference from center → 0 ± 20 nsec</p> <p>When specification is not satisfied → Adjust Step 1 again and check that perform Step 2.</p>