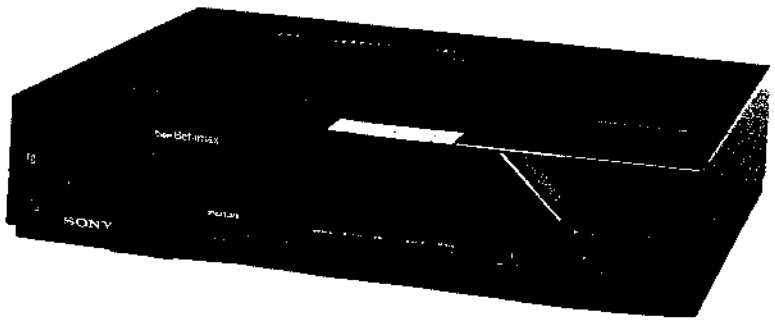
SL-F90
RMT-146/228

SERVICE MANUAL

E Model
Spanish Model
EC Model
ME Model



September, 1986

Super Betamax

SPECIFICATIONS

This manual contains the SUPPLEMENT-1.

SYSTEM

Video recording system: Rotary two-head helical scanning
Video signal: CCIR standards, and PAL color
Channel coverage: VHF: Western European channels E2-E12
UHF: Western European channels E21-E68
(Up to 30 programs can be preset)
Aerial input: 75 ohms, asymmetrical aerial socket
RF output signal: UHF channels E30 to E39 (variable)
75 ohm, unbalanced

VIDEO

Input: VIDEO IN: Phono jack: 1.0 V $^{+1.0}_{-0.5}$ V (p-p)
75 ohm, unbalanced, sync negative
Output: VIDEO OUT
Phono jack: 1.0 ±0.1 V (p-p)
75 ohm, unbalanced, sync negative

AUDIO

Input: AUDIO IN: Phono jack: 47 kohms, −10 dBs
(0 dBs ≈ 0.775 Vrms)
Output: AUDIO OUT
Phono jack:
Load impedance less than 10 kohms, −10 dBs
with 47 kohms load, unbalanced

TAPE TRANSPORT

Tape speed: 18.73 mm/sec.
Maximum recording time
2 hours 10 min. (with Sony L-500 cassette)
3 hours 15 min. (with L-750)
Fast forward/rewind time
Within 5 min. (with L-500)

TIMER

Clock: Crystal lock
Time indication: 24-hour cycle
Timer setting (Only for recording)
6 events/week, adjustable for any day or for all 7 days of the week

GENERAL

Power requirements
Spanish Model : 220V AC
Indonesia Model: 110, 127, 220 or 240V AC adjustable 50/60Hz
Power consumption
39 W
Storage temperature
−20°C to +60°C
Operating temperature
5°C to 40°C
Dimensions: 430 × 95 × 367 mm (W/H/D)
including projecting parts and controls
Weight: 8.0 kg

SUPPLIED ACCESSORIES

75 ohm coaxial cable for recorder to TV connection 1
Screwdriver for RF channel adjustment 1
Remote Commander RMT-146 with two IEC designation R6 batteries (size AA) 1

Design and specifications are subject to change without notice.

MICROFILM

Beta
VIDEO CASSETTE RECORDER
SONY®

SAFETY CHECK-OUT

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

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

TABLE OF CONTENS

SECTION 1
GENERAL

1-1. PRECAUTIONS

On safety

- Before operating, check that the operating power voltage and frequency of the unit are identical with those of your local power supply.
- Should any solid object or liquid fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- Unplug the unit from the wall outlet if it is not to be used for an extended period of time. To disconnect the cord, pull it out by the plug. Never pull the cord itself.
- The unit is not disconnected from the mains (ac power source) as long as it is connected to the mains outlet, even if the unit itself has been turned off.

On installation

- Allow adequate air circulation to prevent internal heat build-up.
- Do not place the unit on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation slots.
- Do not install the unit near heat sources such as radiators or air ducts or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- The unit is designed for operation in a horizontal position. Do not install it in an inclined position.
- Keep the unit and cassette tapes away from equipment with strong magnets, as for example a microwave oven or a large loudspeaker.
- Do not place any heavy object on the unit.

On operation

- When the unit is not in use, turn off the power to conserve energy and to extend its useful life.
- Remove and store video cassettes after recording or playback.
- Store the cassettes in their cases and keep them in an upright position to prevent intrusion of dust and uneven winding.

On cleaning

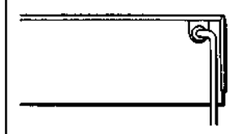
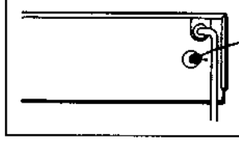
Clean the cabinet, panel and controls with a soft dry cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent, such as alcohol or benzine which might damage the finish.

On repacking

Do not throw away the carton and packing materials. They make an ideal container in which to transport the unit. When shipping the unit to another location, repack it as illustrated on the carton.

1-2. NOTE ON OPERATING VOLTAGE

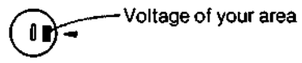
Depending on the area to be used, the SL-F90 comes in two models to suit the local operating power voltage. Check which type your model is and be sure to follow Caution below before plugging the unit to the wall outlet.

	Voltage
Type 1 (Spanish Model) Rear panel 	220 V
Type 2 (Indonesia Model) Rear panel 	110/127/ 220/240 V

Caution

- **For the Spanish Model**
  Operate the unit only on 220 V AC.

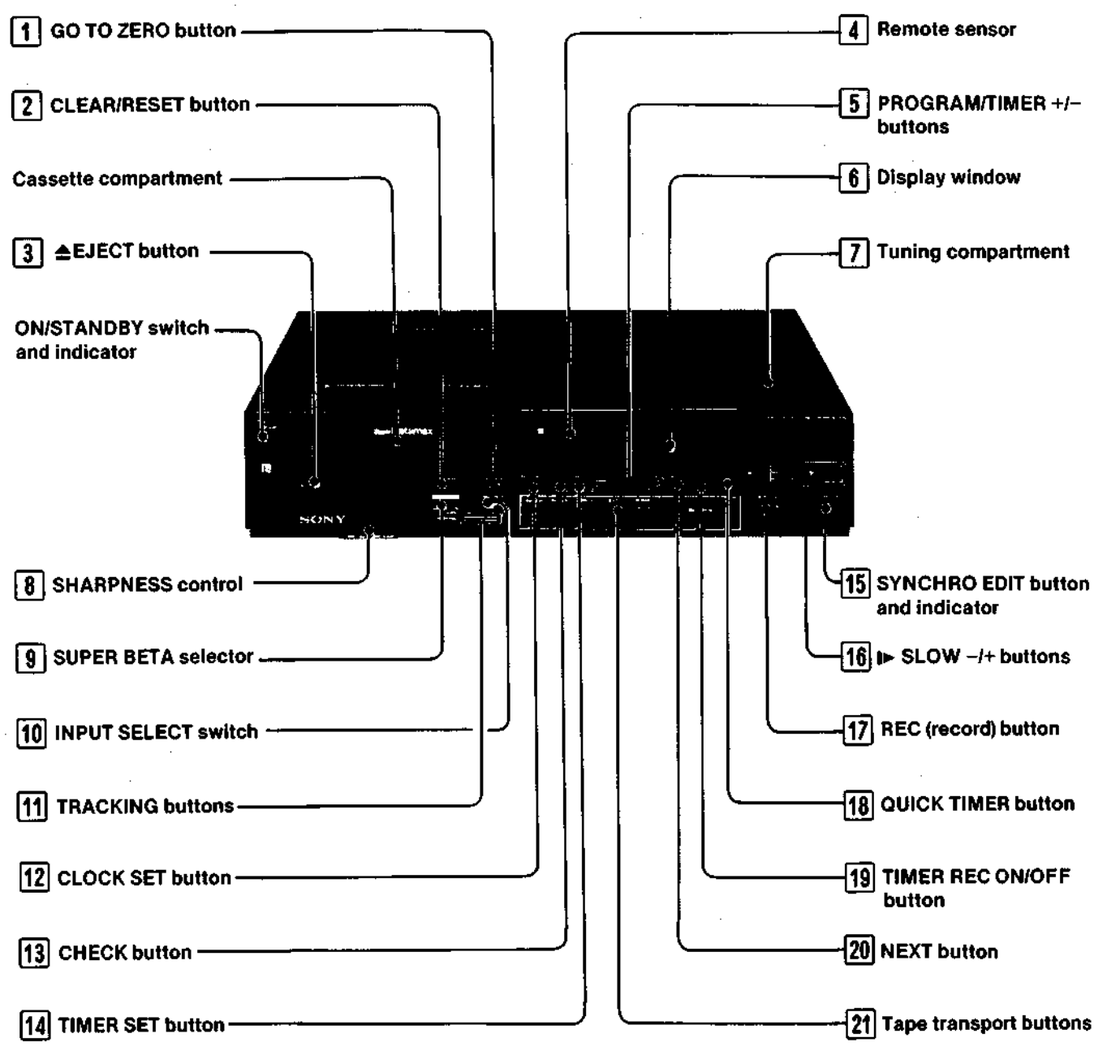
- **For the Indonesia Model**
  Make sure to set the voltage selector in accordance to the power voltage of your area. The unit may suffer **serious damage** if the voltage selector is not set correctly.



1-3. LOCATION AND FUNCTION OF CONTROLS

For details on the use of each control, refer to the pages indicated in the black circles ●

Front



1 GO TO ZERO button
In stop mode, press to advance or rewind the tape approximately to the counter "0H00M00S" point.

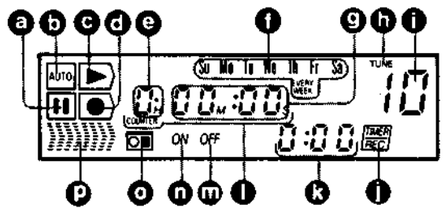
2 CLEAR/RESET button
Press to reset the tape counter to "0H00M00S" and also to clear the timer setting.

3 ⏏ EJECT button
Press to eject the cassette.

4 Remote sensor
Detects the signals transmitted from the Remote Commander.

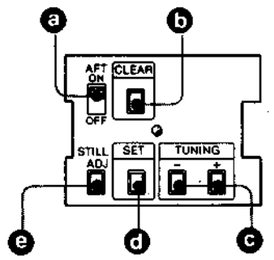
5 PROGRAM/TIMER +/– buttons
Press to select the programs and to set the clock or timer program.

6 Display window



- ⓐ Lights during pause
- ⓑ Lights during auto play, tape return play or automatic cassette eject
- ⓒ Lights during playback
- ⓓ Lights during recording
- ⓔ Timer program position during timer setting
- ⓕ Day indicator
- ⓖ Turn-on time of the timer during timer setting
- ⓗ Lights during TV channel presetting
- ⓘ Program number
- ⓙ Lights when TIMER REC ON/OFF or QUICK TIMER is pressed.
- ⓚ Clock display
  During timer setting, the turn-off time is displayed.
- ⓛ Tape counter
- ⓜ Turn-off indicator
- ⓝ Turn-on indicator
- ⓞ Lights when a cassette is inside
- ⓟ Speed and direction indicator of the tape movement

7 Tuning compartment ●



- ⓐ AFT switch
- ⓑ CLEAR button
- ⓒ TUNING button
- ⓓ SET button
- ⓔ STILL ADJ (adjust) button

8 SHARPNESS control
Adjusts the sharpness of the picture if necessary. Normally set the control at the center detent position.

9 SUPER BETA selector ⓲
Normally keep this selector at NORMAL. To record or play back in Super Beta, set to STD or PRO.

10 INPUT SELECT switch
Select the program to be recorded.
TUNER: For recording TV programs
LINE: For recording signals from the VIDEO IN and AUDIO IN

11 TRACKING buttons ⓯
Press if streaks, snow or noise band appear during normal or slow motion playback.

12 CLOCK SET button
Press to start the setting of the current time.

13 CHECK button
Press to check the contents of the timer presettings.

14 TIMER SET button
Press to start the setting or resetting of the timer recording.

15 SYNCHRO EDIT button and indicator ㉑ ㉒
Press to start and stop playback on the SL-F90 and recording on another VCR simultaneously, when editing a tape.

16 ▮▶ SLOW +/– buttons
Press to obtain a slow motion picture during playback or pause of playback.

17 REC button
Slide to the right to start the recording.

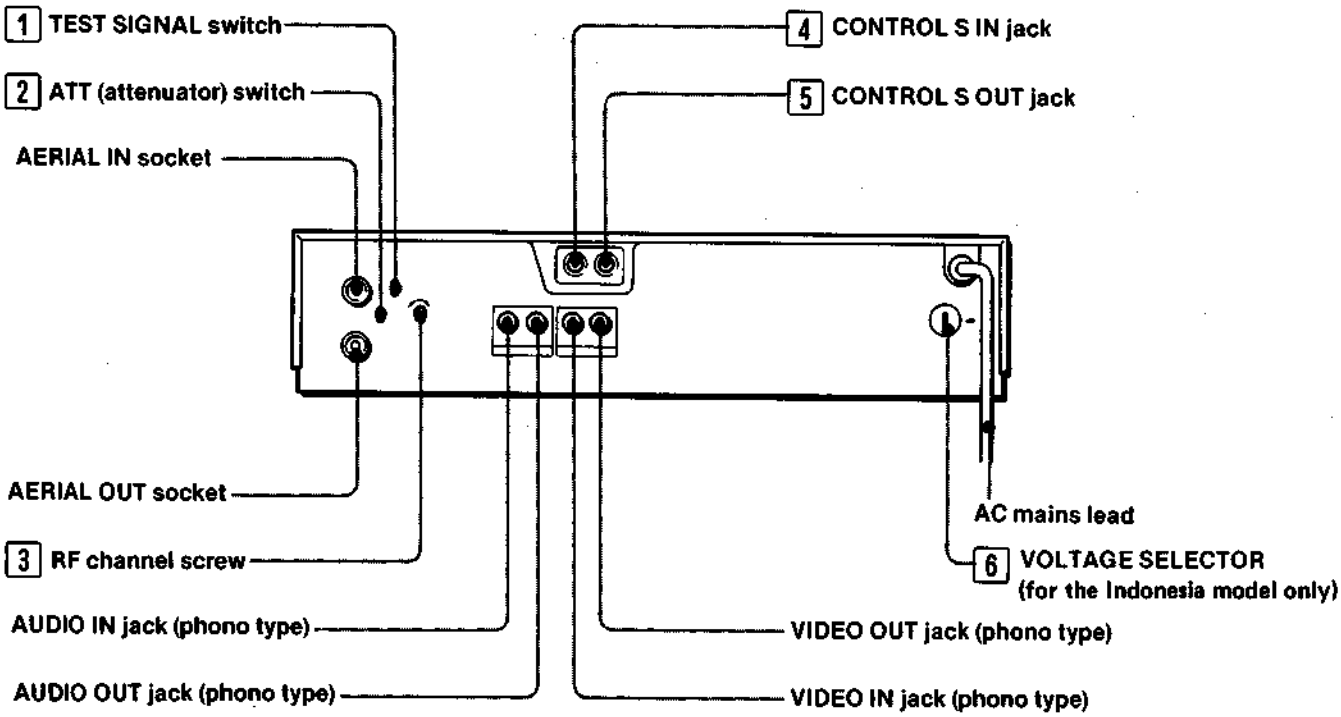
18 QUICK TIMER button ⓳
Press to start the timer recording quickly. The recording time is selected in 30 minute intervals, from 0:30 to 4:00. Press this button as many times as required until the desired recording time is displayed.

19 TIMER REC ON/OFF button
Press to activate the timer recording.

20 NEXT button
Press to advance to the next item to be set during clock or timer setting.

21 Tape transport buttons
◀◀ REW (rewind), ▶ PLAY, ▶▶ FF (fast forward), ■ STOP, ▮▮/▶◀ PAUSE/STILL, ▮▮▶ FRAME

REAR



1 TEST SIGNAL switch
Set to ON to obtain the test pattern for adjusting the TV so that it can receive the signal from the recorder.

2 ATT switch
Normally set this switch to DX. If the TV signal is very strong, set the switch to LOCAL.

3 RF CHANNEL screw
If there is interference on the factory-preset channel for RF output and the signal of this recorder cannot be displayed clearly on the TV screen, adjust this screw with the supplied screwdriver.

4 CONTROL S IN jack (mini type)
Connect to the CONTROL S output jack of other Sony products for various systematic operations.

5 CONTROL S OUT jack (mini type)
Connect to the CONTROL S input jack of another Sony VCR for syncro editing operation.

6 VOLTAGE SELECTOR (for the Indonesia model only)
Set to 110, 127, 220, or 240 V according to your local power line voltage.

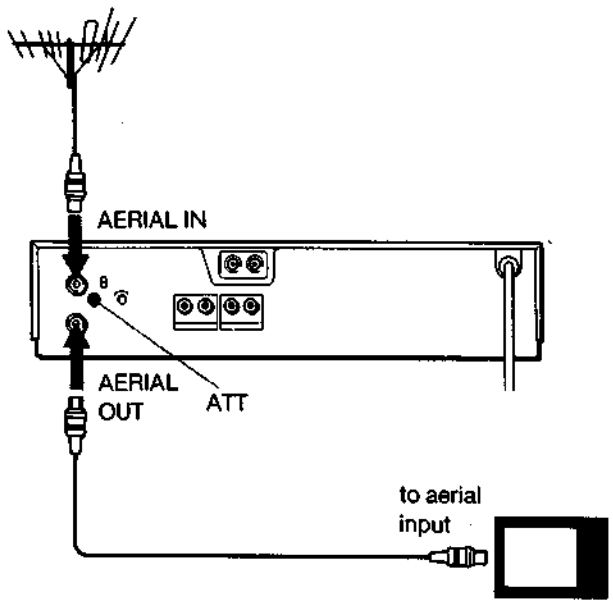
1-4. CONNECTIONS

Notes

- Unplug each unit from the mains outlet before making the following connections.
- Make sure the connections are secure. A loose connection may cause a noisy picture.

CONNECTING A TV

1 Remove the aerial cable from its socket in the back of the TV. Then connect the aerial cable to the AERIAL IN socket at the rear of the recorder.
2 Connect the aerial input of the TV to the AERIAL OUT socket of the recorder, using the supplied cable. Each socket accepts only one particular end of the cable.
3 Connect the recorder and the TV to the mains supply with their own mains leads.
4 Turn on the power of each unit.

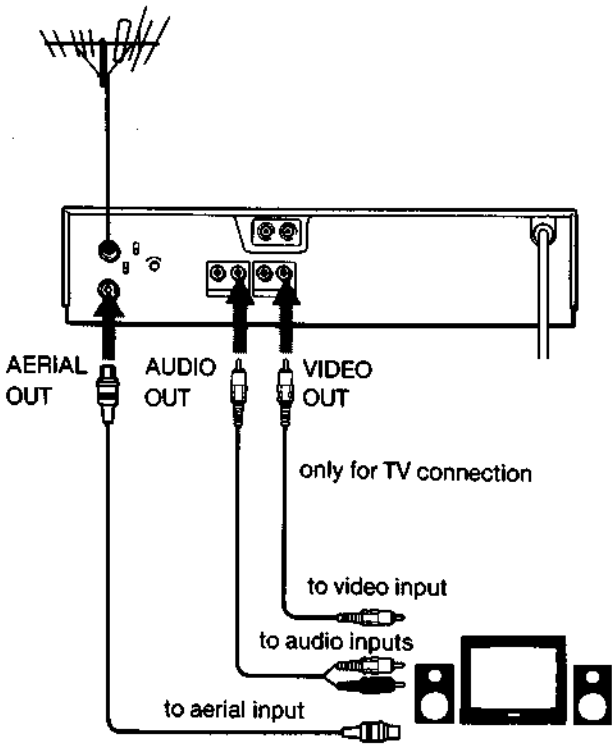


Now the recorder is set up to intercept all signals from the aerial on their way to the TV. The recorder then passes on the signals to the TV. This is why you can record a program while it is being shown on the TV, or while the TV is showing another program, or even when the TV is turned off.

Notice for customers in a strong signal area
The recorder has a booster to assure stable TV reception. However, in areas near TV stations, where the TV signal is very strong, the picture may be affected by the booster. If this happens, set the ATT switch on the rear panel to LOCAL.

CONNECTION FOR BETTER PLAYBACK PICTURE AND SOUND

If your TV receiver/color monitor is equipped with video/audio inputs



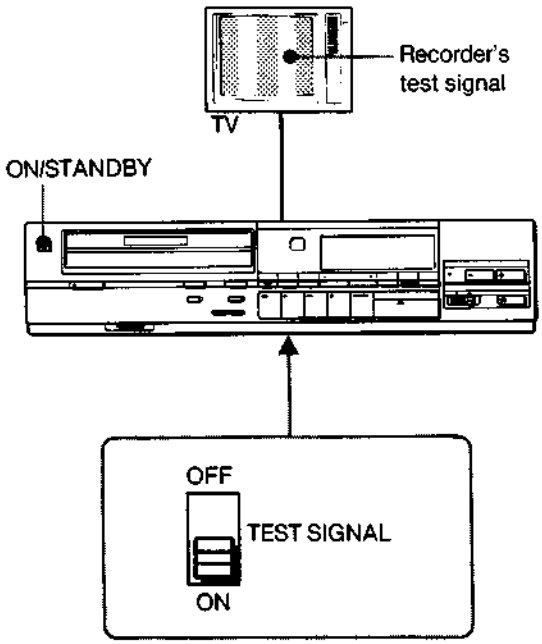
Connection with a color monitor
Connection between the recorder AERIAL OUT socket and the color monitor is not possible since the monitor is not equipped with a tuner. For this reason, you cannot watch a TV program while recording another program on the recorder.

1-5. ADJUSTING THE TV

One of the television program positions must be adjusted to receive the signal from the recorder.
Note that the adjustment is not necessary, however, when the recorder is connected to the video/audio inputs on the TV receiver/monitor.

1 After making the connections, press the ON/STANDBY button.
2 Make sure that the recorder is in the stop mode.
3 Set the TEST SIGNAL switch located at the rear of the recorder to ON. The test signal is transmitted on a channel between UHF channels E30 and E39.
4 Turn on the TV and select a program position which is not being used to receive a TV station. Tune the channel until you see a clear black and white pattern on the TV screen and you hear a continuous tone. This is the recorder's test signal.

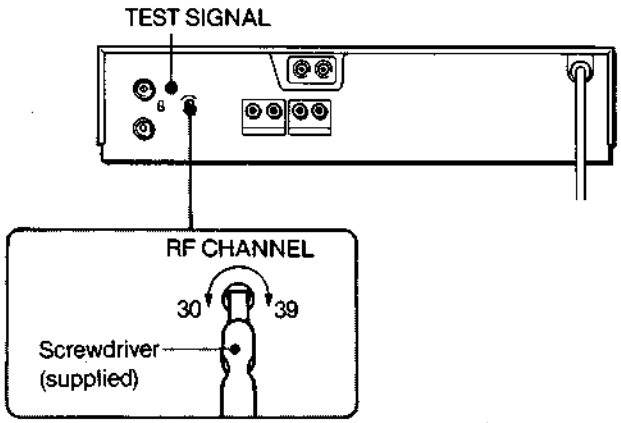
— If you are not sure how to adjust your TV, please refer to the TV's instruction manual or consult your dealer.



Whenever you use the video recorder, you should set the TV to the program position selected in this adjustment.

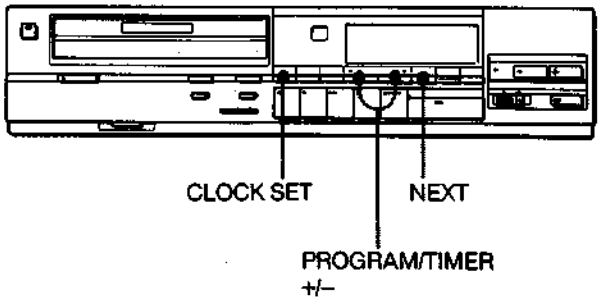
If the test picture is free of disturbance, the TV adjustment is complete. Set the TEST SIGNAL switch to OFF.

If the test picture is not free of disturbance
1 Reset the TEST SIGNAL switch to OFF.
2 Adjust the channel of the TV to a channel between UHF channels E30 and E39 with the tuning control or the fine tuning control on the TV, so that the TV screen shows no picture and so that a steady rustling sound or no sound is heard.
3 Set the TEST SIGNAL switch to ON again.
4 Slowly turn the RF CHANNEL screw on the back of the recorder with the supplied screwdriver, until you see an undistorted test pattern on the TV screen.
5 Now the TV adjustment is complete. Reset the TEST SIGNAL switch to OFF.



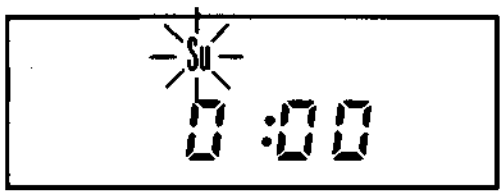
1-6. SETTING THE CLOCK

When you connect the AC power cord to a wall outlet, the clock indicates "0:00" and it will blink to show that the clock is ready to be set.



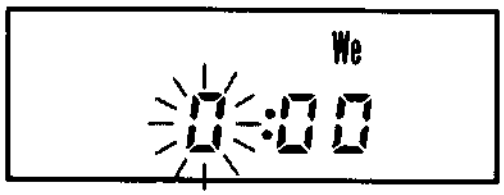
Example: to set for Wednesday afternoon at 3:56

1 Press CLOCK SET.



Set the day with the + or – button until "We" appears.

2 Press NEXT.

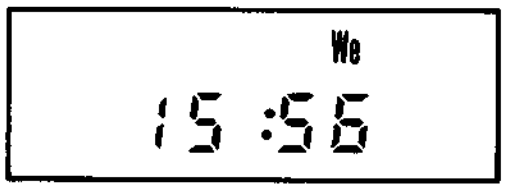


Set the hour with the + or – button until "15:00" appears.

3 Press NEXT.

Set the minute with the + or – button until "15:56" appears.

4 Press NEXT.
(For accurate setting, press NEXT at the same time with an announced time signal.)
The clock will now show the current time.



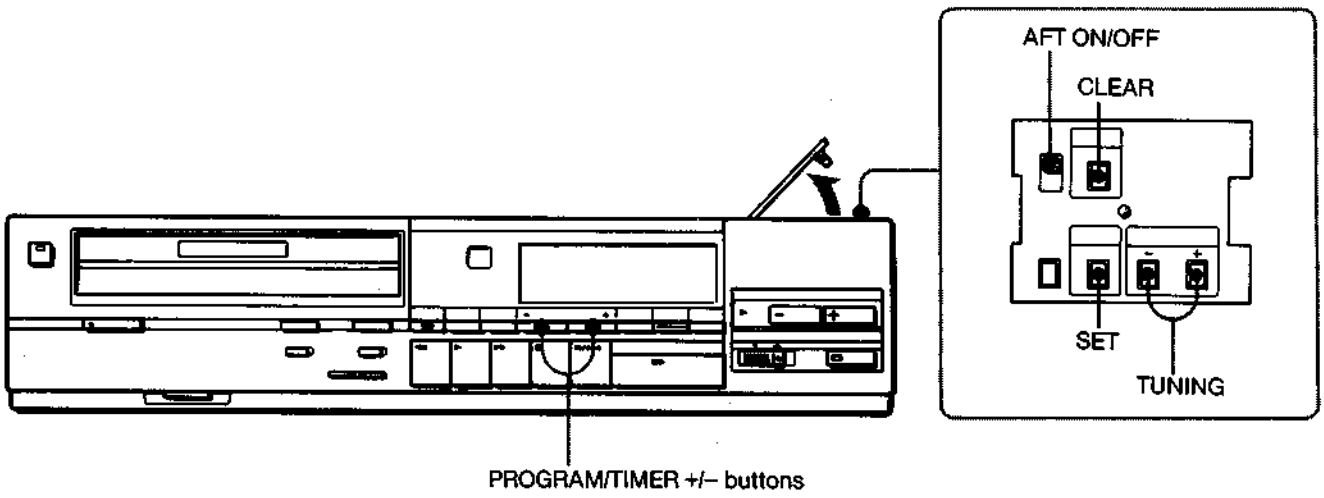
The dots of the colon (:) alternately blink every 30 seconds.

PROGRAM/TIMER +/– buttons
The + and – buttons can be used in two ways:

When you keep a button pressed, the digits will advance continuously until the button is released.

When you press and immediately release a button, the digits will advance by one.

1-7. PROGRAMING TV STATIONS



This recorder has 30 program positions. Once you preset the programs broadcast in your area, program selection is simply made by pressing the + or – button on the recorder or the hand-held Remote Commander.
To start programing, turn on the SL-F90 by pressing ON/STANDBY switch and set the INPUT SELECT switch to TUNER.

1 Press the SET button.
2 Press the + or – PROGRAM/TIMER button to select the program position.
  + for a higher-numbered program position
  – for a lower-numbered program position
3 Press the + TUNING button to locate a station with higher frequency and the – TUNING button to locate a station with lower frequency. The tuning indicator in the display window shows the approximate location of the current channel. When a station has been received, the search will stop. Press the + or – TUNING button again, until the desired station is received.

Repeat steps 2 and 3 for all the desired stations.

4 Press the SET button again so that the tuning indicator disappears.

To cancel an unused program

1 Select the program to be cancelled with the + or – PROGRAM/TIMER button.
2 Press the SET button.
3 Press the CLEAR button.
4 Press the SET button again.

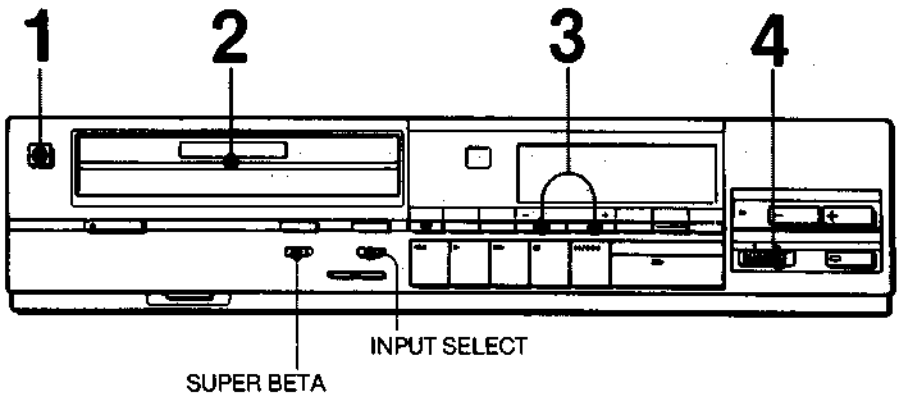
Then the cancelled program will be skipped when the + or – PROGRAM/TIMER button, or the + or – side of the PROGRAM button on the Remote Commander is pressed. When the corresponding program number button on the Commander is pressed, the sound of the cancelled program will be cut out.

To fine tune a station

If the picture of a particular station is not acceptable, check that the SET button is set to OFF, set the AFT switch to OFF and keep the + or – TUNING button pressed until the picture becomes clear. To view this particular station, set the AFT switch to OFF.

1-8. RECORDING TV PROGRAMS

OPERATION **Numbers in the illustration show the sequence of operation.**

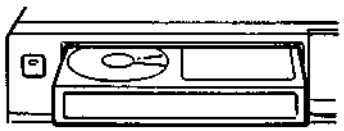


Preparation

- Check the positions of the selectors.
  SUPER BETA → Normally NORMAL
  INPUT SELECT → TUNER
- Turn on the TV and select the program for the recorder.

1 Turn on the power.

2 Insert a cassette.
Insert the cassette with the side that has the window up (you can see the tape through the window).



3 Select the program to be recorded with the + or – button.

4 Slide REC to the right. The recording will begin.

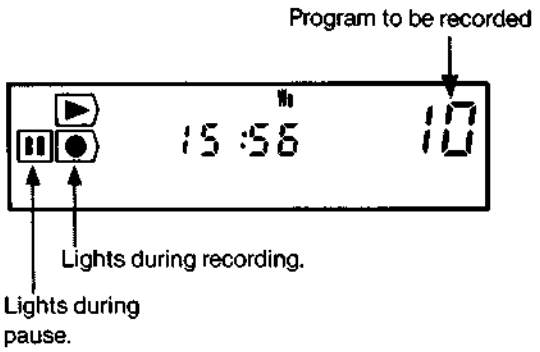
To stop recording, press ■.
When the tape reaches its end, it will be rewound to the beginning.

To eject the cassette, press ⏏ EJECT.

To turn off the power, press ON/STANDBY.

To stop the tape momentarily
Press ⏸/▶|◀. The TV program can still be seen on the TV, but the picture will not be recorded.
To resume recording, press ⏸/▶|◀ again.
To protect the video heads and the tape, the pause mode will be automatically released after about 8 minutes and **recording will stop.**

Check in the window



CAUTION
Television programs, films, video tapes and other materials may be copyrighted.
Unauthorized recording of such material may be contrary to the provision of the copyright laws.

Note
The power can be automatically turned on by inserting a cassette without pressing ON/STANDBY.

In case you want to record a tape which is to be played back on another recorder from the very beginning of the tape, run the tape for about 15 seconds before starting recording. Otherwise you may miss the starting point during playback on the other machine.

SUPER BETA selector

NORMAL position: Normally keep the selector in this position. When playing back tapes recorded on other non-Super Beta recorders or tapes recorded on this recorder by setting this selector to the NORMAL position, set the selector in this position.

SUPER BETA STD (standard) position: In this position, high quality recording and playback picture are obtained.

SUPER BETA PRO position: If you use the highest-grade tape such as Sony PRO-X or equivalent tapes from other tape manufactures, further enhanced picture quality is attained. With lower-grade tapes, however, the picture quality will suffer somewhat.

Note
The picture quality will suffer somewhat, if a tape recorded in the SUPER BETA PRO or STD position is played back on other non-Super Beta recorders, or on this recorder with this selector set to NORMAL.

TO START RECORDING FROM A PARTICULAR POINT

You can decide the starting point for recording while watching the playback picture or by searching for the point using the Picture Search and Skip Scan (on page 15) functions.

1 Search for the point where you wish to start recording on the tape by playing back the tape or using the Picture Search or the Skip Scan function.

2 Press ⏸/▶◀ to stop the tape where you wish to start recording.

3 Slide REC to the right. The recorder will enter the recording pause mode and the picture selected by INPUT SELECT will appear on the monitor screen.

4 Press ⏸/▶◀ to release the pause mode. Recording starts.

TO VIEW ONE TV PROGRAM WHILE RECORDING ANOTHER

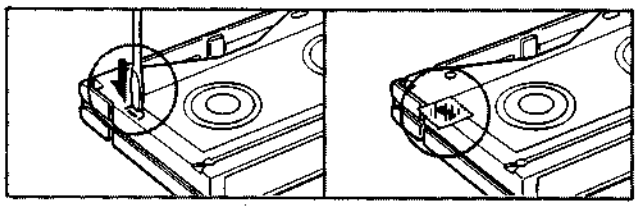
Select the channel you want to view on the TV.

TO KEEP A RECORDED PROGRAM FROM BEING ACCIDENTALLY ERASED

When a new recording is made on a previously recorded cassette, the previous recording will be automatically erased.

To avoid erasing a recording
Break off the safety tab using a screwdriver or similar object.

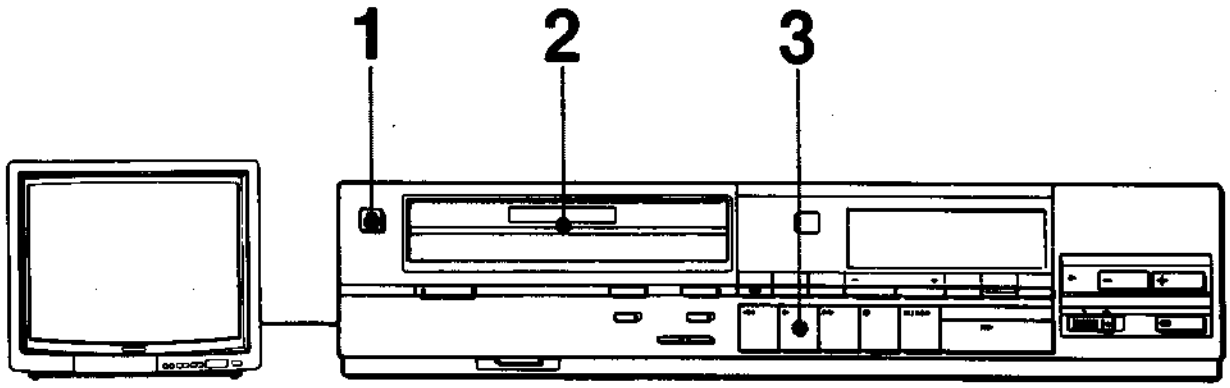
To re-record on a cassette which has had the safety tab removed
Cover the slot with a piece of plastic tape.



If you activate the ● RECORD, TIMER REC ON/OFF, VIDEO INSERT or AUDIO INSERT button with a cassette with its safety tab removed inserted, the cassette will be automatically ejected.

1-9. PLAYBACK

OPERATION **Numbers in the illustration show the sequence of operation.**



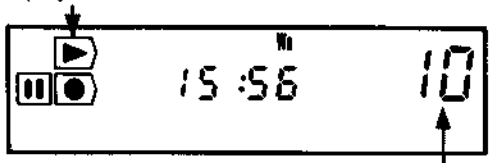
1 Turn on the power.

2 Insert a cassette.

3 Press ▶ PLAY.

Check in the window

Lights during playback.

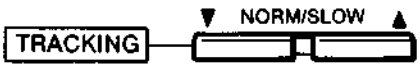


Channel previously viewed.

AUTO PLAY
— To play back a tape from the beginning of the tape after rewinding
Press ▶ PLAY while holding ◀◀ REW depressed. After the tape is completely rewound, it will be automatically played back.

WHEN YOU PLAY BACK A TAPE RECORDED ON ANOTHER VCR

- If streaks or snow appear, press TRACKING ▲ or ▼ until the best possible picture is obtained. After viewing that particular tape, press TRACKING ▲ and ▼ simultaneously to reset the tracking to the standard position.



- To get a sharp picture, turn SHARPNESS towards the right.

SOFT — SHARPNESS — SHARP

1-10. VARIOUS PLAYBACK MODES

PICTURE SEARCH

— Viewing the picture at a fast speed to find a particular scene

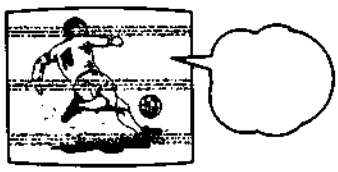
Keep pressing ▶▶ FF or ◀◀ REW during playback.
When you release the button, normal playback will be resumed.

SKIP SCAN

— Viewing the picture momentarily during fast-forward or rewind

Keep pressing ▶▶ FF or ◀◀ REW during fast-forward or rewind mode.
When you release the button, the fast-forward or rewind mode will be resumed.

Streaks will appear and sound will be muted in the Picture Search and Skip Scan pictures.



STILL PICTURE

Press ❚❚/▶|◀ during playback (in normal or slow mode). The sound is muted.
Press ❚❚/▶|◀ again or press ▶ PLAY to resume normal playback.
To protect the video heads and the tape, the pause mode will be automatically released after about 8 minutes and playback will be resumed.

FRAME-BY-FRAME PICTURE

Press ❚❚▶ FRAME in still picture mode.
Press ❚❚/▶|◀ again or press ▶ PLAY to resume normal playback.

SLOW MOTION PICTURE

Press ❚▶ SLOW during normal playback or in still picture mode. Press – for lower speed, and + for higher speed. The playback speed will change from normal to 1/5, 1/7, 1/10, 1/15, 1/20, and 1/30, of the normal speed successively, by pressing –. The sound is muted. Press ▶ PLAY to resume normal playback.

TO OBTAIN BETTER PLAYBACK PICTURE
— in still, frame-by-frame or slow motion picture mode

- **If the picture seems to shake...**
  Set the VCR to the still **picture mode,** and then press STILL ADJ in the tuning compartment until the picture stabilizes.
- **If a noise band appears on the screen...**
  Set the VCR to the slow motion picture mode, and then move the noise band by pressing TRACKING ▲ or ▼.
  Readjustment may be necessary for the tapes recorded on other VCRs.

1-11. USE OF THE TAPE COUNTER

The tape counter indicates the approximate running time of the tape and the relative position of programs on the tape.

TO INDEX THE TAPE CONTENTS

Before starting recording or playback, press CLEAR/RESET to set the counter to "0H00M00s". By noting the counter reading at the desired point, you can easily find that point later by referring to the counter. Use the label on the cassette to list the programs and their counter readings.

CLEAR/RESET

Notes
- The counter reading is automatically reset to zero when a cassette is newly inserted.
- The counter reading will be retained in the memory even after the power is turned off, as long as the cassette is in the cassette compartment.
- The counter will not advance during any portion of a tape that is blank or unrecorded. So the counter can be used to find unrecorded sections on a tape.

GO TO ZERO/GO TO ZERO PLAY

— To stop the tape at a particular point or play back from a particular point

1 During recording or playback, press CLEAR/RESET at the point you want to locate later.

2 When recording or playback is finished, stop the tape and press GO TO ZERO.
The tape will be rewound or advanced close to the point where the counter reads "0H00M00s".

GO TO ZERO

To start playback automatically from the "0H00M00s" point
Press ▶ after pressing GO TO ZERO.

GO TO ZERO

Note
The "go to zero" and "go to zero play" functions cannot be activated when the counter reading is within ± 0H00M29s.

1-12. TIMER-ACTIVATED RECORDING

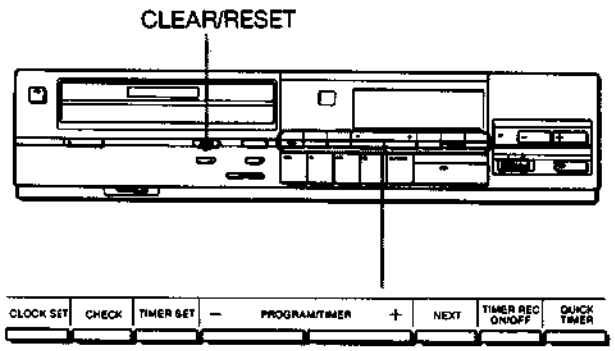
Up to six events can be set to be recorded on a certain day or everyday within seven days, or on the same day every week.

BEFORE SETTING THE TIMER

- Make sure that the clock (day and time) is set correctly.
- Be sure a cassette with a safety tab is inserted in the compartment.
  Check with the ⊡ indicator in the window.

SETTING THE TIMER

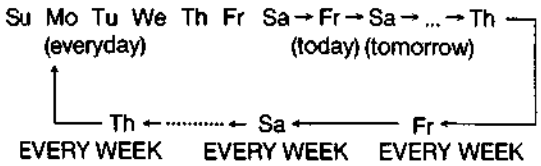
Suppose you want to make a recording of channel 6 from 7:10 to 11:15 on Friday.



NEXT button
Every time you press the NEXT button, the item to be preset next will blink.

+/– buttons
To set the day of the week, the time and the channel, press the + button to advance, and the – button to go back.

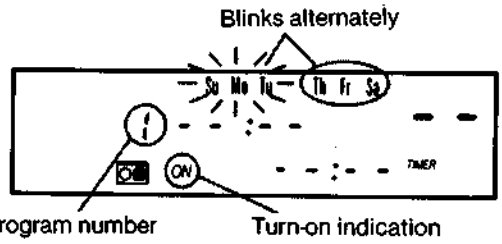
Day indication
By pressing the + button, the day indication changes as follows:
Ex. Today is Friday.



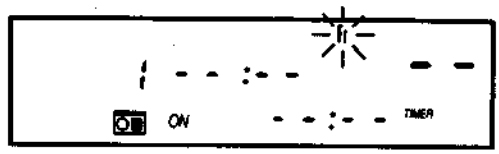
To record at the same time every day, select "Su Mo Tu We Tu We Th Fr Sa".
To record at the same time and day every week, select the desired day indication with "EVERY WEEK".

1 Set the positions of the selectors correctly as on page 9.

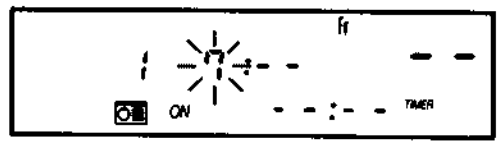
2 Press TIMER SET.
The program number (up to 6) appears. "1" indicates that you are making the first timer setting.



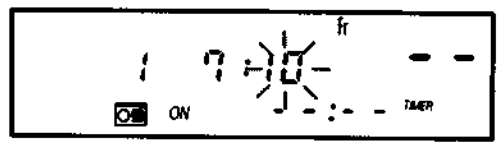
3 Set the day with the + or – button.



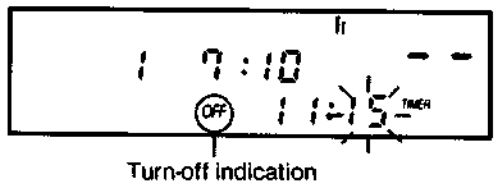
4 Press NEXT and set the turn-on hour with the + or – button.



5 Press NEXT and set the minute with the + or – button.



6 Press NEXT and set the turn-off time as in steps 4 and 5.



7 Press NEXT and set the program to be recorded with the + or – button.

8 Press NEXT.
The tape counter and the current time will reappear.

To preset another program, press TIMER SET again and repeat steps 3 to 8. Up to 6 programs can be preset.

9 Press TIMER REC ON/OFF.
The power will be turned off and the recorder will enter the standby mode.

Recording will start at the preset time and will automatically stop when the recording is completed. The memory of the program except everyday and every week setting will be erased and the program positions preset in the timer will advance one by one.

NOTICE:
ONCE THE TIMER REC INDICATOR HAS LIT UP, only the functions of CHECK and TIMER REC ON/OFF on the recorder can be activated. To turn on the power again for the usual manual operations, press TIMER REC ON/OFF again so that the indicator turns off.

BEFORE THE TIMER-ACTIVATED RECORDING STARTS

To check the timer settings
Press CHECK. Every time you press CHECK, each program will be displayed.

To change the settings
1 Press TIMER REC ON/OFF. The TIMER REC indicator turns off.
2 Press CHECK to select the program to be changed.
3 Press TIMER SET.
4 Press NEXT until the item to be changed blinks.
5 Change the setting with the + or – button.
6 Press NEXT so that the tape counter and the current time appear.
7 Press TIMER REC ON/OFF again to reactivate the timer.

To record the entire tape
Set the turn-off time to exactly the same time as the turn-on time. Recording will continue to the end of the tape.

To erase the memory of a particular program
1 Press TIMER REC ON/OFF. The TIMER REC indicator turns off.
2 Press CHECK to select the program to be erased.
3 Press CLEAR/RESET. The memory of the program will be eliminated.
4 If other programs have been preset for recording, press TIMER REC ON/OFF again to reactivate the timer.

DURING RECORDING

To stop during the timer recording
Press TIMER REC ON/OFF. The recording will stop and the power will be turned off.

When the tape ends during timer recording
The tape stops but the tape will not be rewound to the beginning.

NOTES ON TIMER RECORDING

Troubles when TIMER REC ON/OFF is pressed

The cassette will be ejected automatically.	⇨	The cassette inserted has the safety tab removed.
TIMER REC does not appear in the window.	⇨	No cassette is inserted. The tape is at its end.

1-13. QUICK TIMER RECORDING

Use this function to begin recording a program immediately. You can start timer recording just by pressing QUICK TIMER. The recording duration can be set for up to 4 hours by 30 minutes. You can also use this function to stop the non-timer recording by presetting the recording duration.

TO USE QUICK TIMER FROM THE TAPE STOP MODE

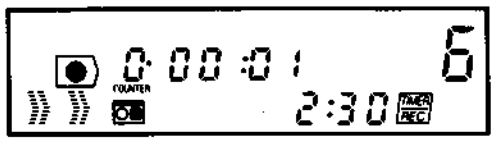
Make sure that the cassete is inserted.

1 Press QUICK TIMER.
The power will be turned on.

Cassette is inserted. Program previously selected

2 Choose the program to be recorded with the + or – button.
If you do not advance to the next step within 30 seconds. The power will be turned off.

3 Press QUICK TIMER so that the recording starts.
Now decide the recording duration.



Every time you press QUICK TIMER, the recording duration indication changes as follows:

0:30 → 1:00 → 1:30 → 2:00 ..... 4:00 → 0:00

30 minutes one hour one and a half hour two hours four hours zero hour

When the recording starts, the duration indication decreases minute by minute to 0:00 and the power will be turned off automatically about 30 seconds after the recording has finished.

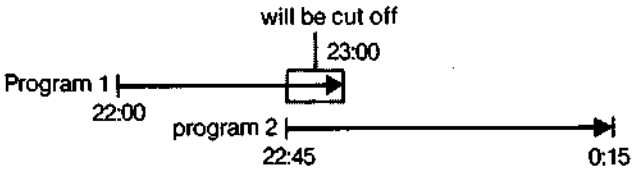
TO USE QUICK TIMER WHILE RECORDING

By pressing QUICK TIMER, you can set the duration so that the recording stops and power turns off after the preset duration.

Once the quick timer recording has started
Only the following function buttons can be activated:
QUICK TIMER.....to change recording duration
TIMER REC ON/OFF.....to interrupt quick timer recording
PAUSE ⏸/▶◀.....to stop quick timer recording momentarily
CHECK.....to check timer programs preset

SPECIFIC NOTES ON TIMER-ACTIVATED RECORDINGS

When the presettings of your timer-activated recordings overlap
There will be no error indication to inform you of the overlap. Even if there is an overlap, a recording will be made.



The recording of program 2 will begin before program 1 is finished.

If a power interruption occurs during timer recording
If the clock shows "0:00" and blinks
When the recorder was in the standby mode, all the timer settings are erased. Reset the clock and timer setting.
When the timer-recording was activated, the recording will stop.

1-14. CAMERA RECORDING

When connecting a Sony color video camera, the use of the Sony HVA-220CE AC adaptor is required. For details on connections, refer to the instruction manual furnished with the AC adaptor.

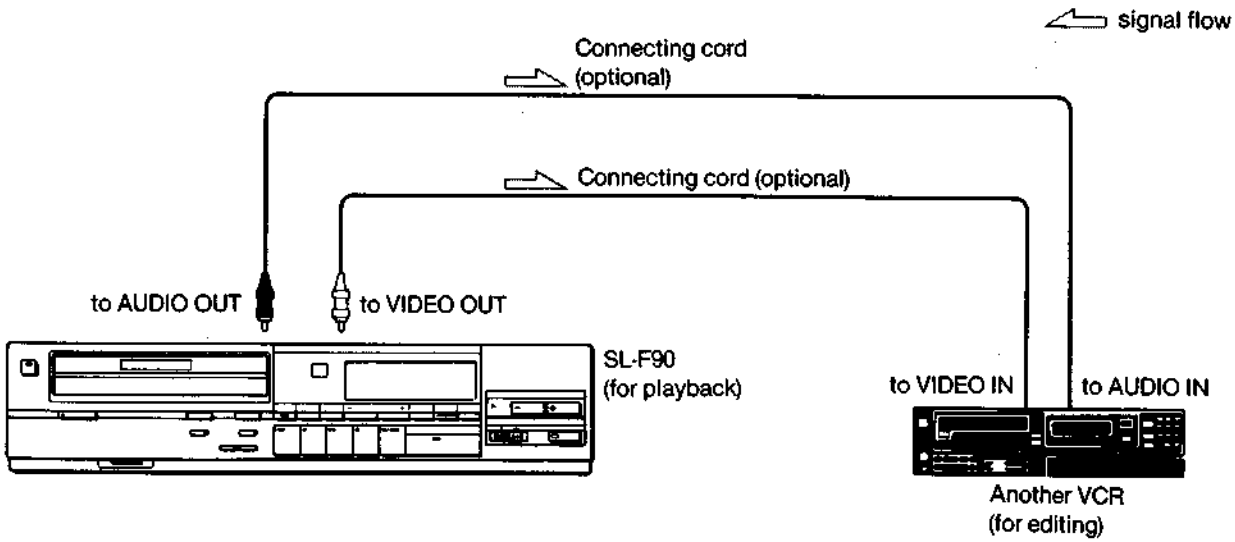
The camera must conform to CCIR PAL TV standards.

1-15. EDITING A TAPE

To edit a home movie tape, you need two video cassette recorders.
To start recording, set the VCR for playback in the playback mode, then press the record button on the other VCR.

Note
Avoid repetition of editing tapes, as the picture and tone quality will be impaired noticeably for newly edited tapes.

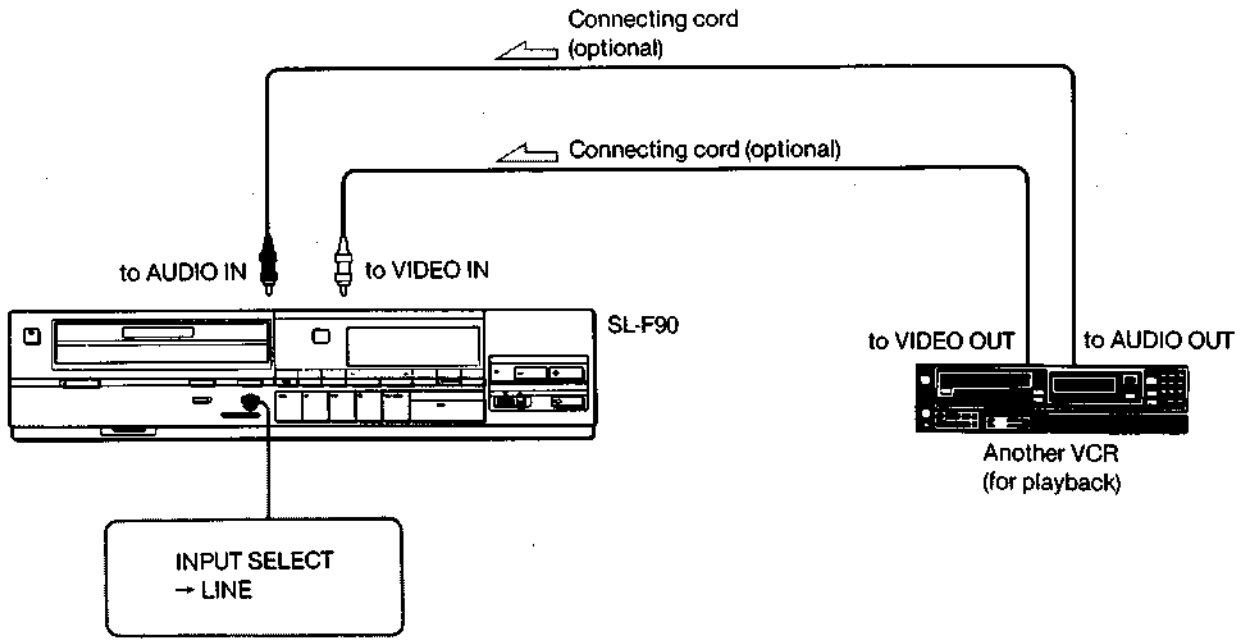
TO EDIT A HOME MOVIE TAPE FROM THE SL-F90 TO ANOTHER VCR



The impairment of the edited picture quality can be decreased by activating the SYNCHRO EDIT button as follows:
Set the SL-F90 to playback pause mode and press SYNCHRO EDIT to turn on the indicator on the button and start editing.

CAUTION
Television programs, films, video tapes and other materials may be copyrighted.
Unauthorized duplication of such material may be contrary to the provisions of the copyright laws.

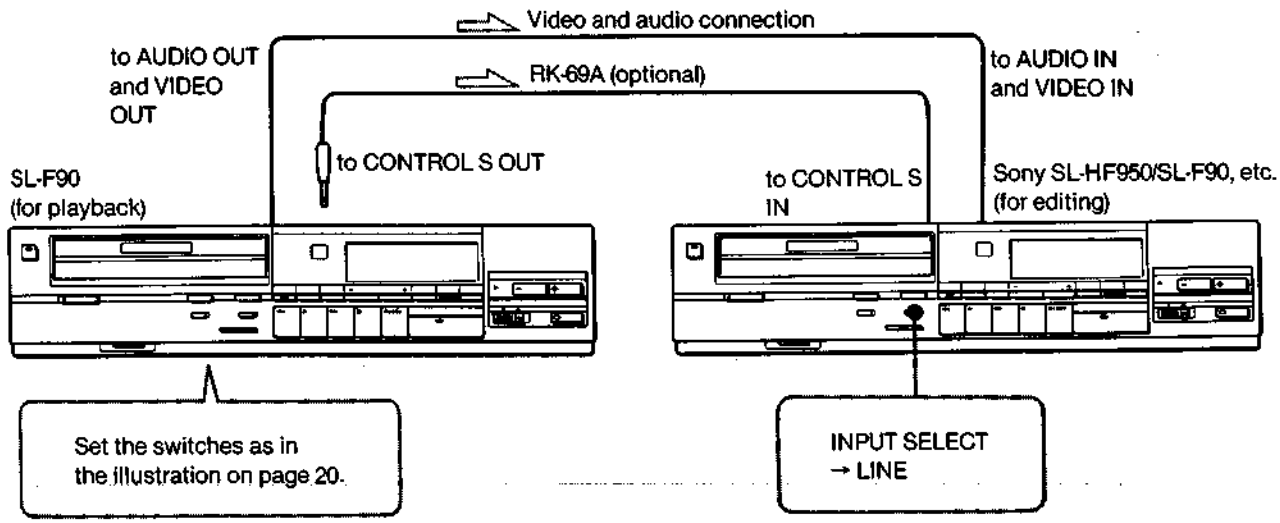
TO EDIT A HOME MOVIE TAPE FROM ANOTHER VCR TO THE SL-F90



SYNCHRO EDITING—Using a VCR equipped with the CONTROL S input

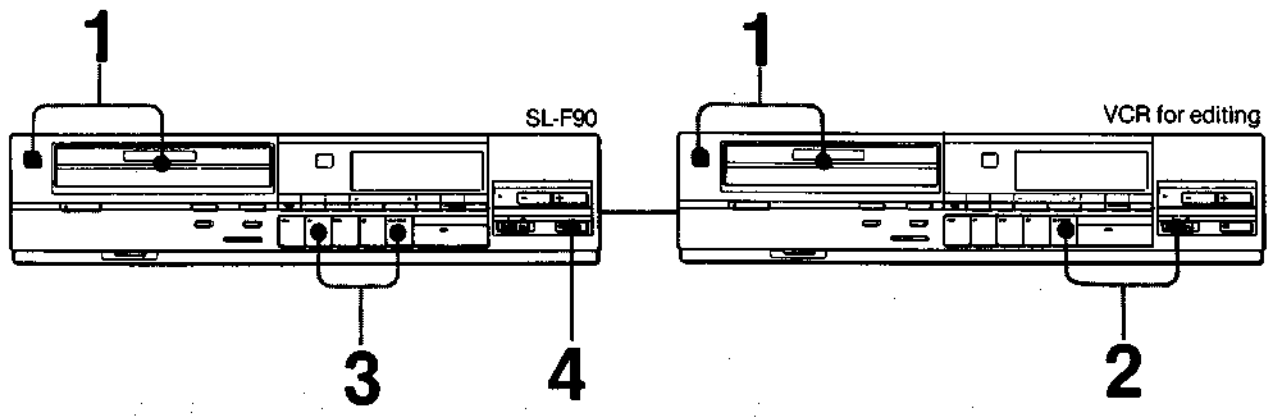
Connect the CONTROL S OUT jack of the SL-F90 to the CONTROL S input jack of another VCR. Recording start/stop on the other VCR can be activated in synchronization with playback start/stop on the SL-F90 simply by pressing the SYNCHRO EDIT button.

Connection and preparations



Note for owners of VCR equipped with the CONTROL S IN and OUT jacks
Avoid simultaneous connections to the CONTROL S IN and OUT jacks. This may cause malfunction of the VCRs.

Operation



1 Turn on the VCRs. Insert a recorded cassette on the SL-F90 and a cassette for recording on the other VCR.

2 Set the VCR for editing to recording pause mode.

3 Locate the portion of the tape at which you want to start editing and press ❚❚/▶|◀.

4 Press SYNCHRO EDIT. The indicator on the button lights. The recording and playback will begin simultaneously on the respective VCRs.

To stop editing momentarily
Press SYNCHRO EDIT again. The indicator on the button goes off. The SL-F90 will enter playback pause mode, and the VCR for editing will enter recording pause mode.
(The pause mode will be automatically released after about 8 minutes and the tape will stop on the VCR for editing and playback will resume on the SL-F90).

To start editing of the next scene
Repeat steps 3 and 4.

To stop the tapes
Press the ■ STOP button on each VCR.

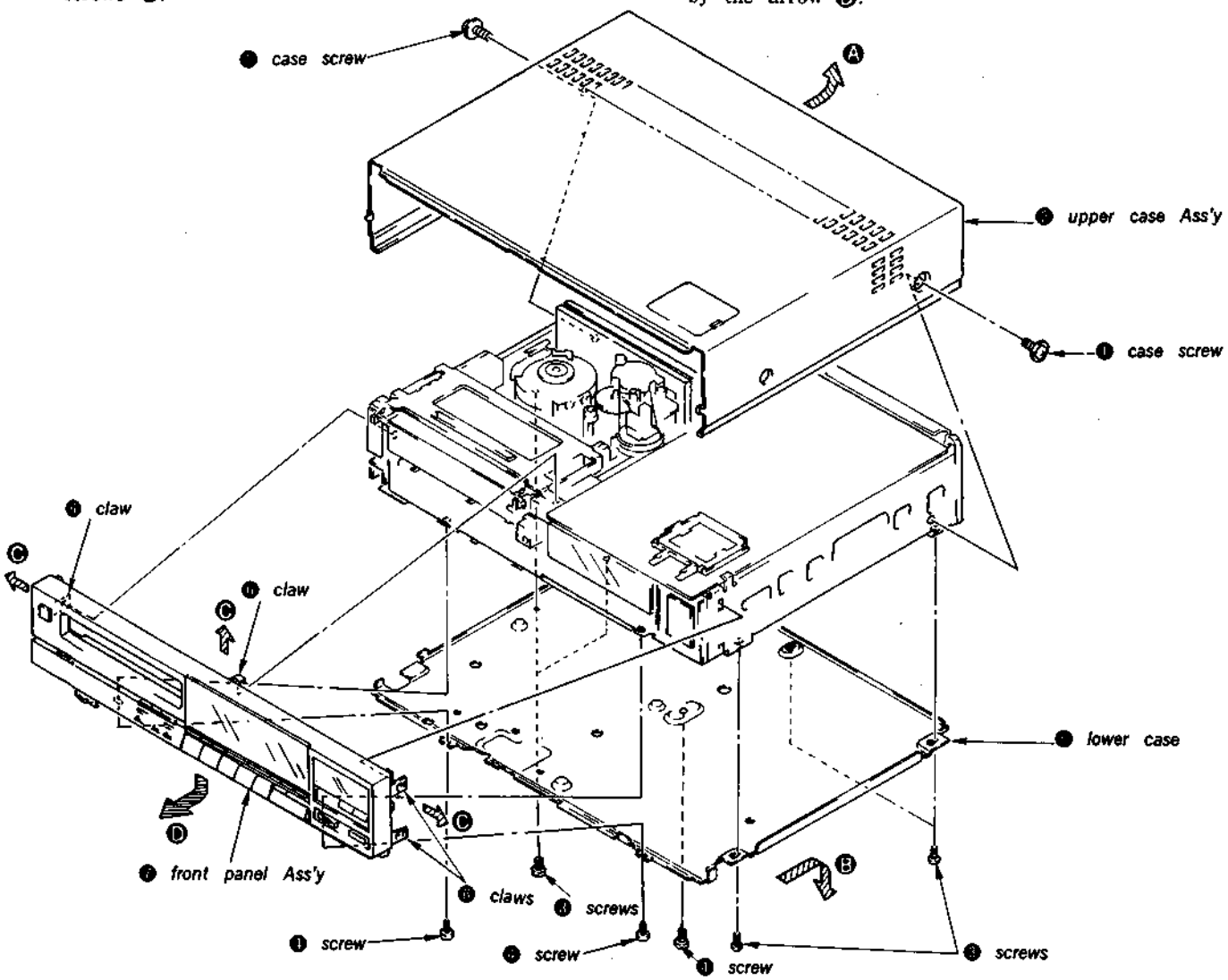
Note
- When SYNCHRO EDIT is pressed and the indicator on the button is lit, the video circuit is switched to editing mode. In this mode, better editing will result.
- If POWER is turned off or the ■ STOP button is pressed on the SL-F90, the editing VCR will enter recording pause mode.

Caution
Do not press any button on the VCRs or on the Remote Commander during editing, as synchro editing will malfunction.

SECTION 2
DISASSEMBLY

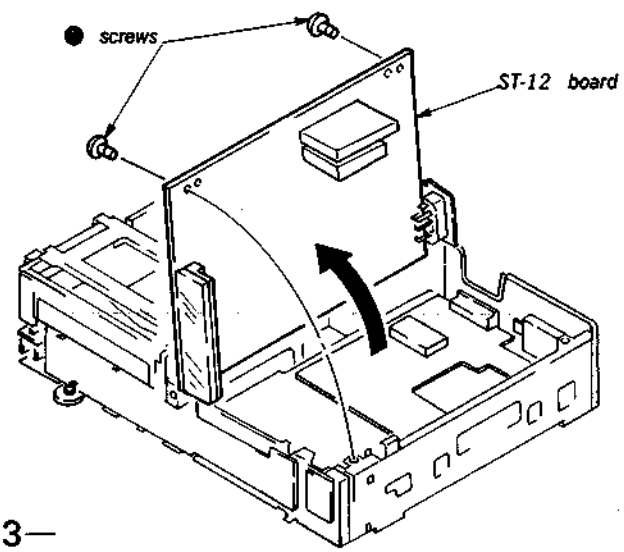
2-1. DISASSEMBLY OF CABINET

1) Remove the two case screws ❶.
2) Remove the upper case ❷ in the direction shown by the arrow Ⓐ.
3) Loosen the five screws ❸, then remove the three screws ❹.
4) Remove the lower case ❺ in the direction shown by the arrow Ⓑ.
5) Remove the four claws ❻ in the direction shown by the arrow Ⓒ.
6) Remove the front panel ❼ in the direction shown by the arrow Ⓓ.



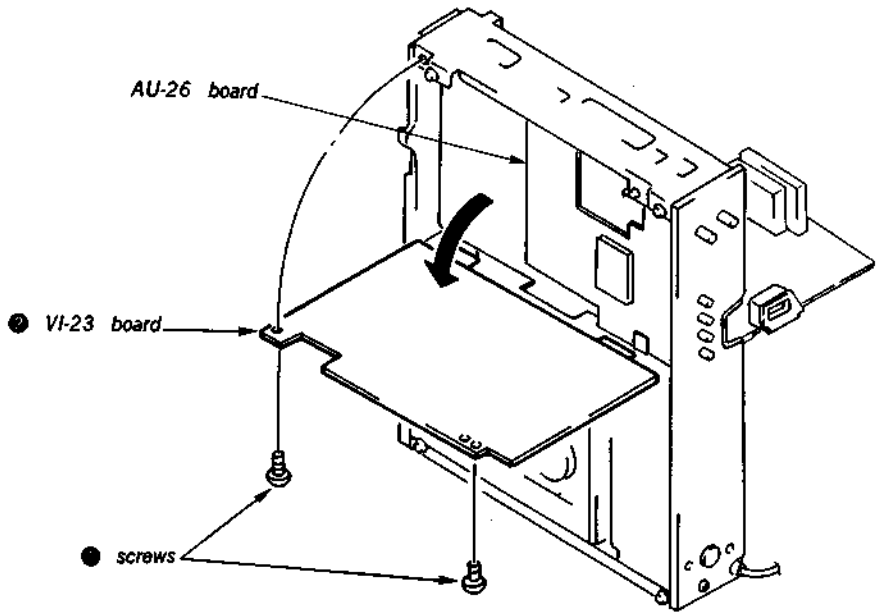
2-2. REMOVAL OF THE ST-12 BOARD

1) Remove the two screws ●.
2) Remove the ST-12 board ❷ in the direction shown by the arrow.



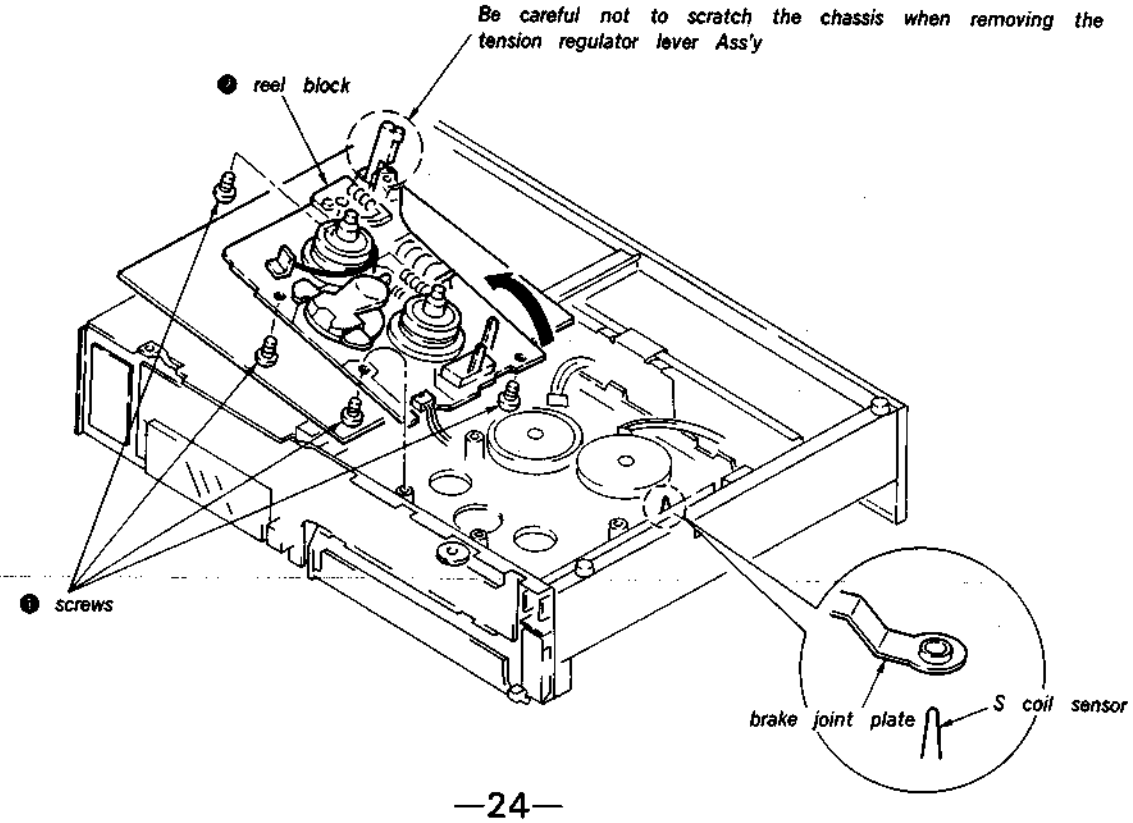
2-3. REMOVAL OF THE AU-26 BOARD AND THE VI-23 BOARD

1) Stand the set with the left side panel on the bottem.
2) Remove the two screws ●.
3) Remove the VI-23 board ❷ in the direction shown by the arrow.
4) Remove the ST-12 board ❸.
(Refer to section 2-2 for instructions on how to remove the ST-12 board.)



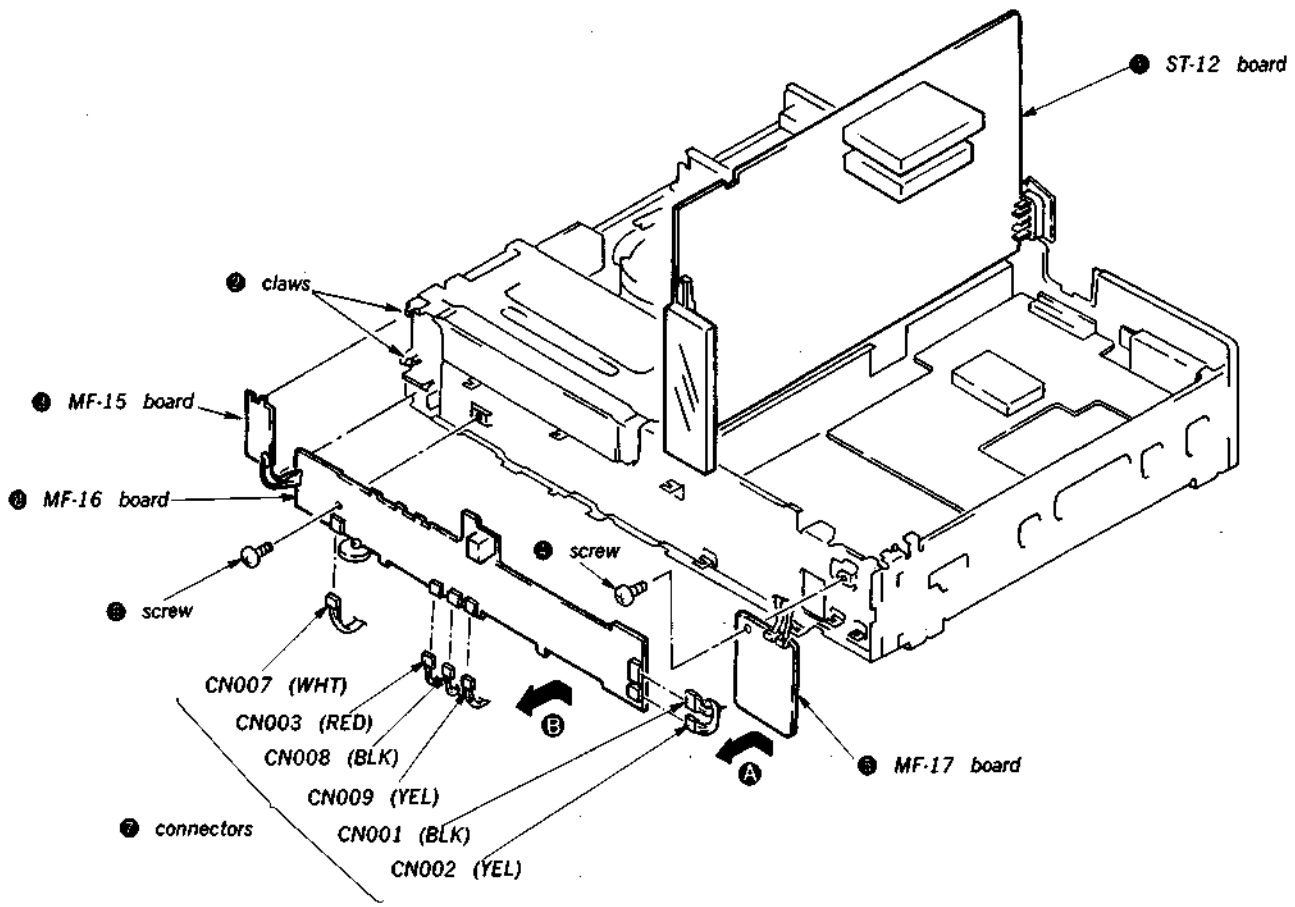
2-4. REMOVAL OF THE REEL BLOCK ASSEMBLY

1) Place the set up side down.
2) Remove the four screws ●.
3) Remove the reel block assembly ❷ in the direction shown by the arrow.



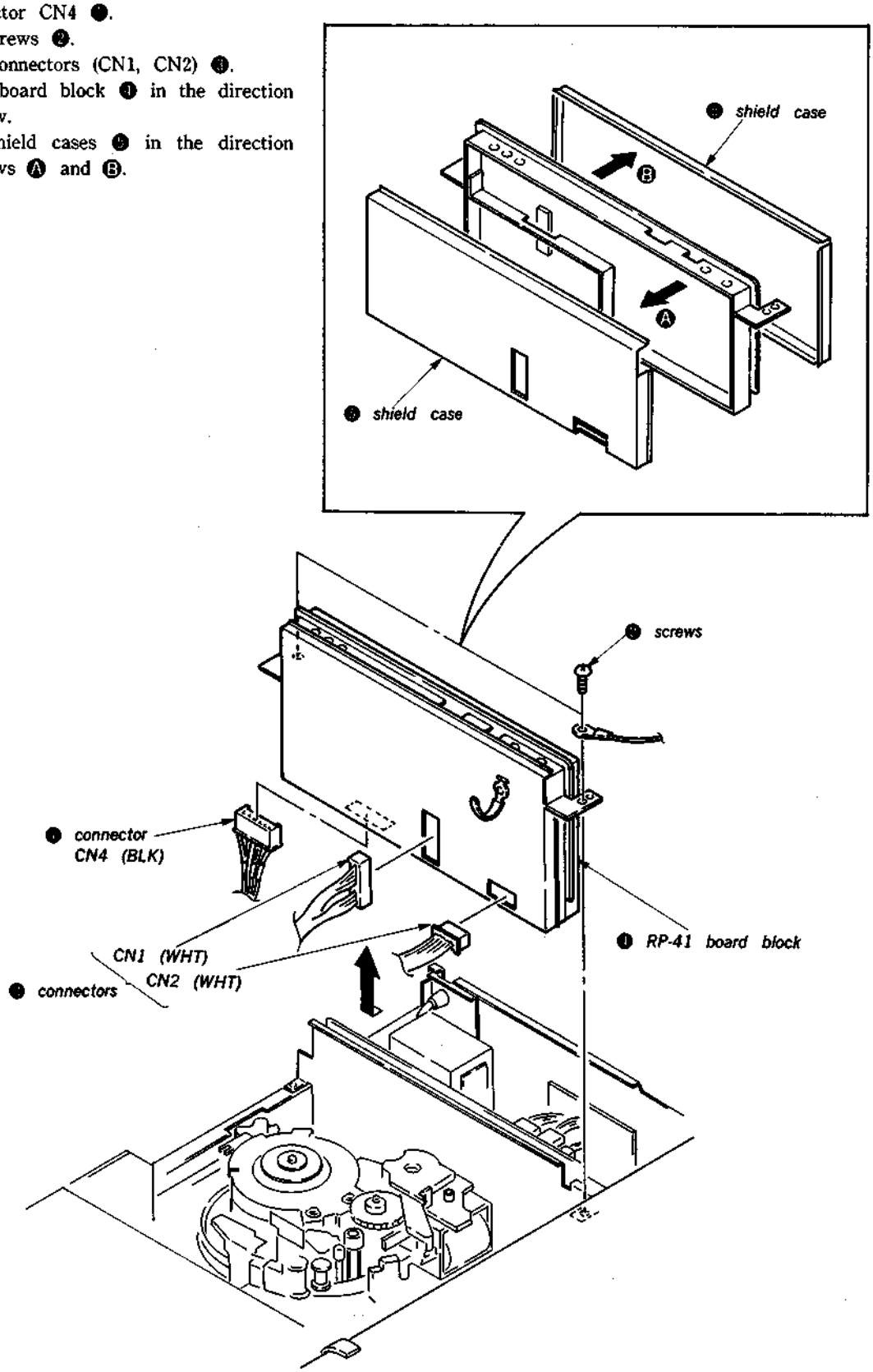
2-5. REMOVAL OF THE MF-17 BOARD AND THE MF-16 BOARD

1) Remove the ST-12 board ❶.
   (Refer to section 2-2 for instructions on how to remove the ST-12 board).
2) Remove the MF-15 board ❸ from the clows ❷.
3) Remove the screw ❹ than remove the MF-17 board ❺ in the direction shown by the arrow Ⓐ.
4) Remove the screw ❻.
5) Pull out the six connectors ❼ (CN001, CN002, CN003, CN007, CN008, CN009).
6) Remove the MF-16 board ❽ in the direction shown by the arrow Ⓑ.



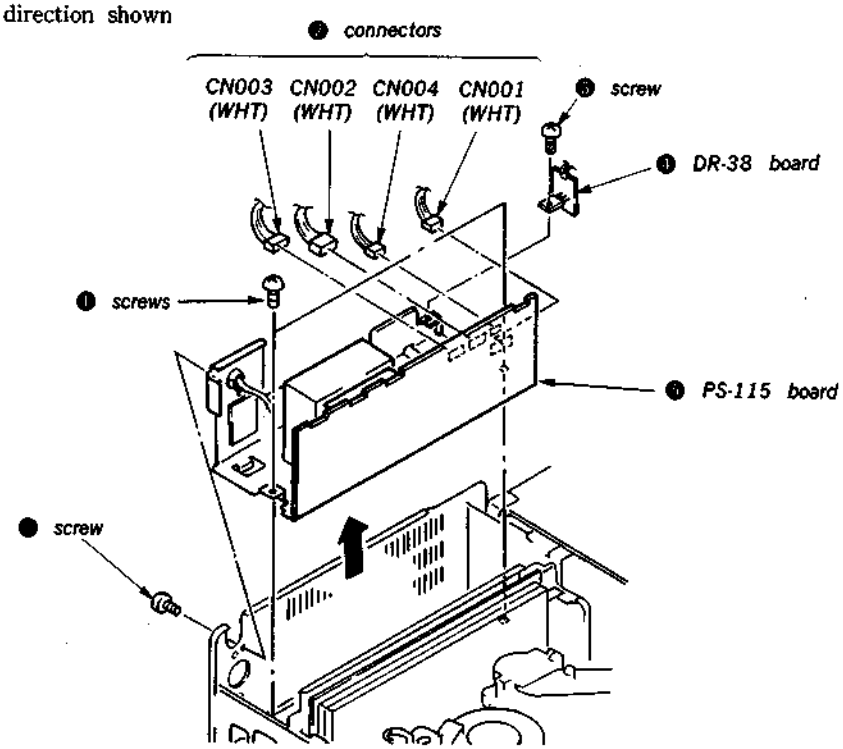
2-6. REMOVAL OF THE RP-41 BOARD

1) Pull out the connector CN4 ❶.
2) Remove the two screws ❷.
3) Pull out the two connectors (CN1, CN2) ❸.
4) Remove the RP-41 board block ❶ in the direction shown by the arrow.
5) Remove the two shield cases ❺ in the direction shown by the arrows Ⓐ and Ⓑ.



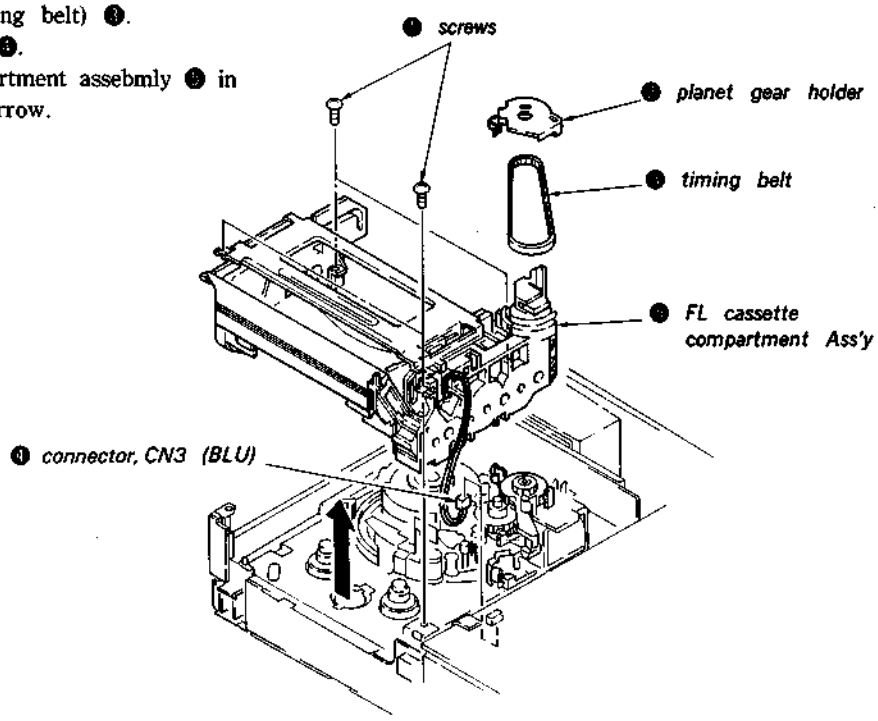
2-7. REMOVAL OF THE PS-115 BOARD

1) Remove the three screws ❶.
2) Pull out the four connectors ❷ (CN001, CN002, CN003, CN004).
3) Remove the screw ❸, then remove the DR-38 board ❹.
4) Remove the PS-115 board ❺ in the direction shown by the arrow.



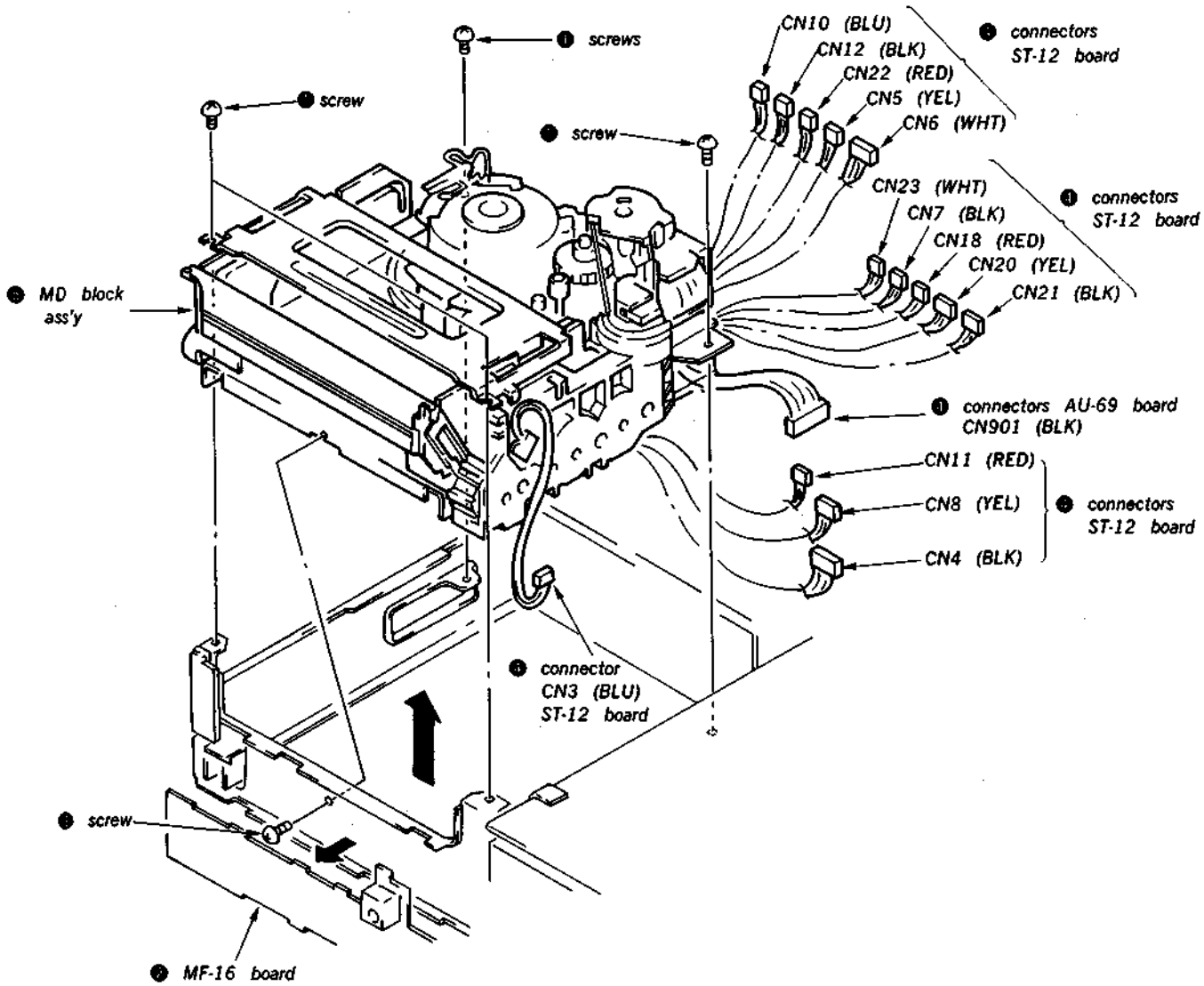
2-8. REMOVAL OF THE FL CASSETTE COMPARTMENT ASSEMBLY

1) Remove the four screws ❶.
2) Remove the pranet gear holder ❷.
3) Remove the timing belt (loading belt) ❸.
4) Pull out the connector, CN3 ❹.
5) Remove the FL cassette compartment assebmly ❺ in the direction shown by the arrow.



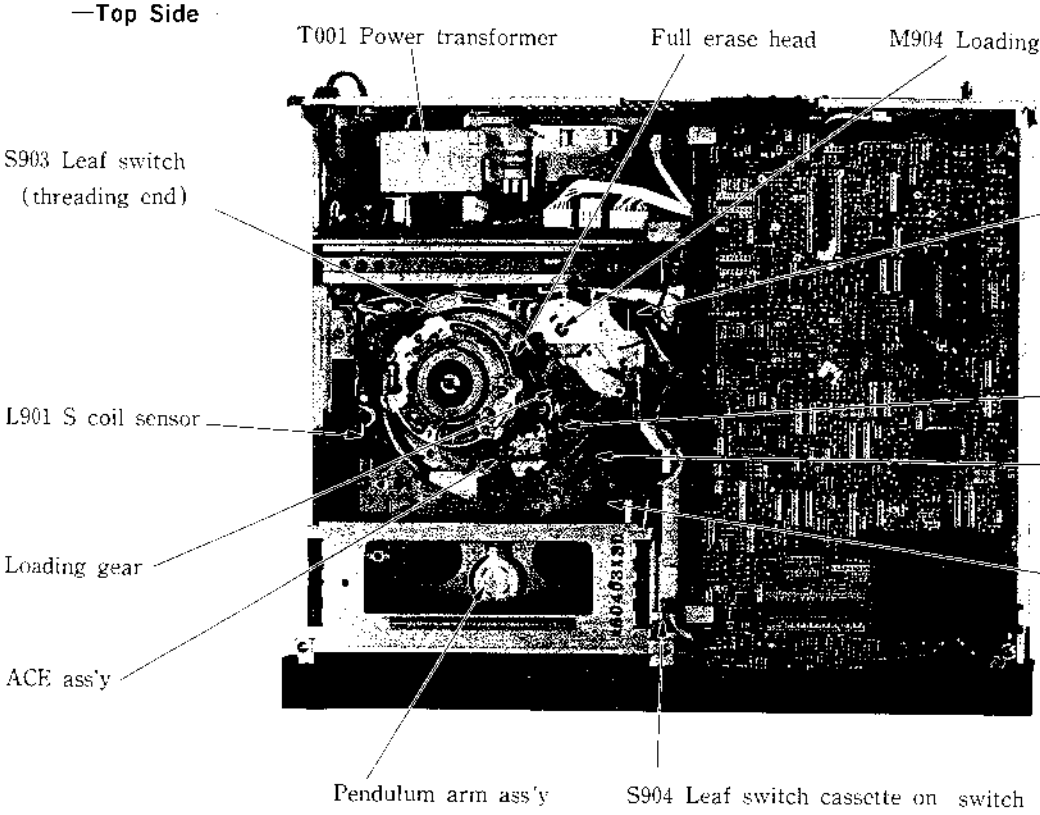
2-9. REMOVAL OF THE MD BLOCK ASSEMBLY

1) Remove the four screws ❶.
2) Remove the MF-16 board ❷.
   (Refer to section 2-5 for instructions on how to remove the MF-16 board)
3) Remove the screw ❸.
4) Pull out the sixteen connectors ❹ (ST-12 board: CN3, CN4, CN5, CN6, CN7, CN8, CN10, CN11, CN12, CN18, CN20, CN21, CN22, CN23) (AU-69 board: CN901).
5) Remove the MD complete assembly ❺ in the direction shown by the arrow.

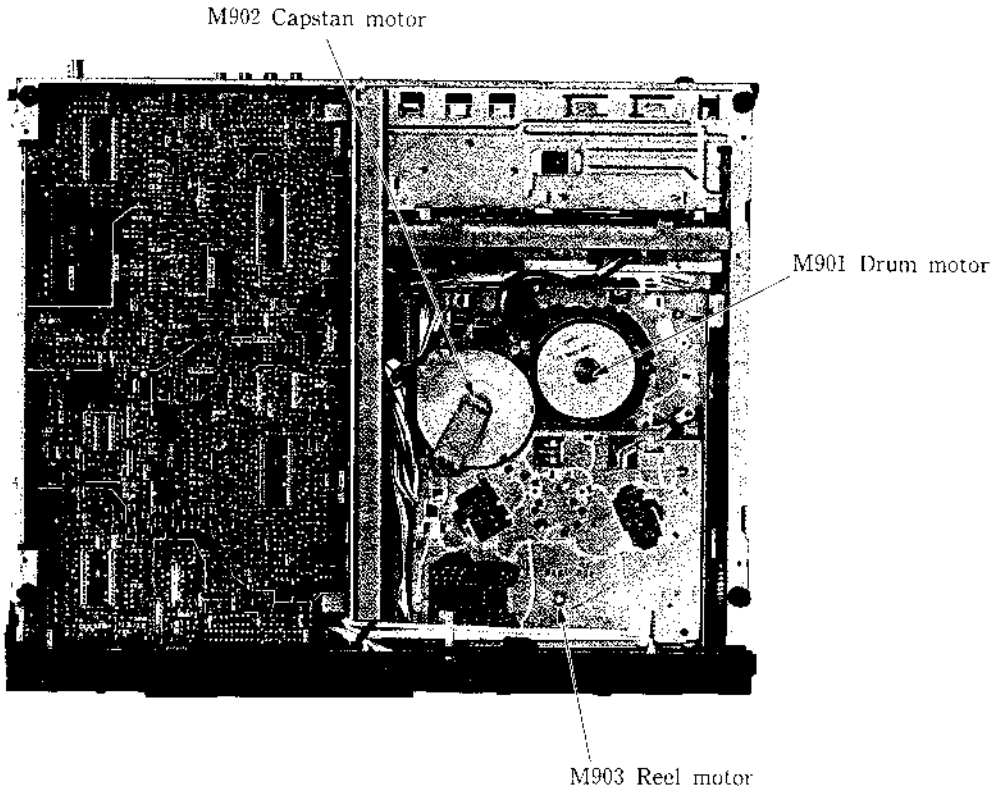


2-10. INTERNAL VIEWS

—Top Side—

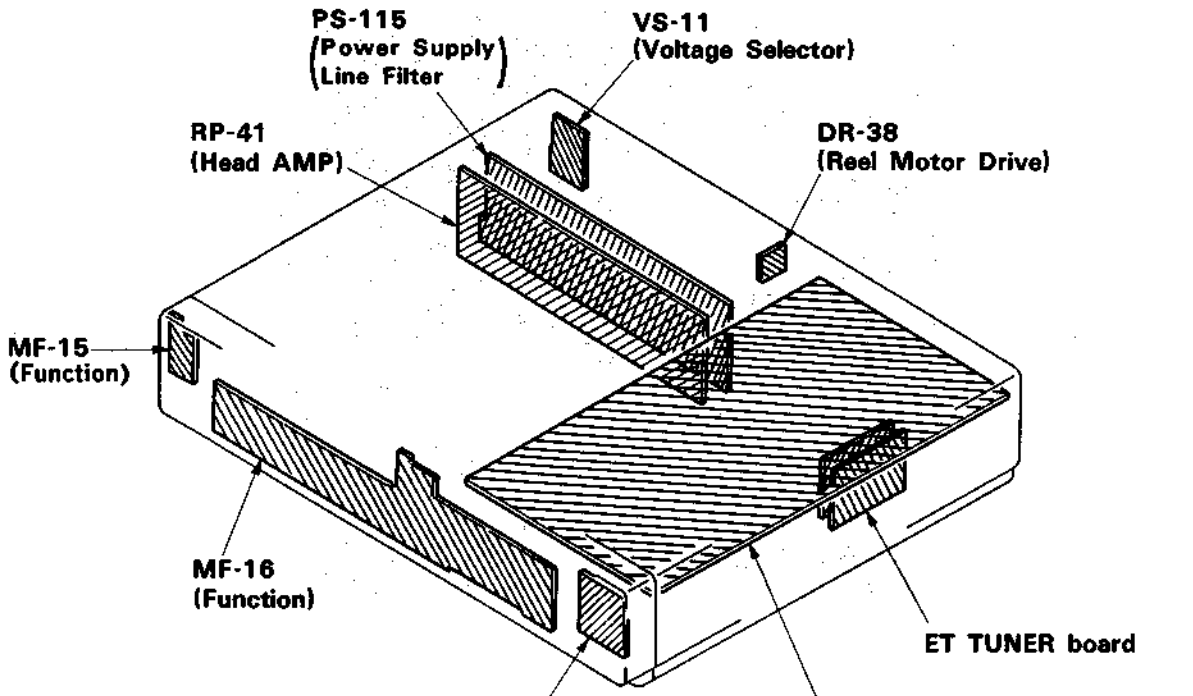


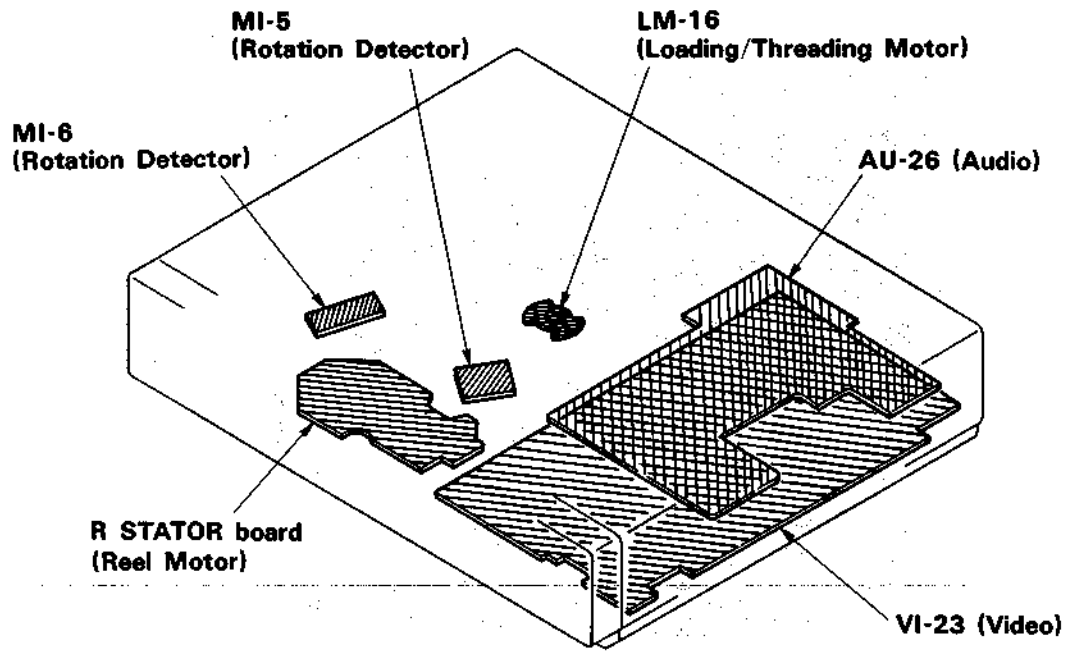
—Bottom Side—



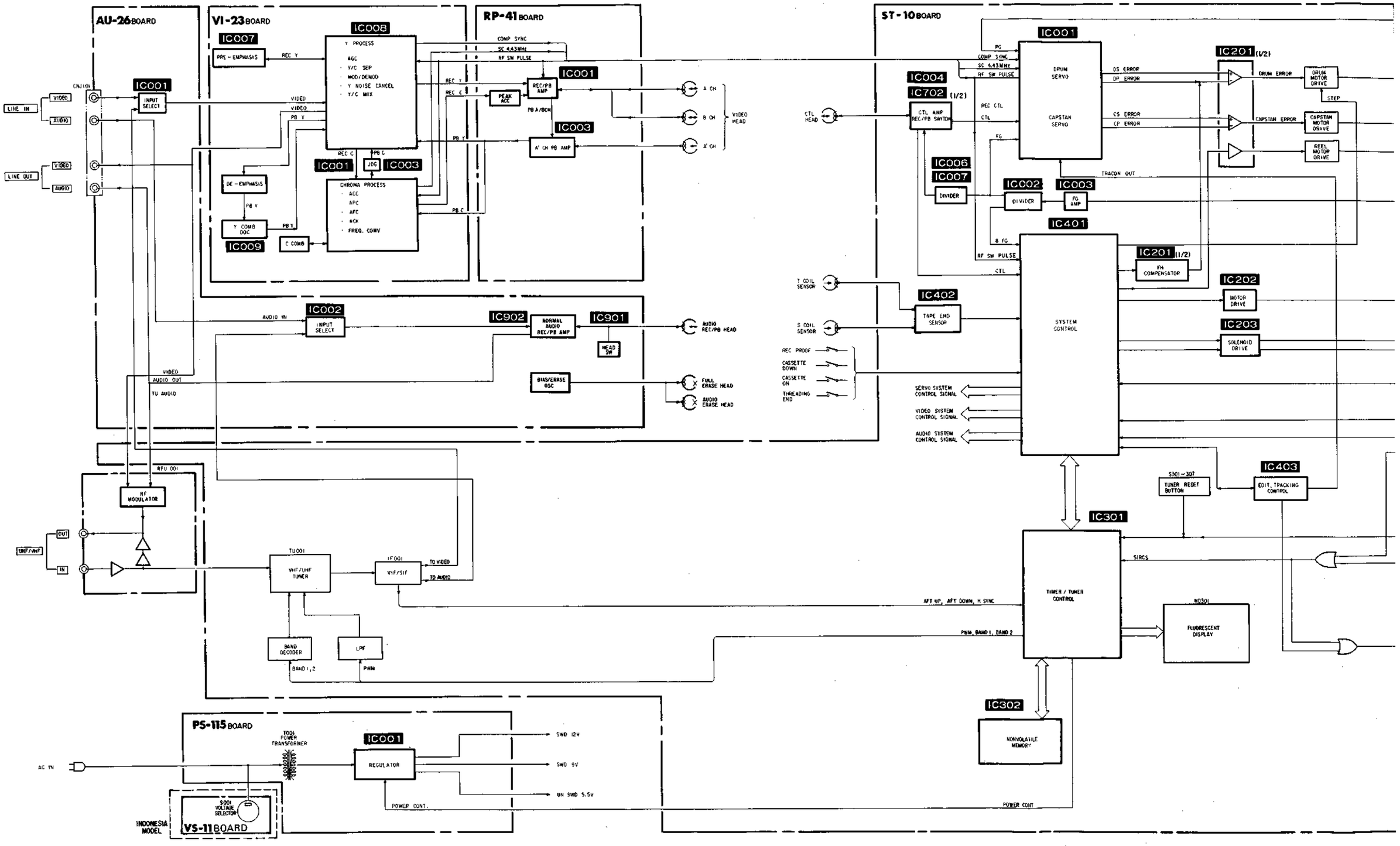
SECTION 3
BLOCK DIAGRAMS

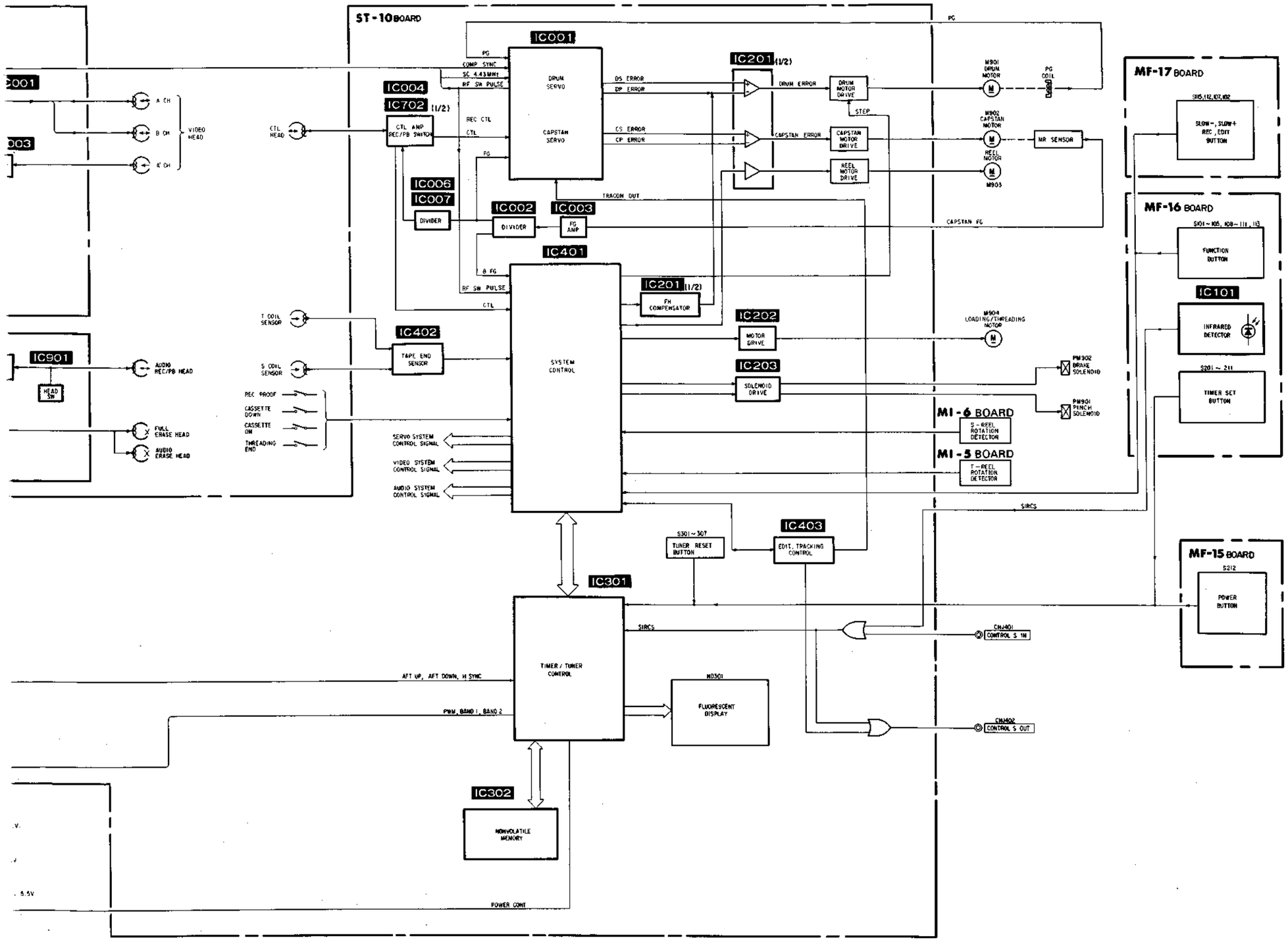
3-1. CIRCUIT BOARDS LOCATION



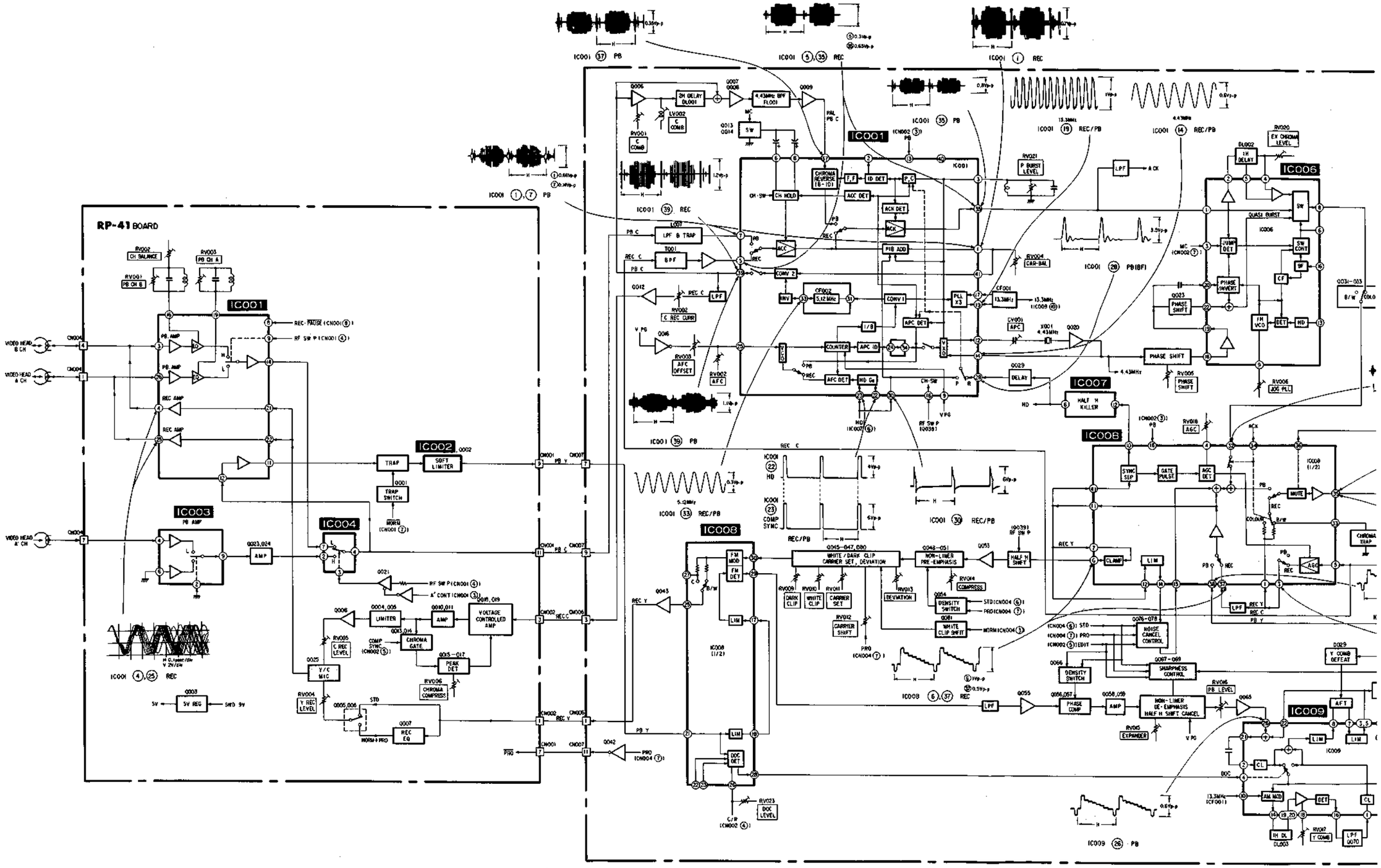


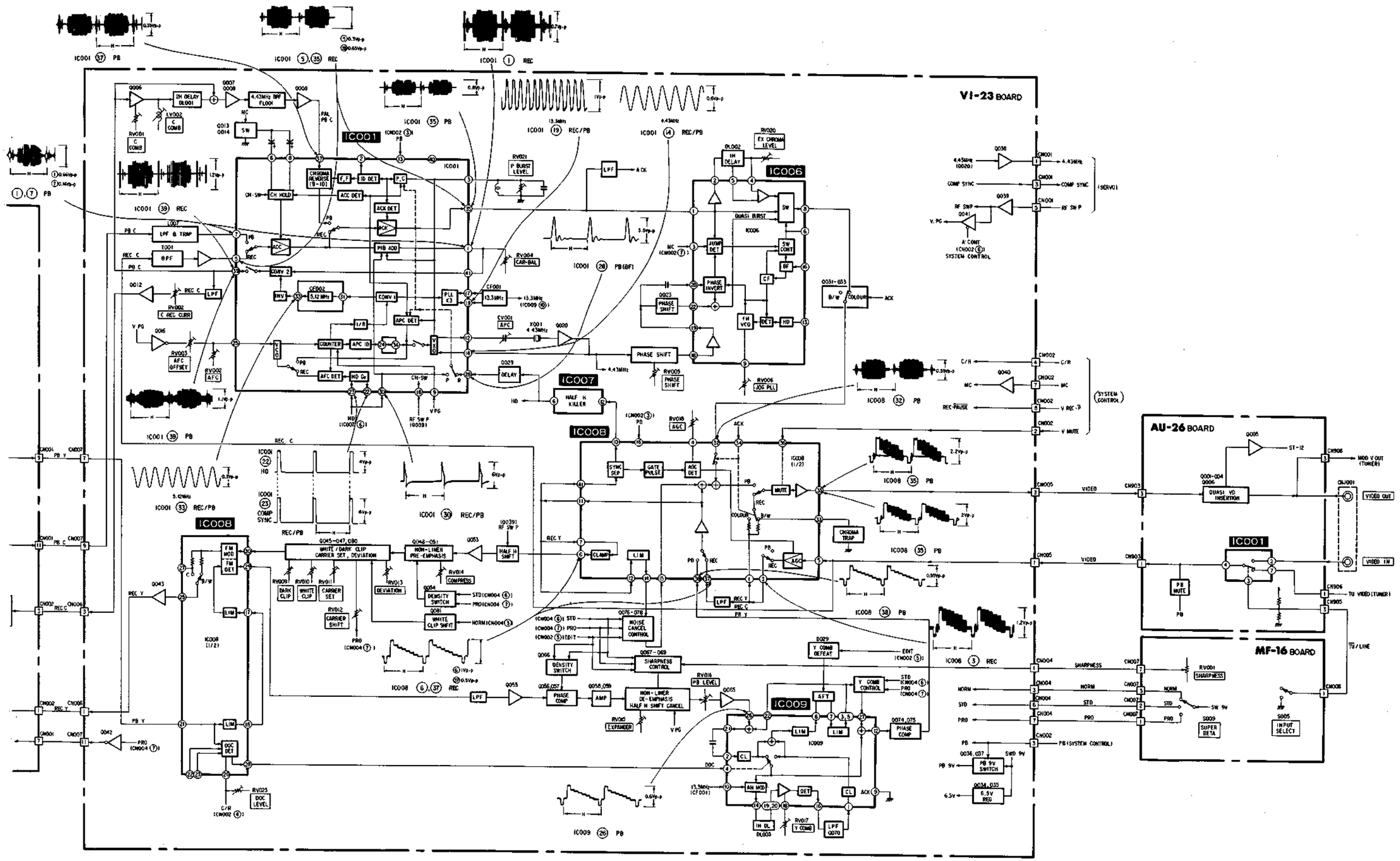
3-2. OVERALL BLOCK DIAGRAM



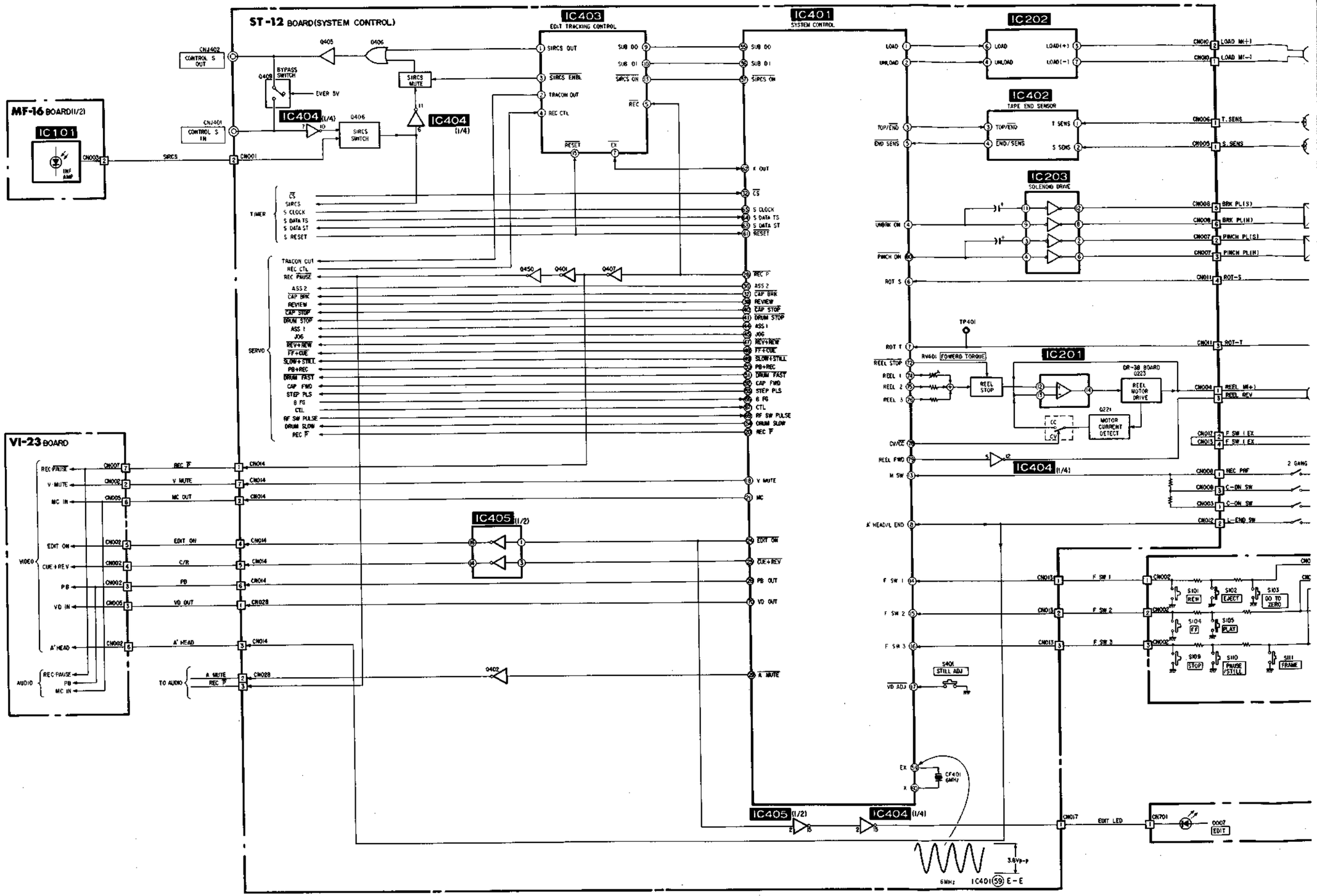

ST-10 BOARD
IC001
DRUM SERVO
CAPSTAN SERVO
IC004
IC702 (1/2)
CTL AMP REC/PB SWITCH
IC006
IC007
DIVIDER
IC002
DIVIDER
IC003
FG AMP
IC401
SYSTEM CONTROL
IC201 (1/2)
FM COMPENSATOR
IC201 (1/2)
DRUM MOTOR DRIVE
CAPSTAN MOTOR DRIVE
REEL MOTOR DRIVE
IC202
MOTOR DRIVE
IC203
SOLENOID DRIVE
IC402
TAPE END SENSOR
IC403
EDIT, TRACKING CONTROL
IC301
TIMER / TUNER CONTROL
IC302
NONVOLATILE MEMORY
IC901
HEAD SW
M901 DRUM MOTOR
M902 CAPSTAN MOTOR
M903
M904 LOADING/THREADING MOTOR
PG COIL
MR SENSOR
PM902 BRAKE SOLENOID
PM901 PINCH SOLENOID
MI-6 BOARD
S-REEL ROTATION DETECTOR
MI-5 BOARD
T-REEL ROTATION DETECTOR
MF-17 BOARD
S115,112,107,102
SLOW-, SLOW+ REC, EDIT BUTTON
MF-16 BOARD
S101~105, 108~111, 113
FUNCTION BUTTON
IC101
INFRARED DETECTOR
S201~211
TIMER SET BUTTON
MF-15 BOARD
S212
POWER BUTTON
S301~307
TUNER RESET BUTTON
M0301
FLUORESCENT DISPLAY
CNJ401
CONTROL S IN
CNJ402
CONTROL S OUT
A CH
B CH
A' CH
VIDEO HEAD
CTL HEAD
AUDIO REC/PB HEAD
FULL ERASE HEAD
AUDIO ERASE HEAD
T COIL SENSOR
S COIL SENSOR
REC PROOF
CASSETTE DOWN
CASSETTE IN
THREADING END
PG
COMP SYNC
SC 4.43MHz
RF SW PULSE
REC CTL
CTL
FG
DS ERROR
DP ERROR
CS ERROR
CP ERROR
DRUM ERROR
CAPSTAN ERROR
STEP
TRACOM OUT
CAPSTAN FG
B FG
SERVO SYSTEM CONTROL SIGNAL
VIDEO SYSTEM CONTROL SIGNAL
AUDIO SYSTEM CONTROL SIGNAL
SIRCS
AFT UP, AFT DOWN, H SYNC
PWM, BAND 1, BAND 2
POWER CONT

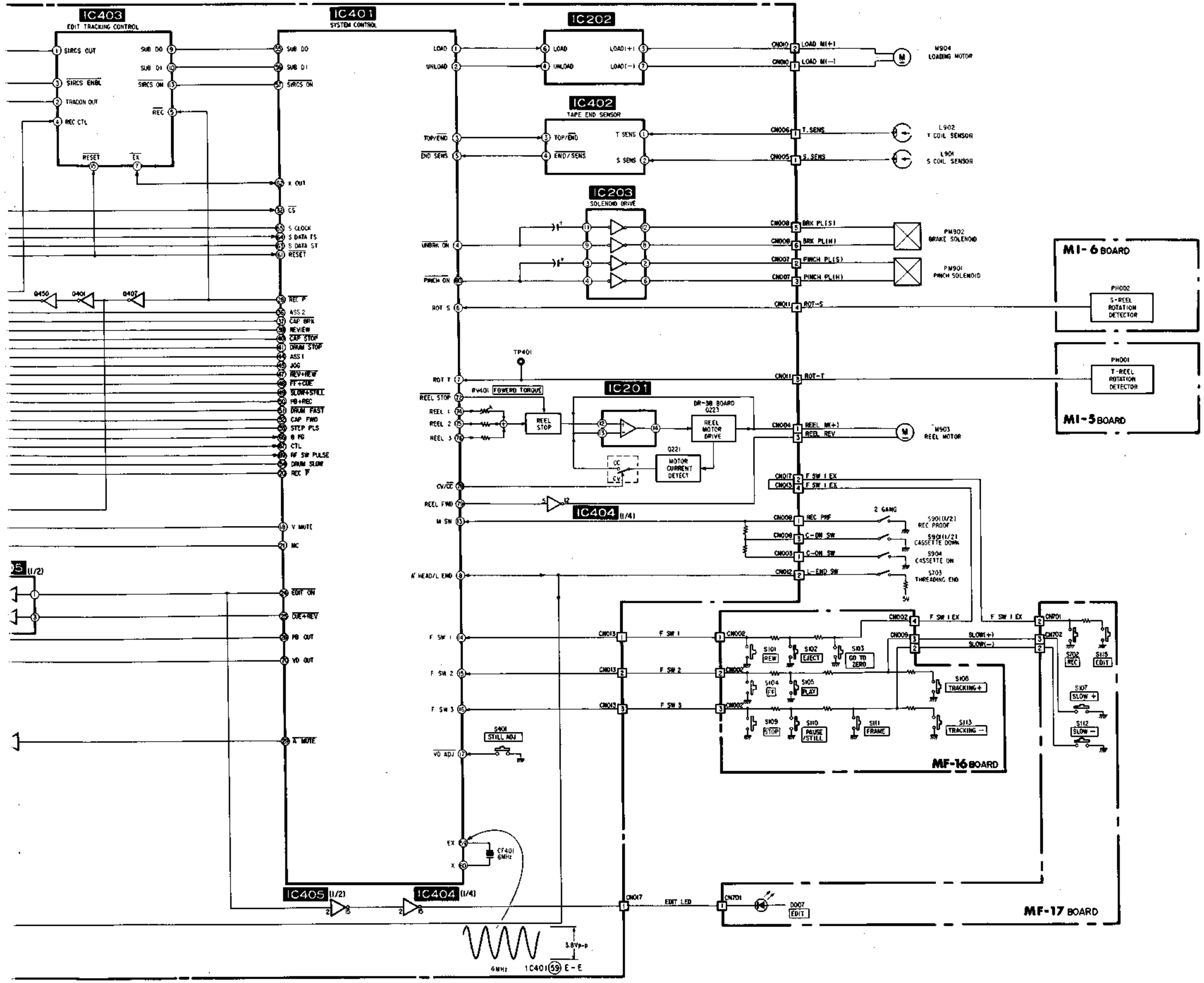
3-3. VIDEO BLOCK DIAGRAM




VI-23 BOARD
IC001
IC006
IC007
IC008
IC009
AU-26 BOARD
MF-16 BOARD
IC001 (37) PB
IC001 (5),(35) REC
IC001 (1) REC
IC001 (39) REC
IC001 (38) PB
IC001 (19) REC/PB
IC001 (14) REC/PB
IC001 (28) PB(BF)
IC001 (35) PB
IC001 (33) REC/PB
IC001 (30) REC/PB
IC008 (32) PB
IC008 (35) PB
IC008 (38) PB
IC008 (3) REC
IC008 (6),(37) REC
IC009 (26) PB
(SERVO)
(SYSTEM CONTROL)
VIDEO OUT
VIDEO IN
TU/LINE
SUPER BETA
INPUT SELECT
PB 9V SWITCH
6.5V REG

3-4. SYSTEM CONTROL BLOCK DIAGRAM




IC403
EDIT TRACKING CONTROL
IC401
SYSTEM CONTROL
IC202
IC402
TAPE END SENSOR
IC203
SOLENOID DRIVE
IC201
IC404
IC405
M904
LOADING MOTOR
L902
T COIL SENSOR
L901
S COIL SENSOR
PM902
BRAKE SOLENOID
PM901
PINCH SOLENOID
M903
REEL MOTOR
MI-6 BOARD
S-REEL ROTATION DETECTOR
T-REEL ROTATION DETECTOR
MI-5 BOARD
MF-16 BOARD
MF-17 BOARD
REW
EJECT
GO TO ZERO
FF
PLAY
TRACKING +
STOP
PAUSE /STILL
FRAME
TRACKING −
REC
EDIT
SLOW +
SLOW −
STILL ADJ
CF401 6MHz
3.8Vp-p
6MHz
IC401 (59) E-E

3-5. SYSTEM CONTROL—VIDEO BLOCK INTERFACE

SIGNAL NAME	MODE I/O	MODE PIN No.	STOP	FF	REW	PB	PB·PAUSE (STILL)	BETA SCAN CUE	BETA SCAN REVIEW	REC	REC·PAUSE	SLOW 1/5-1/30	SKIP SCAN CUE	SKIP SCAN REVIEW	EDIT PB
$\overline{\text{REC·PAUSE}}$	O	IC401 ㉘	H	H	H	H	H	H	H	L	H	H	H	H	H
V MUTE	O	IC401 ⑲	L	L	L	L	L	L	L	L	L	L	L	L	L
$\overline{\text{REC·P(S)}}$	O	IC401 ⑳	H	H	H	H	H	H	H	L*1	H	H	H	H	H
MC OUT	O	IC401 ㉑	L	L	L	L	H	H	H	L	L	H	H	H	L
$\overline{\text{EDIT ON}}$	O	IC401 ㉔	H	H	H	H	H	H	H	H	H	H	H	H	L
$\overline{\text{CUE+REV}}$	O	IC401 ㉕	H	H	H	H	H	L	L	H	H	H	L	L	H
PB OUT	O	IC401 ㉙	L	L	L	H	H	H	H	L	L	H	H	H	H
VD OUT	O	IC401 ㉚	L	L	L	L	*3	*3	*3	*3	L	*3	*3	*3	L
A' HEAD/L END	O/I	IC401 ⑧	L	L	L	L	H	L	L	L	L	H*2	L	L	L

*1. The $\overline{\text{REC·P(S)}}$ is 1.2msec later than $\overline{\text{REC·P}}$
*2. AT "L" pulse during the tepe running (STEP)
*3. Pulse of 50 Hz

3-6. SYSTEM CONTROL—MECHANISM BLOCK INTERFACE

SIGNAL NAME	MODE I/O	MODE PIN No.	EJECTED	LOADING	THREADING	STOP	UNTHREADING	UNLOADING	FF	REW	PB	PB·PAUSE (STILL)	BETA SCAN CUE	BETA SCAN REVIEW	REC	REC-PAUSE	SLOW 1/5-1/30	SKIP SCAN CUE	SKIP SCAN REVIEW
LOAD	O	IC401 ①	L	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L
UNLOAD	O	IC401 ②	L	L	L	L	H	H	L	L	L	L	L	L	L	L	L	L	L
TOP/$\overline{\text{END}}$	O	IC401 ③	L	L	L	L	H	L	L	H	L	L	L	H	L	L	L	L	H
$\overline{\text{END SENS}}$*1	I	IC401 ⑤	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
$\overline{\text{UNBRK ON}}$	O	IC401 ④	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L
$\overline{\text{PINCH ON}}$	O	IC401 ㉚	L	L	H	H	H	L	H	H	L	L	L	L	L	L	L	L	L
ROT S*2	I	IC401 ⑥																	
ROT T*3	I	IC401 ⑦																	
M SW*4	I	IC401 ⑬	5V	2V	0V(0.8V)	0V(0.8V)	0V(0.8V)	2V	0V(0.8V)	0V(0.8V)	0V(0.8V)	0V(0.8V)	0V(0.8V)	0V(0.8V)	0V	0V	0V(0.8V)	0V(0.8V)	0V(0.8V)
A'HEAD/L END	O/I	IC401 ⑧	L	L	L*5	L	L	L	L	L	L	H	L	L	L	L	H*6	L	L

*1. At "L" when performing the tape end/top or unthreading completion detection.
*2. The pulse input is proportional to the number of S reel rotations.
*3. The pulse input is proportional to the number of T reel rotations.
*4. In parentheses show the voltage when the erroneous recording prevention claw of the cassette is broken.
*5. At "H" when the threading is completed.
*6. At "L" pusle during the tape running (STEP).

3-7. SYSTEM CONTROL—REEL BLOCK INTERFACE

SIGNAL NAME	MODE I/O	MODE PIN No.	EJECTED	LOADING	THREADING	S
$\overline{\text{REEL STOP}}$	O	IC401 ㉒	L	L	H	
REEL 1	O	IC401 ㉔	L	L	L	
REEL 2	O	IC401 ㉕	L	L	H	
REEL 3	O	IC401 ㉖	H	H	H	
CV/$\overline{\text{CC}}$	O	IC401 ㉘	H	H	H	
REEL FWD	O	IC401 ㉙	H	H	H	

*1. At "H" after one frame forwarding.

3-8. SYSTEM CONTROL—SYSTEM CONT

SIGNAL NAME	MODE I/O	MODE PIN No.
F SW 1	I	IC401 ⑭
F SW 2	I	IC401 ⑮
F SW 3	I	IC401 ⑯
$\overline{\text{VD ADJ}}$	I	IC401 ⑰
SUB DO	O	IC401 ㊺
SUB DI	O	IC401 ㊻
$\overline{\text{SIRCS ON}}$	O	IC401 ㊼
X OUT	O	IC401 ㊷

SLOW 1/5-1/30	SKIP SCAN		EDIT PB
	CUE	REVIEW	
H	H	H	H
L	L	L	L
H	H	H	H
H	H	H	L
H	H	H	L
H	L	L	H
H	H	H	H
*3	*3	*3	L
H*2	L	L	L

3-7. SYSTEM CONTROL—REEL BLOCK INTERFACE

SIGNAL NAME	MODE I/O	MODE PIN No.	EJECTED	LOADING	THREADING	STOP	UNTHREADING	UNLOADING	FF	REW	PB	PB·PAUSE (STILL)	BETA SCAN CUE	BETA SCAN REVIEW	REC	REC·PAUSE	SLOW 1/5-1/10	SKIP SCAN CUE	SKIP SCAN REVIEW
$\overline{\text{REEL STOP}}$	O	IC401 ⑫	L	L	H	L	H	L	H	H	H	L*1	H	H	H	L	H	H	H
REEL 1	O	IC401 ⑭	L	L	L	L	H	L	H	H	L	L	H	H	L	L	L	H	H
REEL 2	O	IC401 ⑮	L	L	H	L	H	L	H	H	L	L	L	L	L	L	L	L	L
REEL 3	O	IC401 ⑯	H	H	H	H	H	H	H	H	H	L	L	L	H	H	L	L	L
CV/$\overline{\text{CC}}$	O	IC401 ⑱	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H
REEL FWD	O	IC401 ⑲	H	H	H	H	L	H	H	L	H	H	H	L	H	H	H	H	L

*1. At "H" after one frame forwarding.

PB	PB·PAUSE (STILL)	BETA SCAN CUE	BETA SCAN REVIEW	REC	REC-PAUSE	SLOW 1/5-1/30	SKIP SCAN CUE	SKIP SCAN REVIEW
L	L	L	L	L	L	L	L	L
L	L	L	L	L	L	L	L	L
L	L	L	H	L	L	L	L	H
H	H	H	H	H	H	H	H	H
L	L	L	L	L	L	L	L	L
L	L	L	L	L	L	L	L	L
0.8V)	0V(0.8V)	0V(0.8V)	0V(0.8V)	0V	0V	0V(0.8V)	0V(0.8V)	0V(0.8V)
L	H	L	L	L	L	H*6	L	L

3-8. SYSTEM CONTROL—SYSTEM CONTROL PERIPHERAL CIRCUIT INTERFACE

SIGNAL NAME	MODE I/O	MODE PIN No.	Input voltage value when button is pressed: REW	EJECT	GO TO ZERO	FF	PB	SLOW+	TRACKING +	STOP	PAUSE	FRAME	SLOW−	TRACKING −	REC	EDIT
			MF-16 board												MF-17 board	
			S101	S102	S103	S104	S105	S107	S108	S109	S110	S111	S112	S113	S114	S115
F SW 1	I	IC401 ⑭	0V	1V	1.9V										2.9V	3.8V
F SW 2	I	IC401 ⑮				0V	1V	2.9V	3.8V							
F SW 3	I	IC401 ⑯								0V	1V	1.9V	2.9V	3.8V		
$\overline{\text{VD ADJ}}$	I	IC401 ⑰	It turns on when the dormant picture adjusting button is pressed.													
SUB DO	O	IC401 ⑤⑨	Tracking control button data. { Only duringg the PB the staten of tracking+and−buttons are output.													
SUB DI	O	IC401 ⑤⑧														
$\overline{\text{SIRCS ON}}$	O	IC401 ⑤⑦	SIRCS trigger for the EDIT control (Normal...at "H", but at "L" pulse during the EDIT ⇄ PB·PAUSE mode transition period.)													
X OUT	O	IC401 ⑥②	Clock output for the tracking control microcomputer													

3-9. SYSTEM CONTROL—SERVO BLOCK INTERFACE

SIGNAL NAME	MODE I/O	MODE PIN No.	STOP	FF	REW	PB	PB·PAUSE (STILL)	BETA SCAN CUE	BETA SCAN REVIEW	REC	REC·PAUSE	SLOW 1/5-1/30	SKIP SCAN CUE	SKIP SCAN REVIEW
TRACON OUT*1	O	IC403 ②												
REC CTL*2	I	IC403 ④												
$\overline{\text{REC·PAUSE}}$	O	IC401 ㉘	H	H	H	H	H	H	H	L	H	H	H	H
ASS 2	O	IC401 ㉟	L	H	H	L	H	H	H	H	H	H	H	H
$\overline{\text{CAP BRK}}$*3	O	IC401 ㊲	H	H	H	H	H	H	H	H	H	H	H	H
REVIEW	O	IC401 ㊴	L	L	L	L	L	L	H	L	L	L	L	H
$\overline{\text{CAP STOP}}$	O	IC401 ㊵	L	L	L	H	L	H	H	H	L	L	H	H
$\overline{\text{DRUM STOP}}$	O	IC401 ㊶	L	H	H	H	H	H	H	H	H	H	H	H
ASS 1	O	IC401 ㊹	L	L	L	L	L	L	L	L	L*4	L	L	L
JOG	O	IC401 ㊺	L	H	H	L	H	H	H	L	L	H	H	H
$\overline{\text{REV+REW}}$	O	IC401 ㊼	H	H	L	H	H	H	L	H	H	H	H	L
$\overline{\text{FF+CUE}}$	O	IC401 ㊽	H	L	H	H	H	L	H	H	H	H	L	H
$\overline{\text{SLOW+STILL}}$	O	IC401 ㊾	L	H	H	L	L	H	H	L	L	L	H	H
PB+REC	O	IC401 ㊿	H	L	L	H	L	L	L	H	H	L	L	L
$\overline{\text{DRUM FAST}}$	O	IC401 (51)	H	H	H	H	H*5	H	H	H	H	H*6	H	H
CAP FWD	O	IC401 (52)	H	H	H	H*7	H	H	L	H	H	H*8	H	L
STEP PLS	O	IC401 (53)	L	L	L	L*9	L*9	L	L	L	L	*10	L	L
S FG*11	I	IC401 (55)												
CTL*12	I	IC401 (57)	(CTL)	CTL	CTL	CTL	(CTL)	CTL	CTL	REC-CTL	(CTL)	CTL	CTL	CTL
RF SW PULSE*19	I	IC401 (59)												
DRUM SLOW	O	IC401 (54)	L	L	L	L	L*14	L	L	L	L	L*15	L	L

*1. Pulse of 25 Hz (⎍)
*2. Duty 50% pulse of 25 Hz (⎍⎍)
*3. At "L" when the capstan inverse rotation brake
(During the transitional period of the CUE/REVIEW → PB, REC → REC·PAUSE, etc mode)
*4. At "H" during period of the REC·PAUSE → REC mode.
*5. The pulse of "L" during the transitional period of the PB·PAUSE → PB mode.
*6. The pulse of "L" during tape speed acceleration.
*7. The pulse of "L" during the transitional period of the PB → PB·PAUSE mode.
*8. The pulse of "L" during tape speed deceleration.
*9. The pulse of "H" during the transitional period of the ⇄ PB·PAUSE mode.
*10. The pulse of "H" during the tape forwarding (during STEP).
*11. Capstan FG signal input.
*12. (CTL)...No pulse input as the tape does not move.
*13. Duty 50% pulse of 25 Hz (⎍⎍)
*14. The pulse "H" during the transitional period of the PB → STILL mode.
*15. The pulse of "H" during tape steed deceleration.

3-10. SYSTEM CONTROL—AUDIO CIRCUIT INTERFACE

SIGNAL NAME	MODE I/O	MODE PIN No.	STOP	FF	REW	PB	PB·PAUSE (STILL)	BETA SCAN CUE	BETA SCAN REVIEW	REC	P.
$\overline{\text{REC·PAUSE}}$	O	IC401 ㉘	H	H	H	H	H	H	H	L	
MC OUT	O	IC401 ㉑	L	L	L	L	H	H	H	L	
PB OUT	O	IC401 ㉖	L	L	L	H	H	H	H	L	
$\overline{\text{A MUTE}}$	O	IC401 ㉙	H	H	H	H	L	L	L	H	

3-11. SYSTEM CONTROL—TIMER BLOCK INTERFACE

SIGNAL NAME	MODE I/O	MODE PIN No.	FUNCTION
$\overline{\text{CS}}$	O	IC401 ㉜	Chip select signal
S DATA ST	O	IC401 ㉝	Serial data (transmission)
S DATA TS	I	IC401 ㉞	Serial data (receiving)
S CLOCK	O	IC401 ㉟	Serial communication clock
$\overline{\text{RESET}}$	I	IC401 ㉛	System control reset signal

SLOW 1/5-1/30	SKIP SCAN	
	CUE	REVIEW
H	H	H
H	H	H
H	H	H
L	L	H
L	H	H
H	H	H
L	L	L
H	H	H
H	H	L
H	L	H
L	H	H
L	L	L
H*6	H	H
H*8	H	L
*10	L	L
CTL	CTL	CTL
L*15	L	L

*1. Pulse of 25 Hz (⎍)
*2. Duty 50% pulse of 25 Hz (⎍⎍)
*3. At "L" when the capstan inverse rotation brake
(During the transitional period of the CUE/REVIEW → PB, REC → REC•PAUSE, etc mode)
*4. At "H" during period of the REC•PAUSE → REC mode.
*5. The pulse of "L" during the transitional period of the PB•PAUSE → PB mode.
*6. The pulse of "L" during tape speed acceleration.
*7. The pulse of "L" during the transitional period of the PB → PB•PAUSE mode.
*8. The pulse of "L" during tape speed deceleration.
*9. The pulse of "H" during the transitional period of the ⇄ PB•PAUSE mode.
*10. The pulse of "H" during the tape forwarding (during STEP).
*11. Capstan FG signal input.
*12. (CTL)...No pulse input as the tape does not move.
*13. Duty 50% pulse of 25 Hz (⎍⎍)
*14. The pulse "H" during the transitional period of the PB → STILL mode.
*15. The pulse of "H" during tape steed deceleration.

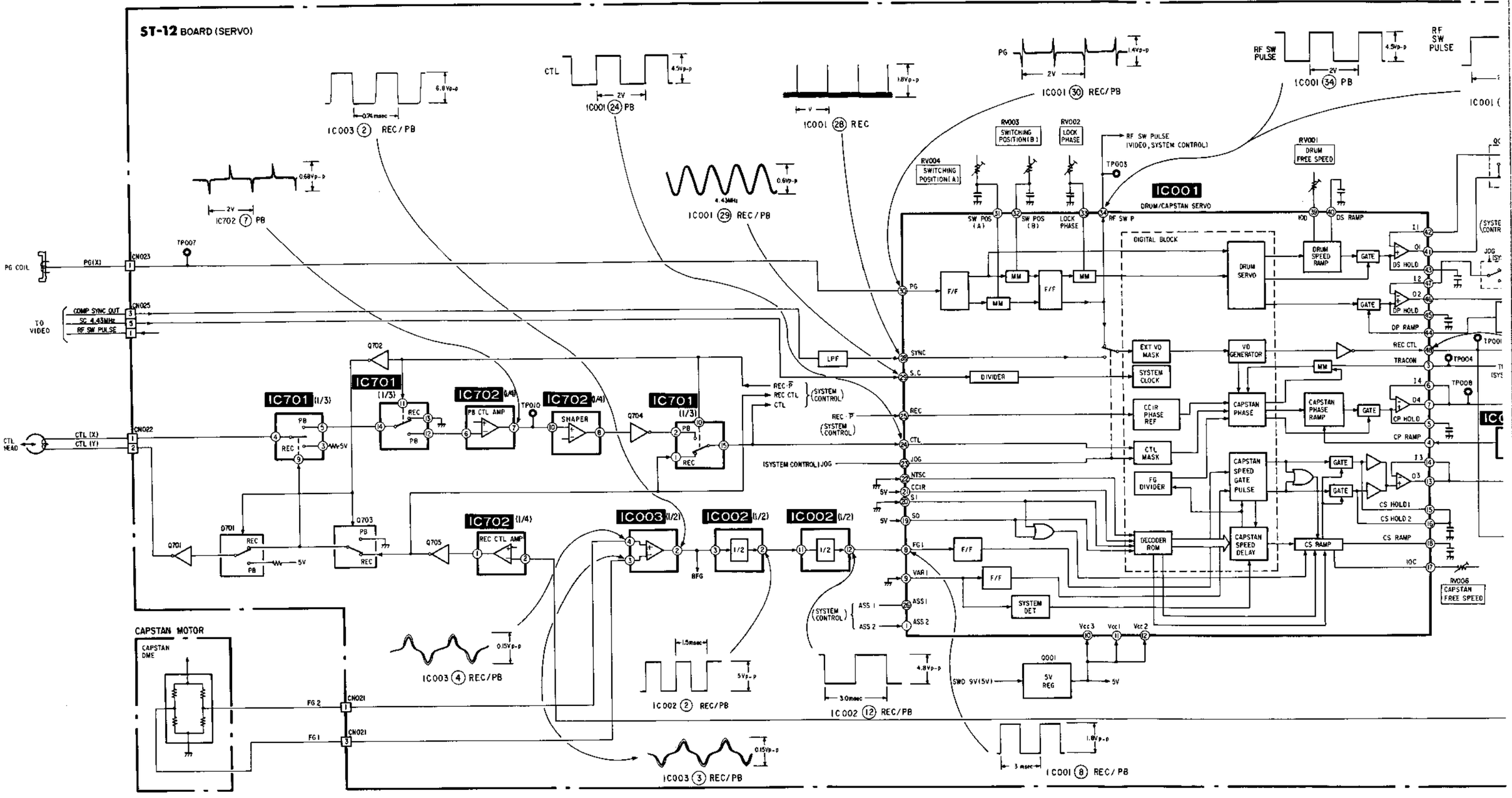
3-10. SYSTEM CONTROL—AUDIO CIRCUIT INTERFACE

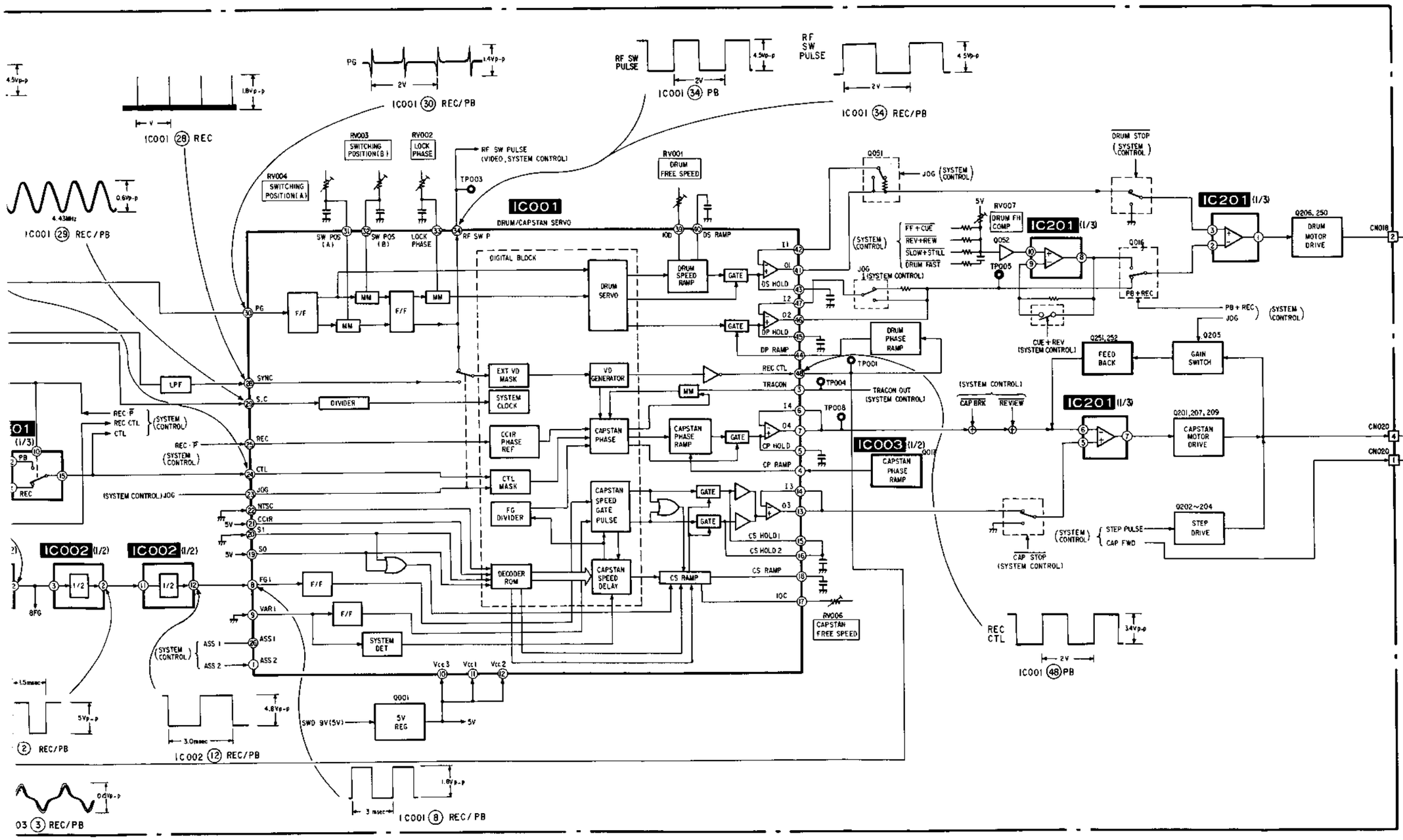
SIGNAL NAME	MODE I/O	MODE PIN No.	STOP	FF	REW	PB	PB• PAUSE (STILL)	BETA SCAN CUE	BETA SCAN REVIEW	REC	REC• PAUSE	SLOW 1/5-1/30	SKIP SCAN CUE	SKIP SCAN REVIEW
$\overline{\text{REC•PAUSE}}$	O	IC401 ㉘	H	H	H	H	H	H	H	L	H	H	H	H
MC OUT	O	IC401 ㉑	L	L	L	L	H	H	H	L	L	H	H	H
PB OUT	O	IC401 ㉙	L	L	L	H	H	H	H	L	L	H	H	H
$\overline{\text{A MUTE}}$	O	IC401 ㉙	H	H	H	H	L	L	L	H	H	L	L	L

3-11. SYSTEM CONTROL—TIMER BLOCK INTERFACE

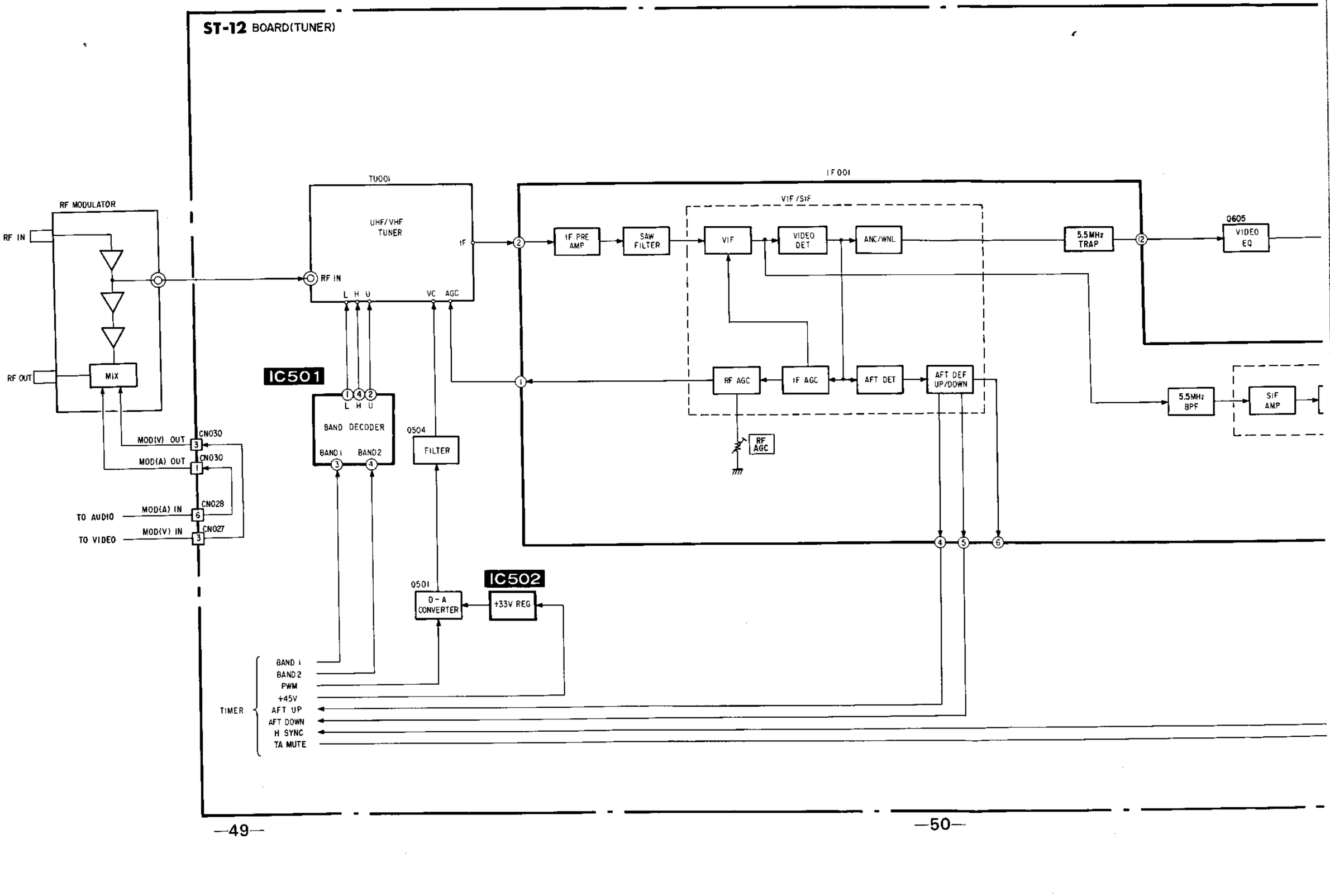
SIGNAL NAME	MODE I/O	MODE PIN No.	FUNCTION
$\overline{\text{CS}}$	O	IC401 ㉜	Chip select signal
S DATA ST	O	IC401 ㉝	Serial data (transmission)
S DATA TS	I	IC401 ㉞	Serial data (receiving)
S CLOCK	O	IC401 ㉟	Serial communication clock
$\overline{\text{RESET}}$	I	IC401 ㊱	System control reset signal

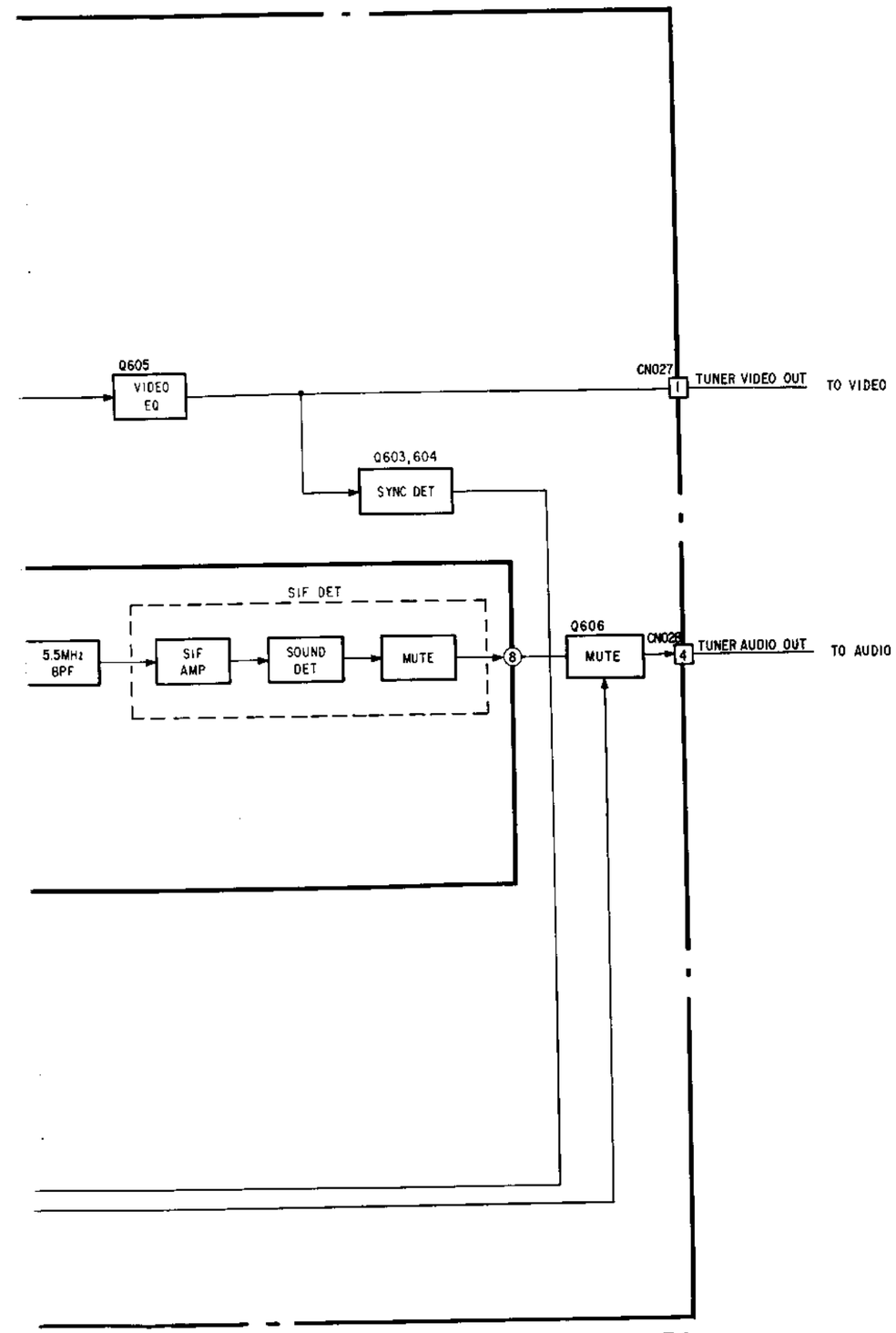
3-12. SERVO BLOCK DIAGRAM



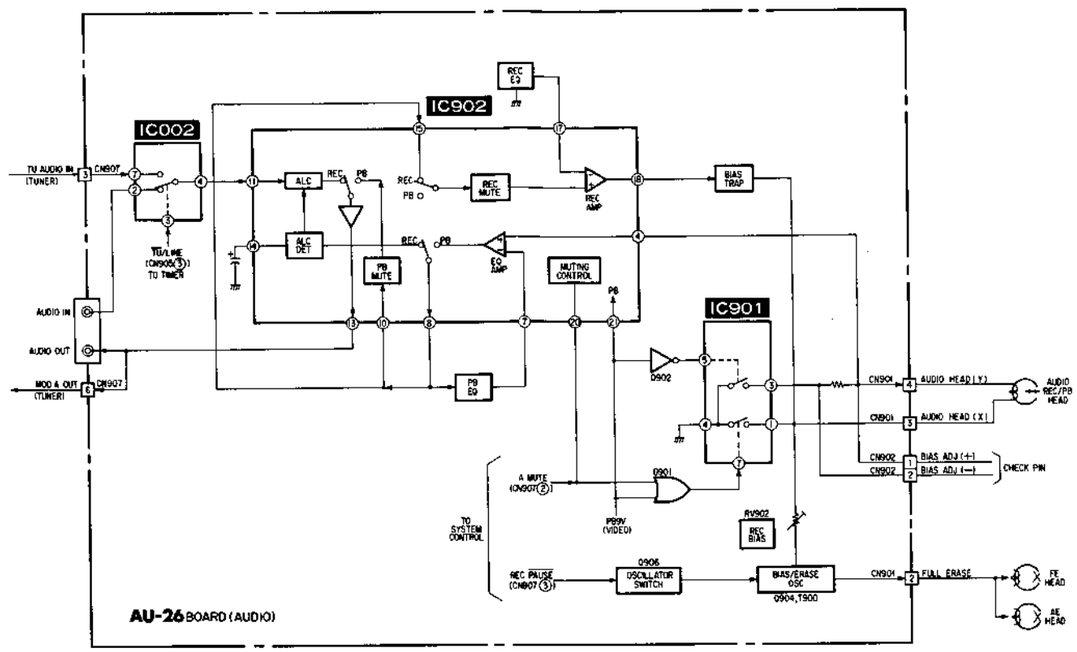

IC001 (28) REC
IC001 (30) REC/PB
IC001 (34) PB
IC001 (34) REC/PB
IC001 (29) REC/PB
IC001
DRUM/CAPSTAN SERVO
RV003 SWITCHING POSITION(B)
RV002 LOCK PHASE
RV004 SWITCHING POSITION(A)
RV001 DRUM FREE SPEED
RF SW PULSE (VIDEO, SYSTEM CONTROL)
DIGITAL BLOCK
DRUM SERVO
DRUM SPEED RAMP
DRUM PHASE RAMP
CAPSTAN PHASE
CAPSTAN PHASE RAMP
CAPSTAN SPEED GATE PULSE
CAPSTAN SPEED DELAY
CS RAMP
DECODER ROM
FG DIVIDER
CTL MASK
EXT VD MASK
VD GENERATOR
SYSTEM CLOCK
CCIR PHASE REF
SYSTEM DET
DIVIDER
LPF
F/F
MM
GATE
IC003 (1/2)
IC002 (1/2)
IC002 (1/2)
8FG
5V REG
Q001
RV006 CAPSTAN FREE SPEED
IC201 (1/3)
IC201 (1/3)
IC201 (1/3)
DRUM MOTOR DRIVE
DRUM FH COMP
DRUM STOP (SYSTEM CONTROL)
JOG (SYSTEM CONTROL)
FF+CUE
REV+REW
SLOW+STILL
DRUM FAST
PB+REC
CUE+REV (SYSTEM CONTROL)
FEED BACK
GAIN SWITCH
CAPSTAN MOTOR DRIVE
CAP BRK
REVIEW
TRACON OUT (SYSTEM CONTROL)
CAP STOP (SYSTEM CONTROL)
STEP DRIVE
STEP PULSE
CAP FWD
DRUM ERROR
CAP ERROR
CAP REV
M901 DRUM MOTOR
M902 CAPSTAN MOTOR
REC CTL
IC001 (48) PB
IC002 (12) REC/PB
IC001 (8) REC/PB
03 (3) REC/PB
(2) REC/PB

3-13. TUNER BLOCK DIAGRAM





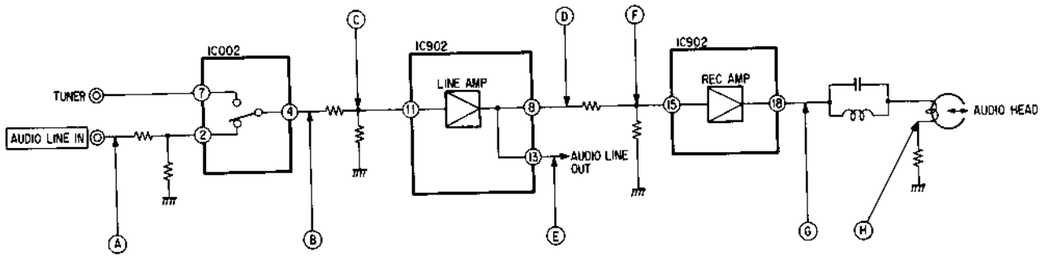
3-14. AUDIO BLOCK DIAGRAM

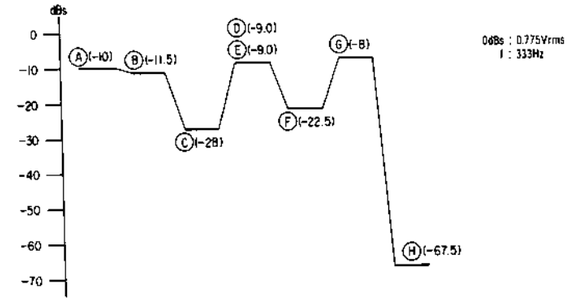


3-15. AUDIO LEVEL DIAGRAM

—Recording system—

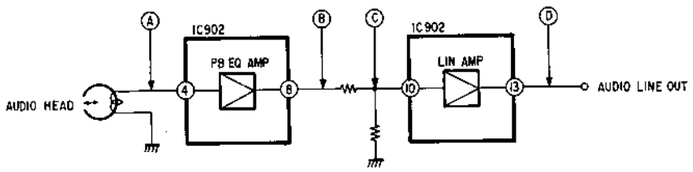
AU-26 BOARD

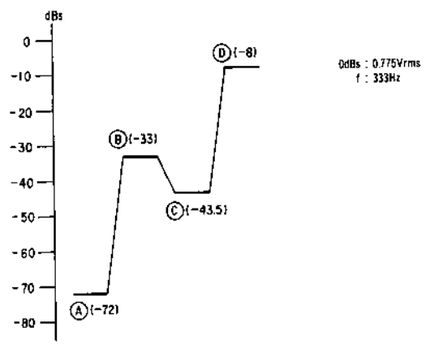




—Playback system—

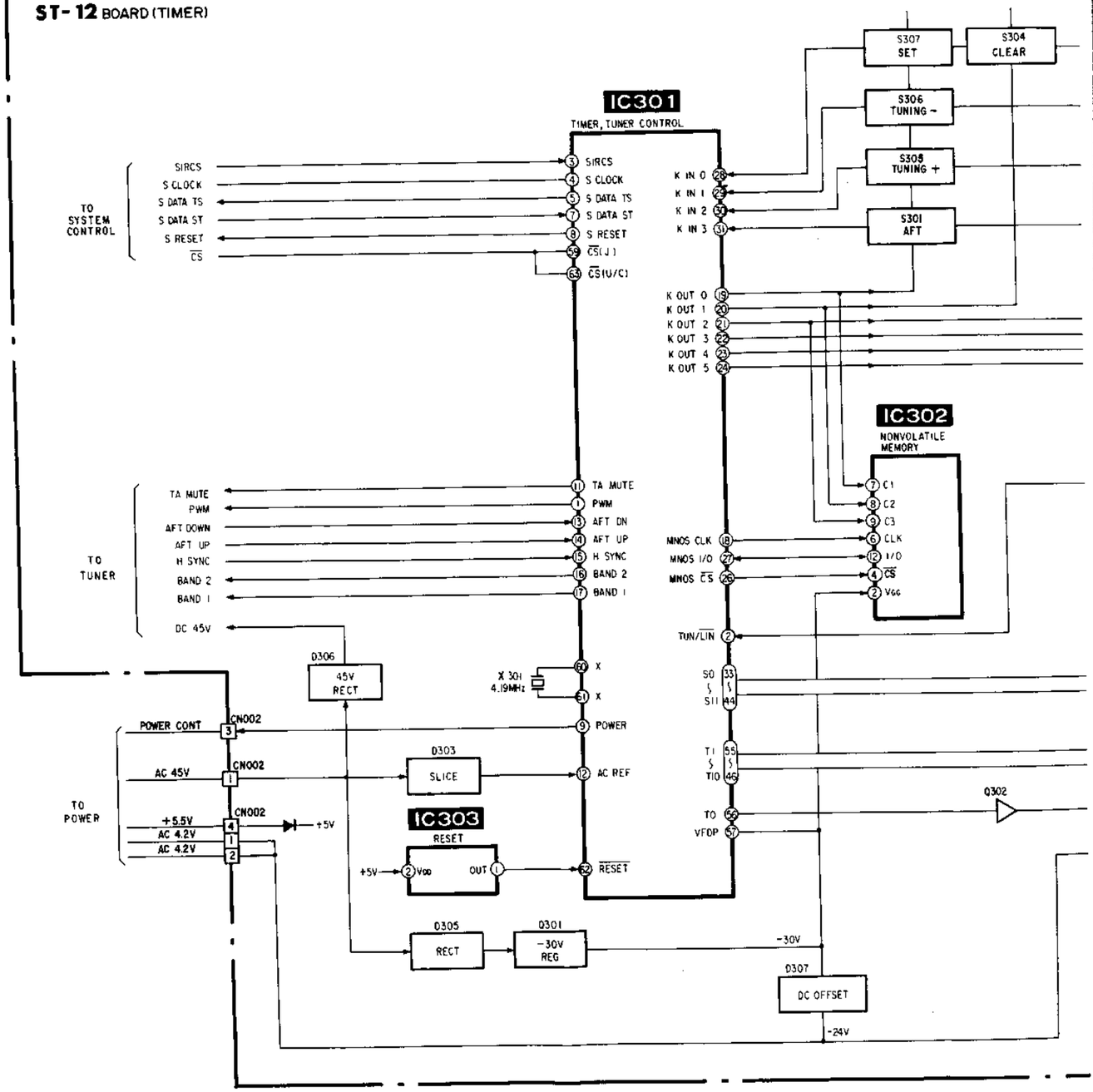
AU-26 BOARD

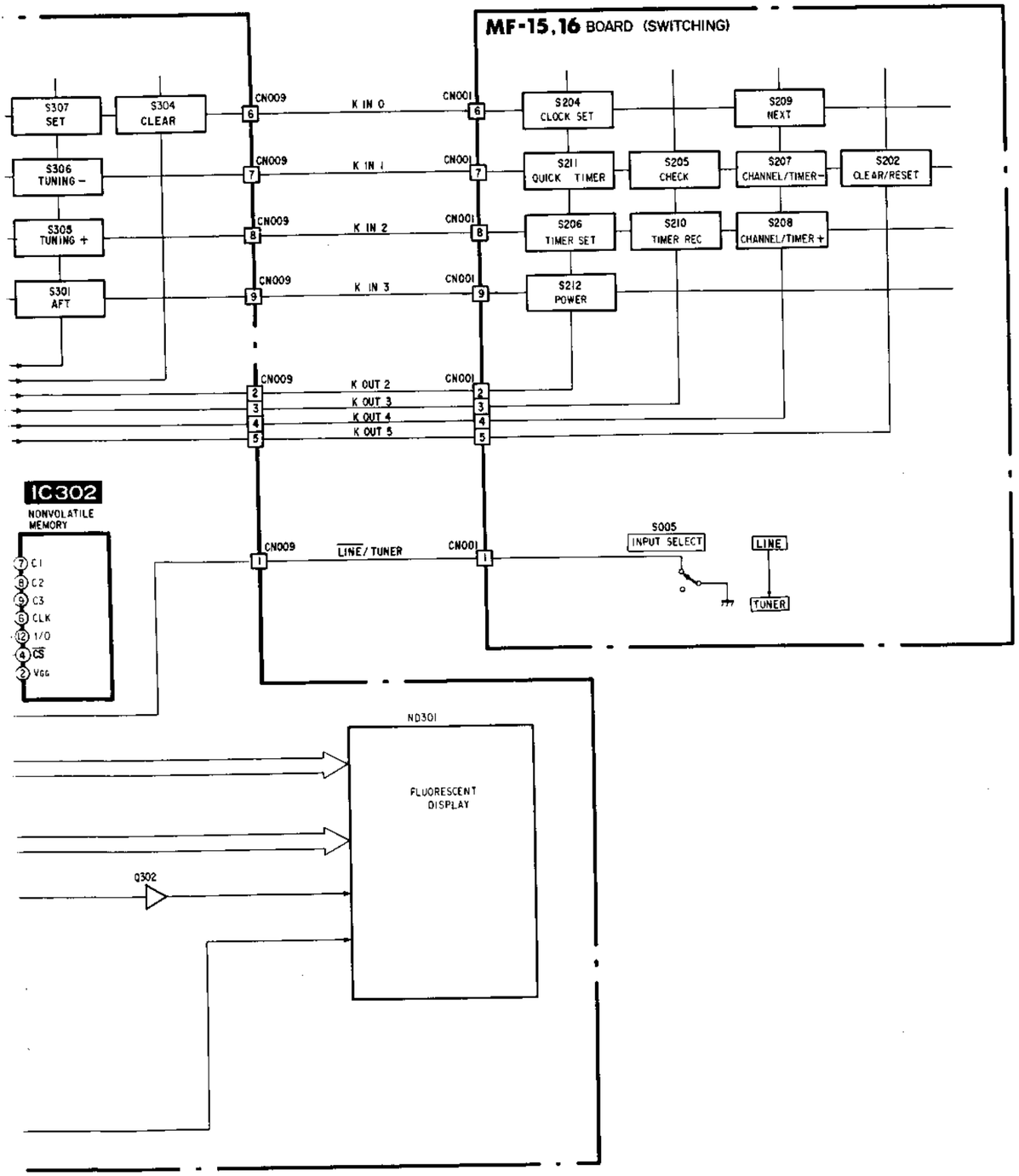




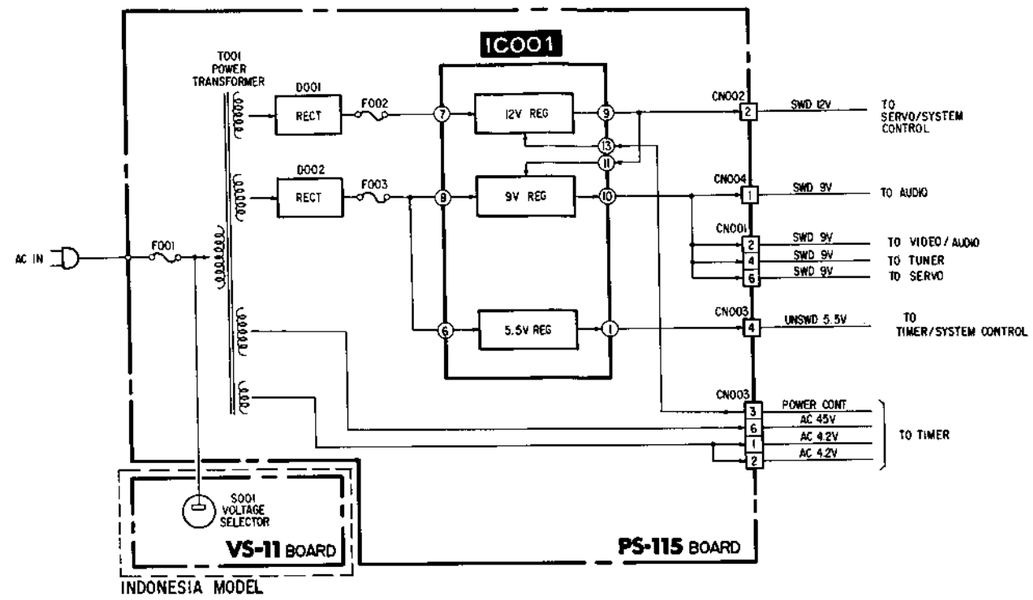
3-16. TIMER BLOCK DIAGRAM

ST-12 BOARD (TIMER)



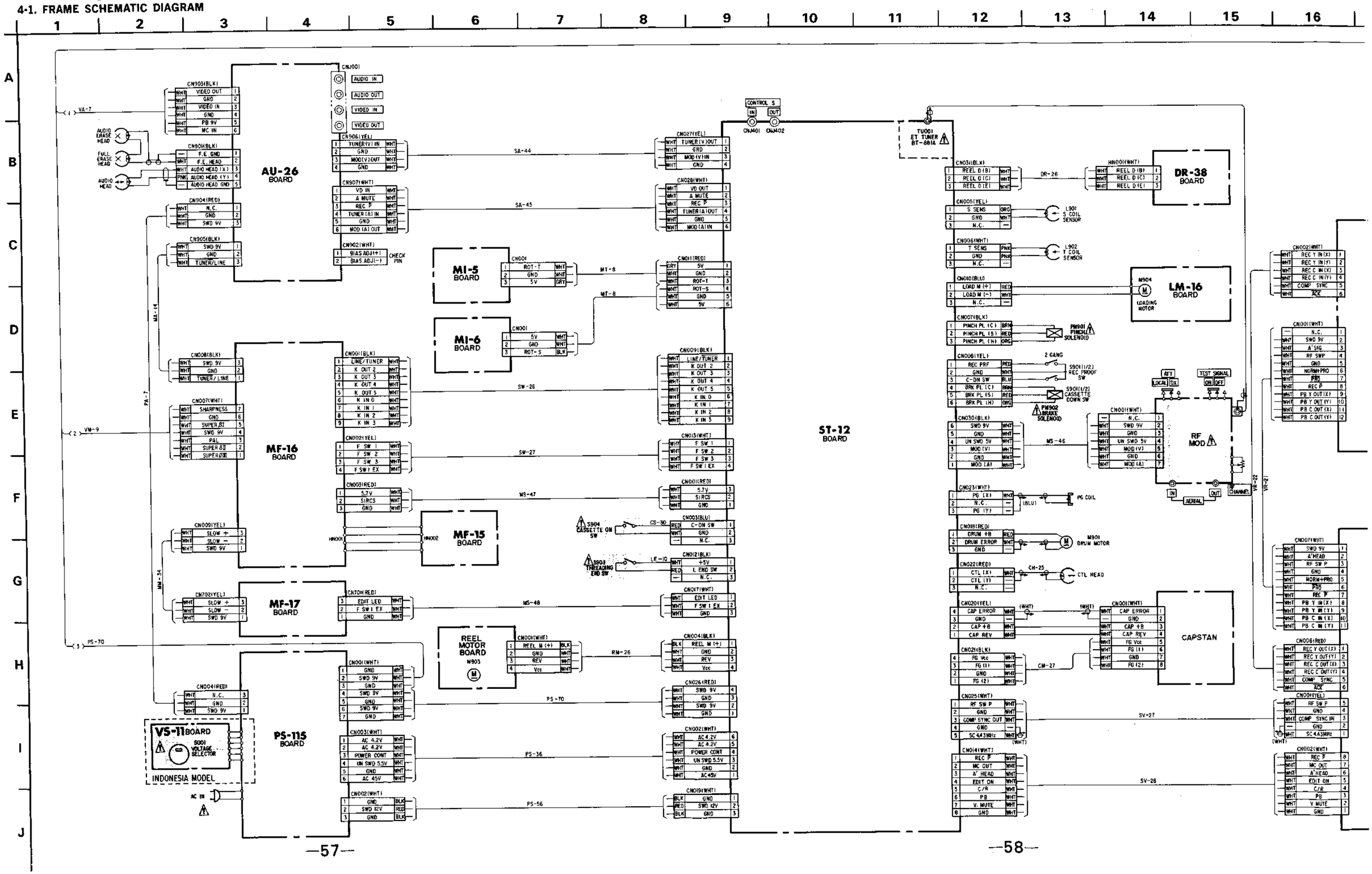


3-17. POWER BLOCK DIAGRAM



SECTION 4
SCHEMATIC DIAGRAM AND PRINTED WIRING BOARDS

4-1. FRAME SCHEMATIC DIAGRAM



8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

A B C D E F G H I J

CONTROL S
IN OUT
CNJ401 CNJ402

TU001
ET TUNER
BT-881A ⚠

CN027(YEL)
WHT TUNER (V) OUT 1
WHT GND 2
WHT MOD (V) IN 3
WHT GND 4

CN028(WHT)
WHT VD OUT 1
WHT A MUTE 2
WHT REC P 3
WHT TUNER (A) OUT 4
WHT GND 5
WHT MOD (A) IN 6

CN011(RED)
GRY 5V 1
WHT GND 2
WHT ROT-T 3
WHT ROT-S 4
WHT GND 5
WHT 5V 6

MT-8
MT-8

CN009(BLK)
WHT LINE/TUNER 1
WHT K OUT 2 2
WHT K OUT 3 3
WHT K OUT 4 4
WHT K OUT 5 5
WHT K IN 0 6
WHT K IN 1 7
WHT K IN 2 8
WHT K IN 3 9

CN013(WHT)
WHT F SW 1 1
WHT F SW 2 2
WHT F SW 3 3
WHT F SW 1 EX 4

CN001(RED)
WHT 5.7V 1
WHT SIRCS 2
WHT GND 3

CS-30
CN003(BLU)
RED C-ON SW 1
WHT GND 2
--- N.C. 3

LE-10
CN012(BLK)
WHT +5V 1
RED L END SW 2
--- N.C. 3

CN017(WHT)
WHT EDIT LED 1
WHT F SW 1 EX 2
WHT GND 3

RM-26
CN004(BLK)
BLK REEL M (+) 1
WHT GND 2
WHT REV 3
WHT Vcc 4

CN026(RED)
WHT SWD 9V 4
WHT GND 3
WHT SWD 9V 2
WHT GND 1

CN002(WHT)
WHT AC 4.2V 6
WHT AC 4.2V 5
WHT POWER CONT 4
WHT UN SWD 5.5V 3
WHT GND 2
WHT AC 45V 1

CN019(WHT)
BLK GND 1
RED SWD 12V 2
BLK GND 3

ST-12
BOARD

CN031(BLK)
1 REEL D (B) WHT
2 REEL D (C) WHT
3 REEL D (E) WHT
DR-26
CN001(WHT)
WHT REEL D (B) 1
WHT REEL D (C) 2
WHT REEL D (E) 3
DR-38
BOARD

CN005(YEL)
1 S SENS ORG
2 GND WHT
3 N.C. ---
L901
S COIL
SENSOR

CN006(WHT)
1 T SENS PNK
2 GND PNK
3 N.C. ---
L902
T COIL
SENSOR

CN010(BLU)
1 LOAD M (+) RED
2 LOAD M (-) WHT
3 N.C. ---
M904
LOADING MOTOR
LM-16
BOARD

CN007(BLK)
1 PINCH PL (C) BRN
2 PINCH PL (S) RED
3 PINCH PL (H) ORG
PM901
PINCH
SOLENOID ⚠

CN008(YEL)
1 REC PRF RED
2 GND WHT
3 C-DN SW BLU
4 BRK PL (C) BRN
5 BRK PL (S) RED
6 BRK PL (H) ORG
2 GANG
S901(1/2)
REC PROOF SW
S901(1/2)
CASSETTE DOWN SW
PM902
BRAKE
SOLENOID ⚠

CN030(BLK)
6 SWD 9V WHT
5 GND WHT
4 UN SWD 5V WHT
3 MOD (V) WHT
2 GND WHT
1 MOD (A) WHT
MS-46
CN001(WHT)
--- N.C. 1
WHT SWD 9V 2
WHT GND 3
WHT UN SWD 5V 4
WHT MOD (V) 5
WHT GND 6
WHT MOD (A) 7

ATT
LOCAL DX
TEST SIGNAL
ON OFF
RF MOD ⚠
IN AERIAL OUT CHANNEL
VR-22
VR-21

CN023(WHT)
1 PG (X) WHT
2 N.C. ---
3 PG (Y) ---
(BLU)
PG COIL

CN018(RED)
1 DRUM +B RED
2 DRUM ERROR WHT
3 GND ---
M901
DRUM MOTOR

CN022(RED)
1 CTL (X) WHT
2 CTL (Y) ---
3 N.C. ---
CH-25
CTL HEAD

CN020(YEL)
4 CAP ERROR WHT
3 GND ---
2 CAP +B WHT
1 CAP REV WHT
(WHT)
(WHT)
CN001(WHT)
WHT CAP ERROR 1
--- GND 2
WHT CAP +B 3
WHT CAP REV 4
WHT FG Vcc 5
WHT FG (1) 6
WHT GND 7
WHT FG (2) 8
CAPSTAN

CN021(BLK)
4 FG Vcc WHT
3 FG (1) WHT
2 GND WHT
1 FG (2) WHT
CM-27

CN025(WHT)
1 RF SW P WHT
2 GND WHT
3 COMP SYNC OUT WHT
4 GND ---
5 SC 4.43MHz WHT
(WHT)
SV-27

CN014(WHT)
1 REC P WHT
2 MC OUT WHT
3 A' HEAD WHT
4 EDIT ON WHT
5 C/R WHT
6 PB WHT
7 V. MUTE WHT
8 GND WHT
SV-28

CN002(WHT)
WHT REC Y IN (X) 1
WHT REC Y IN (Y) 2
WHT REC C IN (X) 3
WHT REC C IN (Y) 4
WHT COMP SYNC 5
WHT ACK 6

CN001(WHT)
--- N.C. 1
WHT SWD 9V 2
WHT A'SIG 3
WHT RF SWP 4
WHT GND 5
WHT NORM+PRO 6
WHT PRO 7
WHT REC P 8
WHT PB Y OUT (X) 9
WHT PB Y OUT (Y) 10
WHT PB C OUT (X) 11
WHT PB C OUT (Y) 12
RP-41
BOARD

CN003(WHT)
3 REC CURR
2 GND
1 C REC CURR
CHECK PIN

CN005(WHT)
5 RF SWP (1)
4 GND
3 RF OUT
2 RF SWP (2)
1 A'SIG
CHECK PIN

CN004(BLK)
10 N.C. ---
9 VH A' (Z) ---
8 VH A' (Y) PNK
7 VH A' (X) WHT
6 VH B (Z) ---
5 VH B (Y) WHT
4 VH B (X) PNK
3 VH A (Z) ---
2 VH A (Y) PNK
1 VH A (X) WHT
(YEL) A'-CH
(RED) B-CH
(BLK) A-CH
VIDEO HEAD

CN007(WHT)
WHT SWD 9V 1
WHT A'HEAD 2
WHT RF SW P 3
WHT GND 4
WHT NORM+PRO 5
WHT PRO 6
WHT REC P 7
WHT PB Y IN (X) 8
WHT PB Y IN (Y) 9
WHT PB C IN (X) 10
WHT PB C IN (Y) 11

CN006(RED)
WHT REC Y OUT (X) 1
WHT REC Y OUT (Y) 2
WHT REC C OUT (X) 3
WHT REC C OUT (Y) 4
WHT COMP SYNC 5
WHT ACK 6

CN001(YEL)
WHT RF SW P 5
WHT GND 4
WHT COMP SYNC IN 3
--- GND 2
WHT SC 4.43MHz 1
(WHT)

CN002(WHT)
WHT REC P 8
WHT MC OUT 7
WHT A'HEAD 6
WHT EDIT ON 5
WHT C/R 4
WHT PB 3
WHT V MUTE 2
WHT GND 1

VI-23
BOARD

CN005(BLK)
1 VIDEO IN WHT
2 GND WHT
3 VIDEO OUT WHT
4 GND WHT
5 PB 9V WHT
6 MC OUT WHT
VA-7
(1)

CN004(WHT)
1 SHARPNESS WHT
2 GND WHT
3 NORM WHT
4 SWD 9V WHT
5 PAL WHT
6 STD WHT
7 PRO WHT
VM-9
(2)

CN003(WHT)
1 GND WHT
2 SWD 9V WHT
3 GND WHT
PS-70
(3)

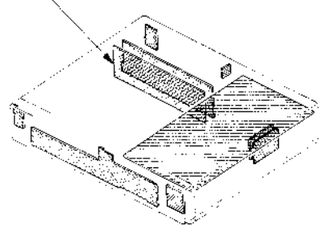
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM

Note:

- ○— : indicates a lead wire mounted on the component side.
- : soldering side.
- : B+ Pattern.

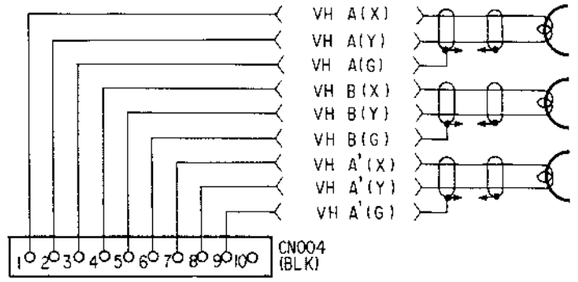
RP-41 (Head AMP)

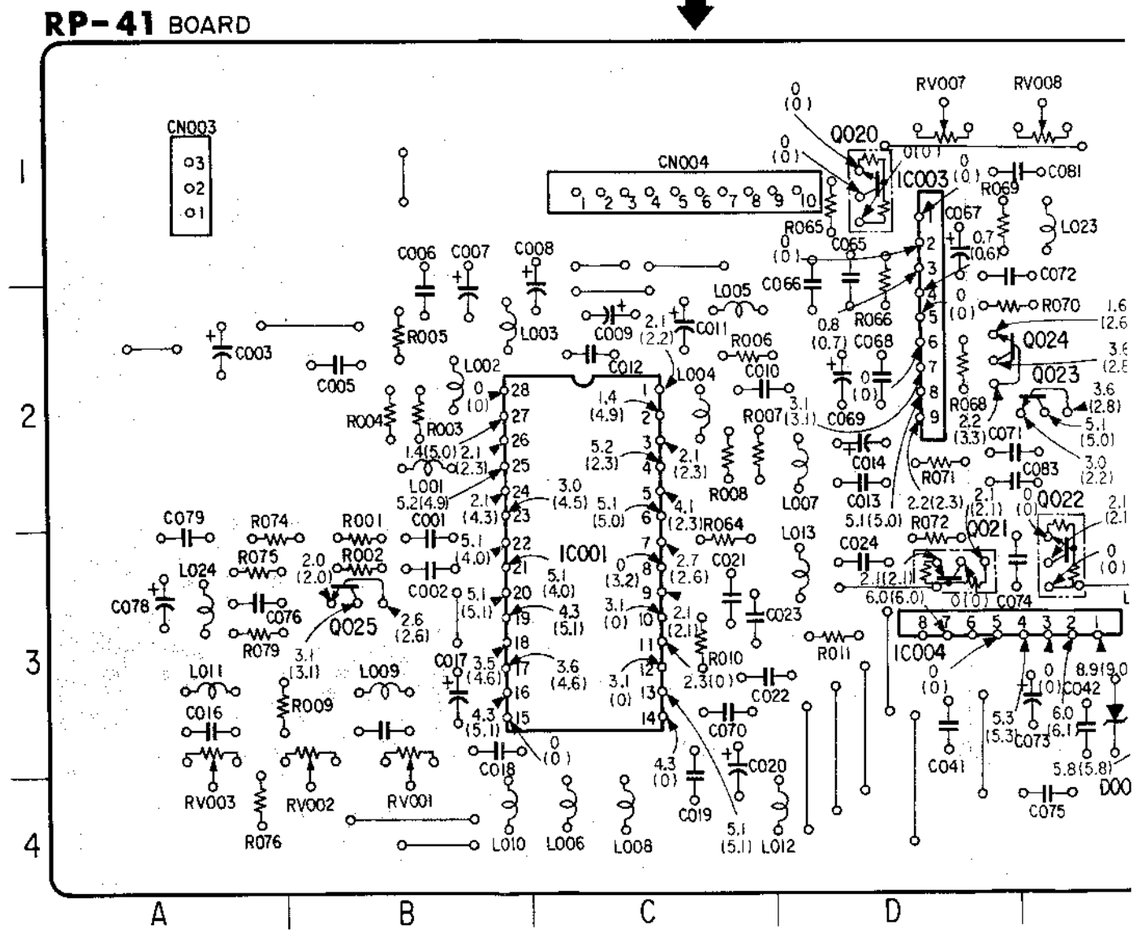


RP-41(HEAD AMP) PRINTED WIRING BOARD

—Ref. No. RP-41 BOARD : 2,000 series—

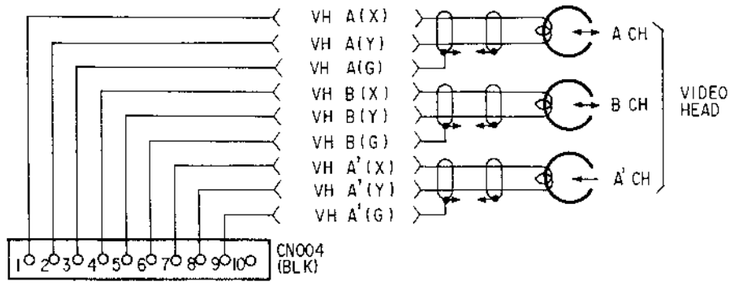
D001	F-2
D002	F-2
D003	E-3
D004	H-3
D005	H-3
D006	G-2
IC001	C-3
IC002	F-3
IC003	D-2
IC004	D-3
Q001	F-3
Q002	F-2
Q003	E-3
Q004	H-2
Q005	H-2
Q006	H-2
Q007	H-1
Q008	H-3
Q010	G-3
Q011	H-3
Q012	H-3
Q013	G-1
Q014	G-1
Q015	G-2
Q016	G-2
Q017	G-2
Q018	G-2
Q019	G-2
Q020	D-1
Q021	D-3
Q022	E-3
Q023	E-2
Q024	D-2
Q025	B-3
RV001	A-3
RV002	B-3
RV003	B-3
RV004	H-4
RV005	H-4
RV006	G-1
RV007	D-1
RV008	E-1





DIAGRAM

RP-41(HEAD AMP) PRINTED WIRING BOARD
—Ref. No. RP-41 BOARD : 2,000 series—



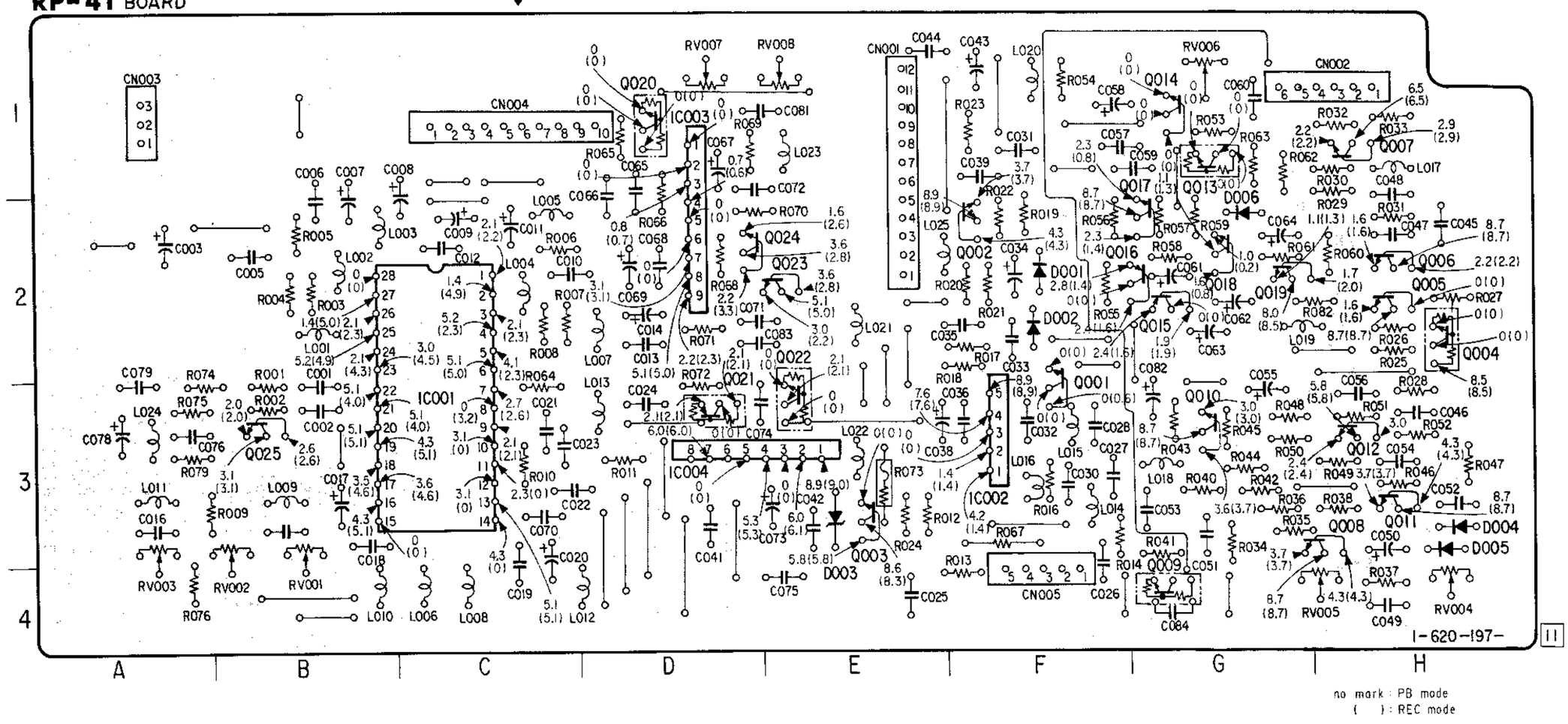
RP-41 BOARD

D001 F-2
D002 F-2
D003 E-3
D004 H-3
D005 H-3
D006 G-2

IC001 C-3
IC002 F-3
IC003 D-2
IC004 D-3

Q001 F-3
Q002 F-2
Q003 E-3
Q004 H-2
Q005 H-2
Q006 H-2
Q007 H-1
Q008 H-3
Q010 G-3
Q011 H-3
Q012 H-3
Q013 G-1
Q014 G-1
Q015 G-2
Q016 G-2
Q017 G-2
Q018 G-2
Q019 G-2
Q020 D-1
Q021 D-3
Q022 E-3
Q023 E-2
Q024 D-2
Q025 B-3

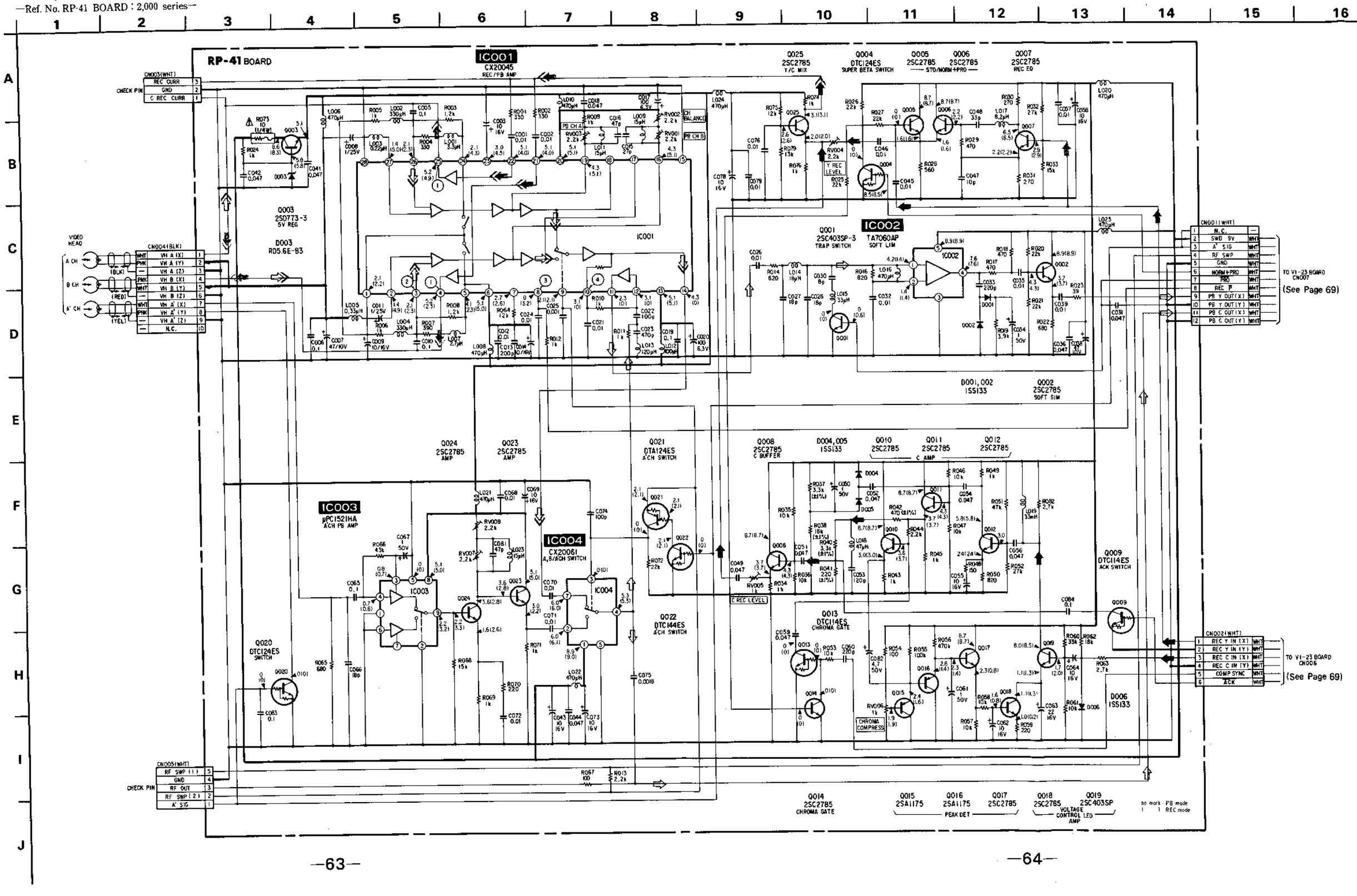
RV001 A-3
RV002 B-3
RV003 B-3
RV004 H-4
RV005 H-4
RV006 G-1
RV007 D-1
RV008 E-1

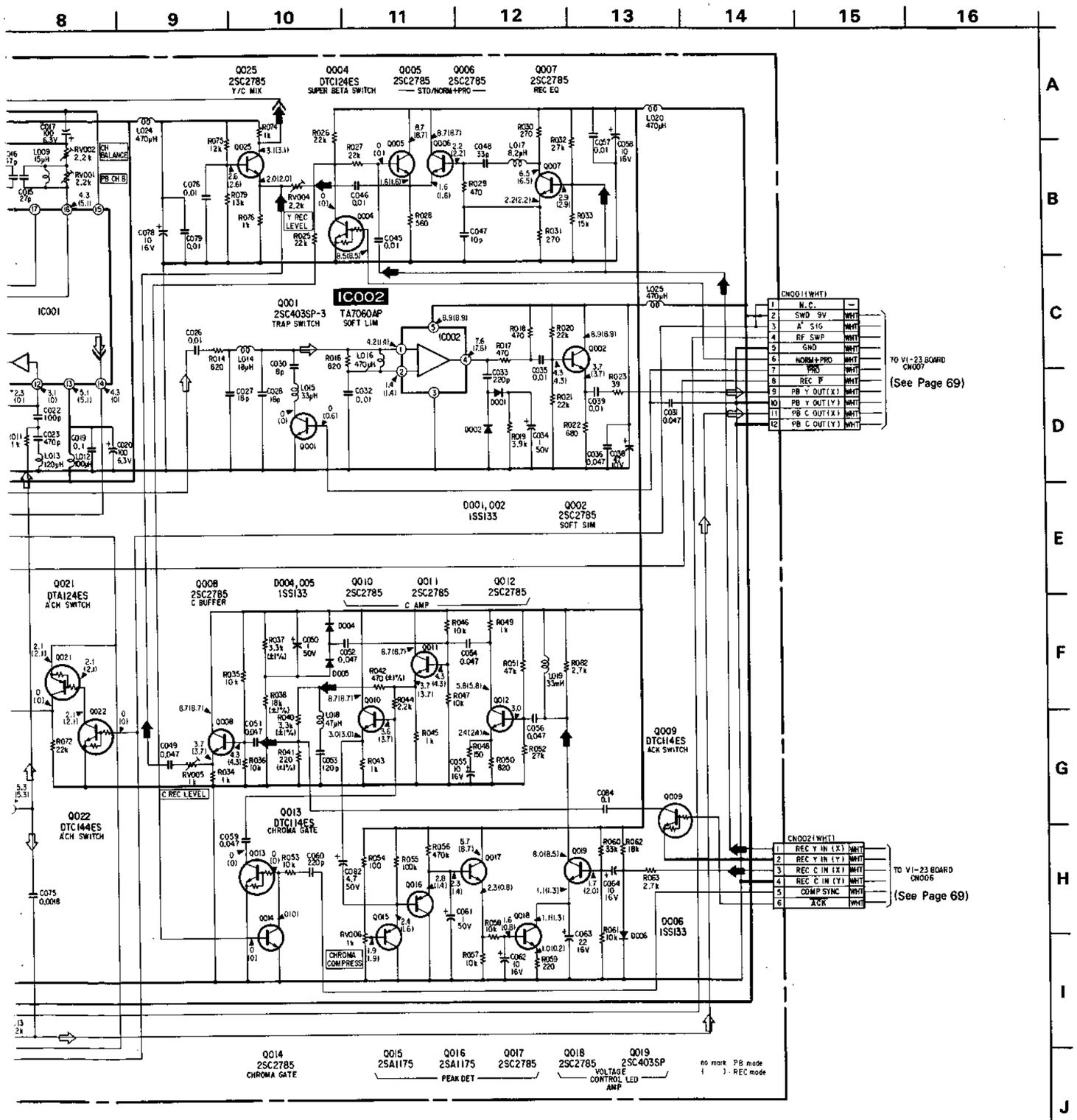


no mark : PB mode
( ) : REC mode

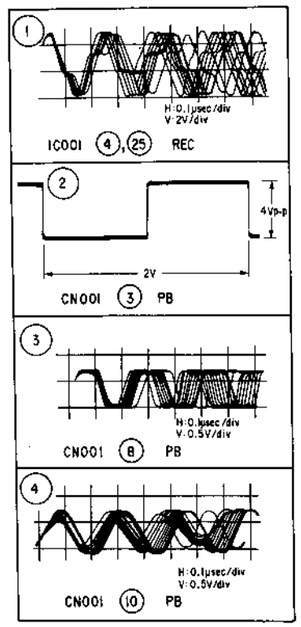
RP-41 (HEAD AMP) SCHEMATIC DIAGRAM

—Ref. No. RP-41 BOARD : 2,000 series—





RP-41 BOARD



Note:

- All resistors are in ohms, 1/6W unless otherwise noted. kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics. and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- △ : internal component.
- : adjustment for repair.
- : B + bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.

When indicating parts by reference number, please include the board name.

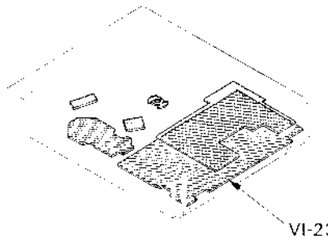
- **Signal path**
  - : REC Y Signal
  - : PB Y Signal
  - : REC CHROMA Signal
  - : PB CHROMA Signal
  - : REC Y/CHROMA Signal
  - : PB Y/CHROMA Signal

VI-23(VIDEO) PRINTED WIRING BOARD

—Ref. No. 3,000 series—

Note:

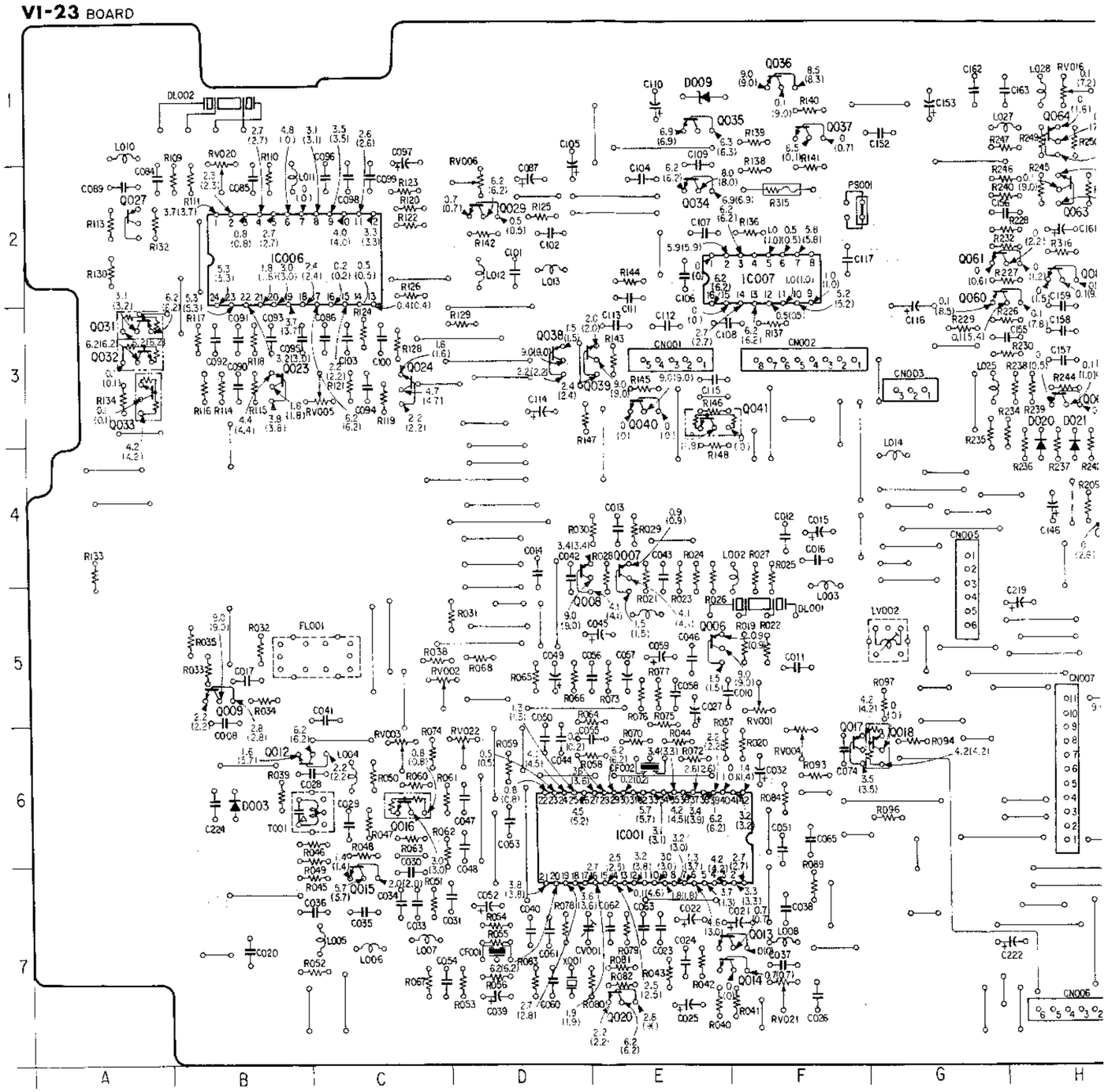
- ⊱— : indicates a lead wire mounted on the component side.
- : Pattern from the side which enables seeing.
- : B+ pattern from the side which enables seeing.



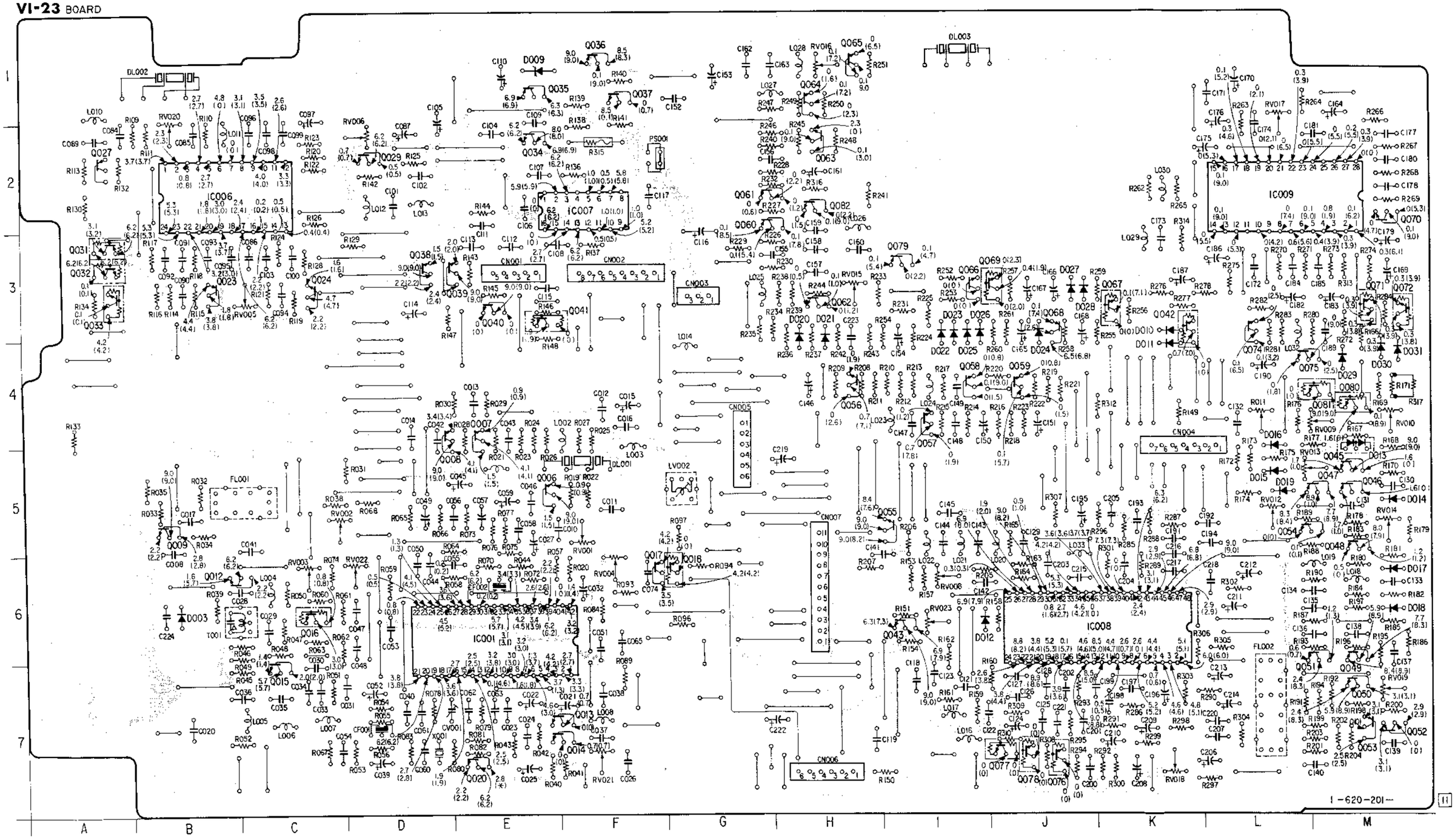
VI-23 (Video)

CV001	D-7	Q074	L-3		
		Q075	L-4		
D003	B-6	Q076	J-7		
D009	E-1	Q077	J-7		
D010	K-3	Q078	J-7		
D011	K-4	Q079	I-3		
D012	I-6	Q080	M-4		
D013	M-5	Q081	M-4		
D014	M-5	Q082	H-2		
D015	L-5				
D016	L-5	RV001	F-5		
D017	M-6	RV002	C-5		
D018	M-6	RV003	C-6		
D019	L-5	RV004	F-6		
D020	H-3	RV005	C-3		
D021	H-3	RV006	D-2		
D022	I-3	RV008	I-6		
D023	I-3	RV009	M-4		
D024	J-3	RV010	M-4		
D025	I-3	RV011	L-4		
D026	I-3	RV012	L-5		
D027	J-3	RV013	L-5		
D028	J-3	RV014	M-5		
D029	M-4	RV015	H-3		
D030	M-4	RV016	H-1		
D031	M-4	RV017	L-1		
		RV018	K-7		
IC001	E-6	RV019	M-7		
IC006	B-2	RV020	B-3		
IC007	F-2	RV021	F-7		
IC008	K-6	RV022	D-6		
IC009	L-2	RV023	I-6		
LV002	G-5				
Q006	E-5				
Q007	E-4				
Q008	E-4				
Q009	B-5				
Q012	C-6				
Q013	D-7				
Q014	D-7				
Q015	C-7				
Q016	C-6				
Q017	F-6				
Q018	G-6				
Q020	E-7				
Q023	B-3				
Q024	C-3				
Q027	A-2				
Q029	D-2				
Q031	A-3				
Q032	A-3				
Q033	A-3				
Q034	E-2				
Q035	E-1				
Q036	F-1				
Q037	F-1				
Q038	D-3				
Q039	E-3				
Q040	E-3				
Q041	E-3				
Q042	K-3				
Q043	I-6				
Q045	M-5				
Q046	M-5				
Q047	M-5				
Q048	M-6				
Q049	M-7				
Q050	M-7				
Q051	M-7				
Q052	M-7				
Q053	M-7				
Q054	L-5				
Q055	I-5				
Q056	H-4				
Q057	I-4				
Q058	I-4				
Q059	J-4				
Q060	G-2				
Q061	G-2				
Q062	H-3				
Q063	H-2				
Q064	H-1				
Q065	H-1				
Q066	I-3				
Q067	K-3				
Q068	J-3				
Q069	J-3				
Q070	M-2				
Q071	M-3				
Q072	M-3				

VI-23 BOARD



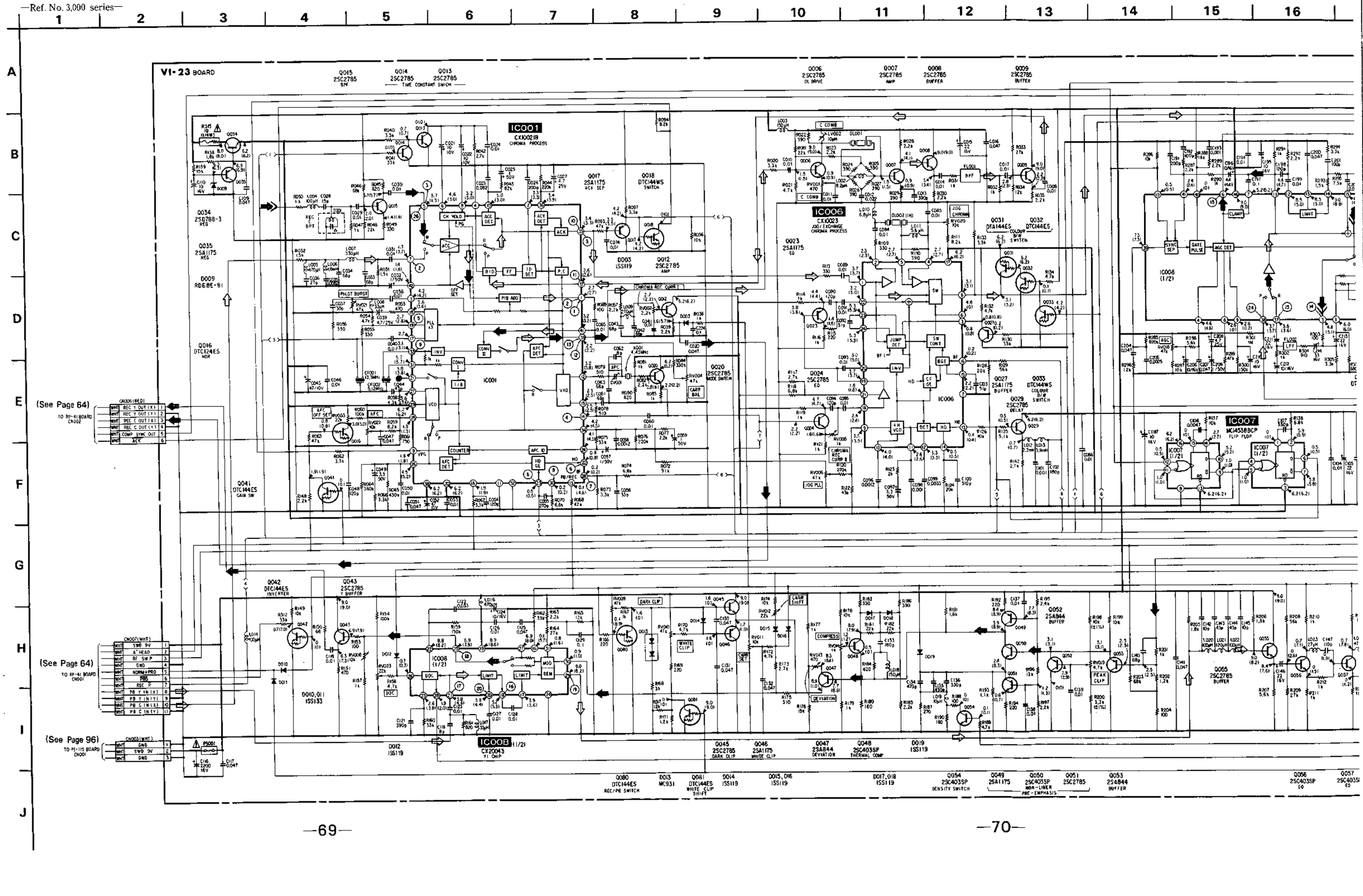
VI-23 BOARD

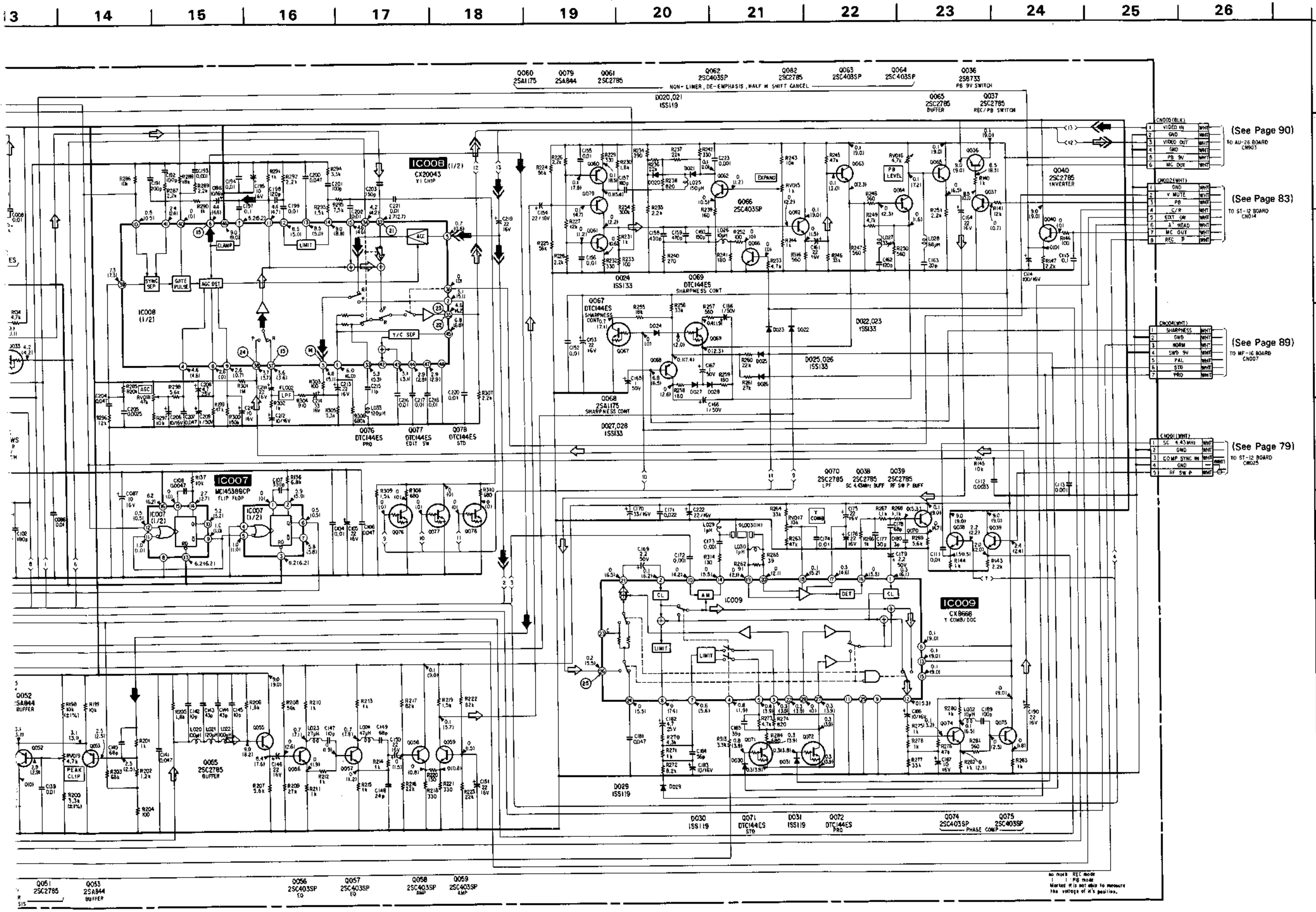


no mark : REC mode
( ) : PB mode
Marked * is not able to measure the voltage of it's position.

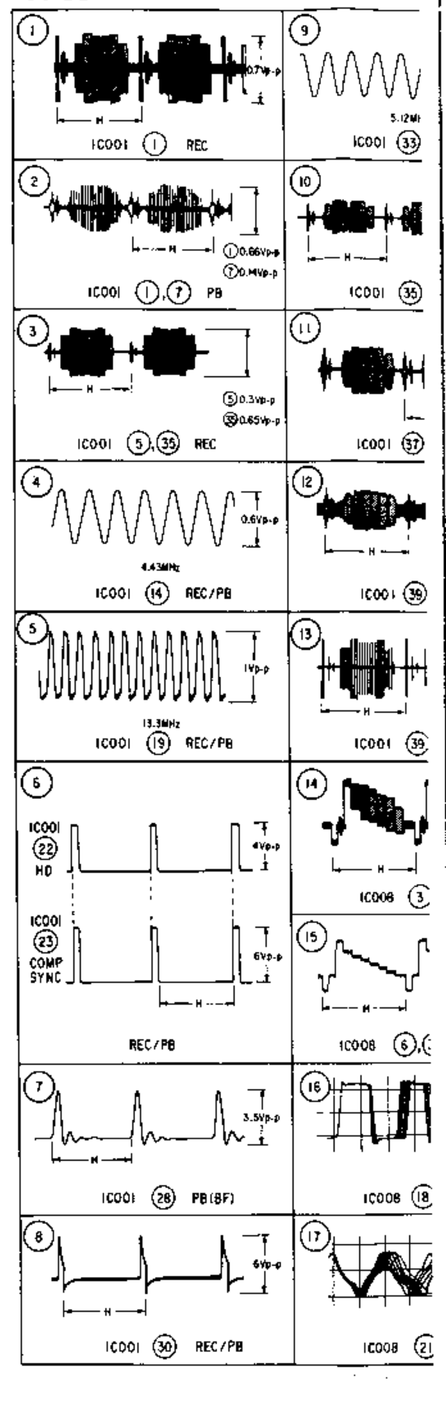
VI-23(VIDEO) SCHEMATIC DIAGRAM

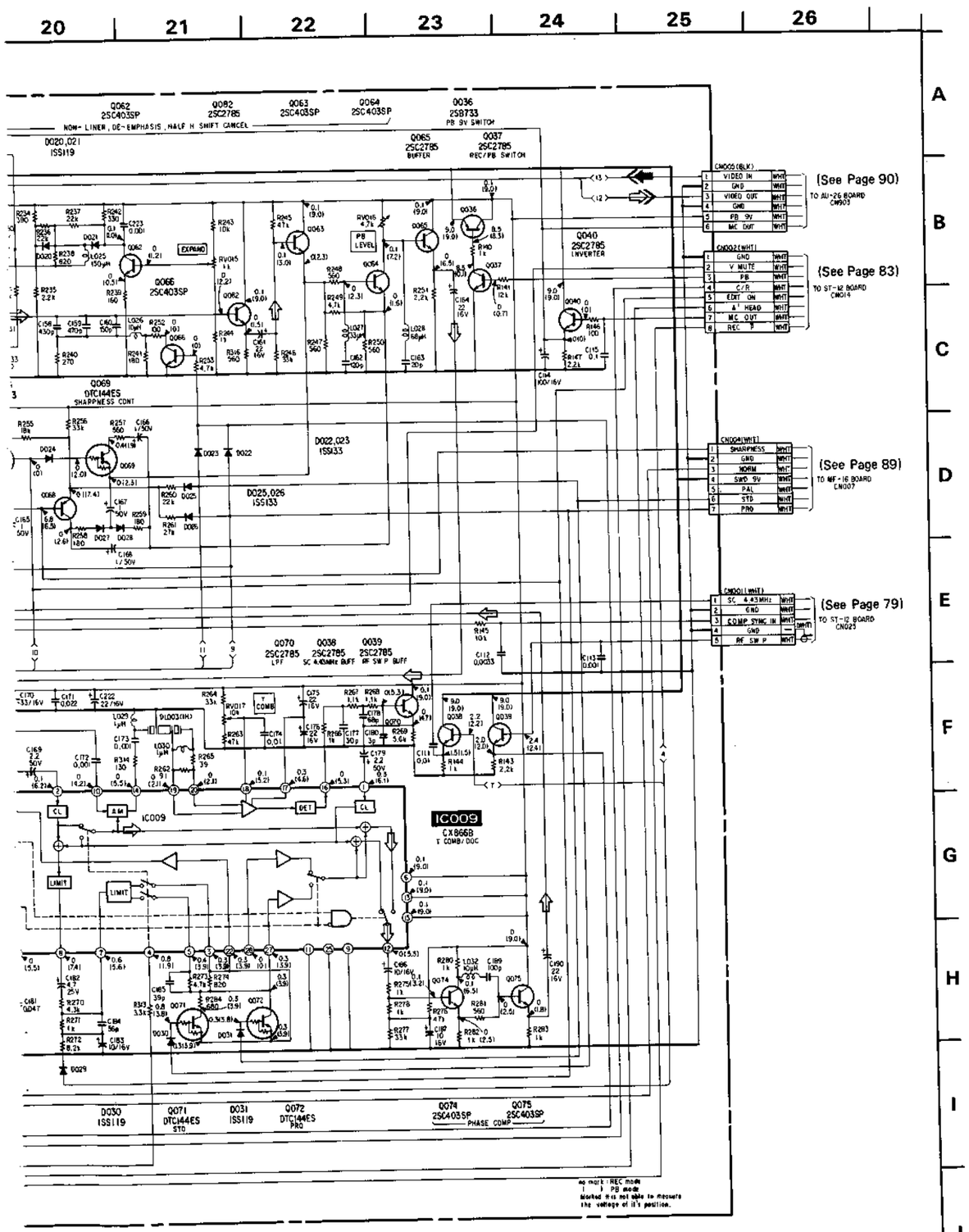
—Ref. No. 3,000 series—



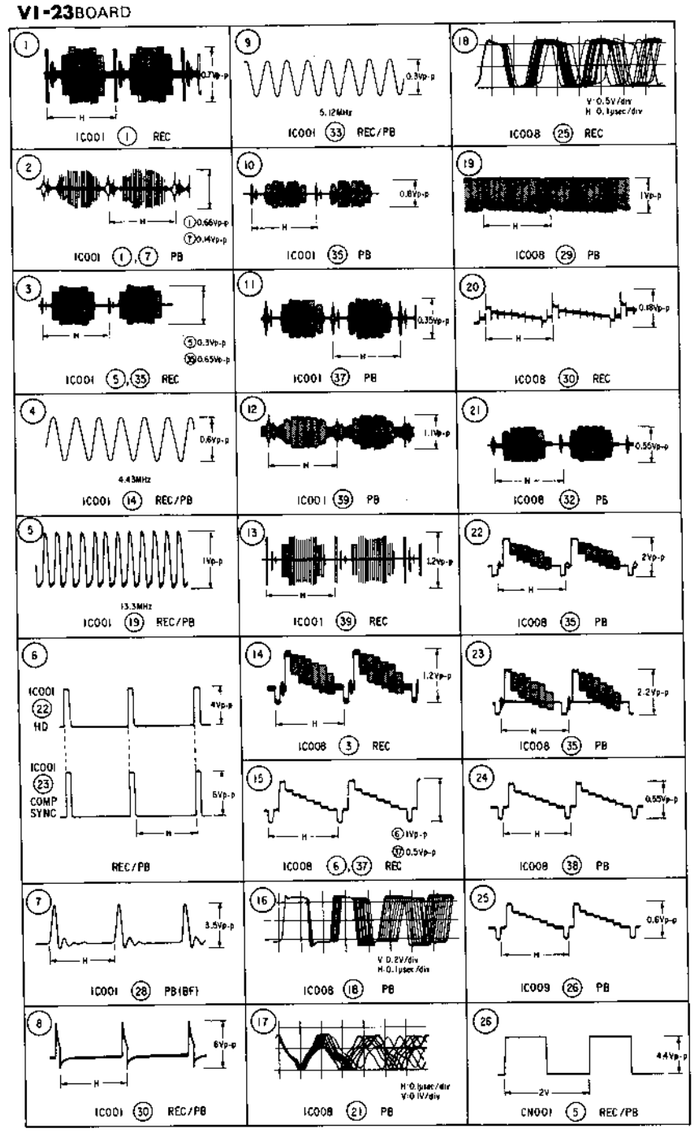

IC008 (1/2)
CX20043
Y1 CHIP
IC007
MC14538BCP
FLIP FLOP
IC009
CX8668
Y COMB/DOC
NON-LINER, DE-EMPHASIS, HALF H SHIFT CANCEL
(See Page 90)
TO AU-26 BOARD CN903
(See Page 83)
TO ST-12 BOARD CN014
(See Page 89)
TO MF-16 BOARD CN007
(See Page 79)
TO ST-12 BOARD CN025
Q040
2SC2785
INVERTER
Q065
2SC2785
BUFFER
Q037
2SC2785
REC/PB SWITCH
Q036
2SB733
PB 9V SWITCH
Q067
DTC144ES
SHARPNESS CONT
Q068
2SA1175
SHARPNESS CONT
Q069
DTC144ES
SHARPNESS CONT
Q070
2SC2785
LPF
Q038
2SC2785
SC 4.43MHz BUFF
Q039
2SC2785
RF SW P BUFF
Q074
2SC403SP
Q075
2SC403SP
PHASE COMP
Q051
2SC2785
Q053
2SA844
BUFFER
Q056
2SC403SP
EQ
Q057
2SC403SP
EQ
Q058
2SC403SP
AMP
Q059
2SC403SP
AMP
Q065
2SC2785
BUFFER
Q076
DTC144ES
PRO
Q077
DTC144ES
EDIT SW
Q078
DTC144ES
STD
D029
1SS119
D030
1SS119
Q071
DTC144ES
STD
D031
1SS119
Q072
DTC144ES
PRO

VI-23 BOARD


IC001 1 REC
IC001 1, 7 PB
IC001 5, 35 REC
IC001 14 REC/PB
IC001 19 REC/PB
IC001 22 HD
IC001 23 COMP SYNC
REC/PB
IC001 28 PB(BF)
IC001 30 REC/PB



VI-23 BOARD



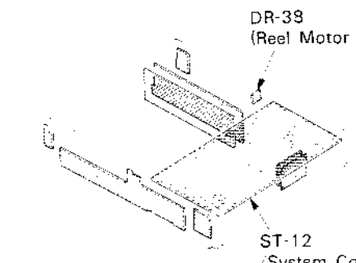
Note:

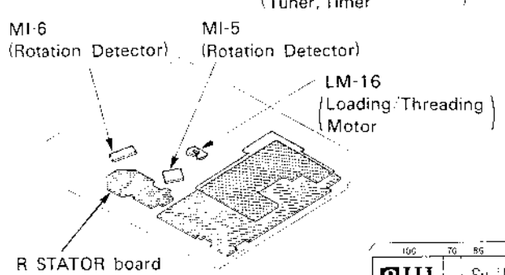
- All resistors are in ohms, 1/6W unless otherwise noted. kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics. and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- ▭ : fusible resistor.
- ▭ : panel designation.
- △ : internal component.
- ▭ : adjustment for repair.
- ▬ : B + bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.

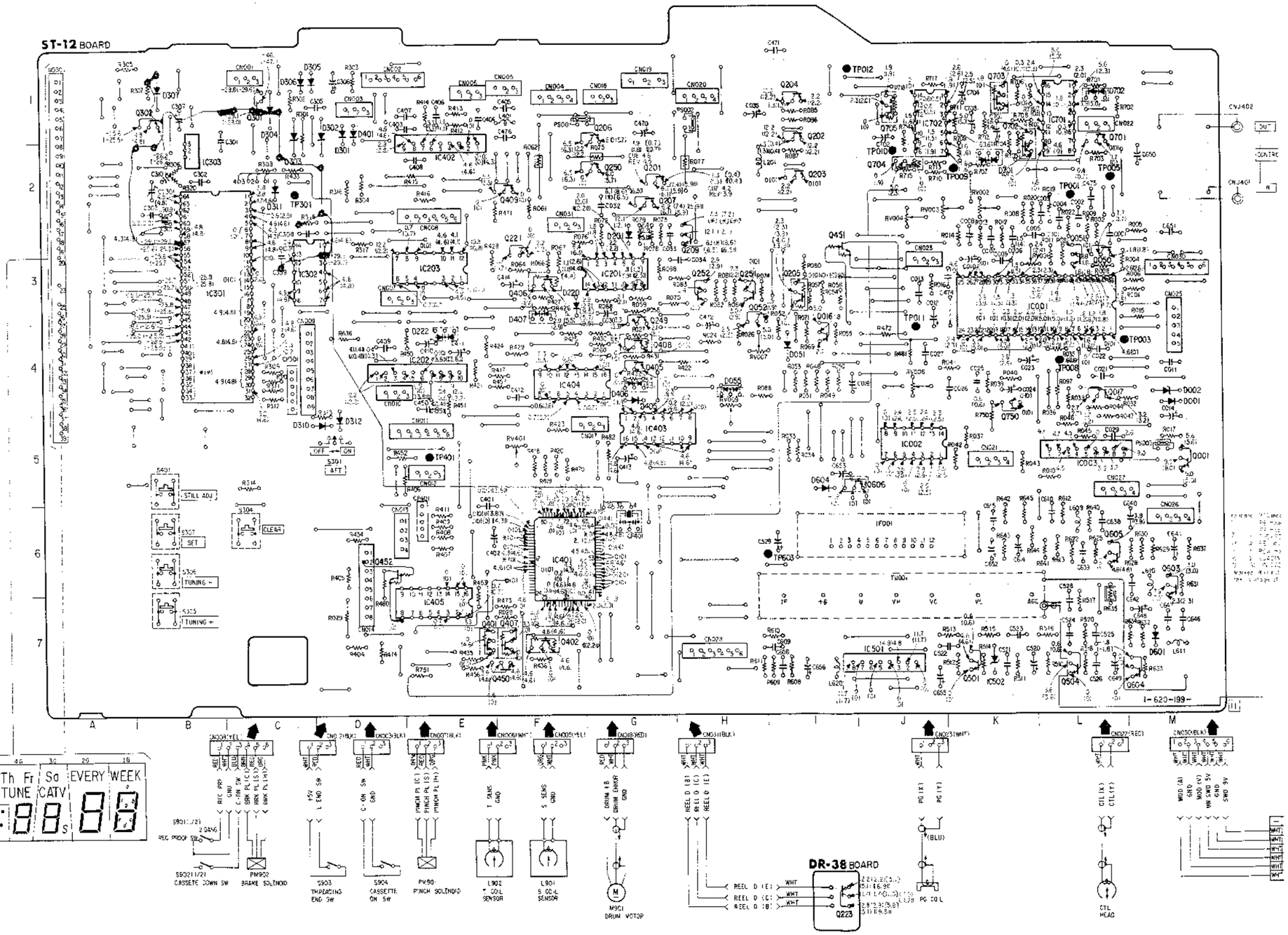
When indicating parts by reference number, please include the board name.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

- **Signal path**
  - : REC Y Signal
  - : PB Y Signal
  - : REC CHROMA Signal
  - : PB CHROMA Signal
  - : REC Y/CHROMA Signal
  - : PB Y/CHROMA Signal







SYSTEM CONTROL/SERVO, TUNER, TIMER

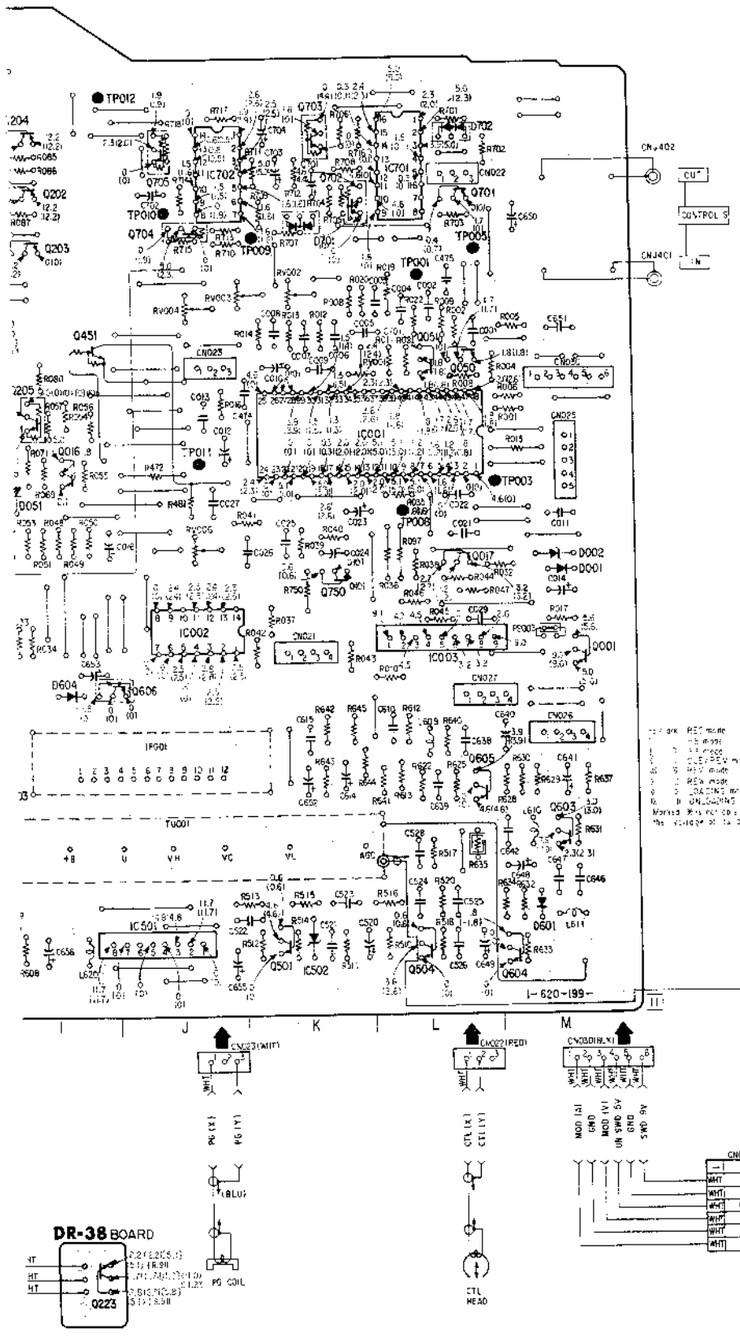
ST-12 (SYSTEM CONTROL/SERVO, TUNER, TIMER) MI-5, MI-6 (ROTATION DETECTOR) DR-38 (REEL MOTOR DRIVE) LM-16 (LOADING/THREADING MOTOR) R STATOR (REEL MOTOR), CAPSTAN MOTOR PRINTED WIRING BOARDS

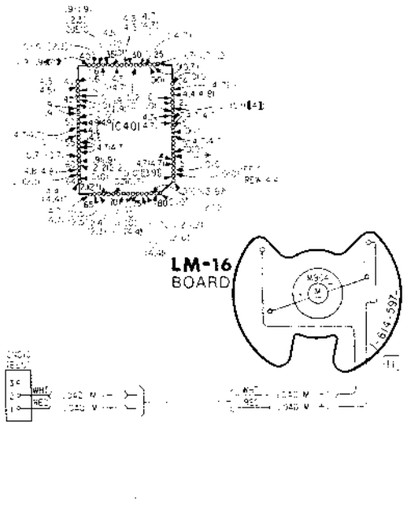
—Ref. No. R STATOR BOARD : 1,000 series, ST-12 BOARD : 5,000 series, MI-5, MI-6 BOARD : 7,000 series, DR-38 BOARD : 8,000 series

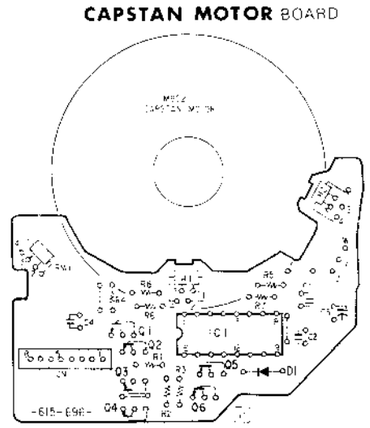
D001	M-4	IC402	E-1	Q409	F-2
D002	M-4	IC403	G-4	Q450	F-7
D051	I-3	IC404	F-4	Q451	I-3
D055	H-4	IC405	E-6	R452	D-6
D201	G-2	IC501	J-7	Q501	K-7
D220	F-3	IC502	K-7	Q504	L-7
D222	E-3	IC701	L-1	Q603	M-6
D301	D-1	IC702	J-1	Q604	M-7
D302	D-1			Q605	L-6
D303	C-1	Q001	M-5	Q606	J-5
D304	C-1	Q016	I-3	Q701	L-1
D305	D-1	Q017	L-4	Q702	L-1
D306	C-1	Q050	L-2	Q703	K-1
D307	B-1	Q051	L-2	Q704	J-1
D310	D-4	Q052	H-3	Q705	J-1
D311	C-2	Q201	G-2	Q750	K-4
D312	D-4	Q202	I-1		
D401	D-1	Q203	I-2	RV001	K-2
D405	G-4	Q204	I-1	RV002	K-2
D406	G-4	Q205	I-3	RV003	K-2
D407	F-3	Q206	G-1	RV004	J-2
D601	M-7	Q207	G-2	RV006	J-4
D604	I-5	Q209	H-2	RV007	H-3
D701	K-1	Q221	F-2	RV009	H-4
D702	L-1	Q249	G-3	RV401	F-5
		Q250	G-1		
IC001	L-3	Q251	H-3	TP001	L-2
IC002	J-5	Q252	H-3	TP003	M-3
IC003	L-5	Q301	C-1	TP005	L-1
IC201	G-3	Q302	B-1	TP008	L-4
IC202	E-4	Q401	E-7	TP009	K-1
IC203	E-3	Q402	F-7	TP010	J-1
IC301	B-3	Q405	G-4	TP011	J-3
IC302	C-3	Q406	F-3	TP012	I-1
IC303	B-1	Q407	F-7	TP301	C-2
IC401	F-6	Q408	G-3	TP401	E-5
				TP603	I-6

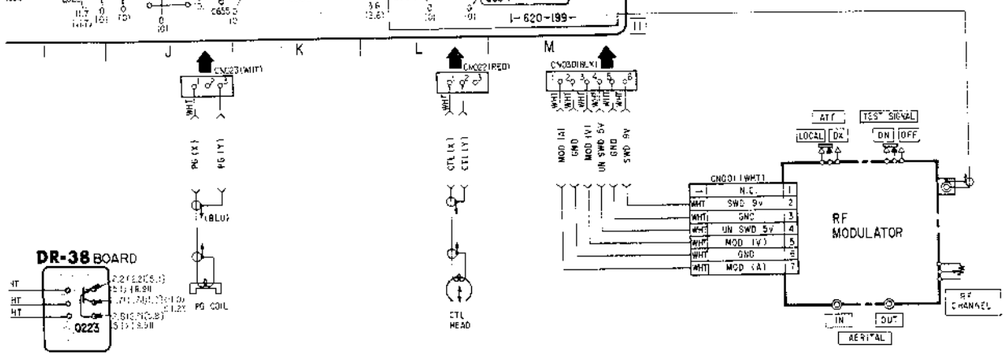
Note:
- ● ▷ ← : indicates a lead wire mounted on the component side.
- ● : soldering side.
- * : component side.
- ● : B+ Pattern.
- ▨ : B− Pattern.

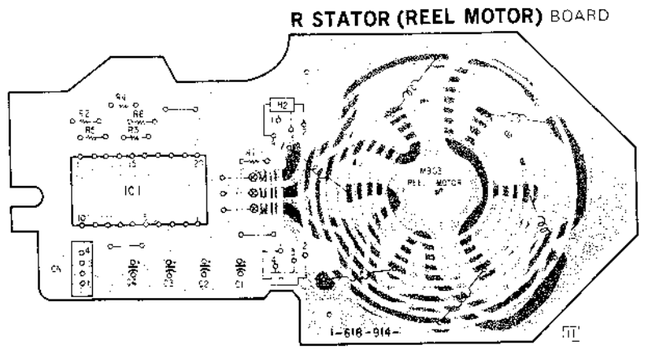
;OTOR), CAPSTAN MOTOR PRINTED WIRING BOARDS











Note:

- All resistors are in ohms, 1/6W unless otherwise noted. kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF 50W\ or less are not indicated except for electrolytics, and tantalums
- All variable and adjustable resistors have characteristic curve B unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- : internal component.
- : adjustment for repair.
- : B + bus.
- : B − bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal productio tolerances.

When indicating parts by reference number, please include the board name.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

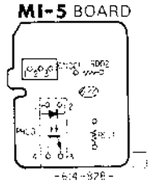
- **Signal path**
  - : REC Y/CHROMA Signa
  - : REC AUDIO Signal

Signal path

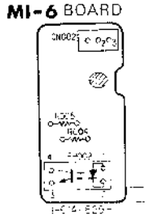
	REC	REC/PB	PB
Drum speed servo			
Drum phase servo			
Drum servo (speed and phase)			
Capstan speed servo			
Capstan phase servo			
Capstan servo (speed and phase)			
Ref. signal			

SYSTEM CONTROL/SERVO, TUNER, TIMER

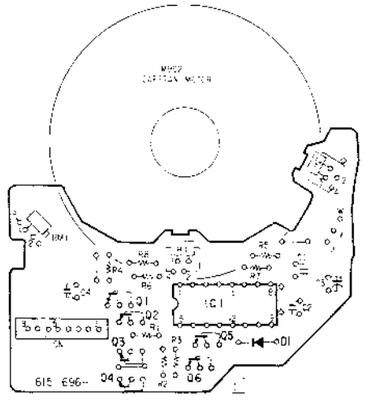
MI-5 BOARD



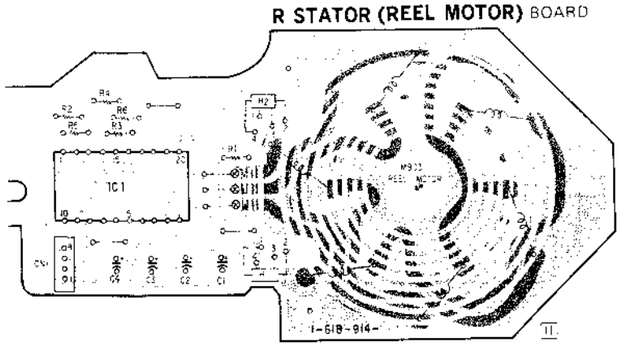
MI-6 BOARD



CAPSTAN MOTOR BOARD



R STATOR (REEL MOTOR) BOARD



Note:

- All resistors are in ohms, 1/6W unless otherwise noted. kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- △ : internal component.
- : adjustment for repair.
- ——— : B + bus.
- — — — : B − bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.

When indicating parts by reference number, please include the board name.

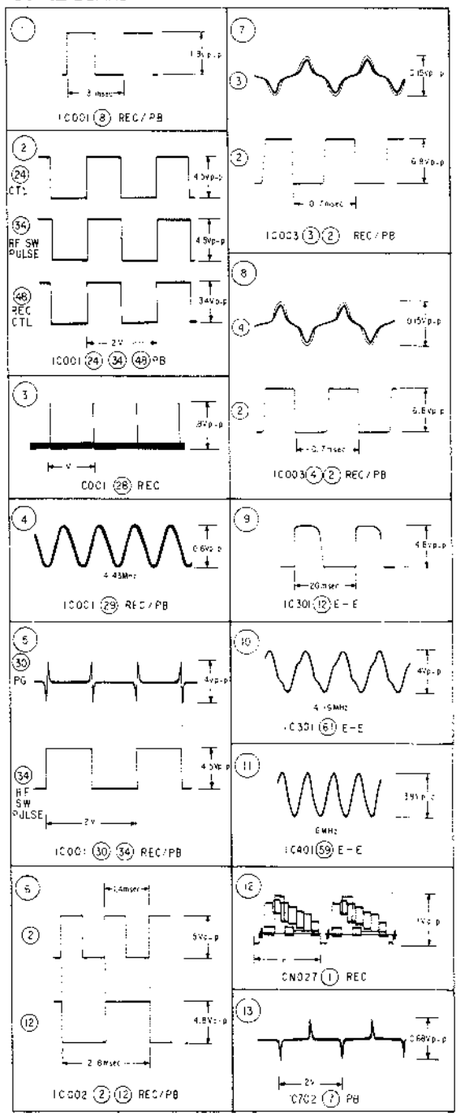
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

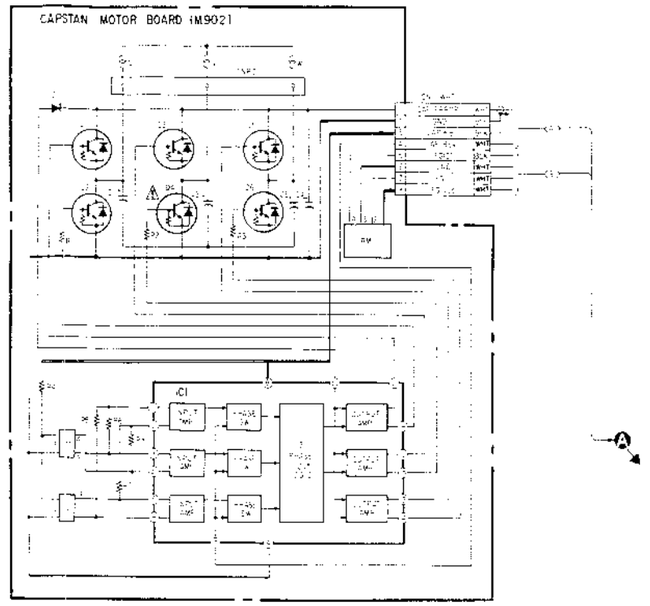
- **Signal path**
  - : REC Y, CHROMA Signal
  - : REC AUDIO Signal

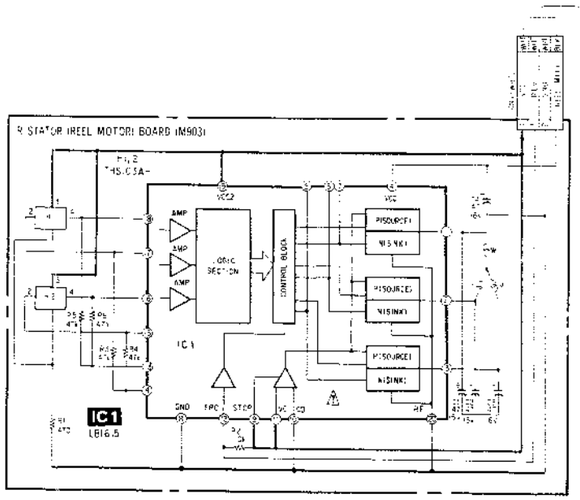
Signal path

	REC	REC/PB	PB
Drum speed servo			
Drum phase servo			
Drum servo (speed and phase)			
Capstan speed servo			
Capstan phase servo			
Capstan servo (speed and phase)			
Ref. signal			

ST-12 BOARD

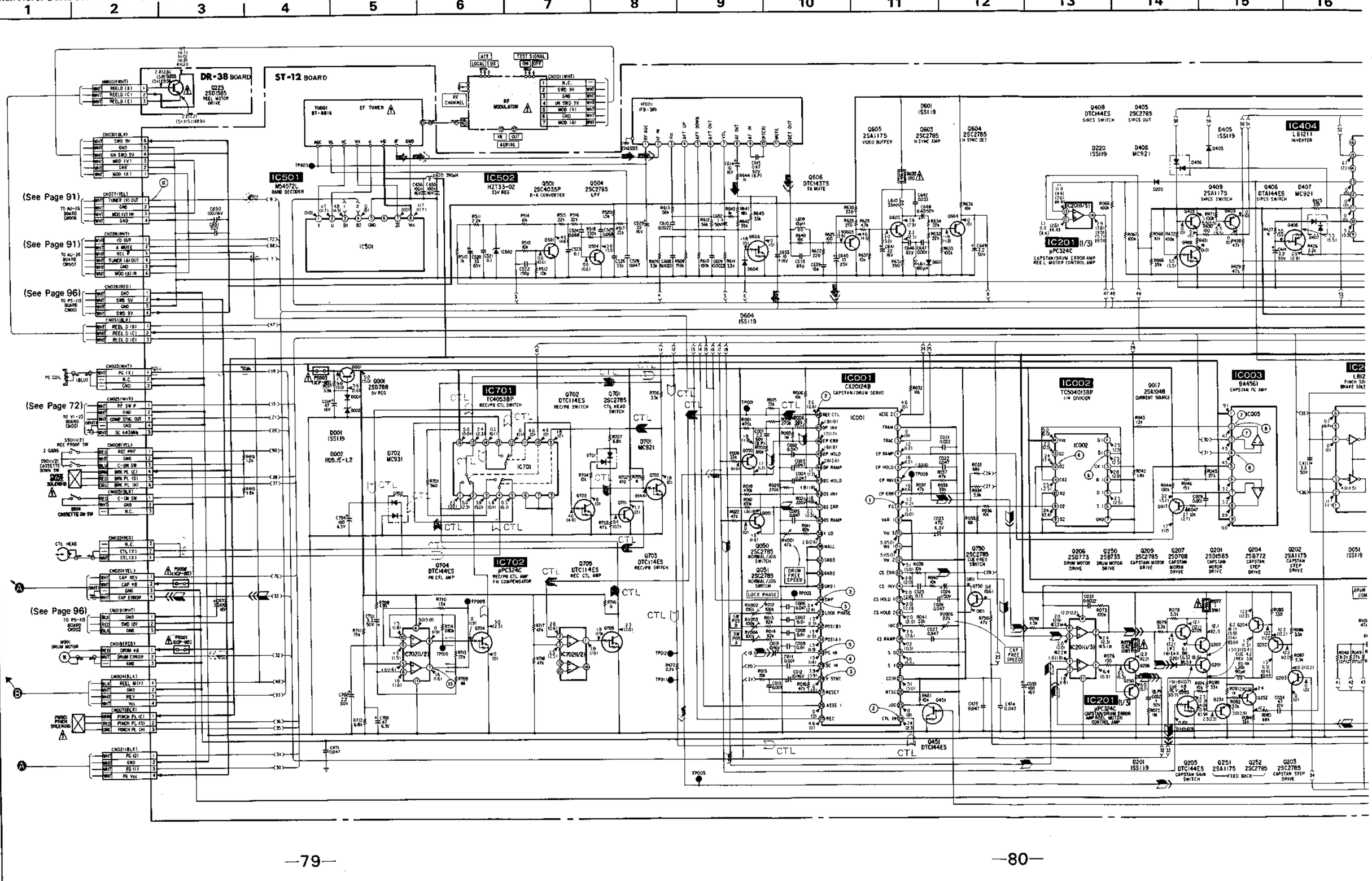




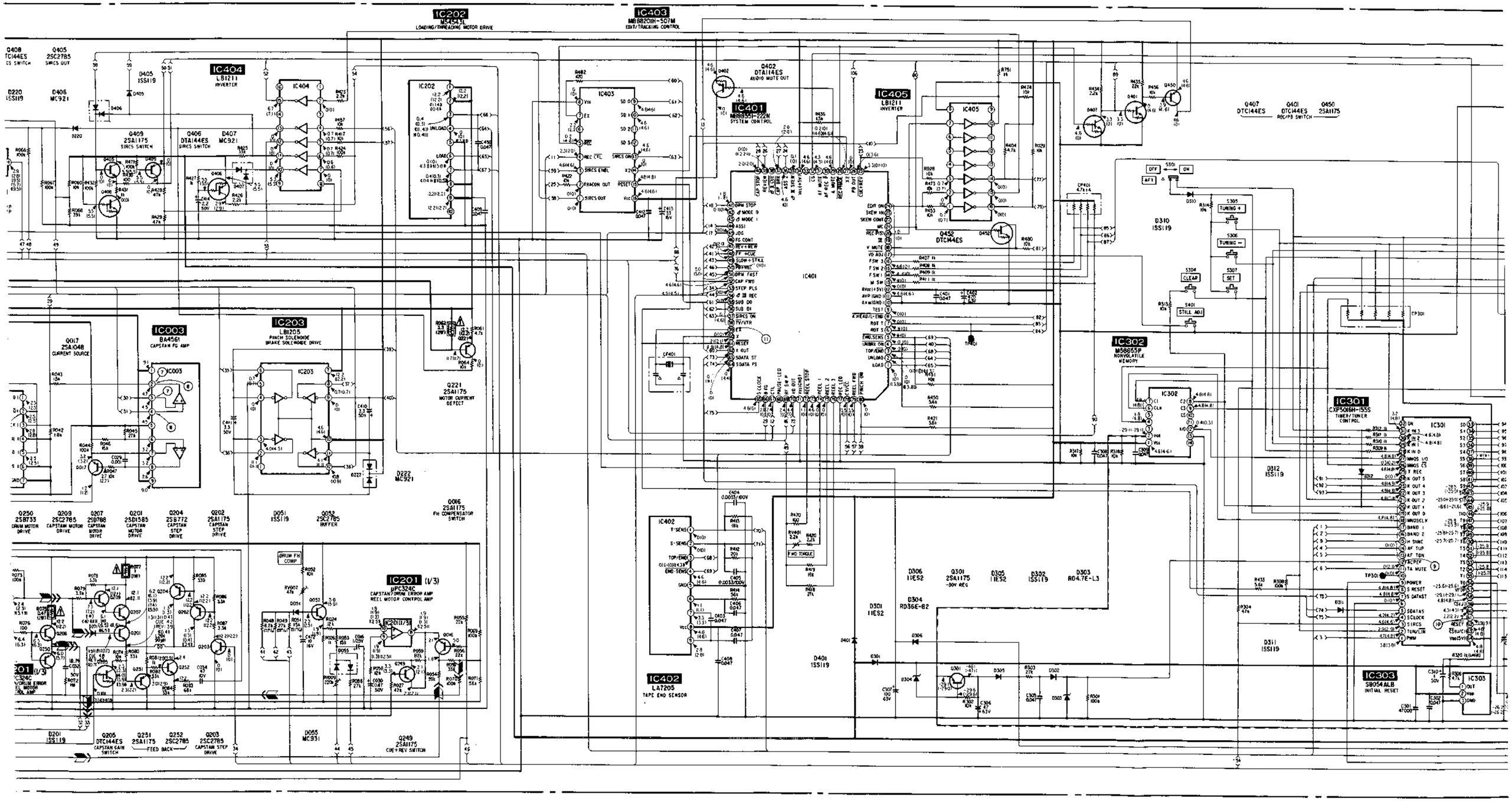


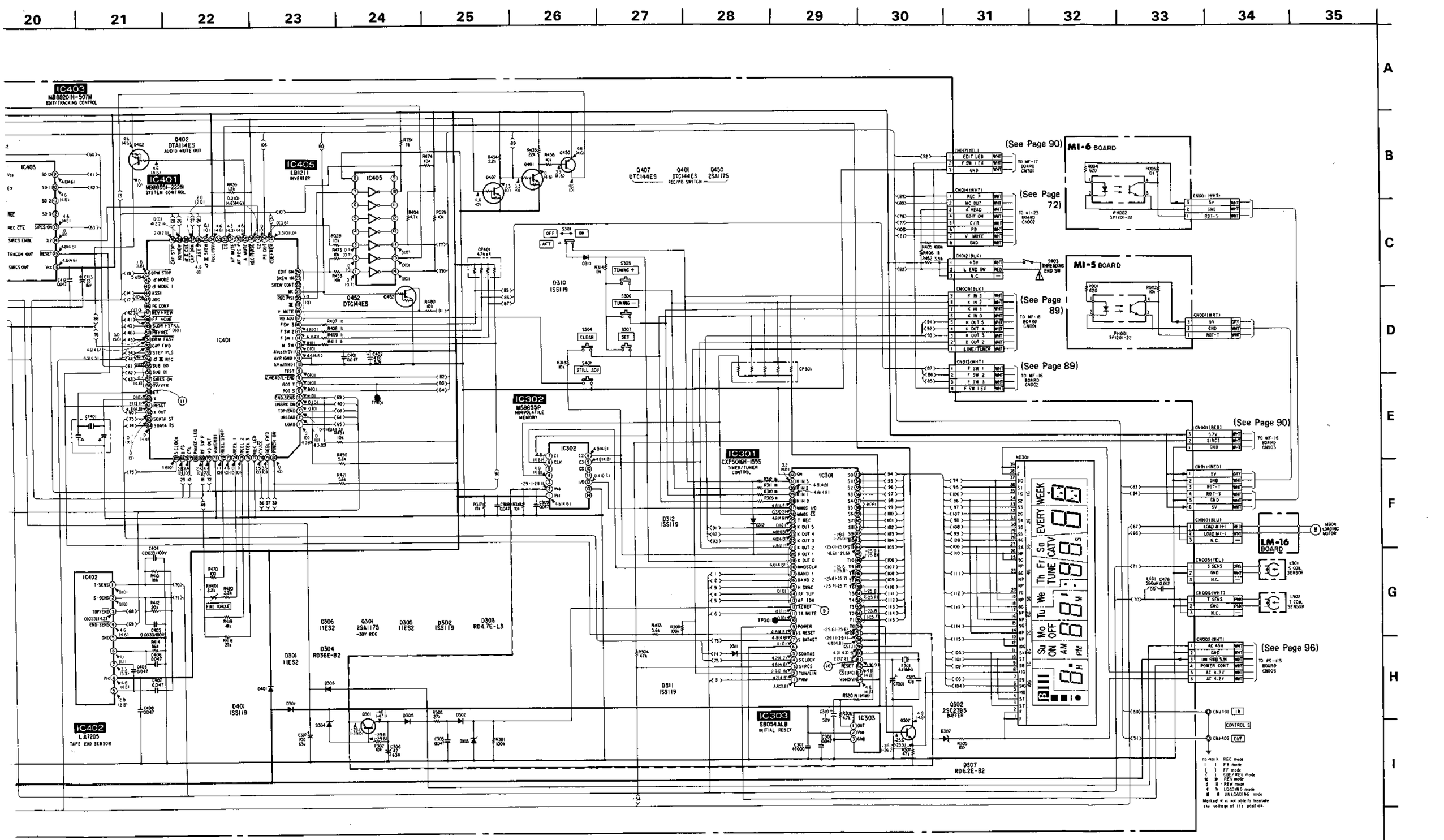
ST-12 (SYSTEM CONTROL/SERVO, TUNER, TIMER) MI-5, MI-6 (ROTATION DETECTOR) DR-38 (REEL MOTOR DRIVE) LM-16 (LOADING/THREADING MOTOR) R STATOR (REEL MOTOR), CAPSTAN MOTOR SCHEMATIC DIAGRAM

—Ref. No. R STATOR BOARD : 1,000 series, ST-12 BOARD : 5,000 series, MI-5, MI-6, BOARDS : 7,000 series, DR-38 BOARD : 8,000 series—



14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29



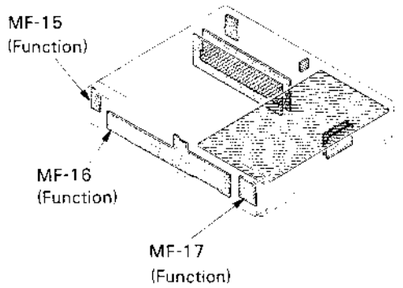

IC403
MB88201H-507M
EDIT/TRACKING CONTROL
IC401
MB18654-202M
SYSTEM CONTROL
IC405
LB1211
INVERTER
IC402
LA7205
TAPE END SENSOR
IC302
M58655P
NONVOLATILE MEMORY
IC301
CXP50164-155S
TIMER/TUNER CONTROL
IC303
S8054ALB
INITIAL RESET
Q402
DTA114ES
AUDIO MUTE OUT
Q407
DTC144ES
Q401
DTC144ES
REC/PB SWITCH
Q450
2SA1175
Q452
DTC144ES
Q302
2SC2785
BUFFER
Q307
RD6.2E-82
Q304
2SA1175
-30V REG
Q306
RD36E-B2
D310
1SS119
D311
1SS119
D312
1SS119
D401
1SS119
D301
1ES2
D305
1ES2
D302
1SS119
D303
RD4.7E-L3
S301
S305 TUNING +
S306 TUNING -
S307 SET
S504 CLEAR
S401 STILL ADJ
S303 TAPE LOADING END SW
(See Page 90)
(See Page 72)
(See Page 89)
(See Page 96)
MI-6 BOARD
MI-5 BOARD
LM-16 BOARD
TO MF-17 BOARD CN701
TO MI-25 BOARD CN002
TO MF-16 BOARD CN001
TO MF-16 BOARD CN002
TO MF-16 BOARD CN003
TO PS-175 BOARD CN003
LOADING MOTOR
CAPSTAN MOTOR
REEL MOTOR
L901 S. COIL SENSOR
L902 T. COIL SENSOR
CN401 IN
CN402 OUT
CONTROL S
EVERY WEEK
Su Mo Tu We Th Fr Sa
TUNE
CATV
AM
PM

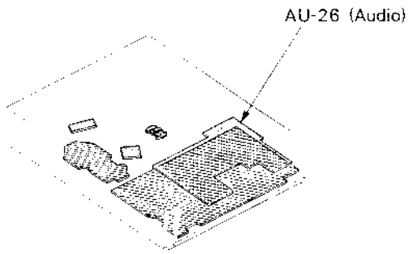
AU-26 (AUDIO), MF-15, MF-16, MF-17 (FUNCTION SWITCH, LED) PRINTED WIRING BOARDS

—Ref. No. AU-26 BOARD : 4,000 series, MF-15, MF-16, MF-17 BOARDS : 8,000 series—

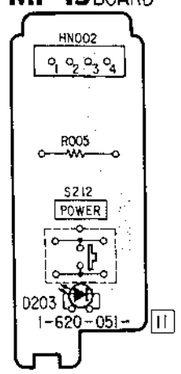
Note:

- ⊙ : indicates a lead wire mounted on the component side.
- ● : Pattern from the side which enables seeing.
- ● : B+ pattern from the side which enables seeing.

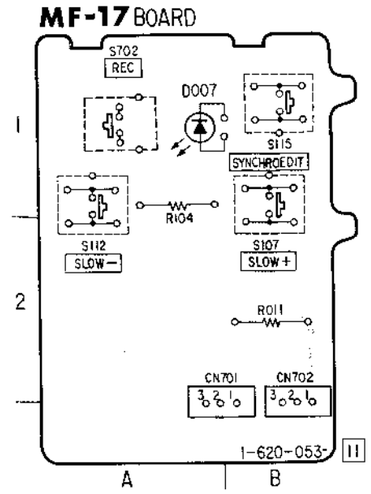




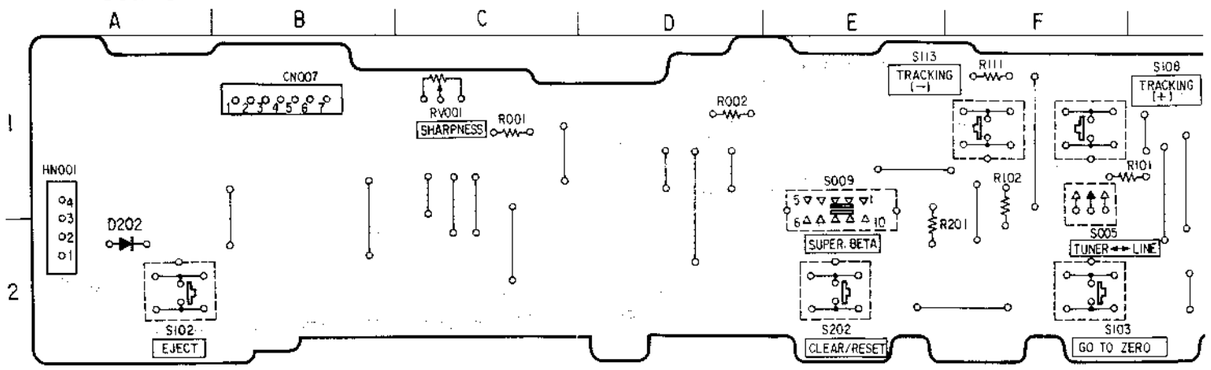
MF-15 BOARD



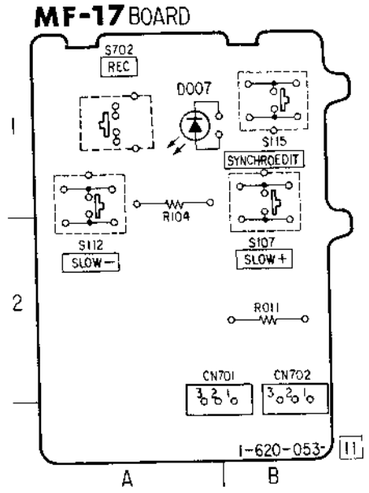
MF-17 BOARD



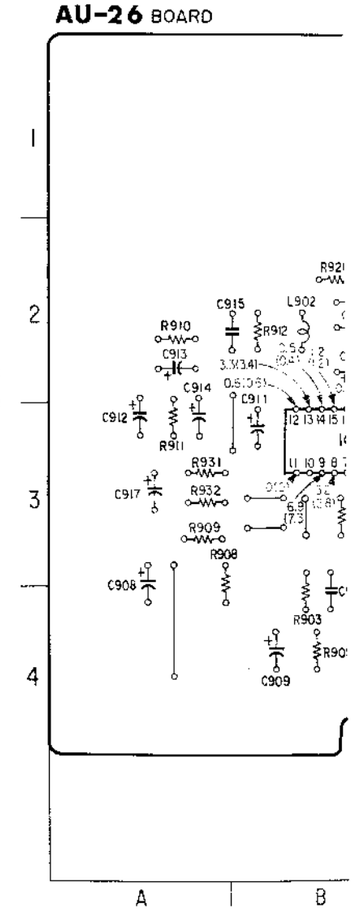
MF-16 BOARD

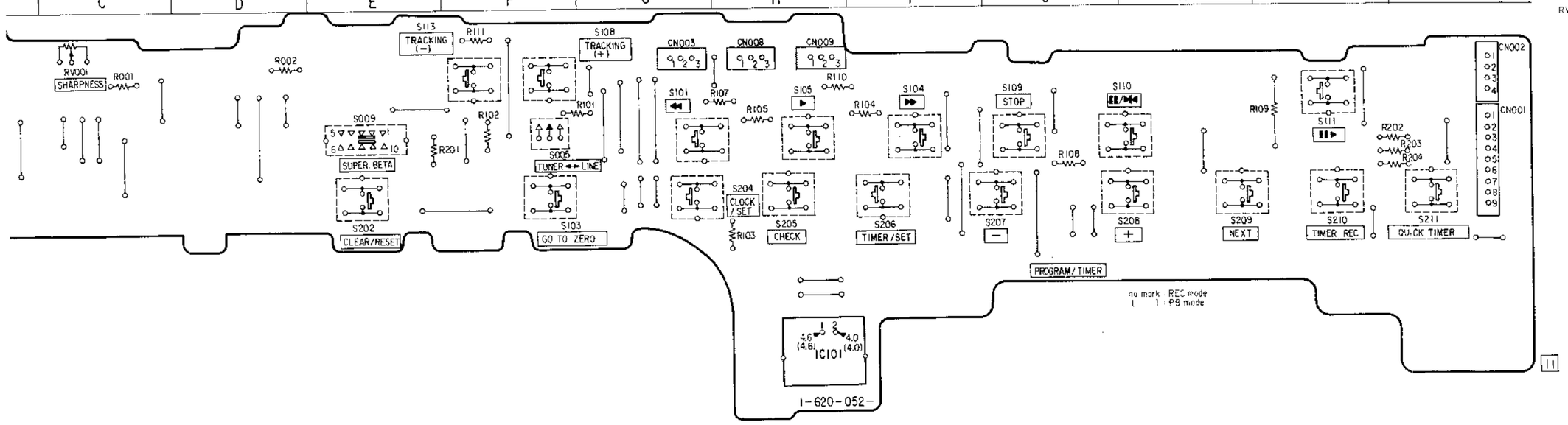


MF-17 BOARD



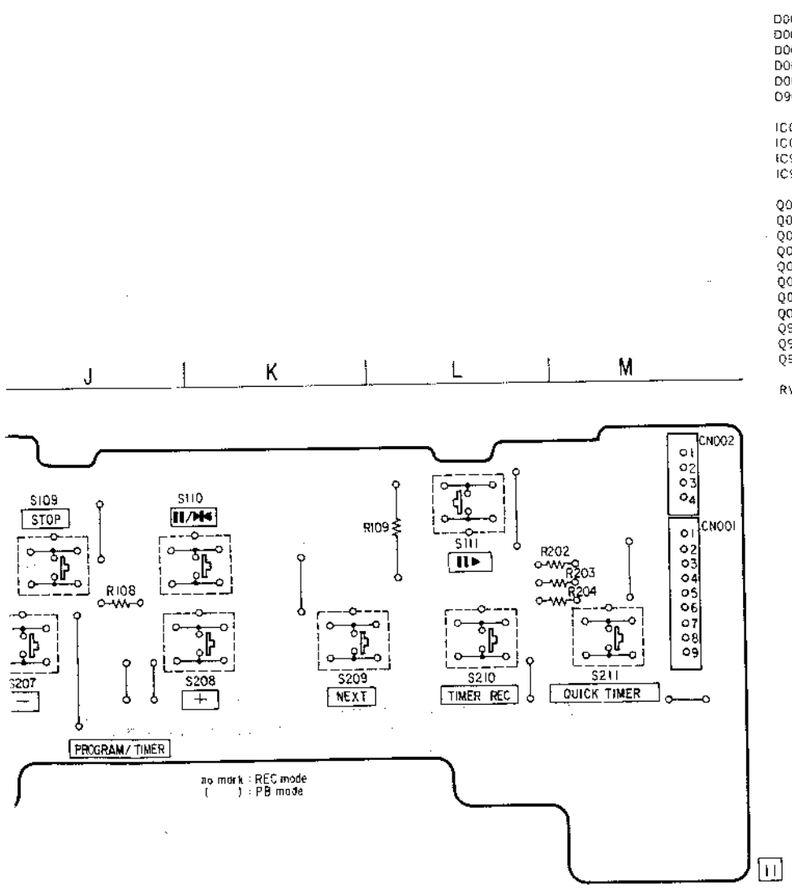
AU-26 BOARD

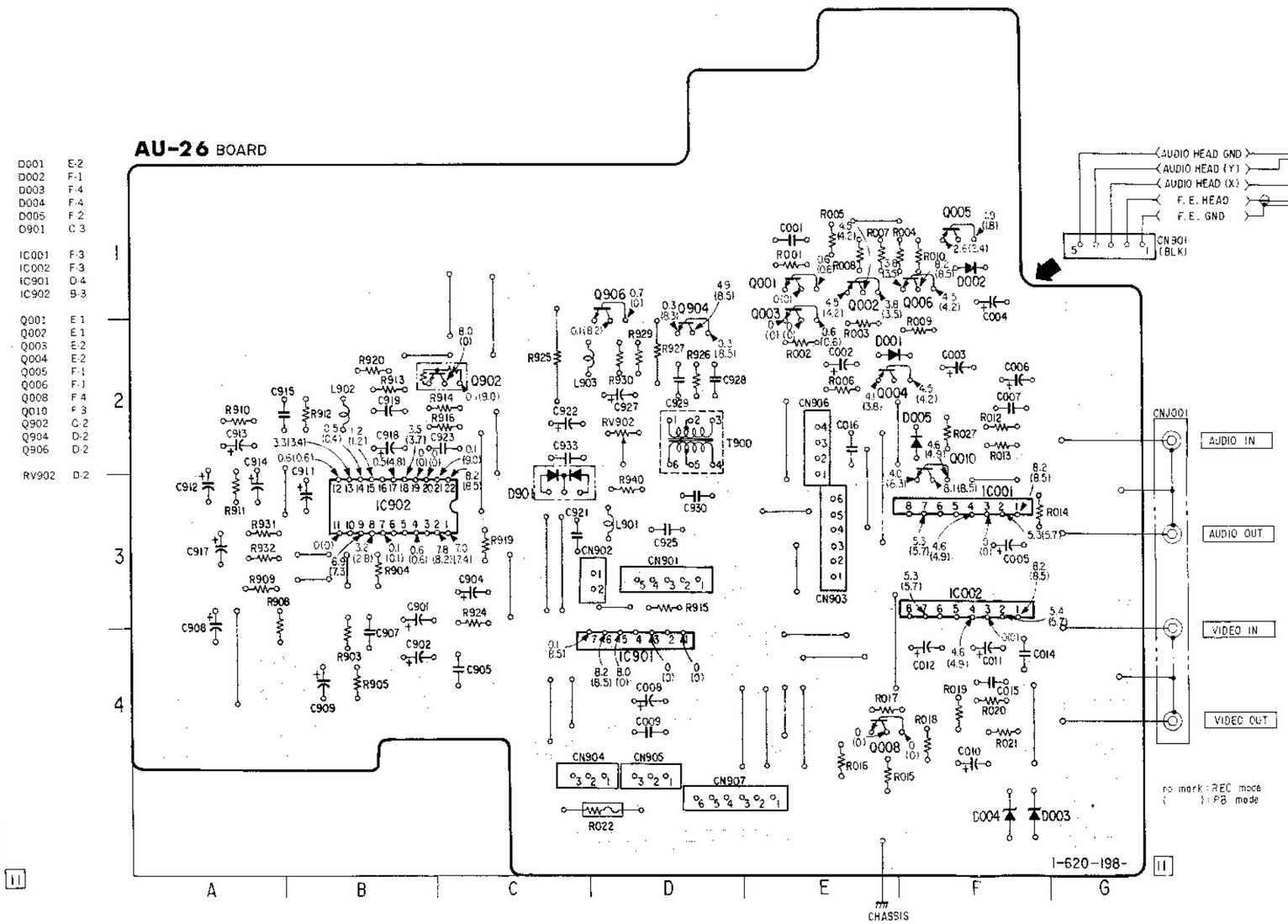




AU-26 BOARD

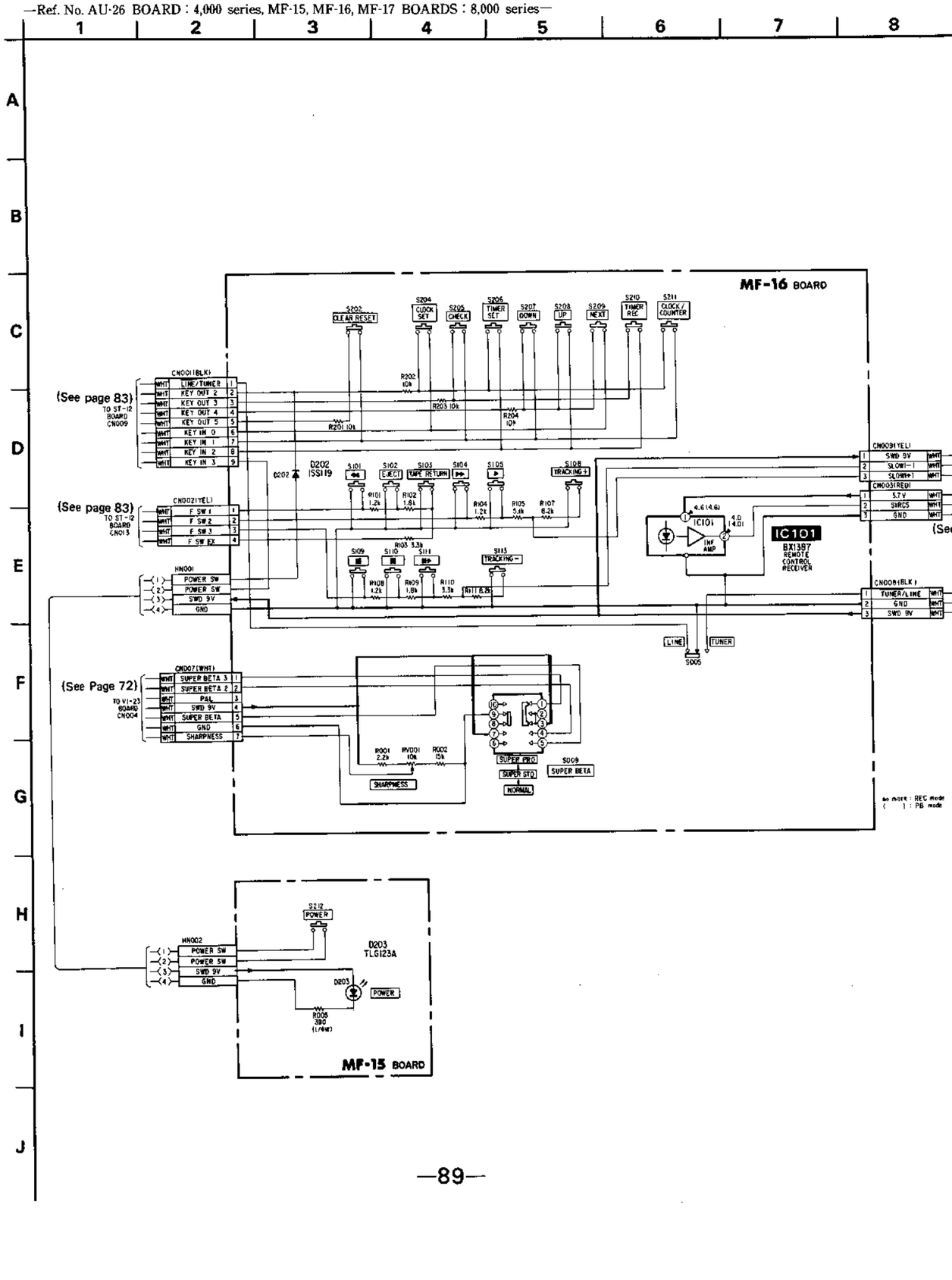
D001	E-2
D002	F-1
D003	F-4
D004	F-4
D005	F-2
D901	C-3
IC001	F-3
IC002	F-3
IC901	D-4
IC902	B-3
Q001	E-1
Q002	E-1
Q003	E-2
Q004	E-2
Q005	F-1
Q006	F-1
Q008	F-4
Q010	F-3
Q902	C-2
Q904	D-2
Q906	D-2
RV902	D-2

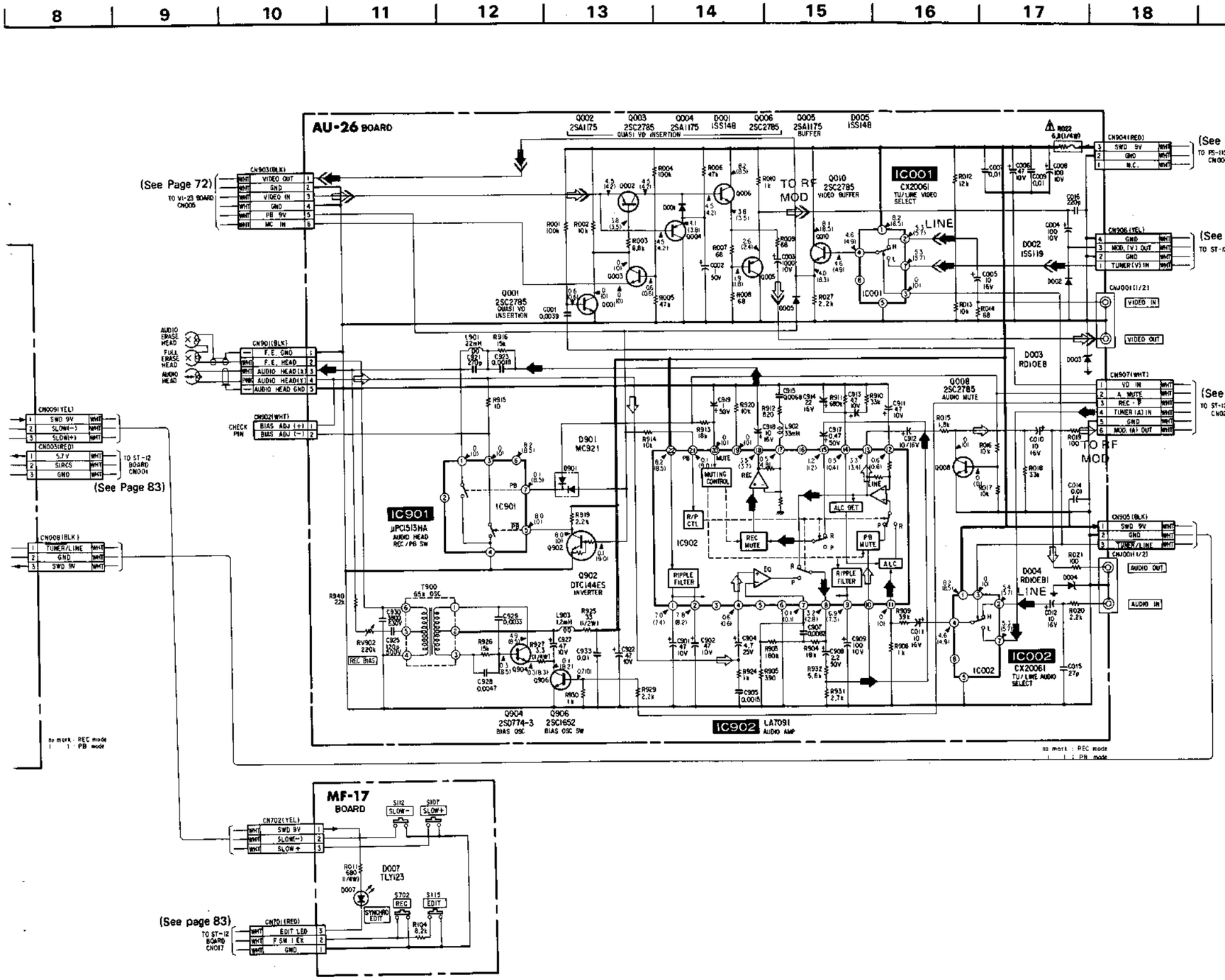




AU-26 (AUDIO), MF-15, MF-16, MF-17 (FUNCTION SWITCH, LED) SCHEMATIC DIAGRAM

—Ref. No. AU-26 BOARD : 4,000 series, MF-15, MF-16, MF-17 BOARDS : 8,000 series—





Note:

- All resistors are in ohms, 1/6W unless otherwise noted. kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics. and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- △ : internal component.
- : B + bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.

When indicating parts by reference number, please include the board name.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

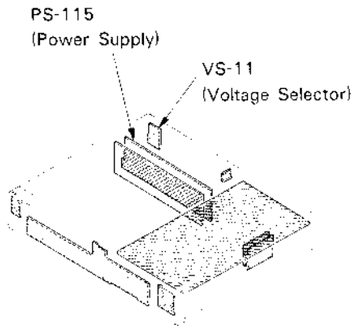
- **Signal path**
  - : REC Y/CHROMA Signal
  - : PB Y/CHROMA Signal
  - : REC AUDIO Signal
  - : PB AUDIO Signal

PS-115 (POWER SUPPLY), VS-11 (VOLTAGE SELECTOR)

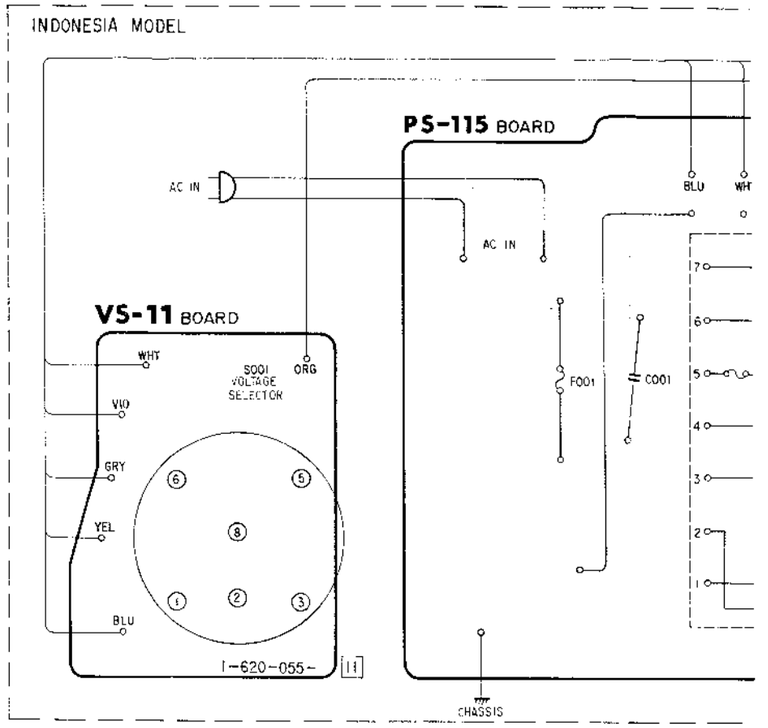
Ref. No. PS-115, VS-11 BOARDS : 6,000 series—

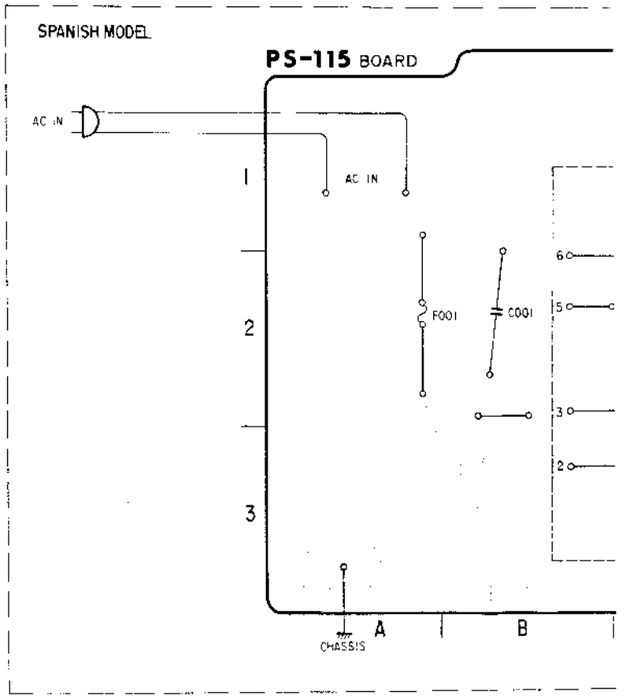
Note:

- ⊢— : indicates a lead wire mounted on the component side.
- : soldering side.
- : B+ Pattern.



PRINTED WIRING BOARDS



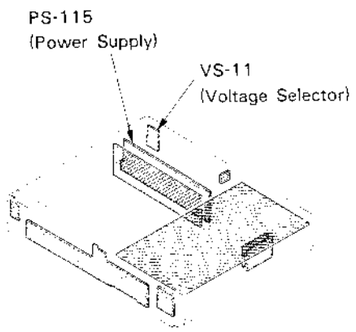


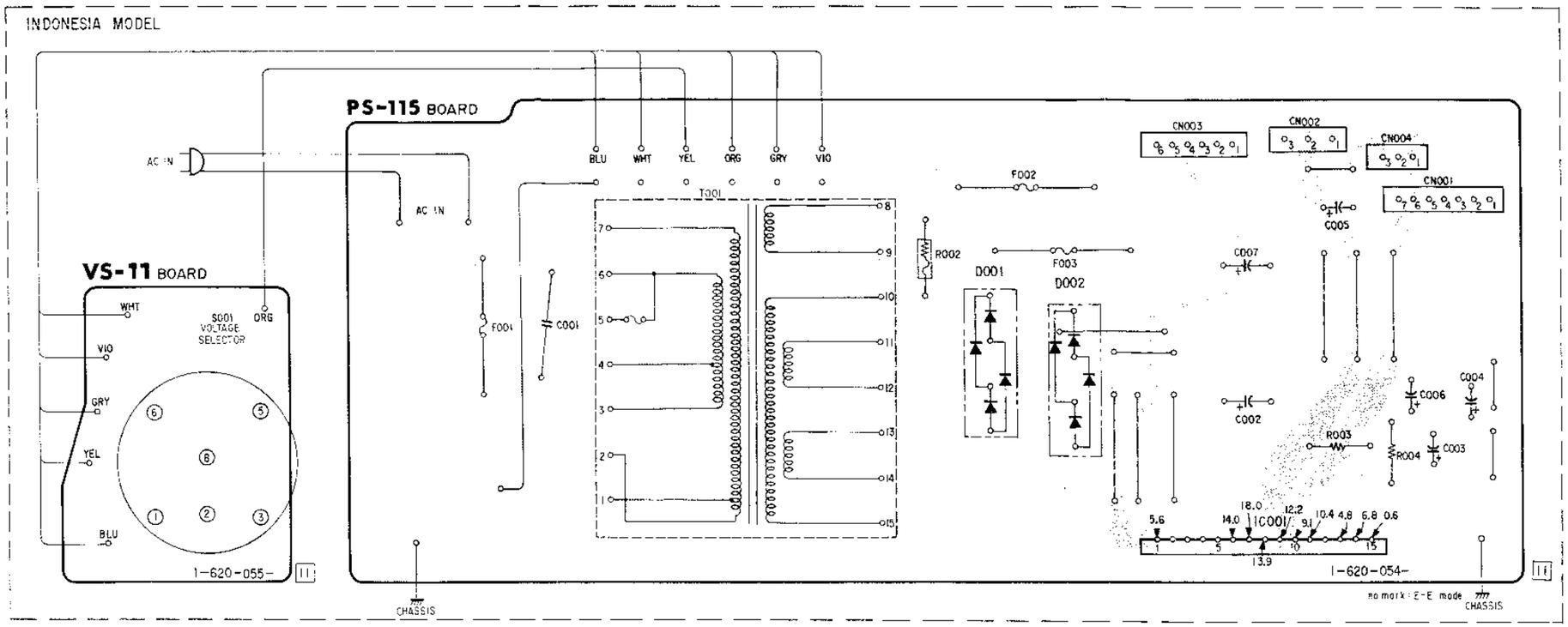
PS-115 (POWER SUPPLY), VS-11 (VOLTAGE SELECTOR) PRINTED WIRING BOARDS

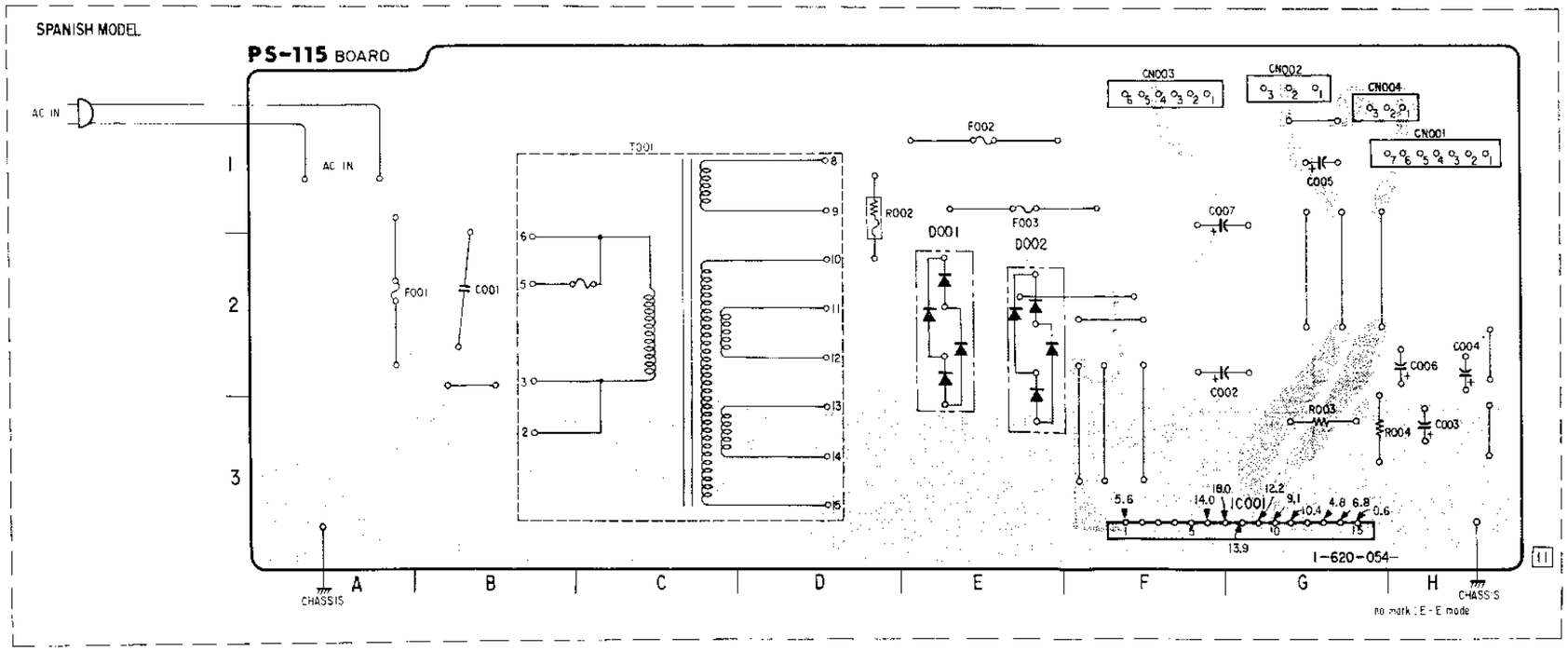
—Ref. No. PS-115, VS-11 BOARDS : 6,000 series—

Note:

- ○— : indicates a lead wire mounted on the component side.
- : soldering side.
- : B+ Pattern.

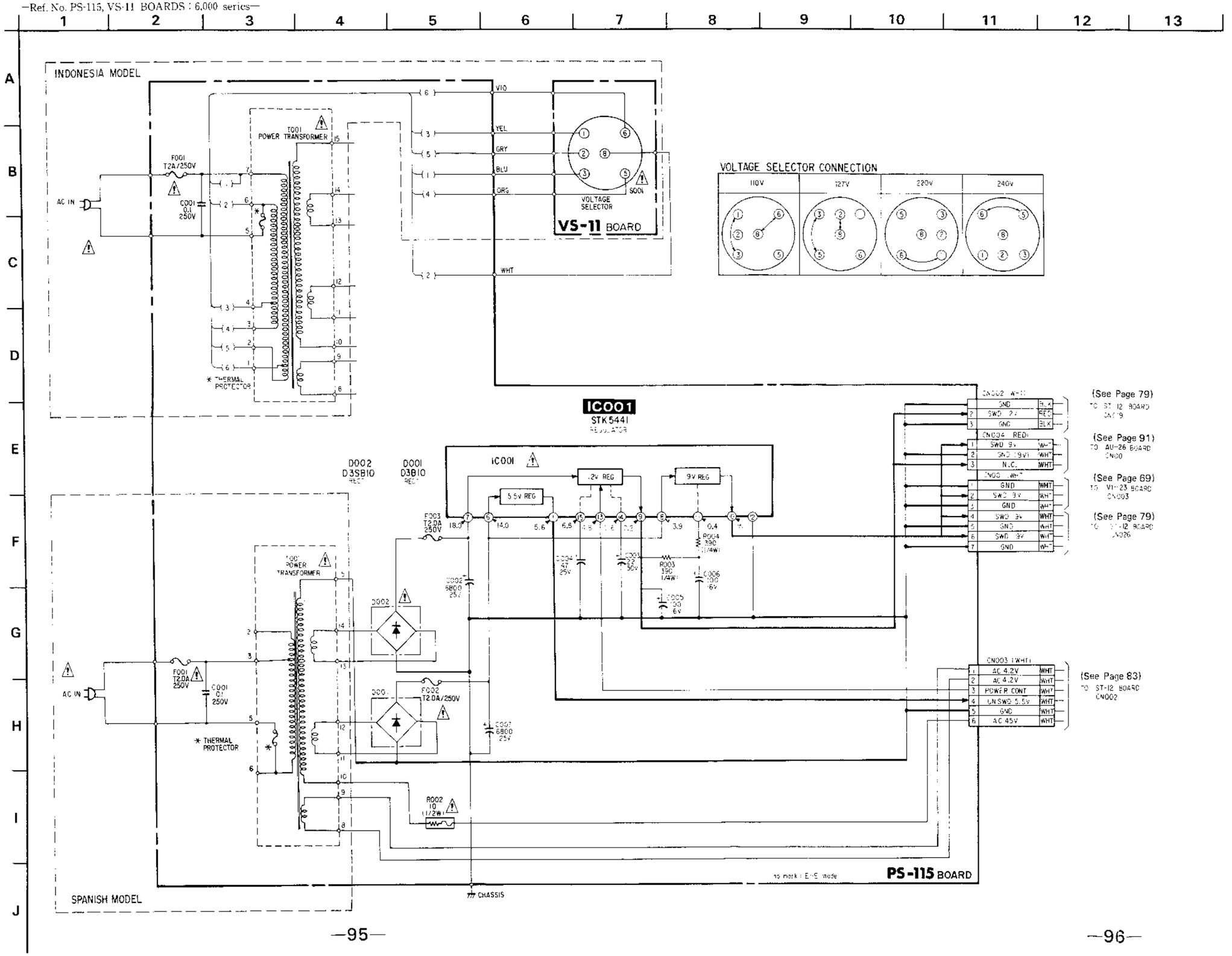






PS-115 (POWER SUPPLY), VS-11 (VOLTAGE SELECTOR) SCHEMATIC DIAGRAM

—Ref. No. PS-115, VS-11 BOARDS : 6,000 series—



VOLTAGE SELECTOR CONNECTION

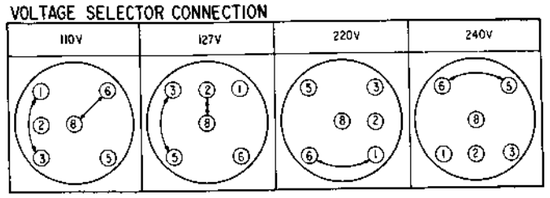
Note:

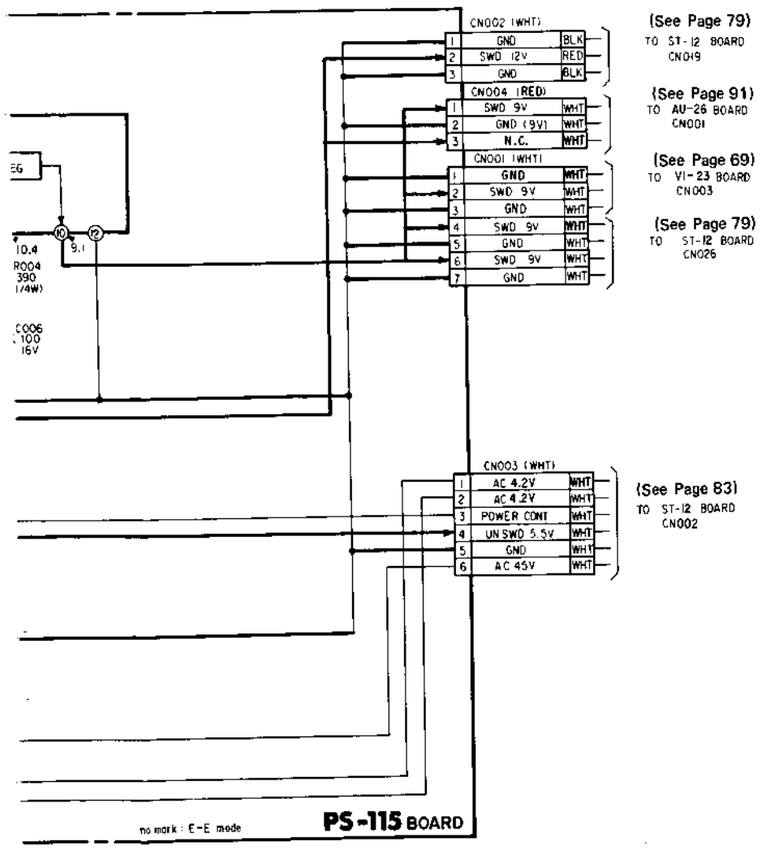
- All resistors are in ohms, 1/6W unless otherwise no kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF or less are not indicated except for electrolytics, a
- All variable and adjustable resistors have characte unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- △ : internal component.
- : B + bus.
- Voltages are dc with respect to ground unless othe
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10
- Voltage variations may be noted due to norm tolerances.

When indicating parts by reference number, please include the board name.

Note: The components identified by shading ar ⚠ are critical for safety. Replace on part number specified.

VOLTAGE SELECTOR CONNECTION





Note:

- All resistors are in ohms, 1/6W unless otherwise noted. kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics, and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- △ : internal component.
- : B + bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.

When indicating parts by reference number, please include the board name.

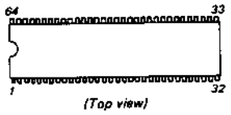
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

4-3. SEMICONDUCTORS

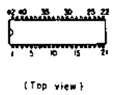
BA4561
LA7205
μPC1521HA

BX-1387

CXP5016-155-S

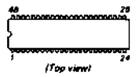


CX10021A-NP
CX10021A-P
CX10021B-NP
CX10021B-P

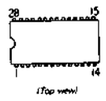


CX10023

CX20043
CX20124A
CX20124B

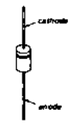


CX20045
CX-866A
CX-866B

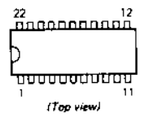


CX20061
M54572L

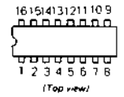
HZT33-02



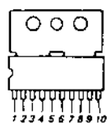
LA7091



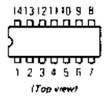
LB1205
LB1211
MB88201H-507M
MC14538BCP
TC4053BP
μPD4053BC



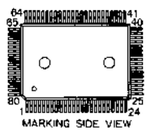
LB1640N



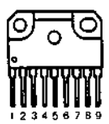
MB84013B
M58655P
μPC324C



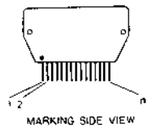
MB88551-222N



M54543L



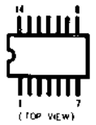
STK5441



S-8053ALR

TA7060AP

TC504013BP



μPC1513HA

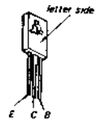
DTA114ES
DTA124ES
DTC114ES
DTC124ES
DTC143TS
DTC144ES
DTC144WS
2SA933
2SA1048-Y
2SA1048-GR
2SA1115
2SC403SP-3
2SC403SP-4
2SC403SP-5
2SC1740S
2SC2458
2SC2603

2SA844

2SA1175
2SC2785

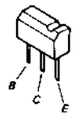
2SB733
2SD733
2SD774

2SB772

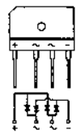


2SC1475
2SD788

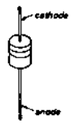
2SC1652



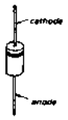
D3SB10



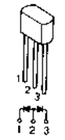
ERA15-02V1
1SS119
1SS133
1SS148



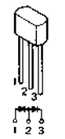
HZ10EB1
HZ10EB2
HZ10EB3
HZ11EB1
HZ11EB2
HZ11EB3
HZ36EB2
HZ5.6EB3
HZ6.2EB2
RD10EB1
RD10EB2
RD10EB3
RD11EB1
RD11EB2
RD11EB3
RD36EB2
RD4,7EL1
RK4.7EL2
RD4.7EL3
RD5.1EL2
RD5.6EB3
RD6.2EB2
11ES2



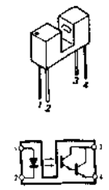
MC921



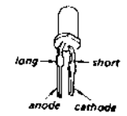
MC931



SPI201-20
SPI201-21



TLG123A
TLY123



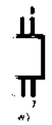
11

DE VIEW

ALR

)AP

)13BP



L3HA

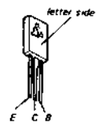
DTA114ES
DTA124ES
DTC114ES
DTC124ES
DTC143TS
DTC144ES
DTC144WS
2SA933
2SA1048-Y
2SA1048-GR
2SA1115
2SC403SP-3
2SC403SP-4
2SC403SP-5
2SC1740S
2SC2458
2SC2603

2SA844

2SA1175
2SC2785

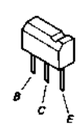
2SB733
2SD733
2SD774

2SB772

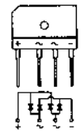


2SC1475
2SD788

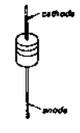
2SC1652



D3SB10



ERA15-02V1
1SS119
1SS133
1SS148



HZ10EB1
HZ10EB2
HZ10EB3
HZ11EB1
HZ11EB2
HZ11EB3
HZ36EB2
HZ5.6EB3
HZ6.2EB2
RD10EB1
RD10EB2
RD10EB3
RD11EB1
RD11EB2
RD11EB3
RD36EB2
RD4,7EL1
RK4.7EL2
RD4.7EL3
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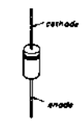
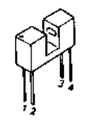
RD6.2EB2
11ES2



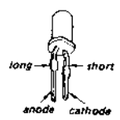
MC921

MC931

SPI201-20
SPI201-21



TLG123A
TLY123



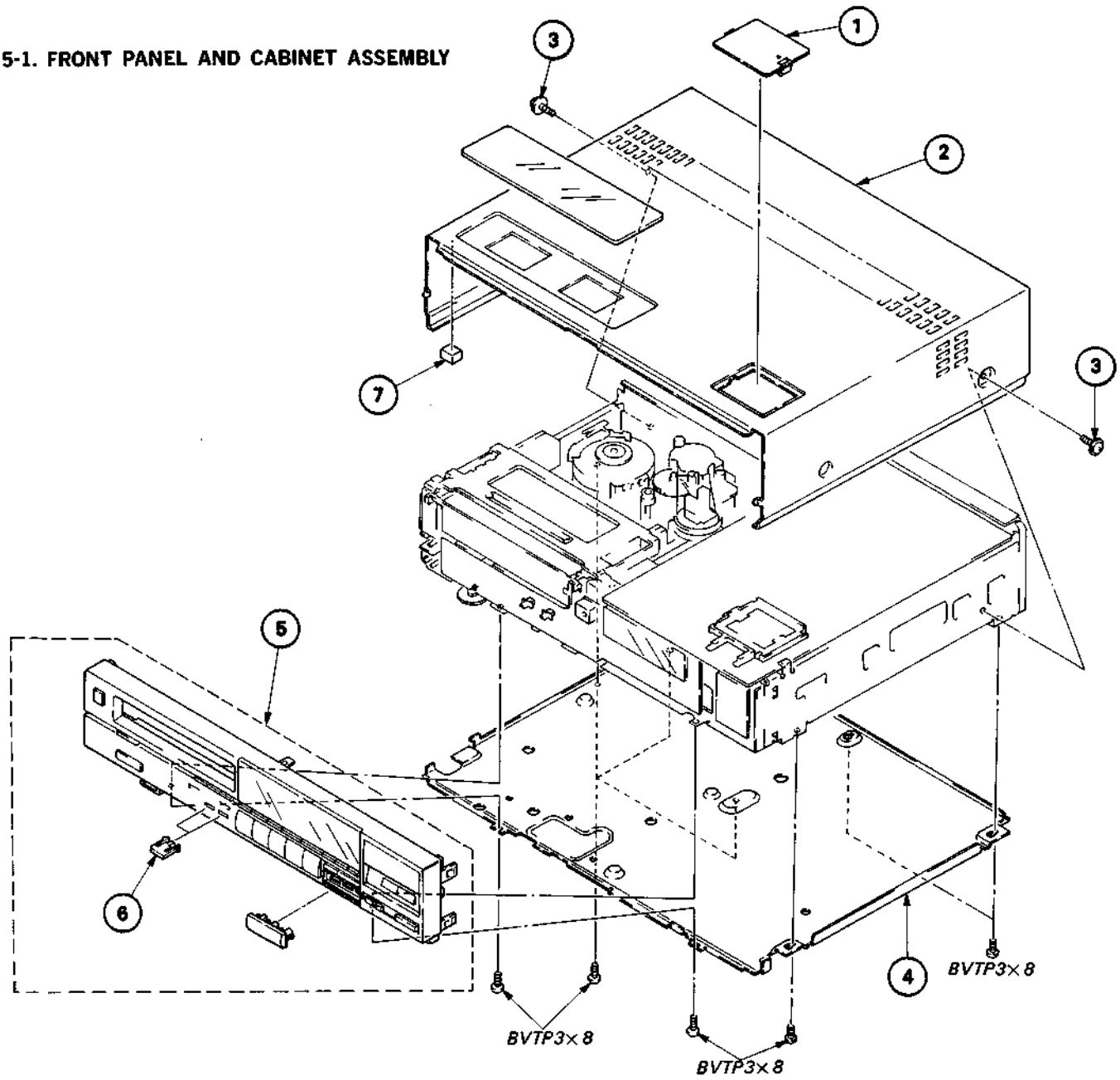
SECTION 5
EXPLODED VIEWS

NOTE:

- Itmes with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

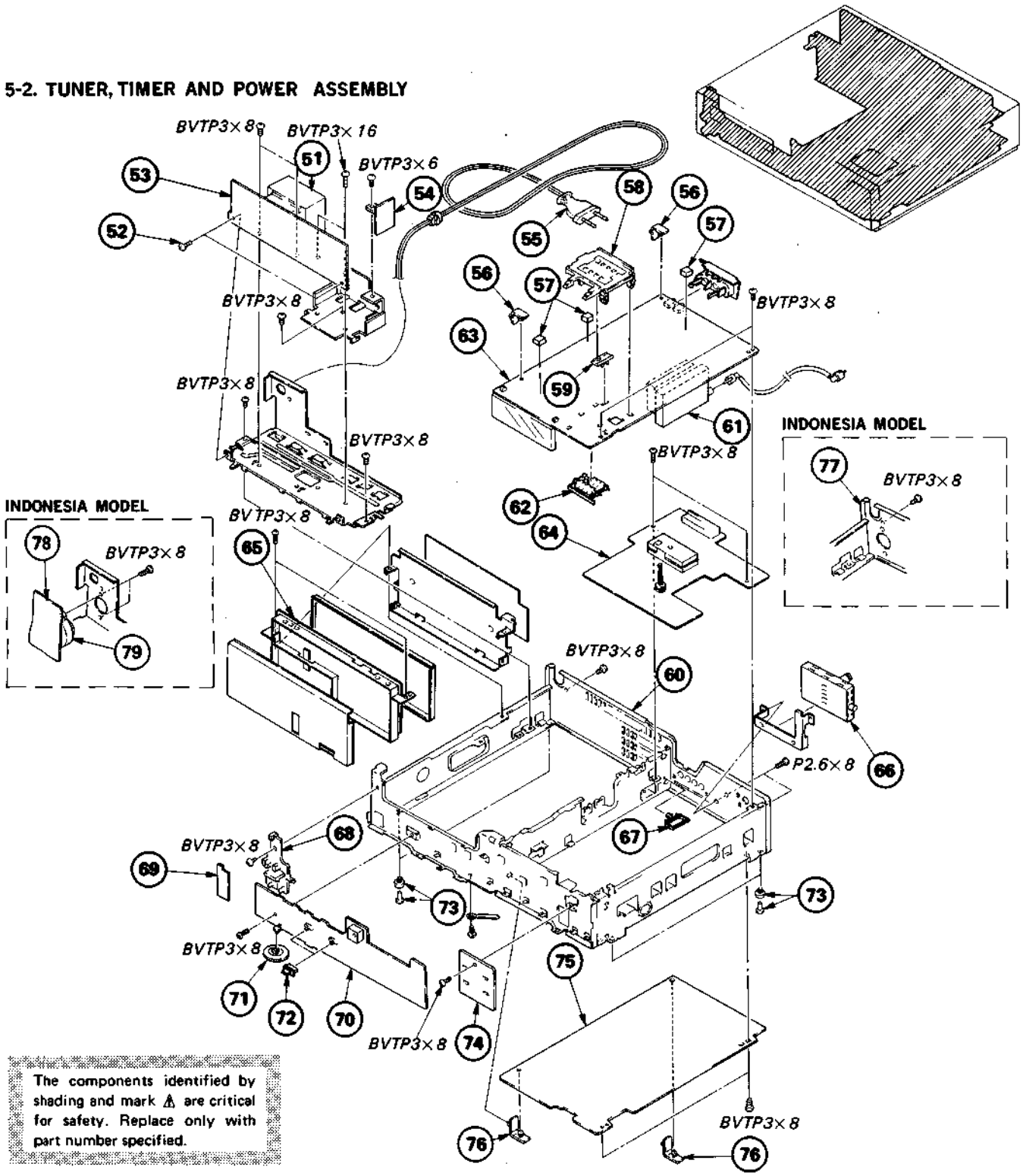
The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

5-1. FRONT PANEL AND CABINET ASSEMBLY



No.	Part No.	Description	Remark
1	3-693-865-11	LID, PRESET	
2	X-3710-522-1	CASE ASSY, UPPER	7
3	4-886-821-01	SCREW, M3 CASE	
4	*3-693-889-06	PLATE, BOTTOM	
5	X-3710-521-1	PANEL ASSY, FRONT	6
6	3-684-312-01	BUTTON, SI	
7	9-911-840-XX	RUBBER (B)	

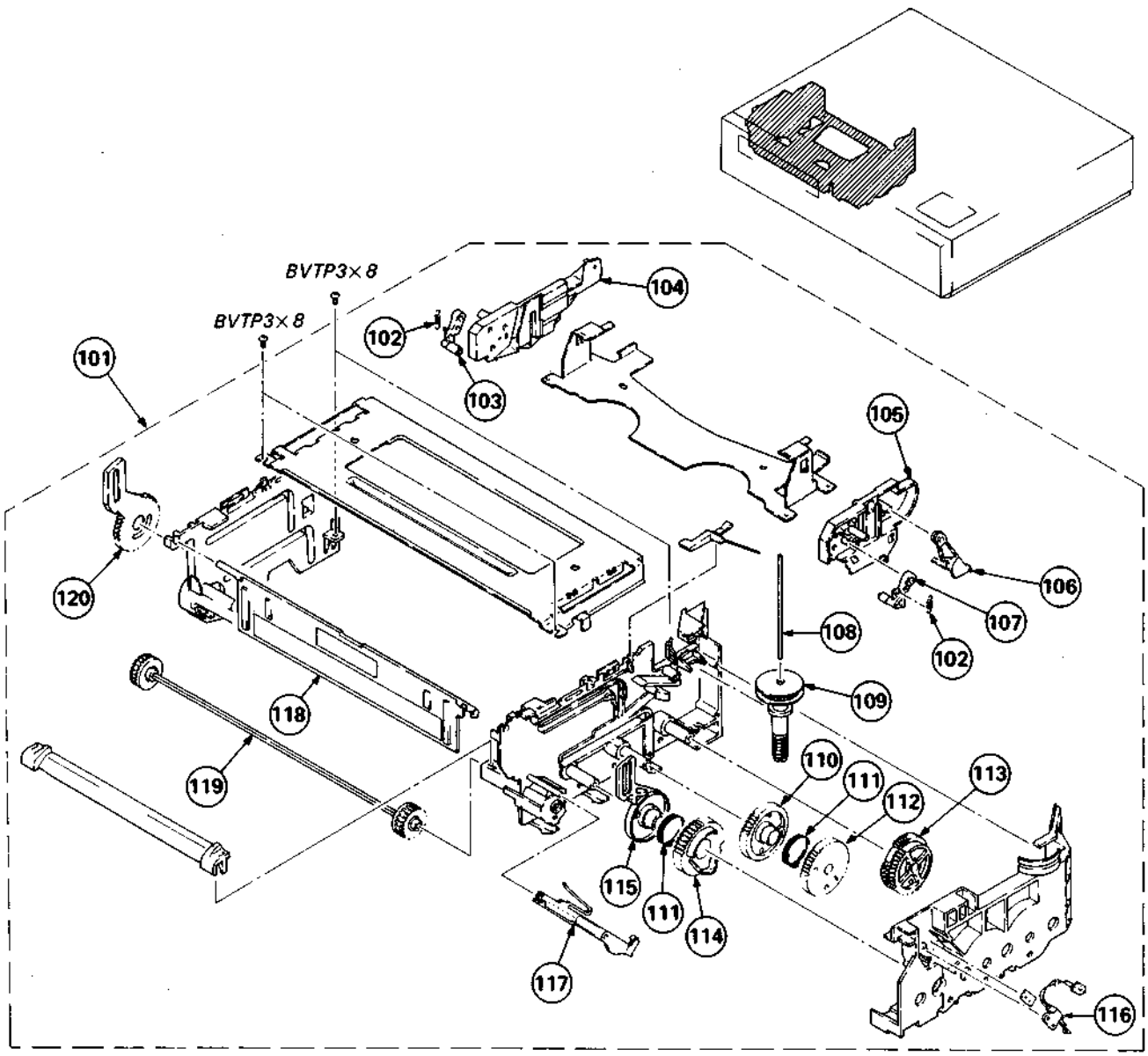
5-2. TUNER, TIMER AND POWER ASSEMBLY



The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

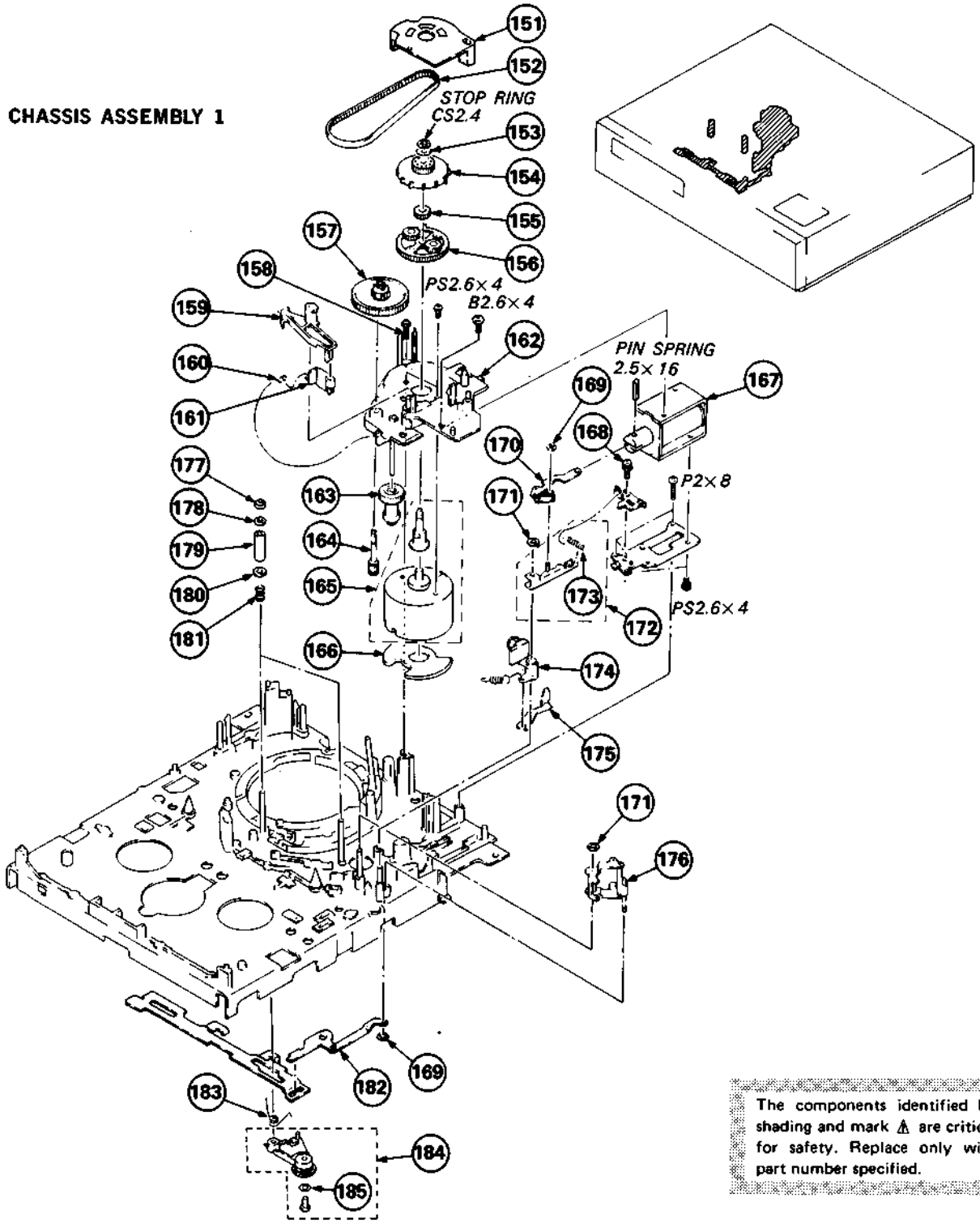
No.	Part No.	Description	Remark
51	⚠1-448-656-11	TRANSFORMER, POWER (SPANISH MODEL)	
	⚠1-448-657-11	TRANSFORMER, POWER (INDONESIA MODEL)	
52	3-693-912-01	SCREW (3X8), TAPPING	
53	*1-620-054-11	PS-115 BOARD	
54	*0-371-032-	DR-38 BOARD	
55	⚠1-551-908-61	CORD, POWER, EU10 PLUG	
56	*3-710-565-01	HINGE, PC BOARD	
57	9-911-842-XX	RUBBER (B)	
58	X-3710-520-1	COVER ASSY, PRESET	
59	3-693-842-01	BUTTON, AFT	
60	*3-710-596-01	PLATE (P), JACK	
61	⚠1-463-584-11	TUNER, ET (BT-881A)	
62	*X-3693-812-1	SHAFT ASSY, PRESET	
63	*A-6715-332-A	ST-12 BOARD, COMPLETE	
64	*A-6713-266-A	AU-26 BOARD, COMPLETE	
65	*A-6711-766-A	RP-41 BOARD, COMPLETE	
66	1-464-690-11	MODULATOR, RF (RFU-857)	
67	*3-695-074-01	CLAMP, WIRE	
68	3-710-533-01	HOLDER, JACK	
69	*1-620-051-11	MF-15 BOARD	
70	*1-620-052-11	MF-16 BOARD	
71	3-710-584-01	KNOB, SHARPNESS	
72	3-684-325-01	BUTTON, SLIDE	
73	3-670-155-11	LEG	
74	*1-620-053-11	MF-17 BOARD	
75	*A-6711-767-A	VI-23 BOARD, COMPLETE	
76	*3-701-832-00	HINGE, CIRCUIT BOARD	
77	*3-710-596-11	PLATE (P), JACK (INDONESIA MODEL)	
78	*1-620-055-11	VS-11 BOARD (INDONESIA MODEL)	
79	⚠1-552-304-11	SELECTOR, VOLTAGE S905 (INDONESIA MODEL)	

5-3. FRONT LOADING ASSEMBLY



No.	Part No.	Description	Remark
101	A-6751-317-A	THREADING BLOCK ASSY, FRONT	102-120
102	3-684-258-01	SPRING, TENSION	
103	X-3684-125-1	RETAINER (LEFT) ASSY, CASSETTE	
104	*X-3693-803-1	PLATE ASSY, SIDE, LEFT, BASE	
105	*X-3684-118-1	PLATE ASSY, SIDE, RIGHT	
106	*3-684-108-01	ARM, LID OPEN	
107	X-3684-124-1	RETAINER (RIGHT) ASSY, CASSETTE	
108	3-679-123-00	SHAFT, GEAR, WORM	
109	X-3693-804-1	GEAR ASSY, WORM	
110	3-684-111-01	GEAR (B), LIMITER	
111	3-684-115-01	SPRING	
112	3-684-109-01	GEAR (A), LIMITER	
113	X-3684-123-1	GEAR ASSY, DRIVING	
114	3-684-163-01	GEAR, DRIVING ARM	
115	3-684-165-01	ARM (RIGHT), DRIVING	
116	1-554-840-11	SWITCH, LEAF (CASSETTE IN) S904	
117	*3-693-854-01	ARM, SWITCHING, DOOR	
118	3-684-168-31	DOOR	
119	X-3684-116-1	SHAFT ASSY, MIDWAY GEAR	
120	*3-684-166-01	ARM (LEFT), DRIVING	

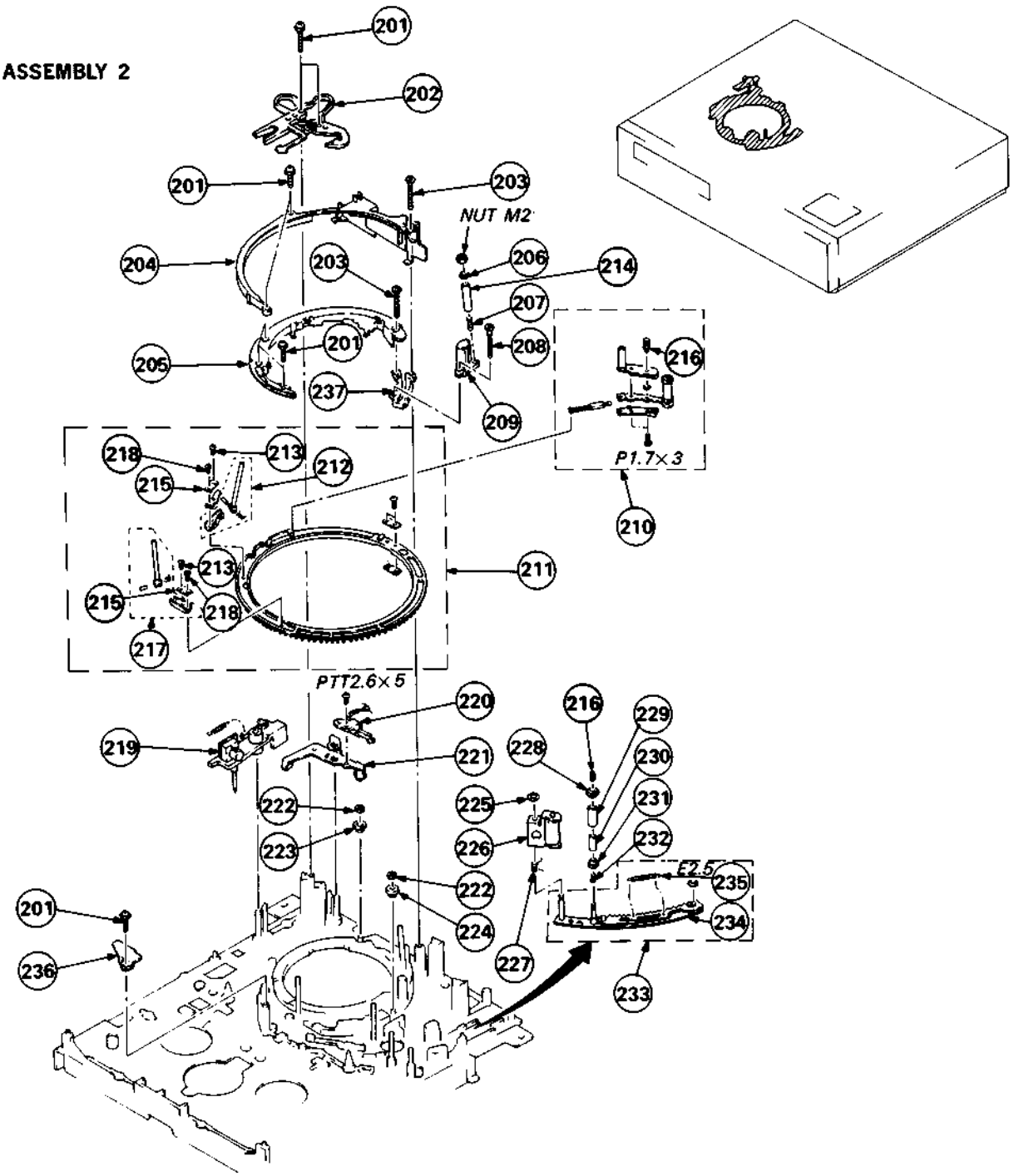
5-4. CHASSIS ASSEMBLY 1



The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

No.	Part No.	Description	Remark
151	*3-693-866-01	HOLDER, GEAR, PLANET	
152	3-684-264-01	BELT, TIMING	
153	3-683-454-01	WASHER, POLYETHYLENE	
154	3-684-178-01	GEAR, INTERNAL	
155	3-679-104-05	GEAR	
156	X-3679-111-0	CARRIER ASSY	
157	3-679-115-00	GEAR (LARGE), LOADING	
158	3-669-480-11	+ PTPWH 2	
159	3-684-167-01	ARM, STOPPER	
160	3-684-227-01	SPRING, TENSION	
161	3-684-116-01	LIMITER, STOPPER	
162	X-3693-809-1	CHASSIS ASSY, PLANET GEAR	
163	X-3669-321-0	GEAR (C) ASSY	
164	3-679-114-00	GEAR (SMALL), LOADING	
165	X-3679-268-1	MOTOR ASSY, L (LOADING/THREADING) M904	
166	*1-614-597-11	LM-16 BOARD	
167	⚠1-454-365-51	SOLENOID, PLUNGER (PINCH) PM901	
168	3-669-607-00	+PSW (SMALL ROUND) 2.6	
169	3-669-465-00	WASHER (1.5), STOPPER	
170	X-3684-109-1	ARM ASSY, PINCH SOLENOID	
171	3-669-595-00	WASHER (2), STOPPER	
172	*X-3684-112-1	ARM ASSY, PINCH LIMITER	173
173	3-515-170-00	SPRING, TENSION	
174	X-3693-830-1	SENSOR BLOCK ASSY, T L902	
175	*3-684-119-01	LINK, TAKE-UP SENSOR	
176	*X-3693-807-1	ARM ASSY, PRESS, PINCH	
177	3-669-318-21	NUT, ADJUSTMENT, GUIDE	
178	3-684-135-01	WASHER (UPPER), GUIDE, #7, 8	
179	3-693-830-01	SLEEVE, GUIDE, #7, #8	
180	3-693-831-01	WASHER, GUIDE	
181	3-693-943-01	SPRING (#7, #8), COMPRESSION	
182	*X-3684-114-1	LEVER ASSY, COMMUNICATION	
183	3-681-154-00	SPRING, TORSION	
184	X-3687-503-1	ARM ASSY, REVIEW BRAKE	185
185	3-701-436-11	WASHER, 1.6	

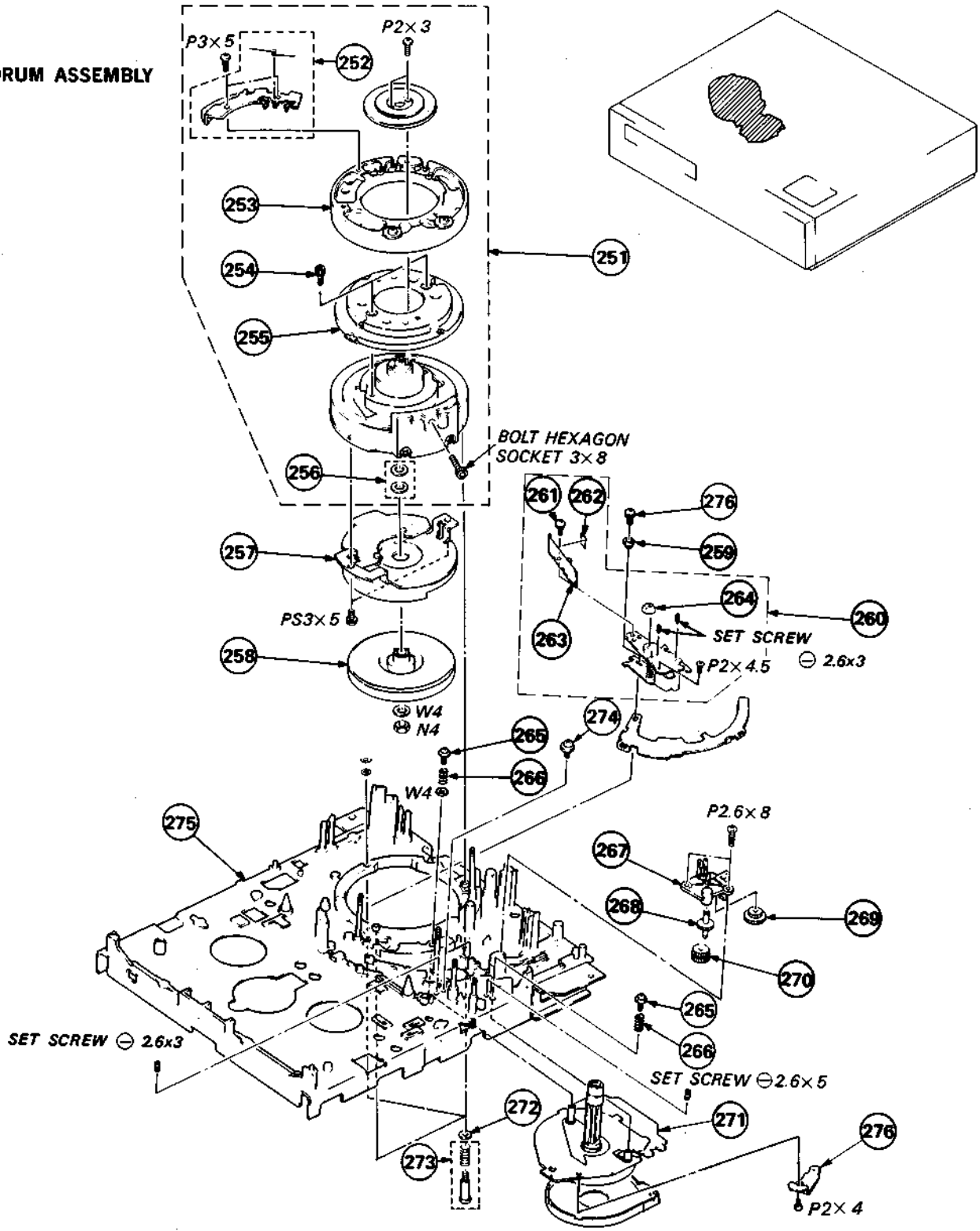
5-5. CHASSIS ASSEMBLY 2



No.	Part No.	Description	Remark
201	3-669-480-11	+ PTPWH 2	
202	3-693-867-01	PLATE (2&3), ADJUSTMENT	
203	3-669-466-21	SCREW (M 2.6)	
204	3-684-217-04	GUIDE (2), SHUTTLE	
205	*3-679-290-00	GUIDE (1-YA), SHUTTLE	
206	3-679-910-00	FLANGE (S), GUIDE, NUMBER 6	
207	3-693-942-01	SPRING (#6), COMPRESSION	
208	3-669-606-00	SCREW (2.6)	
209	8-825-508-50	HEAD, FULL ERASE EF282-21	
210	A-6750-197-A	SHUTTLE (4) BLOCK ASSY, THREADING	216
211	X-3684-178-1	RING (CF) ASSY, S THREADING	212, 213, 215, 217, 218
212	X-3669-430-0	HOLDER BLOCK ASSY, #3 GUIDE	
213	3-669-478-00	SCREW (1X3), TAPPING	
214	3-691-830-01	SLEEVE, GUIDE, #6	
215	*3-669-472-02	RETAINER, SPRING, LEAF	
216	3-694-230-01	SCREW (2X2.5), FLANGE	
217	X-3669-429-0	HOLDER BLOCK ASSY, #2 GUIDE	
218	3-672-586-00	SCREW (1.4X3), TAPPING	

No.	Part No.	Description	Remark
219	X-3693-829-1	SENSOR BLOCK ASSY, S L901	
220	1-554-840-11	SWITCH, LEAF (THREADING END) S903	
221	*X-3684-130-1	ARM ASSY, LOCK	
222	3-669-465-00	WASHER (1.5), STOPPER	
223	3-669-360-00	ROLLER, RING	
224	3-669-597-00	ROLLER (B), RING	
225	3-669-596-00	WASHER (2.3), STOPPER	
226	X-3691-646-1	ARM ASSY, PINCH ROLLER	
227	3-683-441-01	SPRING	
228	3-676-650-00	FLANGE (UPPER) (#9), GUIDE	
229	3-676-649-11	ROLLER (#9), GUIDE	
230	3-672-559-00	SLEEVE, GUIDE	
231	3-669-432-00	FLANGE (LOWER) (#9), GUIDE	
232	3-693-941-01	SPRING (#9), COMPRESSION	
233	A-6750-165-A	GEAR ASSY, SLIDER	234, 235
234	*X-3679-265-1	SLIDER ASSY (2), T	
235	3-549-014-00	SPRING, TENSION	
236	3-669-476-04	PLATE, GUIDE	
237	*X-3679-263-1	BASE ASSY, SLANT	

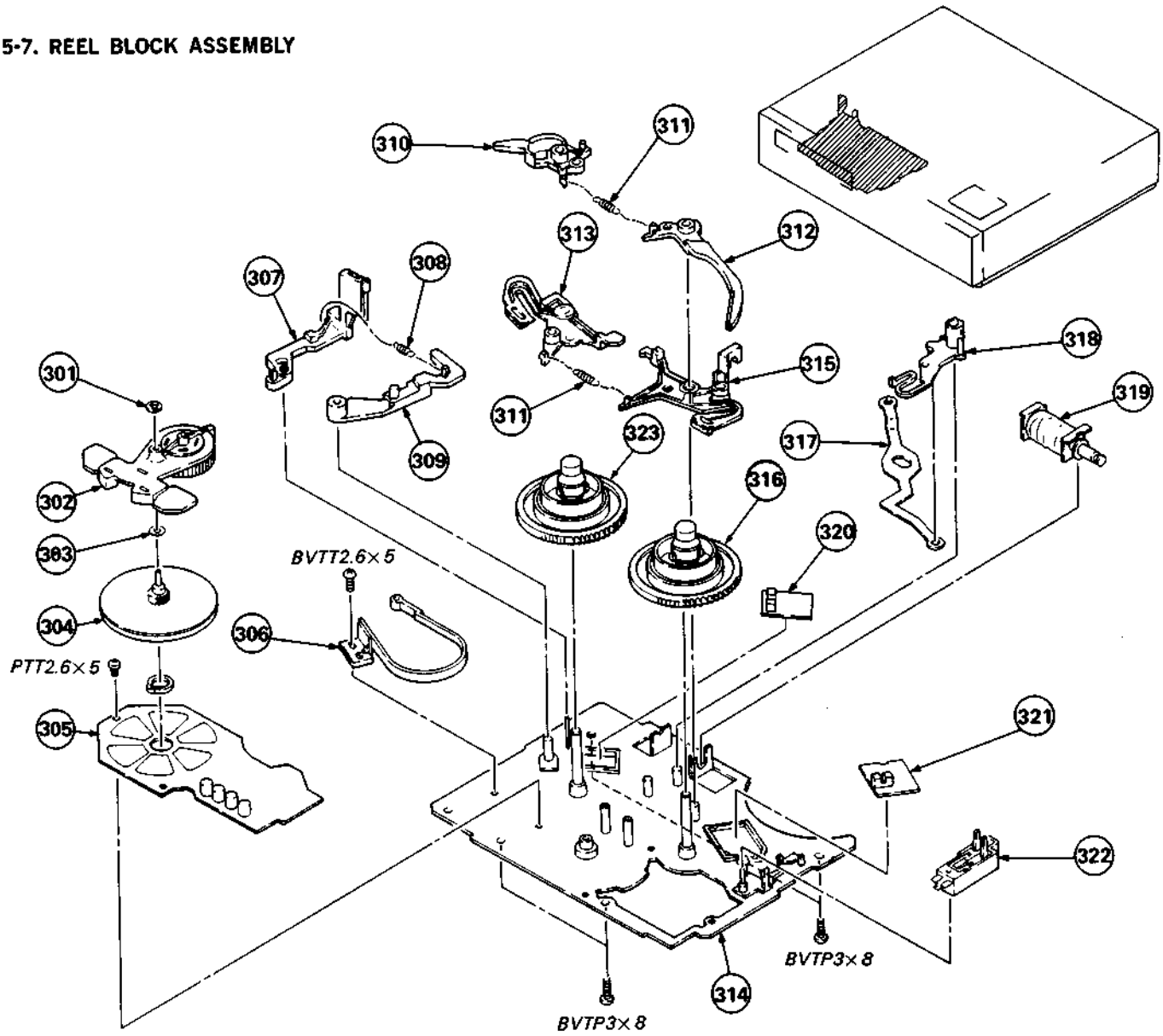
5-6. DRUM ASSEMBLY



No.	Part No.	Description	Remark
251	A-6050-445-A	DRUM ASSY, (DSH-86A-R)	252-256
252	A-6760-066-B	SPRING ASSY, TAPE RETAINER	
253	A-6760-138-A	DRUM ASSY, UPPER	
254	3-669-157-00	BOLT (WASHER) (2.6X8)	
255	A-6762-290-A	DISC ASSY (DSR-86-R)	
256	X-3669-105-0	SPACER BLOCK ASSY	
257	X-2621-228-1	D STATOR ASSY	
258	X-2621-202-0	D ROTOR ASSY	
259	3-684-247-01	BUSHING, ACE	
260	A-6761-115-A	ACE ASSY	
261	3-693-439-11	SCREW (P2.6X5), (+)	
262	3-693-904-01	SHEET (P), INSULATING	
263	3-693-895-01	PROTECTOR (S)	

No.	Part No.	Description	Remark
264	3-684-246-02	NUT, ADJUSTMENT, HEIGHT, ACE	
265	3-669-633-00	SCREW, + PW2	
266	3-679-359-00	SPRING, COMPRESSION	
267	*X-3693-805-1	CHASSIS ASSY, DRIVE GEAR	
268	*X-3693-806-1	GEAR (F) ASSY	
269	3-669-337-00	GEAR (D)	
270	3-669-338-00	GEAR (E)	
271	8-835-201-01	MOTOR, DC BHF-1914B (CAPSTAN) M902	
272	3-669-600-11	WASHER, FLAT (3.5)	
273	X-3693-838-3	SCREW ASSY, FITTING	
274	3-693-932-01	SCREW (2.6X5), W (+) P	
275	*X-3693-816-3	CHASSIS ASSY, MECHANICAL	
276	3-693-439-01	SCREW (P2.6X12), (+)	

5-7. REEL BLOCK ASSEMBLY



The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

No.	Part No.	Description	Remark
301	3-669-595-00	WASHER (2), STOPPER	
302	A-6759-074-A	ARM BLOCK ASSY, PENDULUM	
303	3-679-318-00	WASHER, PENDULUM ARM	
304	X-2622-205-1	ROTOR ASSY, R	
305	A-4910-063-B	R STATOR BOARD, COMPLETE (REEL MOTOR) M903	
306	X-3679-120-0	BAND ASSY, TENSION REGULATOR	
307	X-3684-121-1	LEVER ASSY, TENSION REGULATOR	
308	3-679-151-00	SPRING, TENSION	
309	3-693-869-01	LEVER, FUNCTION	
310	3-684-192-01	ARM, BRAKE, SUPPLY SOFT	
311	3-684-235-01	SPRING, TENSION	
312	X-3684-137-1	BRAKE ASSY, T SOFT	
313	X-3684-107-1	BRAKE ASSY, SUPPLY	
314	*X-3693-813-1	CHASSIS ASSY, SUB	
315	X-3684-108-1	BRAKE ASSY, TAKE-UP	
316	X-3684-106-1	TABLE ASSY, REEL	
317	*3-684-183-01	LINK, L	
318	3-684-193-01	ARM, PENDULUM STOPPER	
319	⚠ 1-454-371-51	SOLENOID, PLUNGER (BRAKE) PM902	
320	*1-614-829-11	MI-6 BOARD	
321	*1-614-828-11	MI-5 BOARD	
322	1-554-839-11	SWITCH, LEAF (2 GANG) (REC PROOF/CASSETTE DOWN) S901	
323	X-3710-506-1	REEL ASSY, ONE-WAY	

5-8. HARDWARE LIST

SET-SCREW

7-621-712-26 SET-SCREW, SLOT 2.6X3FLAT POINT
7-621-712-46 SET-SCREW, SLOT 2.6X5FLAT POINT
7-683-174-21 SET-SCREW, SLOT 3X4 CONE POINT

NUT

7-622-205-05 NUT M2 TYPE2

RING

7-624-118-01 RING, RETAINING E-2.5
7-624-190-61 STOP RING 2.4, TYPE-CS

TAPPING

7-685-105-14 TPG +P 2X8, TYPE 2, NON-SLIT

SCREW

7-621-255-25 SCREW +P 2X4
7-621-775-15 SCREW +B 2.6X4
7-627-552-38 SCREW, PRECISION +P 1.7X3
7-627-553-58 SCREW, PRECISION +P 2X4.5
7-627-554-07 SCREW, PRECISION +P 2X2.2

7-628-253-95 SCREW +PS 2.6X4
7-685-132-14 SCREW +P 2.6X5 TYPE2 NON-SLIT
7-685-134-14 SCREW +P 2.6X8 TYPE2 NON-SLIT
7-685-646-71 SCREW +BVTP 3X8 TYPE2 IT-3
7-685-646-81 SCREW +BVTP 3X8 TYPE2

7-685-650-71 SCREW +BVTP 3X16 TYPE2 IT-3
7-685-650-81 SCREW +BVTP 3X16 TYPE2
7-685-791-04 SCREW +PTT 2.6X5 (S)

R STATOR
RP-41

SECTION 6
ELECTRICAL PARTS LIST

NOTE:

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS
- All resistors are in ohms
- F : nonflammable

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

CAPACITORS
- MF : μF, PF : μμF

COILS
- MMH : mH, UH : μH

Ref.No	Part No.	Description				Remark
	*A-4910-063-B	R STATOR (REEL MOTOR) BOARD, COMPLETE				
		**********				
	*1-560-460-00	PIN, CONNECTOR 4P				
	*1-560-461-00	PIN, CONNECTOR 5P				
		CAPACITOR				
C1	1-123-821-00	ELECT	47MF	20%	16V	
C2	1-123-821-00	ELECT	47MF	20%	16V	
C3	1-123-821-00	ELECT	47MF	20%	16V	
C4	1-123-821-00	ELECT	47MF	20%	16V	
		DIODE				
H1	8-719-800-31	DIODE THS103A-1				
H2	8-719-800-31	DIODE THS103A-1				
		IC				
IC1	8-759-801-97	IC LB1615				
		RESISTOR				
R1	1-247-823-00	CARBON	470	5%	1/6W	
R2	1-249-429-11	CARBON	10K	5%	1/6W	
R3	1-249-437-11	CARBON	47K	5%	1/6W	
R4	1-249-437-11	CARBON	47K	5%	1/6W	
R5	1-249-437-11	CARBON	47K	5%	1/6W	
R6	1-249-437-11	CARBON	47K	5%	1/6W	
**********						
	*A-6711-766-A	RP-41 BOARD, COMPLETE				
		**********				
		CAPACITOR				
C001	1-101-004-00	CERAMIC	0.01MF		50V	
C002	1-101-004-00	CERAMIC	0.01MF		50V	
C003	1-123-356-00	ELECT	10MF	20%	16V	
C005	1-130-495-00	MYLAR	0.1MF	5%	50V	
C006	1-161-025-00	CERAMIC	0.1MF	10%	25V	
C007	1-123-306-00	ELECT	47MF	20%	10V	
C008	1-131-347-00	ELECT(SOLID)	1MF	10%	25V	
C009	1-123-356-00	ELECT	10MF	20%	16V	
C010	1-130-495-00	MYLAR	0.1MF	5%	50V	
C011	1-131-347-00	ELECT(SOLID)	1MF	10%	25V	
C012	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C013	1-102-977-00	CERAMIC	200PF	5%	50V	
C014	1-123-356-00	ELECT	10MF	20%	16V	
C015	1-102-516-00	CERAMIC	27PF	5%	50V	
C016	1-102-852-00	CERAMIC	47PF	5%	50V	
C017	1-123-307-00	ELECT	100MF	20%	6.3V	
C018	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C019	1-161-025-00	CERAMIC	0.1MF	10%	25V	
C020	1-123-307-00	ELECT	100MF	20%	6.3V	
C021	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C022	1-102-529-00	CERAMIC	100PF	5%	50V	
C023	1-102-824-00	CERAMIC	470PF	5%	50V	
C024	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C025	1-102-074-00	CERAMIC	0.001MF	10%	50V	
C026	1-101-004-00	CERAMIC	0.01MF		50V	
C027	1-102-513-00	CERAMIC	18PF	5%	50V	
C028	1-102-513-00	CERAMIC	18PF	5%	50V	
C030	1-102-865-00	CERAMIC	8PF	0.5PF	50V	
C031	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C032	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C033	1-102-978-00	CERAMIC	220PF	5%	50V	
C034	1-123-380-00	ELECT	1MF	20%	50V	
C035	1-101-004-00	CERAMIC	0.01MF		50V	
C036	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C038	1-123-306-00	ELECT	47MF	20%	10V	
C039	1-101-004-00	CERAMIC	0.01MF		50V	
C041	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C042	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C043	1-123-356-00	ELECT	10MF	20%	16V	
C044	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C045	1-101-004-00	CERAMIC	0.01MF		50V	
C046	1-101-004-00	CERAMIC	0.01MF		50V	
C047	1-102-947-00	CERAMIC	10PF	5%	50V	
C048	1-102-518-00	CERAMIC	33PF	5%	50V	
C049	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C050	1-123-380-00	ELECT	1MF	20%	50V	
C051	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C052	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C053	1-102-530-00	CERAMIC	120PF	5%	50V	
C054	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C055	1-123-356-00	ELECT	10MF	20%	16V	
C056	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C057	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C058	1-123-356-00	ELECT	10MF	20%	16V	
C059	1-161-059-00	CERAMIC	0.047MF	10%	25V	
C060	1-102-978-00	CERAMIC	220PF	5%	50V	
C061	1-123-380-00	ELECT	1MF	20%	50V	
C062	1-123-356-00	ELECT	10MF	20%	16V	
C063	1-123-330-00	ELECT	22MF	20%	16V	
C064	1-123-356-00	ELECT	10MF	20%	16V	
C065	1-130-495-00	MYLAR	0.1MF	5%	50V	
C066	1-102-513-00	CERAMIC	18PF	5%	50V	
C067	1-123-380-00	ELECT	1MF	20%	50V	
C068	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C069	1-123-356-00	ELECT	10MF	20%	16V	
C070	1-101-004-00	CERAMIC	0.01MF		50V	
C071	1-101-004-00	CERAMIC	0.01MF		50V	
C072	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C073	1-123-356-00	ELECT	10MF	20%	16V	
C074	1-102-973-00	CERAMIC	100PF	5%	50V	
C075	1-102-120-00	CERAMIC	0.0018MF	10%	50V	
C076	1-161-013-00	CERAMIC	0.01MF	10%	25V	
C078	1-123-356-00	ELECT	10MF	20%	16V	

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Ref.No	Part No.	Description			Remark
C079	1-161-013-00	CERAMIC	0.01MF	10%	25V
C081	1-102-852-00	CERAMIC	47PF	5%	50V
C082	1-123-369-00	ELECT	4.7MF	20%	50V
C083	1-161-025-00	CERAMIC	0.1MF	10%	25V
C084	1-161-025-00	CERAMIC	0.1MF	10%	25V
		CONNECTOR			
CN001	*1-560-900-00	PIN, CONNECTOR 12P			
CN002	*1-560-894-00	PIN, CONNECTOR 6P			
CN003	*1-564-028-00	PIN, CONNECTOR 3P			
CN004	*1-508-736-21	PIN, CONNECTOR			
CN005	*1-564-030-00	PIN, CONNECTOR 5P			
		DIODE			
D001	8-719-911-19	DIODE 1SS119			
D002	8-719-911-19	DIODE 1SS119			
D003	8-719-100-35	DIODE RD5.6EB2			
D004	8-719-911-19	DIODE 1SS119			
D005	8-719-911-19	DIODE 1SS119			
D006	8-719-911-19	DIODE 1SS119			
		IC			
IC001	8-752-004-50	IC CX20045			
IC002	8-759-200-60	IC TA7060AP			
IC003	8-759-103-17	IC UPC1521HA			
IC004	8-752-006-10	IC CX20061			
		COIL			
L001	1-408-403-00	MICRO INDUCTOR 3.3UH			
L002	1-408-427-00	MICRO INDUCTOR 330UH			
L003	1-408-877-00	MICRO INDUCTOR 0.22UH			
L004	1-408-427-00	MICRO INDUCTOR 330UH			
L005	1-408-878-00	MICRO INDUCTOR 0.33UH			
L006	1-408-429-00	MICRO INDUCTOR 470UH			
L007	1-408-402-00	MICRO INDUCTOR 2.7UH			
L008	1-408-429-00	MICRO INDUCTOR 470UH			
L009	1-408-411-00	MICRO INDUCTOR 15UH			
L010	1-408-429-00	MICRO INDUCTOR 470UH			
L011	1-408-411-00	MICRO INDUCTOR 15UH			
L012	1-408-421-00	MICRO INDUCTOR 100UH			
L013	1-408-422-00	MICRO INDUCTOR 120UH			
L014	1-408-412-00	MICRO INDUCTOR 18UH			
L015	1-408-415-00	MICRO INDUCTOR 33UH			
L016	1-410-162-11	MICRO INDUCTOR 470UH			
L017	1-408-408-00	MICRO INDUCTOR 8.2UH			
L018	1-408-417-00	MICRO INDUCTOR 47UH			
L019	1-410-093-11	MICRO INDUCTOR 33MMH			
L020	1-408-429-00	MICRO INDUCTOR 470UH			
L021	1-408-429-00	MICRO INDUCTOR 470UH			
L022	1-408-429-00	MICRO INDUCTOR 470UH			
L023	1-408-411-00	MICRO INDUCTOR 15UH			
L024	1-408-429-00	MICRO INDUCTOR 470UH			
L025	1-408-429-00	MICRO INDUCTOR 470UH			

Ref.No	Part No.	Description				Remark
		TRANSISTOR				
Q001	8-729-603-30	TRANSISTOR 2SC403SP-3				
Q002	8-729-600-27	TRANSISTOR 2SC634SP				
Q003	8-729-177-33	TRANSISTOR 2SD773-4				
Q004	8-729-900-36	TRANSISTOR DTC124ES				
Q005	8-729-600-27	TRANSISTOR 2SC634SP				
Q006	8-729-600-27	TRANSISTOR 2SC634SP				
Q007	8-729-600-27	TRANSISTOR 2SC634SP				
Q008	8-729-600-27	TRANSISTOR 2SC634SP				
Q009	8-729-900-89	TRANSISTOR DTC144ES				
Q010	8-729-600-27	TRANSISTOR 2SC634SP				
Q011	8-729-600-27	TRANSISTOR 2SC634SP				
Q012	8-729-600-27	TRANSISTOR 2SC634SP				
Q013	8-729-900-80	TRANSISTOR DTC114ES				
Q014	8-729-600-27	TRANSISTOR 2SC634SP				
Q015	8-729-204-83	TRANSISTOR 2SA1048-GR				
Q016	8-729-204-83	TRANSISTOR 2SA1048-GR				
Q017	8-729-600-27	TRANSISTOR 2SC634SP				
Q018	8-729-600-27	TRANSISTOR 2SC634SP				
Q019	8-729-603-30	TRANSISTOR 2SC403SP-3				
Q020	8-729-900-36	TRANSISTOR DTC124ES				
Q021	8-729-900-63	TRANSISTOR DTA124ES				
Q022	8-729-900-89	TRANSISTOR DTC144ES				
Q023	8-729-600-27	TRANSISTOR 2SC634SP				
Q024	8-729-600-27	TRANSISTOR 2SC634SP				
Q025	8-729-600-27	TRANSISTOR 2SC634SP				
		RESISTOR				
R001	1-247-819-00	CARBON	330	5%	1/6W	
R002	1-247-819-00	CARBON	330	5%	1/6W	
R003	1-247-833-00	CARBON	1.2K	5%	1/6W	
R004	1-247-819-00	CARBON	330	5%	1/6W	
R005	1-249-417-11	CARBON	1K	5%	1/6W	
R006	1-249-417-11	CARBON	1K	5%	1/6W	
R007	1-247-821-00	CARBON	390	5%	1/6W	
R008	1-247-833-00	CARBON	1.2K	5%	1/6W	
R009	1-249-417-11	CARBON	1K	5%	1/6W	
R010	1-249-417-11	CARBON	1K	5%	1/6W	
R011	1-249-417-11	CARBON	1K	5%	1/6W	
R012	1-249-417-11	CARBON	1K	5%	1/6W	
R013	1-247-839-00	CARBON	2.2K	5%	1/6W	
R014	1-247-829-00	CARBON	820	5%	1/6W	
R015	1-249-433-11	CARBON	22K	5%	1/6W	
R016	1-247-829-00	CARBON	820	5%	1/6W	
R017	1-247-823-00	CARBON	470	5%	1/6W	
R018	1-247-823-00	CARBON	470	5%	1/6W	
R019	1-247-845-00	CARBON	3.9K	5%	1/6W	
R020	1-249-433-11	CARBON	22K	5%	1/6W	
R021	1-249-433-11	CARBON	22K	5%	1/6W	
R022	1-249-415-11	CARBON	680	5%	1/6W	
R023	1-247-797-00	CARBON	39	5%	1/6W	
R024	1-249-417-11	CARBON	1K	5%	1/6W	
R025	1-249-433-11	CARBON	22K	5%	1/6W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R026	1-249-433-11	CARBON	22K	5%	1/6W	
R027	1-249-433-11	CARBON	22K	5%	1/6W	
R028	1-249-414-11	CARBON	560	5%	1/6W	
R029	1-247-823-00	CARBON	470	5%	1/6W	
R030	1-247-817-00	CARBON	270	5%	1/6W	
R031	1-247-817-00	CARBON	270	5%	1/6W	
R032	1-249-434-11	CARBON	27K	5%	1/6W	
R033	1-247-859-00	CARBON	15K	5%	1/6W	
R034	1-249-417-11	CARBON	1K	5%	1/6W	
R035	1-249-429-11	CARBON	10K	5%	1/6W	
R036	1-249-429-11	CARBON	10K	5%	1/6W	
R037	1-215-433-00	METAL	3.3K	1%	1/6W	
R038	1-215-451-00	METAL	18K	1%	1/6W	
R040	1-215-433-00	METAL	3.3K	1%	1/6W	
R041	1-215-405-00	METAL	220	1%	1/6W	
R042	1-215-413-00	METAL	470	1%	1/6W	
R043	1-249-417-11	CARBON	1K	5%	1/6W	
R044	1-247-839-00	CARBON	2.2K	5%	1/6W	
R045	1-249-417-11	CARBON	1K	5%	1/6W	
R046	1-249-429-11	CARBON	10K	5%	1/6W	
R047	1-249-429-11	CARBON	10K	5%	1/6W	
R048	1-247-811-00	CARBON	150	5%	1/6W	
R049	1-249-417-11	CARBON	1K	5%	1/6W	
R050	1-247-829-00	CARBON	820	5%	1/6W	
R051	1-249-437-11	CARBON	47K	5%	1/6W	
R052	1-249-434-11	CARBON	27K	5%	1/6W	
R053	1-249-429-11	CARBON	10K	5%	1/6W	
R054	1-249-405-11	CARBON	100	5%	1/6W	
R055	1-249-441-11	CARBON	100K	5%	1/6W	
R056	1-247-895-00	CARBON	470K	5%	1/6W	
R057	1-249-429-11	CARBON	10K	5%	1/6W	
R058	1-249-429-11	CARBON	10K	5%	1/6W	
R059	1-247-815-00	CARBON	220	5%	1/6W	
R060	1-249-435-11	CARBON	33K	5%	1/6W	
R061	1-249-429-11	CARBON	10K	5%	1/6W	
R062	1-249-432-11	CARBON	18K	5%	1/6W	
R063	1-249-422-11	CARBON	2.7K	5%	1/6W	
R064	1-247-857-00	CARBON	12K	5%	1/6W	
R065	1-249-415-11	CARBON	680	5%	1/6W	
R066	1-247-870-00	CARBON	43K	5%	1/6W	
R067	1-249-405-11	CARBON	100	5%	1/6W	
R068	1-247-859-00	CARBON	15K	5%	1/6W	
R069	1-249-417-11	CARBON	1K	5%	1/6W	
R070	1-247-815-00	CARBON	220	5%	1/6W	
R071	1-249-417-11	CARBON	1K	5%	1/6W	
R072	1-249-433-11	CARBON	22K	5%	1/6W	
R073	⚠ 1-217-387-00	FUSIBLE	10	5%	1/4W	F
R074	1-249-417-11	CARBON	1K	5%	1/6W	
R075	1-247-857-00	CARBON	12K	5%	1/6W	
R076	1-249-417-11	CARBON	1K	5%	1/6W	
R079	1-247-858-00	CARBON	13K	5%	1/6W	
R082	1-249-422-11	CARBON	2.7K	5%	1/6W	

Ref.No	Part No.	Description			Remark
		VARIABLE RESISTOR			
RV001	1-228-920-00	RES, ADJ, CARBON 2.2K			
RV002	1-228-920-00	RES, ADJ, CARBON 2.2K			
RV003	1-228-920-00	RES, ADJ, CARBON 2.2K			
RV004	1-228-920-00	RES, ADJ, CARBON 2.2K			
RV005	1-228-919-00	RES, ADJ, CARBON 1K			
RV006	1-228-990-00	RES, ADJ, CARBON 1K			
RV007	1-228-920-00	RES, ADJ, CARBON 2.2K			
RV008	1-228-920-00	RES, ADJ, CARBON 2.2K			
**********					
	*A-6711-767-A	VI-23 BOARD, COMPLETE			
		**********			
		CAPACITOR			
C008	1-101-004-00	CERAMIC	0.01MF	50V	
C010	1-101-004-00	CERAMIC	0.01MF	50V	
C011	1-101-004-00	CERAMIC	0.01MF	50V	
C012	1-161-055-00	CERAMIC	0.022MF	10% 25V	
C013	1-102-822-00	CERAMIC	390PF	5% 50V	
C014	1-101-004-00	CERAMIC	0.01MF	50V	
C015	1-123-330-00	ELECT	22MF	20% 16V	
C016	1-101-006-00	CERAMIC	0.047MF	50V	
C017	1-101-004-00	CERAMIC	0.01MF	50V	
C020	1-101-006-00	CERAMIC	0.047MF	50V	
C021	1-131-377-00	TANTALUM	10MF	10% 10V	
C022	1-131-377-00	TANTALUM	10MF	10% 10V	
C023	1-161-024-00	CERAMIC	0.082MF	10% 25V	
C024	1-101-004-00	CERAMIC	0.01MF	50V	
C025	1-123-380-00	ELECT	1MF	20% 50V	
C026	1-102-977-00	CERAMIC	200PF	5% 50V	
C027	1-123-369-00	ELECT	4.7MF	20% 25V	
C028	1-102-951-00	CERAMIC	15PF	5% 50V	
C029	1-101-004-00	CERAMIC	0.01MF	50V	
C030	1-101-004-00	CERAMIC	0.01MF	50V	
C031	1-101-004-00	CERAMIC	0.01MF	50V	
C032	1-123-380-00	ELECT	1MF	20% 50V	
C033	1-102-525-00	CERAMIC	68PF	5% 50V	
C034	1-102-525-00	CERAMIC	68PF	5% 50V	
C035	1-102-128-00	CERAMIC	0.0082MF	10% 50V	
C036	1-102-516-00	CERAMIC	27PF	5% 50V	
C037	1-102-962-00	CERAMIC	30PF	5% 50V	
C038	1-101-004-00	CERAMIC	0.01MF	50V	
C039	1-123-369-00	ELECT	4.7MF	20% 25V	
C040	1-101-004-00	CERAMIC	0.01MF	50V	
C041	1-101-004-00	CERAMIC	0.01MF	50V	
C042	1-102-525-00	CERAMIC	68PF	5% 50V	
C043	1-102-525-00	CERAMIC	68PF	5% 50V	
C044	1-102-521-00	CERAMIC	43PF	5% 50V	
C045	1-123-306-00	ELECT	47MF	20% 10V	
C046	1-101-004-00	CERAMIC	0.01MF	50V	
C047	1-101-006-00	CERAMIC	0.047MF	50V	

When indicating parts by reference number, please include the board name.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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Ref.No	Part No.	Description			Remark
C048	1-102-816-00	CERAMIC	120PF	5%	50V
C049	1-123-382-00	ELECT	3.3MF	20%	50V
C050	1-130-483-00	MYLAR	0.01MF	5%	50V
C051	1-101-006-00	CERAMIC	0.047MF		50V
C052	1-123-306-00	ELECT	47MF	20%	10V
C053	1-101-004-00	CERAMIC	0.01MF		50V
C054	1-102-816-00	CERAMIC	120PF	5%	50V
C055	1-102-980-00	CERAMIC	270PF	5%	50V
C056	1-102-963-00	CERAMIC	33PF	5%	50V
C057	1-123-380-00	ELECT	1MF	20%	50V
C058	1-161-040-00	CERAMIC	0.0012MF	10%	25V
C059	1-123-380-00	ELECT	1MF	20%	50V
C060	1-101-004-00	CERAMIC	0.01MF		50V
C061	1-102-525-00	CERAMIC	68PF	5%	50V
C062	1-102-865-00	CERAMIC	8PF	0.5PF	50V
C063	1-102-525-00	CERAMIC	68PF	5%	50V
C065	1-101-004-00	CERAMIC	0.01MF		50V
C074	1-101-004-00	CERAMIC	0.01MF		50V
C084	1-101-004-00	CERAMIC	0.01MF		50V
C085	1-101-004-00	CERAMIC	0.01MF		50V
C086	1-101-004-00	CERAMIC	0.01MF		50V
C087	1-123-356-00	ELECT	10MF	20%	16V
C089	1-101-004-00	CERAMIC	0.01MF		50V
C090	1-102-816-00	CERAMIC	120PF	5%	50V
C091	1-101-004-00	CERAMIC	0.01MF		50V
C092	1-101-882-00	CERAMIC	51PF	5%	50V
C093	1-101-004-00	CERAMIC	0.01MF		50V
C094	1-102-816-00	CERAMIC	120PF	5%	50V
C095	1-101-004-00	CERAMIC	0.01MF		50V
C096	1-130-472-00	MYLAR	0.0012MF	5%	50V
C097	1-123-382-00	ELECT	3.3MF	20%	50V
C098	1-130-471-00	MYLAR	0.001MF	5%	50V
C099	1-161-045-00	CERAMIC	0.0033MF	10%	25V
C100	1-101-059-00	CERAMIC	510PF	5%	50V
C101	1-130-471-00	MYLAR	0.001MF	5%	50V
C102	1-130-047-00	FILM	180PF	5%	50V
C103	1-101-882-00	CERAMIC	51PF	5%	50V
C104	1-101-004-00	CERAMIC	0.01MF		50V
C105	1-123-330-00	ELECT	22MF	20%	16V
C106	1-101-006-00	CERAMIC	0.047MF		50V
C107	1-102-773-00	CERAMIC	330PF	5%	50V
C108	1-161-047-00	CERAMIC	0.0047MF	10%	25V
C109	1-101-006-00	CERAMIC	0.047MF		50V
C110	1-123-356-00	ELECT	10MF	20%	16V
C111	1-101-004-00	CERAMIC	0.01MF		50V
C112	1-161-045-00	CERAMIC	0.0033MF	10%	25V
C113	1-101-001-00	CERAMIC	0.001MF		50V
C114	1-123-333-00	ELECT	100MF	20%	16V
C115	1-161-025-00	CERAMIC	0.1MF	10%	25V
C116	1-123-325-00	ELECT	2200MF	20%	16V
C117	1-101-006-00	CERAMIC	0.047MF		50V
C118	1-102-865-00	CERAMIC	8PF	0.5PF	50V
C119	1-101-004-00	CERAMIC	0.01MF		50V

Ref.No	Part No.	Description			Remark
C121	1-102-822-00	CERAMIC	390PF	5%	50V
C122	1-161-057-00	CERAMIC	0.033MF	10%	25V
C123	1-101-004-00	CERAMIC	0.01MF		50V
C124	1-123-356-00	ELECT	10MF	20%	16V
C125	1-101-006-00	CERAMIC	0.047MF		50V
C126	1-101-004-00	CERAMIC	0.01MF		50V
C127	1-101-004-00	CERAMIC	0.01MF		50V
C128	1-101-004-00	CERAMIC	0.01MF		50V
C129	1-161-025-00	CERAMIC	0.1MF	10%	25V
C130	1-101-006-00	CERAMIC	0.047MF		50V
C131	1-101-006-00	CERAMIC	0.047MF		50V
C132	1-101-006-00	CERAMIC	0.047MF		50V
C133	1-102-976-00	CERAMIC	180PF	5%	50V
C134	1-102-824-00	CERAMIC	470PF	5%	50V
C135	1-102-823-00	CERAMIC	430PF	5%	50V
C136	1-102-820-00	CERAMIC	330PF	5%	50V
C137	1-101-004-00	CERAMIC	0.01MF		50V
C138	1-101-004-00	CERAMIC	0.01MF		50V
C139	1-161-013-00	CERAMIC	0.01MF	10%	25V
C140	1-102-525-00	CERAMIC	68PF	5%	50V
C141	1-101-006-00	CERAMIC	0.047MF		50V
C142	1-102-508-00	CERAMIC	10PF	0.5PF	50V
C143	1-102-521-00	CERAMIC	43PF	5%	50V
C144	1-102-521-00	CERAMIC	43PF	5%	50V
C145	1-102-508-00	CERAMIC	10PF	0.5PF	50V
C146	1-123-330-00	ELECT	22MF	20%	16V
C147	1-102-904-00	CERAMIC	110PF	5%	50V
C148	1-102-515-00	CERAMIC	24PF	5%	50V
C149	1-102-525-00	CERAMIC	68PF	5%	50V
C150	1-123-330-00	ELECT	22MF	20%	16V
C151	1-123-330-00	ELECT	22MF	20%	16V
C152	1-101-004-00	CERAMIC	0.01MF		50V
C153	1-123-330-00	ELECT	22MF	20%	16V
C154	1-123-330-00	ELECT	22MF	20%	16V
C155	1-101-004-00	CERAMIC	0.01MF		50V
C156	1-101-004-00	CERAMIC	0.01MF		50V
C157	1-102-976-00	CERAMIC	180PF	5%	50V
C158	1-102-823-00	CERAMIC	430PF	5%	50V
C159	1-102-824-00	CERAMIC	470PF	5%	50V
C160	1-101-361-00	CERAMIC	150PF	5%	50V
C161	1-123-330-00	ELECT	22MF	20%	16V
C162	1-102-530-00	CERAMIC	120PF	5%	50V
C163	1-101-974-00	CERAMIC	20PF	5%	50V
C164	1-123-330-00	ELECT	22MF	20%	16V
C165	1-123-380-00	ELECT	1MF	20%	50V
C166	1-123-380-00	ELECT	1MF	20%	50V
C167	1-123-380-00	ELECT	1MF	20%	50V
C168	1-123-380-00	ELECT	1MF	20%	50V
C169	1-123-381-00	ELECT	2.2MF	20%	50V
C170	1-123-318-00	ELECT	33MF	20%	16V
C171	1-101-005-00	CERAMIC	0.022MF		50V
C172	1-101-001-00	CERAMIC	0.001MF		50V
C173	1-101-001-00	CERAMIC	0.001MF		50V

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description			Remark
C174	1-101-004-00	CERAMIC	0.01MF		50V
C175	1-123-330-00	ELECT	22MF	20%	16V
C176	1-123-330-00	ELECT	22MF	20%	16V
C177	1-102-962-00	CERAMIC	30PF	5%	50V
C178	1-101-888-00	CERAMIC	68PF	5%	50V
C179	1-123-381-00	ELECT	2.2MF	20%	50V
C180	1-102-936-00	CERAMIC	3PF	0.25PF	50V
C181	1-101-006-00	CERAMIC	0.047MF		50V
C182	1-123-369-00	ELECT	4.7MF	20%	25V
C183	1-123-356-00	ELECT	10MF	20%	16V
C184	1-101-884-00	CERAMIC	56PF	5%	50V
C185	1-102-965-00	CERAMIC	39PF	5%	50V
C186	1-123-356-00	ELECT	10MF	20%	16V
C187	1-123-356-00	ELECT	10MF	20%	16V
C189	1-102-973-00	CERAMIC	100PF	5%	50V
C190	1-123-330-00	ELECT	22MF	20%	16V
C191	1-102-977-00	CERAMIC	200PF	5%	50V
C192	1-102-973-00	CERAMIC	100PF	5%	50V
C193	1-130-471-00	MYLAR	0.001MF	5%	50V
C194	1-101-004-00	CERAMIC	0.01MF		50V
C195	1-123-356-00	ELECT	10MF	20%	16V
C196	1-123-356-00	ELECT	10MF	20%	16V
C197	1-161-025-00	CERAMIC	0.1MF	10%	25V
C198	1-102-816-00	CERAMIC	120PF	5%	50V
C199	1-101-004-00	CERAMIC	0.01MF		50V
C200	1-101-006-00	CERAMIC	0.047MF		50V
C201	1-102-973-00	CERAMIC	100PF	5%	50V
C202	1-101-004-00	CERAMIC	0.01MF		50V
C203	1-101-361-00	CERAMIC	150PF	5%	50V
C204	1-130-491-00	MYLAR	0.047MF	5%	50V
C205	1-161-043-00	CERAMIC	0.0022MF	10%	25V
C206	1-123-356-00	ELECT	10MF	20%	16V
C207	1-101-006-00	CERAMIC	0.047MF		50V
C208	1-123-369-00	ELECT	4.7MF	20%	25V
C209	1-123-380-00	ELECT	1MF	20%	50V
C210	1-123-356-00	ELECT	10MF	20%	16V
C211	1-123-330-00	ELECT	22MF	20%	16V
C212	1-123-356-00	ELECT	10MF	20%	16V
C213	1-123-330-00	ELECT	22MF	20%	16V
C214	1-123-318-00	ELECT	33MF	20%	16V
C215	1-102-948-00	CERAMIC	11PF	5%	50V
C216	1-101-004-00	CERAMIC	0.01MF		50V
C217	1-101-004-00	CERAMIC	0.01MF		50V
C218	1-101-004-00	CERAMIC	0.01MF		50V
C219	1-123-330-00	ELECT	22MF	20%	16V
C220	1-101-004-00	CERAMIC	0.01MF		50V
C221	1-101-004-00	CERAMIC	0.01MF		50V
C222	1-123-330-00	ELECT	22MF	20%	16V
C223	1-161-039-00	CERAMIC	0.001MF	10%	25V
C224	1-161-025-00	CERAMIC	0.1MF	10%	25V

FILTER

CF001	1-527-849-00	FILTER, CERAMIC
CF002	1-527-875-00	FILTER, CERAMIC

CONNECTOR

CN001	*1-560-893-00	PIN, CONNECTOR 5P
CN002	*1-560-896-00	PIN, CONNECTOR 8P
CN003	*1-560-891-00	PIN, CONNECTOR 3P
CN004	*1-560-895-00	PIN, CONNECTOR 7P
CN005	*1-560-894-00	PIN, CONNECTOR 6P
CN006	*1-560-894-00	PIN, CONNECTOR 6P
CN007	*1-560-899-00	PIN, CONNECTOR 11P

TRIMMER

CV001	1-141-275-00	CAP, TRIMMER

DIODE

D003	8-719-911-19	DIODE 1SS119
D009	8-719-100-41	DIODE RD6.8EB2
D010	8-719-911-19	DIODE 1SS119
D011	8-719-911-19	DIODE 1SS119
D012	8-719-911-19	DIODE 1SS119
D013	8-719-000-12	DIODE MC931
D014	8-719-911-19	DIODE 1SS119
D015	8-719-911-19	DIODE 1SS119
D016	8-719-911-19	DIODE 1SS119
D017	8-719-911-19	DIODE 1SS119
D018	8-719-911-19	DIODE 1SS119
D019	8-719-911-19	DIODE 1SS119
D020	8-719-911-19	DIODE 1SS119
D021	8-719-911-19	DIODE 1SS119
D022	8-719-911-19	DIODE 1SS119
D023	8-719-911-19	DIODE 1SS119
D024	8-719-911-19	DIODE 1SS119
D025	8-719-911-19	DIODE 1SS119
D026	8-719-911-19	DIODE 1SS119
D027	8-719-901-33	DIODE 1SS133
D028	8-719-901-33	DIODE 1SS133
D029	8-719-911-19	DIODE 1SS119
D030	8-719-911-19	DIODE 1SS119
D031	8-719-911-19	DIODE 1SS119

DELAY LINE

DL001	1-415-419-21	DELAY LINE
DL002	1-415-313-00	DELAY LINE (1H)
DL003	1-415-352-11	DELAY LINE, 1H

FILTER

FL001	1-235-098-00	FILTER, BAND PASS
FL002	1-235-097-00	FILTER, LOW PASS

IC

IC001	8-759-203-99	IC CX10021B-NP
IC006	8-759-202-47	IC CX10023A

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description	Remark
IC007	8-759-045-38	IC MC14538BCP	
IC008	8-759-101-62	IC CX20043	
IC009	8-758-662-00	IC CX-866B	
		COIL	
L002	1-408-408-00	MICRO INDUCTOR 8.2UH	
L003	1-408-423-00	MICRO INDUCTOR 150UH	
L004	1-408-421-00	MICRO INDUCTOR 100UH	
L005	1-408-429-00	MICRO INDUCTOR 470UH	
L006	1-410-122-11	MICRO INDUCTOR 1.8MMH	
L007	1-408-427-00	MICRO INDUCTOR 330UH	
L008	1-408-415-00	MICRO INDUCTOR 33UH	
L009	1-408-426-00	MICRO INDUCTOR 270UH	
L010	1-408-407-00	MICRO INDUCTOR 6.8UH	
L011	1-408-406-00	MICRO INDUCTOR 5.6UH	
L012	1-407-496-00	MICRO INDUCTOR 2.2MMH	
L013	1-407-499-00	MICRO INDUCTOR 3.9MMH	
L014	1-408-421-00	MICRO INDUCTOR 100UH	
L016	1-408-429-00	MICRO INDUCTOR 470UH	
L017	1-408-415-00	MICRO INDUCTOR 33UH	
L018	1-408-423-00	MICRO INDUCTOR 150UH	
L019	1-408-409-00	MICRO INDUCTOR 10UH	
L020	1-408-421-00	MICRO INDUCTOR 100UH	
L021	1-408-422-00	MICRO INDUCTOR 120UH	
L022	1-408-421-00	MICRO INDUCTOR 100UH	
L023	1-408-414-00	MICRO INDUCTOR 27UH	
L024	1-408-417-00	MICRO INDUCTOR 47UH	
L025	1-408-423-00	MICRO INDUCTOR 150UH	
L026	1-408-409-00	MICRO INDUCTOR 10UH	
L027	1-408-415-00	MICRO INDUCTOR 33UH	
L028	1-408-419-00	MICRO INDUCTOR 68UH	
L029	1-408-397-00	MICRO INDUCTOR 1UH	
L030	1-408-397-00	MICRO INDUCTOR 1UH	
L032	1-408-409-00	MICRO INDUCTOR 10UH	
L033	1-408-422-00	MICRO INDUCTOR 120UH	
		VARIABLE COIL	
LV002	1-408-512-00	COIL (VARIABLE)	
		IC LINK	
PS001	⚠1-532-685-00	LINK, IC	
		TRANSISTOR	
Q006	8-729-600-27	TRANSISTOR 2SC634SP	
Q007	8-729-600-27	TRANSISTOR 2SC634SP	
Q008	8-729-600-27	TRANSISTOR 2SC634SP	
Q009	8-729-600-27	TRANSISTOR 2SC634SP	
Q012	8-729-600-27	TRANSISTOR 2SC634SP	
Q013	8-729-600-27	TRANSISTOR 2SC634SP	
Q014	8-729-600-27	TRANSISTOR 2SC634SP	
Q015	8-729-600-27	TRANSISTOR 2SC634SP	
Q016	8-729-900-36	TRANSISTOR DTC124ES	
Q017	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q018	8-729-900-85	TRANSISTOR DTC144WS	
Q020	8-729-600-27	TRANSISTOR 2SC634SP	
Q023	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q024	8-729-600-27	TRANSISTOR 2SC634SP	
Q027	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q029	8-729-600-27	TRANSISTOR 2SC634SP	
Q031	8-729-900-65	TRANSISTOR DTA144ES	
Q032	8-729-900-89	TRANSISTOR DTC144ES	
Q033	8-729-900-85	TRANSISTOR DTC144WS	
Q034	8-729-177-44	TRANSISTOR 2SD774-5	
Q035	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q036	8-729-113-33	TRANSISTOR 2SB733-4	
Q037	8-729-600-27	TRANSISTOR 2SC634SP	
Q038	8-729-600-27	TRANSISTOR 2SC634SP	
Q039	8-729-600-27	TRANSISTOR 2SC634SP	
Q040	8-729-600-27	TRANSISTOR 2SC634SP	
Q041	8-729-900-89	TRANSISTOR DTC144ES	
Q042	8-729-900-89	TRANSISTOR DTC144ES	
Q043	8-729-600-27	TRANSISTOR 2SC634SP	
Q045	8-729-600-27	TRANSISTOR 2SC634SP	
Q046	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q047	8-729-384-46	TRANSISTOR 2SA844-C	
Q048	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q049	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q050	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q051	8-729-600-27	TRANSISTOR 2SC634SP	
Q052	8-729-384-46	TRANSISTOR 2SA844-C	
Q053	8-729-384-46	TRANSISTOR 2SA844-C	
Q054	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q055	8-729-600-27	TRANSISTOR 2SC634SP	
Q056	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q057	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q058	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q059	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q060	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q061	8-729-600-27	TRANSISTOR 2SC634SP	
Q062	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q063	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q064	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q065	8-729-600-27	TRANSISTOR 2SC634SP	
Q066	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q067	8-729-900-89	TRANSISTOR DTC144ES	
Q068	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q069	8-729-900-89	TRANSISTOR DTC144ES	
Q070	8-729-600-27	TRANSISTOR 2SC634SP	
Q071	8-729-900-89	TRANSISTOR DTC144ES	
Q072	8-729-900-89	TRANSISTOR DTC144ES	
Q074	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q075	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q076	8-729-900-89	TRANSISTOR DTC144ES	
Q077	8-729-900-89	TRANSISTOR DTC144ES	
Q078	8-729-900-89	TRANSISTOR DTC144ES	
Q079	8-729-384-46	TRANSISTOR 2SA844-C	

When indicating parts by reference number, please include the board name.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Ref.No	Part No.	Description				Remark
Q080	8-729-900-89	TRANSISTOR DTC144ES				
Q081	8-729-900-89	TRANSISTOR DTC144ES				
Q082	8-729-600-27	TRANSISTOR 2SC634SP				
		RESISTOR				
R019	1-249-433-11	CARBON	22K	5%	1/6W	
R020	1-249-423-11	CARBON	3.3K	5%	1/6W	
R021	1-249-425-11	CARBON	4.7K	5%	1/6W	
R022	1-247-821-00	CARBON	390	5%	1/6W	
R023	1-247-839-00	CARBON	2.2K	5%	1/6W	
R024	1-247-821-00	CARBON	390	5%	1/6W	
R025	1-247-821-00	CARBON	390	5%	1/6W	
R026	1-247-821-00	CARBON	390	5%	1/6W	
R027	1-247-821-00	CARBON	390	5%	1/6W	
R028	1-247-839-00	CARBON	2.2K	5%	1/6W	
R029	1-247-821-00	CARBON	390	5%	1/6W	
R030	1-247-839-00	CARBON	2.2K	5%	1/6W	
R031	1-249-417-11	CARBON	1K	5%	1/6W	
R032	1-249-417-11	CARBON	1K	5%	1/6W	
R033	1-249-434-11	CARBON	27K	5%	1/6W	
R034	1-247-857-00	CARBON	12K	5%	1/6W	
R035	1-247-839-00	CARBON	2.2K	5%	1/6W	
R038	1-249-417-11	CARBON	1K	5%	1/6W	
R039	1-247-839-00	CARBON	2.2K	5%	1/6W	
R040	1-249-423-11	CARBON	3.3K	5%	1/6W	
R041	1-249-435-11	CARBON	33K	5%	1/6W	
R042	1-249-422-11	CARBON	2.7K	5%	1/6W	
R043	1-249-440-11	CARBON	82K	5%	1/6W	
R044	1-247-887-00	CARBON	220K	5%	1/6W	
R045	1-247-829-00	CARBON	820	5%	1/6W	
R046	1-247-875-00	CARBON	68K	5%	1/6W	
R047	1-249-417-11	CARBON	1K	5%	1/6W	
R048	1-249-433-11	CARBON	22K	5%	1/6W	
R049	1-247-819-00	CARBON	330	5%	1/6W	
R050	1-249-417-11	CARBON	1K	5%	1/6W	
R051	1-249-419-11	CARBON	1.5K	5%	1/6W	
R052	1-249-419-11	CARBON	1.5K	5%	1/6W	
R053	1-247-823-00	CARBON	470	5%	1/6W	
R054	1-249-425-11	CARBON	4.7K	5%	1/6W	
R055	1-247-819-00	CARBON	330	5%	1/6W	
R056	1-247-819-00	CARBON	330	5%	1/6W	
R057	1-247-839-00	CARBON	2.2K	5%	1/6W	
R058	1-247-846-00	CARBON	4.3K	5%	1/6W	
R059	1-247-853-00	CARBON	8.2K	5%	1/6W	
R060	1-249-441-11	CARBON	100K	5%	1/6W	
R061	1-247-828-00	CARBON	750	5%	1/6W,	
R062	1-249-423-11	CARBON	3.3K	5%	1/6W	
R063	1-249-437-11	CARBON	47K	5%	1/6W	
R064	1-247-892-00	CARBON	360K	5%	1/6W	
R065	1-247-894-00	CARBON	430K	5%	1/6W	
R066	1-249-423-11	CARBON	3.3K	5%	1/6W	
R067	1-249-423-11	CARBON	3.3K	5%	1/6W	
R068	1-249-437-11	CARBON	47K	5%	1/6W	

Ref.No	Part No.	Description				Remark
R070	1-247-851-00	CARBON	6.8K	5%	1/6W	
R072	1-247-878-00	CARBON	91K	5%	1/6W	
R073	1-249-423-11	CARBON	3.3K	5%	1/6W	
R074	1-247-851-00	CARBON	6.8K	5%	1/6W	
R075	1-249-435-11	CARBON	33K	5%	1/6W	
R076	1-247-887-00	CARBON	220K	5%	1/6W	
R077	1-247-839-00	CARBON	2.2K	5%	1/6W	
R078	1-247-824-00	CARBON	510	5%	1/6W	
R079	1-247-824-00	CARBON	510	5%	1/6W	
R080	1-247-829-00	CARBON	820	5%	1/6W	
R081	1-249-417-11	CARBON	1K	5%	1/6W	
R082	1-247-839-00	CARBON	2.2K	5%	1/6W	
R083	1-249-417-11	CARBON	1K	5%	1/6W	
R084	1-247-891-00	CARBON	330K	5%	1/6W	
R089	1-249-405-11	CARBON	100	5%	1/6W	
R093	1-249-437-11	CARBON	47K	5%	1/6W	
R094	1-247-853-00	CARBON	8.2K	5%	1/6W	
R096	1-249-429-11	CARBON	10K	5%	1/6W	
R097	1-249-423-11	CARBON	3.3K	5%	1/6W	
R109	1-247-819-00	CARBON	330	5%	1/6W	
R110	1-247-821-00	CARBON	390	5%	1/6W	
R111	1-247-853-00	CARBON	8.2K	5%	1/6W	
R113	1-247-819-00	CARBON	330	5%	1/6W	
R114	1-249-417-11	CARBON	1K	5%	1/6W	
R115	1-247-815-00	CARBON	220	5%	1/6W	
R116	1-249-417-11	CARBON	1K	5%	1/6W	
R117	1-249-422-11	CARBON	2.7K	5%	1/6W	
R118	1-247-851-00	CARBON	6.8K	5%	1/6W	
R119	1-249-417-11	CARBON	1K	5%	1/6W	
R120	1-247-889-00	CARBON	270K	5%	1/6W	
R121	1-249-417-11	CARBON	1K	5%	1/6W	
R122	1-247-870-00	CARBON	43K	5%	1/6W	
R123	1-247-838-00	CARBON	2K	5%	1/6W	
R124	1-247-862-00	CARBON	20K	5%	1/6W	
R125	1-247-848-00	CARBON	5.1K	5%	1/6W	
R126	1-249-429-11	CARBON	10K	5%	1/6W	
R128	1-249-433-11	CARBON	22K	5%	1/6W	
R129	1-247-873-00	CARBON	56K	5%	1/6W	
R130	1-249-435-11	CARBON	33K	5%	1/6W	
R132	1-249-425-11	CARBON	4.7K	5%	1/6W	
R133	1-249-423-11	CARBON	3.3K	5%	1/6W	
R134	1-249-425-11	CARBON	4.7K	5%	1/6W	
R136	1-247-851-00	CARBON	6.8K	5%	1/6W	
R137	1-249-429-11	CARBON	10K	5%	1/6W	
R138	1-249-420-11	CARBON	1.8K	5%	1/6W	
R139	1-247-859-00	CARBON	15K	5%	1/6W	
R140	1-249-417-11	CARBON	1K	5%	1/6W	
R141	1-247-857-00	CARBON	12K	5%	1/6W	
R142	1-249-422-11	CARBON	2.7K	5%	1/6W	
R143	1-247-839-00	CARBON	2.2K	5%	1/6W	
R144	1-249-417-11	CARBON	1K	5%	1/6W	
R145	1-249-429-11	CARBON	10K	5%	1/6W	
R146	1-249-405-11	CARBON	100	5%	1/6W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R147	1-247-839-00	CARBON	2.2K	5%	1/6W	
R148	1-247-839-00	CARBON	2.2K	5%	1/6W	
R149	1-249-429-11	CARBON	10K	5%	1/6W	
R150	1-247-803-00	CARBON	68	5%	1/6W	
R151	1-247-823-00	CARBON	470	5%	1/6W	
R153	1-249-405-11	CARBON	100	5%	1/6W	
R154	1-249-441-11	CARBON	100K	5%	1/6W	
R157	1-249-417-11	CARBON	1K	5%	1/6W	
R158	1-249-425-11	CARBON	4.7K	5%	1/6W	
R159	1-247-883-00	CARBON	150K	5%	1/6W	
R160	1-249-435-11	CARBON	33K	5%	1/6W	
R161	1-247-829-00	CARBON	820	5%	1/6W	
R162	1-249-435-11	CARBON	33K	5%	1/6W	
R163	1-247-839-00	CARBON	2.2K	5%	1/6W	
R164	1-249-434-11	CARBON	27K	5%	1/6W	
R165	1-247-857-00	CARBON	12K	5%	1/6W	
R166	1-247-815-00	CARBON	220	5%	1/6W	
R167	1-249-417-11	CARBON	1K	5%	1/6W	
R168	1-247-842-00	CARBON	3K	5%	1/6W	
R169	1-247-815-00	CARBON	220	5%	1/6W	
R170	1-249-425-11	CARBON	4.7K	5%	1/6W	
R171	1-247-833-00	CARBON	1.2K	5%	1/6W	
R172	1-249-425-11	CARBON	4.7K	5%	1/6W	
R173	1-249-422-11	CARBON	2.7K	5%	1/6W	
R174	1-249-429-11	CARBON	10K	5%	1/6W	
R175	1-247-824-00	CARBON	510	5%	1/6W	
R176	1-247-859-00	CARBON	15K	5%	1/6W	
R177	1-249-417-11	CARBON	1K	5%	1/6W	
R178	1-249-429-11	CARBON	10K	5%	1/6W	
R179	1-249-417-11	CARBON	1K	5%	1/6W	
R180	1-247-812-00	CARBON	160	5%	1/6W	
R181	1-249-433-11	CARBON	22K	5%	1/6W	
R182	1-249-433-11	CARBON	22K	5%	1/6W	
R183	1-247-819-00	CARBON	330	5%	1/6W	
R184	1-247-829-00	CARBON	820	5%	1/6W	
R185	1-247-839-00	CARBON	2.2K	5%	1/6W	
R186	1-247-821-00	CARBON	390	5%	1/6W	
R187	1-247-817-00	CARBON	270	5%	1/6W	
R188	1-249-405-11	CARBON	100	5%	1/6W	
R189	1-249-425-11	CARBON	4.7K	5%	1/6W	
R190	1-247-813-00	CARBON	180	5%	1/6W	
R191	1-249-420-11	CARBON	1.8K	5%	1/6W	
R192	1-247-815-00	CARBON	220	5%	1/6W	
R193	1-247-832-00	CARBON	1.1K	5%	1/6W	
R194	1-247-815-00	CARBON	220	5%	1/6W	
R195	1-247-840-00	CARBON	2.4K	5%	1/6W	
R196	1-247-857-00	CARBON	12K	5%	1/6W	
R197	1-247-839-00	CARBON	2.2K	5%	1/6W	
R198	1-215-445-00	METAL	10K	1%	1/6W	
R199	1-249-429-11	CARBON	10K	5%	1/6W	
R200	1-215-433-00	METAL	3.3K	1%	1/6W	
R201	1-249-417-11	CARBON	1K	5%	1/6W	
R202	1-247-833-00	CARBON	1.2K	5%	1/6W	

Ref.No	Part No.	Description				Remark
R203	1-247-875-00	CARBON	68K	5%	1/6W	
R204	1-249-405-11	CARBON	100	5%	1/6W	
R205	1-249-420-11	CARBON	1.8K	5%	1/6W	
R206	1-249-420-11	CARBON	1.8K	5%	1/6W	
R207	1-247-849-00	CARBON	5.6K	5%	1/6W	
R208	1-247-873-00	CARBON	56K	5%	1/6W	
R209	1-249-434-11	CARBON	27K	5%	1/6W	
R210	1-249-417-11	CARBON	1K	5%	1/6W	
R211	1-249-417-11	CARBON	1K	5%	1/6W	
R212	1-249-417-11	CARBON	1K	5%	1/6W	
R213	1-249-417-11	CARBON	1K	5%	1/6W	
R214	1-249-417-11	CARBON	1K	5%	1/6W	
R215	1-249-417-11	CARBON	1K	5%	1/6W	
R216	1-249-433-11	CARBON	22K	5%	1/6W	
R217	1-249-440-11	CARBON	82K	5%	1/6W	
R218	1-247-819-00	CARBON	330	5%	1/6W	
R219	1-249-419-11	CARBON	1.5K	5%	1/6W	
R220	1-247-811-00	CARBON	150	5%	1/6W	
R221	1-247-819-00	CARBON	330	5%	1/6W	
R222	1-249-440-11	CARBON	82K	5%	1/6W	
R223	1-249-433-11	CARBON	22K	5%	1/6W	
R224	1-247-873-00	CARBON	56K	5%	1/6W	
R225	1-247-873-00	CARBON	56K	5%	1/6W	
R226	1-247-839-00	CARBON	2.2K	5%	1/6W	
R227	1-247-857-00	CARBON	12K	5%	1/6W	
R228	1-247-839-00	CARBON	2.2K	5%	1/6W	
R229	1-247-819-00	CARBON	330	5%	1/6W	
R230	1-249-420-11	CARBON	1.8K	5%	1/6W	
R231	1-249-417-11	CARBON	1K	5%	1/6W	
R232	1-247-819-00	CARBON	330	5%	1/6W	
R233	1-249-405-11	CARBON	100	5%	1/6W	
R234	1-247-821-00	CARBON	390	5%	1/6W	
R235	1-247-839-00	CARBON	2.2K	5%	1/6W	
R236	1-249-433-11	CARBON	22K	5%	1/6W	
R237	1-249-433-11	CARBON	22K	5%	1/6W	
R238	1-247-829-00	CARBON	820	5%	1/6W	
R239	1-247-812-00	CARBON	160	5%	1/6W	
R240	1-247-817-00	CARBON	270	5%	1/6W	
R241	1-247-813-00	CARBON	180	5%	1/6W	
R242	1-247-819-00	CARBON	330	5%	1/6W	
R243	1-249-429-11	CARBON	10K	5%	1/6W	
R244	1-249-417-11	CARBON	1K	5%	1/6W	
R245	1-249-437-11	CARBON	47K	5%	1/6W	
R246	1-249-435-11	CARBON	33K	5%	1/6W	
R247	1-249-414-11	CARBON	560	5%	1/6W	
R248	1-249-414-11	CARBON	560	5%	1/6W	
R249	1-249-425-11	CARBON	4.7K	5%	1/6W	
R250	1-249-414-11	CARBON	560	5%	1/6W	
R251	1-247-839-00	CARBON	2.2K	5%	1/6W	
R252	1-249-405-11	CARBON	100	5%	1/6W	
R253	1-249-425-11	CARBON	4.7K	5%	1/6W	
R254	1-247-890-00	CARBON	300K	5%	1/6W	
R255	1-249-432-11	CARBON	18K	5%	1/6W	

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description				Remark
R256	1-249-435-11	CARBON	33K	5%	1/6W	
R257	1-249-414-11	CARBON	560	5%	1/6W	
R258	1-247-813-00	CARBON	180	5%	1/6W	
R259	1-247-813-00	CARBON	180	5%	1/6W	
R260	1-249-433-11	CARBON	22K	5%	1/6W	
R261	1-249-434-11	CARBON	27K	5%	1/6W	
R262	1-247-806-00	CARBON	91	5%	1/6W	
R263	1-249-437-11	CARBON	47K	5%	1/6W	
R264	1-249-435-11	CARBON	33K	5%	1/6W	
R265	1-247-797-00	CARBON	39	5%	1/6W	
R266	1-249-417-11	CARBON	1K	5%	1/6W	
R267	1-247-832-00	CARBON	1.1K	5%	1/6W	
R268	1-247-832-00	CARBON	1.1K	5%	1/6W	
R269	1-247-849-00	CARBON	5.6K	5%	1/6W	
R270	1-247-846-00	CARBON	4.3K	5%	1/6W	
R271	1-249-417-11	CARBON	1K	5%	1/6W	
R272	1-247-853-00	CARBON	8.2K	5%	1/6W	
R273	1-249-425-11	CARBON	4.7K	5%	1/6W	
R274	1-247-829-00	CARBON	820	5%	1/6W	
R275	1-249-417-11	CARBON	1K	5%	1/6W	
R276	1-249-437-11	CARBON	47K	5%	1/6W	
R277	1-249-435-11	CARBON	33K	5%	1/6W	
R278	1-249-417-11	CARBON	1K	5%	1/6W	
R280	1-249-417-11	CARBON	1K	5%	1/6W	
R281	1-249-414-11	CARBON	560	5%	1/6W	
R282	1-249-417-11	CARBON	1K	5%	1/6W	
R283	1-249-417-11	CARBON	1K	5%	1/6W	
R284	1-249-415-11	CARBON	680	5%	1/6W	
R285	1-247-901-00	CARBON	820K	5%	1/6W	
R286	1-249-429-11	CARBON	10K	5%	1/6W	
R287	1-247-839-00	CARBON	2.2K	5%	1/6W	
R288	1-249-432-11	CARBON	18K	5%	1/6W	
R289	1-247-839-00	CARBON	2.2K	5%	1/6W	
R290	1-249-417-11	CARBON	1K	5%	1/6W	
R291	1-249-417-11	CARBON	1K	5%	1/6W	
R292	1-247-839-00	CARBON	2.2K	5%	1/6W	
R293	1-249-419-11	CARBON	1.5K	5%	1/6W	
R294	1-249-423-11	CARBON	3.3K	5%	1/6W	
R295	1-247-852-00	CARBON	7.5K	5%	1/6W	
R296	1-247-857-00	CARBON	12K	5%	1/6W	
R297	1-249-429-11	CARBON	10K	5%	1/6W	
R298	1-247-849-00	CARBON	5.6K	5%	1/6W	
R299	1-249-437-11	CARBON	47K	5%	1/6W	
R300	1-247-883-00	CARBON	150K	5%	1/6W	
R301	1-247-903-00	CARBON	1M	5%	1/6W	
R302	1-249-417-11	CARBON	1K	5%	1/6W	
R303	1-249-405-11	CARBON	100	5%	1/6W	
R304	1-247-830-00	CARBON	910	5%	1/6W	
R305	1-249-423-11	CARBON	3.3K	5%	1/6W	
R306	1-247-899-00	CARBON	680K	5%	1/6W	
R307	1-247-839-00	CARBON	2.2K	5%	1/6W	
R308	1-249-415-11	CARBON	680	5%	1/6W	
R309	1-249-419-11	CARBON	1.5K	5%	1/6W	
R310	1-249-415-11	CARBON	680	5%	1/6W	
R312	1-249-435-11	CARBON	33K	5%	1/6W	
R313	1-249-423-11	CARBON	3.3K	5%	1/6W	
R314	1-247-810-00	CARBON	130	5%	1/6W	
R315 ⚠	1-217-387-00	FUSIBLE	10	5%	1/4W	F
R316	1-249-414-11	CARBON	560	5%	1/6W	
R317	1-247-833-00	CARBON	1.2K	5%	1/6W	

VARIABLE RESISTOR

RV001	1-228-989-00	RES, ADJ, CARBON 470
RV002	1-228-991-00	RES, ADJ, CARBON 2.2K
RV003	1-228-995-00	RES, ADJ, CARBON 22K
RV004	1-228-996-00	RES, ADJ, CARBON 47K
RV005	1-228-990-00	RES, ADJ, METAL GLAZE 1K
RV006	1-228-996-00	RES, ADJ, CARBON 47K
RV008	1-228-994-00	RES, ADJ, CARBON 10K
RV009	1-228-996-00	RES, ADJ, CARBON 47K
RV010	1-228-996-00	RES, ADJ, CARBON 47K
RV011	1-228-994-00	RES, ADJ, CARBON 10K
RV012	1-228-995-00	RES, ADJ, CARBON 22K
RV013	1-228-989-00	RES, ADJ, METAL GLAZE 470
RV014	1-228-990-00	RES, ADJ, CARBON 1K
RV015	1-228-990-00	RES, ADJ, CARBON 1K
RV016	1-228-993-00	RES, ADJ, METAL GLAZE 4.7K
RV017	1-228-994-00	RES, ADJ, METAL GLAZE 10K
RV018	1-228-996-00	RES, ADJ, CARBON 47K
RV019	1-228-993-00	RES, ADJ, METAL GLAZE 4.7K
RV020	1-228-994-00	RES, ADJ, CARBON 10K
RV021	1-228-996-00	RES, ADJ, CARBON 47K
RV022	1-228-994-00	RES, ADJ, CARBON 10K
RV023	1-228-995-00	RES, ADJ, CARBON 22K

TRANSFORMER

T001	1-426-093-00	COIL, REC C BPT

CRYSTAL

X001	1-567-504-11	OSCILLATOR, CRYSTAL

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*A-6713-266-A AU-26 BOARD, COMPLETE

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CAPACITOR

C001	1-130-478-00	MYLAR	0.0039MF	5%	50V
C002	1-123-380-00	ELECT	1MF	20%	50V
C003	1-124-473-11	ELECT	1000MF	20%	10V
C004	1-123-307-00	ELECT	100MF	20%	10V
C005	1-123-356-00	ELECT	10MF	20%	16V
C006	1-123-306-00	ELECT	47MF	20%	10V
C007	1-161-013-00	CERAMIC	0.01MF	10%	25V
C008	1-123-307-00	ELECT	100MF	20%	10V
C009	1-161-013-00	CERAMIC	0.01MF	10%	25V
C010	1-123-356-00	ELECT	10MF	20%	16V

When indicating parts by reference number, please include the board name.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

AU-26

Ref.No	Part No.	Description			Remark
C011	1-123-356-00	ELECT	10MF	20%	16V
C012	1-123-356-00	ELECT	10MF	20%	16V
C013	1-123-306-00	ELECT	47MF	20%	10V
C014	1-161-013-00	CERAMIC	0.01MF	10%	25V
C015	1-102-961-00	CERAMIC	27PF	10%	50V
C016	1-102-978-00	CERAMIC	220PF	5%	50V
C901	1-123-306-00	ELECT	47MF	20%	10V
C902	1-123-306-00	ELECT	47MF	20%	10V
C904	1-123-369-00	ELECT	4.7MF	20%	25V
C905	1-130-473-00	MYLAR	0.0015MF	5%	50V
C907	1-130-482-00	MYLAR	0.0082MF	5%	50V
C908	1-123-381-00	ELECT	2.2MF	20%	50V
C909	1-123-307-00	ELECT	100MF	20%	10V
C911	1-123-306-00	ELECT	47MF	20%	10V
C912	1-123-356-00	ELECT	10MF	20%	16V
C913	1-123-306-00	ELECT	47MF	20%	10V
C914	1-123-330-00	ELECT	22MF	20%	16V
C915	1-130-481-00	MYLAR	0.0068MF	5%	50V
C917	1-123-379-00	ELECT	0.47MF	20%	50V
C918	1-123-356-00	ELECT	10MF	20%	16V
C919	1-123-380-00	ELECT	1MF	20%	50V
C921	1-102-980-00	CERAMIC	270PF	5%	50V
C922	1-123-822-00	ELECT	47MF	20%	10V
C923	1-130-474-00	MYLAR	0.0018MF	5%	50V
C925	1-107-171-00	MICA	120PF	5%	500V
C927	1-123-822-00	ELECT	47MF	20%	10V
C928	1-130-479-00	MYLAR	0.0047MF	5%	50V
C929	1-130-477-00	MYLAR	0.0033MF	5%	50V
C930	1-136-051-00	FILM	0.0039MF	10%	630V
C933	1-161-013-00	CERAMIC	0.01MF	10%	25V

CONNECTOR

CN901	*1-560-893-00	PIN, CONNECTOR 5P	
CN902	*1-508-796-00	PIN, CONNECTOR 2P	
CN903	*1-560-894-00	PIN, CONNECTOR 6P	
CN905	*1-560-891-00	PIN, CONNECTOR 3P	
CN906	*1-560-892-00	PIN, CONNECTOR 4P	

JACK

CNJ001	1-507-944-11	JACK, PIN (4 GANG) (VIDEO/AUDIO IN/OUT)

DIODE

D001	8-719-911-19	DIODE 1SS119
D002	8-719-911-19	DIODE 1SS119
D003	8-719-100-57	DIODE RD10EB2
D004	8-719-100-57	DIODE RD10EB2
D005	8-719-911-19	DIODE 1SS119
D901	8-719-000-06	DIODE MC921

IC

IC001	8-752-006-10	IC CX20061
IC002	8-752-006-10	IC CX20061
IC901	8-759-101-73	IC UPC1513HA
IC902	8-759-802-11	IC LA7091

COIL

L901	1-407-508-00	MICRO INDUCTOR 22MMH
L902	1-407-510-00	MICRO INDUCTOR 33MMH
L903	1-410-120-11	MICRO INDUCTOR 1.2MMH

TRANSISTOR

Q001	8-729-600-27	TRANSISTOR 2SC634SP
Q002	8-729-117-54	TRANSISTOR 2SA1175
Q003	8-729-600-27	TRANSISTOR 2SC634SP
Q004	8-729-117-54	TRANSISTOR 2SA1175
Q005	8-729-117-54	TRANSISTOR 2SA1175
Q006	8-729-600-27	TRANSISTOR 2SC634SP
Q008	8-729-600-27	TRANSISTOR 2SC634SP
Q010	8-729-600-27	TRANSISTOR 2SC634SP
Q902	8-729-900-89	TRANSISTOR DTC144ES
Q904	8-729-177-44	TRANSISTOR 2SD774-5
Q906	8-729-965-22	TRANSISTOR 2SC1652

RESISTOR

R001	1-249-441-11	CARBON	100K	5%	1/6W
R002	1-249-429-11	CARBON	10K	5%	1/6W
R003	1-247-851-00	CARBON	6.8K	5%	1/6W
R004	1-249-441-11	CARBON	100K	5%	1/6W
R005	1-249-437-11	CARBON	47K	5%	1/6W
R006	1-249-437-11	CARBON	47K	5%	1/6W
R007	1-247-803-00	CARBON	68	5%	1/6W
R008	1-247-803-00	CARBON	68	5%	1/6W
R009	1-247-803-00	CARBON	68	5%	1/6W
R010	1-249-417-11	CARBON	1K	5%	1/6W
R012	1-247-857-00	CARBON	12K	5%	1/6W
R013	1-249-429-11	CARBON	10K	5%	1/6W
R014	1-247-803-00	CARBON	68	5%	1/6W
R015	1-249-420-11	CARBON	1.8K	5%	1/6W
R016	1-249-429-11	CARBON	10K	5%	1/6W
R017	1-249-429-11	CARBON	10K	5%	1/6W
R018	1-249-435-11	CARBON	33K	5%	1/6W
R019	1-249-405-11	CARBON	100	5%	1/6W
R020	1-247-839-00	CARBON	2.2K	5%	1/6W
R021	1-249-405-11	CARBON	100	5%	1/6W
R022 ⚠	1-217-385-00	FUSIBLE	6.8	5%	1/4W F
R027	1-247-839-00	CARBON	2.2K	5%	1/6W
R903	1-247-885-00	CARBON	180K	5%	1/6W
R904	1-249-432-11	CARBON	18K	5%	1/6W
R905	1-247-821-00	CARBON	390	5%	1/6W
R908	1-249-417-11	CARBON	1K	5%	1/6W
R909	1-247-869-00	CARBON	39K	5%	1/6W
R910	1-249-435-11	CARBON	33K	5%	1/6W
R911	1-247-899-00	CARBON	680K	5%	1/6W
R912	1-247-829-00	CARBON	820	5%	1/6W
R913	1-249-432-11	CARBON	18K	5%	1/6W

When indicating parts by reference number, please include the board name.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Ref.No	Part No.	Description				Remark
R914	1-249-429-11	CARBON	10K	5%	1/6W	
R915	1-247-783-00	CARBON	10	5%	1/6W	
R916	1-247-859-00	CARBON	15K	5%	1/6W	
R919	1-247-839-00	CARBON	2.2K	5%	1/6W	
R920	1-249-429-11	CARBON	10K	5%	1/6W	
R924	1-249-417-11	CARBON	1K	5%	1/6W	
R925	1-247-204-00	CARBON	33	5%	1/2W	
R926	1-247-859-00	CARBON	15K	5%	1/6W	
R927	1-249-453-11	CARBON	3.3	5%	1/4W	
R929	1-247-839-00	CARBON	2.2K	5%	1/6W	
R930	1-249-417-11	CARBON	1K	5%	1/6W	
R931	1-249-422-11	CARBON	2.7K	5%	1/6W	
R932	1-247-849-00	CARBON	5.6K	5%	1/6W	
R940	1-249-433-11	CARBON	22K	5%	1/6W	
		VARIABLE RESISTOR				
RV902	1-228-998-00	RES, ADJ, CARBON 220K				
		TRANSFORMER				
T900	1-433-237-00	TRANSFORMER, OSCILLATOR				

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*A-6715-332-A ST-12 BOARD, COMPLETE
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*1-555-005-00 CABLE, P-P
*3-710-595-01 COVER (P), JACK

CAPACITOR

C001	1-124-272-00	ELECT	2.2MF	20%	50V
C002	1-130-491-00	MYLAR	0.047MF	5%	50V
C003	1-130-491-00	MYLAR	0.047MF	5%	50V
C004	1-130-491-00	MYLAR	0.047MF	5%	50V
C005	1-130-491-00	MYLAR	0.047MF	5%	50V
C006	1-130-491-00	MYLAR	0.047MF	5%	50V
C007	1-130-483-00	MYLAR	0.01MF	5%	50V
C008	1-130-483-00	MYLAR	0.01MF	5%	50V
C009	1-161-013-00	CERAMIC	0.01MF	10%	25V
C010	1-123-356-00	ELECT	10MF	20%	16V
C011	1-161-039-00	CERAMIC	0.001MF	10%	25V
C012	1-123-356-00	ELECT	10MF	20%	16V
C013	1-161-039-00	CERAMIC	0.001MF	10%	25V
C014	1-123-332-00	ELECT	47MF	20%	16V
C016	1-131-347-00	ELECT(SOLID)	1MF	10%	25V
C021	1-130-487-00	MYLAR	0.022MF	5%	50V
C022	1-130-491-00	MYLAR	0.047MF	5%	50V
C023	1-123-298-00	ELECT	470MF	20%	6.3V
C024	1-123-380-00	ELECT	1MF	20%	50V
C025	1-130-497-00	MYLAR	0.15MF	5%	50V
C026	1-130-491-00	MYLAR	0.047MF	5%	50V
C027	1-130-491-00	MYLAR	0.047MF	5%	50V
C029	1-161-039-00	CERAMIC	0.001MF	10%	25V
C030	1-131-345-00	ELECT(SOLID)	0.47MF	10%	25V
C032	1-124-271-00	ELECT	1MF	20%	50V
C033	1-161-043-00	CERAMIC	0.0022MF	10%	25V
C034	1-124-290-00	ELECT	47MF	20%	10V
C035	1-123-333-00	ELECT	100MF	20%	16V
C301	1-125-299-00	DUBLE LAYERS	47000MF		5.5V
C302	1-161-059-00	CERAMIC	0.047MF	10%	25V
C303	1-102-947-00	CERAMIC	10PF	5%	50V
C305	1-161-059-00	CERAMIC	0.047MF	10%	25V
C306	1-123-373-00	ELECT	47MF	20%	63V
C307	1-123-374-00	ELECT	100MF	20%	63V
C308	1-161-059-00	CERAMIC	0.047MF	10%	25V
C309	1-161-059-00	CERAMIC	0.047MF	10%	25V
C310	1-123-380-00	ELECT	1MF	20%	50V
C401	1-161-059-00	CERAMIC	0.047MF	10%	25V
C402	1-123-298-00	ELECT	470MF	20%	6.3V
C403	1-161-059-00	CERAMIC	0.047MF	10%	25V
C404	1-136-298-00	FILM	0.0033MF	5%	100V
C405	1-136-298-00	FILM	0.0033MF	5%	100V
C406	1-161-059-00	CERAMIC	0.047MF	10%	25V
C407	1-161-059-00	CERAMIC	0.047MF	10%	25V
C408	1-161-059-00	CERAMIC	0.047MF	10%	25V
C409	1-161-059-00	CERAMIC	0.047MF	10%	25V
C410	1-123-382-00	ELECT	3.3MF	20%	50V
C411	1-123-382-00	ELECT	3.3MF	20%	50V
C412	1-161-059-00	CERAMIC	0.047MF	10%	25V
C413	1-123-318-00	ELECT	33MF	20%	16V
C414	1-123-381-00	ELECT	2.2MF	20%	50V
C450	1-161-059-00	CERAMIC	0.047MF	10%	25V
C470	1-123-323-00	ELECT	470MF	20%	16V
C471	1-161-059-00	CERAMIC	0.047MF	10%	25V
C472	1-123-356-00	ELECT	10MF	20%	16V
C474	1-161-059-00	CERAMIC	0.047MF	10%	25V
C475	1-161-059-00	CERAMIC	0.047MF	10%	25V
C476	1-130-484-00	MYLAR	0.012MF	5%	50V
C520	1-123-372-00	ELECT	33MF	20%	63V
C521	1-101-004-00	CERAMIC	0.01MF		50V
C522	1-101-361-00	CERAMIC	150PF	5%	50V
C523	1-130-495-00	MYLAR	0.1MF	5%	50V
C524	1-130-493-00	MYLAR	0.068MF	5%	50V
C525	1-130-493-00	MYLAR	0.068MF	5%	50V
C526	1-102-963-00	CERAMIC	33PF	5%	50V
C528	1-130-491-00	MYLAR	0.047MF	5%	50V
C529	1-123-330-00	ELECT	22MF	20%	16V
C608	1-102-121-00	CERAMIC	0.0022MF	10%	50V
C609	1-102-121-00	CERAMIC	0.0022MF	10%	50V
C610	1-102-121-00	CERAMIC	0.0022MF	10%	50V
C614	1-123-356-00	ELECT	10MF	20%	16V
C615	1-124-655-11	ELECT	0.47MF	20%	50V
C638	1-102-965-00	CERAMIC	39PF	5%	50V
C639	1-102-953-00	CERAMIC	18PF	5%	50V
C640	1-123-356-00	ELECT	10MF	20%	25V
C641	1-123-330-00	ELECT	22MF	20%	16V
C642	1-130-477-00	MYLAR	0.0033MF	5%	50V
C646	1-102-971-00	CERAMIC	82PF	5%	50V
C647	1-102-074-00	CERAMIC	0.001MF	10%	50V

When indicating parts by reference number, please include the board name.

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Ref.No	Part No.	Description			Remark
C648	1-123-379-00	ELECT	0.47MF	20%	50V
C649	1-123-381-00	ELECT	2.2MF	20%	50V
C650	1-123-333-00	ELECT	100MF	20%	16V
C651	1-101-004-00	CERAMIC	0.01MF		50V
C652	1-123-380-00	ELECT	1MF	20%	50V
C653	1-123-356-00	ELECT	10MF	20%	16V
C655	1-123-333-00	ELECT	100MF	20%	16V
C656	1-123-333-00	ELECT	100MF	20%	16V
C701	1-123-382-00	ELECT	3.3MF	20%	50V
C702	1-123-381-00	ELECT	2.2MF	20%	50V
C703	1-123-306-00	ELECT	47MF	20%	6.3V
C704	1-123-307-00	ELECT	100MF	20%	6.3V

FILTER

CF401	1-567-470-11	VIBRATOR, CERAMIC

CONNECTOR

CN001	*1-560-891-00	PIN, CONNECTOR 3P
CN002	*1-560-894-00	PIN, CONNECTOR 6P
CN003	*1-560-891-00	PIN, CONNECTOR 3P
CN004	*1-560-892-00	PIN, CONNECTOR 4P
CN005	*1-560-891-00	PIN, CONNECTOR 3P
CN006	*1-560-891-00	PIN, CONNECTOR 3P
CN007	*1-560-891-00	PIN, CONNECTOR 3P
CN008	*1-560-894-00	PIN, CONNECTOR 6P
CN009	*1-560-897-00	PIN, CONNECTOR 9P
CN010	*1-560-891-00	PIN, CONNECTOR 3P
CN011	*1-560-894-00	PIN, CONNECTOR 6P
CN012	*1-560-891-00	PIN, CONNECTOR 3P
CN013	*1-560-892-00	PIN, CONNECTOR 4P
CN014	*1-560-896-00	PIN, CONNECTOR 8P
CN017	*1-560-891-00	PIN, CONNECTOR 3P
CN018	*1-560-466-00	PIN, CONNECTOR 3P
CN019	*1-564-104-00	PIN, CONNECTOR 3P
CN020	*1-560-892-00	PIN, CONNECTOR 4P
CN021	*1-560-892-00	PIN, CONNECTOR 4P
CN022	*1-560-891-00	PIN, CONNECTOR 3P
CN023	*1-560-891-00	PIN, CONNECTOR 3P
CN025	*1-560-893-00	PIN, CONNECTOR 5P
CN026	*1-560-892-00	PIN, CONNECTOR 4P
CN027	*1-560-892-00	PIN, CONNECTOR 4P
CN028	*1-560-894-00	PIN, CONNECTOR 6P
CN030	*1-560-894-00	PIN, CONNECTOR 6P
CN031	*1-560-891-00	PIN, CONNECTOR 3P

JACK

CNJ401	1-507-841-00	JACK, MINIATURE (CONTROL S INPUT)
CNJ402	1-507-841-00	JACK, MINIATURE (CONTROL S OUTPUT)

TRIMMER

CT301	1-141-227-00	CAP, CERAMIC TRIMMER

Ref.No	Part No.	Description	Remark

DIODE

D001	8-719-911-19	DIODE 1SS119
D002	8-719-101-50	DIODE RD5.1EL2
D051	8-719-911-19	DIODE 1SS119
D055	8-719-000-12	DIODE MC931
D201	8-719-911-19	DIODE 1SS119
D220	8-719-911-19	DIODE 1SS119
D222	8-719-000-06	DIODE MC921
D301	8-719-200-23	DIODE 11ES2
D302	8-719-911-19	DIODE 1SS119
D303	8-719-101-47	DIODE RD4.7EL2
D304	8-719-101-17	DIODE RD36EB2
D305	8-719-200-23	DIODE 11ES2
D306	8-719-200-23	DIODE 11ES2
D307	8-719-100-38	DIODE RD6.2EB2
D310	8-719-911-19	DIODE 1SS119
D311	8-719-911-19	DIODE 1SS119
D312	8-719-911-19	DIODE 1SS119
D401	8-719-911-19	DIODE 1SS119
D405	8-719-911-19	DIODE 1SS119
D406	8-719-000-06	DIODE MC921
D407	8-719-000-06	DIODE MC921
D601	8-719-911-19	DIODE 1SS119
D604	8-719-911-19	DIODE 1SS119
D701	8-719-000-06	DIODE MC921
D702	8-719-000-12	DIODE MC931

IC

IC001	8-752-012-41	IC CX20124A
IC002	8-759-205-76	IC TC504013BP
IC003	8-759-923-97	IC BA4561
IC201	8-759-132-40	IC UPC324C
IC202	8-759-600-24	IC M54543L
IC203	8-759-802-60	IC LB1205
IC301	8-752-800-78	IC CXP5016H-155S
IC302	8-759-603-41	IC M58655P
IC303	8-759-913-41	IC S-8054ALB
IC401	8-759-938-28	IC MB88551-222N
IC402	8-759-800-72	IC LA7205
IC403	8-759-938-27	IC MB88201H-507M
IC404	8-759-802-59	IC LB1211
IC405	8-759-802-59	IC LB1211
IC501	8-759-602-16	IC M54572L
IC502	8-759-157-40	IC UPC574J
IC701	8-759-240-53	IC TC40538P
IC702	8-759-132-40	IC UPC324C

IF BLOCK

IF001	1-464-553-11	IF BLOCK (IFB-389)

COIL

L201	1-408-710-00	COIL, CHOKE

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
L401	1-410-116-11	MICRO INDUCTOR 0.56MMH	
L609	1-408-411-00	MICRO INDUCTOR 15UH	
L610	1-407-879-00	COIL, CHOKE 33MMH	
L611	1-408-421-00	MICRO INDUCTOR 100UH	
L620	1-408-428-00	MICRO INDUCTOR 390UH	
		INDICATOR TUBE	
ND301	1-519-356-11	INDICATOR TUBE, FLUORESCENT	
		IC LINK	
PS001 ⚠	1-532-727-11	LINK, IC	
PS002 ⚠	1-532-727-11	LINK, IC	
PS003 ⚠	1-532-727-11	LINK, IC	
		TRANSISTOR	
Q001	8-729-177-33	TRANSISTOR 2SD773-4	
Q016	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q017	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q050	8-729-600-27	TRANSISTOR 2SC634SP	
Q051	8-729-600-27	TRANSISTOR 2SC634SP	
Q052	8-729-600-27	TRANSISTOR 2SC634SP	
Q201	8-729-107-25	TRANSISTOR 2SD1585-L	
Q202	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q203	8-729-600-27	TRANSISTOR 2SC634SP	
Q204	8-729-177-23	TRANSISTOR 2SB772	
Q205	8-729-900-89	TRANSISTOR DTC144ES	
Q206	8-729-177-33	TRANSISTOR 2SD773-4	
Q207	8-729-177-33	TRANSISTOR 2SD773-4	
Q209	8-729-600-27	TRANSISTOR 2SC634SP	
Q221	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q249	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q250	8-729-113-33	TRANSISTOR 2SB733-4	
Q251	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q252	8-729-600-27	TRANSISTOR 2SC634SP	
Q301	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q302	8-729-600-27	TRANSISTOR 2SC634SP	
Q401	8-729-900-89	TRANSISTOR DTC144ES	
Q402	8-729-900-61	TRANSISTOR DTA114ES	
Q405	8-729-600-27	TRANSISTOR 2SC634SP	
Q406	8-729-900-65	TRANSISTOR DTA144ES	
Q407	8-729-900-89	TRANSISTOR DTC144ES	
Q408	8-729-900-89	TRANSISTOR DTC144ES	
Q409	8-729-117-54	TRANSISTOR 2SA1175-F	
Q450	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q451	8-729-900-89	TRANSISTOR DTC144ES	
Q452	8-729-900-89	TRANSISTOR DTC144ES	
Q501	8-729-603-30	TRANSISTOR 2SC403SP-3	
Q504	8-729-600-27	TRANSISTOR 2SC634SP	
Q603	8-729-600-27	TRANSISTOR 2SC634SP	
Q604	8-729-600-27	TRANSISTOR 2SC634SP	
Q605	8-729-204-83	TRANSISTOR 2SA1048-GR	
Q606	8-729-900-74	TRANSISTOR DTC143TS	
Q701	8-729-600-27	TRANSISTOR 2SC634SP	
Q702	8-729-900-80	TRANSISTOR DTC114ES	
Q703	8-729-900-80	TRANSISTOR DTC114ES	

Ref.No	Part No.	Description	Remark
Q704	8-729-900-89	TRANSISTOR DTC144ES	
Q705	8-729-900-80	TRANSISTOR DTC114ES	
Q750	8-729-600-27	TRANSISTOR 2SC634SP	
		RESISTOR	
R001	1-247-895-00	CARBON 470K 5% 1/6W	
R002	1-249-441-11	CARBON 100K 5% 1/6W	
R003	1-247-903-00	CARBON 1M 5% 1/6W	
R004	1-247-889-00	CARBON 270K 5% 1/6W	
R005	1-249-435-11	CARBON 33K 5% 1/6W	
R006	1-228-995-00	RES, ADJ, CARBON 22K	
R006	1-249-429-11	CARBON 10K 5% 1/6W	
R008	1-215-465-00	METAL 68K 1% 1/6W	
R009	1-249-435-11	CARBON 33K 5% 1/6W	
R010	1-249-441-11	CARBON 100K 5% 1/6W	
R011	1-215-467-00	METAL 82K 1% 1/6W	
R012	1-249-441-11	CARBON 100K 5% 1/6W	
R013	1-249-440-11	CARBON 82K 5% 1/6W	
R014	1-249-440-11	CARBON 82K 5% 1/6W	
R015	1-247-859-00	CARBON 15K 5% 1/6W	
R016	1-249-437-11	CARBON 47K 5% 1/6W	
R017	1-247-845-00	CARBON 3.9K 5% 1/6W	
R019	1-247-895-00	CARBON 470K 5% 1/6W	
R020	1-247-889-00	CARBON 270K 5% 1/6W	
R021	1-247-887-00	CARBON 220K 5% 1/6W	
R022	1-249-437-11	CARBON 47K 5% 1/6W	
R024	1-247-857-00	CARBON 12K 5% 1/6W	
R026	1-249-417-11	CARBON 1K 5% 1/6W	
R027	1-249-437-11	CARBON 47K 5% 1/6W	
R028	1-249-429-11	CARBON 10K 5% 1/6W	
R029	1-249-429-11	CARBON 10K 5% 1/6W	
R032	1-249-429-11	CARBON 10K 5% 1/6W	
R033	1-247-875-00	CARBON 68K 5% 1/6W	
R034	1-247-845-00	CARBON 3.9K 5% 1/6W	
R035	1-249-429-11	CARBON 10K 5% 1/6W	
R036	1-249-429-11	CARBON 10K 5% 1/6W	
R037	1-249-437-11	CARBON 47K 5% 1/6W	
R038	1-247-869-00	CARBON 39K 5% 1/6W	
R039	1-249-429-11	CARBON 10K 5% 1/6W	
R040	1-249-429-11	CARBON 10K 5% 1/6W	
R041	1-249-433-11	CARBON 22K 5% 1/6W	
R042	1-249-420-11	CARBON 1.8K 5% 1/6W	
R043	1-249-419-11	CARBON 1.5K 5% 1/6W	
R044	1-249-441-11	CARBON 100K 5% 1/6W	
R045	1-249-434-11	CARBON 27K 5% 1/6W	
R046	1-247-859-00	CARBON 15K 5% 1/6W	
R047	1-249-429-11	CARBON 10K 5% 1/6W	
R048	1-215-443-00	METAL 8.2K 1% 1/6W	
R049	1-215-455-00	METAL 27K 1% 1/6W	
R051	1-215-449-00	METAL 15K 1% 1/6W	
R052	1-249-429-11	CARBON 10K 5% 1/6W	
R053	1-247-859-00	CARBON 39K 5% 1/6W	
R054	1-247-869-00	CARBON 39K 5% 1/6W	

When indicating parts by reference number, please include the board name.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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Ref.No	Part No.	Description				Remark
R055	1-249-433-11	CARBON	22K	5%	1/6W	
R056	1-249-433-11	CARBON	22K	5%	1/6W	
R057	1-249-435-11	CARBON	33K	5%	1/6W	
R058	1-247-857-00	CARBON	12K	5%	1/6W	
R059	1-249-440-11	CARBON	82K	5%	1/6W	
R060	1-249-429-11	CARBON	10K	5%	1/6W	
R061	1-249-425-11	CARBON	4.7K	5%	1/6W	
R062 ⚠	1-206-451-01	METAL OXIDE	3.3	5%	2W	F
R064	1-249-429-11	CARBON	10K	5%	1/6W	
R066	1-249-441-11	CARBON	100K	5%	1/6W	
R067	1-249-441-11	CARBON	100K	5%	1/6W	
R068	1-247-869-00	CARBON	39K	5%	1/6W	
R069	1-249-441-11	CARBON	100K	5%	1/6W	
R070	1-249-441-11	CARBON	100K	5%	1/6W	
R071	1-247-873-00	CARBON	56K	5%	1/6W	
R072	1-247-903-00	CARBON	1M	5%	1/6W	
R073	1-249-441-11	CARBON	100K	5%	1/6W	
R074	1-249-429-11	CARBON	10K	5%	1/6W	
R075 ⚠	1-212-356-00	METAL OXIDE	0.47	5%	1W	F
R076	1-249-405-11	CARBON	100	5%	1/6W	
R077 ⚠	1-212-360-00	METAL OXIDE	1	5%	1W	F
R078	1-249-423-11	CARBON	3.3K	5%	1/6W	
R079	1-249-423-11	CARBON	3.3K	5%	1/6W	
R080	1-249-435-11	CARBON	33K	5%	1/6W	
R081	1-249-417-11	CARBON	1K	5%	1/6W	
R082	1-249-435-11	CARBON	33K	5%	1/6W	
R083	1-247-875-00	CARBON	68K	5%	1/6W	
R084	1-249-435-11	CARBON	33K	5%	1/6W	
R085	1-247-819-00	CARBON	330	5%	1/6W	
R086	1-249-423-11	CARBON	3.3K	5%	1/6W	
R087	1-249-423-11	CARBON	3.3K	5%	1/6W	
R088	1-249-434-11	CARBON	27K	5%	1/6W	
R097	1-249-437-11	CARBON	47K	5%	1/6W	
R098	1-249-419-11	CARBON	1.5K	5%	1/6W	
R301	1-249-441-11	CARBON	100K	5%	1/6W	
R302	1-249-429-11	CARBON	10K	5%	1/6W	
R303	1-249-434-11	CARBON	27K	5%	1/6W	
R304	1-249-437-11	CARBON	47K	5%	1/6W	
R305	1-249-405-11	CARBON	100	5%	1/6W	
R306	1-249-425-11	CARBON	4.7K	5%	1/6W	
R307	1-249-437-11	CARBON	47K	5%	1/6W	
R308	1-249-441-11	CARBON	100K	5%	1/6W	
R309	1-249-417-11	CARBON	1K	5%	1/6W	
R310	1-249-417-11	CARBON	1K	5%	1/6W	
R311	1-249-417-11	CARBON	1K	5%	1/6W	
R312	1-249-417-11	CARBON	1K	5%	1/6W	
R313	1-249-429-11	CARBON	10K	5%	1/6W	
R314	1-249-429-11	CARBON	10K	5%	1/6W	
R317	1-249-429-11	CARBON	10K	5%	1/6W	
R318	1-249-429-11	CARBON	10K	5%	1/6W	
R319	1-247-833-00	CARBON	1.2K	5%	1/6W	
R320	1-247-713-11	CARBON	1K	5%	1/4W	
R404	1-249-425-11	CARBON	4.7K	5%	1/6W	
R405	1-249-441-11	CARBON	100K	5%	1/6W	

Ref.No	Part No.	Description				Remark
R406	1-249-417-11	CARBON	1K	5%	1/6W	
R407	1-249-417-11	CARBON	1K	5%	1/6W	
R408	1-249-417-11	CARBON	1K	5%	1/6W	
R409	1-249-417-11	CARBON	1K	5%	1/6W	
R411	1-249-417-11	CARBON	1K	5%	1/6W	
R412	1-247-862-00	CARBON	20K	5%	1/6W	
R413	1-249-432-11	CARBON	18K	5%	1/6W	
R414	1-247-873-00	CARBON	56K	5%	1/6W	
R415	1-249-420-11	CARBON	1.8K	5%	1/6W	
R416	1-247-833-00	CARBON	1.2K	5%	1/6W	
R417	1-249-429-11	CARBON	10K	5%	1/6W	
R418	1-249-434-11	CARBON	27K	5%	1/6W	
R419	1-249-432-11	CARBON	18K	5%	1/6W	
R420	1-247-839-00	CARBON	2.2K	5%	1/6W	
R421	1-247-849-00	CARBON	5.6K	5%	1/6W	
R422	1-249-429-11	CARBON	10K	5%	1/6W	
R423	1-247-839-00	CARBON	2.2K	5%	1/6W	
R424	1-249-441-11	CARBON	100K	5%	1/6W	
R425	1-249-435-11	CARBON	33K	5%	1/6W	
R426	1-247-839-00	CARBON	2.2K	5%	1/6W	
R427	1-249-417-11	CARBON	1K	5%	1/6W	
R428	1-249-437-11	CARBON	47K	5%	1/6W	
R429	1-249-437-11	CARBON	47K	5%	1/6W	
R430	1-249-405-11	CARBON	100	5%	1/6W	
R431	1-249-417-11	CARBON	1K	5%	1/6W	
R432	1-249-441-11	CARBON	100K	5%	1/6W	
R433	1-247-849-00	CARBON	5.6K	5%	1/6W	
R434	1-247-839-00	CARBON	2.2K	5%	1/6W	
R435	1-249-433-11	CARBON	22K	5%	1/6W	
R436	1-249-419-11	CARBON	1.5K	5%	1/6W	
R450	1-247-849-00	CARBON	5.6K	5%	1/6W	
R451	1-249-429-11	CARBON	10K	5%	1/6W	
R452	1-247-845-00	CARBON	3.9K	5%	1/6W	
R453	1-249-429-11	CARBON	10K	5%	1/6W	
R456	1-249-429-11	CARBON	10K	5%	1/6W	
R457	1-249-429-11	CARBON	10K	5%	1/6W	
R470	1-249-405-11	CARBON	100	5%	1/6W	
R471	1-249-441-11	CARBON	100K	5%	1/6W	
R472	1-247-839-00	CARBON	2.2K	5%	1/6W	
R473	1-249-429-11	CARBON	10K	5%	1/6W	
R474	1-249-429-11	CARBON	10K	5%	1/6W	
R480	1-247-853-31	CARBON	10K	5%	1/6W	
R481	1-247-853-31	CARBON	10K	5%	1/6W	
R482	1-247-823-00	CARBON	470	5%	1/6W	
R510	1-249-417-11	CARBON	1K	5%	1/6W	
R511	1-247-839-00	CARBON	2.2K	5%	1/6W	
R512	1-249-429-11	CARBON	10K	5%	1/6W	
R513	1-249-429-11	CARBON	10K	5%	1/6W	
R514	1-249-429-11	CARBON	10K	5%	1/6W	
R515	1-249-433-11	CARBON	22K	5%	1/6W	
R516	1-249-433-11	CARBON	22K	5%	1/6W	
R517	1-249-433-11	CARBON	22K	5%	1/6W	
R518	1-247-891-00	CARBON	330K	5%	1/6W	
R520	1-249-419-11	CARBON	1.5K	5%	1/6W	
R608	1-247-883-00	CARBON	150K	5%	1/6W	
R609	1-249-423-11	CARBON	3.3K	5%	1/6W	

When indicating parts by reference number, please include the board name.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Ref.No	Part No.	Description				Remark
R610	1-247-883-00	CARBON	150K	5%	1/6W	
R611	1-249-423-11	CARBON	3.3K	5%	1/6W	
R612	1-247-873-00	CARBON	56K	5%	1/6W	
R613	1-247-873-00	CARBON	56K	5%	1/6W	
R622	1-247-815-00	CARBON	220	5%	1/6W	
R625	1-249-405-11	CARBON	100	5%	1/6W	
R628	1-247-817-00	CARBON	270	5%	1/6W	
R629	1-249-425-11	CARBON	4.7K	5%	1/6W	
R630	1-247-819-00	CARBON	330	5%	1/6W	
R631	1-247-821-00	CARBON	390	5%	1/6W	
R632	1-249-433-11	CARBON	22K	5%	1/6W	
R633	1-249-441-11	CARBON	100K	5%	1/6W	
R634	1-249-433-11	CARBON	22K	5%	1/6W	
R635	⚠ 1-249-405-11	CARBON	100	5%	1/6W	F
R636	1-249-429-11	CARBON	10K	5%	1/6W	
R637	1-249-429-11	CARBON	10K	5%	1/6W	
R640	1-249-429-11	CARBON	10K	5%	1/6W	
R641	1-249-432-11	CARBON	18K	5%	1/6W	
R642	1-247-869-00	CARBON	39K	5%	1/6W	
R643	1-249-417-11	CARBON	1K	5%	1/6W	
R644	1-249-417-11	CARBON	1K	5%	1/6W	
R645	1-249-435-11	CARBON	33K	5%	1/6W	
R701	1-249-414-11	CARBON	560	5%	1/6W	
R702	1-247-823-00	CARBON	470	5%	1/6W	
R703	1-249-437-11	CARBON	47K	5%	1/6W	
R704	1-249-429-11	CARBON	10K	5%	1/6W	
R705	1-249-417-11	CARBON	1K	5%	1/6W	
R706	1-249-423-11	CARBON	3.3K	5%	1/6W	
R707	1-247-851-00	CARBON	6.8K	5%	1/6W	
R708	1-249-420-11	CARBON	1.8K	5%	1/6W	
R709	1-247-903-00	CARBON	1M	5%	1/6W	
R710	1-247-859-00	CARBON	15K	5%	1/6W	
R711	1-247-859-00	CARBON	15K	5%	1/6W	
R712	1-247-851-00	CARBON	6.8K	5%	1/6W	
R713	1-249-433-11	CARBON	22K	5%	1/6W	
R714	1-247-899-00	CARBON	680K	5%	1/6W	
R716	1-249-417-11	CARBON	1K	5%	1/6W	
R717	1-249-437-11	CARBON	47K	5%	1/6W	
R718	1-249-437-11	CARBON	47K	5%	1/6W	
R750	1-249-437-11	CARBON	47K	5%	1/6W	
R751	1-249-417-11	CARBON	1K	5%	1/6W	

VARIABLE RESISTOR

RV001	1-228-996-00	RES, ADJ, METAL GLAZE 47K
RV002	1-228-997-00	RES, ADJ, METAL GLAZE 100K
RV003	1-228-997-00	RES, ADJ, CARBON 100K
RV004	1-228-997-00	RES, ADJ, CARBON 100K
RV007	1-228-996-00	RES, ADJ, METAL GLAZE 47K
RV009	1-228-998-00	RES, ADJ, CARBON 220K
RV401	1-228-991-00	RES, ADJ, CARBON 2.2K

SWITCH

S301	1-553-725-21	SWITCH, SLIDE (AFT)
S304	1-553-856-00	SWITCH, KEY BOARD (CLEAR)
S305	1-553-856-00	SWITCH, KEY BOARD (TUNING+)
S306	1-553-856-00	SWITCH, KEY BOARD (TUNING-)
S307	1-553-856-00	SWITCH, KEY BOARD (SET)
S401	1-553-856-00	SWITCH, KEY BOARD (STILL ADJ)

TUNER

TU001	⚠ 1-463-584-11	TUNER, ET (BT-881A)

CRYSTAL

X301	1-567-519-11	VIBRATOR, CRYSTAL (4.19MHZ)

****

	*1-620-054-11	PS-115 BOARD
		**********
	1-533-189-11	HOLDER, FUSE
	*1-535-444-00	TERMINAL

CAPACITOR

C001	⚠ 1-136-472-11	FILM	0.1MF	20%	250V
C002	1-125-349-00	ELECT(BLOCK)	6800MF	20%	25V
C003	1-123-381-00	ELECT	2.2MF	20%	50V
C004	1-123-332-00	ELECT	47MF	20%	25V
C005	1-123-333-00	ELECT	100MF	20%	16V
C006	1-123-333-00	ELECT	100MF	20%	16V
C007	1-125-349-00	ELECT(BLOCK)	6800MF	20%	25V

CONNECTOR

CN001	*1-560-895-00	PIN, CONNECTOR 7P
CN002	*1-564-104-00	PIN, CONNECTOR 3P
CN003	*1-560-894-00	PIN, CONNECTOR 6P
CN004	*1-560-891-00	PIN, CONNECTOR 3P

DIODE

D001	⚠ 8-719-500-32	DIODE D3SB10
D002	⚠ 8-719-500-32	DIODE D3SB10

FUSE

F001	⚠ 1-532-203-00	FUSE, TIME-LAG 2.0A
F002	⚠ 1-532-203-00	FUSE, TIME-LAG 2.0A
F003	⚠ 1-532-203-00	FUSE, TIME-LAG 2.0A

IC

IC001	⚠ 8-749-964-41	IC STK5441

RESISTOR

R002	⚠ 1-212-958-00	FUSIBLE	10	5%	1/2W	F
R003	1-247-707-11	CARBON	390	5%	1/4W	
R004	1-247-707-11	CARBON	390	5%	1/4W	

****

When indicating parts by reference number, please include the board name.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

MI-5 | MI-6 | LM-16 | MF-15 | MF-16

Ref.No	Part No.	Description				Remark
	*1-614-828-11	MI-5 BOARD **********				
		CONNECTOR				
CN001	*1-564-013-00	PIN, CONNECTOR 3P				
		DIODE				
PH001	8-719-913-41	DIODE SPI201-22				
		RESISTOR				
R001	1-247-826-00	CARBON	620	5%	1/6W	
R002	1-249-429-11	CARBON	10K	5%	1/6W	
**********						
	*1-614-829-11	MI-6 BOARD **********				
		CONNECTOR				
CN002	*1-564-002-00	PIN, CONNECTOR 3P				
		DIODE				
PH002	8-719-913-41	DIODE SPI201-22				
		RESISTOR				
R004	1-247-826-00	CARBON	620	5%	1/6W	
R005	1-249-429-11	CARBON	10K	5%	1/6W	
**********						
	*1-614-597-11	LM-16 BOARD **********				
**********						
	1-620-051-11	MF-15 BOARD **********				
		DIODE				
D203	8-719-812-33	DIODE TLG123A (ON/STANDBY)				
		RESISTOR				
R005	1-247-707-11	CARBON	390	5%	1/4W	
		SWITCH				
S212	1-553-856-00	SWITCH, KEY BOARD (ON/STANDBY)				
**********						

Ref.No	Part No.	Description				Remark
	*1-620-052-11	MF-16 BOARD **********				
		CONNECTOR				
CN001	*1-564-019-11	PIN, CONNECTOR 9P				
CN002	*1-564-014-00	PIN, CONNECTOR 4P				
CN003	*1-564-013-00	PIN, CONNECTOR 3P				
CN007	*1-564-017-00	PIN, CONNECTOR 7P				
CN008	*1-564-013-00	PIN, CONNECTOR 3P				
CN009	*1-564-013-00	PIN, CONNECTOR 3P				
		DIODE				
D202	8-719-911-19	DIODE 1SS119				
		IC				
IC101	8-741-138-70	IC BX-1387				
		RESISTOR				
R001	1-247-839-00	CARBON	2.2K	5%	1/6W	
R002	1-247-859-00	CARBON	15K	5%	1/6W	
R101	1-247-833-00	CARBON	1.2K	5%	1/6W	
R102	1-249-420-11	CARBON	1.8K	5%	1/6W	
R103	1-249-423-11	CARBON	3.3K	5%	1/6W	
R104	1-247-833-00	CARBON	1.2K	5%	1/6W	
R105	1-247-848-00	CARBON	5.1K	5%	1/6W	
R107	1-247-853-00	CARBON	8.2K	5%	1/6W	
R108	1-247-833-00	CARBON	1.2K	5%	1/6W	
R109	1-249-420-11	CARBON	1.8K	5%	1/6W	
R110	1-249-423-11	CARBON	3.3K	5%	1/6W	
R111	1-247-853-00	CARBON	8.2K	5%	1/6W	
R201	1-249-429-11	CARBON	10K	5%	1/6W	
R202	1-249-429-11	CARBON	10K	5%	1/6W	
R203	1-249-429-11	CARBON	10K	5%	1/6W	
R204	1-249-429-11	CARBON	10K	5%	1/6W	
		VARIABLE RESISTOR				
RV001	1-230-430-11	RES, VAR, CARBON 10K				
		SWITCH				
S005	1-553-716-00	SWITCH, SLIDE (INPUT SELECT)				
S009	1-553-751-00	SWITCH, SLIDE (SUPER BETA)				
S101	1-553-856-00	SWITCH, KEY BOARD (◀◀)				
S102	1-553-856-00	SWITCH, KEY BOARD (EJECT)				
S103	1-553-856-00	SWITCH, KEY BOARD (GO TO ZERO)				
S104	1-553-856-00	SWITCH, KEY BOARD (▶▶)				
S105	1-553-856-00	SWITCH, KEY BOARD (▶)				
S108	1-553-856-00	SWITCH, KEY BOARD (TRACKING+)				
S109	1-553-856-00	SWITCH, KEY BOARD (■ STOP)				
S110	1-553-856-00	SWITCH, KEY BOARD (▮▮ / ▶◀)				
S111	1-553-856-00	SWITCH, KEY BOARD (▮▮▶)				
S113	1-553-856-00	SWITCH, KEY BOARD (TRACKING-)				

When indicating parts by reference number, please include the board name.

Ref.No	Part No.	Description	Remark
S202	1-553-856-00	SWITCH, KEY BOARD (CLEAR/RESET)	
S204	1-553-856-00	SWITCH, KEY BOARD (CLOCK SET)	
S205	1-553-856-00	SWITCH, KEY BOARD (CHECK)	
S206	1-553-856-00	SWITCH, KEY BOARD (TIMER SET)	
S207	1-553-856-00	SWITCH, KEY BOARD (PROGRAM/TIMER-)	
S208	1-553-856-00	SWITCH, KEY BOARD (PROGRAM/TIMER+)	
S209	1-553-856-00	SWITCH, KEY BOARD (NEXT)	
S210	1-553-856-00	SWITCH, KEY BOARD (TIMER REC)	
S211	1-553-856-00	SWITCH, KEY BOARD (QUICK TIMER)	

****

*1-620-053-11 MF-17 BOARD
****

CONNECTOR

CN701	*1-564-013-00	PIN, CONNECTOR 3P	
CN702	*1-564-013-00	PIN, CONNECTOR 3P	

DIOD

D007	8-719-812-32	DIODE TLY123 (SYNCHRO EDIT)	

RESISTOR

R011	1-247-711-11	CARBON	680	5%	1/4W
R104	1-247-853-00	CARBON	8.2K	5%	1/6W

SWITCH

S107	1-553-856-00	SWITCH, KEY BOARD (SLOW+)	
S112	1-553-856-00	SWITCH, KEY BOARD (SLOW-)	
S115	1-553-856-00	SWITCH, KEY BOARD (SYNCHRO EDIT)	
S702	1-554-088-00	SWITCH, KEY BOARD (REC)	

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*1-620-055-11 VS-11 BOARD (INDONESIA MODEL)
****

SWITCH

S001	⚠1-552-304-00	SWITCH(VOLTAGE SELECTOR)(INDONESIA MODEL)	

****

DR-38 BOARD
****

TRANSISTOR

Q223	⚠8-729-107-25	TRANSISTOR 2SD1585-L	

****

Ref.No	Part No.	Description	Remark
		MISCELLANEOUS	
		**********	
	⚠1-464-690-11	MODULATOR, RF (RFU-857)	
	⚠1-551-908-61	CORD, POWER, EULO PLUG	
L901	X-3693-829-1	SENSOR BLOCK ASSY, S	
L902	X-3693-830-1	SENSOR BLOCK ASSY, T	
M902	8-838-096-01	MOTOR, DC (BHF-1914A) (CAPSTAN)	
M903	A-4910-063-B	R STATOR(REEL MOTOR)BOARD,COMPLETE(REEL)	
M904	X-3679-268-1	MOTOR ASSY, L (LOADING)	
PM901	⚠1-454-349-51	SOLENOID, PLUNGER (PINCH)	
PM902	⚠1-454-371-51	SOLENOID, PLUNGER (BRAKE)	
S901	1-554-839-11	SWITCH, LEAF (2 GANG) (REC PROOF, CASSETTE DOWN)	
S903	⚠1-554-840-11	SWITCH, LEAF (THREADING END)	
S904	⚠1-554-840-11	SWITCH, LEAF (CASSETTE ON)	
T001	⚠1-448-656-11	TRANSFORMER, POWER	

****

ACCESSORIES AND PACKING MATERIALS
****

Part No.	Description	Remark
A-6767-240-A	COMMANDER ASSY (RMT-149)	
1-551-513-00	CORD ASSY, COAXIAL	
*3-677-503-00	SHEET, PROTECTION	
*3-695-072-01	CUSHION (LOWER)	
3-701-625-00	BAG, POLYETHYLENE	
*3-710-562-01	CUSHION (UPPER)	
*3-710-589-01	INDIVIDUAL CARTON (INDONESIA MODEL)	
3-712-801-01	INDIVIDUAL CARTON (Spanish Model)	
3-765-539-41	MANUAL, INSTRUCTION (ENGLISH, Spanish)	

****

When indicating parts by reference number, please include the board name.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

SECTION 7
ADJUSTMENTS

TABLE OF CONTENS

1. MECHANICAL CHECK ADJUSTMENT AND PREPARATIONS FOR REPLACEMENT

The 9 items of the disassembly procedure mentioned be low are detailed page23~28.

1-1. DISASSEMBLY OF CABINET
1-2. REMOVAL OF THE ST-12 BOARD
1-3. REMOVAL OF THE AU-26 BOARD AND THE VI-23 BOARD
1-4. REMOVAL OF THE REEL BLOCK ASSEMBLY
1-5. REMOVAL OF THE MF-17 BOARD AND THE MF-16 BOARD
1-6. REMOVAL OF THE RP-41 BOARD
1-7. REMOVAL OF THE PS-115 BOARD
1-8. REMOVAL OF THE FL CASSETTE COMPARTMENT ASSEMBLY
1-9. REMOVAL OF THE MD BLOCK ASSEMBLY

1-10. OPERATION OF THE UNIT WITH THE FL CASSET COMPARTMENT REMOVED

1-10-1. How to Put the Unit into Threading Completed Mode when the FL Cassette Compartment is Removed.

1) Connect ordinary screwdriver to short the leaf switch ● (cassette-on switch shown in Fig. 1-1.).
Note :
Be careful that the ordinary screwdriver do not touch any other parts (use tape or other insulation).
2) Press the cassette-down switch ❷ and leave it pressed in, when the power button is turned ON, threading starts.
* Refer to section 2-8 for instructions on how to remove the FL cassette compartment.

[How to EJECT in this condition]

- Press the EJECT button. When unthreading is completed and the internal gear starts to turn, turn the power OFF.

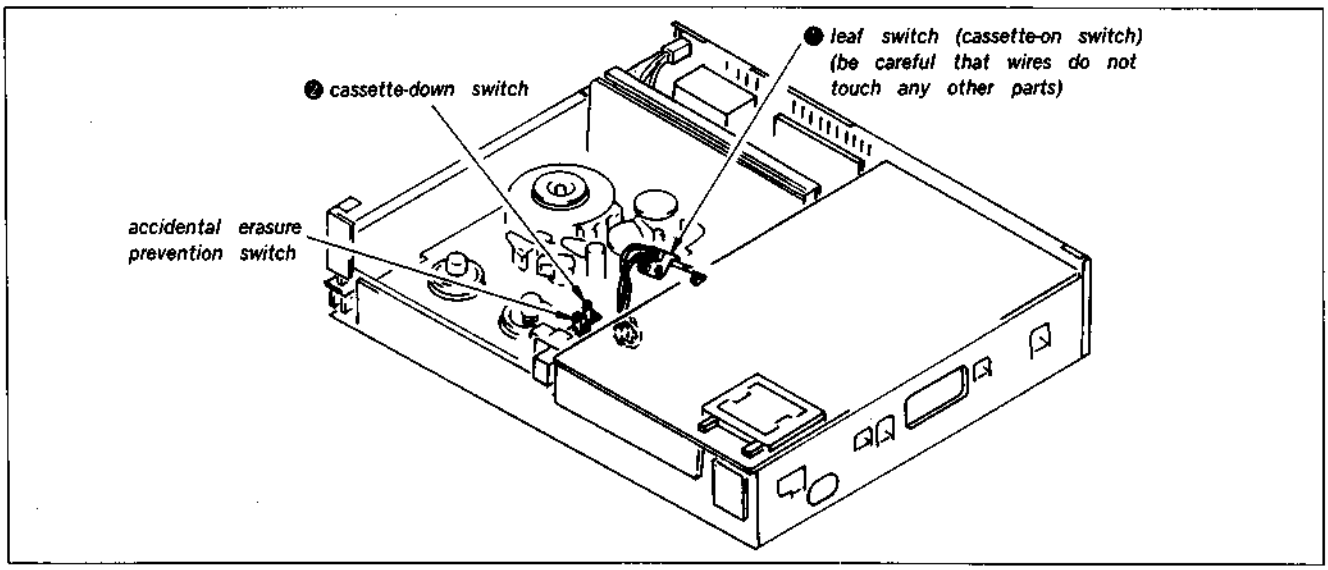


Fig. 1-1. How to put the unit into Threading completed mode when the FL cassette compartment in removed.

1-10-2. Playback Without Cassette Installed

Complete threading by the procedure described in 1-10-1, then press the palyback button.

1-10-3. How to Put in Recording Mode Without Cassette Installed

1. Thread by the procedure in 1-10-1 than press the accidental erasure prevention switch 1 shown in Fig. 1-2.
2. With the accidental erasure prevention 1 switch pressed down, press the recording button.

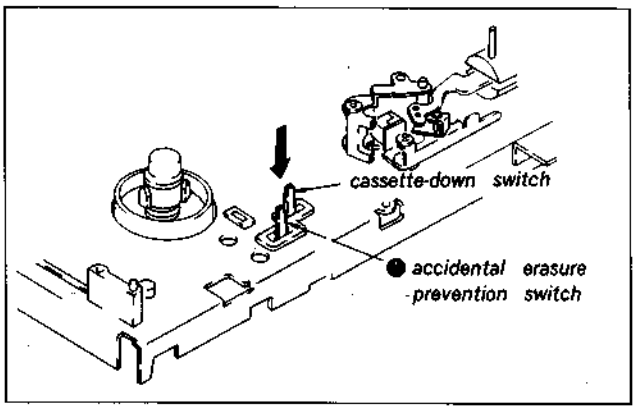


Fig. 1-2. How to put the recorder in recording mode with the FL cassette compartment removed

1-11. HOW TO LOAD, THREAD, UNLOAD AND UNTHREAD WITH THE POWER OFF

1-11-1. Manual Loading and Unloading

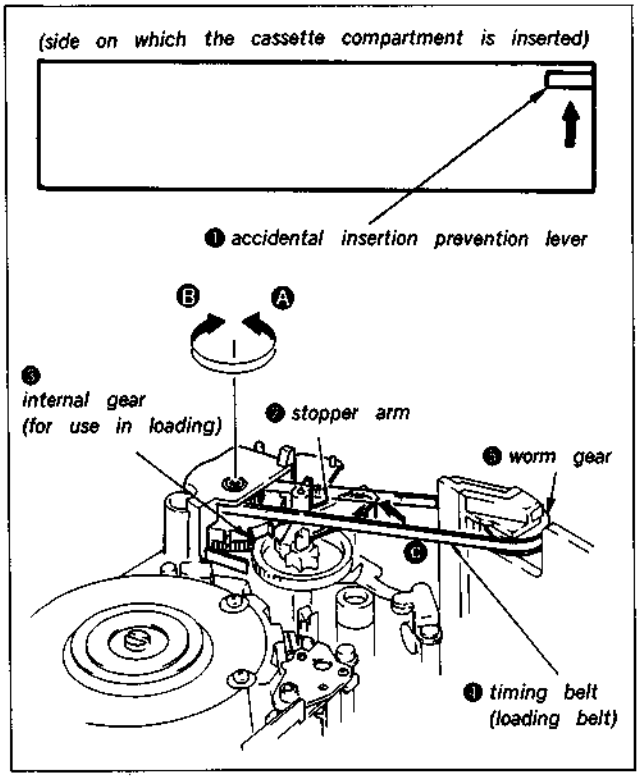


Fig. 1-3. Manual loading and unloading

1) Release the right accidental insertion prevention lever ❶ inside the cassette compartment, then press the stopper arm ❷ in the direction of arrow Ⓒ and release the internal gear ❸ stop.
2) Turn the internal gear ❸ manually in the direction of arrow Ⓐ until loading is completed.
3) To unload, turn the internal gear ❸ in the direction of arrow Ⓑ.

Note:
When the loading belt ❹ has been removed, load and unload by turning the worm gear ❺ manually.

1-11-2. Manual Threading and Unthreading

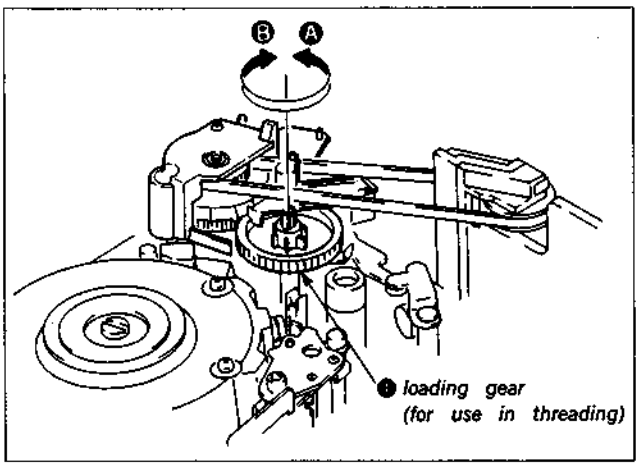


Fig. 1-4. Manual threading and unthreading

1) Turn the loading gear ❶ in the direction of arrow Ⓐ until threading is completed.
2) To unthread, turn the loading gear ❶ in the direction of arrow Ⓑ.

Note:
Always turn the loading gear sideways by hand. Never use a screwdriver or other tool.

1-12. TOOLS AND FIXTURES REQUIRED FOR SERVICING

Ref. No.	Name	Part Code	Carved Jig No.	Use and Remarks
J-1	Torque Measurement Tape	J-6080-003-C	SL-0003C	forward torque and back tension measurement
J-2	Parallel Plate	J-6086-570-A	SL-0657	audio/CTL head lateral adjustment capstan shaft vertical adjustment
J-3	Dental Mirror (handle) Dental Mirror (mirror)	J-6080-029-A J-6080-030-1	SL-5052	tape path and tape traveling adjustment check
J-4	Alignment Tape (KR5-2H)	8-969-995-52	—	tracking, overall adjustment of picture quality, etc.
J-5	Cleaning Fluid	Y-2031-001-0	—	for cleaning
J-6	Thickness Gauge	9-911-053-00		for clearance check
J-7	Chamois Cloth	2-034-697-00	—	cleaning
J-8	Head Demagnetizer	widely available	—	demagnetization of video head and audio head
J-9	Cleaning Cassette Tape	8-888-004-00	—	video head cleaning
J-10	Dihedral Adjustment Screw	J-6080-013-A	SL-0013	video dihedral adjustment
J-11	Video Head Checker	7-732-080-01	SL-5151	video head check

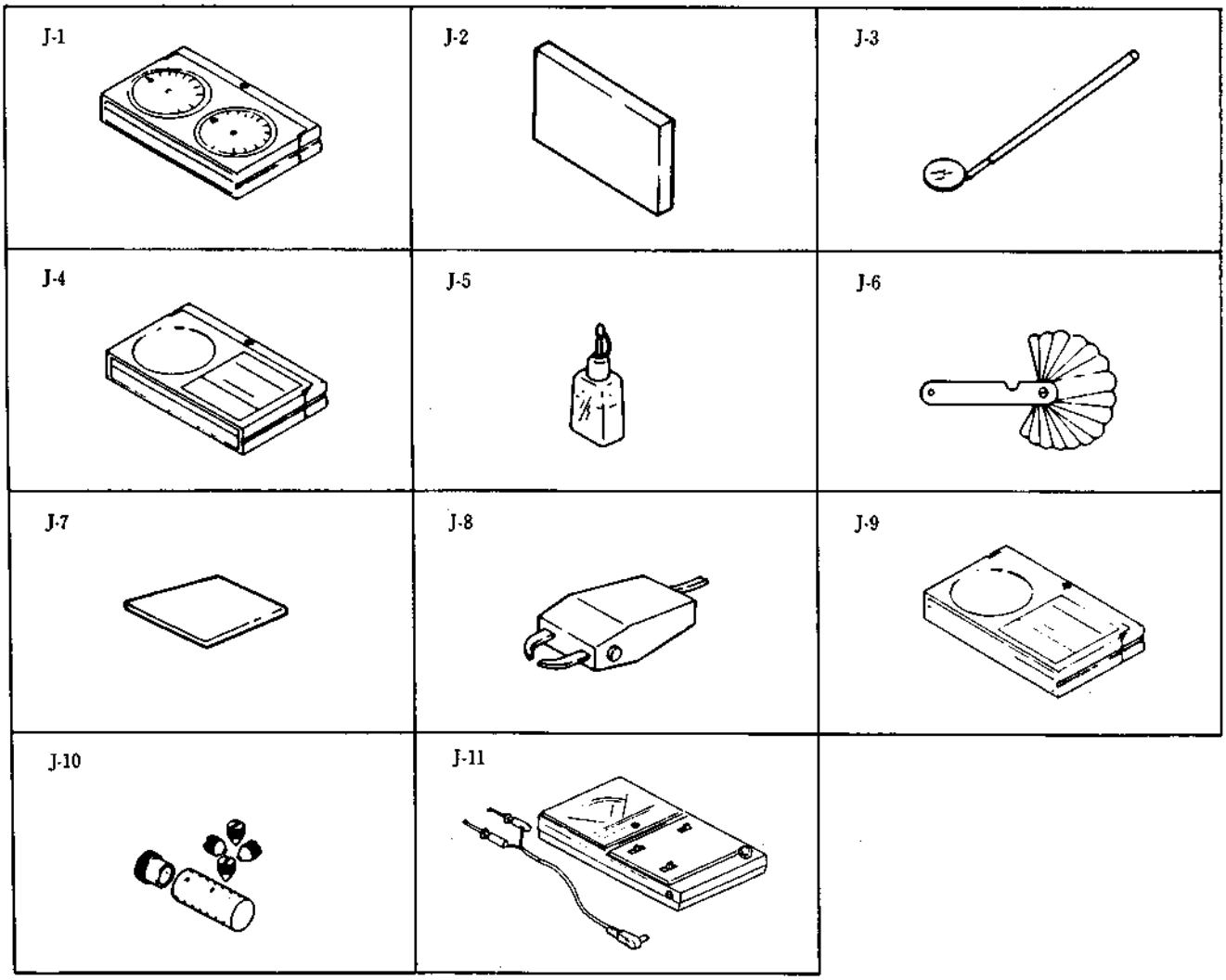


Fig. 1-5. Tools and fixtures required for servicing

2. PERIODIC CHECK AND MAINTENANCE

In order to obtain the best performance from this unit and make full use of its capabilities, and to extend the life of the unit and tapes. it is recommended that the following periodic checks and maintenance be performed.

2-1. POST-REPAIR MAINTENANCE

The following must be done after every repair regardless of how many hours the user has operated the machine.

2-1-1. Cleaning of Rotating Head Disk Assembly

1) Press a chamois cloth (Jig Ref. No. J-7) which has been dipped in cleaning fluid (Jig Ref. No. J-5) lightly against the rotating drum assembly, then do the cleanig by slowly rotating the rotating head disk by hand. (Never try to clean by using the motor to turn it.)
2) Never try to clean by moving the chamois cloth at a right angle to the head tip. There is a very great danger of damaging the head tip if this is done.

2-1-2. Cleaning of the Tape Movement System

1) Clean the surfaces which the tape contacts during its movement (tape guide. drum assembly surface, capstan, pinch roller, etc.) with a chamois cloth that has been dipped in cleaning fluid.

2-1-3. Cleaning the Drive System

1) Clean the driving parts with a cloth that has been dipped in cleaning fluid.

parts requiring cleaning

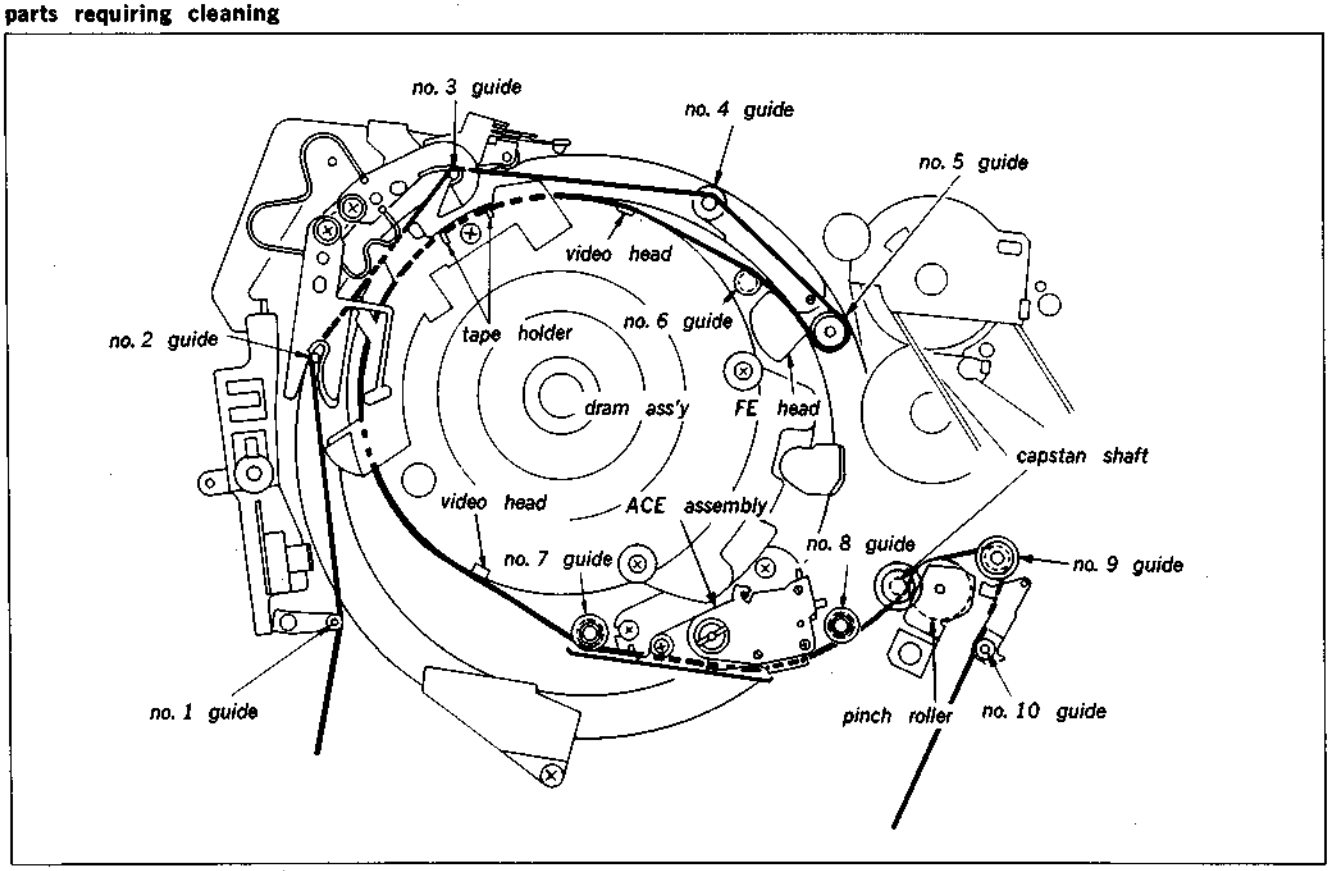


Fig. 2-1. Parts requiring cleaning

2-2. PERIODIC CHECK ITEMS

Perform the maintenance and check listed on the table below, accoring to user's operating hours.

Maintenance & Check		Replacement Part No.	Operating Hours (H) 500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	Remarks
Tape Transportation System	Cleaning of tape transportation system	——	○	○	○	○	○	○	○	○	○	○	This cleaning must be done whenever a repair is made.
	Cleaning and degaussing of ACE ass'y	——	○	○	○	○	○	○	○	○	○	○	
	Cleaning & degaussing of video disk ass'y	——	○	○	○	○	○	○	○	○	○	○	The life of the head varies, depending on operational conditions and method.
Driving System	Loading belt (timing belt)	3-684-264-01	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	This cleaning must be done whenever a repair is made.
	Cleaning of iron core and opening of solenoid	——	—	—	—	○	—	—	—	○	—	—	Wipe iron core and opening of solenoid with dry cloth.
Performance Confirmation	Abnormal sound		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust or replace the section which causes abnormal sound.
	Measurement of FWD back tension		—	☆	—	☆	—	☆	—	☆	—	☆	Confirmation must be made according to section 3-13. Specified value: adjust to 34±3g•cm (When measured with torque cassette tape)
	Confirmation of brake system		—	☆	—	☆	—	☆	—	☆	—	☆	
	Confirmation of record & playback functions		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Perform the confirmation whenever repair is made.
	Measurement of forward torque		☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust to 80±5g•cm (SL-0003C)

○ Cleaning ★ Replacement ☆ Confirmation

Note :
On overhaul
When overhauling the unit, replace parts as indicated in the above table.

2-3. STATE OF WEAR OF VIDEO HEADS CHECK

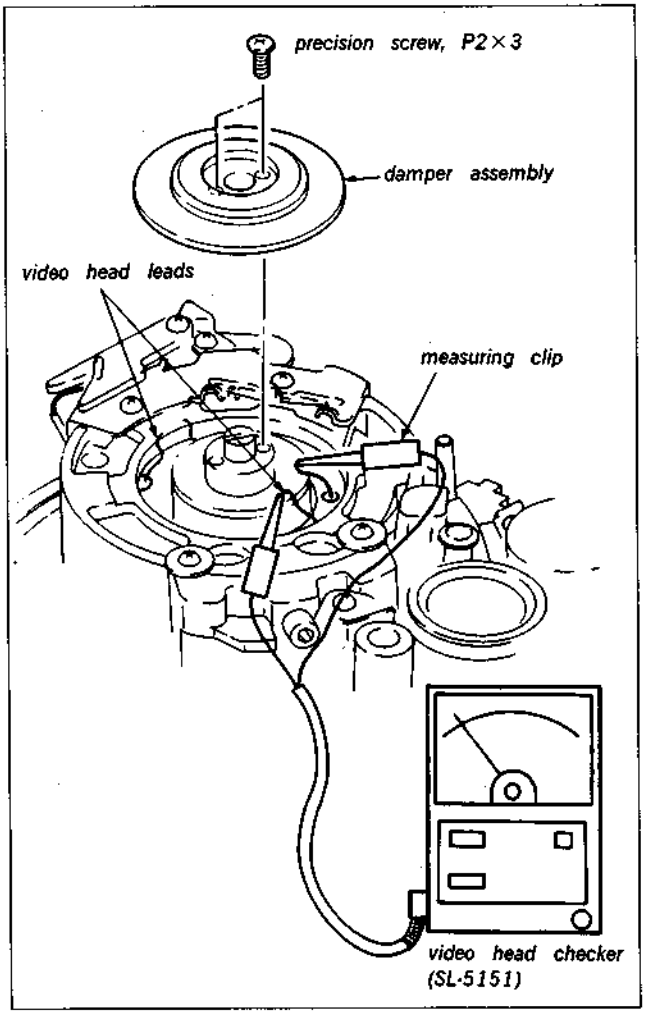
As the accuracy of the check depends on the state of the heads and precision of the checker the results should be taken only as an indication of the state of wear.

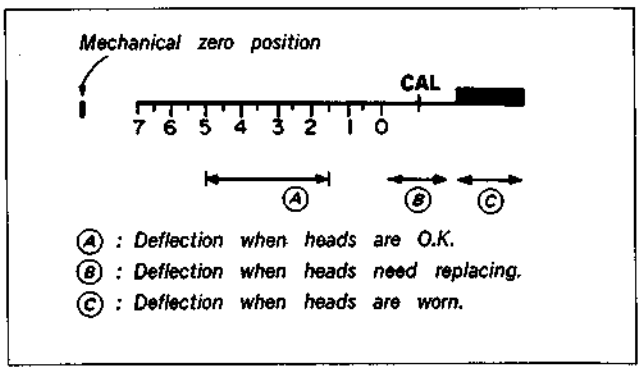
[Adjustment of video head checker]

1) Mechanical zero
   Verify that the pointer of the video head checker is at the mechanical zero position. If it is not at this position adjust the mechanical zero control.
2) Battery voltage check
   Set the MODE switch to "BATT" and set the POWER switch to "ON". The deflection of the pointer should be within the range marked "BATT". If not, replace the battery (use a 6F22 battery) as follows.
3) Calibration check
   Set the POWER switch to "ON" and the MODE switch to "CAL" then adjust the CAL control so that the pointer is on the CAL mark.
   Note 1: Be sure to carry out this adjustment whenever the RANGE switch is changed.
   Note 2: Be sure to check CAL before measuring the head and proceed the measurement after adjusting CAL, if CAL is not properly set.

[Method of measurement]

1) Remove the two screws that hold the damper assembly in place, then remove the damper assembly.
2) Detach the lead wires on the 2 video heads.
3) Attach the measuring clips to the head leads.
   Be sure to separate the leads by at least 1.5 cm.
4) Set RANGE switch to "B" and MODE switch to "MEAS".
   The pointer will deflect to indicate the state of wear of the heads.
   Note: The deflection for the 2 video heads may be different, so be sure to measure both.





MEASURED VALUE

3. CHECK ADJUSTMENT AND REPLACEMENT PROCEDURES

3-1. PEPLACEMENT OF ROTATING HEAD DISK ASSEMBLY

3-1-1. Removal of the Rotating Head Disk Assembly (Fig. 3-1)

1) Remove the adjustment plates 2 and 3 ❽ in accordance with the repalcement of the drum assembly 1), 2) and 3) described in 3-3-1.
2) Remove the two precision screws ❷ then remove the damper assembly ❸.
3) Use a hexagonal wrench to remove the hexagonal socket bolt ❹ then remove the upper drum assembly ❺.

Note:

Turn the upper drum to remove, being careful not to move the adjusting plate. Movement of the adjusting plate will have a great effect on the tape path, so caution in required.

4) Unsolder the rotating head disk ❻ relay board four red and white leads) ❼.
5) Remove the two hexagonal socket bolts ❽ then remove the rotating head disk assembly ❻.

Note:

Be careful not to touch the head tip with the hand or bang anything against it.

3-1-2. Mounting of the Rotating Head Disk Assembly (Fig. 3-1)

1) Insert rotating head disk ❻ in place being careful of the direction so that the red and white leads are in the right places.
2) Tighten hexagonal socket bolts ❽ and solder the lead wires.

Note:

Be careful to solder the lead wires correctly and not to break any wires.

3) Attach the upper drum being careful (as during removal) not to move the adjusting plate. While pressing the two points that determine the height tighten hexagonal socket bolt ❹.

Note:

When inserting the upper drum, be careful that it does not touch the head tip.

Note:

When replacing the rotating drum head, it can happen that the rotating head disk assembly will be hard to remove. In such a case, remove it using the method explained below (Fig. 3-2).

1) Remove the hexagonal socket bolts ❶ that hold the rotating head disk assembly in place.
2) When the head disk is jammed on tight and is hard to remove, screw the hexagonal socket bolts removed in step ❷ into the threaded holes removed from the original holes by 90°. Tighten them a little at a time.

The head disk will be lifted up by the two screws and will come off easily.

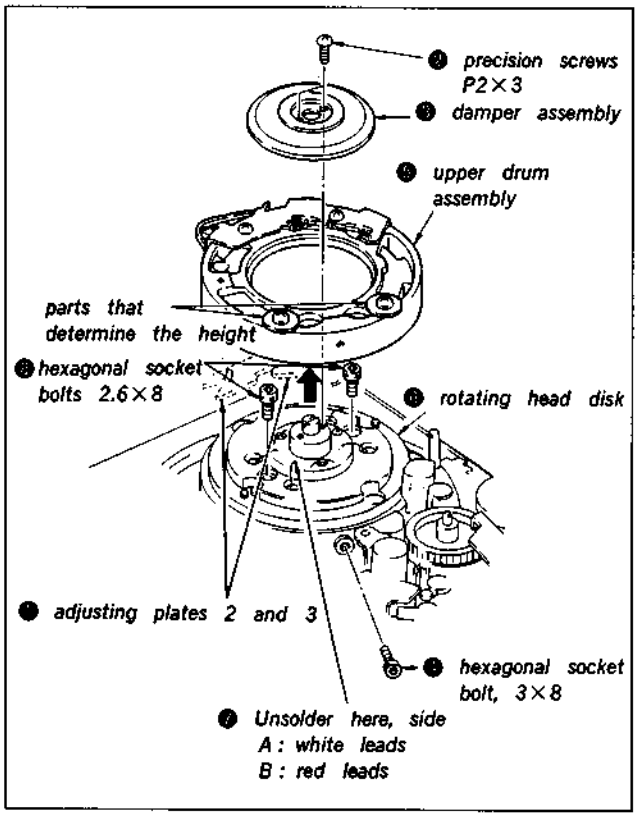


Fig. 3-1. Removal of the rotating head disk assembly I

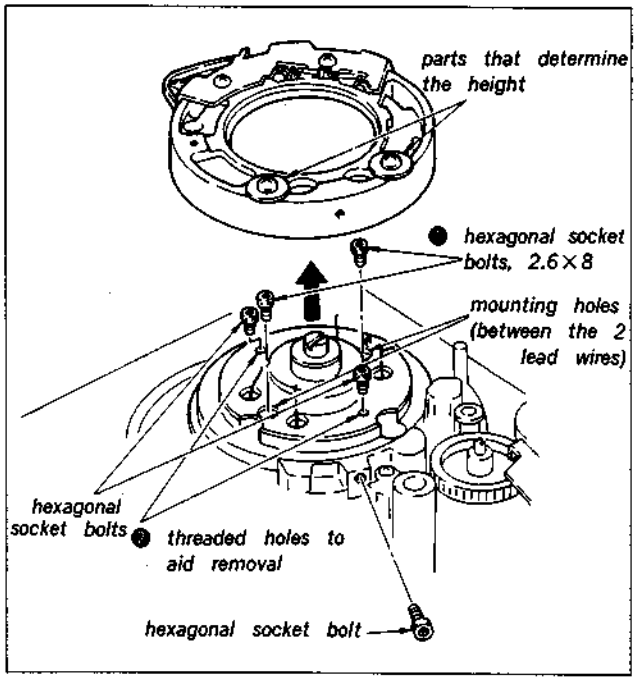


Fig. 3-2. Removal of the rotating head disk assembly II

3-2. VIDEO HEAD DIHEDRAL CHECK AND ADJUSTMENT

This adjustment is generally unnecessary but it is sometimes necessary when the video head disk is replaced. (The video head disk used for maintenance has been precision adjusted at the factory using a microscope and almost never needs to be readjusted).

When judging whether the video head dihedral angle is correct the alignment tape is played back. When this is done the tracking control knob must be in the centering position. If the check is done with this knob in other than the center click position (if the tracking is off-center) even if the dihedral angle is correct the picture will be reproduced as if it were off.

Before this adjustment is performed, the ACE assembly position adjustment (refer to the section where the tape path adjustment is described) must be completed.

[Method of checking]

With the tracking control knob set to the center click position play back the monoscope section of the alignment tape. Check to see if any of the vertical monoscope lines immediately below the switching pulse are reproduced double. If not the dihedral angle is correct and does not have to be adjustment. If perform the adjustment as explained below.

[Method of adjustment]

1) As shown in Fig. 3-3. screw two dihedral angle adjustment screws (SL-0013 in the list of fixtures and tools) into the adjustment screw holes on the side on which the red lead wires from the video head are connected until the top of the screw is level with the video head disk. (If they are not screwed in far enough, the video head disk will not turn past the point where the top of the adjustment screw strikes the upper drum. Conversely, if it is screwed in too far, the head base will be moved, throwing the video head dihedral angle way off.)
   The side on which the white lead wires are connected is the reference side and must not be moved.
2) Screw one of the two adjustment screws in a little bit farther until resistance is felt. Beyond this point turning the screw still farther will move the video head adjusting the dihedral angle.
3) With the adjustment screws in place play the monoscope signal section of the alignment tape and see how the lines are reproduced. If the verical lines are split apart more than before turn the screw which was screwed in more tightly counterclockwise to loosen it then adjust by tightening the other screw.
4) After the adjustment is completed remove the adjustment screws and play the tape again to reconfirm that the adjustment is correct.

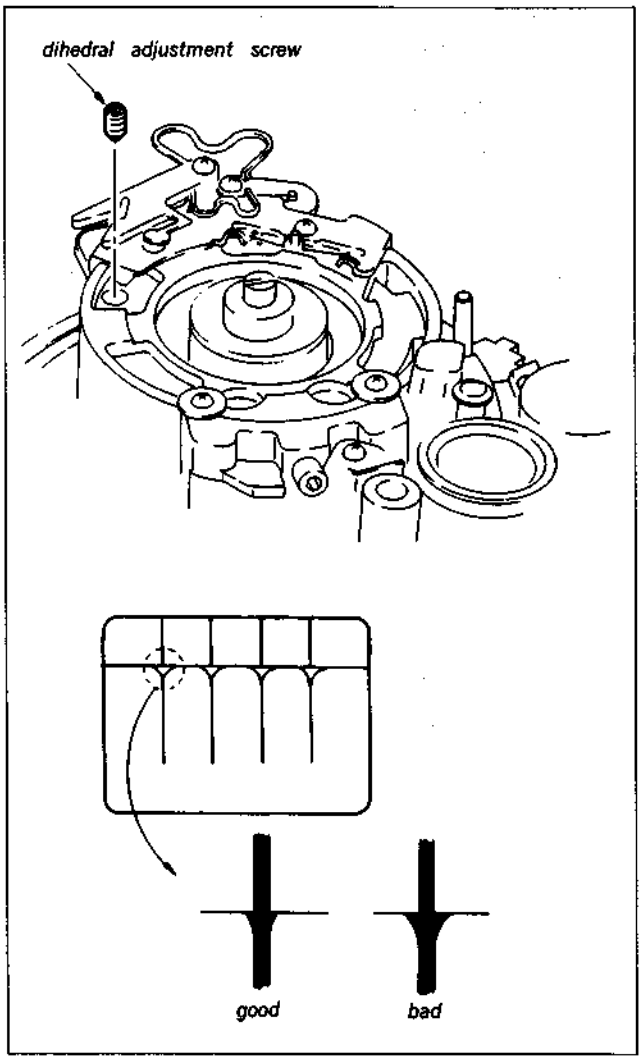


Fig. 3-3. Video head dihedral adjustment

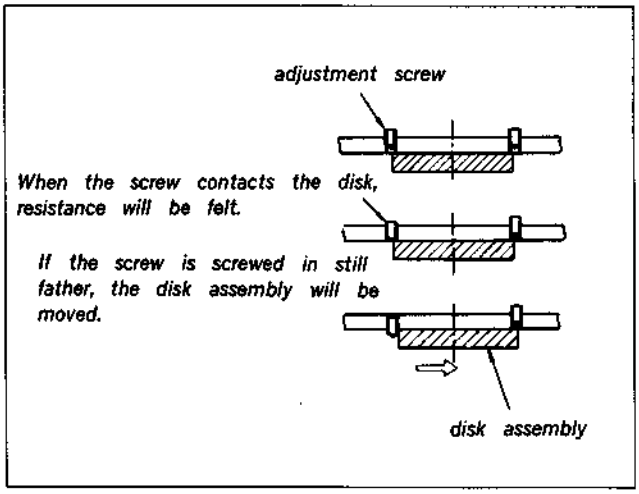


Fig. 3-4.

3-3. REPLACEMENT AND ADJUSTMENT OF THE DRUM ASSEMBLY

3-3-1. Replacement of the Drum Assembly

1) Measure the gap Ⓐ between adjusting plate 2 and 3 and the upperdrum holder section and record the measurement.
   Note :
   The position where the adjusting plate is mounted has a large effect on the tape path, so this measurement must be performed.
2) Measure the gap Ⓑ between adjusting plate 2 and 3 and the upperdrum holder section, and record the measurement.
   Note :
   The position where the adjusting plate is mounted has a large effect on the tape path, so this measurement must be performed.
3) Remove the two screws ● shown in Fig. 3-5, then remove the adjusting plates 2 and 3 ❷.
4) Remove the three connectors ❶ from the rear of the chassis as shown in Fig. 3-6.
5) Remove the three drum mounting screws ❸ from the rear of the chassis, then remove the main body of the drum assembly ❺. After the replacement has been completed, adjust the drum path.

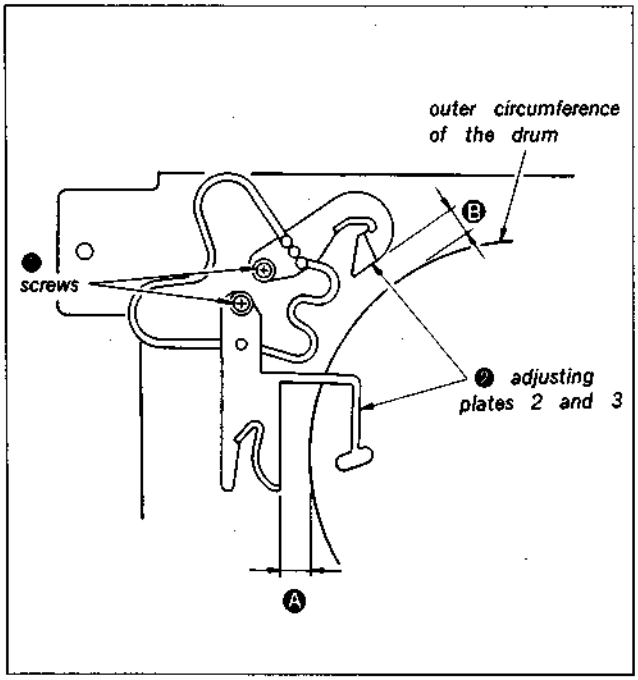


Fig. 3-5. Measurement of the position of adjusting plates 2 and 3

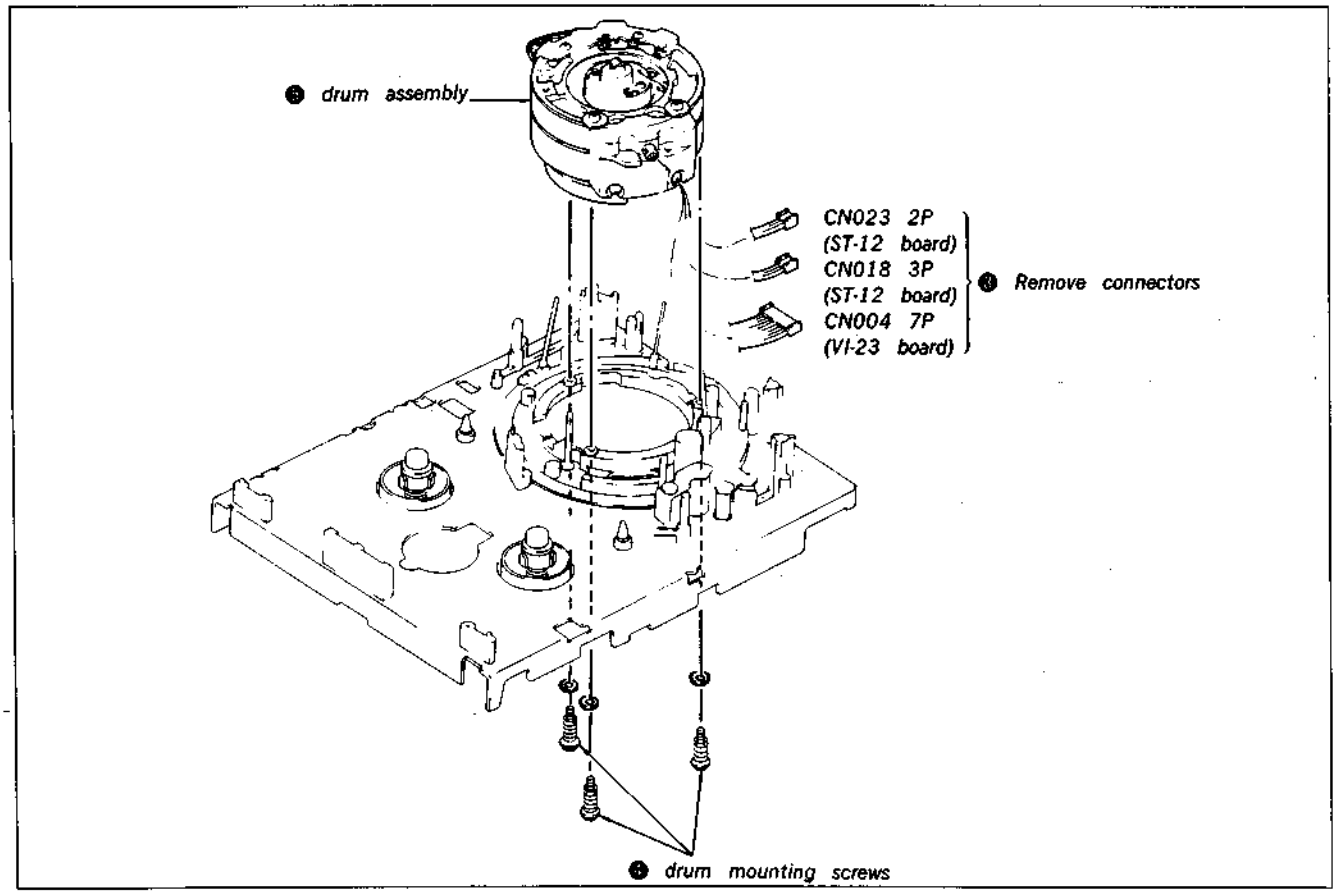


Fig. 3-6. Removal of the drum assembly

3-3-2. Adjustment of the Motor Gap when Replacing the Drum Assembly

After replacing the drum assembly adjust the gap between the motor rotor and the coil to 0.3 mm 0.6 mm (Fig. 3-7).

[Procedure]

1) When re-assembling the drum use the spacers which were removed to produce a gap of between 0.3 mm and 0.6 mm. Measure the gap using the gauge and maintenance use. One side of the gauge in 0.3 mm and the other side is 0.6 mm. If the gap is adjusted correctly the 0.3 mm side should fit in and the 0.6 mm side should not.
2) If this tails to give the correct gap width, do not use the spacers which were removed; instead, use a combination of the accessory four spacers (0.3 mm) to obtain the correct width.

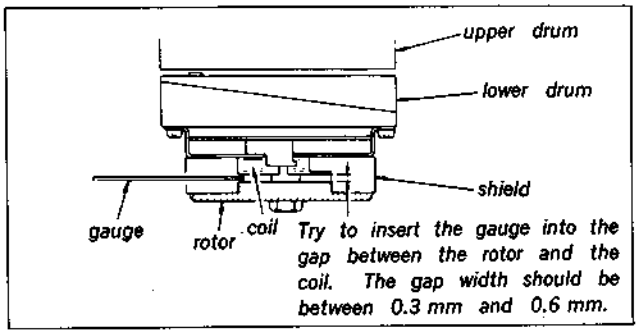


Fig. 3-7. Checking the motor gap width after replacing the drum assembly

Removal of the stator and rotor when replacing the drum

1) Remove the nut and washer ❶.
2) Remove the rotor ❷ from the stator ❸.
3) Remove the two screws ❹, then remove the stator ❸ from the main body of the drum.

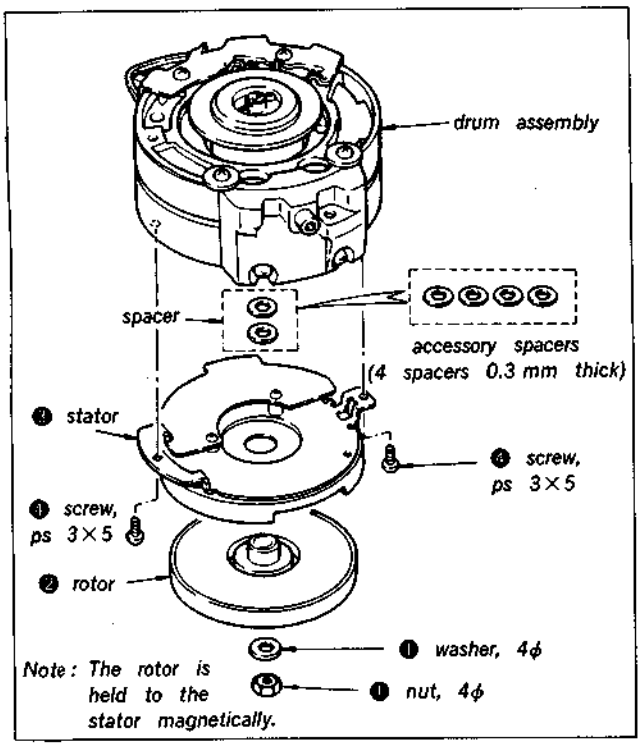


Fig. 3-8. Removal of the stator and rotor when replacing the drum

3-4. REPLACEMENT OF THE CAPSTAN MOTOR

3-4-1. Removal of the Capstan Motor (Fig. 3-9)

1) Remove the two screws (+PW2 × 6) ❶ and screw (+P2.6 × 5)❷.
2) Remove the capstan motor ❸ from the rear of the mechanical chassis.
3) Remove screw (+P2 × 4) ❹, and remove the rotor holder ❺.
4) Remove three claws, and remove capstan cover ❻.

Note:

When the capstan motor has been removed or replaced, check the tape path once.

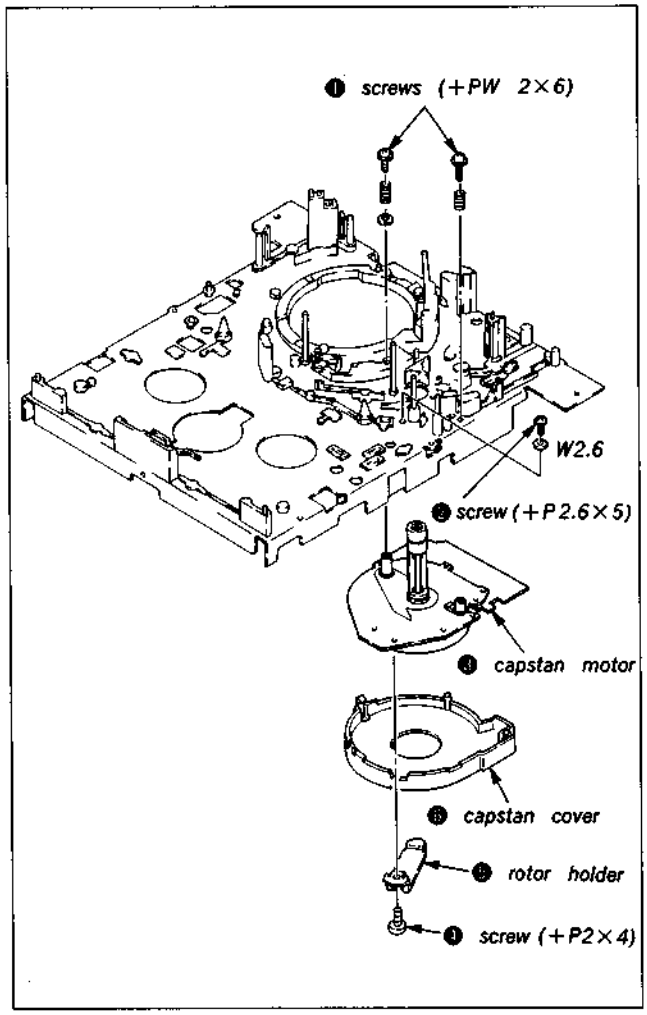


Fig. 3-9. Removal of capstan motor

3-4-2. Capstan Shaft Verticality Adjustment

When the capstan motor has been replaced or removed, be sure to make the following adjustment.

1) Loosen clamping screws Ⓑ and Ⓒ.
2) Apply parallel plate (SL-0657 in the list of fixtures and tools) vertically to the capstan motor shaft and the No. 8 guide sleeve, as shown in Fig. 3-10.
3) Turn adjust screw Ⓐ until the capstan motor shaft becomes vertical.
4) Apply the jig to the capstan motor shaft and the No. 10 guide shaft of the pinch arm assembly in the vertical attitude as shown in Fig. 3-11.

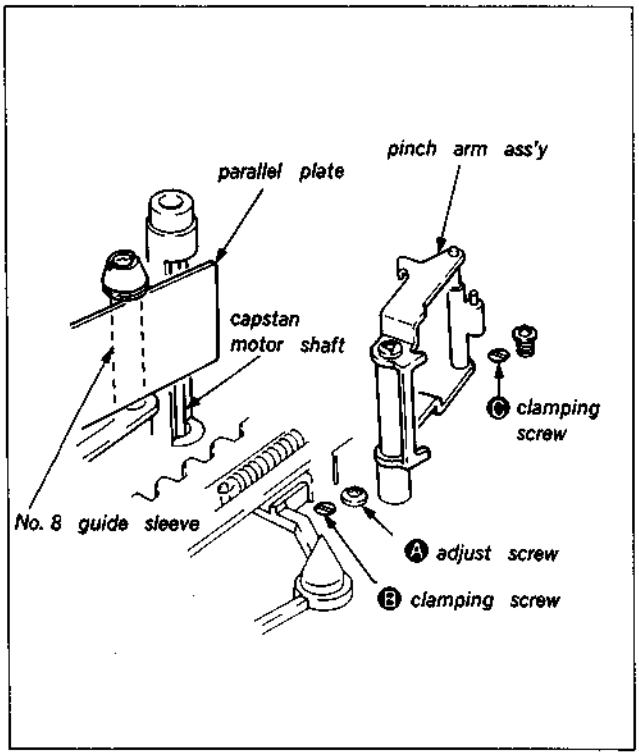


Fig. 3-10.

5) Turn clamping screw Ⓒ until the capstan motor shaft becomes vertical, and clamp the capstan motor.
6) Apply the jig again as shown in Fig. 3-10, and check the verticality of the capstan motor shaft. If it is not accurately vertical, repeat the processes from 3).
7) Tighten clamping screw Ⓑ to clamp the capstan motor.
8) Make adjustment following the described tape path adjustment processes.

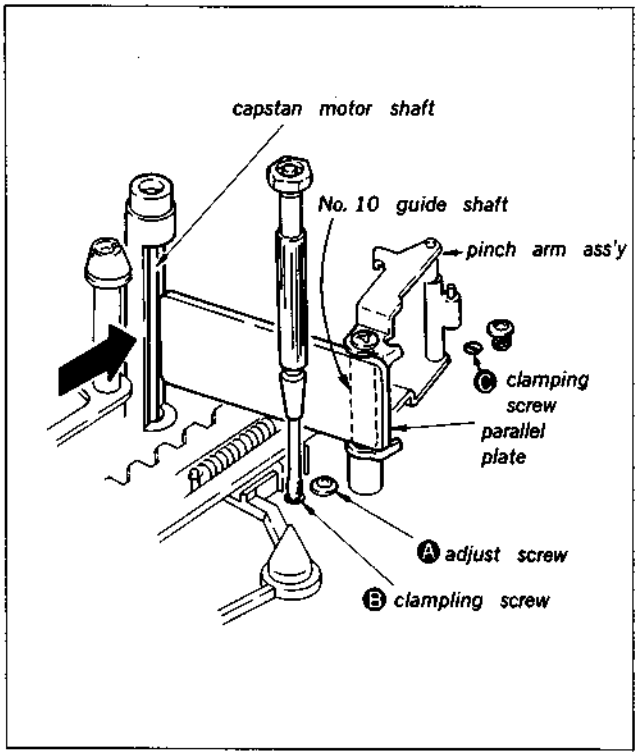


Fig. 3-11.

3-5. REMOVAL OF THE S COIL SENSOR (Fig. 3-12)

1) Remove the spring ❶.
2) Remove the claw ❷ in the direction of arrow Ⓐ, then pull the S coil sensor ❸ out.
3) Pull out the connector ❹ from CN5 on ST-12 board.

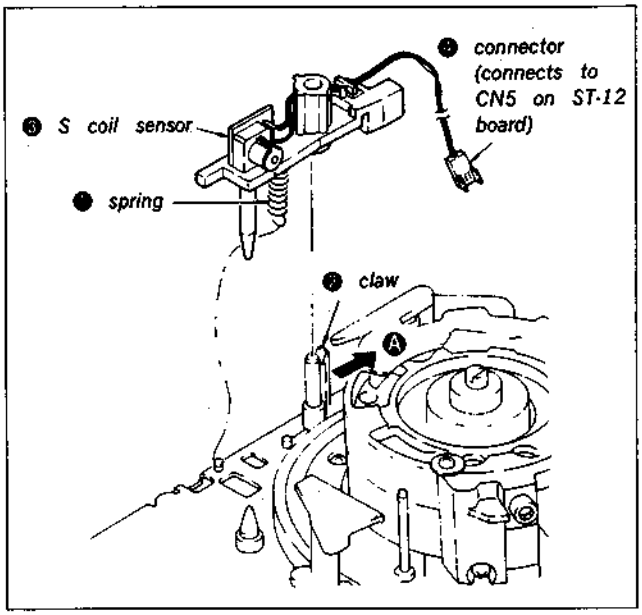


Fig. 3-12. Removal of the S coil sensor

3-6. REMOVAL OF GEAR HOLDER (Fig. 3-13)

1) Remove FL cassette compartment assembly in accordance with 2-8 in **SECTION 2**.
2) Remove three claws ❶. (Easy to remove with flatblade screwdriver.)
3) Remove claw ❷ and open gear holder ❶ in the direction of arrow Ⓑ while taking precaution to the Ⓐ section.
4) Remove two claws ❸ and remove gear holder ❹. (When installing, install from claws ❺.)

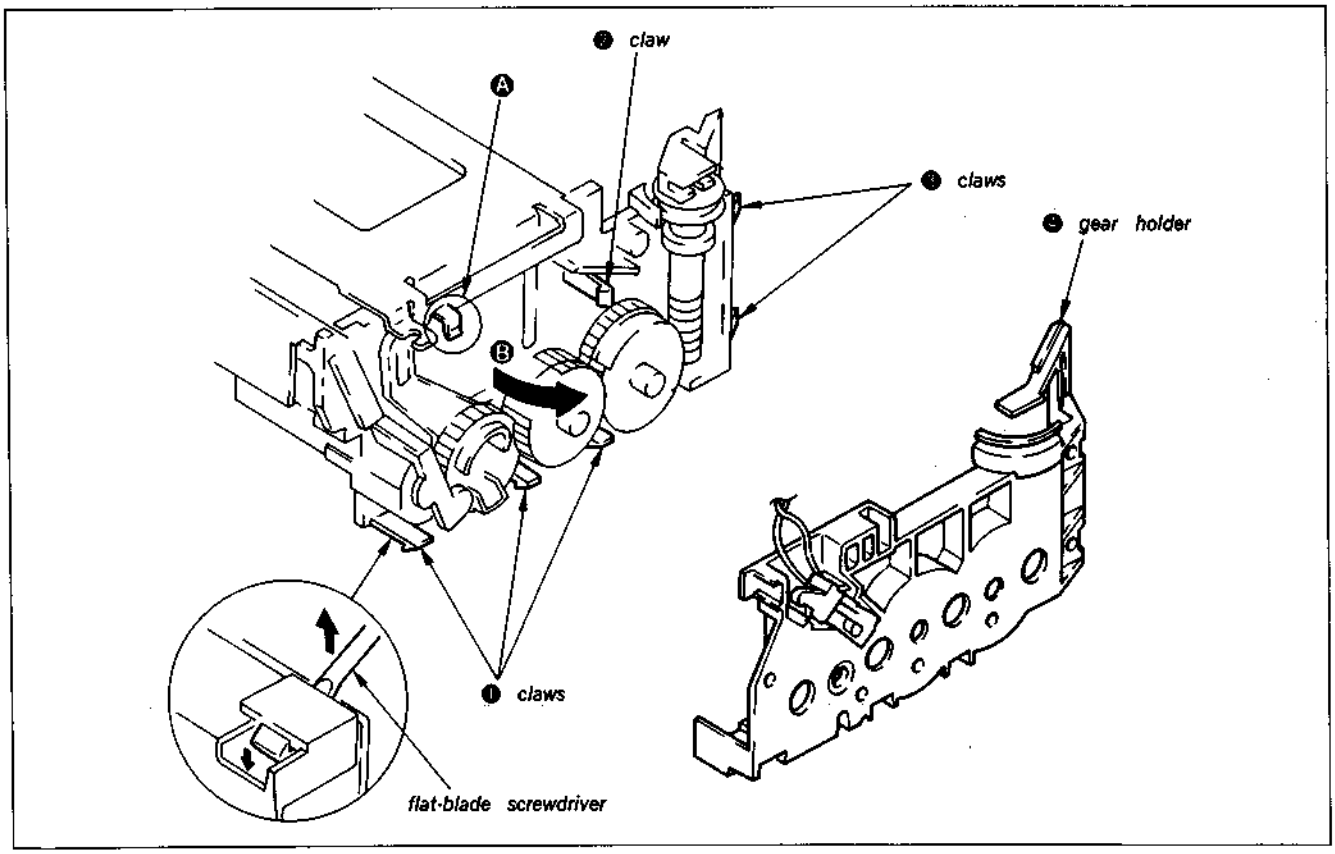


Fig. 3-13. Removal of gear holder

3-7. ADJUSTMENT OF THE FL CASSETTE COMPARTMENT

3-7-1. Adjustment of the Position of the Right Gear of the FL Cassette Compartment Assembly

In the FL cassette compartment assembly the cassette holder must always move parallel to the mechanical chassis. The gear system is used to control the amount by which the cassette holder advances so that this will be the case. Consequently if the gears in this section slip out of mesh the next time the unit is assembled the gear mesh must be adjusted to the correct position otherwise the cassette will not feed properly.

[Adjustment Method of Right Gear Wheel Positioning (Phase)] (Fig. 3-14-A)

Preparation prior to adjustment

1) Remove gear holder in accordance with 3-6.
2) Remove the respective limiter gear assembly ❷ drive gear assembly ❸, and worm gear assembly ❹ from the right side plate.
3) Pull the base block toward you and draw the L groove (right side plate) of the fulcrum ❺ of the base block right side plate to the left edge (Fig. 3-14-A position)

Note:

Adjustment hereafter is carried out in above state.

Adjustment and Check

1) See to it that the fulcrum ❺ of the base block right side plate passes the slot of the drive arm (right) assembly.
2) Install the limiter gear assembly ❷, irrespective of the positioning hole ⓐ to engage with the drive arm (right) assembly ❶. (Regarding phase matching hole ⓐ, it is desirable, if possible, to come to the vicinity of Fig. 3-14-A).
3) Install drive gear assembly ❸ so that the fourth tooth of the drive gear assembly ❸ becomes into a straight line ⓔ with the shaft of the limiter gear assembly ❷ and drive gear assembly ❸.
4) Install worm gear assembly ❹.
5) Install the gear holder in reverse procedure of 3-6. Thereafter stop the drawing forward of the base block assembly.
6) Turn the flange ⓓ of the worm gear assembly ❹ in the direction of arrow unitl it stops.

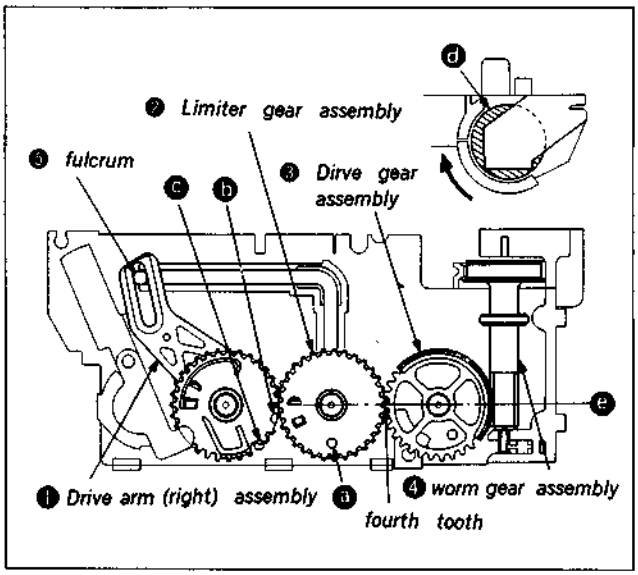


Fig. 3-14-A. Adjustment method of position (Phase) matching of right gear wheel

Note:

The chip ⓑ of the drive arm (right) assembly ❶ is a chip for phase matching during assembly, and chip ⓒ is a chip to determine the FL position during assembling.

Be sure that grease in not adhered to the belt pulley section of the ⓓ section of the worm gear assembly ❹.

[Adjustment Method of Position (Phase) Matching of Left Gear Wheel] (Fig. 3-14-B)

Preparation prior to adjustment

1) Remove drive arm (left) assembly from left side plate.
2) Pull the base block toward you, and draw the L groove (left side plate) of the fulcrum ❼ to the left edge (Fig. 3-14-B position)

Note:

Adjustment hereafter is carried out in the above state.

Adjustment and Check

1) Install the drive arm (left) assembly ❺ to that the third tooth of the drive arm (left) assembly becomes into a straight line ❶ with the shaft of the drive arm assembly ❺ and middle gear when fulcrum ❼ is in Fig. 3-14-A position, the third gear of the drive arm (left) assembly automatically becomes into a straight line ❶.

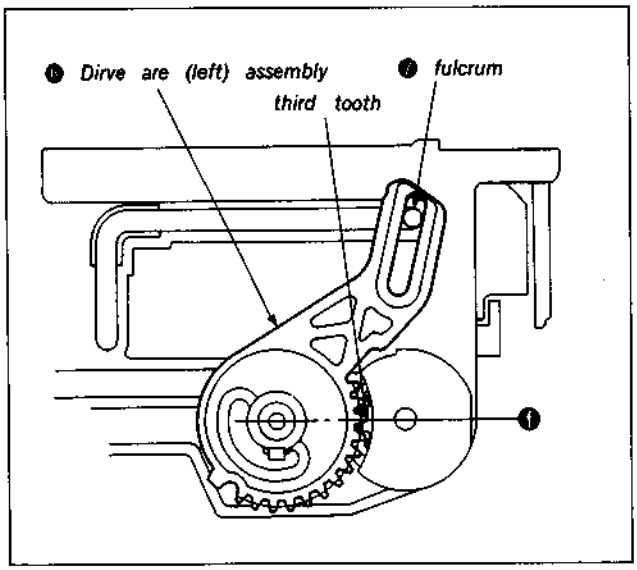


Fig. 3-14-B. Adjustment method of position (phase) matching of left gear wheel

[Checking Method When Phase is in Matched State] (Fig. 3-14-C)

1) Turn worm gear assembly ❽ in the direction of arrow Ⓐ until stops.
2) Release base block ❾.
3) When the base block assembly ❿ is shifted in the direction of arrow Ⓑ, be sure that the base block assembly ❿ is returned in the direction of arrow Ⓒ. At this point, be sure that the base block assembly ❿ does not tilt and shifts.

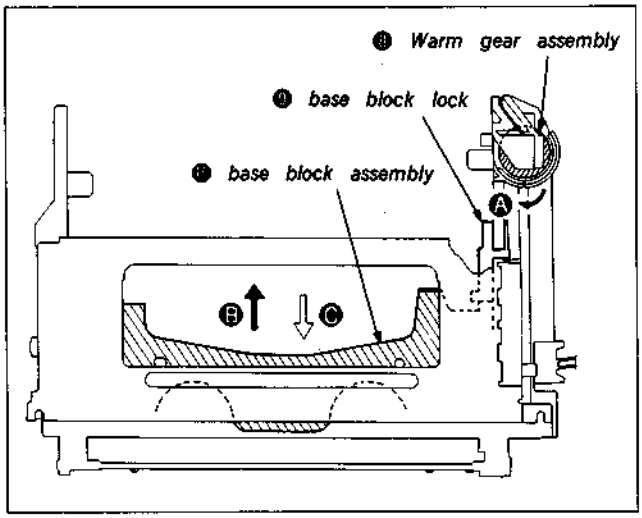


Fig. 3-14-C. Checicing method when phase is in matched state

3-7-2. Cassette ON Switch Operation Check

[Method of checking]

When inserting a cassette into the FL cassette compartment assembly confirm that as the cassette is inserted the microswitch comes ON when the center of the drive roller is 7 to 13 mm from the end of the guide groove as shown in Fig. 3-15. (A clicking sound can be heard after the switch is pressed.)

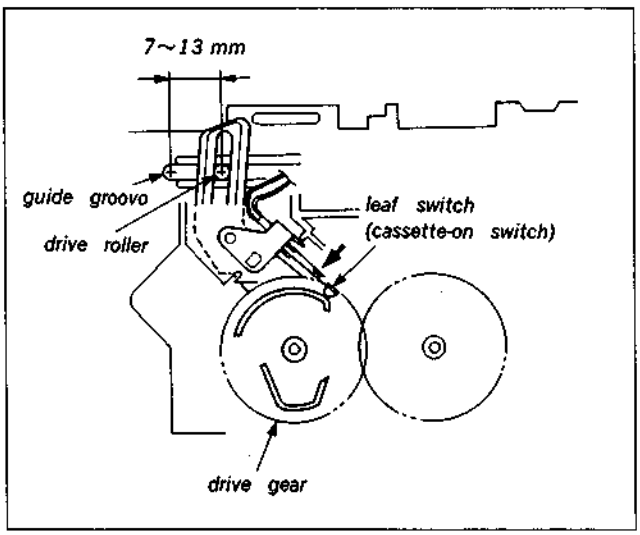


Fig. 3-15. Cassette ON switch operation check

3-7-3. Checking and Adjustment of the Cassette Door Assembly

[Method of checking]

With the door opening and closing arm returned all the way in the direction of arrow Ⓐ check to make sure that the door in vertical.

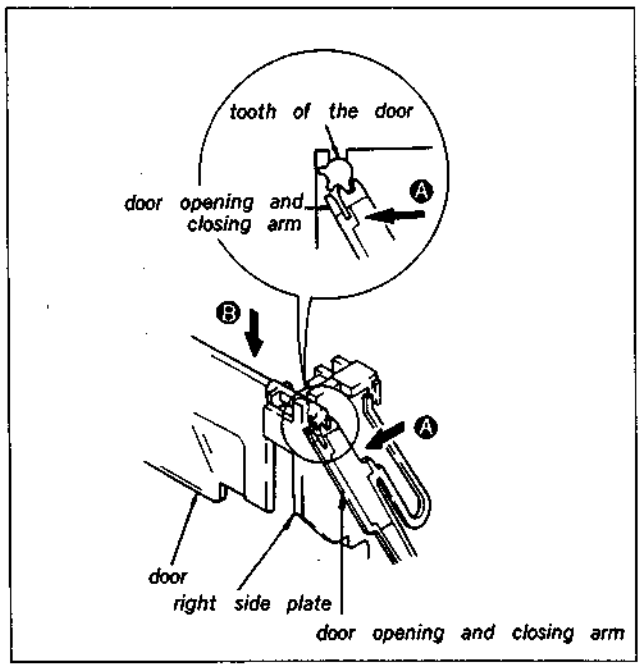


Fig. 3-16. Adjustment of the position of the cassette door assembly

[Method of adjustment]

Check to make sure that the door opening and closing rack plate has returned all the way. Then close the door in the direction of arrow Ⓑ so that it is vertical and mesh the gears.

3-7-4. Mounting the FL Cassette Compartment Assembly (Fig. 3-17)

1) Hook the two holes ❶ of the FL cassette compartment assembly onto the mechanical chassis, then place the compartment in the specified position on the chassis.
2) Loosely tighten the four mounting screws ❷ of the FL cassette compartment assembly. Move the FL cassette compartment assembly forward and backward with respect to the mechanical chassis, set it in the correct position, then tighten the mounting screws ❷ all the way.
3) Connect the timing belt (loading belt) ❸ between the loading motor and the worm gear, then hold it in place with the planet gear holder ❹.
4) Insert the harness sticking ❺ out from the FL cassette compartments into connector ❻ CN3 on ST-12 board.

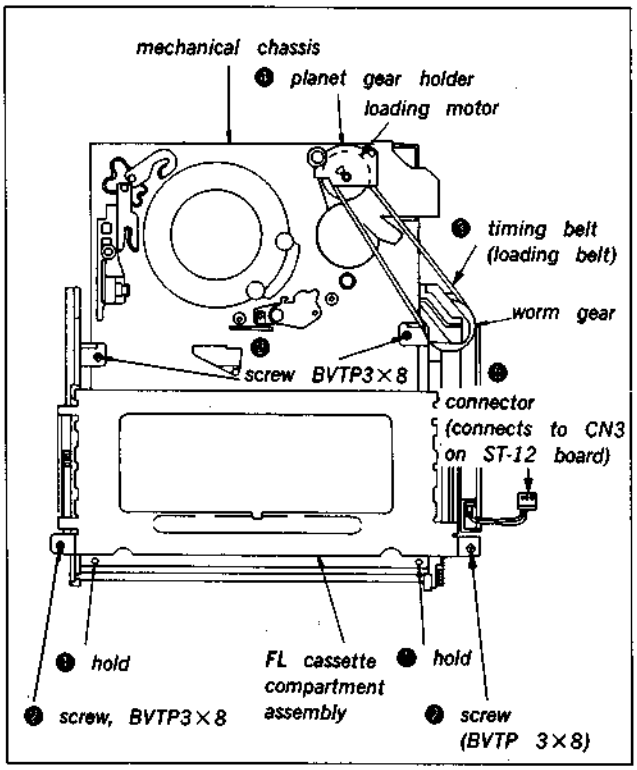


Fig. 3-17. Mounting the FL cassette compartment assembly

3-8. REMOVAL OF THE No. 2 AND No. 3 GUIDES

3-8-1. Removal of the No. 2 Guide

1) Remove the 1×3 tap-in screw ❶.
2) Remove the 1.4×3 tap-in screw ❷.
3) Remove the No. 2 guide assembly ❸.

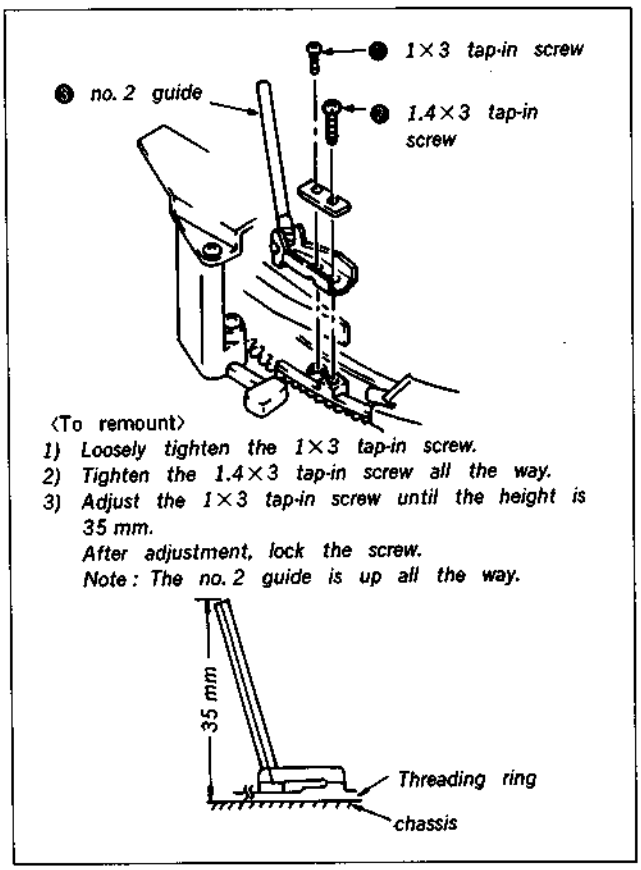


Fig. 3-18. Removal of the no. 2 guide

3-8-2. Removal of the No. 3 Guide

1) Remove the 1×3 tap-in screw ❶.
2) Remove the 1.4×3.5 tap-in screw ❷.
3) Remove the limiter spring ❸.
4) Remove the No. 3 guide assembly ❹.

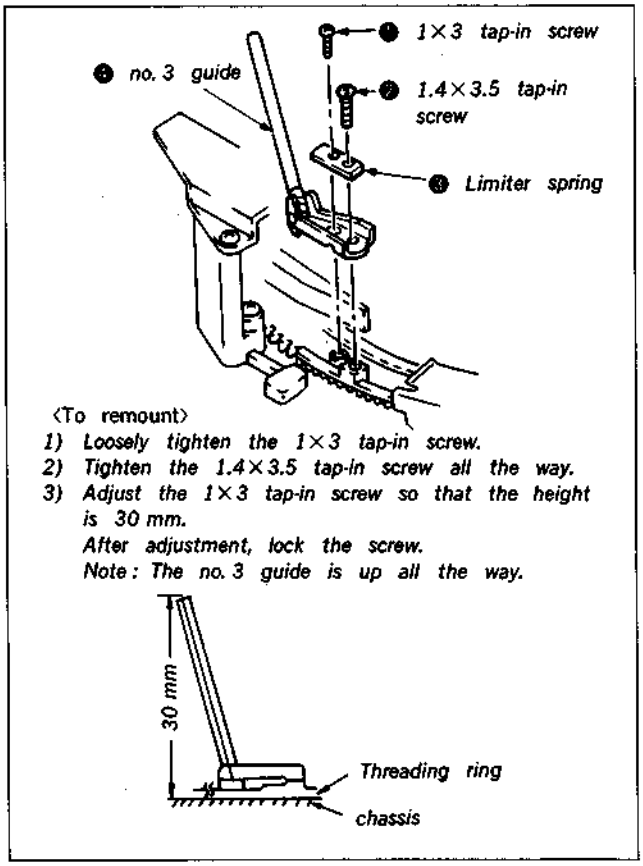


Fig. 3-19. Removal of the no. 3 guide

3-9. REPLACEMENT AND ADJUSTMENT OF THE S THREADING RING

3-9-1. Perparation to Remove the S Therading Ring Removal of the ACE Assembly, FE Head and Threading Motor (Fig. 3-20)

1) Remove the cross-recessed head screw ❶.
2) Remove the No. 6 guide nut ❷.
3) Remove the No. 6 guide washer ❸.
4) Remove the No. 6 guide spacer ❹.
5) Remove the compression coil spring ❺.
6) Remove the two screws (PSW 2.6×12) ❻, then remove the ACE assembly ❼ and the FE head ❽.

Note:
Since the ACE assembly and the FE head are connected by a lead wire, be careful when removing them. It is not necessary to remove the compression coil spring below the ACE assembly, but be careful not to use it.

7) Remove the screw (PTPWH2×8) ❾ and the screw (B2.6×4)❿ then remove the L motor assembly ⓫ by pulling it up and out.
8) When ACE assembly ❼ only is to be removed, remove two screws (PSW 2.6×12) ❻ and the wiring of FE head ❽.

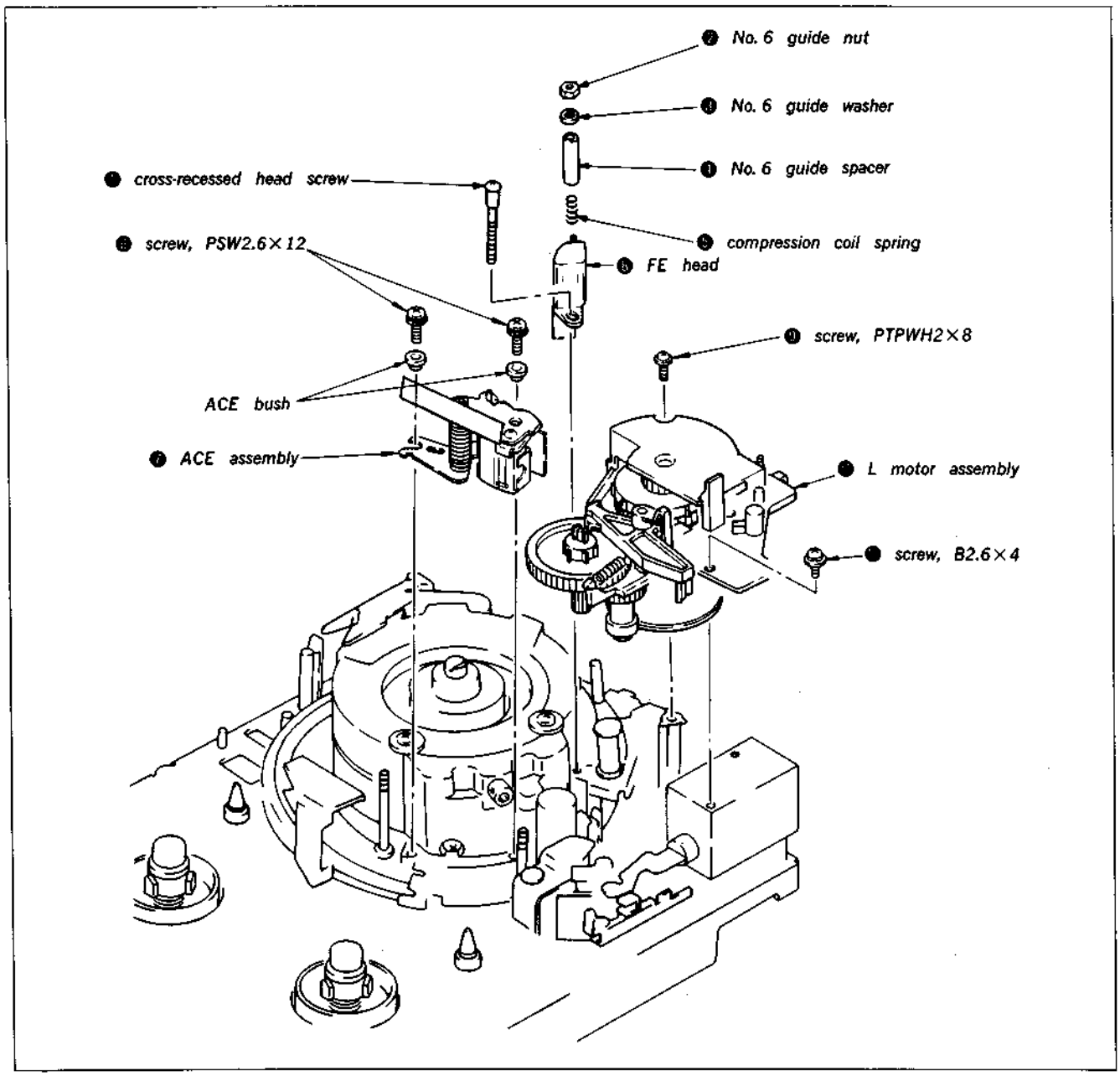


Fig. 3-20. Removal of the ACE assembly, FE head and TE motor assembly

Removal of Miscellaneous Parts (Fig. 3-21)

Proceeding in the same manner as in replacement of the drum assembly measure the width of the gap between the upper drum and the adjusting plates (Fig. 3-5).

1) Remove the two screws ❶, then remove the adjusting plates 2 and 3 ❷.
2) Remove the two screws ❸, then remove the tape holder assembly ❹.
3) Remove the screw ❺, then remove the guide plate ❻.
4) Remove the two screws (PTPWH 2×8) ❼ and the screw (2.6×24) ❽, then remove shuttle guide 2 ❾.
5) Remove the three screws (PTPWH 2×8) ❿ and the screw (2.6×24) ⓫. Then remove the two claws holding shuttle guide 1-YA ⓬ in place, and finally remove shuttle guide 1-YA ⓭.
6) Remove the slant base assembly ⓮.
7) Remove the pin link liner plate ⓯.

Note:

After removing the guide plate, do not thread or unthread a tape with the shuttle guide mounted.

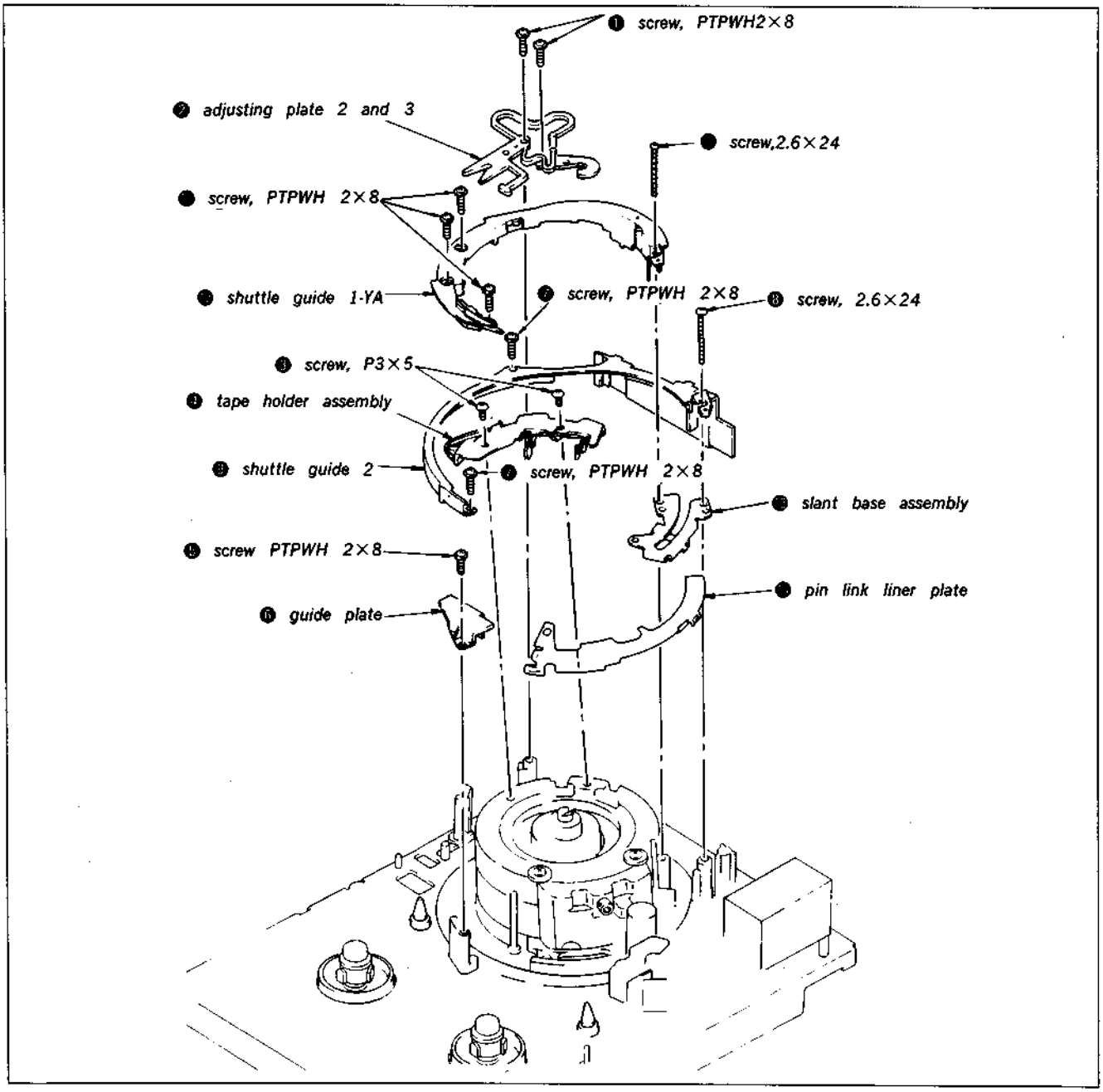


Fig. 3-21. Removal of miscellaneous parts

3-9-2. Removal of the S Threading Ring (Fig. 3-22)

1) Turn the two stop wahers ❶ and remove the ring roller (B) ❷ and (C) ❸.
2) Remove the S threading ring ❹.

Note :
Once a stop washer has been removed, do not use it again.

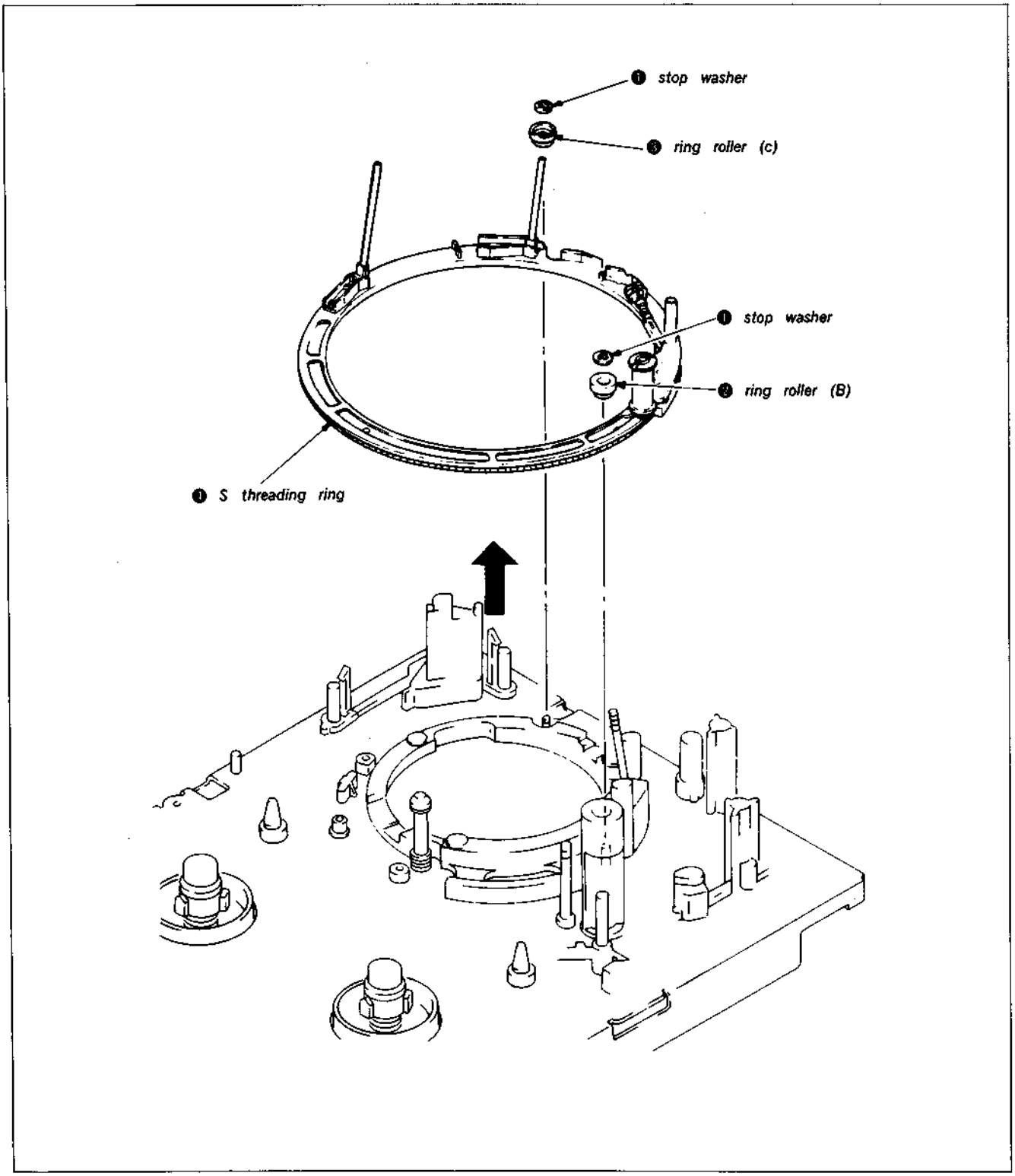


Fig. 3-22. Removal of the S threading ring

3-9-3. S Tureading Ring Mounting and Position Adjustment (Fig. 3-23)

1) Set the slider gear assembly ❶ in the unthreading completed position.
   (Slider gear assembly ❶ set so that it is up against part T slider stop mold ❷.)
2) In this condition, fit the S threading ring ❸ into place, match the chassis hole (3ϕ) ❹ of part Ⓐ with the S threading ring hole (1.5ϕ) ❺ and mesh with the drive gear assembly ❻ teeth.
3) Attach ring roller (B) ❼ and fix in place with a stop washer ❽ .

Note :
After replacement and mounting are completed, adjust the ACE assembly as explained in the section on tape path adjustment.

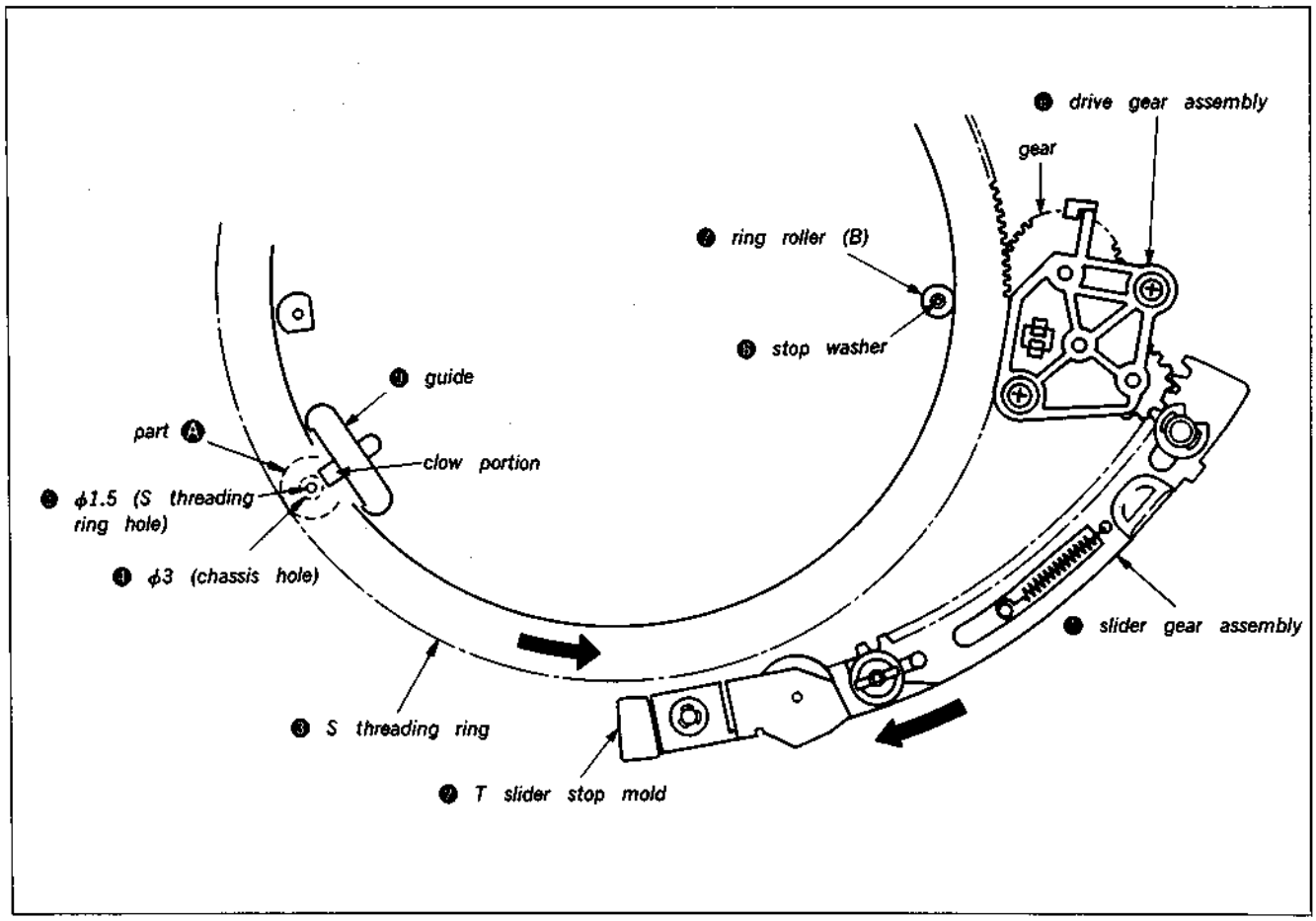


Fig. 3-23. S threading ring position adjustment

3-10. PINCH SNAP-FIT LIMITER GAP CHECK AND ADJUSTMENT

[Method of checking]

1) Set in the threading completed condition.
2) With the plunger pushed in all the way, confirm that the thickness of the pinch snap-fit limiter gap is 0. 4 mm to 0.6 mm. If it is not, adjust as explained under [method of adjustment] below.

[Method of adjustment]

1) With the pinch solenoid in the absorbed condition (when the plunger is pushed in all the way) , loosen the adjustment screw ❶ .
2) Press the pinch limiter adjustment plate ❸ in the direction of arrow ⓐ a with an ordinary screwdriver ❷ , as in section Ⓐ in the diagram, and adjust until the thickness of the gap in 0.4mm to 0.6mm. Tighten the adjustment screw and then lock it to fix everthing in place.

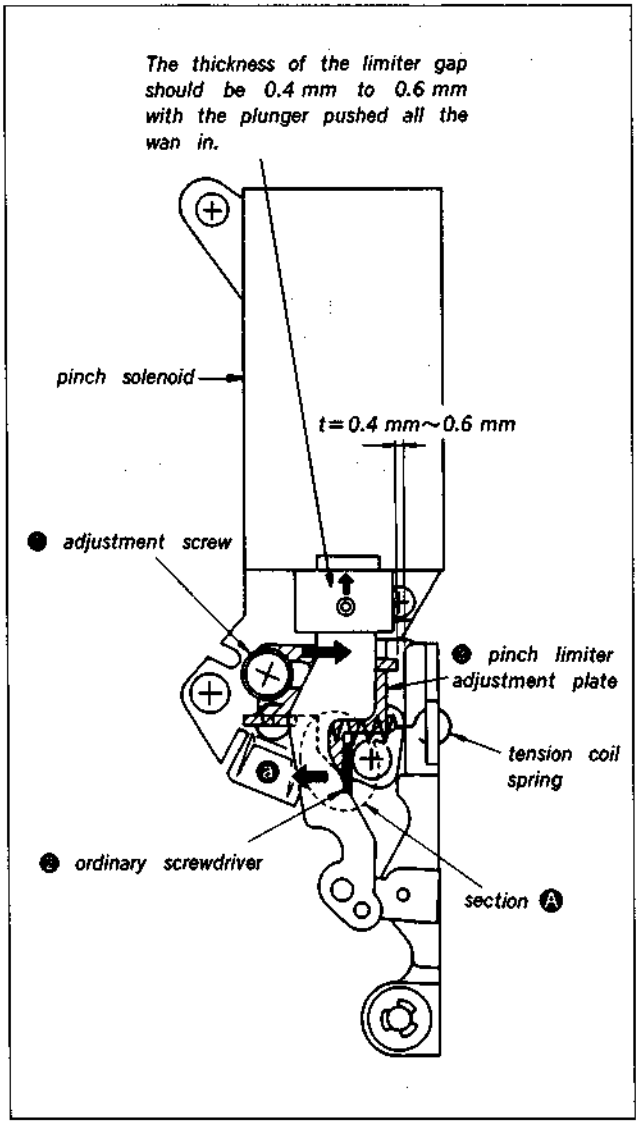


Fig. 3-24. Pinch snap-fit limiter gap adjustment plate

3-11. THREADING END SWITCH AND T COIL SENSOR

3-11-1. Threading End Switch (TE Switch) Position Check and Adjustment

[Method of checking]

Turn the S threading ring manually. Check to make sure that. when the lock roller moves from above the straight line part of the notch in the ring (Fig. 3-25 section Ⓐ) to 1/3 of the way down it and back, the TE switch turns ON and OFF.

If the lock roller has to outside of this range before the switch will turn ON and OFF, adjust as explained below.

[Method of adjustment]

1) Set the lock roller between the top of the notch in the S threading ring and 1/3 of the way down it turn the TE switch in the direction of the arrow and, when the switch turns ON fix the TE switch in place.
2) When the adjustment is completed, repeat the check as described above [method of checking] .

[Removal]

1) Remove the tension coil spring ❷ that is attached to the Scoil sensor assembly ❶ , then remove the S coil sensor.
2) Remove the lock arm assembly ❸ in the direction of arrow Ⓐ .

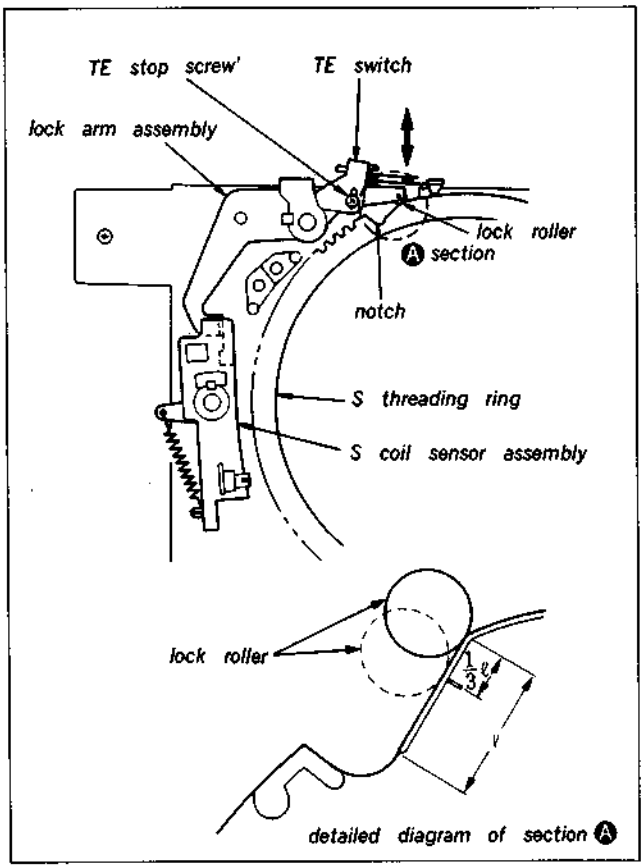


Fig. 3-25. TE switch position adjustment

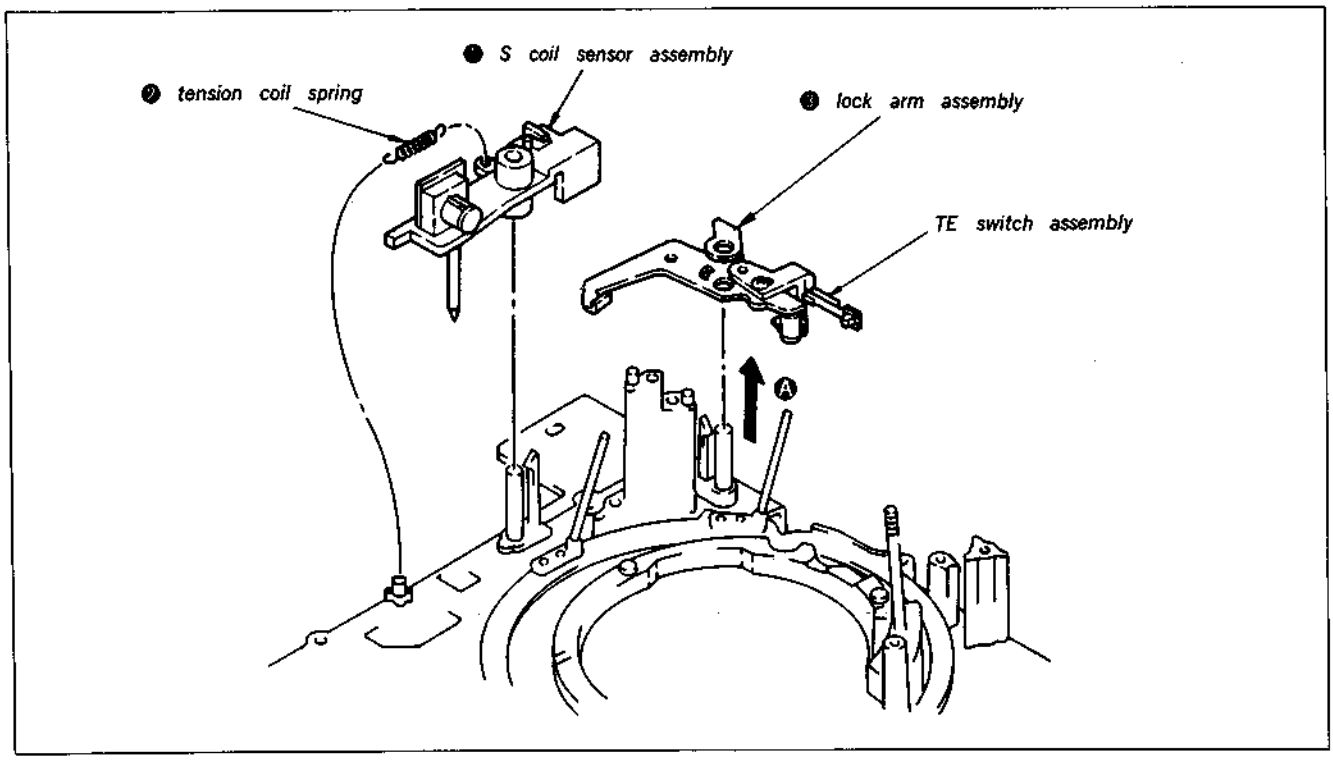


Fig. 3-26. Removal of the TE switch assembly and lock arm assembly

3-11-2. T Coil Sensor Mounting and Operation Check

[Method of checking]

Confirm that T coil sensor link ❷ is pressed and T coil sensor ❸ moves in the direction of arrow Ⓑ when the T slider gear assembly ❶ is moved in the direction of arrow Ⓐ .

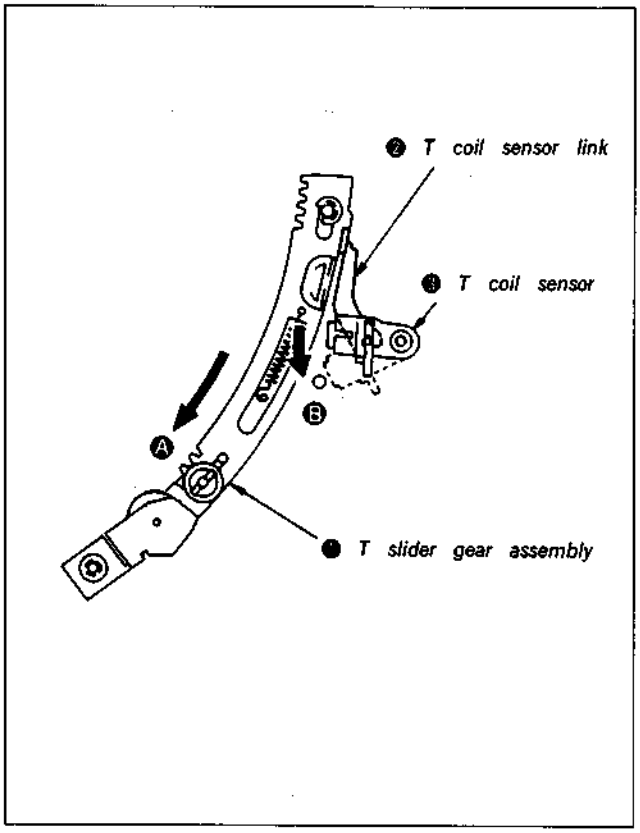


Fig. 3-27. T coil sensor operation check.

[Method of mounting]

1) Place T coil sensor link ❶ in the prescribed position.
2) Match up the T coil sensor ❷ hole with the chassis shaft ❸ and insert. Place so that it engages with T coil sensor link ❶ .
3) Hook the tension coil spring ❹ on the T coil sensor and chassis claw.

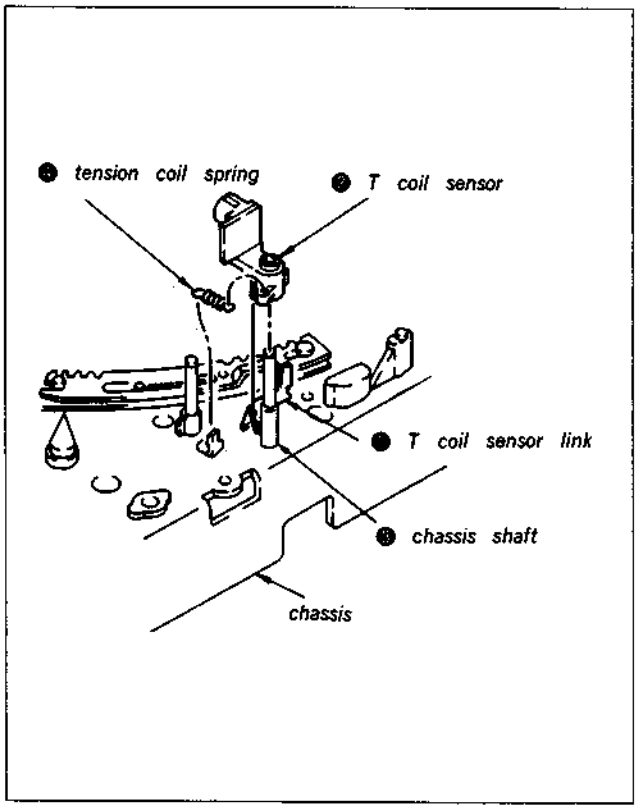


Fig. 3-28. T coil sensor link and T coil sensor mounting.

3-12. REMOVAL AND ADJUSTMENT OF THE REEL BLOCK ASSEMBLY

3-12-1. Removal of the Reel Block Assembly

1) Place the set upside down.
2) Remove the four BVTP 3×8 tap-in screws ❶ .
3) Remove the reel block assembly ❷ .

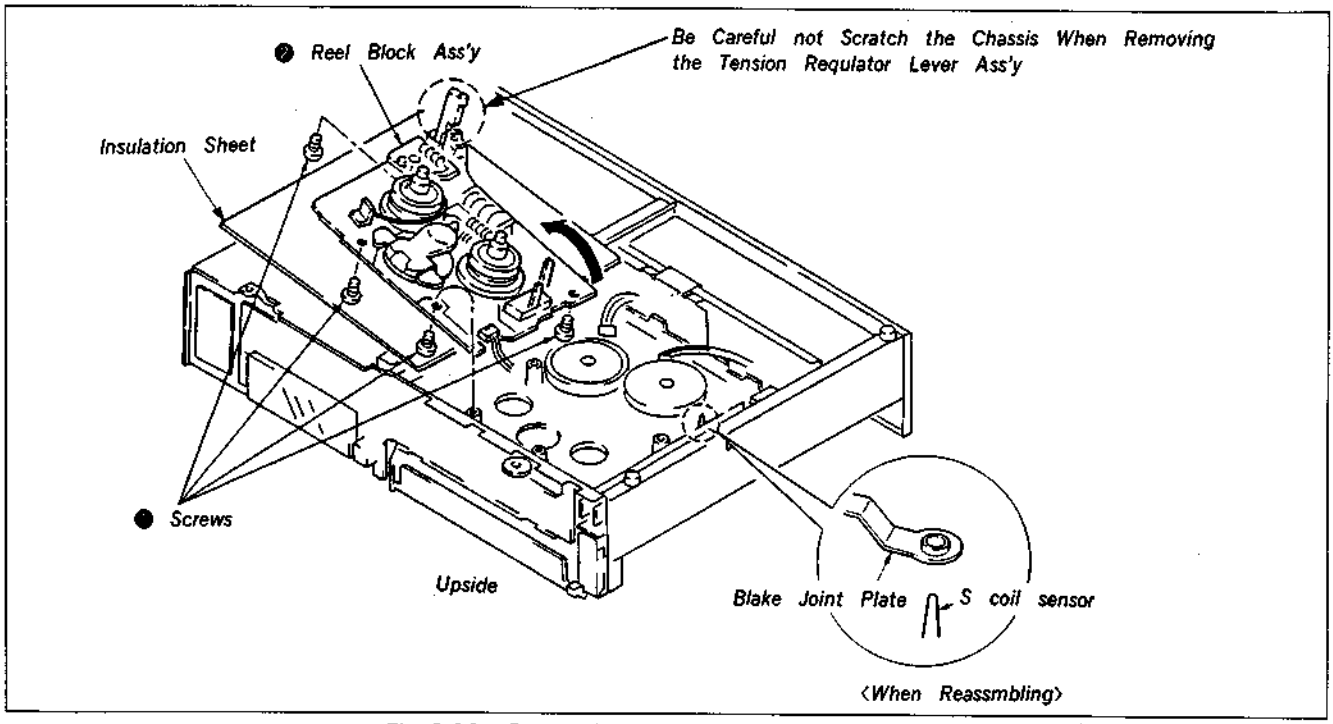


Fig. 3-29 Removal of the reel block assembly

3-12-2. Adjustment of the Position of the Tension Regulating Lever

[Method of adjustment]

1) Put the unit in playback mode.
2) Loosen the adjustment spring until the tape guide pin of the tension regulating lever assembly is positioned to the outside of the outer circumference of shuttle guide 2. as shown in Fig. 3-30. Then adjust by moving the tension regulating band assembly in the direction of arrow Ⓐ .
3) After adjustment tighten the adjustment screw, being careful that the tension regulating band assembly does not move.

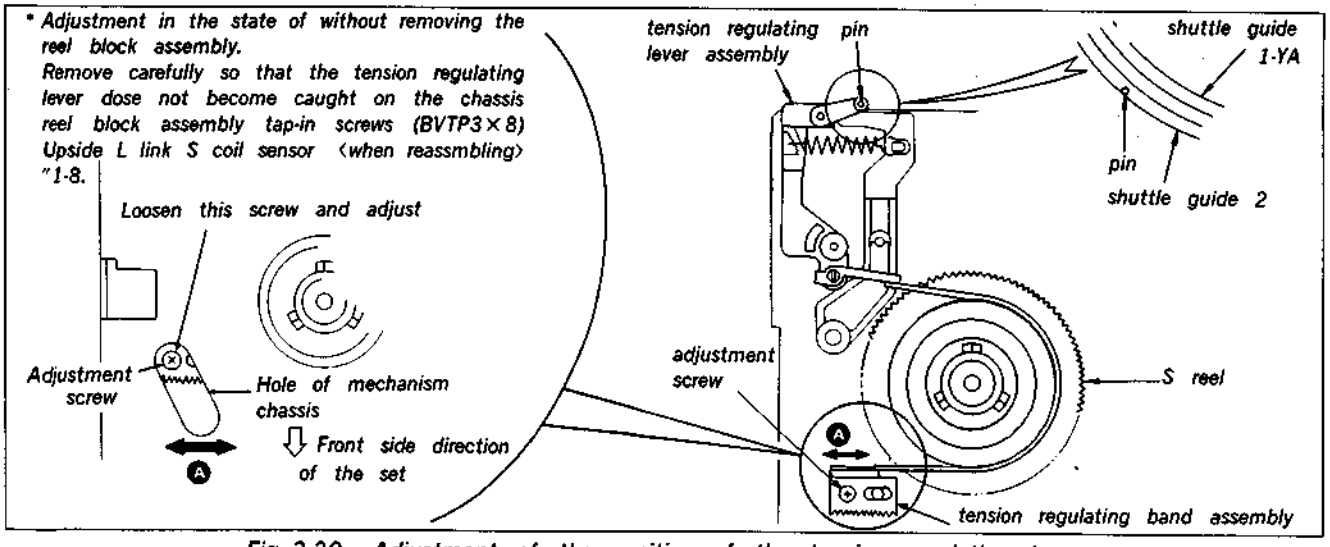


Fig. 3-30. Adjustment of the position of the tension regulating lever

3-13. ADJUSTMENT OF THE FORWARD BACK TENSION

[Method of measurement]

1) Insert the torque cassette (SL-0003C) and put the unit in playback mode.
2) Read the value on the meter on the S reel side after the needle has gone around about once.
   The correct value is 34g•cm ± 3g•cm.

Notes:

i) The set must be perfectly level during this measurement.

ii) After the measurement, the tape can become slack when the stop button is pressed. If this happens set the unit is forward mode to take up the slack before removing the tape.

[Mothod of adjustment]

Move the position of the tension coil spring that is hooked on the tension regulating lever assembly in the direction of arrow Ⓐ until the measured value falls within the correct range.

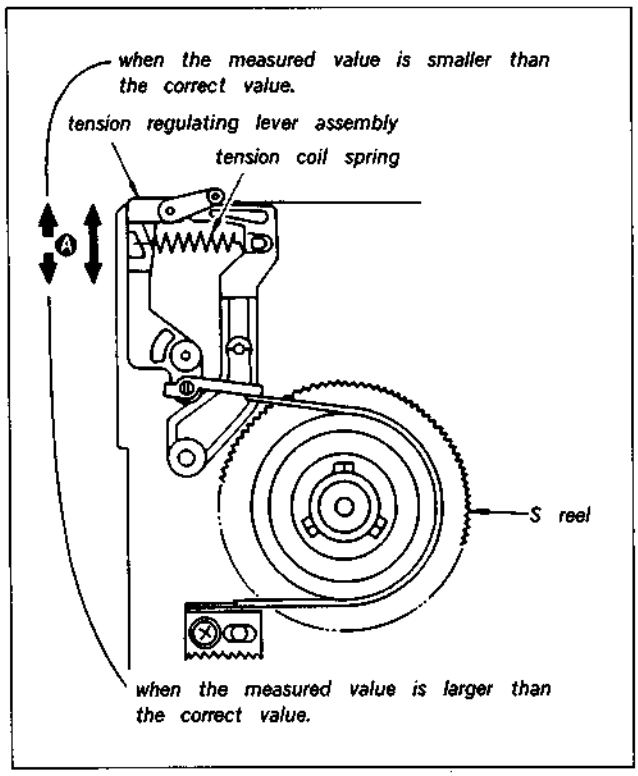


Fig. 3-31. Adjustment of the back tension

3-14. ADJUSTMENT OF THE FORWARD TORQUE

[Method of measurement]

1) Insert the torque cassette (SL-003C) and put it into video recording state.
2) Read the indicated value of the meter on the T reel side when it has become stabilized.
   The correct value is 80g•cm ± 5g•cm.

[Method of adjustment]

1) Turn RV401 on ST-12 board to adjust the torque until its value falls within the correct range.

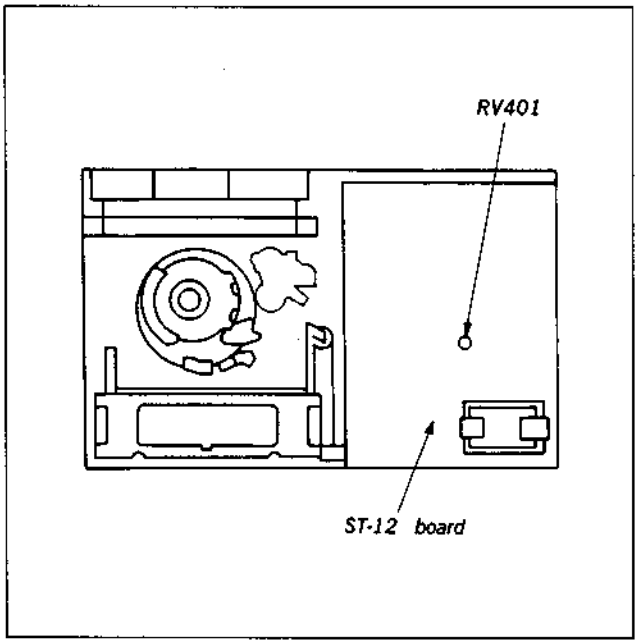


Fig. 3-32. Adjustment of the forward torque

Note:

When the forward torque is weakened during the measurement the tape can become slack, in which case the set will go into emergency stop mode. In such a case, the only switches that will work are the cassette eject switch and the power switch. It is necessary to temporarily remove the cassette, or to turn the power OFF and back ON.

4. TAPE PATH ADJUSTMENT

4-1. TRACKING ADJUSTMENT

This adjustment has a large effect on the picture quality in each mode and on the interchangeabillity of tapes. so it should be done carefully.

4-1-1. Preparation for adjustment
4-1,2. Adjustment on the entrance side
4-1-3. Adjustment on the exit side

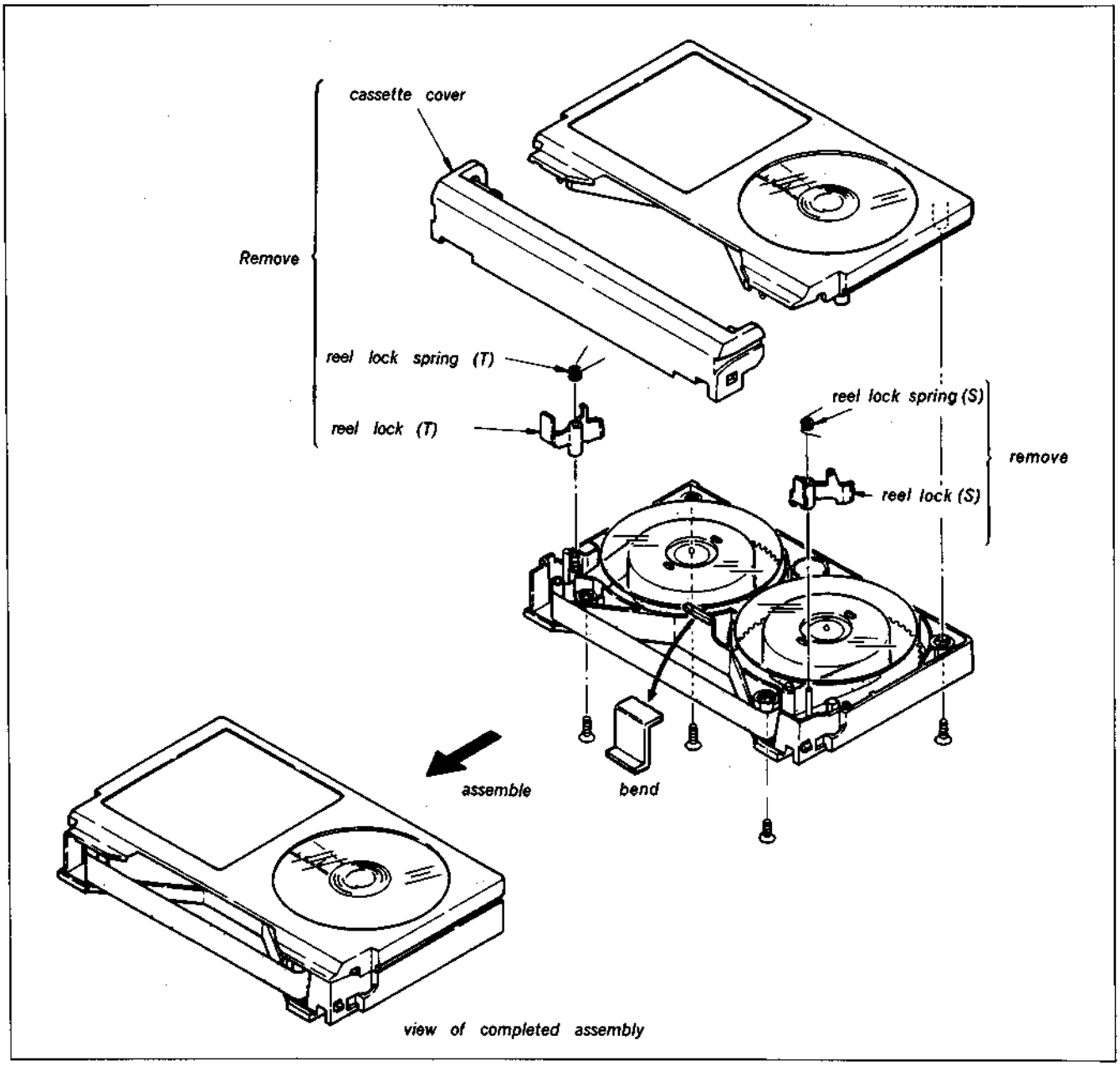


Fig. 4-1.

4-1.1. Preparation for Adjustment

1) Remove the cassette cover of the alignment tape in accordance with Fig. 4-1.
2) Clean the surface contacted by traveling tape (tape guide. drum tape trailing surface capstan shaft pich roller. ACE FE head surface) with a chamois cloth dipped in methanol.
3) Connect the oscilloscope as follows:
   Channel 1:pin ③ of CN005 (RP-41 board)
   External trigger: pin ① of CN005 (RP-41 board)
4) Playback the 1 MHz signal on the traking section of the alignment tape. (KR2-IH)
5) Confirm that the oscilloscope radio frequency output waveform is flat and that the amplitude is a maximum. (Turn the tracking knob right and left to increase and decrease the amplitude while the waveform remains flat.) When the amplitude of the waveform is a maximum. confirm that the fluctuations and contact of the radio frequency output waveform meet the standards given in Fig. 4-2. If they do not. go through the procedure given in step6).
6) If the entrance waveform cannot be made flat. as shown in Fig. 4-3 (a). by turning the tracking knob. go through the "entrance side adjustment" described in 4-1-2: if the exit waveform shown in Fig. 4-3 (b) cannot be made flat. go through the "exit side adjustment" in 4-1-3.

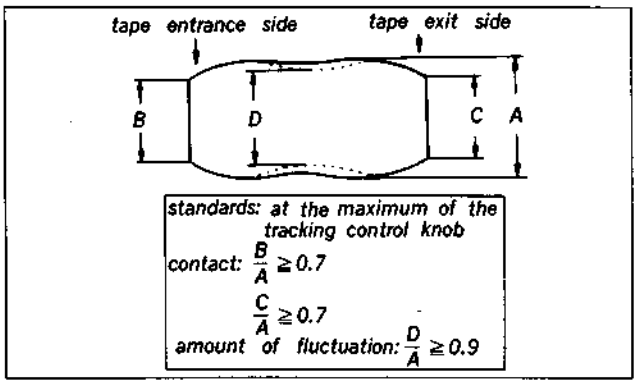


Fig. 4-2.

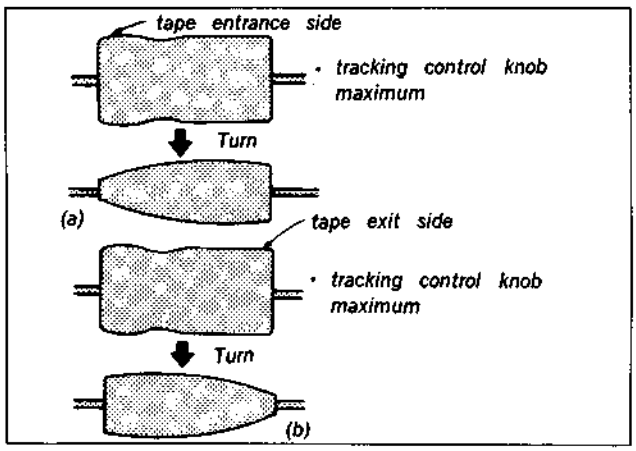


Fig. 4-3.

4-1-2. Entrance Side Adjustment

Whenever the entrance side adjustment is performed. the exit side adjustment must also be performed. The various tape guides and adjustment positions are shown in Fig. 4-5.

1) Turn the No.6 guide counterclockwise to free the movement of the tape as it enters the drum.
2) Turn the tracking control knob until the amplitude of the waveform is about 60% of its maximum.
3) Loosen No.5 guide lock screw ❶ and turn the No.5 guide until the entrance waveform sticks up a little above falt. as shown in the figure below. Then tighten the No.5 guide lock screw ❶ (Fig. 4-6).
   Note:
   After tightening No.5 guide lock screw ❶, confirm that it is as in the figure below.

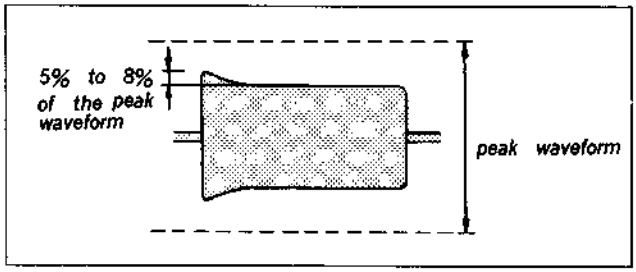


Fig. 4-4.

4) Next. lower the No.6 guide until the waveform is flat.
5) Press the tape down between the NO.4 and No.5 guide with a finger to lower the entrance side radio frequency waveform. then let go and confirm that the waveform returns to what it was before.
6) In this condition. check the clearance and curl of the No. 5 guide. If there are clearance and curl. adjust as explainedin subsequent sections.

Note:

The tape tension between the No.3, No.4 and No.5 guides must be balanced. If it is not, adjust the tilt of the No.3 and No.5 guides.

If the waveform cannot be made to look as shown in Fig. 4-4. or if when the tape is pressed and released on the entrance side it takes time for the waveform to return to what it was before. or if it does not return to what it was before. adjust according to the instructions given below.

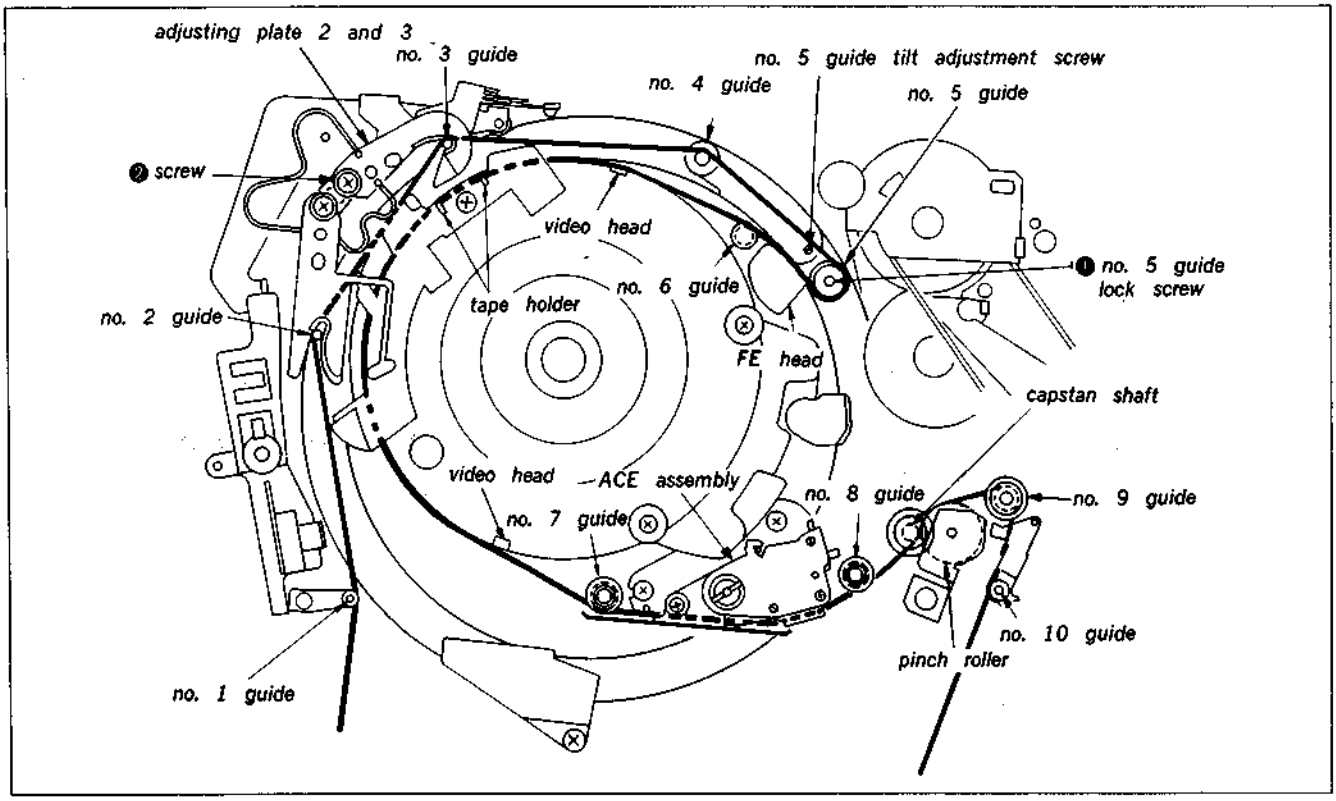


Fig. 4-5. Tape guide layout diagram

[What to do when the waveform entrance output will not rise]

1) Check to see if the up-down tension between the No. 3. No.4 and No.5 guides is uniform. If it is not, adjust the tilt of the No.3 and No.5 guides.
   Note:
   The lower flange of the No.4 guide must not protrude.
2) Raise the lower flange of the No.4 guide to raise the entrance output.
   Note:
   It is sufficient to raise the lower flange of the No. 4 guide to 0.4mm from its lowest position (within a rotation angle of 360°).
3) If the operation performed in step 2) fails to raise the waveform output, turn the No.5 guide tilt adjustment screw slightly to the left, and the entrance output should rise.

[What to do when the waveform entrance output will not drop]

1) Remove the adjusting plate 2 and 3 of the No.3 guide from the drum. Just before the lower tension of the tape becomes slack, tighten screw ❷.
2) If the tape is in contact with the lower flange of the No.4 guide. lower the flange. If the tape is sitcking up from the lower flange. adjust the tilt of the No.5 guide so that the tape does not stick up from the lower flange of the No.4 guide.

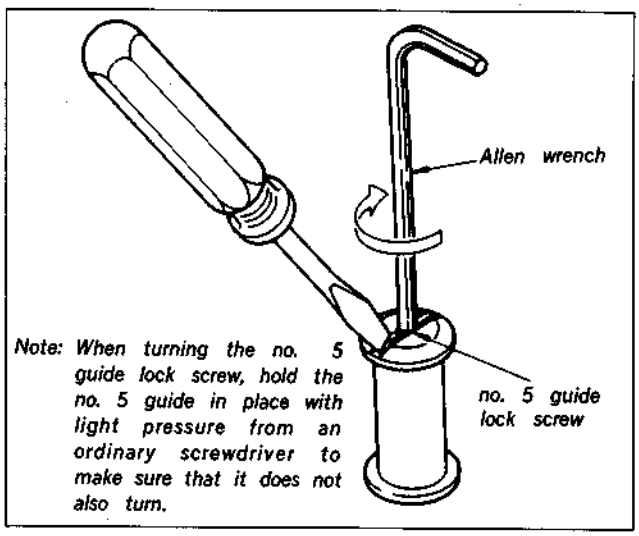
[What to do when there is a clearance in the No.5 guide]

Turn the No.4 guide counterclockwise to run the tape upward and eliminate the clearance in the No.5 guide.

Note:
At this time make sure that a large curl is not produced below the No.4 guide.

[What to do when there is a curl]

1) When there is a gap below the No.4 guide.
   Just before the lower tension on the tape becomes slack, move adjusting plate 2 and 3 of the No.3 guide to the outside.
2) When there is not a gap below the No.4 guide (when there is a curl below the No.4 guide):
   i) Check to see if the No.4 guide has been raised up too high. If it has been raised up too high. turn the adjusting plate clockwise to lower the No.4 guide.
   ii) If the curl still has not been removed after i). tighten the No.5 guide tilt adjustment screw in the clockwise direction until the curl is removed.



Note: When turning the no. 5 guide lock screw, hold the no. 5 guide in place with light pressure from an ordinary screwdriver to make sure that it does not also turn.

Fig. 4-6.

4-1-3. Exit Side Adjustment

1) Connect the oscilloscope to pin ③ of CN005 (RP-41 board).
   Connect the external trigger to pin ① of CN005. (RP-41 board).
2) Play the tracking section of the alignment tape. Adjust the tracking knob to reduce the amplitude of the radio frequency output waveform to 60% of its maximum level.
3) Watch the radio frequency output waveform when the No.7 and No.8 guides are raised (by turning the respective guide nuts counterclockwise) to let tape run free. This waveform is called exit free waveform.

Note:
Be careful not to raise the guides too far. They should be raised only about 0.2 to 0.3 mm.

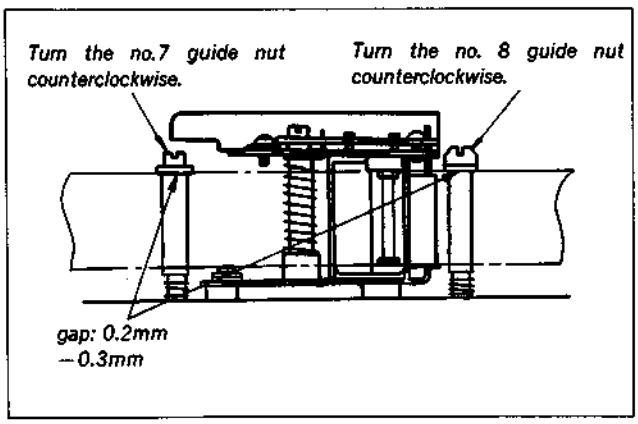


Fig. 4-7.

4) At this time. confirm that the exit free waveform is within the range shown in Fig. 4-8 (a) and (b).
   • If it is outside of this range. adjust according to the procedure in 4-3.

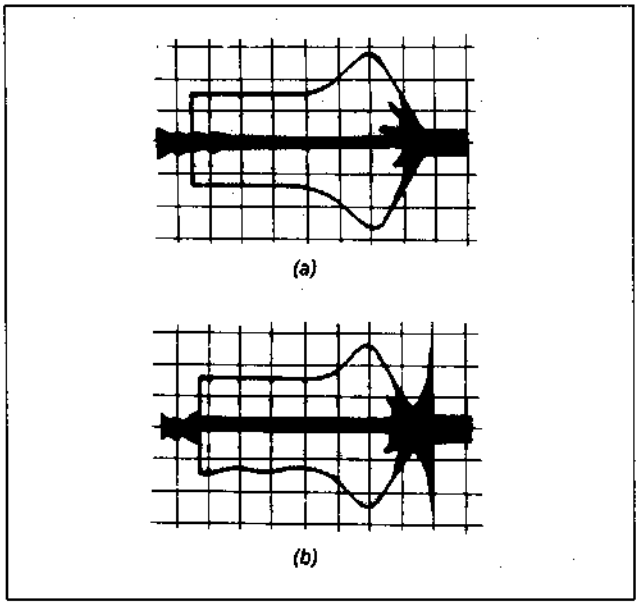


Fig. 4-8.

5) Turn the No.7 guide nut clockwise until the waveform is flat.
6) Turn the No.8 guide nut clockwise until the No.8 guide is lined up with the tape (just before the waveform starts to change, lower the guide until there is no curl).
7) During playback. confirm that no curl occurs at the No.7 guide or the No.8 guide.
8) During rewind. confirm that no curl or elearance occurs at the No.8 guide. If there is a curl or clearance. adjust using the No.9 guide. After adjustment. lock the guide nut.

4-2. ADJUSTMENTS AFTER REPLACEMENT OF THE ACE ASSEMBLY

After removal or replacement of the ACE assembly perform the adjustments listed below.

4-2-1. Exit side tracking adjustment
4-2-2. CTL head (ACE assembly) position adjustment
4-2-3. Audio head (ACE assembly) azimuth adjustment
4-2-4. Audio head (ACE assembly) height adjustment

4-2-1. Exit Side Tracking Adjustment

1) Set the parallel plate (SL-0657 in the list of fixtures and tools) up against the unit as shown in Fig. 4-9. and turn the tilt adjustment screw to adjust the audio head vertically.

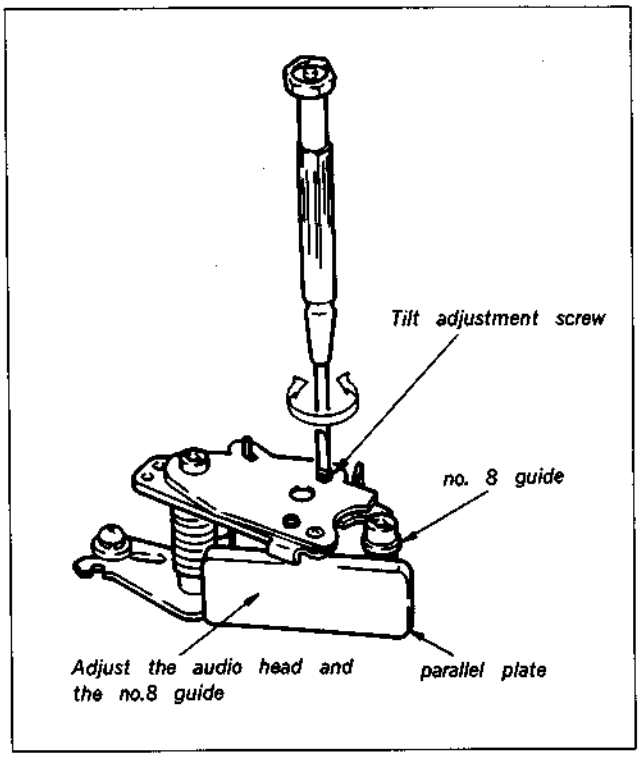


Fig. 4-9.

2) Connect the oscilloscope to pin ③ of connector CN005 (RP-41 board). Connect the external trigger to pin ① of CN005. (RP-41 board).
3) Play the tracking section of the alignment tape. Adjust the tracking knob until the radio frequency output waveform amplitude is reduced to about 60% of its maximum level.
4) Raise the No.7 and No.8 guides (turn the respective guide nuts counterclockwise) and observe the radio frequency exit free waveform when the tape runs free.

Note:
Be careful not to raise the guide too far. Raise it about 0.2 to 0.3 mm.

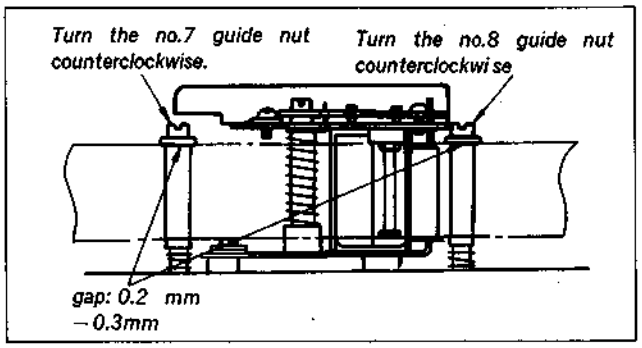


Fig. 4-10.

5) At this time, confirm that the exit free waveform is within the range shown in Fig. 4-11(a) and (b).

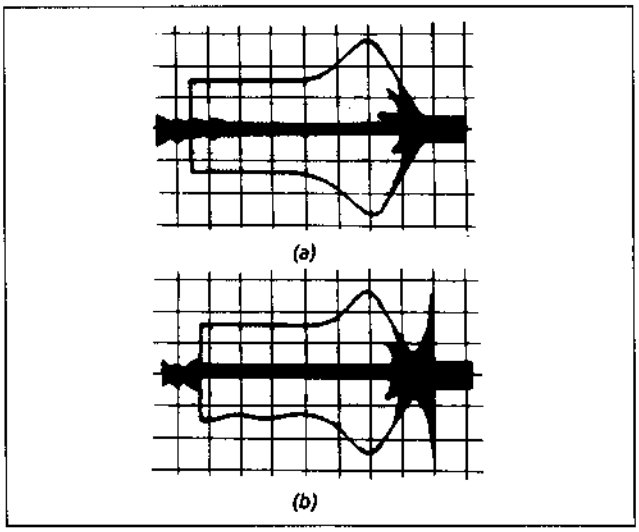


Fig. 4-11.

[When the waveform is outside this range]

- When the waveform is outside this range and has the form shown in Fig.4-12. turn the tilt adjustment screw clokwise to adjust until the waveform is within the required range.

Note:
Complete the adjustment by turning the adjustment screw in the tightening direction (clockwise).

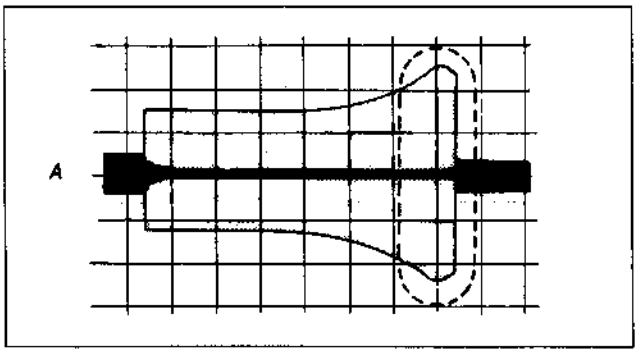


Fig. 4-12

• When the exit free waveform is outside of the required range and has the form shown in Fig. 4-13. turn the tilt adjustment screw counterclockwise to produce waveform A (Fig. 4-12). then turn it clockwise to bring the waveform within the required range.

Note:

Finish the adjustment by turning the adjustment screw in the direction of tightening (clockwise).

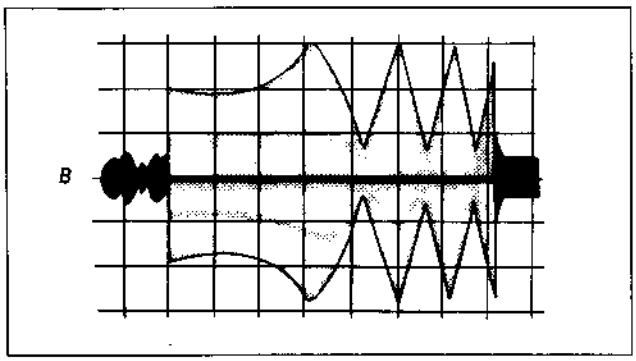


Fig. 4-13.

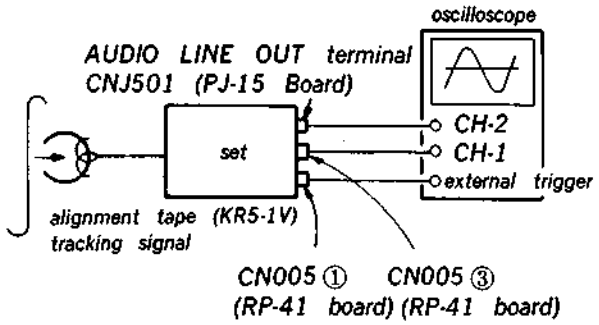
6) Turn the No. 7 guide nut clockwise to flatten the waveform.
7) Turn the No. 8 guide nut clockwise to line the No. 8 guide up with the tape (lower it so that there is no curl just before the waveform starts to change).
8) If the radio frequency waveform is as shown in Fig. 4-12 on the exit side. repeat the adjustment.

4-2-2. CTL Head (ACE Assembly) Position Adjustment

This adjustment includes the mechanical CTL head mounting position adjustment and the electrical tracking control center adjustment. The tracking control center adjustment is to be performed first. followed by the mechanical adjustment of the head mounting position.

[Connections]

1) Playback mode



[Method of adjustment]

1) Play the tracking signal section of the alignment tape.
2) Turn the tracking control knob clockwise or counterclockwise to the center click position. Confirm that the amplitude of the radio frequency output signal is at its maximum level. Also confirm that the audio signal 0 level position occurs at the location of the channel B waveform. If the necessary standards are not met follow the procedure in 3).

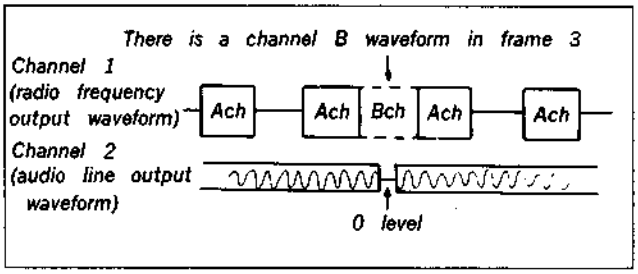


Fig. 4-14.

3) CTL head position adjustment
   a. Set the tracking control knob at the center click position.
   b. Loosen the two ACE assembly position adjustment screws, then use a tool such as an ordinary screwdriver to slide the ACE assembly to where the radio frequency output waveform amplitude becomes a maximum.
   c. Play the color bar signal on the alignment tape and check the picture quality.
   d. Tighten the position adjustment screws. then lock them.

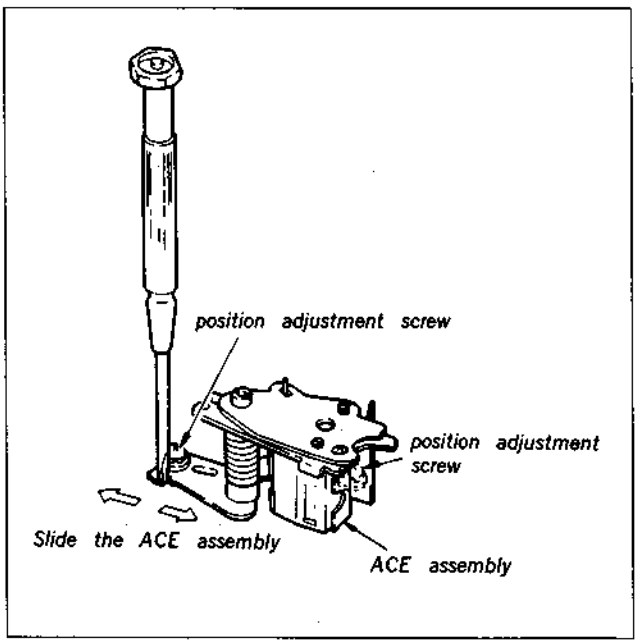
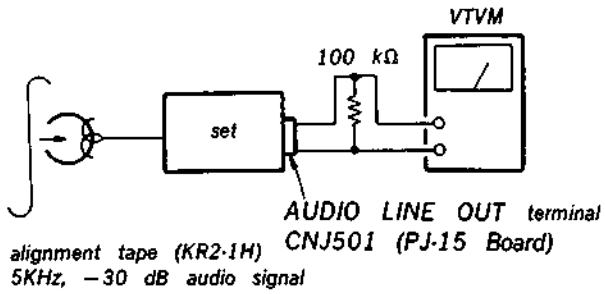


Fig. 4-15.

4-2-3. Audio head (ACE Assembly) Azimuth Adjustment

[**Connections**]

1) Playback mode



[**Method of adjustment**]

1) Play the 5kHz, −30dB audio signal section (RF sweep section) of the alignment tape.
2) Adjust the azimuth adjustment screw until the output level (VTVM indication) is maximum.
   Note :
   Complete the adjustment by turning the adjustment screw in the tightening direction (clockwise).
3) After adjustment, lock the adjustment screw.

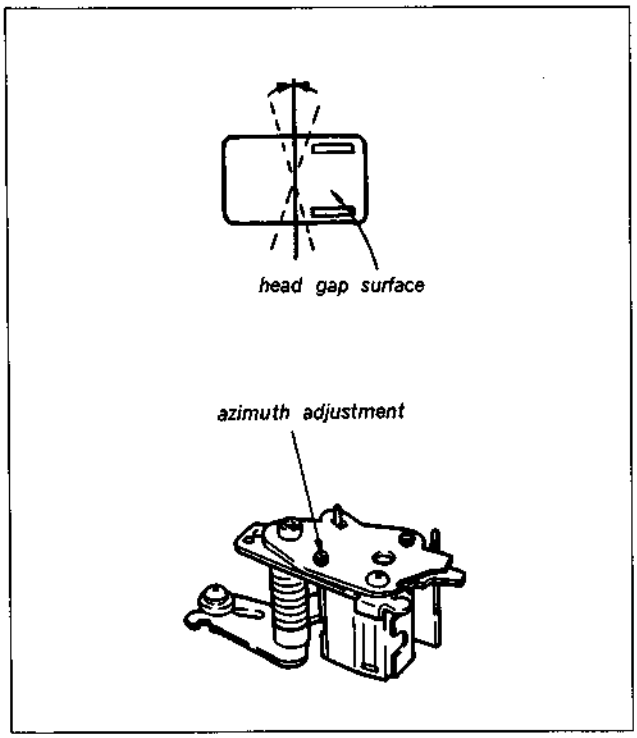


Fig. 4-16.

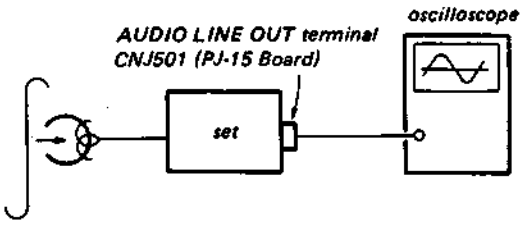
4-2-4. Audio Head (ACE Assembly) Height Adjustment

[**Condition**]

This adjustment must only be performed after the exit side tracking adjustment has been completed.

[**Connections**]

1) Playback mode



[**Method of adjustment**]

1) Play the 5kHz, −30dB audio signal section (RF sweep section) of the alignment tape.
2) Adjust the height adjustment screw and the tilt adjustment nut so that the amplitude of the audio line output waveform (5kHz) becomes a maximum.

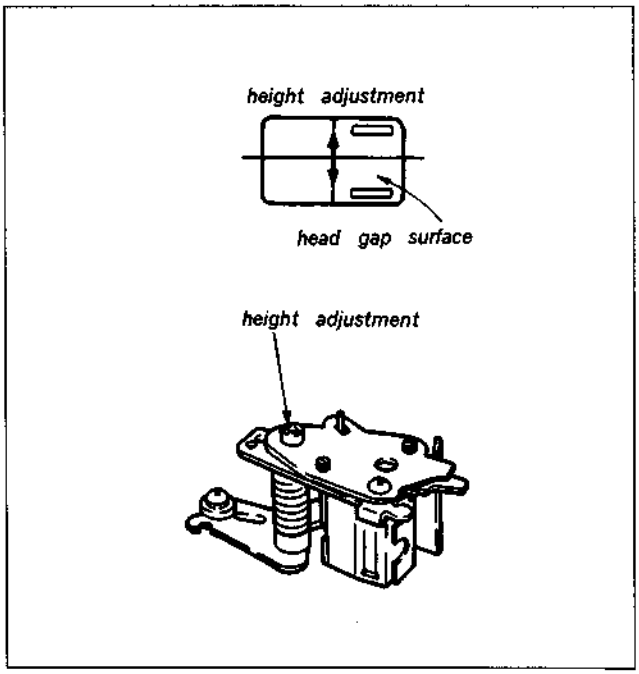


Fig. 4-17.

4-3. HOW TO CHECK THE TAPE TRAVELING AFTER ADJUSTMENT OF TAPE PATH

Adjust and check the tape path using the alignment tape then check the tape travel using the procedure below.

1) Prepare one L-830 reel ready (these cassette are widely available commercially). Remove the cassette cover referring to Fig. 4-1 of the adjustment guide.
2) Run the L-830 tape in playback mode and check the following points.
   i) Entrance side
   Confirm that the tape does not contact the upper flange of the No. 4 guide or the No. 6 guide. and is not damaged. (Some tape curl is allowed but the tape must not be creased.) (Fig. 4-18)
   ii) Exit side
   Confirm that the tape does not contact the upper flange of the No. 7 guide or the No. 8 guide. or the upper or lower flange of the No. 10 guide. and is not scratched. (Some tape curl is allowed but the tape must not be creased.) (Fig. 4-19)
   iii) If the tape was found to not be running correctly in step ii). readjust the tape path using the alignment tape.
   If the tape is not running correctly on the entrance side. refer to section 4-1-2.
   If the tape is not running correctly on the exit side. refer to section 4-1-3.

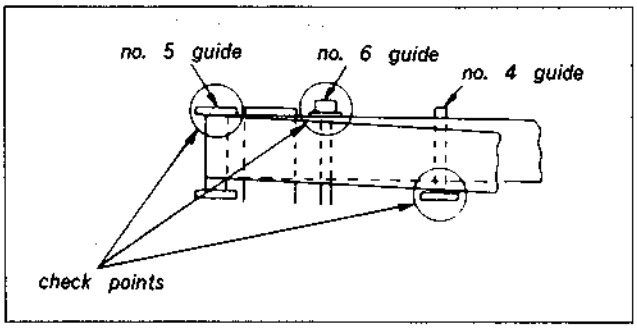


Fig. 4-18.

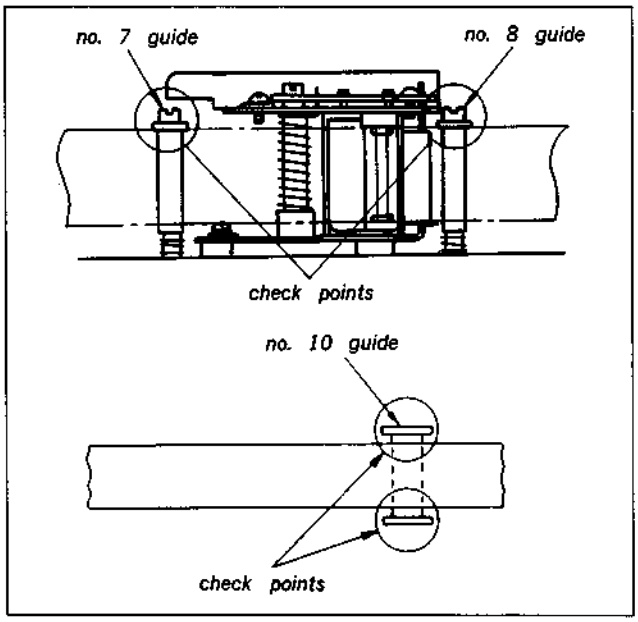


Fig. 4-19.

5. ELECTRICAL ADJUSTMENTS

During the adjustment, see the parts location diagram relevant to the adjustment on page 176, 177.

All the electrical adjustment can be performed by using the equipment mentioned below, the alignment tape, and the PAL colour-bar signal(100%).

[Equipment Required]

(1) PAL Colour Monitor TV
(2) Oscilloscope, Dual-trace, Bandwidth... more than 10 MHz with delay mode
(3) Frequency Counter
(4) PAL Colour-Bar Generator
(5) Digital voltmeter
(6) Distortion meter
(7) Audio Signal Generator
(8) Audio level meter(VTVM)
(9) Attenuator
(10) Alignment Tape, type: KR5-2H, Code No. 8-969-995-52

[Setup for Adjustment]

The antenna should be connected correctly to the antenna input terminal of the videocassette recorder.
It is important that the video output signal satisfies the specification because the telecast signal received by the incorporated tuner of the videocassette recorder is utilized as the adjustment signal of the machine. The incorporated tuner should be set to the channel with the best reception. The video signal should be checked with an oscilloscope connected to VIDEO OUT terminal. Verify that the sync signal amplitude is approx. 0.3Vp-p and the video signal amplitude is approx. 0.7Vp-p at peak. Adjust the fine tuning while observing the signal and the TV screen so that the burst signal amplitude becomes approx. 0.3V ± 0.1Vp-p. Also confirm that there is not spikes observed at the sync signal portion. (See Fig. 5-1.)
The video (colour-bar) signal for the adjustment is shown in Fig. 5-1.

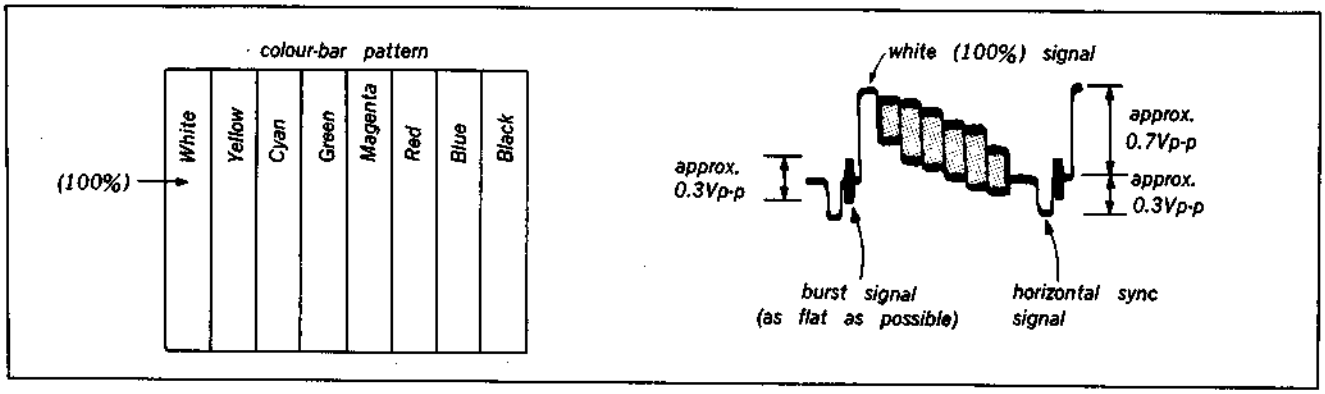


Fig. 5-1. Video (colour-bar) signal

[Alignment Tape]
KR5-2H

	Video signal	Audio signal	Playing time	Use for
1.	Colour-bars	3kHz −5dB	5 min	General performance, tape speed checks, switching position adjustment.
2.	Monoscope	333Hz −25dB	5 min	Video head dihedral, audio level adjustment.
3.	RF sweep	5kHz −25dB	5 min	Video audio frequency characteristics, audio azimuth adjustment. marker: 1, 2, 3.58, 4.5, 5.2, MHz
4.	Tracking 1 MHz(CH-B) *1(Channel B is inserted in every 3 frames.)	1 kHz −5dB *2(Signal is dropped out in the positions where channel B is inserted.)	5 min	Tracking, Audio height adjustments CTL Position check. (Check if *1 and *2 are the same position.)

[Required Levels and Impedances of Input and Output]

Video

Input VIDEO IN: Phono jack
1.0V(p-p)$^{+1.0}_{-0.5}$V(p-p)
75 ohms, unbalanced,
sync negative

Output VIDEO OUT: Phono jack
1.0V(p-p)±0.1V(p-p)
75 ohms, unbalanced,
sync negative

Audio

Inputs AUDIO IN: Phono jacks
47 kilohms, −10dBs
(0dBs = 0.775Vrms)
Microphone: −60dBs, for low-impedance microphone

Outputs AUDIO OUT: Phono jacks
Load impedance less than 10 kilohms
−10dBs with 47 kilohms load,
unbalanced

[Colour-Bar Signal]

The 100% colour-bar signal recorded on the Alignment tape is shown in Fig. 5-2.

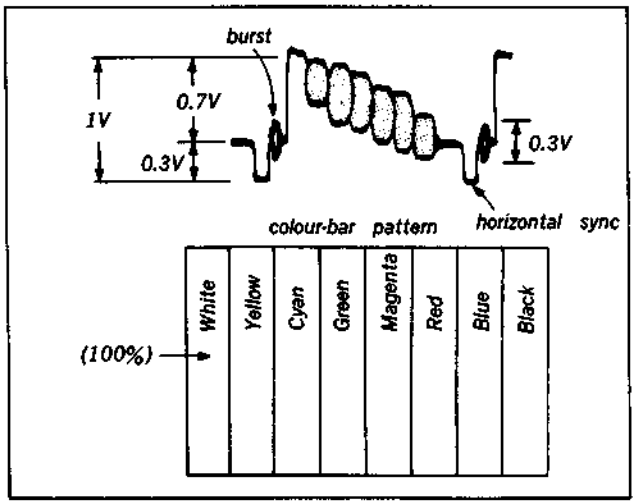


Fig. 5-2. Colour-bar signal recorded on the alignment tape

[75Ω Terminating Method]

To terminate the video output terminal follow the steps shown in Fig. 5-3.

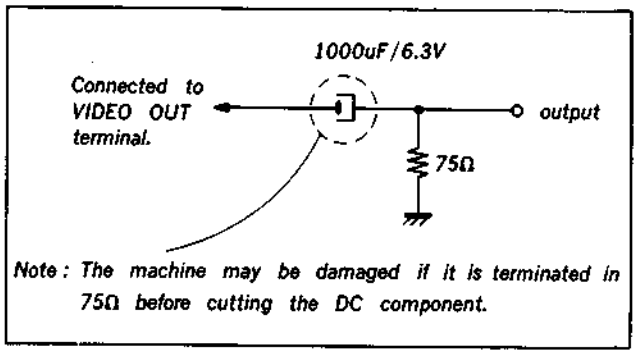
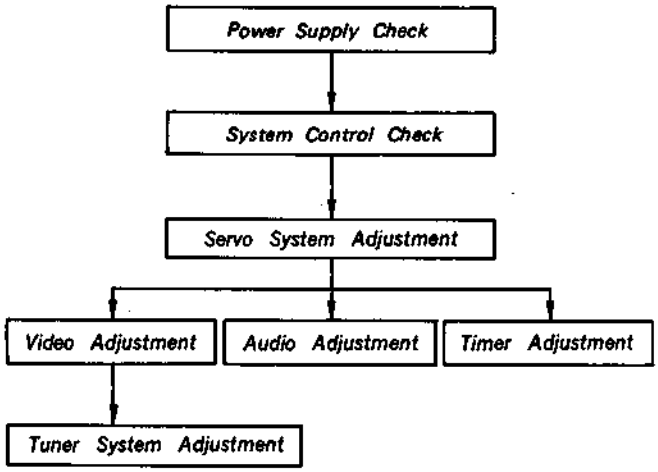


Fig. 5-3. 75Ωterminating circuit

[Adjustment Procedure]

Adjust in the order given below.



5-1. POWER SUPPLY CHECK (PS-115 Board)

Measure in E-E mode (POWER supply switch ON)

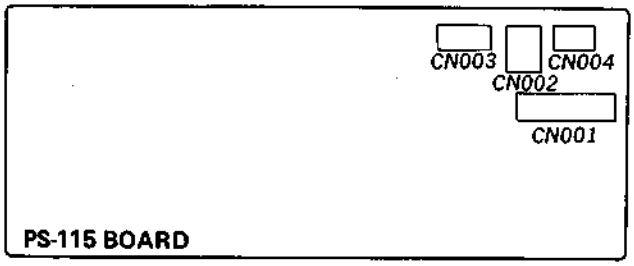


Fig. 5-4. Component layout

1. Switched 12V check
   Pin ② of CN002 shall be 12.0±0.3Vdc
2. Switched 9V check
   Pin ② of CN001 shall be 9.0±0.1Vdc
3. Un switched + 5.5V check
   Pin ④ of CN003 shall be 5.5±0.1Vdc
4. AC 45V check
   Between Pin ⑥ (45Vac) and Pin ⑤ (GND) of CN003 shall be approx. 38Vac

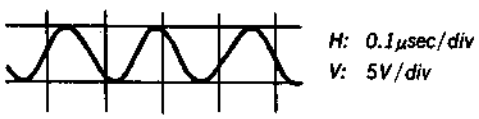
5-2. SYSTEM CONTROL CHECK (ST-12 Board)

5-2-1. Clock Frequency Check

Mode	E-E
Signal	None
Measurement Point	Pin ㊾ of IC401
Measurement Equipment	Frequency counter
Specified Value	6.0±0.1MHz

[Confimation Method]

(1) Confirm by a frequency counter that the frequency of Pin ㊾ of IC 401 is 6.0±0.1MHz.



f = 6.0MHz ± 0.1MHz

Fig. 5-5. Clock frequency

5-3. SERVO SYSTEM ADJUSTMENT

[Adjustment Sequency]

5-3-1. Reel motor control system Adjustment
5-3-2. Drum/Capstan servo system Adjustment

5-3-1. Reel Motor Control System Adjustment

1. FWD Torque Adjustment (ST-12 Board)

See "Mechanical Adjustment"

5-3-2. Drum/Capstan Servo System Adjustment

1. Voltage Check (ST-12 Board)

Measurement Point	Pin ⑪ of IC001
Measurement Equipment	Digital voltmeter
Specified Value	5.00±0.12Vdc

[Confimation Method]

(1) Pin ⑪ of IC001 shall be 5.00±0.12V

2. Clock Check (ST-12 Board)

Measurement Point	Pin ㉘ of IC001 (4.43MHz)
Measurement Equipment	Oscilloscope
Specified Value	Approx. 0.6Vp-p

[Confimation Method]

(1) Pin ㉘ of IC001 shall be approx. 0.6Vp-p

3. Drum Free Speed Adjustment (ST-12 Board)

Mode	Playback or Record
Signal	Colour bar or monoscope
Measurement Point	Pin ㊻ of IC001 (TP005)
Measurement Equipment	Digital Voltmeter
Adjustment Element	RV001
Specified Value	1.8±0.2Vdc

[Adjustment Method]

(1) Adjust to 1.8±0.2Vdc with RV001

4. Capstan Free Speed Adjustment (ST-12 Board)

Mode	Record
Signal	Colour bar
Measurement Point	Pin ⑦ of IC001 (TP008)
Measurement Equipment	Digital voltmeter
Adjustment Element	RV006
Specified Value	1.6±0.1Vdc

[Adjustment Method]

(1) Adjust to 1.6±0.1Vdc with RV006

5. RF Switching Position Adjustment (ST-12 Board)

Mode	Playback
Signal	Alignment tape colour bar
Measurement Point	CH1 : Pin ㉞ of IC001 (TP003) CH2 : Pin ③ of CN025
Measurement Equipment	Oscilloscope
Adjustment Element	(1) RV004 (2) RV003
Specified Value	(1) 7H±0.5 (448±30μsec) (2) 7H±0.5 (448±30μsec)

[Adjustment Method]

(1) Press the TRACKING button and set for the Optimum state.

(2) Adjustment RV004 so that the Lock Phase of RF SW PULSE (Ach) becomes specified value.

(3) Adjust RV003 so that the Lock Phase of RF SW PULSE (Bch) becomes specified value.

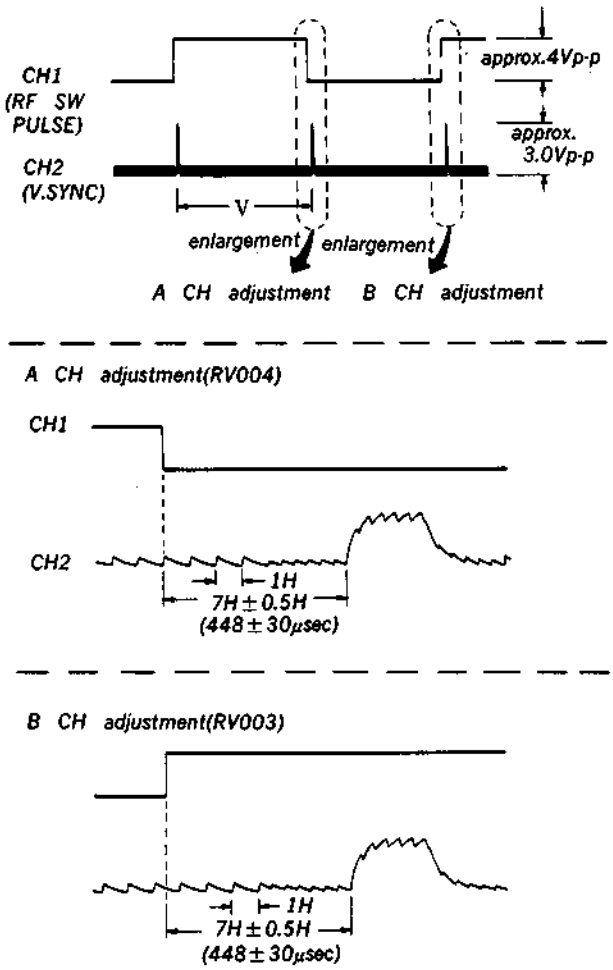


Fig. 5-6. Switching position adjustment

6. Drum Lock Phase Adjustment (ST-12 Board)

Mode	Record
Signal	Colour bar
Measurement Point	CH1 : Pin ㉞ of IC001 (TP003) CH2 : Pin ③ of CN025
Measurement Equipment	Oscilloscope
Adjustment Element	RV002
Specified Value	7H±0.5H (448±30μsec)

[Adjustment Method]

(1) Adjust RV002 so that the Lock Phase of CH1 (RF SW PULSE) and CH2 (V SYNC) become specified values.

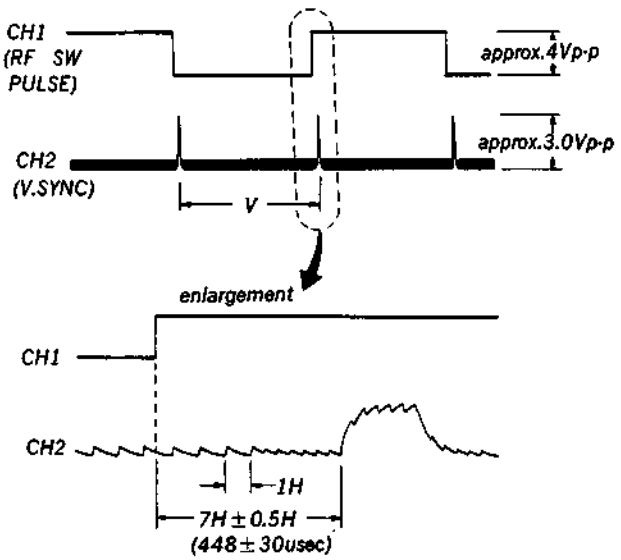


Fig. 5-7. Drum lock phase

7. Drum f_H Adjustment (ST-12 Board, VI-23 Board)

Mode	STILL (playback+pause)
Signal	Alignment tape colour bar or monoscope
Measurement Point	Pin ⑩ of IC008 on the VI-23 board (COMP SYNC)
Measurement Equipment	Oscilloscope
Adjustment Element	RV007 (ST-12 board)
Specified Value	0±0.05μsec

[Adjustment Method]

Adjust f_H during the STILL mode by RV007 (ST-12 board) to be equal to f_H in the PB mode.

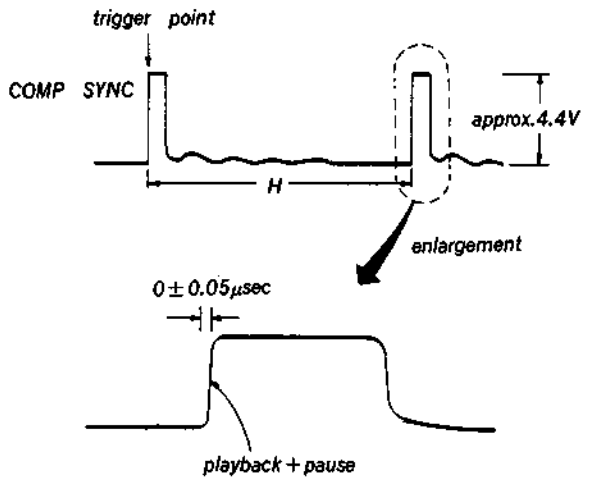


Fig. 5-8. Drum f_H adjustment

5-4. PAL VIDEO SYSTEM ADJUSTMENT

As a rule, first the playback system is adjusted with an alignment tape to check that it operates normally, then the recording system is adjusted.

The adjustment sequence is shown below. The Y signal and chroma signal systems are adjusted for both playback and recording systems.

Colour video signal supplied by the PAL colour-bar generator is used as video input signal for video system adjustment in the record mode. Check that the sync and colour burst signals conform to the specifications designated in "Set-up for Adjustment" in Fig. 5-1.

[Record System Adjustment]

1) AGC adjustment
2) Carrier set adjustment
3) Deviation adjustment
4) Compress adjustment
5) Peak clip adjustment
6) Carrier shift adjustment
7) White clip adjustment
8) Dark clip adjustment
9) Y record current adjustment
10) 4.43MHz REF adjustment
11) AFC adjustment
12) AFC offset adjustment
13) Pilot burst signal level adjustment
14) Chroma record current adjustment (I)
15) Peak ACC adjustment
16) Chroma record current adjustment (II)

[Playback System Adjustment]

1) Playback frequency characteristic adjustment
2) Expand adjustment
3) Playback video level adjustment
4) Y-comb adjustment
5) Dropout compensator adjustment
6) Carrier balance adjustment
7) Chroma comb filter adjustment
8) JOG PLL adjustment
9) JOG exchange chroma level adjustment
10) Shift adjustment

5-4-1. Record System Adjustment

1. AGC Adjustment (VI-23 Board)

Mode	E-E
Signal	Gray scale
Measurement Point	Video out terminal
Measurement Equipment	Oscilloscope
Adjustment Element	RV018
Specified Value	1.00±0.05Vp-p

[Adjustment Method]

(1) Adjust to 1.00±0.05Vp-p with RV018

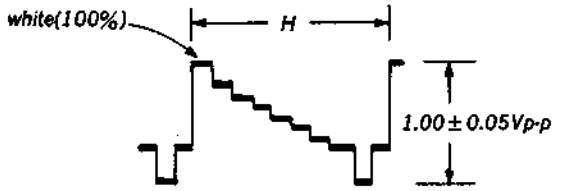


Fig. 5-9. Peak AGC Adjustment

2. Carrier Set Adjustment (VI-23 Board)

Mode	E-E
Signal	None
Measurement Point	Pin ㉕ of IC008
Measurement Equipment	Oscilloscope
Adjustment Element	RV011
Specified Value	3.800±0.038MHz

[Adjustment Method]

(1) Rotate RV010 clockwise full and rotate RV009 counter clockwise full seen from the Pattern side.
(2) Set up the input select to LINE and NORMAL mode.
(3) Adjust to 3.800±0.038MHz with RV011.

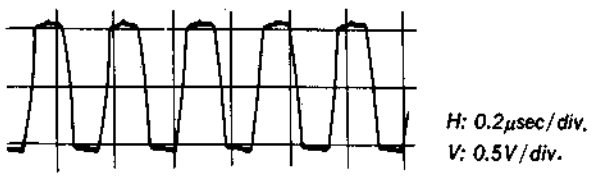


Fig. 5-10. Carrier set adjustment

3. Deviation Adjustment (VI-23 Board)

Mode	Self-record and playback
Signal	Colour bar
Measurement Point	Video out terminal
Measurement Equipment	Oscilloscope
Adjustment Element	RV013
Specified Value	1.00±0.05Vp-p

- The playback system adjustment and the carrier set adjustment in paragraph 2 above must be completed before making this adjustment

[Adjustment Method]

(1) Supply the colour-bar signal and set up E-E mode.
(2) Connect the oscilloscope to VIDEO OUT terminal.
(3) Set up record mode.
(4) Playback the recorded section of the tape.
(5) Check that the video signal level is 1.00±0.05 Vp-p, if the level is outside of this range, repeat steps(3) through(4) above adjusting with RV013 until the standard value is obtained.

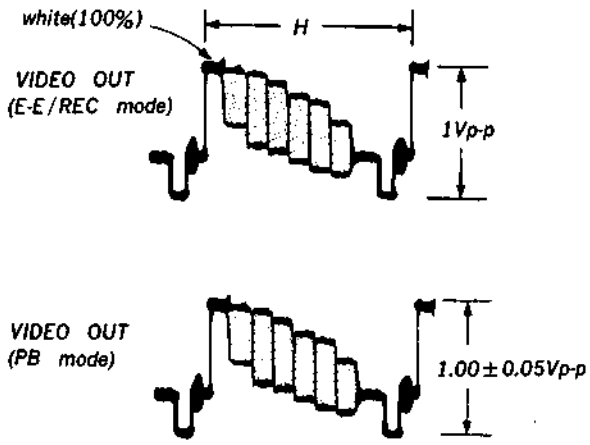


Fig. 5-11. Deviation adjustment

Note: Make sure to adjust 7 WHITE CLIP adjustment and 8 DARK CLIP adjustment

4. Compress Adjustment (VI-23 Board)

Mode	E-E
Signal	None
Measurement Point	See Fig. 5-12
Measurement Equipment	Digital voltmeter
Adjustment Element	RV014
Specified Value	0.30±0.01Vdc

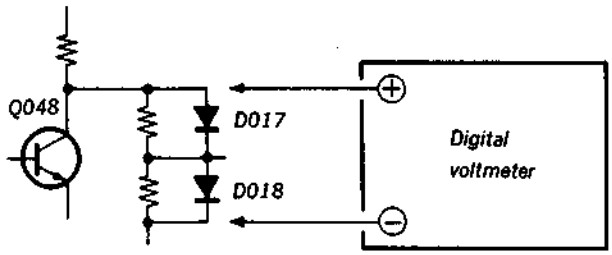


Fig. 5-12.

[Adjustment Method]

(1) Adjust to 0.30±0.01 Vdc using RV014

Note: Make this adjustment more than 30sec after turning on the power switch

5. Peak Clip adjustment (VI-23 Board)

Mode	E-E
Signal	White (100%)
Measurement Point	Base of Q052
Measurement Equipment	Oscilloscope
Adjustment Element	RV019
Specified Value	0.15±0.05Vdc

[Adjustment method]

(1) In the Q053 base, the DC level of 100% white is con-sidered as Vp. Adjust the Q052 base DC level by RV019 so that it is equal to Vp+0.15±0.05 Vdc.(See Fig. 5-13)

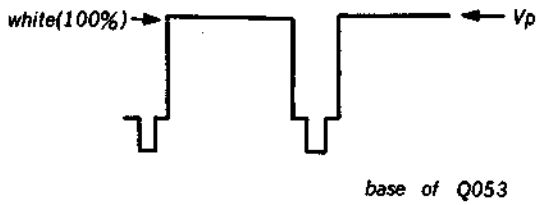


Fig. 5-13. Peak clip adjustment

6. Carrier Shift Adjustment (VI-23 Board)

Mode	E-E
Signal	None
Measurement Point	Pin ㉕ of IC008
Measurement Equipment	Oscilloscope
Adjustment Element	RV012
Specified Value	4.30±0.04MHz

[Adjustment Method]

(1) Set up the input select to LINE and Super Beta PRO mode

(2) Adjust to 4.30±0.04MHz with RV012

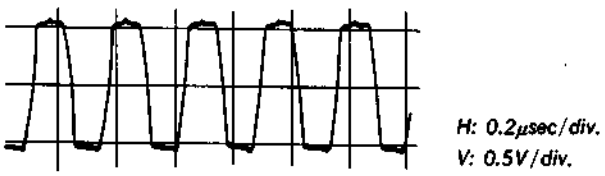


Fig. 5-14. Carrier shift adjustment

7. White Clip Adjustment (VI-23 Board)

Mode	E-E
Signal	Colour bar
Measurement Point	Collector of Q047
Measurement Equipment	Oscilloscope
Adjustment Element	RV010
Specified Value	220^{+0}_{-10} %

[Adjustment Method]

(1) Set up the Super Beta PRO mode and adjust to white peak 220^{+0}_{-10} % with RV010 (See Fig. 5-15)

8. Dark Clip Adjustment (VI-23 Board)

Mode	E-E
Signal	Colour bar
Measurement Point	Collector of Q047
Measurement Equipment	Oscilloscope
Adjustment Element	RV009
Specified Value	110±10%

[Adjustment Method]

(1) Set up the Super Beta PRO mode and adjust to Sync peak 110±10% with RV009 (See Fig. 5-15)

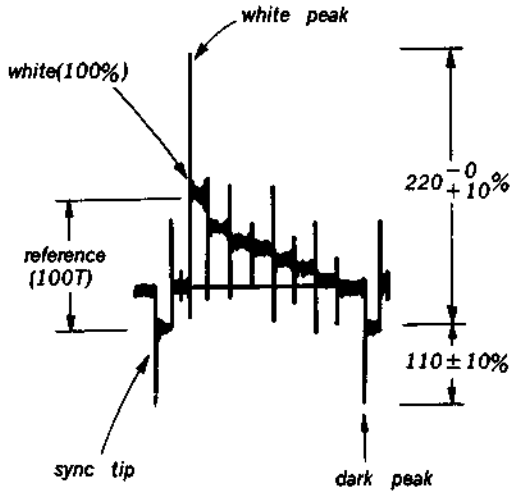


Fig. 5-15. Dark clip and white clip adjustment

9. Y Record Current Adjustment (RP-41 Board)

Mode	Record (STD mode)
Signal	None
Measurement Point	Pin ③ of CN003
Measurement Equipment	Oscilloscope
Adjustment Element	RV004
Specified Value	4.2±0.1Vp-p

[Adjustment Method]

(1) Adjust to 4.2±0.1Vp-p with RV004

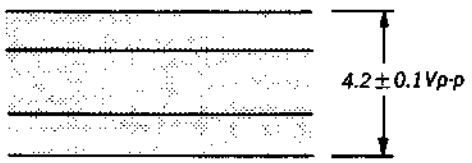


Fig. 5-16. Y record current adjustment

10. APC Adjustment (VI-23 Board)

Mode	Playback
Signal	Colour bar
Measurement Point	Pin ① of CN001
Measurement Equipment	Frequency counter
Adjustment Element	CV001
Specified Value	4433619±5Hz

[Adjustment Method]

(1) Adjust to 4433619±5Hz with CV001

11. AFC Adjustment (VI-23 Board)

Mode	E-E
Signal	None
Measurement Point	Pin ㉑ of IC001
Measurement Equipment	Frequency counter
Adjustment Element	RV022
Specified Value	5.515±0.200MHz

[Preparation]

- Apply 5Vdc to pin ⑤ of CN001 (Connect the pin ⑤ of CN001 and 5Vdc point with jumper leads)
- Apply 4.50±0.01Vdc to pin ㉘ of IC001 (Connect the pin ㉘ of IC001 with Stabilizer power Supply)

[Adjustment Method]

(1) Adjust to 5.515±0.20MHz with RV022

(2) Confirm item 12

12. AFC Offset Adjustment (VI-23 Board)

Mode	Record
Signal	Colour bar
Measurement Point	Pin ㉘ of IC001
Measurement Equipment	Oscilloscope
Adjustment Element	RV003
Specified Value	minimum (0±5mv)

[Adjustment Method]

(1) Adjust RV003 so that the fluctuation of DC level is minimum (See Fig. 5-17)

(2) Confirm item 11

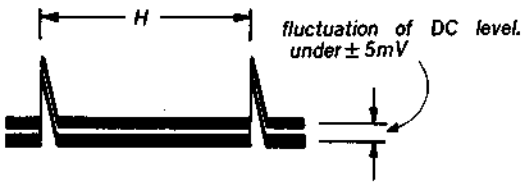


Fig. 5-17. AFC offset adjustment

Note: Repeat items 11. and 12. until each of them complies with its standard.

13. Pilot Burst Signal level Adjustment (VI-23 Board)

Mode	E-E
Signal	Colour bar
Measurement Point	Pin ① of IC001
Measurement Equipment	Oscilloscope
Adjustment Element	RV021
Specified Value	Pilot burst signal level = Chroma signal level

[Adjustment Method]

(1) Adjust the pilot burst signal with the chroma signal level using RV021

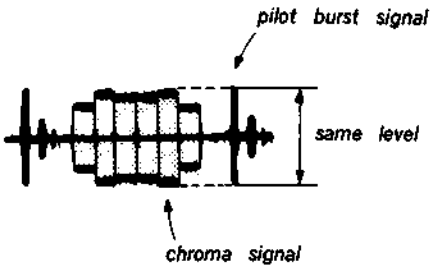


Fig. 5-18. Pilot burst signal level adjustment

14. Chroma Record Current Adjustment (I) (VI-23 Board)

Mode	Record (Super Beta PRO mode)
Signal	Colour bar
Measurement Point	Pin ③ of CN006
Measurement Equipment	Oscilloscope
Adjustment Element	RV002
Specified Value	150±5mVp-p

[Adjustment Method]

(1) Adjust to 150±5mVp-p with RV002

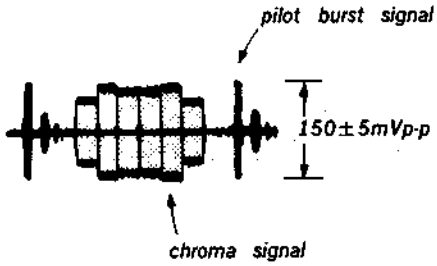


Fig. 5-19. chroma record current adjustment

15. Peak ACC Adjustment (RP-41 Board)

Mode	E-E
Signal	Colour bar
Measurement Point	Emitter of Q011
Measurement Equipment	Oscilloscope
Adjustment Element	RV006
Specified Value	2.0±0.1Vp-p

[Adjustment Method]

(1) Adjust to 2.0±0.1Vp-p with RV006

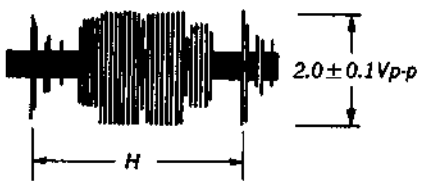


Fig. 5-20. Peak ACC adjustment

Note: Make sure to adjust 14. chroma Record Current Adjustment(I)

16. Chroma Record Current Adjustment (II) (RP-41 Board)

Mode	Record (STD mode)
Signal	Colour bar
Measurement Point	Pin ① of CN003 (Q025 collector)
Measurement Equipment	Oscilloscope (1 : 1 probe)
Adjustment Element	RV005
Specified Value	26±1mVp-p

[Adjustment Method]

(1) Adjust to 26±1mVp-p with RV005

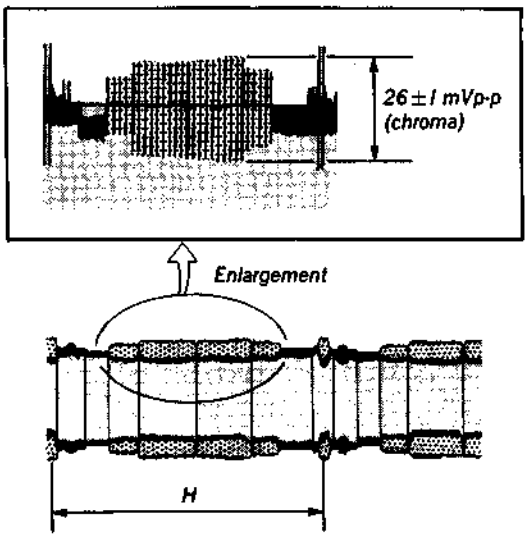


Fig. 5-21. Chroma record current

Note: Make sure to adjust 14. Chroma Record Current Adjustment(I) and 15. Peak ACC Adjustment.

5-4-2. Playback System Adjustment

1. Playback Frequency Characteristic Adjustment (RP-41 Board)

1) Adjust both the A and B channels The B channel indicated by [ ]

Mode	Playback
Signal	RF sweep
Measurement Point	Pin ③ of CN005 External trigger: pin ⑤ of CN005
Measurement Equipment	Oscilloscope
Adjustment Element	RV003 〔RV001〕
Specified Value	56~62% (See Fig. 5-22)

[Adjustment Method]

(1) Rotate the tracking knob to make 2MHz to be maximum.

(2) Rotate RV002 to adjust the 2MHz level of B-ch to be less than ±20mV to the 2MHz level of A-ch.

(3) Set the trigger slope to−(+).

(4) Adjust the 5.2MHz amplitude to 56~62% of the 2MHz amplitude with RV003〔RV001〕.

2) Adjust the A' channels

Mode	Playback
Signal	RF sweep
Measurement Point	Pin ③ of CN005 Exterminal trigger: Pin ⑤ of CN005
Measurement Equipment	Oscilloscope
Adjustment Element	RV007
Specified Value	56~62% (See Fig. 5-22)

[Prepartion]

- (ST-12 Board) Pin ㉔ of IC001 (TP011) and Base of Q704 (TP010) with Short
  Pin ⑰ IC401 (TP012) with GND
- (RP-41 Board) Connect a 470Ω resister serially between Pin ① of CN001 and Stabilizer power supply (+5Vdc)

[Adjustment Method]

(1) Rotate RV008 to adjust 2MHz level of A'-ch to be less than ±20mV to the 2MHz level of A-ch

(2) Adjust the 5.2MHz amplitude to 56~62% of the 2MHz amplitude with RV007

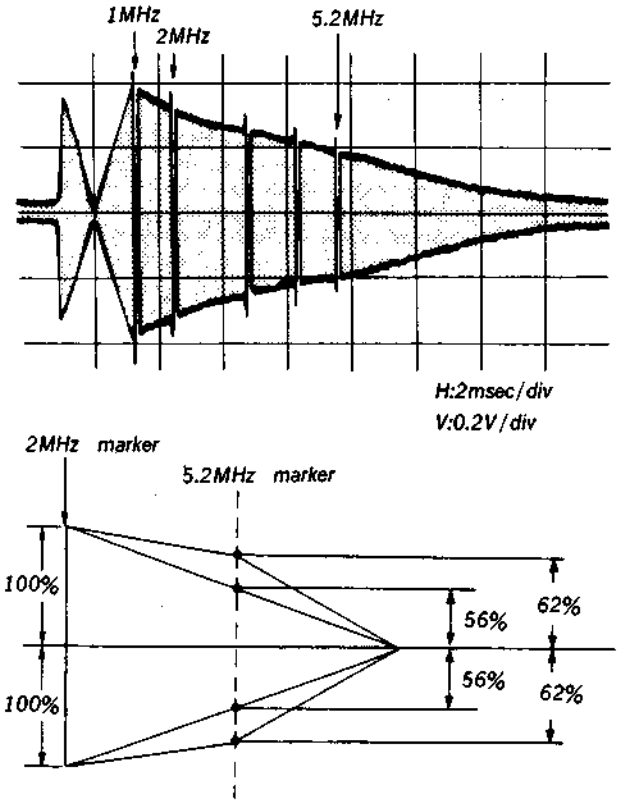


Fig. 5-22. Playback amplifier frequency character stic adjustment

2. Expand Adjustment (VI-23 Board)

Mode	Playback
Signal	Colour bar
Measurement Point	See Fig. 5-23
Measurement Equipment	Digital voltmeter
Adjustment Element	RV015
Specified Value	0.30±0.01Vdc

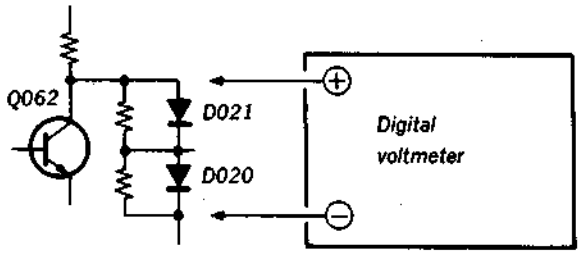


Fig. 5-23.

[Adjustment Method]

(1) Adjust to 0.30±0.01Vdc using RV015

Note: Adjust more than 30 sec after playback.

3. Playback Video Level Adjustment (VI-23 Board)

Mode	Playback
Signal	Colour bar
Measurement Point	Video out terminal
Measurement Equipment	Oscilloscope
Adjustment Element	RV016
Specified Value	1.00±0.05Vp-p

[Adjustment Method]

(1) Adjust to 1.00±0.05Vp-p with RV016

Fig. 5-24. Playback video level adjustment

4. Y-Comb Adjustment (VI-23 Board)

Mode	Playback
Signal	Colour bar
Measurement Point	Pin ⑧ of IC009
Measurement Equipment	Oscilloscope
Adjustment Element	RV017
Specified Value	See Fig. 5-25 A level ≒ B level

[Adjustment Method]

(1) Rotate RV017 to adjust to that the limiter works vertically symmetrically (See Fig. 5-25)

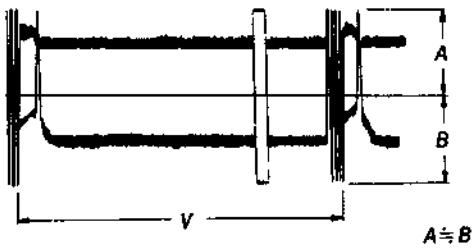


Fig. 5-25. Y-comb adjustment

5. Dropout Compensator Threshold Adjustment (VI-23 Board)

Mode	Playback
Signal	Colour bar
Measurement Point	Pin ㉖ of IC008
Measurement Equipment	Digital voltmeter
Adjustment Element	RV023
Specified Value	0.26±0.02Vdc

[Adjustment Method]

(1) Adjust to 0.26±0.02Vdc with RV023

6. Carrier Balance Adjustment (VI-23 Board)

Mode	Playback
Signal	Colour bar
Measurement Equipment	Monitor TV screen
Adjustment Element	RV004
Specified Value	Minimize beats

[Adjustment Method]

(1) Minimize beats with RV004.

7. Chroma Comb Filter Adjustment (VI-23 Board)

Mode	Playback
Signal	Colour bar
Measurement Equipment	Monitor TV Screen
Adjustment Element	RV001 and LV002
Specified	Minimize beats

[Adjustment Method]

(1) Minimize beats with RV001 and LV002

8. JOG PLL Adjustment (VI-23 Board)

Mode	E-E
Signal	Colour bar
Measurement Point	Pin ⑩ of IC006
Measurement Equipment	Oscilloscope
Adjustment Element	RV006
Specified Value	20±1μsec

[Adjustment Method]

(1) Adjust to 20±1μsec with RV006 (See Fig. 5-26)

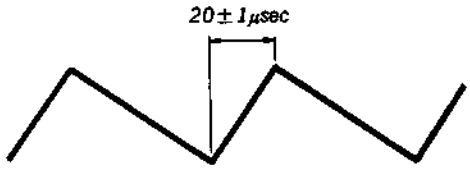


Fig. 5-26. JOG PLL adjustment

9. JOG Exchange Chroma Level Adjustment (VI-23 Board)

Mode	Playback-Pause (STILL)
Signal	Colour bar
Measurement Point	Pin ⑧ of IC006
Measurement Equipment	Oscilloscope
Adjustment Element	RV020
Specified Value	Minimum

[Adjustment Method]

(1) Adjust RV020 so that the fluctuation of level is minimum (See Fig. 5-27)

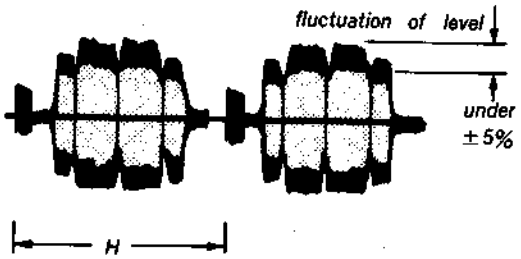


Fig. 5-27. JOG Exchange Chroma level adjustment

10. Shift Adjustment (VI-23 Board)

Mode	Playback-Pause(STILL)
Signal	Alignment tape Colour bar
Measurement Point	CH1 : Pin ㉔ of IC006 CH2 : Pin ㉓ of IC006
Measurement Equipment	Oscilloscope
Adjustment Element	RV005
Specified Value	Same level

[Adjustment Method]

(1) Adjust to the signal level (Per 1H) with RV005

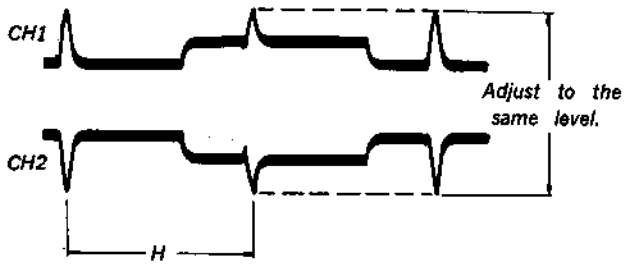


Fig. 5-28. Shift adjustment

5-5. AUDIO SYSTEM ADJUSTMENT

Adjustments of the audio system shall be mode. Use a Dynamicron tape (L125~L500) for adjustments.

[Connection of Related Equipment]

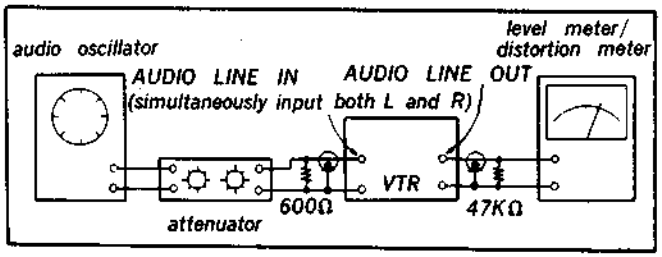


Fig. 5-29.

Unless otherwise specified set the VTR switch and as shown below when making the adjustments

INPUT SELECT switch···LINE

[Adjustment Sequence]

(1) ACE head adjustment
(2) Playback frequency characteristic Check
(3) Playback output level Check
(4) E-E output level check
(5) Bias oscillator Frequency and Bias Trap check
(6) Record bias adjustment
(7) Overall frequency characteristic check
(8) Overall level characteristics and distortion ratio checks
(9) Overall S/N check

1. ACE Head Adjustment

Refer to "Mechanical Adjustment"

2. Playback Frequency Characteristic Check

Mode	Playback
Signal	Alignment tape 333Hz (monoscope) and 5kHz (RF sweep) portions
Measurement Point	Audio out terminal
Measurement Equipment	Level meter
Specified Value	Within 2dB

[Confimation Method]

(1) Playback 333Hz (monoscope) and 5kHz (RF sweep) from the alignment tape and confirm so that the level difference between 333Hz and 5kHz within 2dB.

3. Playback Output Level Check

Mode	Playback
Signal	Alignment tape 333Hz (monoscope) portion
Measurement Point	Audio out terminal
Measurement Equipment	Level meter
Specified Value	−30±2dBs

[Confimation Method]

(1) Playback 333Hz (monoscope) from the alignment tape and Confimation that the output level is −30±2dBs

4. E-E Output Level Check

Mode	E-E
Signal	333Hz. −10dBs
Measurement Point	Audio out terminal
Measurement Equipment	Level meter
Specified Value	−10±2dBs

[Confimation Method]

(1) Confirm that the audio line output level is −10±2dBs

5. Bias Oscillater Frequency and Bias Trap Check (AU-26 Board)

Mode	Record
Signal	None (Input pins are short)
Bias Oscillator Frequency check	
Measurement Point	Pin ③ of CN901
Measurement Equipment	Frequency counter
Specified Value	65±6.5kHz (See Fig. 5-30)
Bias Trap Check	
Measurement Point	Pin ⑱ of IC902
Measurement Equipment	Oscilloscope
Specified Value	Bias leak is below 0.4Vp-p

• Input is "AUDIO LINE IN" input pin is shorted.

[Confimation Method]

(1) Input is Nore-signal in record mode

(2) Connect the frequency counter to pin ③ of CN901 Confirm that the oscillation frequency is 65kHz± 6.5kHz (See Fig. 5-30) (Bias Oscillator Frequency)

(3) Connect the oscilloscope to Pin ⑱ of IC902 and confirm that bias leak is below 0.4Vp-p.

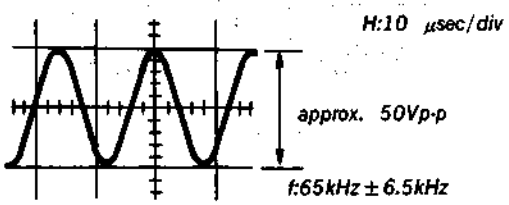


Fig. 5-30. Bias Oscillator Frequency Check

6. Record Bias Adjustment (AU-26 Board)

Mode	Self-Record and Playback
Signal	333Hz and 7kHz
Measurement Point	Audio out terminal
Measurement Equipment	Level meter and Attenuator
Adjustment Element	RV902
Specified Value	0±1dB

• Check that the Tape path adjustment and the playback output level adjustment have been performed.

[Adjustment Method]

(1) Connect Pin ⑭ of IC902 and GND with a jumper wire so as to turn off the AGC operation.

(2) Supply a 333Hz signal to the audio line input.

(3) Connect level meter to audio line output.

(4) Adjust attenuator so that the level meter becomes −30dBs.

(5) Record

(6) Record by making the audio line input signal into 7kHz.

(7) Playback the recorded portion, and measure the output level of 333Hz and 7kHz.

(8) Confirm that the 7kHz playback output level against the 333Hz playback level is 0±1dB. When it is out of specifications, adjust RV902 and repeat items (2) to (8).

(9) Remove the jumper wire.

7. Overall Level Characteristics and Distortion Ratio Checks.

Mode	Self-Record and Playback
Signal	333Hz, −10dBs
Measurement Point	Audio out terminal
Measurement Equipment	Level meter and Distortion meter
Specified Value	Playback level is −10±3dBs Distortion ratio is within 5%

[Confimation Method]

(1) Record
(2) Playback the recorded portion.
(3) Connect the level meter and distortion meter to the audio line output pin.
(4) Confirm that the playback level is−10±3dBs.
(5) Confirm that the distortion ratio is within 4%

8. Overall S/N Check (AU-26 Board)

Mode	Self-Record and Playback
Signal	333Hz and None
Measurement Point	Audio out terminal
Measurement Equipment	Level meter and Attenuater
Specified Value	S/N : More than 33dB

[Confimation Method]

(1) Connect jumper wire between Pin ⑭ of IC902 and GND and turn off off AGC operation
(2) Supply a 333Hz signal to the audio line input and adjust attenuator so that the level meter becomes −10dBs
(3) Record
(4) Switch to no-signalinput while continuing in record mode (Audio Input Pin is short)
(5) Playback the recorded portion, and confirm that the level difference between the 333Hz signal and no-signal portion (the portion immediately after the 333Hz signal) is more than 33dB
(6) Remove jumper wire.

5-6. TUNER SYSTEM ADJUSTMENT

1. RF AGC Adjustment (ST-12 Board)

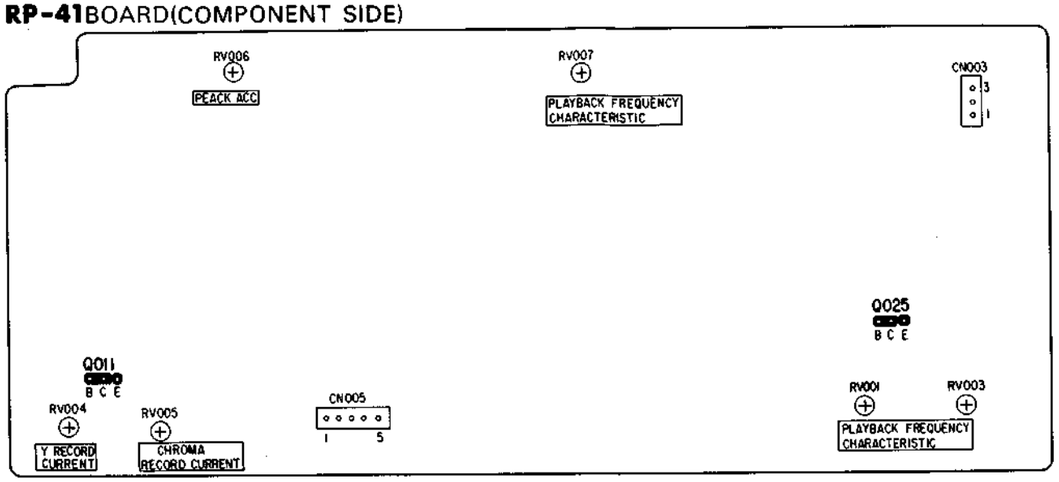
Mode	E-E
Signal	VHF TV broad cast signal
Measurement Equipment	Monitor TV
Adjustment Element	IF001
Specified Value	Snow noise disappears point

[Adjustment Method]

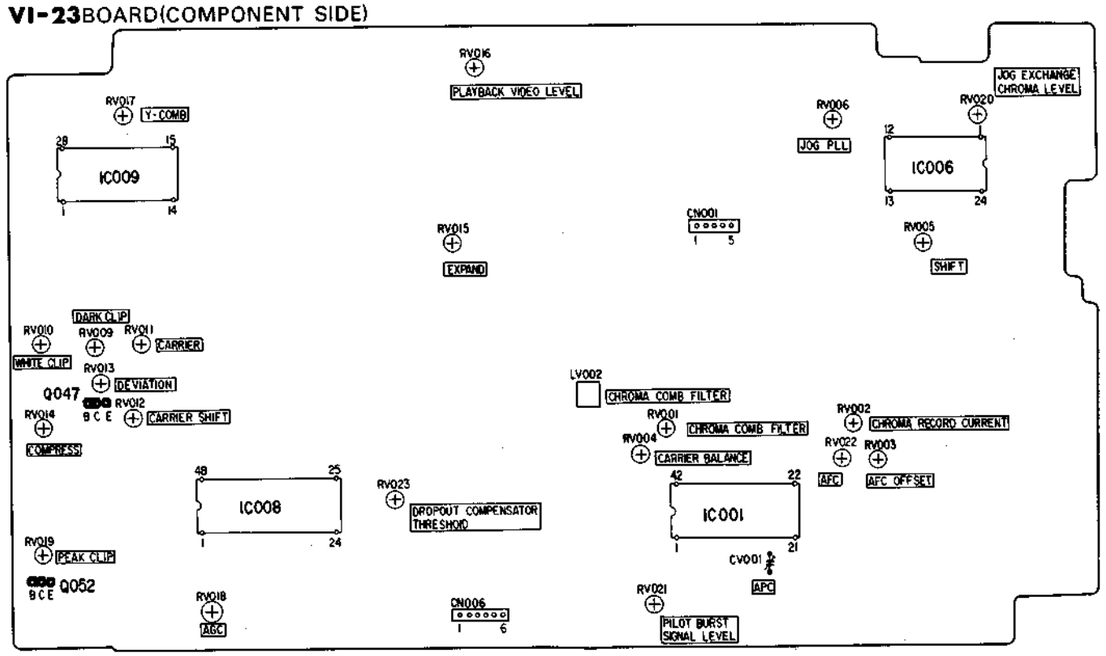
(1) Adjust the monitor TV for best contrast
(2) Adjust IF001 so that show noise is visible
(3) Turn IF001 in the opposite direction to that in (2) and set at the point where snow noise disappears.
(4) Receive each channel and confirm that there is no beat picture disturbance or snow noise.

5-7. ADJUSTMENT ELEMENT LOCATION

RP-41BOARD(COMPONENT SIDE)

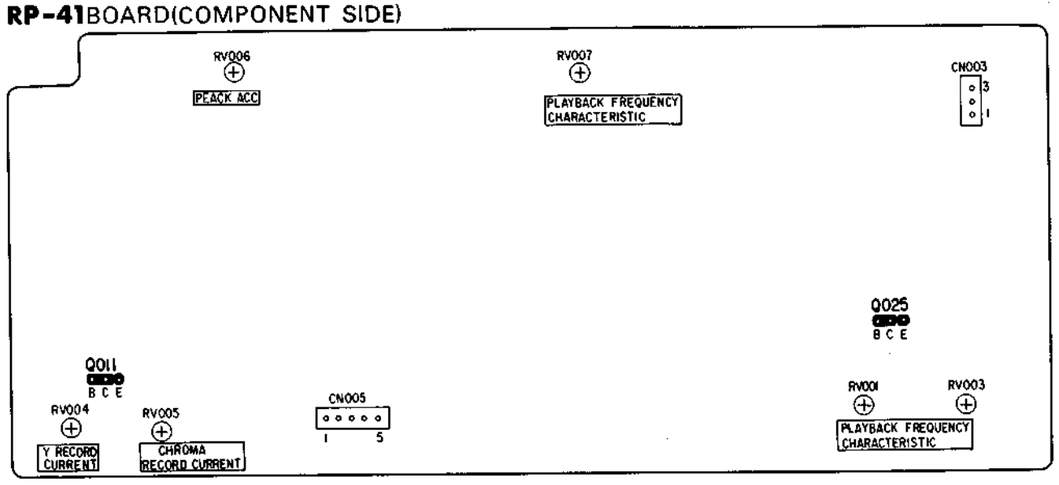


VI-23BOARD(COMPONENT SIDE)

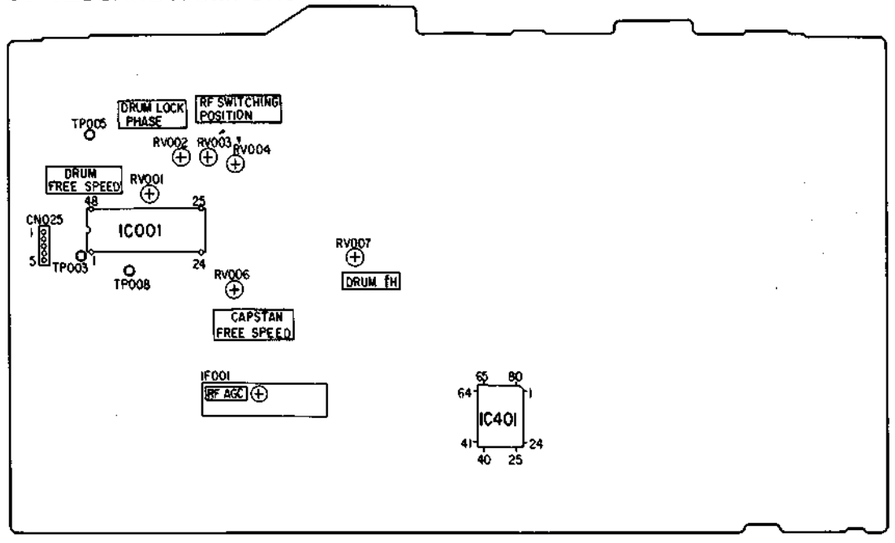


5-7. ADJUSTMENT ELEMENT LOCATION

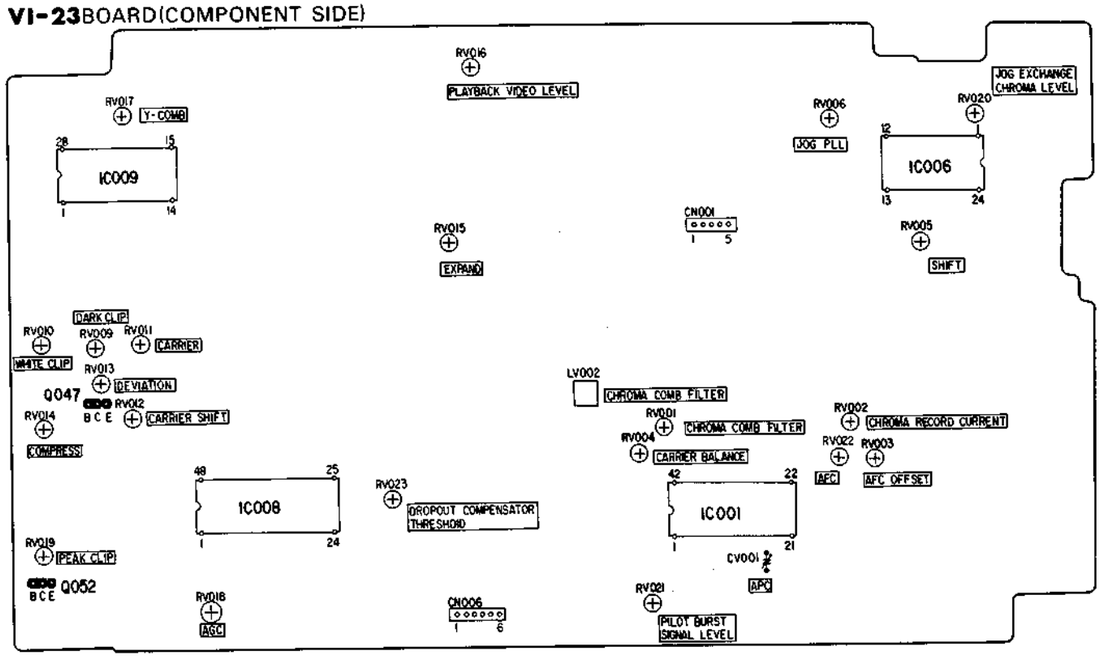
RP-41 BOARD (COMPONENT SIDE)



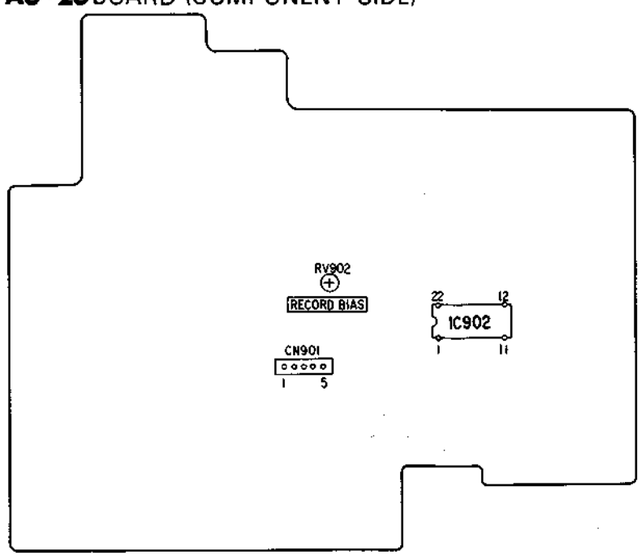
ST-12 BOARD (COMPONENT SIDE)



VI-23 BOARD (COMPONENT SIDE)



AU-26 BOARD (COMPONENT SIDE)



180 kr

RMT-146

SERVICE MANUAL

SPECIFICATIONS

Remote control system	Infrared control
Power requirements	3 V DC, 2 IEC designation R6 batteries (size AA)
Dimensions	45 × 20 × 175 mm (W/H/D) incl. projecting parts and controls
Weight	Approx. 105 g incl. batteries

REMOTE COMMANDER

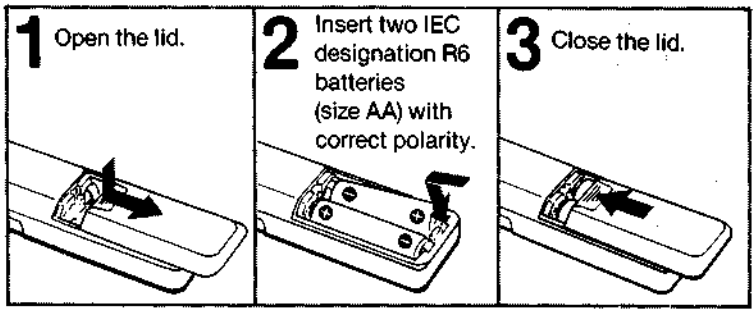
SONY®

ACC

1. REMOTE CONTROL OPEPATION

You can control almost all the functions of this video cassette recorder from your armchair using the supplied Remote Commander.

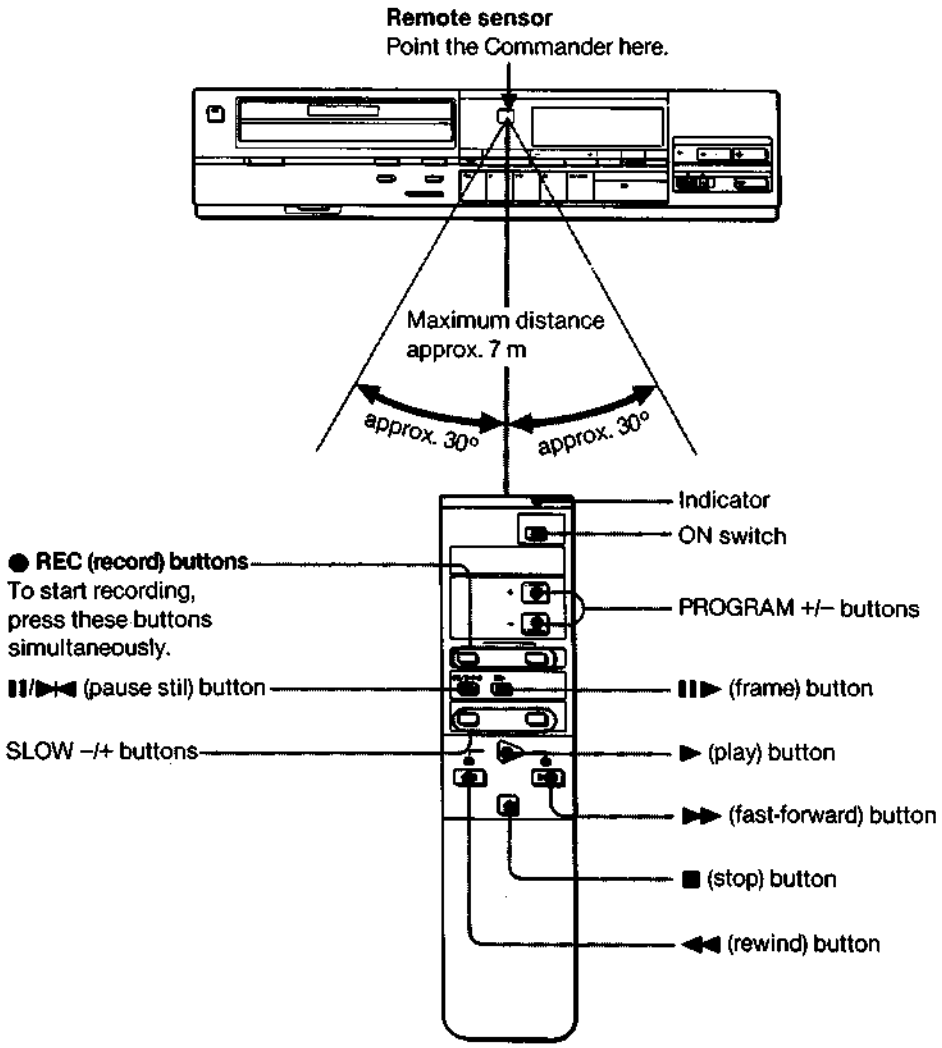
BATTERY INSERTION



Battery life
In normal operation, batteries will last for about six months.
When the batteries are exhausted, the indicator will not light when the buttons on the Commander are pressed.

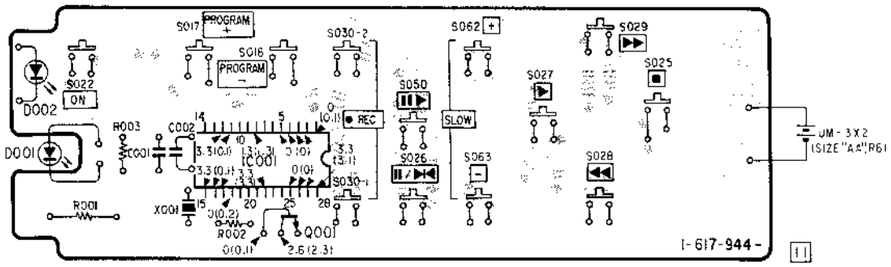
If the Remote Commander is not to be used for a long period of time, remove the batteries to avoid possible damage caused by battery leakage.

OPERATION



2. PRINTED WIRING BOARD

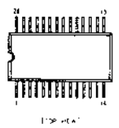
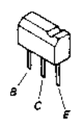
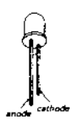
IR-A3 BOARD



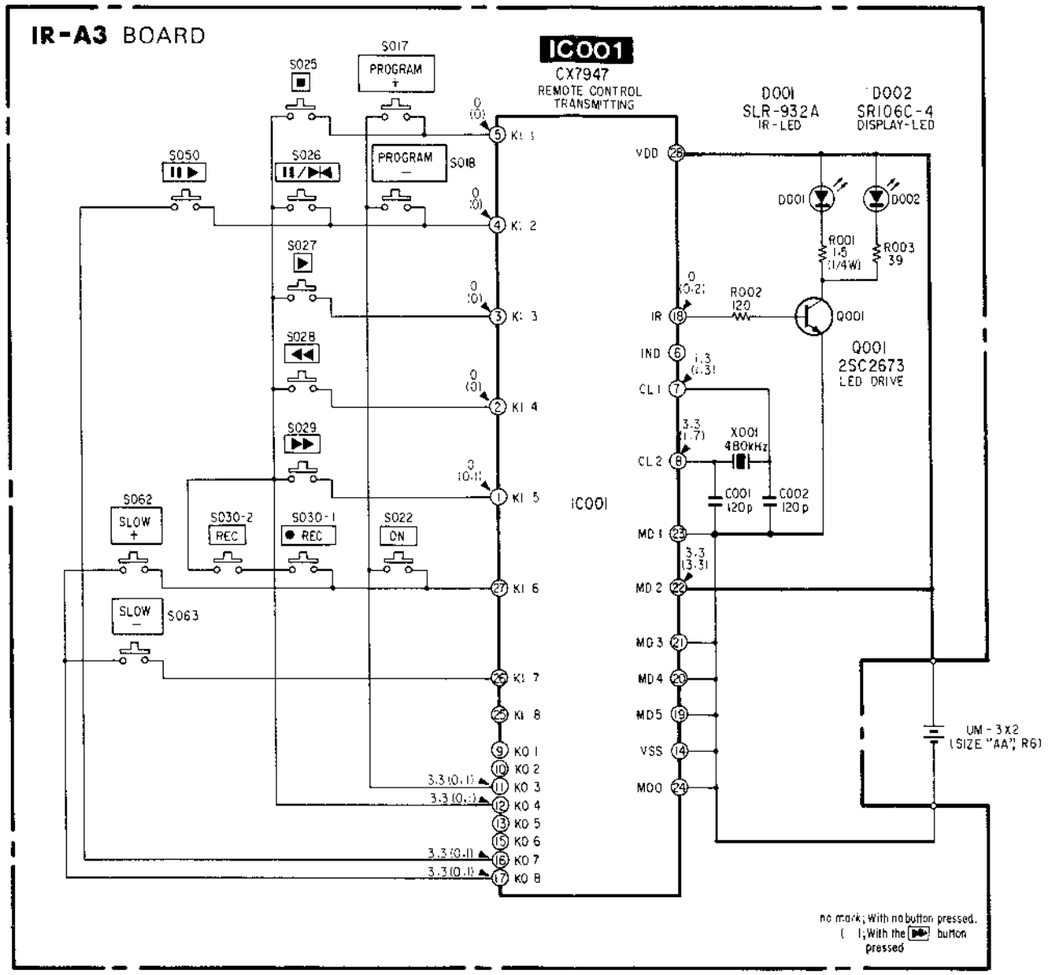
Note:

- ⊢ : indicates a lead wire mounted on the component side.
- : soldering side.
- : carbon pattern.
- . B+ Pattern.

SEMICONDUCTORS

CX7947	2SC2673	SLR-932A	SR106C
			

3. SCHEMATIC DIAGRAM



Note:

- All resistors are in ohms, 1/6W unless otherwise noted. kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics. and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- [ ] : panel designation.
- ——— : B + bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.

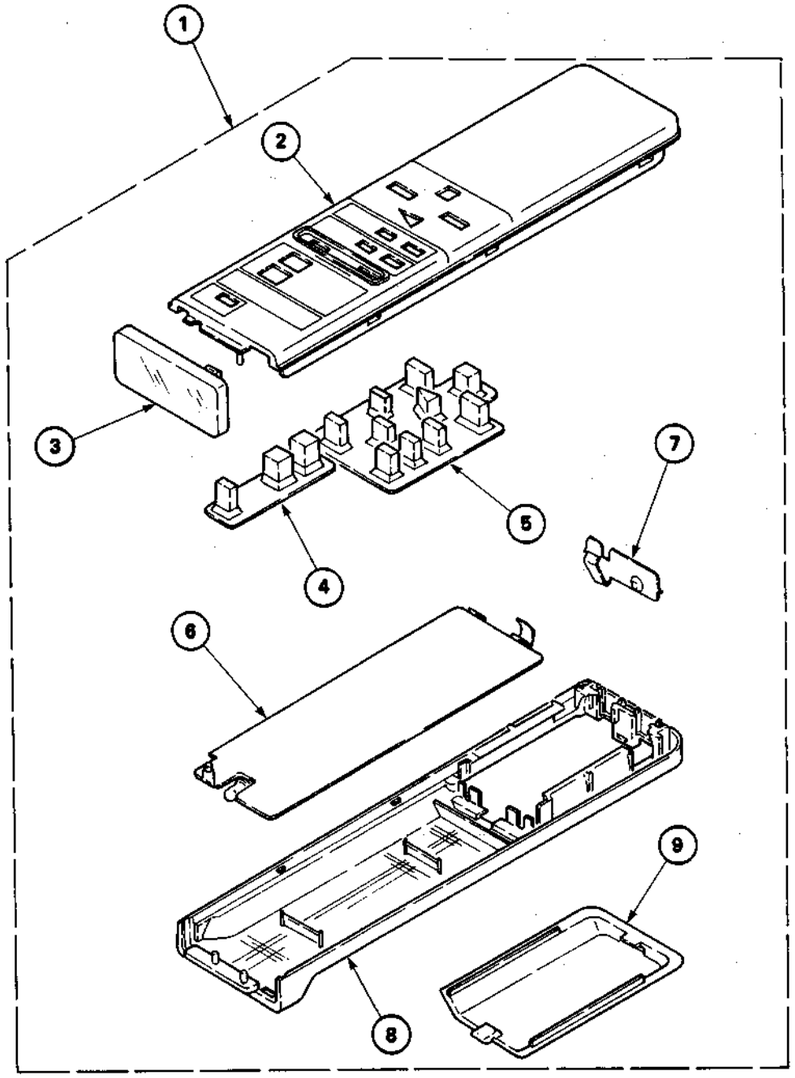
When indicating parts by reference number, please include the board name.

4. EXPLODED VIEW

NOTE:

- Itmes with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.



No.	Part No.	Description	Remark
1	A-6767-240-A	COMMANDER ASSY (RMT-146)	
2	X-2357-234-1	CASE ASSY, UPPER	
3	2-357-208-01	PANEL, FRONT, COMMANDER	
4	2-357-209-01	RUBBER (A), CONTACT	
5	2-357-261-01	RUBBER, CONTACT	
6	*1-617-944-11	IR-A3 BOARD	
7	4-350-925-00	TERMINAL (C), BATTERY	
8	2-357-207-01	CASE, LOWER	
9	2-387-105-11	COVER, BATTERY	

5. ELECTRICAL PARTS LIST

NOTE:

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS
- All resistors are in ohms
- F : nonflammable

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

CAPACITORS
- MF : μF, PF : μμF

COILS
- MMH : mH, UH : μH

Ref.No	Part No.	Description				Remark
	*1-617-944-11	IR-A3 BOARD **********				
	2-357-201-01	TERMINAL (A), BATTERY				
	2-357-202-01	TERMINAL (B), BATTERY				
		CAPACITOR				
C001	1-102-107-00	CERAMIC	120PF	10%	50V	
C002	1-102-107-00	CERAMIC	120PF	10%	50V	
		DIODE				
D001	8-719-912-39	DIODE SLR-932A				
D002	8-719-107-95	DIODE SR106C-4				
		IC				
IC001	8-759-902-22	IC CX-7947				
		TRANSISTOR				
Q001	8-729-967-32	TRANSISTOR 2SC2673-Q				
		RESISTOR				
R001	1-247-073-00	CARBON	1.5	5%	1/4W	
R002	1-247-809-00	CARBON	120	5%	1/6W	
R003	1-247-797-00	CARBON	39	5%	1/6W	
		CRYSTAL				
X001	1-527-476-00	OSCILLATOR, CERAMIC				

****

SL-F90
RMT-146

SONY
SERVICE MANUAL

E Model

November, 1986

SUPPLEMENT-1

File this Supplement With the Service Manual.

EC Model Addition

An EC model has been added to SL-F90.

This EC model was designed based on the SL-F90 E(Spanish) model.

The differences from the SL-F90 E(Spanish) model are in the tuner block and accessory block remote commander.

This Supplement-1 includes only the differences from the SL-F90 E(Spanish) model.

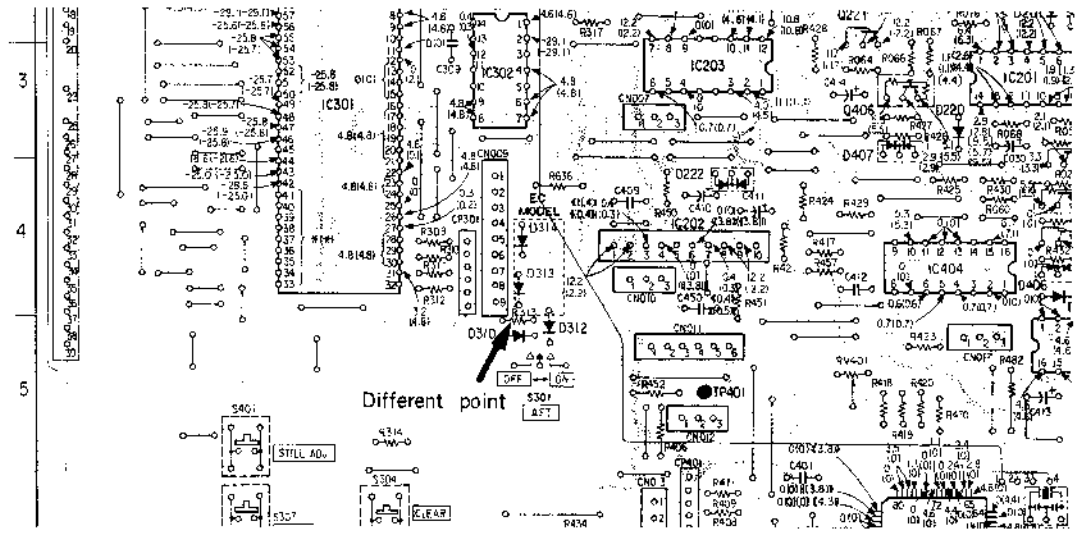
SPECIFICATIONS

E(Spanish) Model	EC Model
SYSTEM Video recording system: Rotary two-head helical scanning Video signal: CCIR standards, and PAL color Channel coverage: VHF: Western European channels E2-E12 UHF: Western European channels E21-E68 (Up to 30 programs can be preset) Aerial input: 75 ohms, asymmetrical aerial socket RF output signal: UHF channels E30 to E39 (variable) 75 ohm, unbalanced	**SYSTEM** Video recording system: Rotary two-head helical scanning Video signal: CCIR standards, and PAL color Channel coverage: VHF: Western European channels E2-U10 UHF: Western European channels E21-E69 (Up to 30 programs can be preset) Aerial input: 75 ohms, asymmetrical aerial socket RF output signal: UHF channels E30 to E39 (variable) 75 ohm, unbalanced
SUPPLIED ACCESSORIES 75 ohm coaxial cable for recorder to TV connection ..... 1 Screwdriver for RF channel adjustment ..... 1 Remote Commander RMT-146 with two IEC designation R6 batteries (size AA) ..... 1 Design and specifications are subject to change without notice.	**SUPPLIED ACCESSORIES** 75 ohm coaxial cable for recorder to TV connection ..... 1 Screwdriver for RF channel adjustment ..... 1 Remote Commander RMT-228 with two IEC designation R6 batteries (size AA) ..... 1 Design and specifications are subject to change without notice.

SCHEMATIC DIAGRAM AND PRINTED WIRING BOARDS

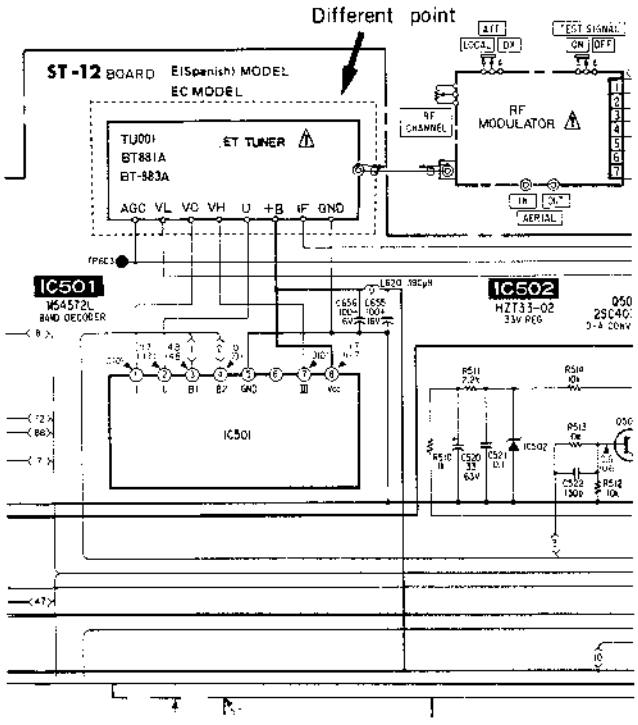
ST-12 (SYSTEM CONTROL/SERVO, TUNER, TIMER) PRINTED WIRING BOARD

Page 75

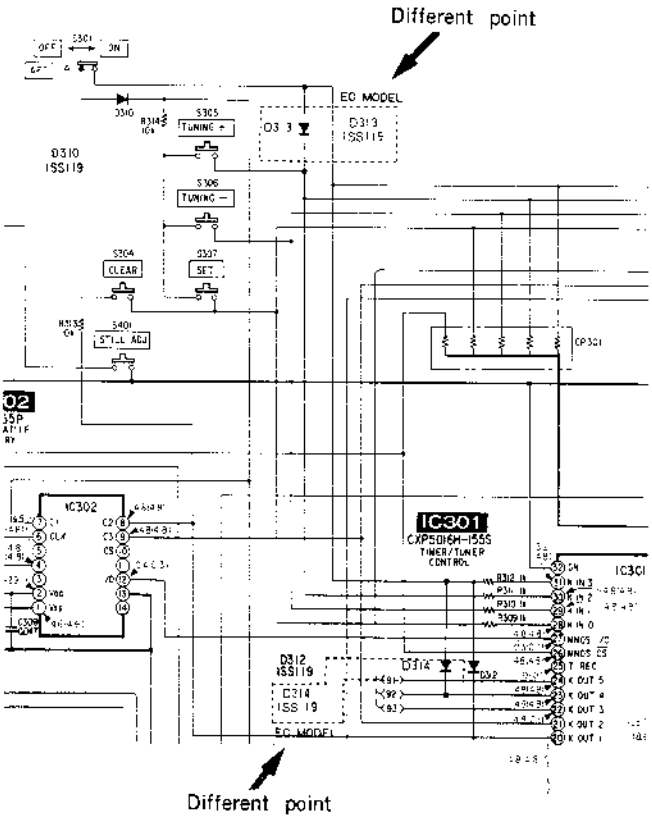


ST-12 (SYSTEM CONTROL/SERVO, TUNER, TIMER) SCHEMATIC DIAGRAM

Page 79



Page 82



EXPLODED VIEWS

NOTE:

- Itmes with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Page 102

5-2. TUNER, TIMER AND POWER ASSEMBLY

	E (Spanish) Model		EC Model	
No.	Part No.	Description	Part No.	Description
61	⚠1-463-584-11	TUNER, ET(BT-881A)	⚠1-463-577-11	TUNER, ET(BT-883A)
63	*A-6715-332-A	ST-12 BOARD, COMPLETE	*A-6715-340-A	ST-12 BOARD, COMPLETE

ELECTRICAL PARTS LIST

NOTE:

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS

- All resistors are in ohms
- F : nonflammable

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

CAPACITORS

- MF : μF, PF : μμF

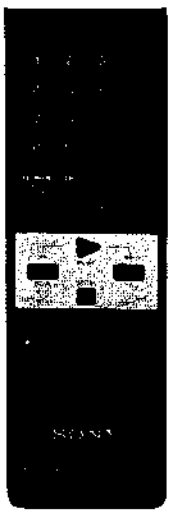
COILS

- MMH : mH, UH : μH

			E (Spanish) Model		EC Model	
Page	BOARD	Ref. No	Part No.	Description	Part No.	Description
119	ST-12	—	*A-6715-332-A	ST-12 BOARD, COMPLETE	*A-6715-340-A	ST-12 BOARD, COMPLETE
120		D313	——	——	8-719-911-19	DIODE ISS119
		D314	——	——	8-719-911-19	DIODE ISS119
123		TU001	⚠1-463-584-11	TUNER, ET(BT-881A)	⚠1-463-577-11	TUNER, ET(BT-883A)
125	ACCESSORIES AND PACKING MATERIALS	—	A-6767-240-A	COMMANDER ASSY (RMT-146)	A-6767-352-A	COMMANDER ASSY (RMT-228)
		—	3-701-625-00	BAG, POLYETHYLENE	3-701-628-00	BAG, POLYETHYLENE
		—	3-765-539-41	MANUAL, INSTRUCTION (English, Spanish)	3-765-539-51	MANUAL, INSTRUCTION (English, French, Dutch)

RMT-228

SERVICE MANUAL



SPECIFICATIONS

Remote Commander RMT-228

Remote control system
Infrared control

Power requirements
3 V DC, 2 IEC designation R6 batteries (size AA)

Dimensions 55 × 20 × 175 mm (W/H/D)
incl. projecting parts and controls

Weight Approx. 140 g incl. batteries

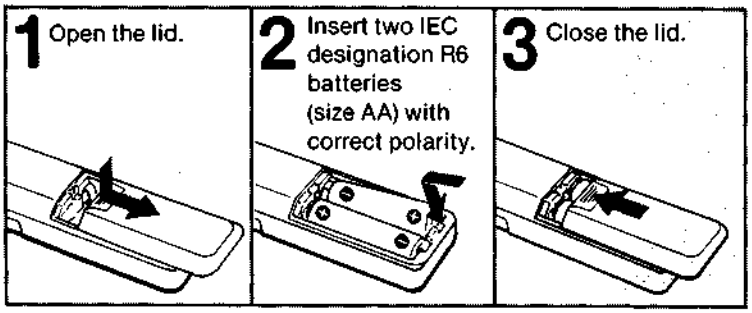
REMOTE COMMANDER

SONY®

1. REMOTE CONTROL OPERATION

You can control almost all the functions of this video cassette recorder from your armchair using the supplied Remote Commander.

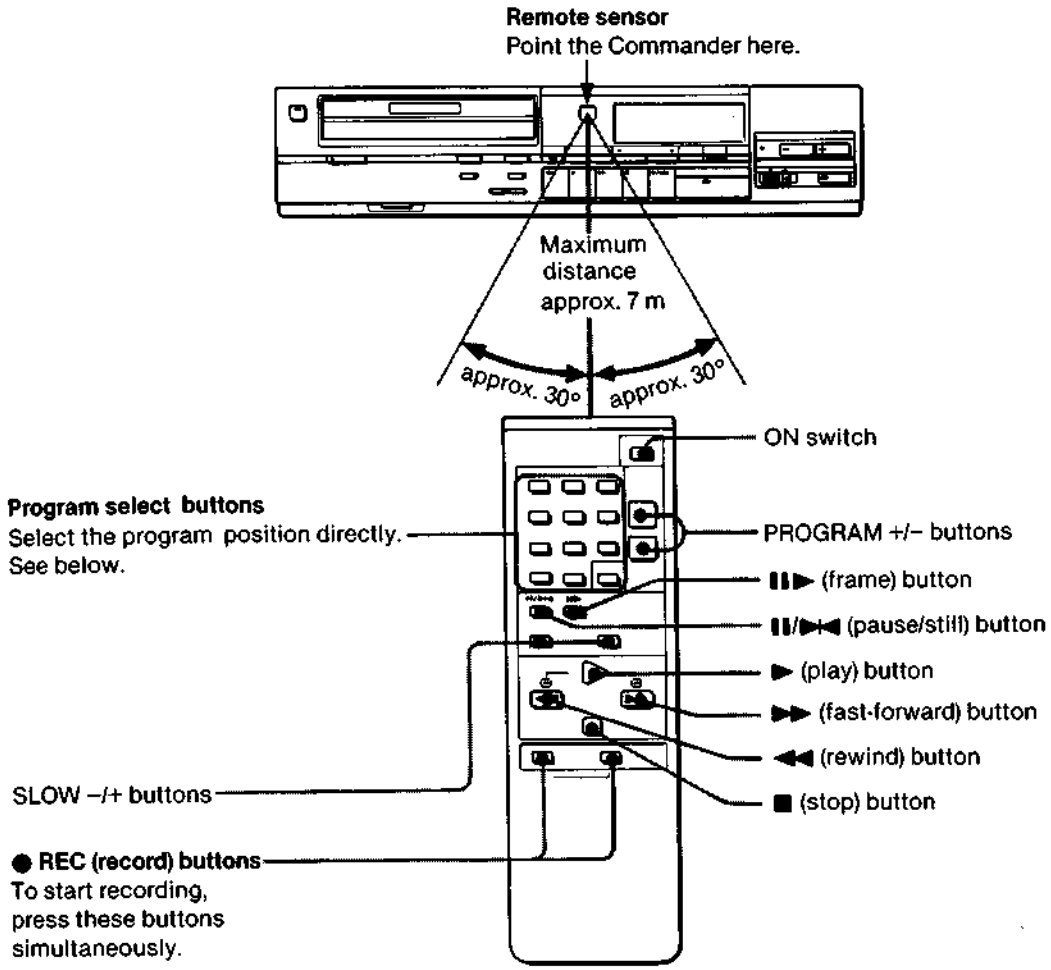
BATTERY INSERTION



Battery life
In normal operation, batteries will last for about six months.

If the Remote Commander is not to be used for a long period of time, remove the batteries to avoid possible damage caused by battery leakage.

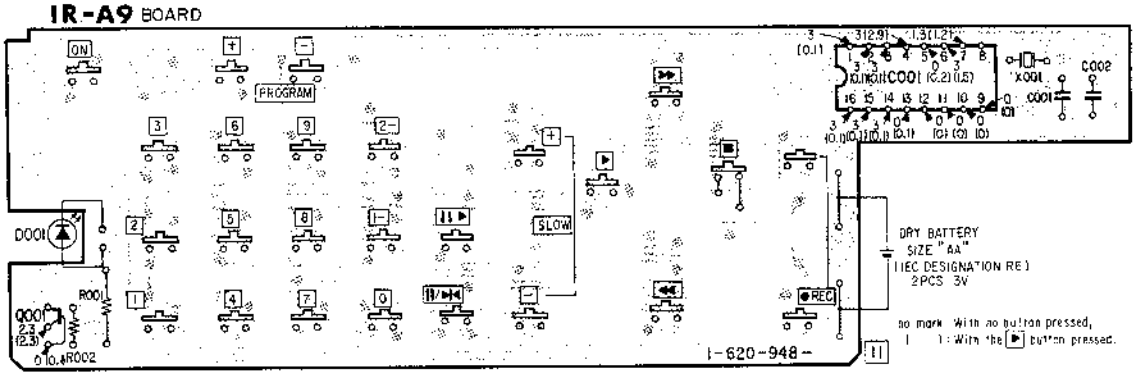
OPERATION



How to press the program select buttons
For programs 1 through 9, press the corresponding single-digit button.
For 10 through 19, press "1-" for the tens-digit and then the corresponding single-digit button.
For 20 through 29, press "2-" and then the corresponding single-digit button.
For 30, press "0".
• If you do not press a single-digit button within several seconds after pressing "1-" or "2-", the previous program position will be recalled.

2. PRINTED WIRING BOARD

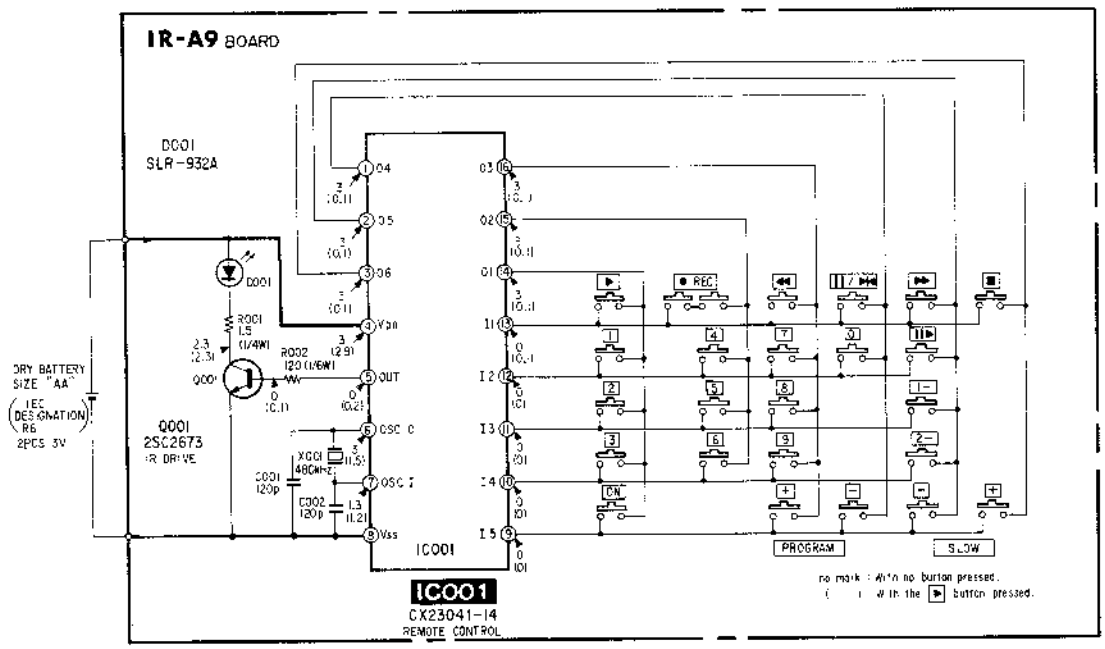
IR-A9 BOARD



Note:

- ○— : indicates a lead wire mounted on the component side.
- : soldering side.
- : carbon pattern.
- : B+ Pattern.

3. SCHEMATIC DIAGRAM

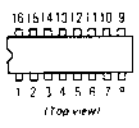


Note:

- All resistors are in ohms, 1/6W unless otherwise noted.
  kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics. and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : panel designation.
- : B + bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.

SEMICONDUCTORS

CX23041-14 **2SC2673** **SLR-932A**



4. EXPLODED VIEW

NOTE:

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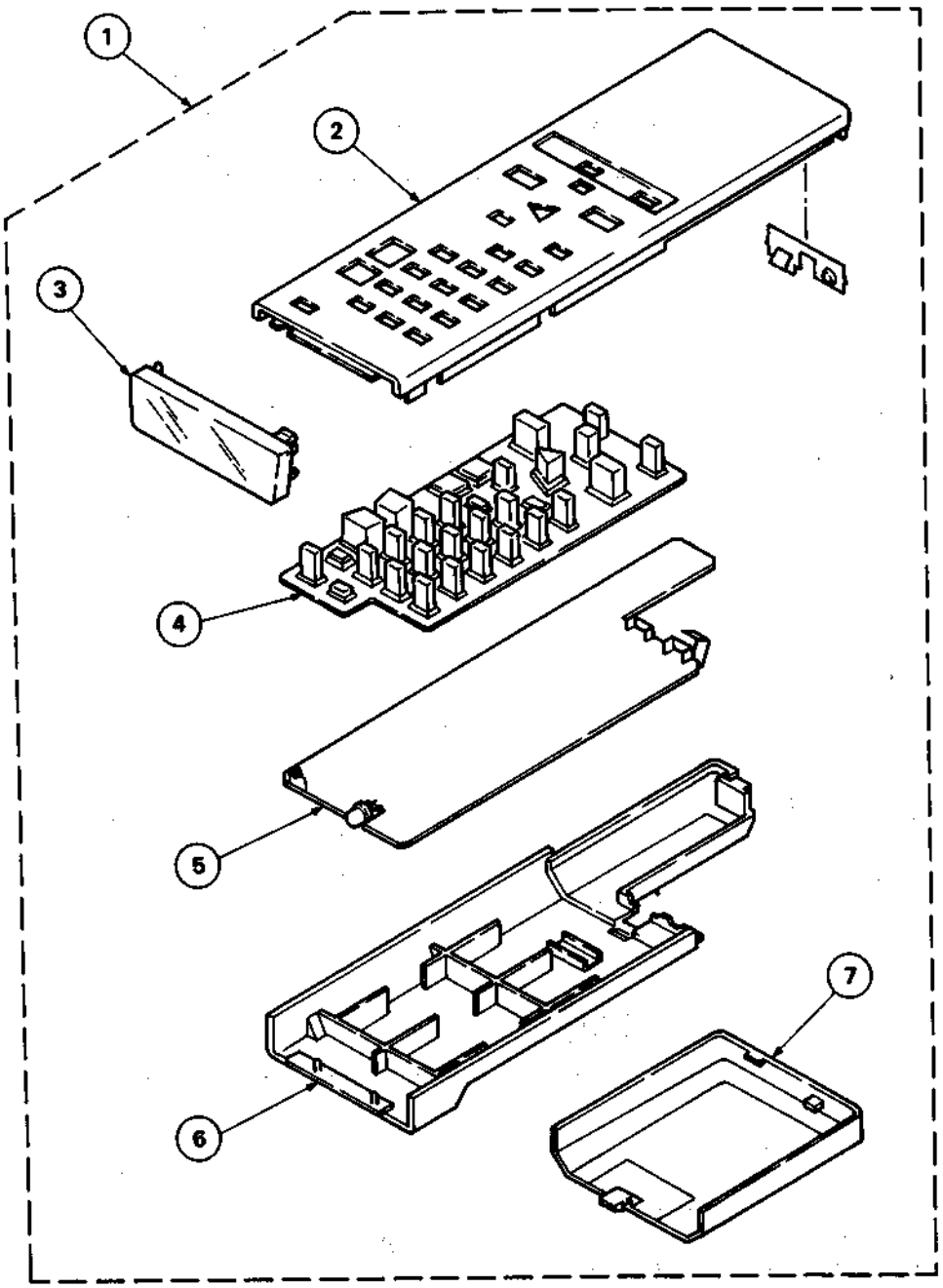

No.	Part No.	Description	Remark
1	A-6767-352-A	COMMANDER ASSY (RMT-228)	2-7
2	X-2357-244-1	CASE ASSY, UPPER	
3	2-387-133-01	PLATE, FROSTED	
4	2-357-284-01	RUBBER (J), CONTACT	
5	*1-620-948-11	IR-A9 BOARD	
6	2-357-248-01	CASE LOWER	
7	2-357-245-01	COVER, BATTERY	

5. ELECTRICAL PARTS LIST

NOTE:

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CAPACITORS

- MF : μF, PF : μμF

COILS

- MMH : mH, UH : μH

Ref.No	Part No.	Description				Remark
	*1-620-948-11	IR-A9 BOARD **********				
	2-387-103-01	TERMINAL (A), BATTERY				
	2-387-104-01	TERMINAL (B), BATTERY				
		CAPACITOR				
C001	1-102-107-00	CERAMIC	120PF	10%	50V	
C002	1-102-107-00	CERAMIC	120PF	10%	50V	
		DIODE				
D001	8-719-912-39	DIODE SLR-932A				
		IC				
IC001	8-759-938-10	IC CX-23041-14				
		TRANSISTOR				
Q001	8-729-967-32	TRANSISTOR 2SC2673-Q				
		RESISTOR				
R001	1-247-073-00	CARBON	1.5	5%	1/4W	
R002	1-247-809-00	CARBON	120	5%	1/6W	
		CRYSTAL				
X001	1-527-476-00	OSCILLATOR, CERAMIC				

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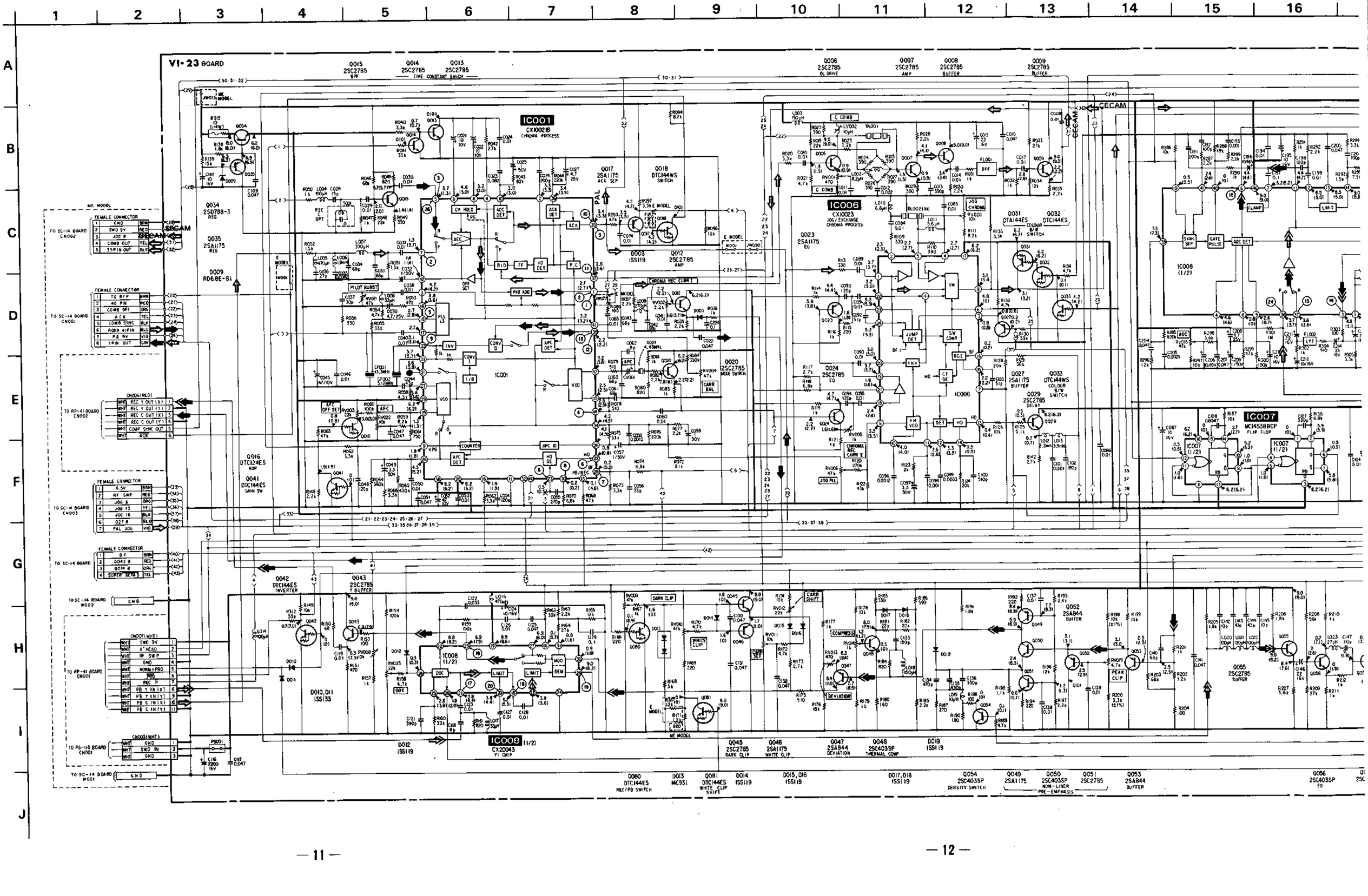
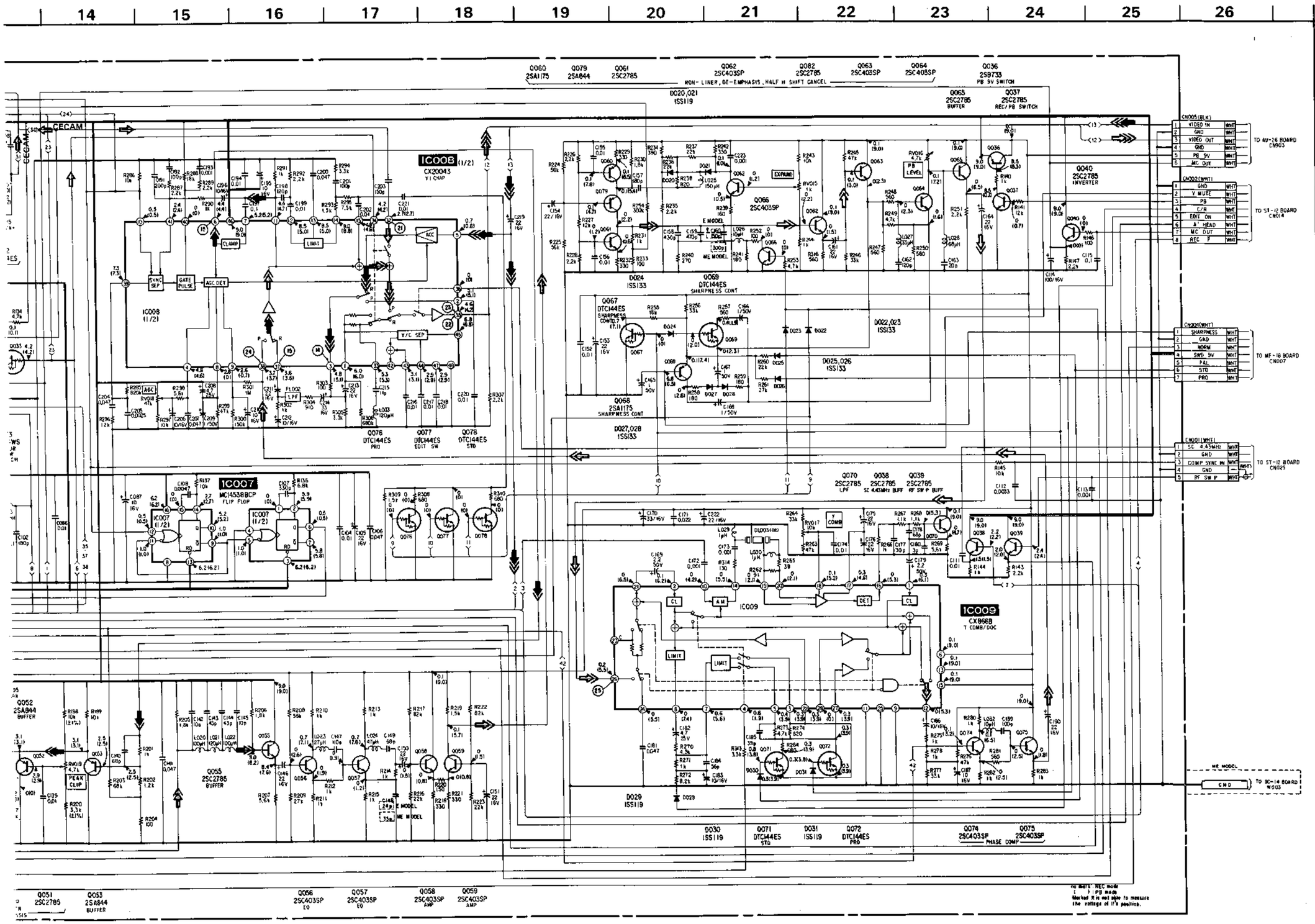

VI-23 BOARD
IC001
CX100218
CHROMA PROCESS
IC006
CX10023
JOG/EXCHANGE
CHROMA PROCESS
IC008
(1/2)
CX20043
Y/C CHIP
IC007
MC14538BCP
FLIP FLOP
Q001 2SC2785 BPF
Q002 2SC2785 TIME CONSTANT SWITCH
Q003 ISS119 AMP
Q004 2SC2785 OL DRIVE
Q005 2SA1175 AMP
Q006 2SC2785 BUFFER
Q007 2SC2785 BUFFER
Q008 2SC2785 BUFFER
Q009 2SC2785 BUFFER
Q010 2SC2785 ACK SEP
Q011 DTC144WS SWITCH
Q012 2SC2785 AMP
Q013 2SC2785 TIME CONSTANT SWITCH
Q014 2SC2785
Q015 2SC2785 BPF
Q016 DTC124ES NOR
Q017 2SA1175 ACK SEP
Q018 DTC144WS SWITCH
Q020 2SC2785 MUTE SWITCH
Q023 2SA1175 EQ
Q024 2SC2785 EQ
Q027 2SA1175 BUFFER
Q029 2SC2785 DELAY
Q031 DTA144ES COLOUR B/W SWITCH
Q032 DTC144ES
Q033 DTC144WS COLOUR B/W SWITCH
Q034 2SD788-3 REG
Q035 2SA1175 REG
Q041 DTC144ES GAIN SW
Q042 DTC144ES INVERTER
Q043 2SC2785 Y BUFFER
Q045 2SC2785 DARK CLIP
Q046 2SA1175 WHITE CLIP
Q047 2SA844 DEVIATION
Q048 2SC4035P THERMAL COMP
Q049 2SA1175
Q050 2SC4035P NON-LINER PRE-EMPHASIS
Q051 2SC2785
Q052 2SA844 BUFFER
Q053 2SA844 BUFFER
Q054 2SC4035P DENSITY SWITCH
Q055 2SC2785 BUFFER
Q056 2SC4035P EQ
Q080 DTC144ES REC/PB SWITCH
Q081 DTC144ES WHITE CLIP SHIFT
D001 ISS133
D002 6.2(6.2)
D003 ISS119
D010,011 ISS133
D012 ISS119
D013 MC931
D014 ISS119
D015,016 ISS119
D017,018 ISS119
D019 ISS119
SECAM
NTSC
PAL
FEMALE CONNECTOR
TO SC-14 BOARD CN002
TO SC-14 BOARD CN003
TO SC-14 BOARD CN004
TO SC-14 BOARD W002
TO AP-41 BOARD CN001
TO AP-41 BOARD CN002
TO PS-115 BOARD CN001
TO SC-14 BOARD W001
CN001(WHT)
CN002(RED)
CN003(WHT)
CN004(WHT)
PS001
C COMB
BPF
JOG CHROMA
COLOUR B/W SWITCH
PEAK CLIP
DEVIATION
COMPRESS
CARR SHIFT
WHITE CLIP
DARK CLIP
CLAMP
LIMIT
SYNC SEP
GATE PULSE
ADC DET
ACC DET
ACK DET
APC DET
CH HOLD
PHB ADD
PILOT BURST
OFF SET
CARR BAL
JUMP DET
SW CONT
JOG PLL
CHROMA REC CURR
REC/PB SWITCH
WHITE CLIP SHIFT
DENSITY SWITCH
NON-LINER PRE-EMPHASIS
FLIP FLOP
DELAY
BUFFER
EQ
DEVIATION
THERMAL COMP
DARK CLIP
INVERTER
Y BUFFER
REC/PB SWITCH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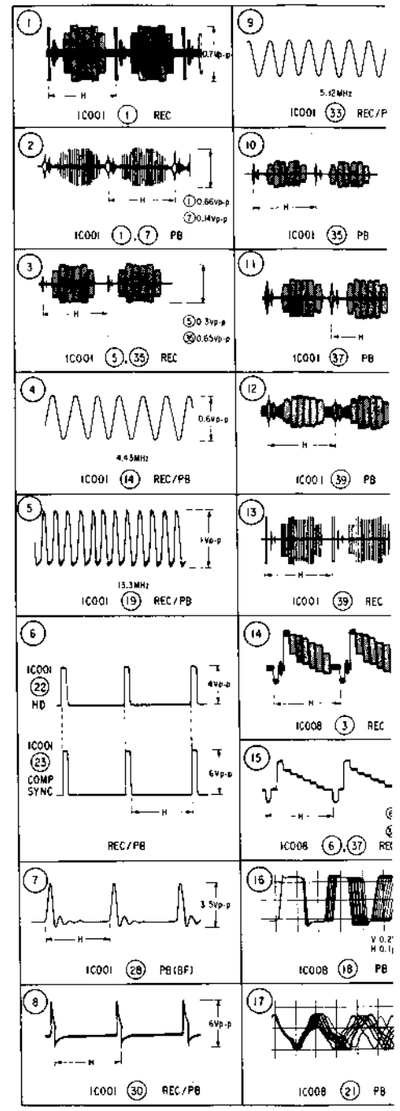
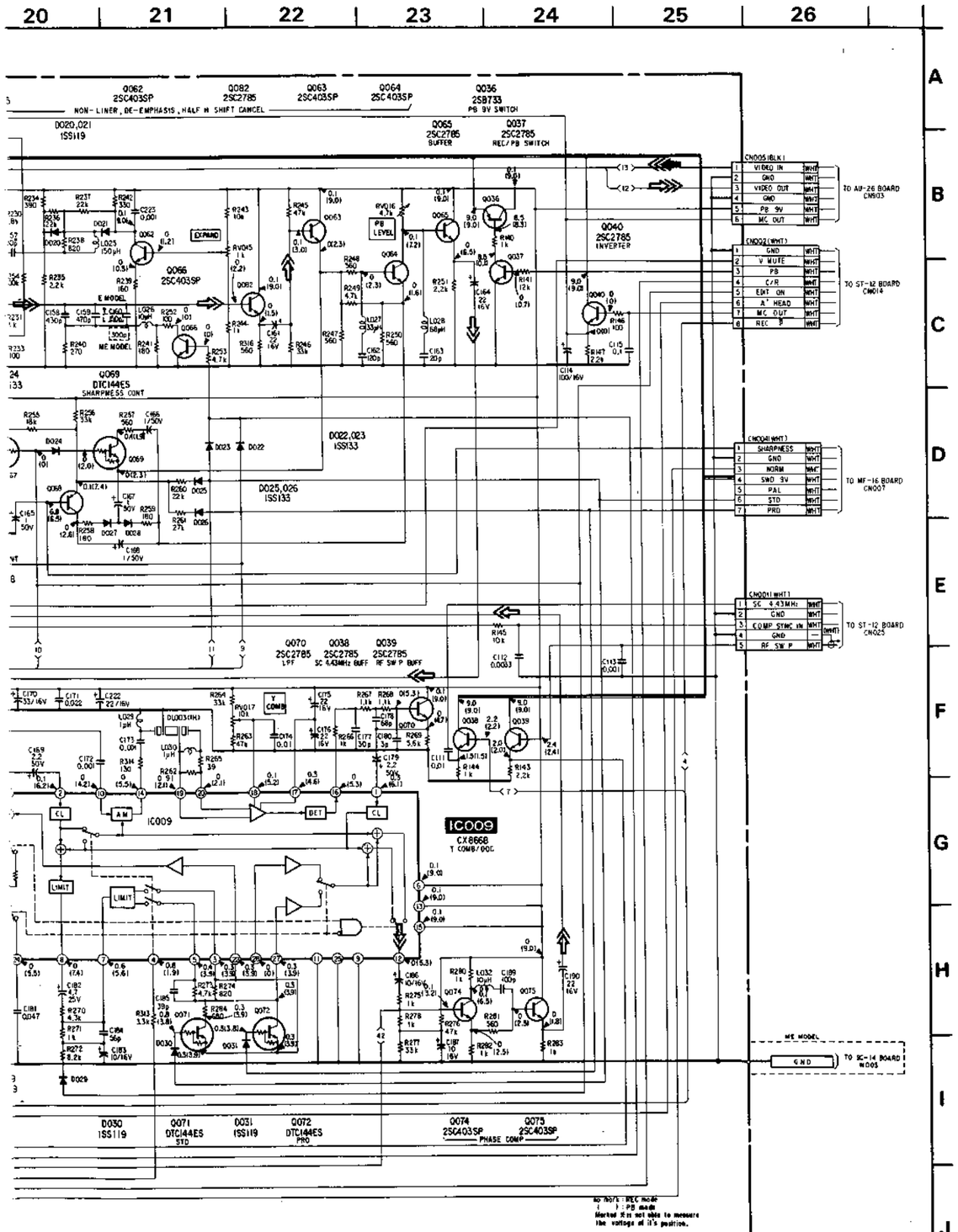
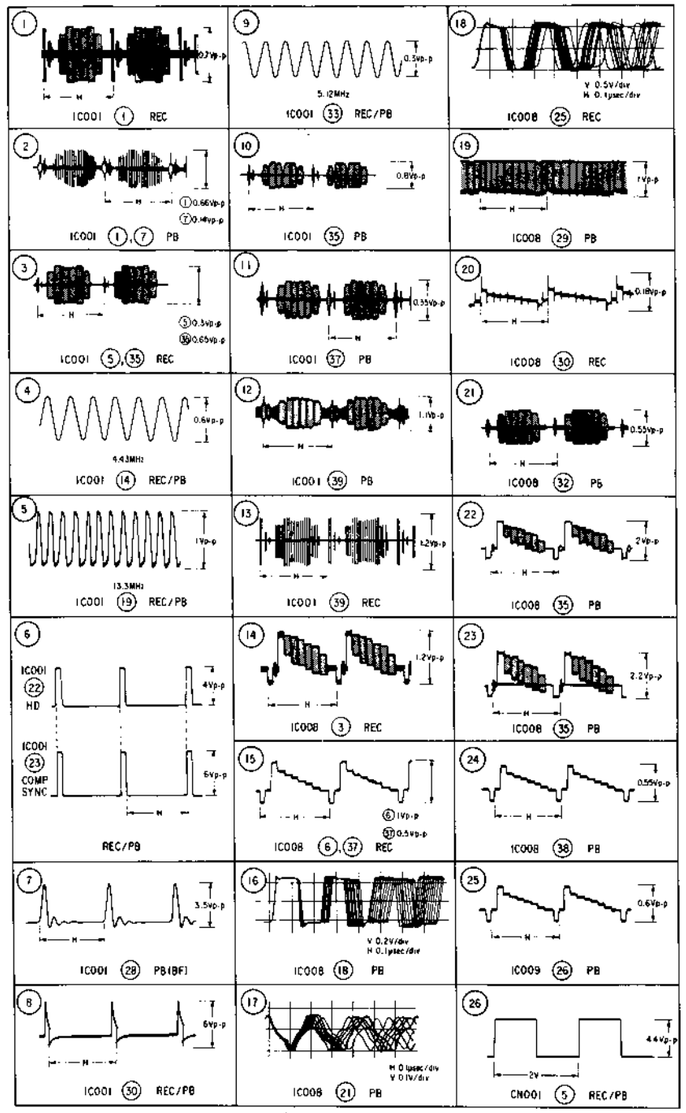
IC008 (1/2) CX20043 YI CHIP
IC007 MC14538BCP FLIP FLOP
IC009 CX9668 Y COMB/DOC
Q060 2SA1175
Q079 2SA844
Q061 2SC2785
Q062 2SC4403SP
Q082 2SC2785
Q063 2SC4403SP
Q064 2SC4403SP
Q036 2SB733
Q065 2SC2785 BUFFER
Q037 2SC2785 REC/PB SWITCH
Q040 2SC2785 INVERTER
Q066 2SC4403SP
Q067 DTC144ES
Q068 2SA1175
Q069 DTC144ES
Q076 DTC144ES PRO
Q077 DTC144ES EDIT SW
Q078 DTC144ES STD
Q052 2SA844 BUFFER
Q055 2SC2785 BUFFER
Q051 2SC2785
Q053 2SA844 BUFFER
Q056 2SC4403SP EQ
Q057 2SC4403SP EQ
Q058 2SC4403SP AMP
Q059 2SC4403SP AMP
Q070 2SC2785 LPF
Q038 2SC2785 SC 4.43MHz BUFF
Q039 2SC2785 RF SW P BUFF
Q071 DTC144ES STD
Q072 DTC144ES PRO
Q074 2SC4403SP
Q075 2SC4403SP PHASE COMP
D020,021 1SS119
D022,023 1SS133
D024 1SS133
D025,026 1SS133
D027,028 1SS133
D029 1SS119
D030 1SS119
D031 1SS119
CECAM
CLAMP
LIMIT
ACC
SYNC SEP
GATE PULSE
AGC DET
Y/C SEP
LPF
AGC
PEAK CLIP
AM
DET
CL
EXPAND
PB LEVEL
E MODEL
ME MODEL
CN005(BLK)
1 VIDEO IN
2 GND
3 VIDEO OUT
4 GND
5 PB 9V
6 MIC OUT
TO AV-26 BOARD CN903
CN002(WHT)
1 GND
2 V MUTE
3 PB
4 C/R
5 EDIT ON
6 F HEAD
7 MIC OUT
8 REC F
TO ST-12 BOARD CN014
CN004(WHT)
1 SHARPNESS
2 GND
3 WOBW
4 SW5 9V
5 PAL
6 STD
7 PRO
TO MF-16 BOARD CN007
CN001(WHT)
1 SC 4.43MHz
2 GND
3 COMP SYNC IN
4 GND
5 RF SW P
TO ST-12 BOARD CN025
ME MODEL
GND
TO SC-16 BOARD CN003
no mark : REC mode
( ) : PB mode
Marked X is not able to measure the voltage of it's position.

VI-23 BOARD


1 IC001 (1) REC
2 IC001 (1),(7) PB
3 IC001 (5),(35) REC
4 IC001 (14) REC/PB
5 IC001 (19) REC/PB
6 IC001 (22) HD, IC001 (23) COMP SYNC
REC/PB
7 IC001 (28) PB(BF)
8 IC001 (30) REC/PB
9 IC001 (33) REC/P
10 IC001 (35) PB
11 IC001 (37) PB
12 IC001 (39) PB
13 IC001 (39) REC
14 IC008 (3) REC
15 IC008 (6),(37) REC
16 IC008 (18) PB
17 IC008 (21) PB



VI-23 BOARD



Note:

- All resistors are in ohms, 1/4W unless otherwise noted. kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics. and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- △ : internal component.
- : adjustment for repair.
- : B + bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.

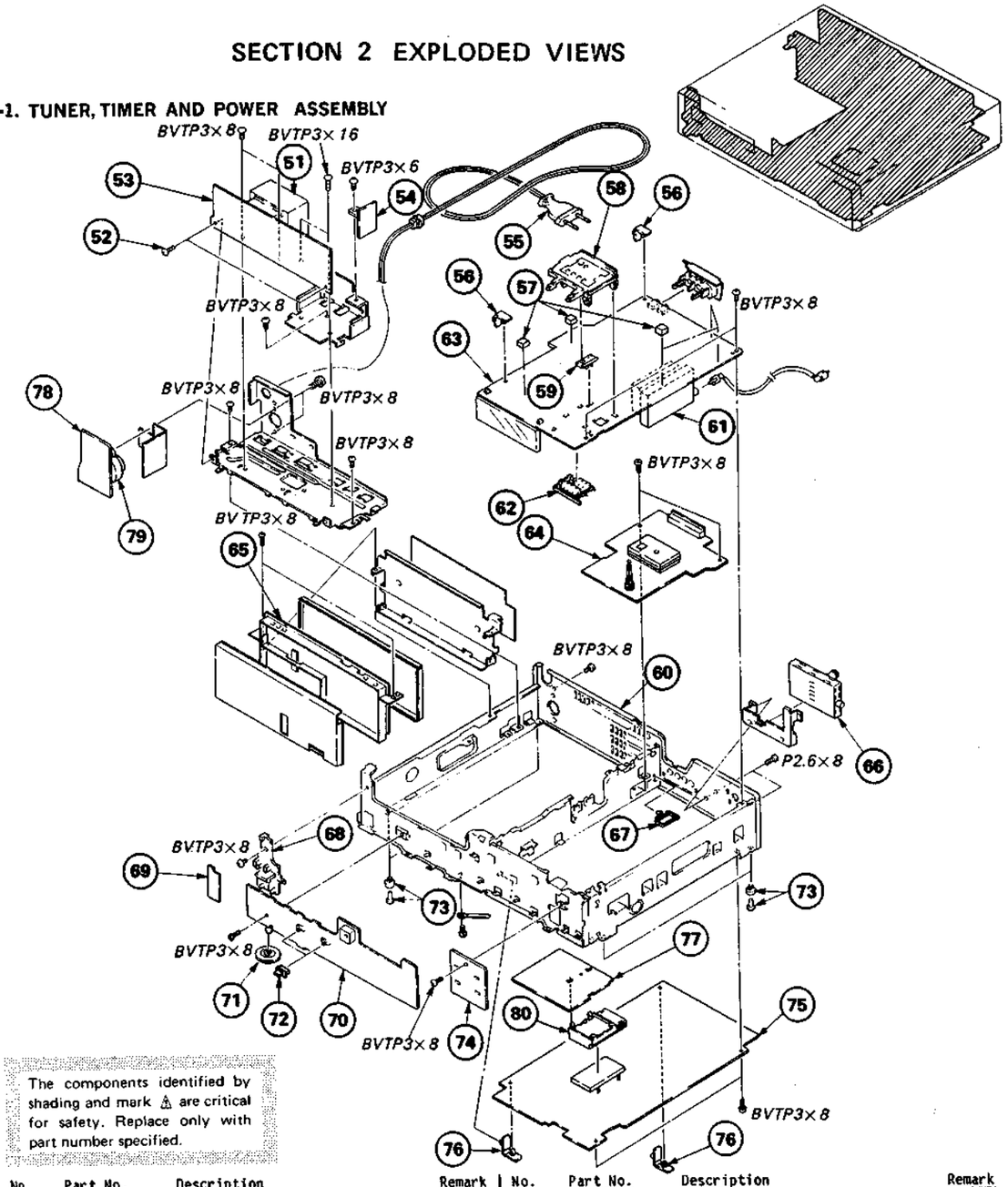
When indicating parts by reference number, please include the board name.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

- **Signal path**
  - : REC Y Signal
  - : PB Y Signal
  - : REC CHROMA Signal
  - : PB CHROMA Signal
  - : REC Y/CHROMA Signal
  - : PB Y/CHROMA Signal

SECTION 2 EXPLODED VIEWS

2-1. TUNER, TIMER AND POWER ASSEMBLY



The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

No.	Part No.	Description	Remark
51	⚠1-448-667-11	TRANSFORMER, POWER	
52	3-693-912-11	SCREW (3X8), TAPPING	
53	*1-620-054-11	PS-115 BOARD	
54	*1-620-200-11	DR-38 BOARD	
55	⚠1-551-908-61	CORD, POWER, EULO PLUG	
56	*3-710-565-01	HINGE, PC BOARD	
57	9-911-842-XX	RUBBER (B)	
58	X-3710-520-1	COVER ASSY, PRESET	
59	3-693-842-01	BUTTON, AFT	
60	*3-710-596-11	PLATE (P), JACK	
61	⚠1-463-584-11	TUNER, ET (BT-881A) (TU001)	
62	*X-3693-812-1	SHAFT ASSY, PRESET	
63	*A-6715-332-A	ST-12 BOARD, COMPLETE	
64	*A-6713-266-A	AU-26 BOARD, COMPLETE	
65	*A-6711-766-A	RP-41 BOARD, COMPLETE	
66	1-464-690-11	MODULATOR, RF (RFU-857)	
67	*3-695-074-01	CLAMP, WIRE	
68	3-710-533-01	HOLDER, JACK	
69	*1-620-051-11	MF-15 BOARD	
70	*1-620-052-12	MF-16 BOARD	
71	3-710-584-01	KNOB, SHARPNESS	
72	3-684-325-01	BUTTON, SLIDE	
73	3-670-155-11	LEG	
74	*1-620-053-11	MF-17 BOARD	
75	*A-6711-767-A	VI-23 BOARD, COMPLETE	
76	*3-701-832-00	HINGE, CIRCUIT BOARD	
77	*1-626-442-11	SC-14 BOARD	
78	*1-620-055-22	VS-11 BOARD	
79	⚠1-552-304-11	SELECTOR, VOLTAGE S90S (INDONESIA MODEL)	
80	3-716-558-01	HOLDER, SC-14 BOARD	

SECTION 3
ELECTRICAL PARTS LIST

NOTE:

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS
- All resistors are in ohms
- F : nonflammable

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

CAPACITORS
- MF : μF, PF : μμF

COILS
- MMH : mH, UH : μH

SL-F90 (E model)						SL-F90 (ME model)					
Ref.No.	Part No.	Description				Ref.No.	Part No.	Description			
C148	1-102-515-00	CERAMIC	24PF	5%	50V	C148	1-102-518-00	CERAMIC	33PF	5%	50V
C160	1-101-361-00	CERAMIC	150PF	5%	50V	C160	1-102-981-00	CERAMIC	300PF	5%	50V
JW013	NO MOUNT					JW013	1-535-143-00	LEAD, JUMPER			
JW077	1-535-143-00	LEAD JUMPER				JW077	NO MOUNT				
JW089	1-535-143-00	LEAD JUMPER				JW089	NO MOUNT				
JW090	1-535-143-00	LEAD JUMPER				JW090	NO MOUNT				
R171	1-247-833-00	CARBON	1.2K	5%	1/6W	R171	1-249-416-00	CARBON	820	5%	1/6W
R317	1-247-833-00	CARBON	1.2K	5%	1/6W	R317	NO MOUNT				

Ref.No	Part No.	Description				Remark
	*1-626-442-11	SC-14 BOARD				
		**********				
		CAPACITOR				
C001	1-101-004-61	CERAMIC	0.01MF		50V	
C002	1-102-516-61	CERAMIC	27PF	5%	50V	
C003	1-101-004-61	CERAMIC	0.01MF		50V	
C004	1-102-978-61	CERAMIC	220PF	5%	50V	
C005	1-101-004-61	CERAMIC	0.01MF		50V	
C006	1-101-004-61	CERAMIC	0.01MF		50V	
C007	1-123-306-51	ELECT	47MF	20%	10V	
C008	1-101-004-61	CERAMIC	0.01MF		50V	
C009	1-123-328-51	ELECT	4.7MF	20%	25V	
C010	1-123-306-51	ELECT	47MF	20%	10V	
C011	1-130-488-51	MYLAR	0.027MF	5%	50V	
C012	1-101-004-61	CERAMIC	0.01MF		50V	
C013	1-101-004-61	CERAMIC	0.01MF		50V	
C014	1-101-004-61	CERAMIC	0.01MF		50V	
C015	1-101-004-61	CERAMIC	0.01MF		50V	
C016	1-101-006-61	CERAMIC	0.047MF		50V	
C017	1-101-004-61	CERAMIC	0.01MF		50V	
C018	1-101-006-61	CERAMIC	0.047MF		50V	
C019	1-102-118-61	CERAMIC	0.0012M	10%	50V	
C020	1-102-516-61	CERAMIC	27PF	5%	50V	
C021	1-102-523-61	CERAMIC	56PF	5%	50V	
C022	1-123-306-51	ELECT	47MF	20%	10V	
C023	1-101-004-61	CERAMIC	0.01MF		50V	
C024	1-123-319-51	ELECT	47MF	20%	16V	
C025	1-101-004-61	CERAMIC	0.01MF		50V	
C026	1-101-004-61	CERAMIC	0.01MF		50V	

Ref.No	Part No.	Description	Remark
		FILTER	
CF001	1-527-998-11	FILTER, CERAMIC	
		CONNECTOR	
CN001	*1-560-896-11	PIN, CONNECTOR 8P	
CN002	*1-560-893-11	PIN, CONNECTOR 5P	
CN003	*1-560-895-11	PIN, CONNECTOR 7P	
CN004	*1-560-892-11	PIN, CONNECTOR 4P	
		DIODE	
D001	8-719-911-19	DIODE 1SS119	
D002	8-719-911-19	DIODE 1SS119	
D003	8-719-911-19	DIODE 1SS119	
D004	8-719-911-19	DIODE 1SS119	
D005	8-719-911-19	DIODE 1SS119	
D006	8-719-911-19	DIODE 1SS119	
D007	8-719-911-19	DIODE 1SS119	
D008	8-719-911-19	DIODE 1SS119	
		IC	
IC001	8-759-904-95	IC BA7007	
IC002	8-759-208-94	IC CX-894	
IC003	8-752-006-10	IC CX20061	
IC004	8-759-909-20	IC BA634	
		COIL	
L001	1-408-608-11	INDUCTOR 27UH	
L002	1-408-613-11	INDUCTOR 68UH	

Ref.No	P
LV001	1
LV002	1
LV003	1
Q001	8
Q002	8
Q003	8
Q004	8
Q005	8
Q006	8
Q007	8
Q008	8
Q009	8
Q010	8
Q011	8
Q012	8
Q013	8
R001	1
R002	1
R003	1
R004	1
R005	1
R006	1
R007	1
R008	1
R009	1
R010	1
R011	1
R012	1
R013	1
R014	1
R015	1
R016	1
R017	1
R018	1
R019	1
R020	1
R021	1
R022	1
R023	1
R024	1
R025	1
R026	1
R027	1
R028	1
R029	1
R030	1
R031	1
R032	1
R033	1
R034	1
R035	1
R036	1
R037	1
R038	1
RV001	1

SECTION 3
TRICAL PARTS LIST

standardization, replacements
arts list may be different from
specified in the diagrams or
onents used on the set.

able and adjustable resistors
aracteristic curve B, unless
noted.

STORS
ors are in ohms
ammable

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

CAPACITORS
- MF : μF, PF : μμF

COILS
- MMH : mH, UH : μH

SL-F90 (ME model)

Ref.No.	Part No.	Description			
C148	1-102-518-00	CERAMIC	33PF	5%	50V
C160	1-102-981-00	CERAMIC	300PF	5%	50V
JW013	1-535-143-00	LEAD, JUMPER			
JW077	NO MOUNT				
JW089	NO MOUNT				
JW090	NO MOUNT				
R171	1-249-416-00	CARBON	820	5%	1/6W
R317	NO MOUNT				

Remark	Ref.No	Part No.	Description	Remark
			FILTER	
	CF001	1-527-998-11	FILTER, CERAMIC	
			CONNECTOR	
	CN001	*1-560-896-11	PIN, CONNECTOR 8P	
	CN002	*1-560-893-11	PIN, CONNECTOR 5P	
	CN003	*1-560-895-11	PIN, CONNECTOR 7P	
	CN004	*1-560-892-11	PIN, CONNECTOR 4P	
			DIODE	
	D001	8-719-911-19	DIODE 1SS119	
	D002	8-719-911-19	DIODE 1SS119	
	D003	8-719-911-19	DIODE 1SS119	
	D004	8-719-911-19	DIODE 1SS119	
	D005	8-719-911-19	DIODE 1SS119	
	D006	8-719-911-19	DIODE 1SS119	
	D007	8-719-911-19	DIODE 1SS119	
	D008	8-719-911-19	DIODE 1SS119	
			IC	
	IC001	8-759-904-95	IC BA7007	
	IC002	8-759-208-94	IC CX-894	
	IC003	8-752-006-10	IC CX20061	
	IC004	8-759-909-20	IC BA634	
			COIL	
	L001	1-408-608-11	INDUCTOR 27UH	
	L002	1-408-613-11	INDUCTOR 68UH	

Ref.No	Part No.	Description			
		VARIABLE COIL			
LV001	1-408-532-11	COIL, VARIABLE 47UH			
LV002	1-407-291-21	INDUCTOR 15MMH			
LV003	1-408-513-11	COIL (VARIABLE) 22UH			
		TRANSISTOR			
Q001	8-729-178-54	TRANSISTOR 2SC2785			
Q002	8-729-117-54	TRANSISTOR 2SA1175			
Q003	8-729-117-54	TRANSISTOR 2SA1175			
Q004	8-729-900-85	TRANSISTOR DTC144WS			
Q005	8-729-178-54	TRANSISTOR 2SC2785			
Q006	8-729-117-54	TRANSISTOR 2SA1175			
Q007	8-729-178-54	TRANSISTOR 2SC2785			
Q008	8-729-900-36	TRANSISTOR DTC124ES			
Q009	8-729-178-54	TRANSISTOR 2SC2785			
Q010	8-729-178-54	TRANSISTOR 2SC2785			
Q011	8-729-117-54	TRANSISTOR 2SA1175			
Q012	8-729-900-36	TRANSISTOR DTC124ES			
Q013	8-729-178-54	TRANSISTOR 2SC2785			
		RESISTOR			
R001	1-247-821-31	CARBON	390	5%	1/4W
R002	1-247-825-31	CARBON	560	5%	1/4W
R003	1-247-807-31	CARBON	100	5%	1/4W
R004	1-247-801-31	CARBON	56	5%	1/4W
R005	1-247-821-31	CARBON	390	5%	1/4W
R006	1-247-831-31	CARBON	1K	5%	1/4W
R007	1-247-843-31	CARBON	3.3K	5%	1/4W
R008	1-247-871-31	CARBON	47K	5%	1/4W
R009	1-247-853-31	CARBON	8.2K	5%	1/4W
R010	1-247-855-31	CARBON	10K	5%	1/4W
R011	1-247-839-31	CARBON	2.2K	5%	1/4W
R012	1-247-839-31	CARBON	2.2K	5%	1/4W
R013	1-247-815-31	CARBON	220	5%	1/4W
R014	1-247-831-31	CARBON	1K	5%	1/4W
R015	1-247-817-31	CARBON	270	5%	1/4W
R016	1-247-835-31	CARBON	1.5K	5%	1/4W
R017	1-247-891-31	CARBON	330K	5%	1/4W
R018	1-247-847-31	CARBON	4.7K	5%	1/4W
R019	1-247-855-31	CARBON	10K	5%	1/4W
R020	1-247-881-31	CARBON	120K	5%	1/4W
R021	1-247-879-31	CARBON	100K	5%	1/4W
R022	1-247-801-31	CARBON	56	5%	1/4W
R023	1-247-847-31	CARBON	4.7K	5%	1/4W
R024	1-247-847-31	CARBON	4.7K	5%	1/4W
R025	1-247-863-31	CARBON	22K	5%	1/4W
R026	1-247-873-31	CARBON	56K	5%	1/4W
R027	1-247-867-31	CARBON	33K	5%	1/4W
R028	1-247-824-31	CARBON	510	5%	1/4W
R029	1-247-806-31	CARBON	91	5%	1/4W
R030	1-247-791-31	CARBON	22	5%	1/4W
R031	1-247-867-31	CARBON	33K	5%	1/4W
R032	1-247-855-31	CARBON	10K	5%	1/4W
R033	1-247-849-31	CARBON	5.6K	5%	1/4W
R034	1-247-863-31	CARBON	22K	5%	1/4W
R035	1-247-831-31	CARBON	1K	5%	1/4W
R036	1-247-867-31	CARBON	33K	5%	1/4W
R037	1-247-807-31	CARBON	100	5%	1/4W
R038	1-247-807-31	CARBON	100	5%	1/4W
		VARIABLE RESISTOR			
RV001	1-228-989-11	RES, ADJ, METAL GLAZE 470			

SECTION 4 ELECTRICAL ADJUSTMENTS

During the adjustment, see the parts arrangement diagram relevant to the adjustment on page 21.

SECAM VIDEO SYSTEM ADJUSTMENT

- Make this adjustment after adjusting the PAL video system.
- For this adjustment, use the equipment listed below in conjunction with an alignment tape and SECAM color bar signals.

[Equipment required]
1) SECAM color Monitor TV
2) Oscilloscope, Dual-trace, Bandwidth...more than 10 MHz with delay mode
3) SECAM color-Bar Generator
4) Alignment Tape, Type : KR5-1J,
   Code No. 8-969-996-03

[Setup for adjustment]
In this adjustment, video signals obtained from pattern generator will be used as adjustment sig Therefore, the video output signals should be wi the specifications.
Verify video signals by connecting an oscillos to VIDEO OUT connector (75Ω terminated). Cl that the video signals are flat when the ampli of the horizontal sync signal is about 0.3 Vp-p, amplitude of the video portion is about 0.7 Vp-p, the amplitude of the burst signal is about 0.3 V The video signal (color-bar signal) used in adjustment is shown in Fig. 1.

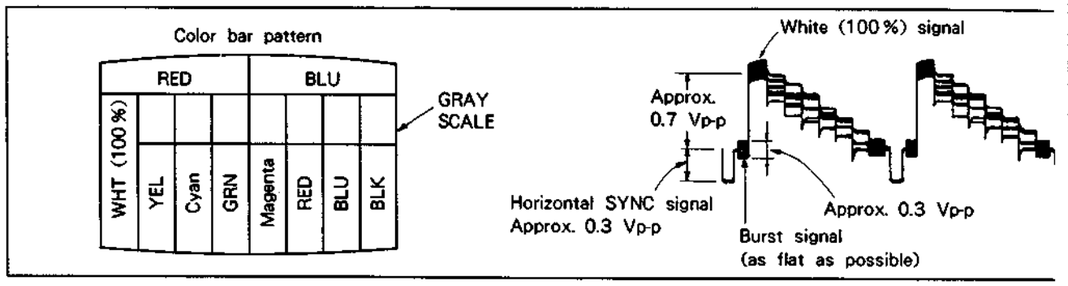


Fig. 1. SECAM video (color bar) signal

[Alignment tape]
KR5-1J

	Video signal	Audio signal	Playing time	Use for
1	Color bars	3 kHz, – 10 dB	5 min	General performance, tape speed check switching position adjustment.
2	Monoscope	333 Hz, – 30 dB	5 min	Video head dihedral, audio lev adjustment.
3	RF sweep	5 kHz, – 30 dB	5 min	Video, audio frequency characteristic audio azimuth adjustment marker : 1 MH 2 MHz, 3.58 MHz, 4.5 MHz, 5.2 MHz.
4	Tracking 1 MHz (CH-A) *1 (Channel B is inserted in every 3 frames.)	1 kHz, – 10 dB *2 (Signal is dropped out in the positions where channel B is inserted.)	5 min	Tracking, Audio height adjustments CTI Position check (Check if *1 and *2 are the sam position.)

SECTION 4 ELECTRICAL ADJUSTMENTS

During the adjustment, see the parts arrangement diagram relevant to the adjustment on page 21.

SECAM VIDEO SYSTEM ADJUSTMENT

- Make this adjustment after adjusting the PAL video system.
- For this adjustment, use the equipment listed below in conjunction with an alignment tape and SECAM color bar signals.

[Equipment required]

1) SECAM color Monitor TV
2) Oscilloscope, Dual-trace, Bandwidth...more than 10 MHz with delay mode
3) SECAM color-Bar Generator
4) Alignment Tape, Type : KR5-1J,
   Code No. 8-969-996-03

[Setup for adjustment]

In this adjustment, video signals obtained from the pattern generator will be used as adjustment signals. Therefore, the video output signals should be within the specifications.

Verify video signals by connecting an oscilloscope to VIDEO OUT connector (75Ω terminated). Check that the video signals are flat when the amplitude of the horizontal sync signal is about 0.3 Vp-p, the amplitude of the video portion is about 0.7 Vp-p, and the amplitude of the burst signal is about 0.3 Vp-p. The video signal (color-bar signal) used in this adjustment is shown in Fig. 1.

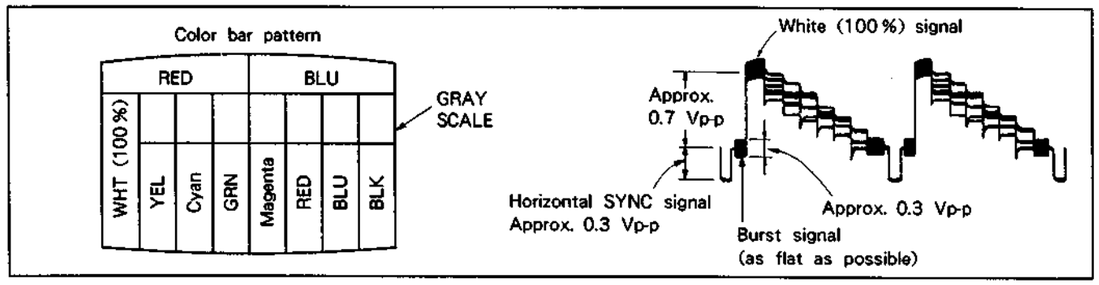


Fig. 1. SECAM video (color bar) signal

[Alignment tape]
KR5-1J

	Video signal	Audio signal	Playing time	Use for
1	Color bars	3 kHz, − 10 dB	5 min	General performance, tape speed checks, switching position adjustment.
2	Monoscope	333 Hz, − 30 dB	5 min	Video head dihedral, audio level adjustment.
3	RF sweep	5 kHz, − 30 dB	5 min	Video, audio frequency characteristics, audio azimuth adjustment marker : 1 MHz, 2 MHz, 3.58 MHz, 4.5 MHz, 5.2 MHz.
4	Tracking 1 MHz (CH-A) ＊1 (Channel B is inserted in every 3 frames.)	1 kHz, − 10 dB ＊2 (Signal is dropped out in the positions where channel B is inserted.)	5 min	Tracking, Audio height adjustments CTL Position check (Check if ＊1 and ＊2 are the same position.)

1. SECAM ACK Adjustment (SC-14 Board)

Mode	E-E
Signal	SECAM color bar
Measurement Point	Pin ⑨ of IC001
Measuring Instrument	Oscilloscope
Adjusting Element	LV002, RV001
Specified Value	5.5 ± 0.2 Vp-p

Adjusting method :

1) Adjust LV002 until the amplitude is a maximum.
2) Adjust RV001 to 5.5 ± 0.2 Vp-p.

Fig. 2. SECAM ACK adjustment

2. Bell Filter Adjustment (SC-14 Board)

Mode	E-E
Signal	SECAM color bar
Measurement Point	CH1 : Pin ⑥ of CN001 EXT TRIG : Pin ⑤ of CN001
Measuring Instrument	Oscilloscope TRIGGER SOURCE : EXT
Adjusting Element	LV003
Specified Value	Flat waveform

Adjusting method :

1) Adjust LV003 until the waveform is flat.

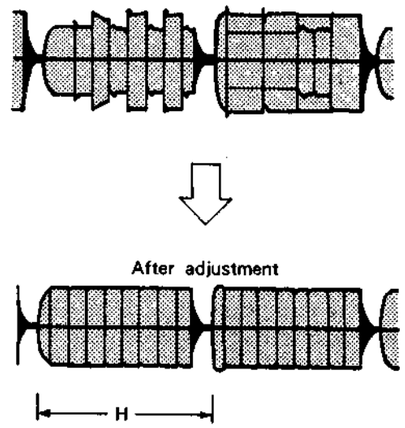


Fig. 3. Bell filter adjustment

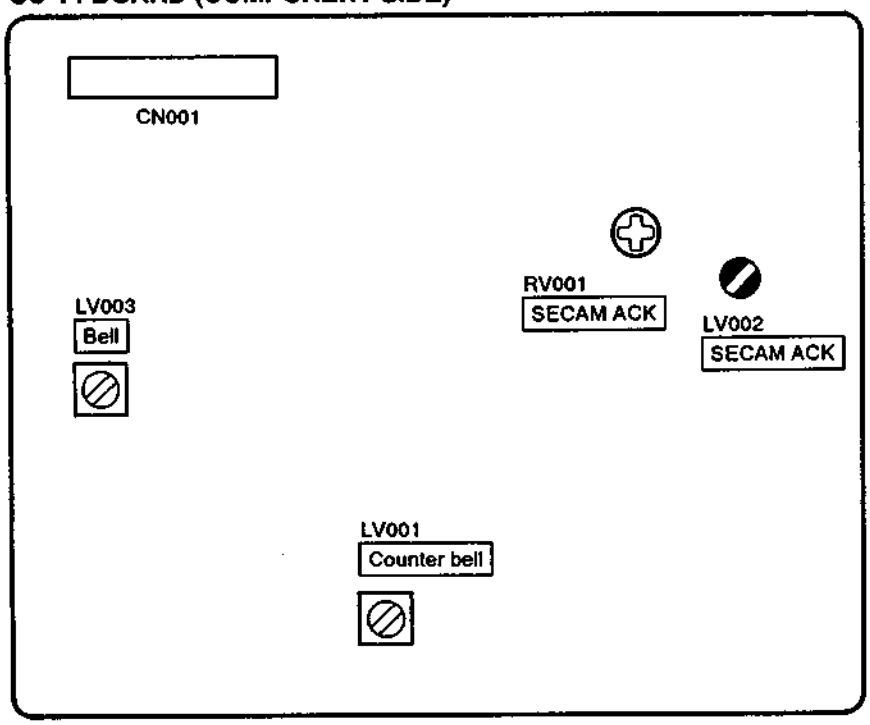
3. Counter Bell Filter Adjustment (SC-14 Board)

Mode	Self-recording and playback
Signal	SECAM color bar
Measurement Point	Adjust while observing the SECAM monitor TV screen.
Measuring Instrument	
Adjusting Element	LV001
Specified Value	Cleanest border between the red and blue areas

Adjusting method :

1) Record SECAM color bar signals.
2) Playback the recorded signals.
3) While observing the monitor TV screen, adjust LV001 until the border between the red and blue areas is at its cleanest (minimum beats).

SC-14 BOARD (COMPONENT SIDE)



SL-F90
SVHS-ME

SERVICE MANUAL

ME Model

Super Betamax

SL-F90(ME model) is a model whose design has been based on SL-F90(E model).
On this service manual , only differences from SL-F90(E model) are described.

المواصفات

النظام

نظام تسجيل الصورة	مسح حلزوني برأسين دورانيين
اشارة الصورة	مقاييس CCIR ، الوان بال PAL وسيكام SECAM
تغطية القنوات	VHF : قنوات أوروبا الغربية من E2 الى E12
	UHF : قنوات أوروبا الغربية من E21 الى E68
	(يمكن ضبط ما يصل الى ٣٠ برنامجا ضبط مسبقا)
دخل الهوائي	مقبس هوائي لا تماثلي ٧٥ أوم
اشارة خرج تردد الراديو	قنوات UHF من E30 الى E39 (قابلة للتغيير)
	٧٥ أوم، غير متوازن

الصورة

الدخل: VIDEO IN	مقبس فونو: ١,٠ فولت $^{+0,5}_{-0,2}$ فولت (p-p)
	٧٥ أوم، غير متوازن، تزامن سالب
الخرج: VIDEO OUT	مقبس فونو: ١,٠ ± ٠,١ فولت (p-p)
	٧٥ أوم، غير متوازن، تزامن سالب

الصوت

الدخل: AUDIO IN	مقبس فونو: ٤٧ كيلوأوم، ـ ١٠ ديسيبل
	(صفر ديسيبل = ٠,٧٧٥ فولت جذر متوسط مربع التيار)
الخرج: AUDIO OUT	مقبس فونو:
	معاوقة الحمل اقل من ١٠ ك أوم، ـ ١٠ ديسيبل مع حمل ٤٧ ك
	أوم، غير متوازن

حركة الشريط

سرعة الشريط	١٨,٧٢ مم/ثانية
اقصى مدة للتسجيل	ساعتان و١٠ دقائق (مع كاسيت سوني L-500)
	٣ ساعات و١٥ دقيقة (مع L-750)
مدة التقديم السريع/اعادة اللف	خلال ٥ دقائق (مع L-500)

المؤقت

الساعة	تأمين كريستال
بيان الوقت	دورة من ٢٤ ساعة
تهيئة ضبط المؤقت (للتسجيل فقط)	٦ أحداث/اسبوع، قابل للضبط على أي يوم أو على ايام الاسبوع السبعة

عام

متطلبات القدرة الكهربائية	تيار متردد ١١٠ أو ١٢٧ أو ٢٢٠ أو ٢٤٠ فولت قابل للضبط، ٥٠/٦٠ هرتز
استهلاك التيار الكهربائي	٣٩ وات
درجة حرارة التخزين	ـ ٢٠°م الى + ٦٠°م
درجة حرارة التشغيل	٥°م الى ٤٠°م
الابعاد	٤٣٠ × ٩٥ × ٣٦٧ مم (عرض/ارتفاع/عمق)
	مع الاجزاء والضوابط البارزة
الوزن	٨,٠ كجم

موجه التحكم عن بعد RMT-146

نظام التحكم عن بعد	تحكم بالاشعة تحت الحمراء
متطلبات القدرة الكهربائية	تيار مباشر ٣ فولت، بطاريتين IEC فئة R6 (حجم AA)
الابعاد	٤٥ × ٢٠ × ١٧٥ مم (عرض/ارتفاع/عمق)
	مع الاجزاء والضوابط البارزة
الوزن	١٠٥ جم تقريبا مع البطاريات

الكماليات المجهزة

كبل مشترك المحور ٧٥ أوم لتوصيل المسجل بالتلفزيون	١
مفك براغي لضبط قناة تردد الراديو	١
موجه التحكم عن بعد RMT-146 مع بطاريتين IEC فئة R6 (حجم AA)	١

التصميم والمواصفات عرضة للتغيير بدون اشعار.

Beta
VIDEO CASSETTE RECORDER
SONY

MICROFILM

SECTION 1
SCHEMATIC DIAGRAM AND PRINTED WIRING BOARDS

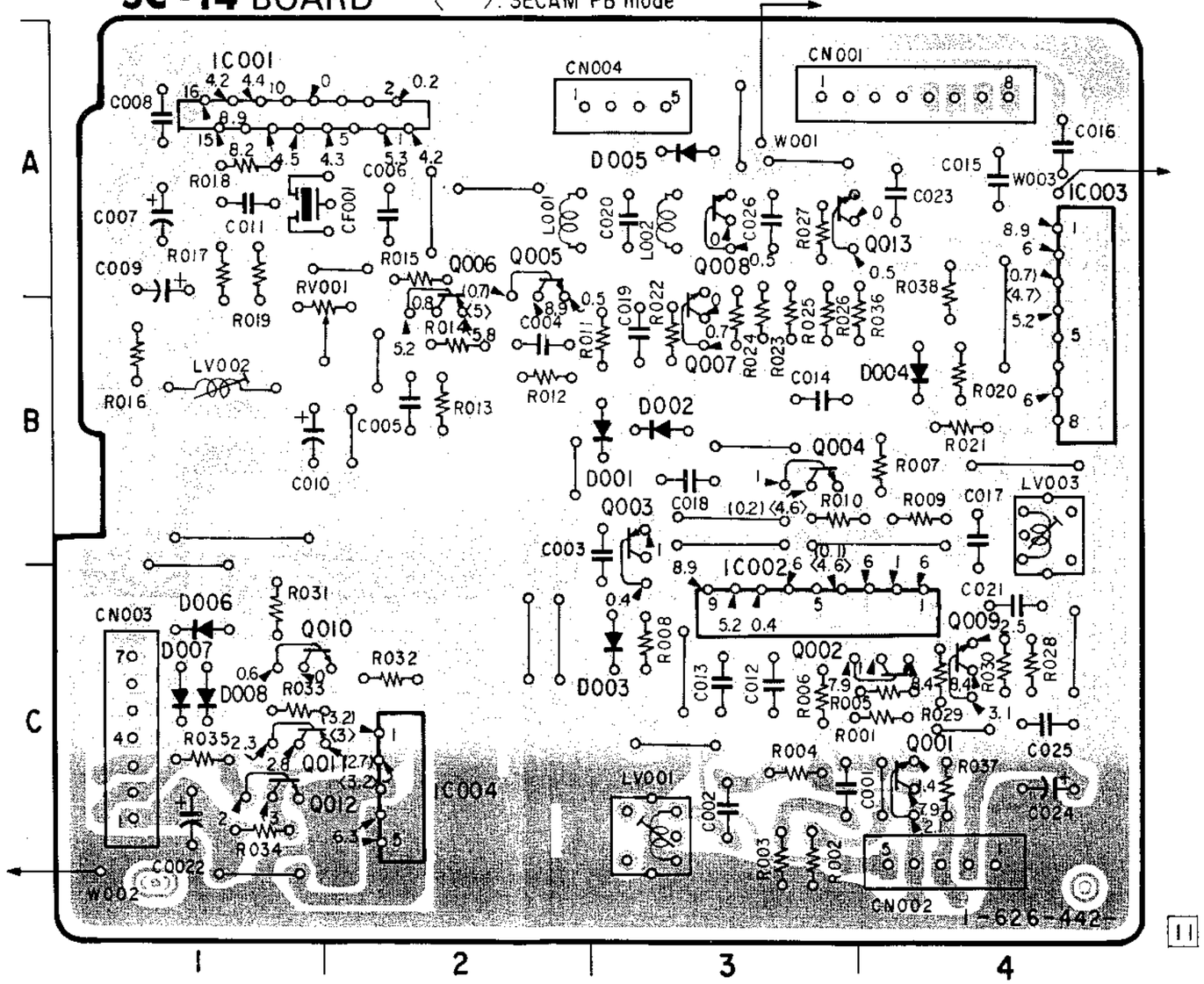
SC-14(VIDEO) PRINTED WIRING BOARD

—Ref. No. 9,000 series—

Note:

- O– : indicates a lead wire mounted on the component side.
- : Pattern from the side which enables seeing.
- : B+ pattern from the side which enables seeing.

no mark : SECAM REC / PB mode
( ) : SECAM REC mode
〈 〉 : SECAM PB mode



SC-14(VIDEO) SCHEMATIC DIAGRAM

—Ref. No. 9,000 series—

SC-14 BOARD

no mark : SECAM REC / PB mode
( ) : SECAM REC mode
< > : SECAM PB mode

IC001
BA7007 SECAM DISCRIMINATOR

IC004
BA634
CECAM CHROMA EXCHANGE PULSE GEN

IC002
CX-894
PAL/SECAM SWITCH
PILOT BURST CLEANING

IC003
CX-20061
PAL/SECAM SWITCH

Q001 COUNTER BELL FILTER
Q002 INVERT AMP
Q003 PAL ACK BUFFER
Q004 PAL-PB SWITCH
Q005 BURST FLAG BUFFER
Q006 CHROMA AMP
Q007,008 TRAP SWITCH
Q009 PAL/SECAM SWITCH
Q010 SECAM ACK SWITCH
Q011 PAL/SECAM SWITCH
Q012 INVERT
Q013 COMB FILTER SWITCH

CN004
SUPER BETA 3	4
Q074 B	3
Q043 B	2
B.F.	1

TO VI-23 BOARD FEMALE CONNECTOR

TO VI-23 BOARD W003

CN002
35 PIN OUT	5
COMB OUT	4
JOG B	3
SWD 9V	2
GND	1

TO VI-23 BOARD FEMALE CONNECTOR

CN001
TO R/P	1
40 PIN	2
COMB OFF	3
ACK	4
COM SYNC	5
R089 41 PIN	6
PB 9V	7
1 PIN OUT	8

TO VI-23 BOARD FEMALE CONNECTOR

TO VI-23 BOARD W001

CN003
7	PAL JOG
6	Q27 B
5	JOG 16
4	JOG 13
3	JOG 6
2	RF SWP
1	6.5V

TO VI-23 FEMALE

TO VI-23 BOARD W002

8 9 10 11 12 13 14 15 16 17

A B C D E F G H I J

mark : SECAM REC / PB mode
( ) : SECAM REC mode
〈 〉 : SECAM PB mode

IC001
BA7007 SECAM DISCRIMINATOR

Q002 INVERT AMP
Q003 PAL ACK BUFFER
Q004 PAL-PB SWITCH
Q005 BURST FLAG BUFFER

D001 1SS119
D002 1SS119
D003 1SS119
D004 1SS119
D006 1SS119
D007 1SS119
D008 1SS119

R005 390
R007 3300
R009 8200
R004 56
R006 1k
R010 10k
R011 2200
R012 2200
R013 220
R014 1k
R015 270
R016 1500
R017 330k
R018 4700
R019 10k
R020 120k
R021 100k
R031 33k
R032 10k
R033 5600
R034 22k
R035 1k
R038 100
RV001 470 1M

C001 0.01 F
C002 27p CH
C003 0.01 F
C004 220p
C005 0.01 F
C006 0.01 F
C007 47 10V
C008 0.01 F
C009 4.7 25V
C010 47 10V
C011 0.027 PET
C012 0.01 F
C013 0.01 F
C014 0.01 F
C015 0.01 F
C016 0.047 F
C018 0.047 F
C022 47 10V
C026 0.01 F
CF001 4.16MHz
LV001 47μH
LV002 15mH

Q002 2SA1175
Q003 2SA1175
Q004 DTC144WS
Q005 2SC2785
Q006 2SA1175
Q009 PAL/SECAM SWITCH
Q010 2SC2785 SECAM ACK SWITCH
Q011 2SA1175 PAL/SECAM SWITCH
Q012 DTC124ES INVERT

IC002 CX-894 PAL/SECAM SWITCH PILOT BURST CLEANING
IC003 CX-20061 PAL/SECAM SWITCH
IC004 BA634 CECAM CHROMA EXCHANGE PULSE GEN

Vcc GND DET FF ACK BLL SECAM PAL CECAM

CN003

7	PAL JOG
6	Q27 B
5	JOG 16
4	JOG 13
3	JOG 6
2	RF SWP
1	6.5V

TO VI-23 BOARD FEMALE CONNETOR

TO VI-23 BOARD W002

Note:

- All resistors are in ohms, 1/4W unless otherwise noted. kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics. and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- : panel designation.
- △ : internal component.
- : adjustment for repair.
- : B + bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.

When indicating parts by reference number, please include the board name.

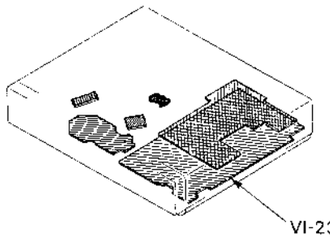
- **Signal path**
  - : REC CHROMA Signal
  - : PB CHROMA Signal

VI-23(VIDEO) PRINTED WIRING BOARD

—Ref. No. 3,000 series—

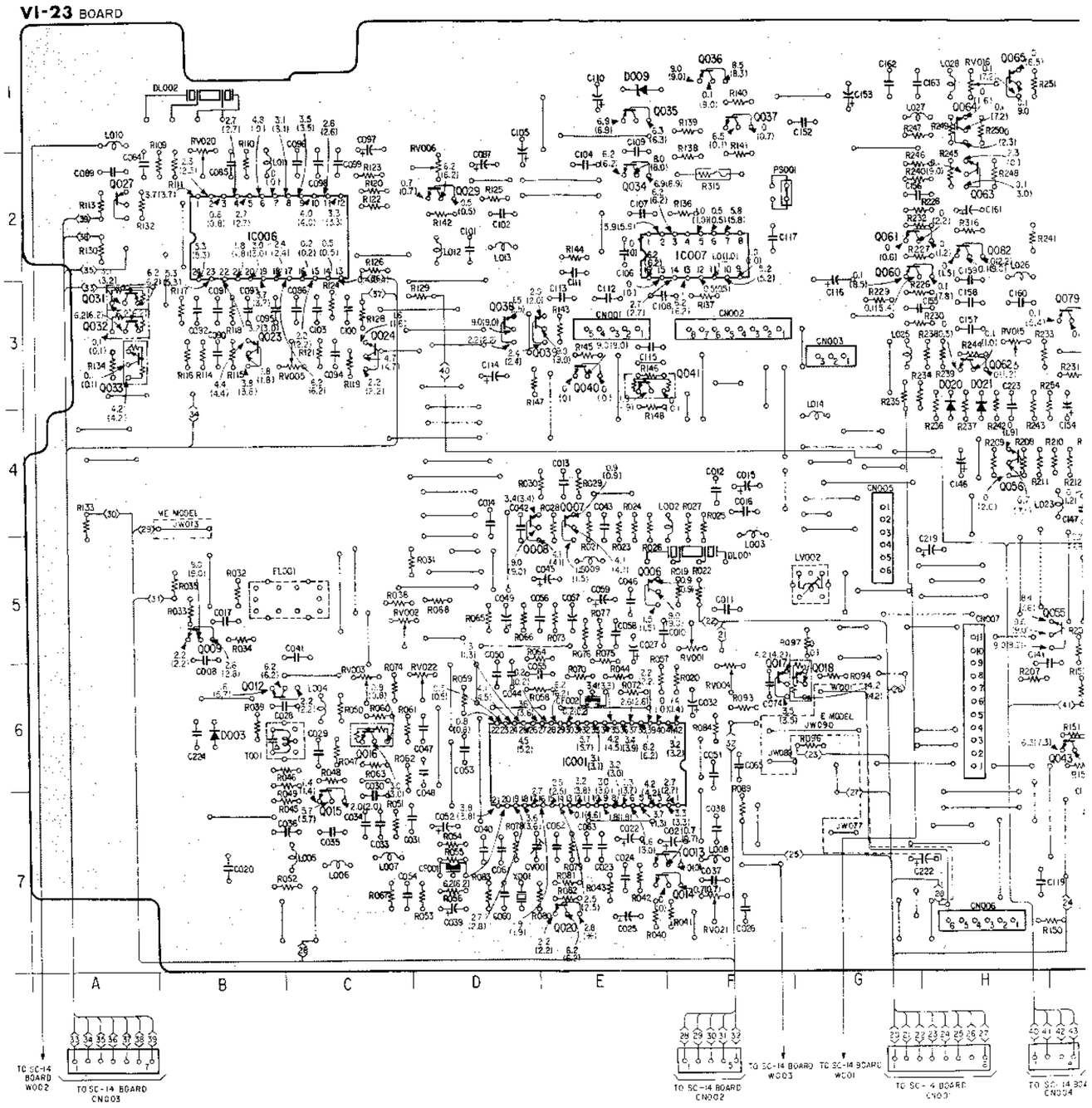
Note:

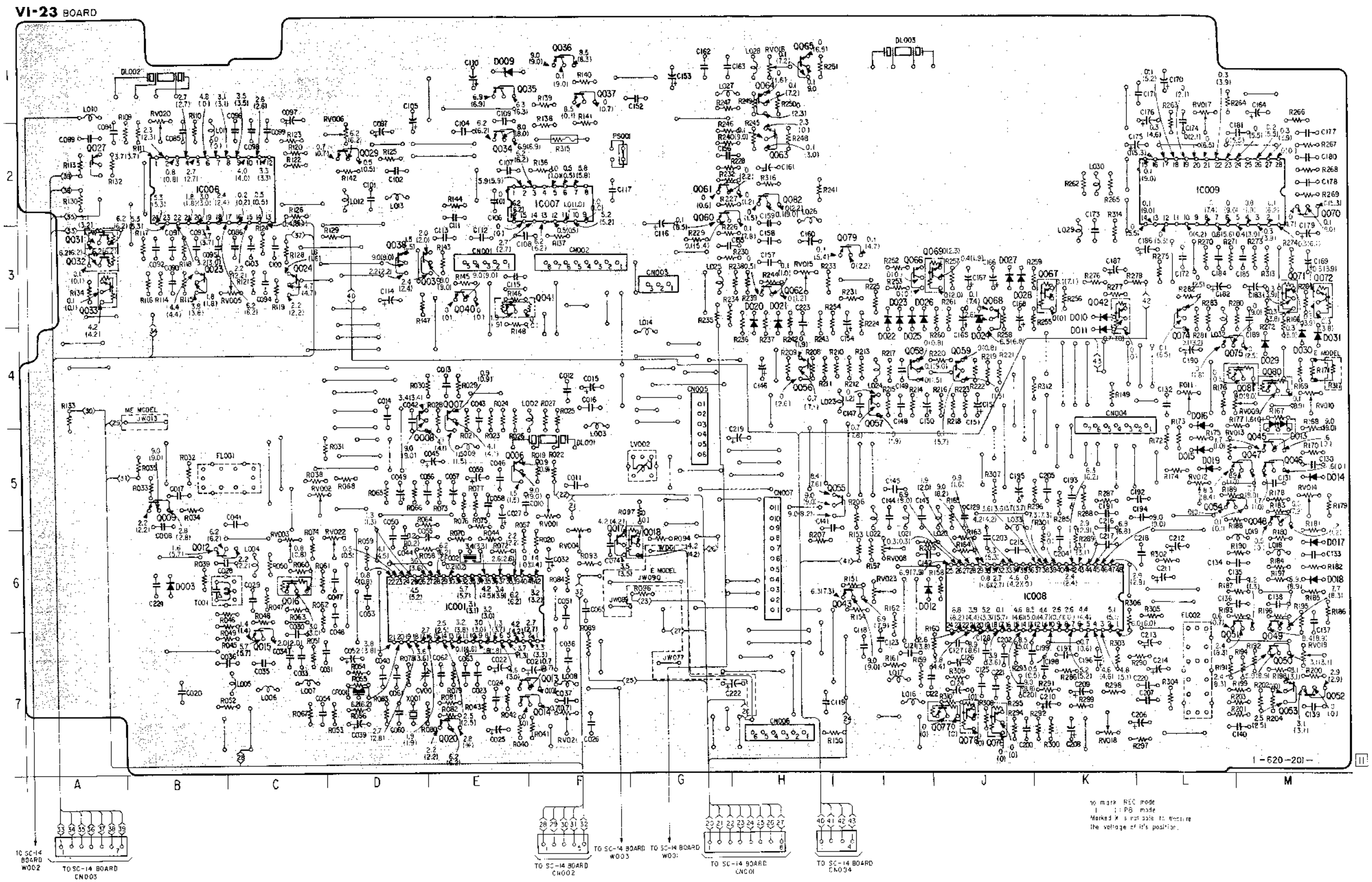
- ○— : Indicates a lead wire mounted on the component side.
- : Pattern from the side which enables seeing.
- : B+ pattern from the side which enables seeing.



VI-23 (Video)

CV001	D-7			Q074	L-3
				Q075	L-4
D003	B-6			Q076	J-7
D009	E-1			Q077	J-7
D010	K-3			Q078	J-7
D011	K-4			Q079	I-3
D012	I-6			Q080	M-4
D013	M-5			Q081	M-4
D014	M-5			Q082	H-2
D015	L-5				
D016	L-5			RV001	F-5
D017	M-6			RV002	C-5
D018	M-6			RV003	C-6
D019	L-5			RV004	F-6
D020	H-3			RV005	C-3
D021	H-3			RV006	D-2
D022	I-3			RV008	I-6
D023	I-3			RV009	M-4
D024	J-3			RV010	M-4
D025	I-3			RV011	L-4
D026	I-3			RV012	L-5
D027	J-3			RV013	L-5
D028	J-3			RV014	M-5
D029	M-4			RV015	H-3
D030	M-4			RV016	H-1
D031	M-4			RV017	L-1
				RV018	K-7
IC001	E-6			RV019	M-7
IC006	B-2			RV020	B-1
IC007	F-2			RV021	F-7
IC008	K-6			RV022	D-6
IC009	L-2			RV023	I-6
LV002	G-5				
Q006	E-5				
Q007	E-4				
Q008	E-4				
Q009	B-5				
Q012	C-6				
Q013	D-7				
Q014	D-7				
Q015	C-7				
Q016	C-6				
Q017	F-6				
Q018	G-6				
Q020	E-7				
Q023	B-3				
Q024	C-3				
Q027	A-2				
Q029	D-2				
Q031	A-3				
Q032	A-3				
Q033	A-3				
Q034	E-2				
Q035	E-1				
Q036	F-1				
Q037	F-1				
Q038	D-3				
Q039	E-3				
Q040	E-3				
Q041	E-3				
Q042	K-3				
Q043	I-6				
Q045	M-5				
Q046	M-5				
Q047	M-5				
Q048	M-6				
Q049	M-7				
Q050	M-7				
Q051	M-7				
Q052	M-7				
Q053	M-7				
Q054	L-5				
Q055	I-5				
Q056	H-4				
Q057	I-4				
Q058	I-4				
Q059	J-4				
Q060	G-2				
Q061	G-2				
Q062	H-3				
Q063	H-2				
Q064	H-1				
Q065	H-1				
Q066	I-3				
Q067	K-3				
Q068	J-3				
Q069	J-3				
Q070	M-2				
Q071	M-3				
Q072	M-3				




VI-23 BOARD
IC001
IC006
IC007
IC008
IC009
CN001
CN002
CN003
CN004
CN005
CN006
CN007
ME MODEL
E MODEL
1-620-201-
TO SC-14 BOARD W002
TO SC-14 BOARD CN003
TO SC-14 BOARD CN002
TO SC-14 BOARD W003
TO SC-14 BOARD W001
TO SC-14 BOARD CN001
TO SC-14 BOARD CN004