

HITACHI ● **SERVICE MANUAL**

TK

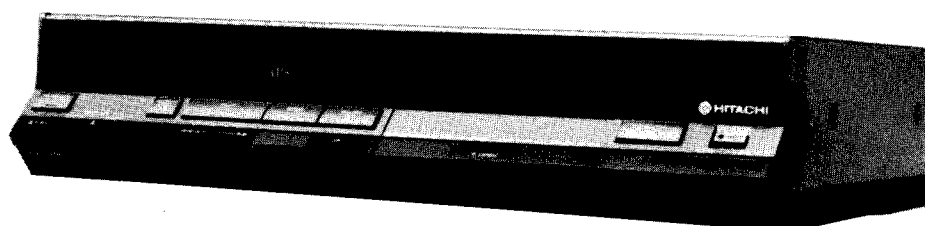
No. 2397E

VT-110E/120E(CT)

Technical Data



— VT-110E —



— VT-120E —

MC-Service

VHS

THIS VIDEO DECK IS A VHS TYPE VIDEO RECORDER. FOR PROPER OPERATION, ONLY THE VHS TYPE CASSETTE MUST BE USED.

Differences between VT-110E and VT-120E

MODEL ITEM	VT-110E	VT-120E
SHAPE OF FRONT PANEL	STRAIGHT FACE	SEMI-SLANT FACE
OPERATING SOUND	—	PI-SOUND

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CASSETTE RECORDER

February 1986

TOKAI WORKS

MC-Service

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SPECIFICATIONS

ITEM	VT-110E/120E
Format:	VHS PAL Standard
Recording:	Rotary Two-Head Helical Scan Azimuth Recording
Tape Speed:	23.39 mm/sec.
Tape Width:	12.7 mm
Operation Temperature:	5°C to 40°C
Video:	PAL colour (system B & G) & CCIR monochrome signals 625 lines
Recording Time:	240 min. (with Hitachi E-240 cassette)
Aerial Input:	VHF channels 2 — 12 CATV channels S1 — S20 UHF channels 21 — 69
RF Output:	UHF channels 37 (30 — 39 adjustable) (System G)
Video Input:	0.5 to 1.5V p-p 75 ohm Unbalanced
Video Output:	1V p-p 75 ohm Unbalanced
S/N Ratio (Video):	40 dB
S/N Ratio (Audio):	43 dB
Horizontal Resolution:	Colour 240 lines
Audio Input:	—2 dBm 50 Kohm
Audio Output:	—2 dBm 10 Kohm
Audio Frequency Range:	70 Hz to 12 kHz
Power:	AC 220V 50 Hz
Power Consumption:	34W (including timer)
Timer:	24 hour digital indication
Cabinet Size:	435 mm(W) x 95 mm(H) x 324 mm(D)
Weight:	7.0 kg
Accessory Included:	1 — Aerial cable 2 — Programme sheets 1 — Infrared Remote control unit

* Design and specifications are subject to change without notice.

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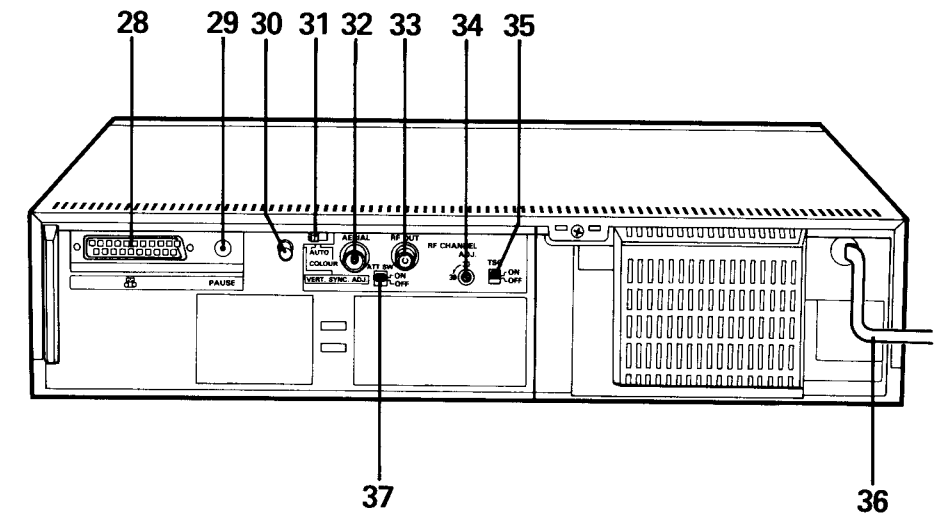
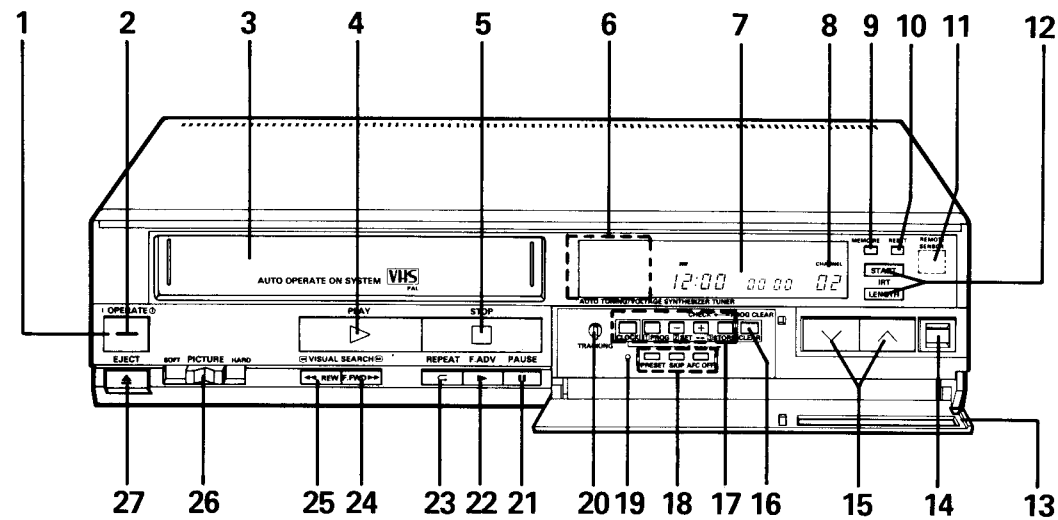
SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine Hitachi replacement parts. Especially critical parts in the power circuit block should not be replaced with other makers'. Critical parts are marked with Δ in the schematic diagram and circuit board diagram.
2. Before returning repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

LIST OF DIFFERENCES

	ITEM	VT-110E/120E	VT-63E
FEATURES	HQ (HIGH QUALITY)	USED	UNUSED
	TRICK PLAY	○ VISUAL SEARCH ○ PAUSE ○ F. ADV (By Remote Control) ○ REPEAT	○ VISUAL SEARCH ○ PAUSE
	AUTO OPERATE ON FUNCTION	YES	NO
	NOISE LOCK SEARCH FUNCTION	YES	YES
	REMOTE CONTROL	WIRELESS	WIRED
	TIMER RECORDING PROGRAMS	4 PROGRAMMES/2 WEEKS	4 PROGRAMMES/2 WEEKS
	TIMER BACKUP POWER	ABOUT 5 MINUTES	ABOUT 5 MINUTES
	TIMER PROGRAMMED TIME DISPLAY	START AND STOP SIMULTANEOUSLY	START AND STOP SEQUENTIALLY
	IRT	CAN SET START TIME	CAN SET RECORDING TIME ONLY
	TAPE COUNTER INDICATOR	INDEPENDENT	CLOCK/COUNTER SWITCHING
	MEMORY STOP OPERATION MODE	REWIND AND FORWARD	REWIND
	CHANNEL TUNING FUNCTION	VOLTAGE SYNTHESIZER (AUTO TUNING)	VOLTAGE SYNTHESIZER
	INPUT SELECT SWITCH	NONE	YES
	PLAYBACK PICTURE CONTROL	HIGH FREQUENCY CONTROL	HIGH FREQUENCY CONTROL
CHASSIS	ONE BUTTON RECORDING	YES	NO
	BASIC CHASSIS TYPE	UY	UX
	CYLINDER MOTOR	THREE-PHASE OUTER ROTOR FG: 300 Hz	SINGLE-PHASE FLAT FG: 200 Hz
	VIDEO HEAD	2 HEADS CH-1/CH-2: 65 μ m CONNECTOR TYPE	2 HEADS CH-1/CH-2: 65 μ m SOLDERED TYPE
	HEATER	NONE (USED HEAT SINK)	YES
MAIN CONTROLS	DEW SENSOR	NO	NO
	VIDEO SYSTEM	Y-SIGNAL PROCESS CHROMA SIGNAL PROCESS REC/PB AMP AND CORRECTOR PICTURE CONTROL	HT4727 (IC203) HT4539 (IC301) HT4708 (IC205) HA11852 (IC1) MSM6965RS (IC204)
	AUDIO SYSTEM	REC/PB AMP	BA5115L (IC402)
	SERVO SYSTEM	SPEED/PHASE CONTROL CYLINDER MOTOR DRIVE CAPSTAN MOTOR DRIVE TRICK PLAY CONTROL	HA11843 (IC604) HA13430A (IC601) M54548L-A (IC603)
	SYSTEM CONTROL	SYSTEM CONTROL μ P LOADING MOTOR DRIVE	HD614042SD37 (IC901) M54649L (IC902)
	TIMER	TIMER μ P	HD614045SD53 (IC751)
	CH-TUNING SYSTEM	TUNING μ P BAND SWITCHING	M50757-681SP (IC101)
POWER SUPPLY	POWER SUPPLY	REGULATOR	STK5471 (IC851)
			STK5451 (IC151)



1. OPERATE SWITCH

Turn system power on and off.

2. OPERATE INDICATOR

3. CASSETTE COMPARTMENT

Insert a cassette in through the door, and loading will be completed automatically.

Note: Power is turned on automatically when the cassette is loaded.

4. PLAY BUTTON

5. STOP BUTTON

The STOP button must be pressed between "RECORD" and any other operation.

6. MODE INDICATORS

- " " appears when a cassette is in the compartment.
- "PLAY" appears during the playback mode.
- "REC" appears during the record mode.
- "◀◀" appears during the rewind mode and flashes during rewind visual search mode.
- "▶▶" appears during the fast forward mode and flashes during forward visual search mode.
- "||" appears during the play/record pause mode.
- "⌚" appears when turning the power off after programming the timer.

7. DIGITAL DISPLAY

This shows the time with a 24-hour display and shows the tape position.

8. CHANNEL INDICATOR DISPLAY

This shows the channel number corresponding to the channel selected.

9. MEMORY BUTTON

Press this button so "M" is indicated in the display, then fast forward or rewind the tape. The tape stops when the counter reaches approximately "0000".

Note: Press the button again to switch off the "M" indicator.

10. COUNTER RESET BUTTON

To reset counter to "0000".

11. INFRARED RAY RECEIVING SECTION

Receives infrared rays from remote control unit.

12. INSTANT RECORDING TIMER BUTTONS (IRT)

This allows unattended recording.

Timer will switch the VTR off automatically at a pre-selected time. This is convenient when you go out during recording.

13. SECONDARY CONTROL DOOR

14. RECORD BUTTON

Press RECORD button to record.

15. CHANNEL SELECT BUTTONS

Select the channels you wish to view or record by pressing these buttons.

And you can also select the "AUX" position* by pressing this button to record or watch the programme input at the PERI jack.

* One channel position either higher or lower outside the range of your preset channels.

16. PROGRAMME CLEAR BUTTON

Press the button to clear the programming information.

17. TIME SET BUTTONS

18. CHANNEL PRESET BUTTONS

19. TIMER RESET SWITCH

Press this switch if the digital display malfunctions or no display appears to reset the display. Set the correct present time for the clock then programme the timer.

20. TRACKING CONTROL

To minimize noise in playback.

21. PAUSE BUTTON

Press to pause during recording.

Press to view a still picture during playback.

Press again to release.

22. FRAME ADVANCE BUTTON

When you hold FRAME ADVANCE button down during still playback mode, tape will be played back frame by frame. Operates only after PAUSE button has been pressed.

23. REPEAT BUTTON

Press this button after pressing the PLAY button to repeat the scene you have just viewed during playback. The tape is rewound to the position where PLAY button was pressed, then the tape is played back from that position.

24. FAST FORWARD/VISUAL SEARCH BUTTON

Press to activate fast forward.

Press this button during playback and forward playback picture at high speed can be seen.

25. REWIND/VISUAL SEARCH BUTTON

Press to start rewind.

Press this button during playback and reverse playback picture at high speed can be seen.

26. PICTURE CONTROL

Adjust the picture so it is easy to see.

27. EJECT BUTTON

Press to remove cassette. The STOP button must be pressed before "EJECT".

28. PERI JACK

For connection with a TV with a PERI or DIN jack using an exclusive cable.

29. CAMERA PAUSE JACK

Connect Camera pause cable.

30. VERTICAL SYNC. ADJUSTMENT CONTROL

If you see vertical shaking on the TV screen in the still playback mode, rotate this control to minimize shaking.

31. AUTO/COLOUR SWITCH

AUTO: Circuits are automatically switched to colour or black/white mode. Set to this position when playing or recording PAL signal.

COLOUR: When recording PAL signal in the area very far from broadcasting station, the recorded picture may lose colour. In this case set to this position in recording and playback.

32. AERIAL INPUT SOCKET

Connect external aerial.

33. RF OUTPUT

Connect to TV aerial input.

34. RF CHANNEL CONTROL

Turn TSG ON/OFF switch to "ON" and rotate this control to set the video channel correctly.

35. TSG ON/OFF SWITCH

Set to ON and check that the video channel of your TV set is correct. After setting, set this switch to OFF.

36. MAINS LEAD

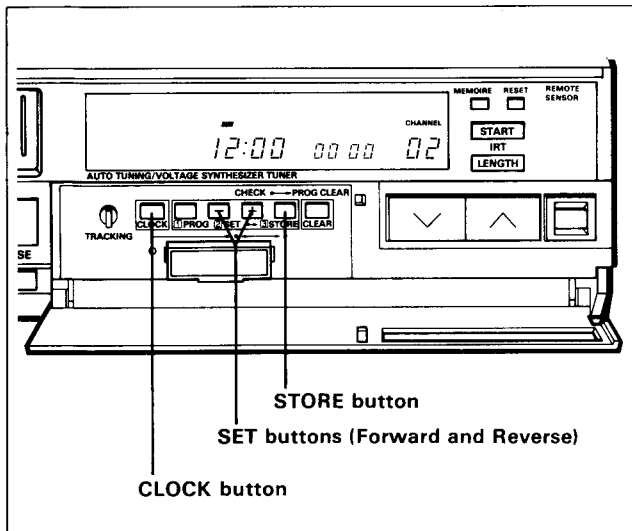
37. ATTENUATOR SWITCH

Generally set to the NORMAL position.

Set to "ATT-ON" when interference occurs in an area with a strong signal.

CLOCK TIME SETTING

The built-in digital clock is based on a 24 hour cycle and gives you a constant readout of the time and day.

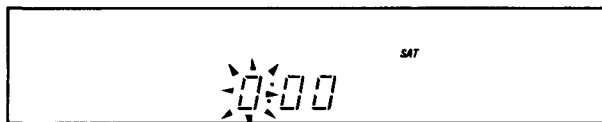


- When the MAINS lead is plugged in for the first time, "—:—:—" will appear on the display.

1. Press the CLOCK button.
"SUN" flashes on and off and "0:00" lights.



2. Press the SET button (Forward or Reverse) to select the present day of the week.
Hold the button down to advance rapidly.
When the present day of the week appears, press the STORE button. "0" hour starts flashing.



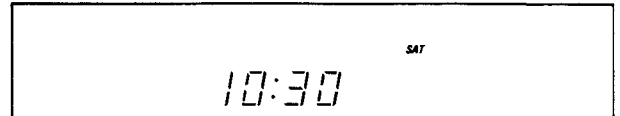
For example, the above diagram shows that Saturday (SAT) has been set.

3. Press the SET button (Forward or Reverse) to set the present hour.
Hold the button down to advance rapidly. Press the STORE button when the present hour appears.
"00" minutes starts flashing.



For example, the diagram shows that "10" hour has been set.

4. Press the SET button (Forward or Reverse) to set the minute.
Hold the button down to advance rapidly. Press the STORE button when the present minute appears.



For example, the diagram shows that "30" minutes has been set.

Now the clock has been set to the correct time of day.

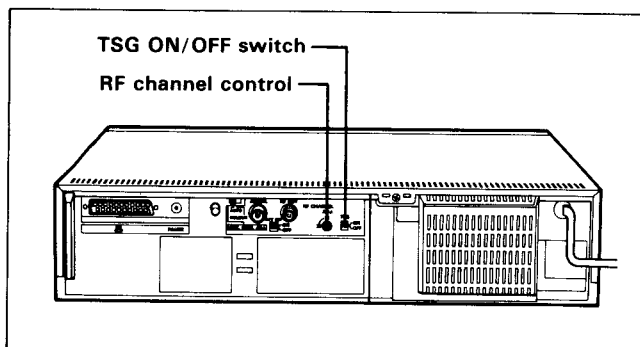
Notes:

- This VTR has a built-in power failure compensation circuit. If power interruption of less than 5 minutes occurs, the clock time and programming will not be lost.
- The digital display is bright when the OPERATE switch is turned ON and automatically becomes dim when the switch is off.

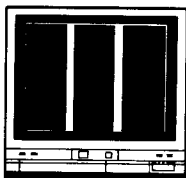
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VIDEO CHANNEL SETTING

The RF converter changes the video and audio signals from a previously recorded video tape during playback to the same type of signal used for TV broadcasts. The RF converter output in this unit is pre-set prior to shipment to UHF channel 37.



1. Turn the TV on and select an unused channel (CH37) (in some cases this may be marked A/V).
2. Turn the OPERATE switch on.
3. Set the TSG ON/OFF switch to "ON". Then tune the TV until the test pattern shown below is received.



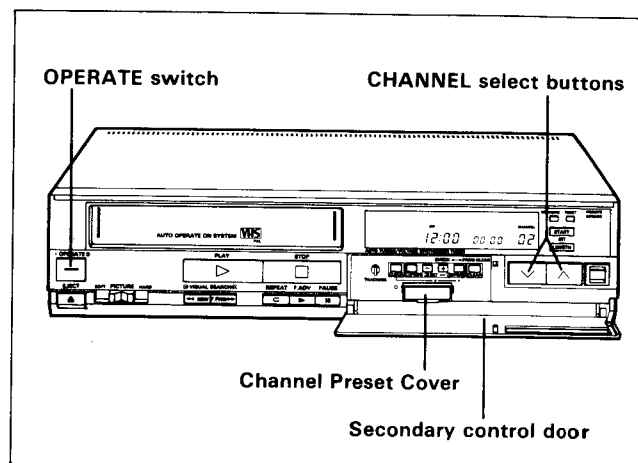
4. If it is not possible to correctly tune to the test pattern or channel 37 is used for broadcasting in your area, adjust the RF converter output with the RF channel control using a small screwdriver and re-adjust your TV until the test pattern is observed. For higher channel numbers, turn counterclockwise. For a lower channel, turn clockwise.
5. Having completed the adjustment, set the TSG ON/OFF switch to "OFF".

When connecting the VTR to a TV set provided with auto-tuning and the video channel cannot be set, operate as follows:

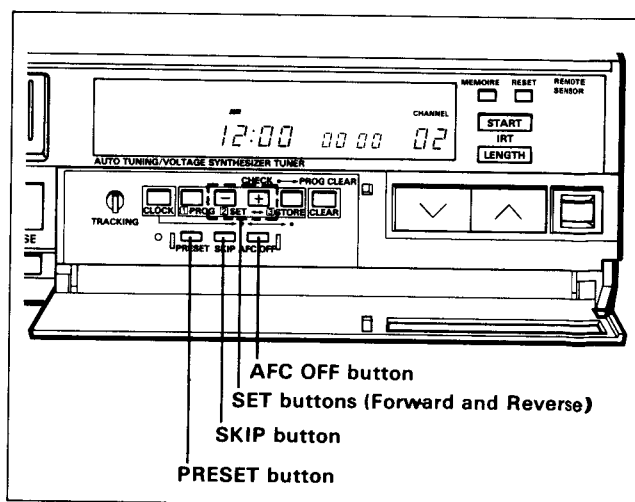
1. Remove the aerial cable from the AERIAL terminal on the VTR.
2. Leave the TSG ON/OFF switch "OFF".
3. Playback a blank tape.
4. Press the PAUSE button to obtain the pause mode.
5. Press the Auto-tuning button.
6. Auto-tuning starts and it stops at video channel 37.
Note: The auto-tuning indicator of the TV set changes to an exact tuning indicator.
7. Set the channel memory of the TV to ON and store the channel which was set in item 6.
8. Set the TSG ON/OFF switch to "ON" and check that the picture appears on the TV screen. Now, the video channel of TV has been set properly.
9. Return the TSG ON/OFF switch to "OFF".
10. Reconnect the aerial cable to the VTR.

PRE-TUNING OF BUILT-IN TV TUNER

This VTR incorporates a complete television tuner with the required tuning controls. Once you have pre-tuned to preferred stations, you can select any of them by merely pressing the CHANNEL select button.



1. Turn the TV on and select the pre-tuned video channel.
2. Turn the OPERATE switch of the VTR on.
3. Open the Secondary control door to access the Pre-tuning controls.
4. Remove the Channel Preset Cover.



5. Press the PRESET button once.
The display indication changes from the clock time display to the band indicator display.
Note: Pressing the button twice will lock the display. If you have pressed it twice, press it once more.
6. Press the CHANNEL select button on VTR to select the channel to be memorized.
Notes:
 1. The Channel Number Display can be now consecutively selected from "00" through "73" and then "95" through "99" and "AUX" by pressing the CHANNEL select button either upward or downward. In this case, Channel Number may be any number.
 2. When "AFC" is not indicated in the display, press AFC OFF button to display "AFC".



For example, the above diagram shows that channel 4 has been selected.

7. Press the SET button (Forward or Reverse) to start tuning.

At a station that is broadcasting, the picture appears on the TV screen. If the station received is different from the channel to be preset, press SET button (Forward or Reverse) again.

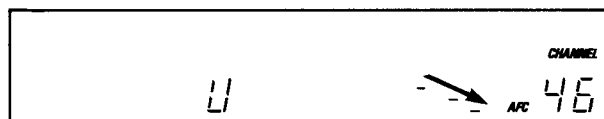
At the next station, the searching will stop and the new station can be preset. Repeat this until the desired station is reached. By repeating this, the Band indicator on the display will change in sequence L, H, U, L....

Notes:

- Press SET button (Forward); channels are searched in the order, VHF (1 — 12) → CATV (S1 — S20) → UHF (21 — 69), and "—" appears in sequence in the direction of the arrow during searching.



- Press SET button (Reverse); channels are searched in the reverse order to the above, and "—" appears in sequence in the direction of the arrow.



8. Follow the same steps as explained in steps 6 and 7 above for other channels.

You can preset up to 79 channels in memory.

9. After having completed tuning all channel memories you want, press the PRESET button once again.

These channels preset in memory as shown in the above can be selected by the CHANNEL select buttons on the VTR.

The provided sheet is used to list the programmes to which you pre-tune your VTR. List the programmes and paste the sheet on the side panel, etc. so as not to hinder you when you operate the VTR.

AFC (Automatic Frequency Control)

Since this unit has an AFC circuit, when a channel is preset following the above procedure, the AFC turns on automatically and you can receive the signal in optimum condition.

If a TV channel signal is marginal due to graininess or ghosting, the picture may sometimes be improved by manually tuning for best picture and then defeating the AFC action. To turn AFC off, follow the procedure below.

1. Select the desired channel by pressing CHANNEL select button.
2. Press the PRESET button once.
3. Press the AFC OFF button. "AFC" disappears from the display.
Note: Pressing the button once again will turn the AFC on.
4. Press the PRESET button once again.

Channel selection

The channel up and down controls on the VTR permit advancing the tuner directly to the next higher or lower programmed channel.

Eliminating unwanted preset channels

You can rearrange the desired channels by eliminating unwanted preset channels for channel up/down tuning.

1. Press the PRESET button once.
2. Press the CHANNEL select buttons until an unwanted channel is found.
3. Press the SKIP button once.
Sound will go off indicating the channel has been erased from memory.
4. Repeat steps 2 and 3 until all unwanted channels have been erased.
5. After eliminating them, press the PRESET button once again.

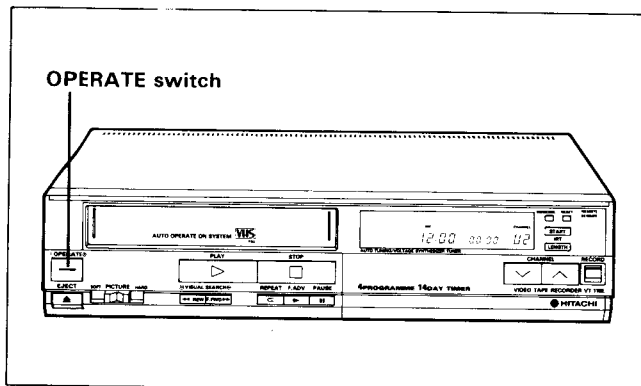
Note: To restore the erased channel, repeat the above steps 1 through 3.

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TIMER RECORDING

The programmable electronic clock/timer permits the unattended recording of 4 preselected programmes within a period of 14 consecutive days, including the same programme(s) repeated on every day and the same programme(s) every week. It turns the unit on and off and selects the channel automatically.

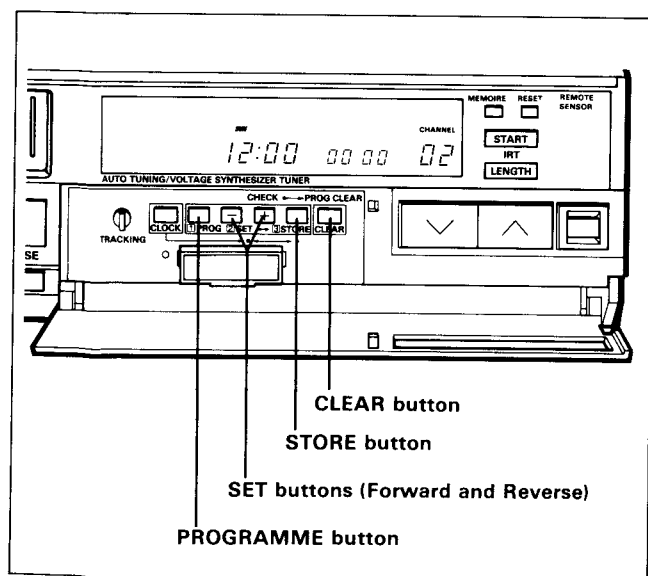
Preparations for timer recording



- Your TV does not have to be on to make a recording because the VTR records TV programmes without the aid of your TV. Its only use is for monitoring.
- 1. Make sure that the clock shows the present time and day correctly.
- 2. Insert a cassette.
Be sure to check that the record safety tab is not missing. If the record safety tab is missing, recording will not begin.
- 3. Programme the timer.

Programming the timer for unattended recording

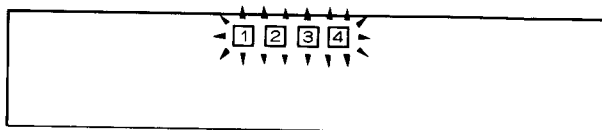
For unattended recording the timer needs to know what **day** to make the recording, the **time to start**, the **time to stop**, and the **channel to be recorded**.



Note: If you input erroneous information by mistake when programming the timer, press the CLEAR button and input the correct information again.

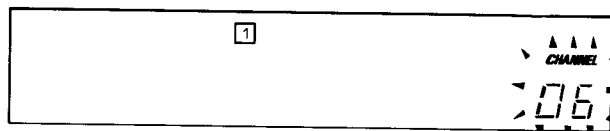
1. Press the PROGRAMME button.

Programme indicators (1 through 4) flash to indicate which memory positions have not been programmed. If a memory has been programmed, its indicator will not flash.



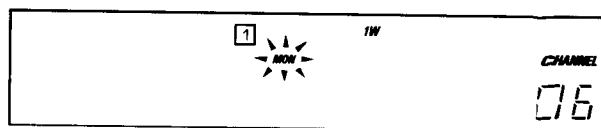
Note: You should determine which memory positions have not been programmed before entering new programming information. New information automatically erases previous programming.

2. Press the SET button (Forward) until the desired programme indicator lights. Programme indicators (1 through 4) light, in sequence, across top of digital display. Press the STORE button when the desired programme number is displayed. Channel number starts flashing.

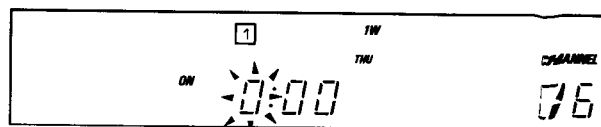


For example, above diagram shows programme "1" has been set.

3. Choose the channel to be recorded by pressing the SET or CHANNEL select button. Then press the STORE button. "1W" appears and the present day flashes.



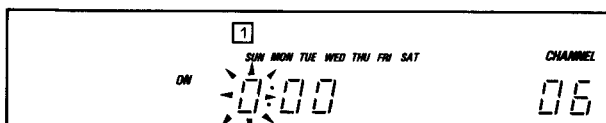
4. Press the SET button (Forward or Reverse) to select the day of recording. Make sure desired Week indicator (1W or 2W) lights. Continuing forward will advance timer to Week Two. Press the STORE button after selecting the day of recording. "0" hour starts flashing.



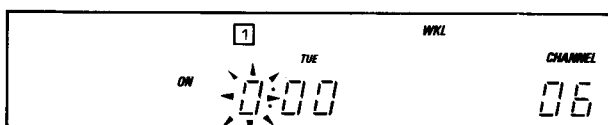
For example, above diagram shows recording on Thursday within 1 week from today.

Notes :

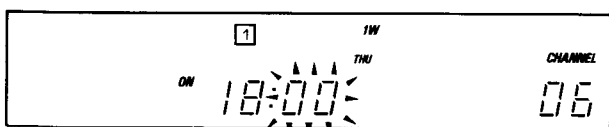
1. To record same time every day of the week:
Press the SET button (Forward or Reverse) until all day indicators light. Hold down the button to advance rapidly. Then press the STORE button.



2. To record on a specified day at the same time each week:
Press the SET button (Forward or Reverse) until the "WKL" indicator lights. Hold down the button to advance rapidly. Then press the STORE button.

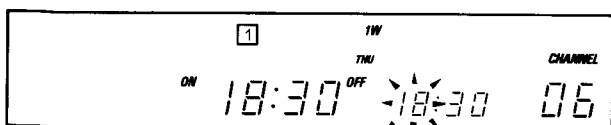


5. Select the hour for recording to start by pressing the SET button (Forward or Reverse). Hold down the button to advance rapidly.
Press the STORE button after selecting the hour for recording to start.
"00" minutes starts flashing.



For example, the above diagram shows "18" hours has been set.

6. Select the minutes for recording to start by pressing the SET button (Forward or Reverse). Hold down button to advance rapidly. Press the STORE button after selecting the minute for recording to start.
"OFF" will appear and "18" hour starts flashing.



For example, the above diagram shows "30" minutes has been set.

7. Select the hour and minute to stop recording in the same procedures described in steps 5 and 6. Be sure to press the STORE button after selecting the minute.

Now, one programming has been completed.
After few seconds the display returns the clock time display together with letters "1" automatically.

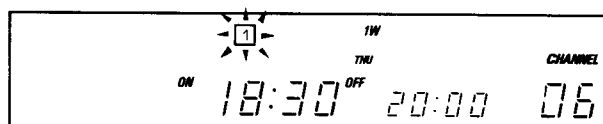
8. Turn off the OPERATE switch. The "⊕" indicator will come on.

Notes:

1. If the erase prevention tab is removed, the cassette is ejected automatically and "⊕" indication will flash. Stick a piece of cellophane tape over the erase prevention hole on the cassette to enable recording.
2. The "⊕" indication will flash, if a cassette is not inserted.

To clear a programme

1. Press the SET button (Forward) until desired programme indicator flashes. Then start and stop time appear on the display.



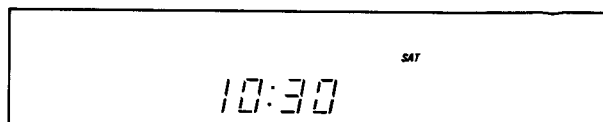
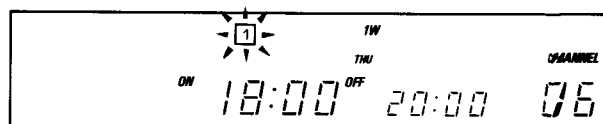
2. Press the CLEAR button.

The display returns the clock time display to show that the programming has been cleared. Be sure to press the CLEAR button while the display shows the start and stop time. The programming does not clear if the CLEAR button is pressed when the display returns the clock time display.

To check programming

Press the SET button (Forward).

The programme indicator "1" flashes. If the programme No. 1 has been already programmed, both start and stop times are displayed in a few seconds. The display then automatically returns to the present time of day.

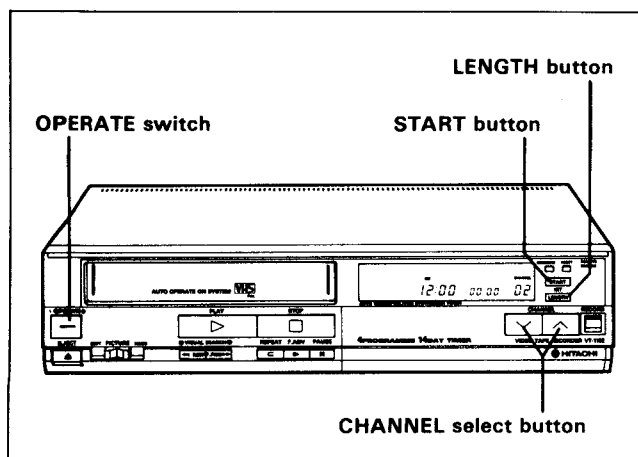


Programming errors

If programmes overlap, the VTR will select the programme with the earliest start time. When that programme is over, the VTR will switch to the next programme. If the start times are the same, the VTR will select the programmes in numerical order.

INSTANT RECORDING TIMER (IRT)

Instant Recording Timer allows you to make simplified timer recording without using the programme timer. There are two simplified methods as explained below.



■ FOR IMMEDIATE RECORDING

1. Insert the cassette (one with the erase prevention tab intact) into the cassette loading door.
2. Press CHANNEL select button to select the channel to be recorded.
3. Press LENGTH button to set the timer to "0:00". Then press LENGTH once again to indicate the recording time on the display. The time changes in hours and minutes in the order of 0:30, 1:00, 1:30, 2:00, 3:00 and 4:00 every time the button is pressed. Recording starts when 0:30 is displayed. During recording, the remaining time is displayed.
4. At the end of recording the display reads 0:00; the VTR will automatically stop recording.

Note: The IRT feature does not operate during play and after a program timer recording has started. During rewind mode, the IRT recording will automatically start after the tape is rewound fully to the end.

■ FOR SIMPLIFIED TIMER RECORDING

1. First perform Steps 1 and 2 of "FOR IMMEDIATE RECORDING".
2. Press START button to select the start time. Each press will change the clock display (the start time) by increments of 10 minutes from the nearest 10 minutes of the hour.
3. Press LENGTH button for the recording time. The counter display is reset to hours and minutes in the order of 0:00, 0:30, 1:00, 1:30, 2:00, 3:00 and 4:00 every time the button is pressed.
4. Press OPERATE switch off, and the "⊕" indication will appear on the Display. The recording will start at the time you have selected and will automatically stop when the recording time display reads "0:00".

Notes:

1. The recording time can be extended any time during IRT by pressing LENGTH button. The recording time display will be reset to 0:30, 1:00, 1:30, 2:00, 3:00 or 4:00 as selected.
2. To stop the VTR during IRT, press LENGTH button until the recording time display reads 0:00, or press OPERATE switch and the STOP button within ten seconds.
3. To change the IRT program, the previous information must be first cleared.
4. If IRT and the program timer recording overlap, the former will override the latter.

To recall the IRT program

Press START or LENGTH button for recalling the start time and the recording time. In about 8 seconds the displays return to the present time of day.

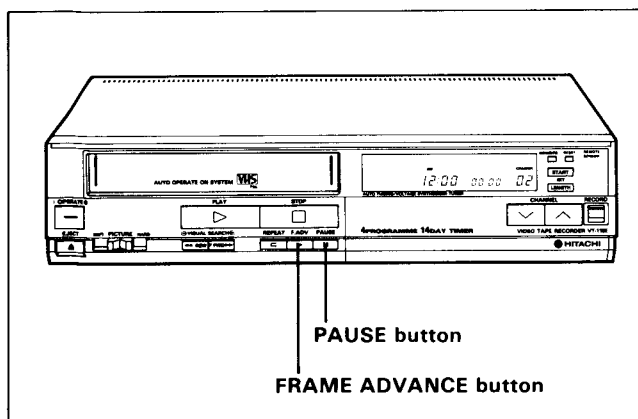
Note: To recall the start time or the recording time, press LENGTH button only once. Pressing more will change the recording time and cause a need for resetting.

To cancel Instant Recording

Press LENGTH button as many as may be required to indicate "0:00" on the display. After approximately 8 seconds the display will return to the present time of day, and IRT has been now cleared.

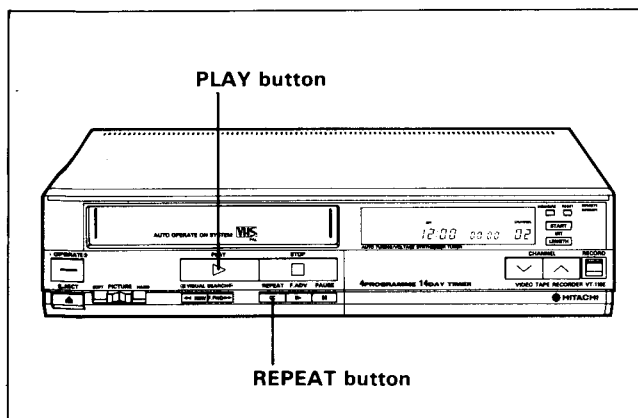
Note: OPERATE switch may be on or off.

Frame advance



When you hold FRAME ADVANCE button down during still playback mode, tape will be played back frame by frame. Operates only after PAUSE button has been pressed.

Repeat function



Use this function to repeat the scene you have just viewed during playback.

1. During playback, press PLAY button at the scene where you want the repeat of the playback to start. The playback continues.
2. Press REPEAT button. The tape is automatically re-wound to the position where PLAY button was pressed, and playback is repeated.

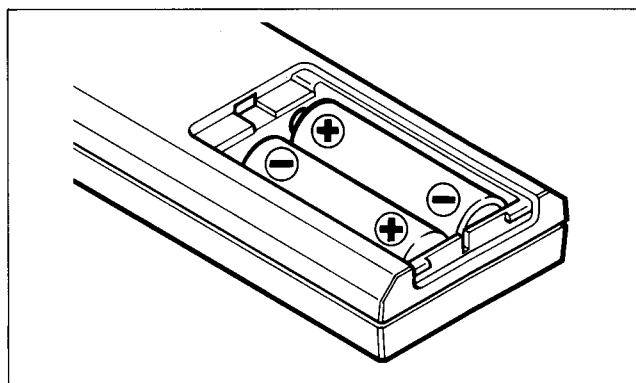
MC-Service

REMOTE OPERATION

You can operate the VTR from a distance using the Infrared Remote Control unit which performs the same functions as the corresponding buttons on the VTR — except for its RECORD buttons.

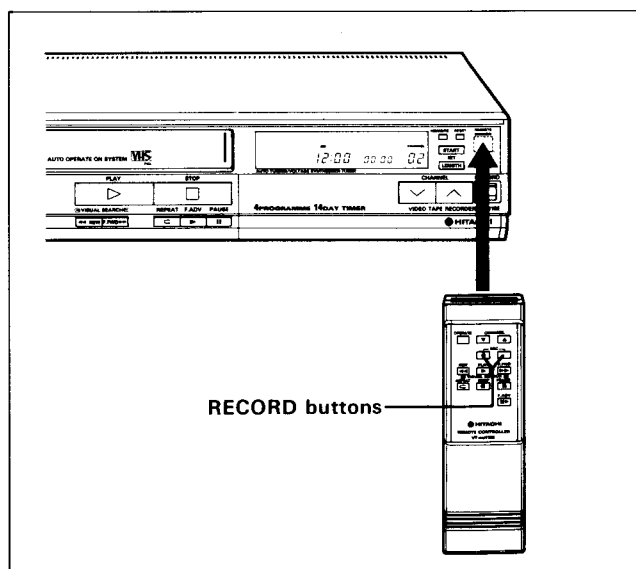
Power source of infrared remote control unit

The infrared remote control unit is powered by two batteries (size IEC standard R6). The life of the batteries is about a year although it depends on the numbers of times the unit is used. Replace the batteries when operation is not possible or when the distance becomes too small.



Operation of remote control

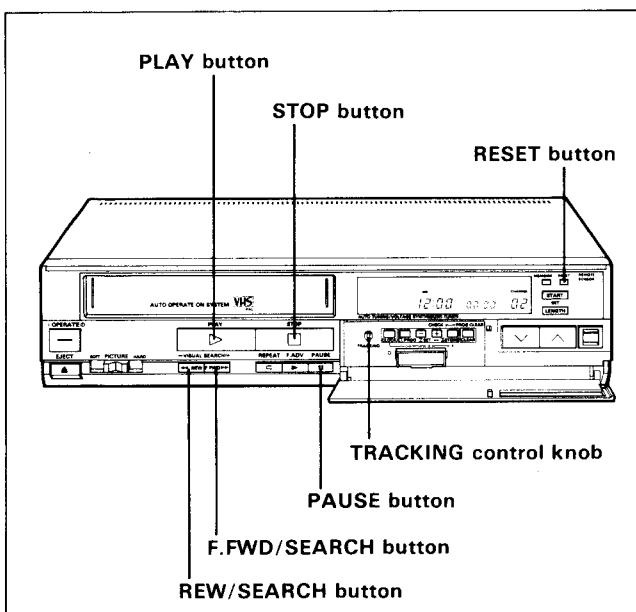
To use the infrared remote control unit aim it at the receiver on the front panel of the VTR.



Press RECORD buttons simultaneously on the remote control unit to record.

Note: The infrared rays will bounce off the walls and eventually reach the receiver on the VTR, but for best results transmit rays directly to the receiver.

PLAYBACK



1. Turn the TV set on and select the video channel.
2. Insert the cassette.
3. Press the PLAY button.
4. Press the STOP button to stop playback.

Tracking control adjustment

When playing prerecorded tapes or those recorded on units other than your own, black and white streaks may appear on your TV screen. If this occurs, adjust the TRACKING control until the streaks disappear. When playback of this particular tape is over, readjust the TRACKING control to its original position. The original position is normally in the center position.

Tape counter

This indicates the amount of video tape transported as a number.

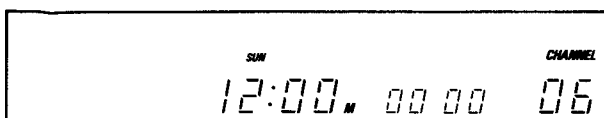
Press the RESET button to set the counter reading to "0000" when starting recording or playing back.

Note the number on the Tape counter at the beginning and end of each programme you record. This will allow you to use the counter to find the desired programme later.

Counter memory function

This is useful if there is a section of tape you want to view immediately after recording or you want to return to the same point several times.

1. Begin recording or playing back a tape.
2. At the point where you want playback to begin, reset the tape counter to "0000" by pressing the RESET button.
3. Press MEMORY button, and the "M" appears on the Display.



4. Continue to play or record.
5. Press the STOP button when recording or playback finishes.
6. Press the REWIND button.

The tape will automatically stop at the pre-selected "0000" position.

Actually, so that you won't miss the very first part of the programme to be viewed, the tape will stop slightly prior to "0000" at approximately the "9997" position.

Note: The counter memory function will also operate during fast-forwarding mode.

Automatic rewind

The VTR automatically rewinds the tape when the end of the tape is reached.

Rewind shut off

If OPERATE switch is pressed during rewind operation, power will be turned off automatically after the tape has been completely rewound.

Still playback

Press the PAUSE button to stop the picture on the screen during playback.

During still playback, press the PAUSE button to return to normal playback or the STOP button to stop the tape.

Notes:

- If you see vertical shaking on the TV screen in the still playback mode, rotate the VERT. SYNC. ADJ. control on the rear of the VTR to minimize shaking.
- When the still playback mode continues for about 5 minutes, the VTR switches to the stop mode automatically to prevent damage to the tape.
- The playback picture will have some noise in the still playback mode.

Visual search

This allows you to view the picture from a recorded tape at high speed in both the forward and reverse directions.

Press the PLAY button to play a tape, then press either the VISUAL SEARCH button REW or F.FWD. Pictures can be viewed at high speed in either the forward or reverse direction.

Note: The playback picture will have some noise in the visual search mode.

DISASSEMBLY

1. NAMES AND LOCATIONS OF CIRCUIT BOARDS

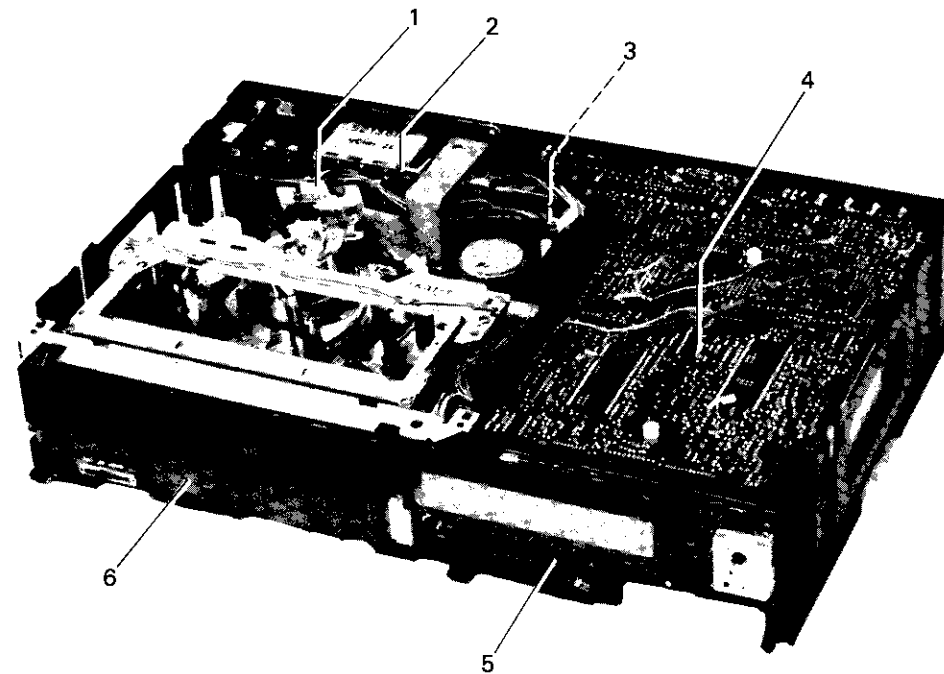


Fig. 1 Top View

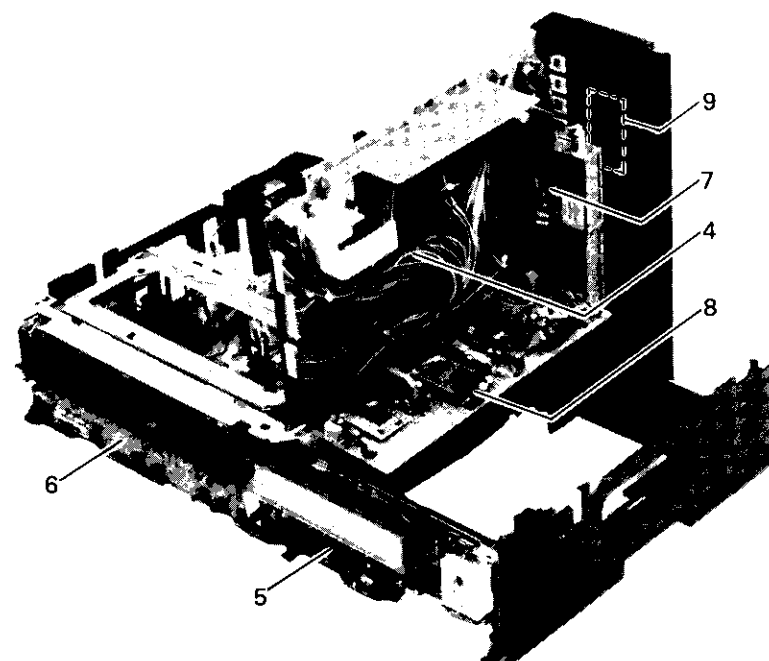


Fig. 2 Top View (with main circuit board open)

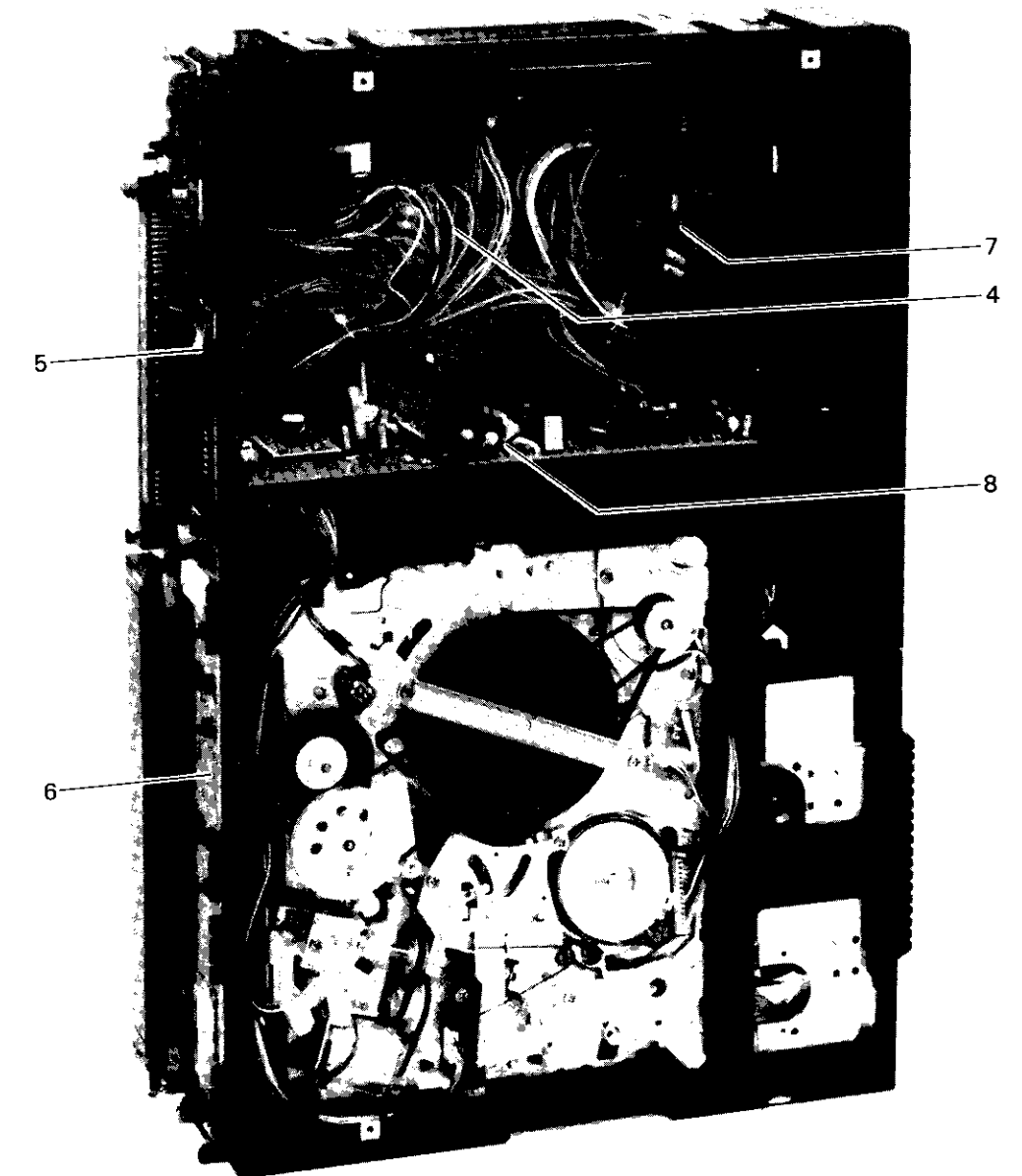


Fig. 3 Bottom View

1. Preamp circuit board
2. Regulator circuit board
3. Cylinder motor driver circuit board
4. Main circuit board
5. Timer circuit board
6. Operation switch circuit board
7. VS tuning circuit board
8. Y/chroma circuit board
9. Buzzer circuit board — VT-120E only —

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(See page 2-9 for details on removing these circuit boards.)

2. NAMES AND LOCATIONS OF MAIN MECHANICAL COMPONENTS

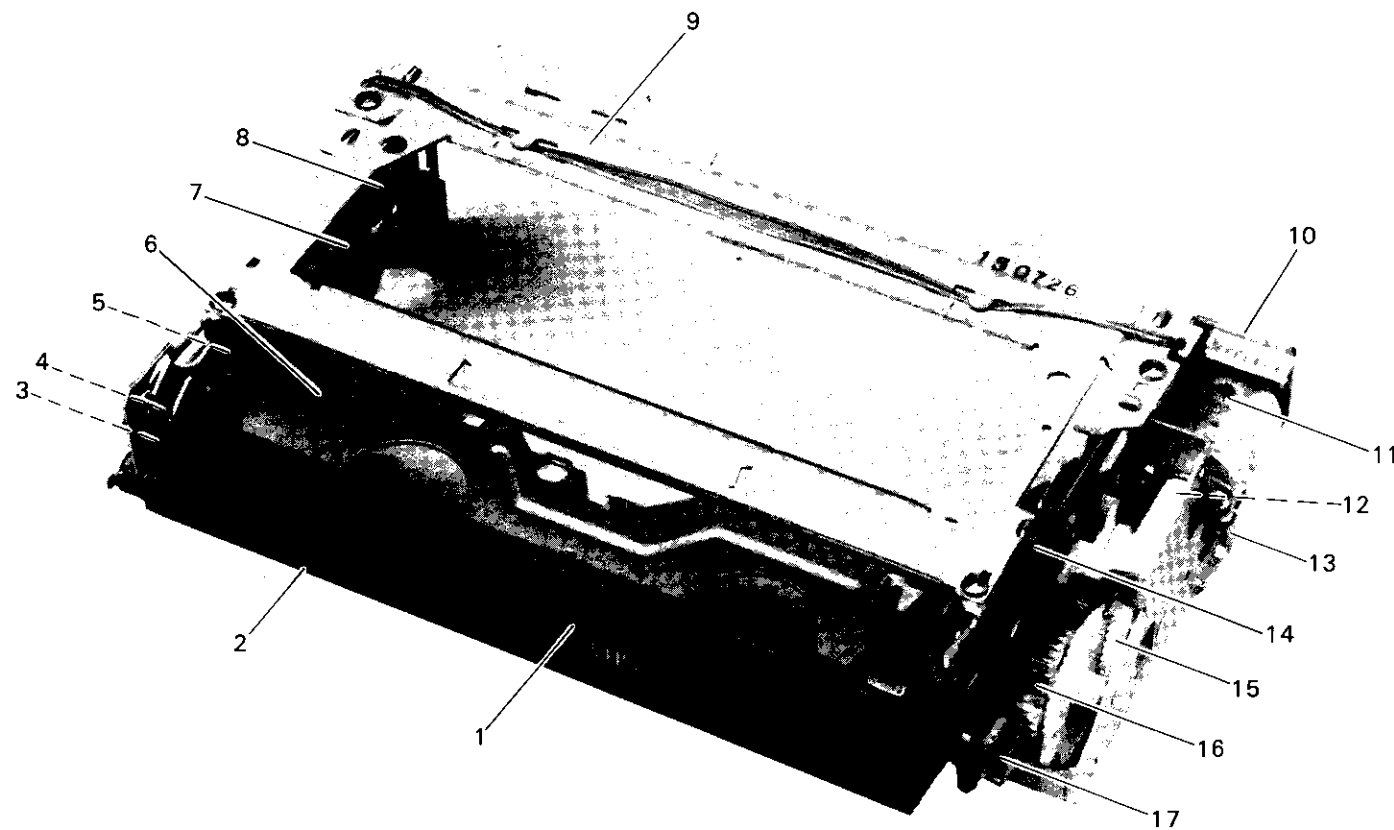


Fig. 4 Cassette Loading Mechanism

- | | |
|----------------------|--|
| 1. Cassette door | 10. Cassette loading motor circuit board |
| 2. Front holder | 11. Cassette loading motor |
| 3. Synchro gear (L) | 12. Cassette-in switch |
| 4. Door arm | 13. Cassette-up switch |
| 5. Drive gear (L) | 14. Side chassis (R) |
| 6. Cassette holder | 15. Drive gear (R) |
| 7. Side chassis (L) | 16. Clutch gear |
| 8. Supply end sensor | 17. Synchro gear (R) |
| 9. Chassis holder | |

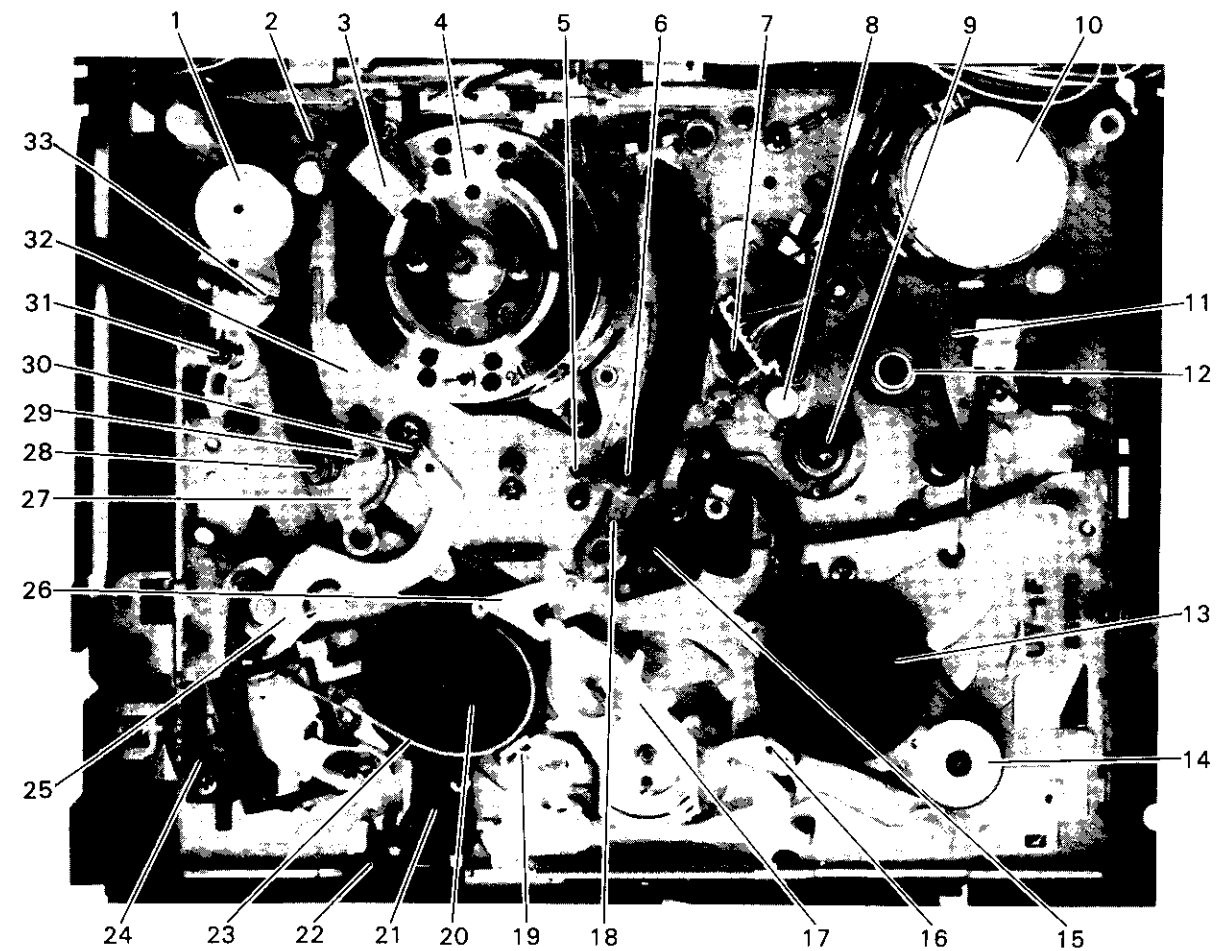


Fig. 5 Top View of Mechanism

- | | |
|---------------------------------|-------------------------------|
| 1. Impedance roller | 16. Main brake (take-up) |
| 2. Catcher/cylinder base | 17. Reel drive gear |
| 3. Ground brush | 18. Take-up guide roller base |
| 4. Upper cylinder (video heads) | 19. Main brake (supply) |
| 5. Inclined guide (take-up) | 20. Supply reel disk |
| 6. Take-up guide roller | 21. Safety tab switch |
| 7. A/C (audio/control) head | 22. Record prevention arm |
| 8. Take-up guide pole | 23. Tension band |
| 9. Capstan shaft | 24. Spring hanger |
| 10. Capstan motor | 25. Tension arm |
| 11. Arm bracket | 26. Supply sub brake |
| 12. Pressure roller | 27. Supply guide roller base |
| 13. Take-up reel disk | 28. Supply guide roller |
| 14. Load pulley | 29. Inclined guide (supply) |
| 15. End lamp | 30. Tension pole |
| | 31. Supply guide pole |
| | 32. Subchassis |
| | 33. FE (full-erase) head |

MC-Service

(See page 2-11 for details on removing the above components.)

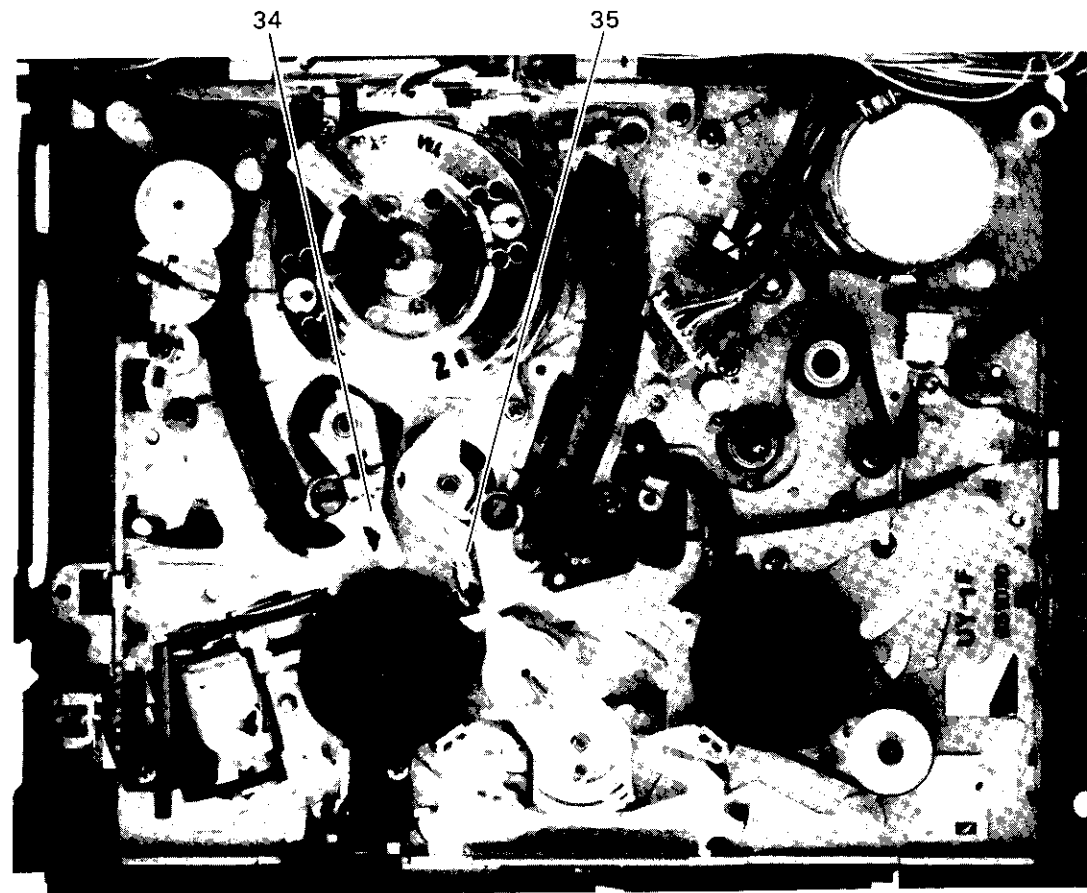


Fig. 6 Top View of Mechanism (with subchassis removed)

- 34. Supply loading link
- 35. Take-up loading link

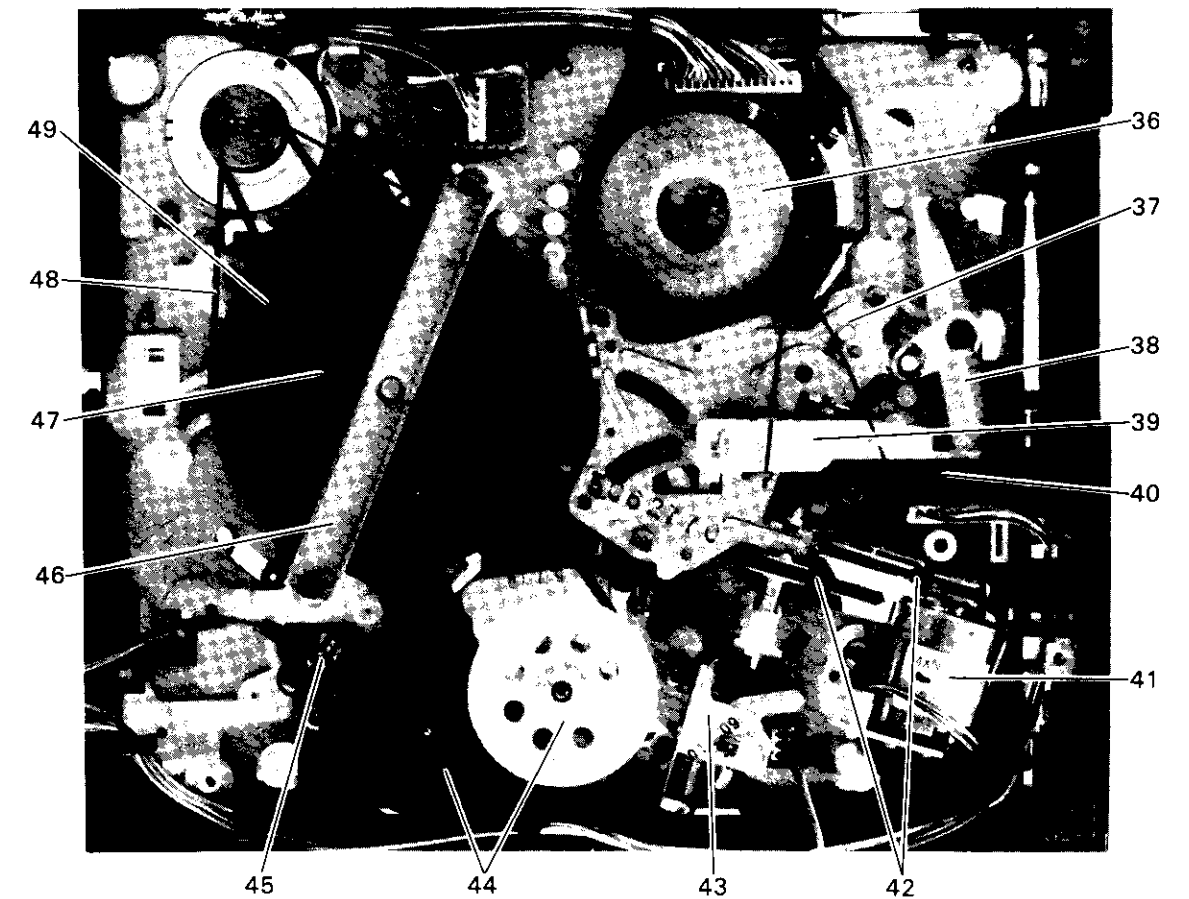


Fig. 7 Bottom View of Mechanism

- 36. Cylinder motor
- 37. Loading gear assembly
- 38. Tension release arm
- 39. Switch slider
- 40. Mechanism state switch
- 41. Loading motor
- 42. Loading belt
- 43. Brake slider
- 44. Clutch plate assembly
- 45. Reel sensor
- 46. Flywheel retainer bar
- 47. Reel belt
- 48. Capstan belt
- 49. Capstan flywheel

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(See page 2-14 for details on removing the above components.)

3. CASE REMOVAL

1. Preset door
2. Top cover
3. Bottom cover
4. Front panel
5. Shield cover
6. Remote controller

1. Preset Door

- 1) Open the preset door. Press down on the attachment holder and pull outward in the direction of the arrow.

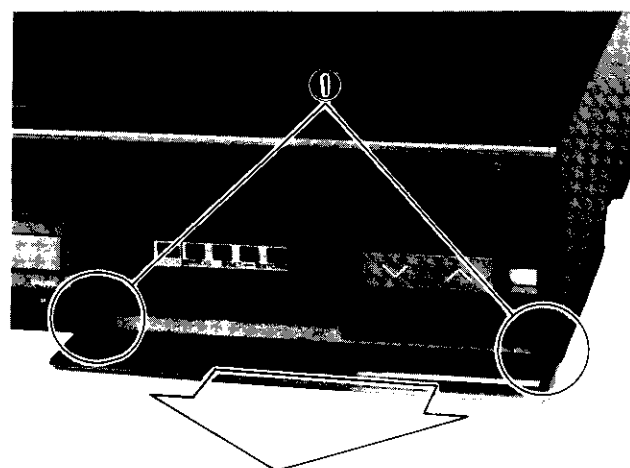


Fig. 1 Preset Door

2. Top Cover

- 1) Remove the 5 screws.
- 2) Lift the rear of the top cover upward. Slide the entire cover to the rear.

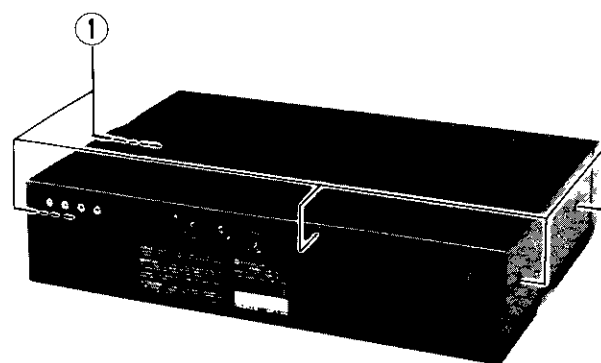


Fig. 2 Top Cover

3. Bottom Cover

- 1) Remove the 6 screws.

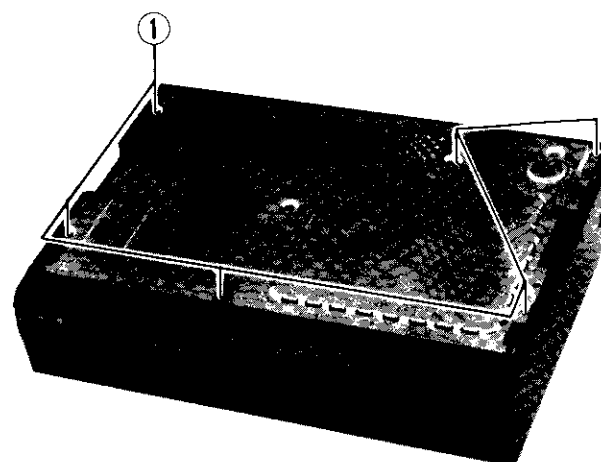


Fig. 3 Bottom Cover

4. Front Panel

- 1) Remove top and bottom covers (see items 2 and 3).
- 2) Remove the screw.
- 3) Release the 5 stoppers.
- 4) Tilt the top toward you and pull out the entire front panel.

[Cautions during reassembly]

- * Make sure the picture control slide lever on the operation switch circuit board is correctly inserted into the picture control knob on the back of the front panel.
- * Removing the tracking control knob first will simplify reassembly.

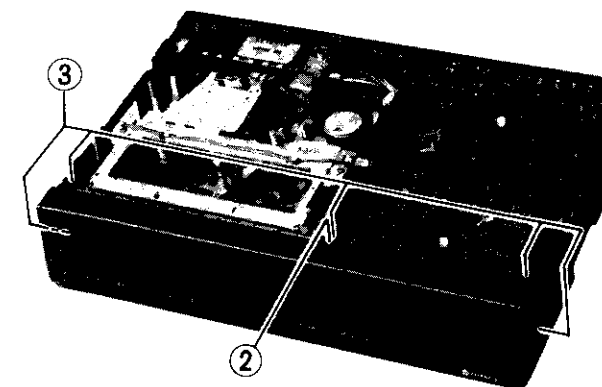


Fig. 4 Front Panel

5. Shield Cover

- 1) Remove the top cover (see item 2).
- 2) Remove the screw holding the shield cover.

[Cautions during reassembly]

- * Make sure the rear of the shield cover correctly fits over the preamp circuit board's shield case.

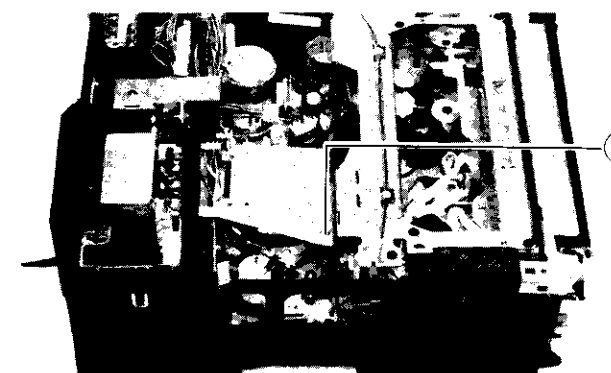


Fig. 5 Shield Cover

6. Remote Controller

- 1) Release 6 stoppers.

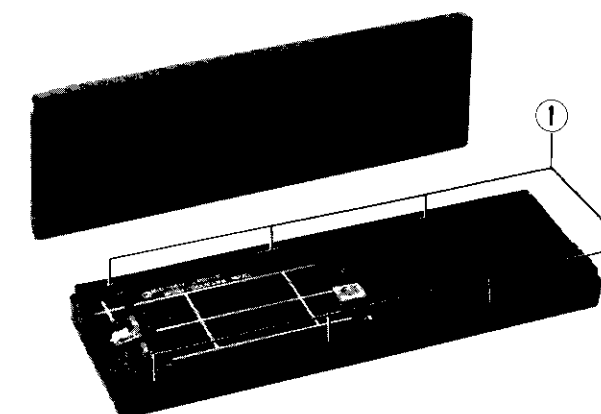


Fig. 6 Remote Controller

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4. CIRCUIT BOARD REMOVAL

1. Main Circuit Board Block (Main, Y/chroma, VS tuning)
2. Operation Switch Circuit Board
3. Timer Circuit Board
4. Regulator Circuit Board
5. Preamp Circuit Board

1. Main Circuit Board Block

- 1) Remove the top and bottom covers (see items 2 and 3 in the section on case removal.)
- 2) Release the 2 stoppers.
- 3) Remove the 2 screws.
- 4) Push the circuit board holder in the direction of the arrow. Then lift up the entire circuit board.
- 5) The circuit board can now be opened in the direction of the arrow.

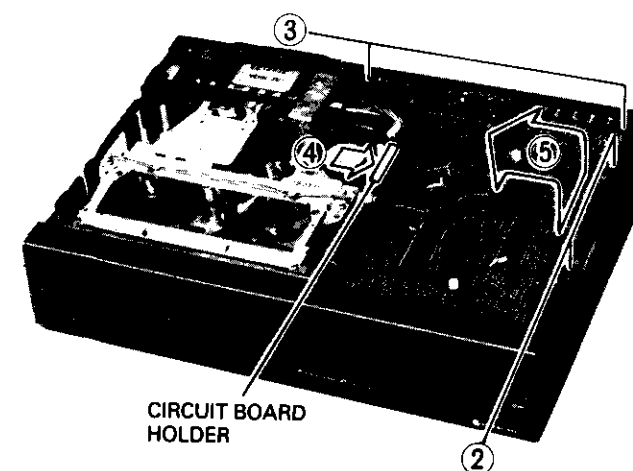


Fig. 1 Main Circuit Board Block

2. Operation Switch Circuit Board (Figs. 2 and 4)

- 1) Remove the top and bottom covers and the front panel (see items 2, 3 and 4 in the section on case removal.)
- 2) Disconnect the connector.
- 3) Release the 6 (5) upper and lower stoppers.

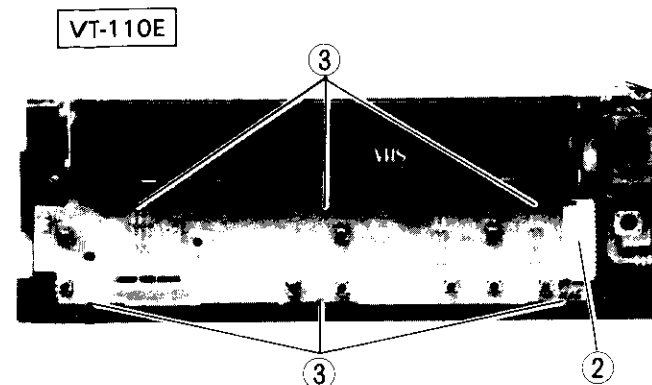


Fig. 2 Operation Switch Circuit Board

3. Timer Circuit Board (Figs. 3 and 4)

- 1) Remove the top and bottom covers and the front panel (see items 2, 3 and 4 in the section on case removal.)
- 2) Disconnect the connector.
- 3) Release the 5 (7) upper and lower stoppers.
- 4) Remove the 5 screws.

[Cautions while working]

* Since the backup capacitor retains its charge for approx. 5 minutes after the AC power lead has been unplugged, press the reset switch to discharge the capacitor.

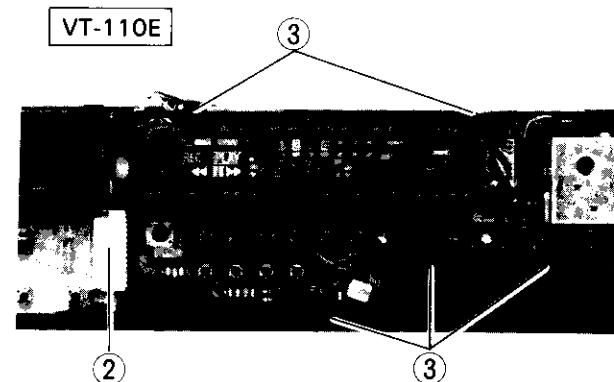


Fig. 3 Timer Circuit Board

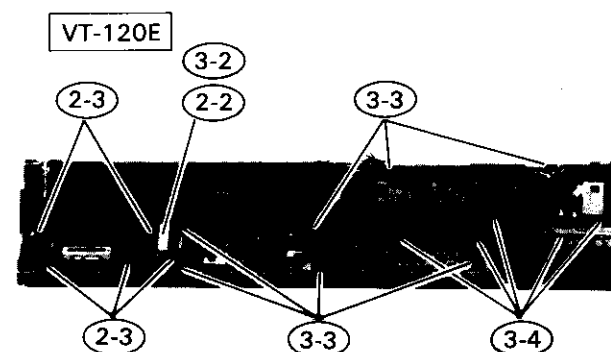


Fig. 4 Operation Switch/Timer Circuit Board

4. Regulator Circuit Board (Figs. 5 and 6)

- 1) Remove the top cover (see item 2 in the section on case removal).
- 2) Remove the 2 screws from the bottom cover.
- 3) Remove the screw holding the heat sink. Remove the heat sink.
- 4) Remove the 2 screws on the transformer holder.
- 5) Lift up in the direction of the arrow.

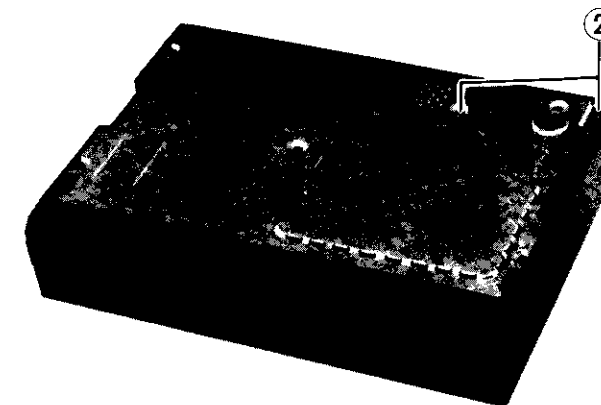


Fig. 5 Bottom Cover

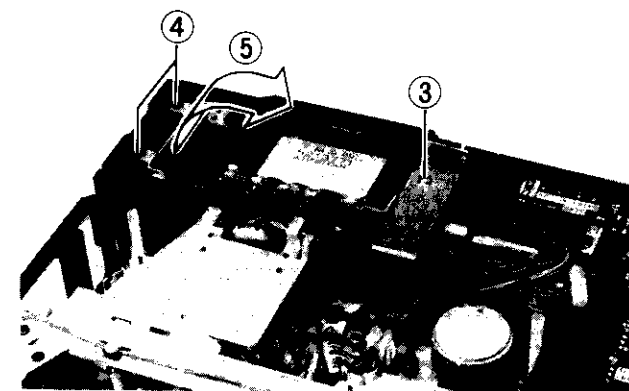


Fig. 6 Regulator Circuit Board

5. Preamp Circuit Board

- 1) Remove the top cover and the shield cover (see items 2 to 5 in the section on case removal).
- 2) Pull out and up.

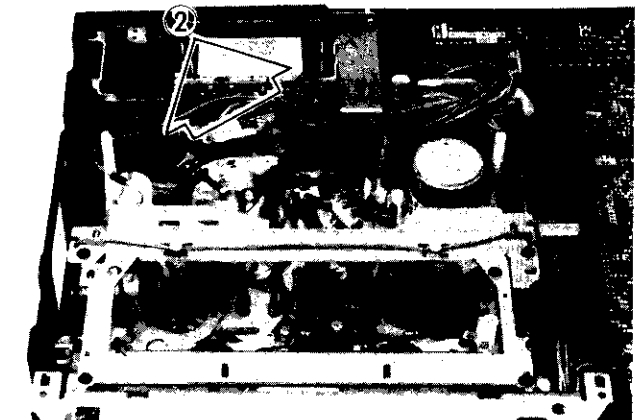


Fig. 7 Preamp Circuit Board

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5. CASSETTE LOADING MECHANISM REMOVAL

- 1. Cassette Door
- 2. Supply End Sensor
- 3. Chassis Holder

* Components listed below will be described as if the top and bottom covers, front panel and shield cover have already been removed. (See items 2, 3, 4, and 5 in the section on case removal.)

- 4. Cassette Loading Mechanism
- 5. Gear Cover
- 6. Door Arm
- 7. Drive Gear (L)
- 8. Motor Block
- 9. Cassette Loading Motor
- 10. Drive Gear (R)
- 11. Cassette Holder

1. Cassette Door

- 1) Remove the top and bottom covers and the front panel (see items 2, 3 and 4 in the section on case removal).
- 2) Push and spread apart the front holder in the direction indicated by the arrow. Remove the cassette door.

[Cautions during reassembly]

* Make sure the pin on the door arm fit into the groove in the cassette door.



Fig. 1 Cassette Door

2. Supply End Sensor

- 1) Remove the top cover (see item 2 in the section on case removal).
- 2) Release the stopper.

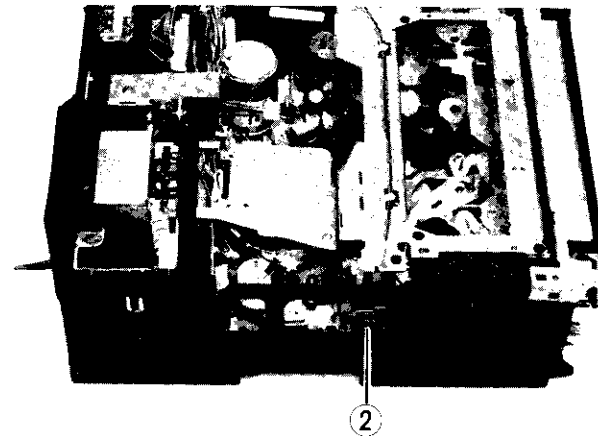


Fig. 2 Supply End Sensor

3. Chassis Holder

- 1) Remove the top and bottom covers (see items 2 and 3 in the section on case removal).
- 2) Remove the supply end sensor (see item 2).
- 3) Release the supply end sensor cord from the chassis holder.
- 4) Remove the 4 screws.

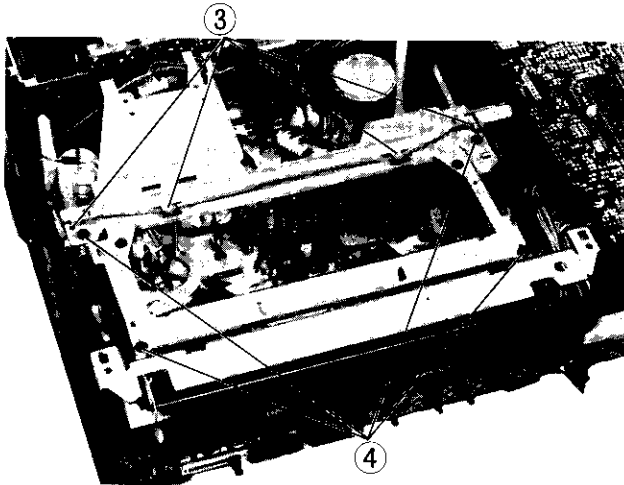


Fig. 3 Chassis Holder

4. Cassette Loading Mechanism

- 1) Push the reinforcing plate in the direction of the arrow, and lift upward.
- 2) Disconnect the connector.
- 3) Remove the 2 screws.
- 4) Lift the rear end of the mechanism upwards and release the engagement fitting on the bottom front.

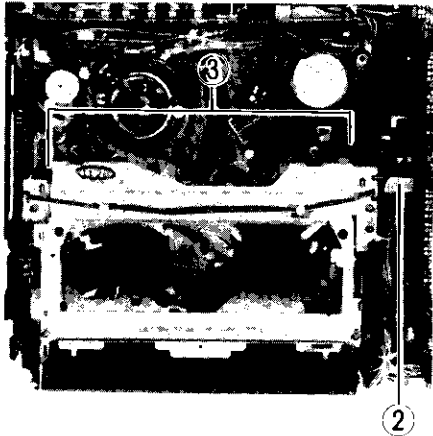


Fig. 4 Cassette Loading Mechanism

5. Gear Cover

- 1) Remove the cassette loading mechanism (see item 4).
- 2) Lift section (A) up slightly. Then pull the entire gear cover unit forward.

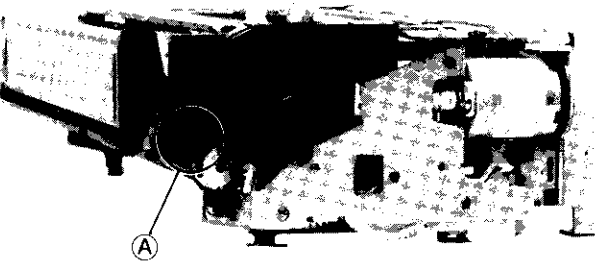


Fig. 5 Gear Cover

6. Door Arm

- 1) Remove the cassette loading mechanism (see item 4.)
- 2) Remove the spring.
- 3) Release the 2 stoppers.

[Cautions during reassembly]

* Insert the pin on the front edge of the door arm into the groove in the cassette door.

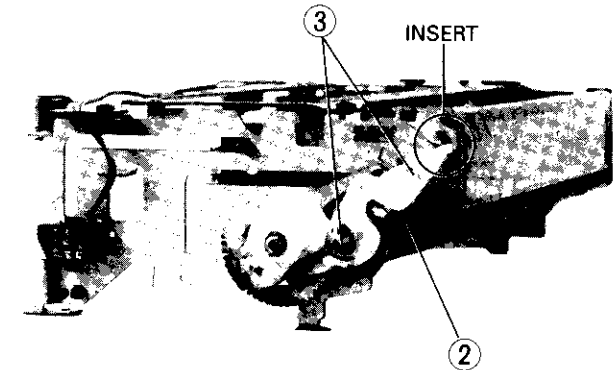


Fig. 6 Door Arm

7. Drive Gear (L)

- 1) Remove the cassette loading mechanism and the door arm (see items 4 and 6).
- 2) Release the stopper and pull out the drive gear (L).

[Cautions during reassembly]

* Align the triangular mark on the drive gear (L) with the triangular mark on the synchro gear (L).

* Insert the pin on the cassette holder into the groove in the drive arm.

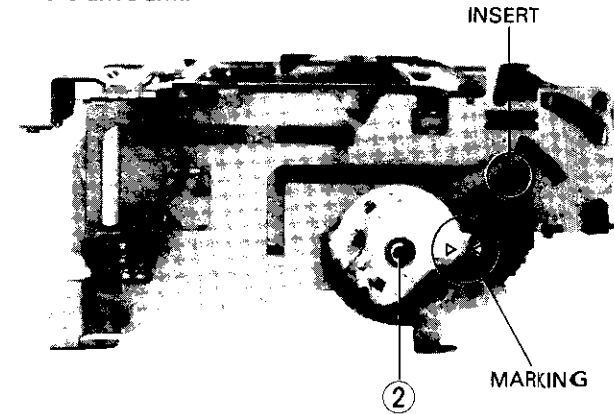


Fig. 7 Drive Gear (L)

MC-Service

8. Motor Block

- 1) Remove the cassette loading mechanism, the gear cover, the supply end sensor and the chassis holder (see items 4, 5, 2 and 3).
- 2) Remove the 2 screws holding the motor block.

[Cautions during reassembly]

- * Place the cassette holder in the unloaded position (prior to cassette insertion). Align the triangular markings on the synchro gear and the clutch gear.
- * Insert the slide pin on the cassette holder into the groove in the clutch gear's drive arm.

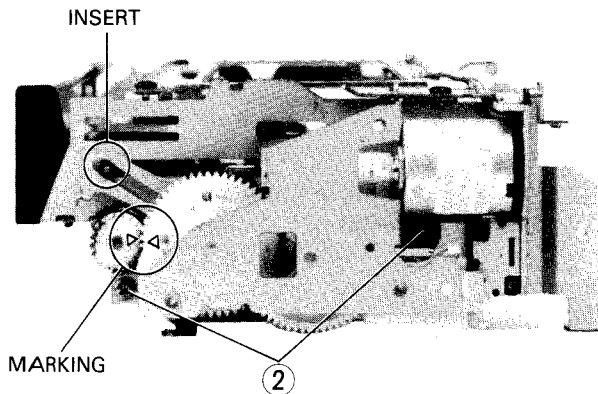


Fig. 8 Cassette Loading Motor Block

9. Cassette Loading Motor

- 1) Remove the cassette loading mechanism, the gear cover, the supply end sensor, the chassis holder and the motor block (see items 4, 5, 2, 3 and 8).
- 2) Remove the 2 screws holding the cassette loading motor.

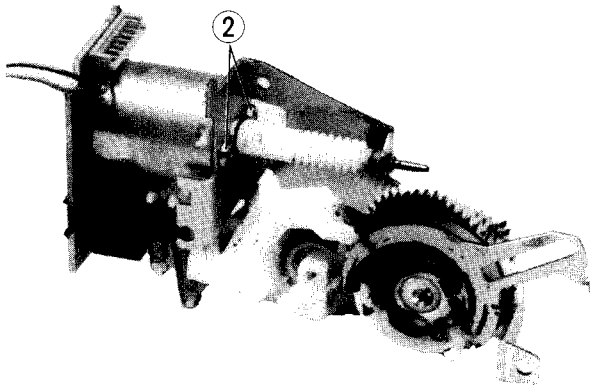


Fig. 9 Cassette Loading Motor

10. Drive Gear (R) (Figs. 10, 11 and 12)

- 1) Remove the cassette loading mechanism, the gear cover, the supply end sensor, the chassis holder and the motor block (see items 4, 5, 2, 3 and 8).
- 2) Remove the 2 springs. Pull the switch lever out.
- 3) Turn the drive arm counterclockwise and pull the clutch gear out.
- 4) Release the stopper. Pull out another gear.
- 5) Remove the screw holding the gear holder.

[Cautions during reassembly]

- * Position the triangular marking on the drive gear (R) so that it faces the worm gear. (See Fig. 11). The (○) and triangle can also be seen from the outside so that correct position can be checked after reassembling the motor block. (See Fig. 12)
- * Align marking (▷) on drive gear (R) with projection (◊) on the clutch gear. (See Fig. 11)
- * Attach the spring on the clutch gear to both gears (See Fig. 11)

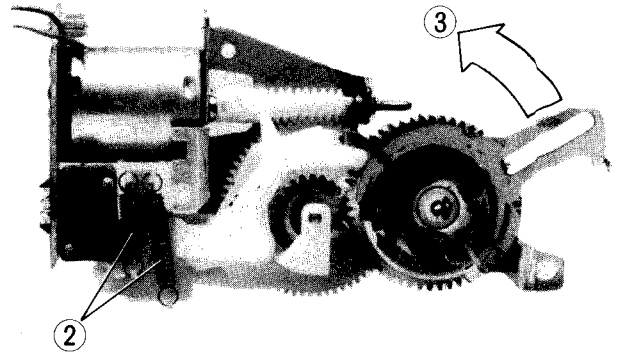


Fig. 10 Drive Gear (I)

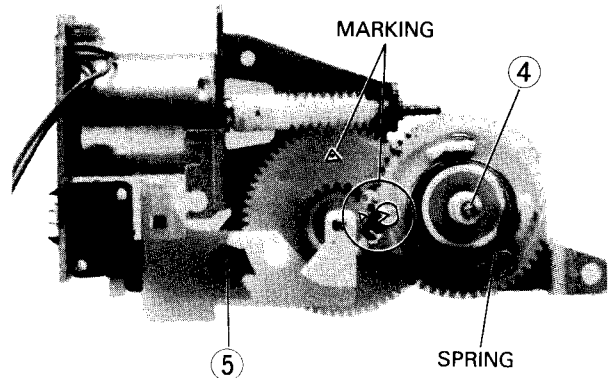


Fig. 11 Drive Gear (II)

MC-Service

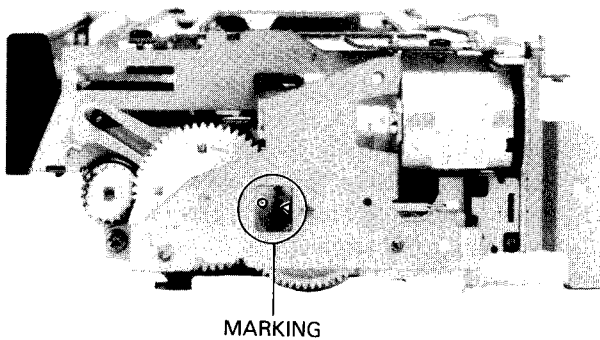


Fig. 12 Marking on Gear

11. Cassette Holder

- 1) Remove the cassette loading mechanism, the gear cover, the supply end sensor, the chassis holder and the motor block (see items 4, 5, 2, 3 and 8).
- 2) Remove the screw on top of the front holder. Remove the side chassis (R).

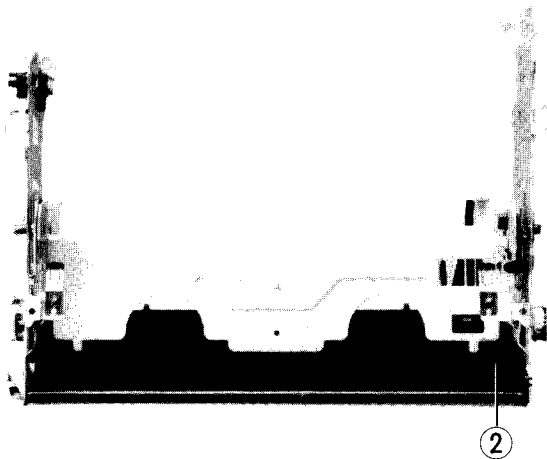


Fig. 13 Cassette Holder

6. MAIN MECHANICAL COMPONENTS REMOVAL

Heads

1. Upper Cylinder (Video Heads)
2. Impedance Roller and FE (Full Erase) Head
3. A/C (Audio Control) Head

Motors

4. Cylinder Assembly
Rotor Magnet
FG Coil
5. Capstan Motor
6. Loading Motor

Sensors, Switches

7. End Lamp
8. Reel Sensor
9. Mechanism State Switch
10. Safety Tab Switch

Others

11. Main Brake
12. Subbrake
13. Supply Guide Pole
14. Take-up Guide Pole
15. Reel Drive Gear
16. Take-up Reel Disk
17. Load Pulley
18. Tension Arm/Tension Band
19. Guide Roller
20. Supply Reel Disk
21. Pressure Roller
22. Arm Bracket
23. Guide Base and Loading Link
24. Clutch Plate Assembly
25. Capstan Flywheel
26. Brake Slider
27. Loading Gear Assembly

MC-Service

1. Upper Cylinder (Video Heads) (Figs. 1 and 2)

- 1) Remove the top cover and shield cover (see items 2 and 5 in the section on case removal)
- 2) Remove the screw holding the brush. Remove the earth brush.
- 3) Remove the 2 screws holding the upper cylinder. Pull the upper cylinder out.

[Cautions while working]

- * Since the upper cylinder has connectors, do not apply pressure in the direction of rotation. Pull the cylinder vertically upward in the direction of cylinder attachment.
- * Do not touch the video head tips with fingers or tools.

[Cautions during reassembly]

- * Insert so that the arrow on the rotary transformer matches the blue side of the video head connector.
- * Alternately tighten the 2 screws holding the upper cylinder.

[Adjustments after reassembly]

- Adjustments after replacing the cylinder

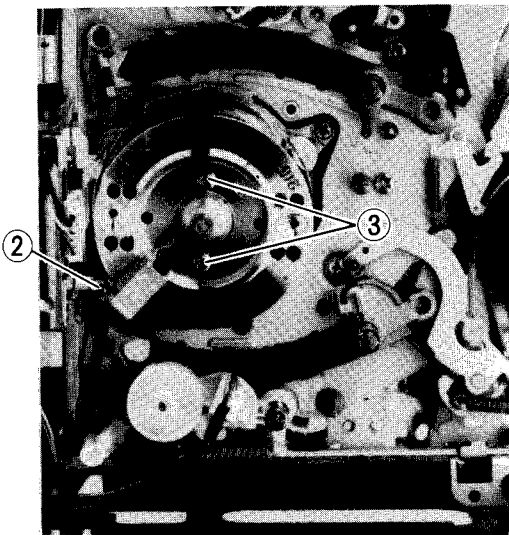


Fig. 1 Video Head

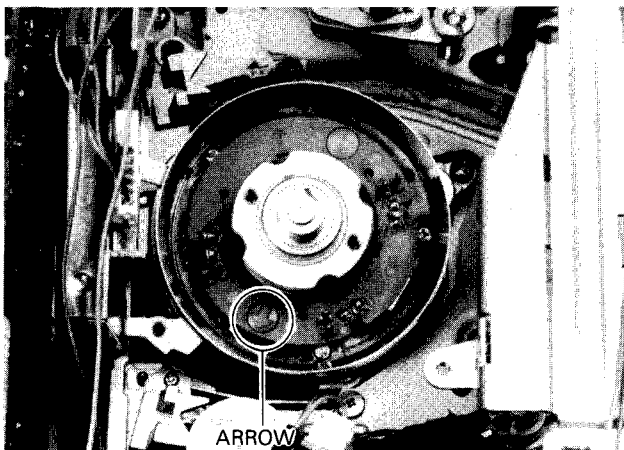


Fig. 2 Rotary Transformer

2. Impedance Roller and FE (Full Erase) Head

- 1) Remove top cover and shield cover (see items 2 and 5 in the section on case removal).
- 2) Disconnect the connector.
- 3) Remove the spring attached between the FE head base and the chassis.
- 4) Remove the lock nut on the guide pole and then pull the guide pole, spring and washer out.
- 5) Pull up the FE head together unit the base and out.
- 6) Then with the FE head removed, remove the screw on the back of the base.

[Adjustments after reassembly]

- Guide pole height adjustment

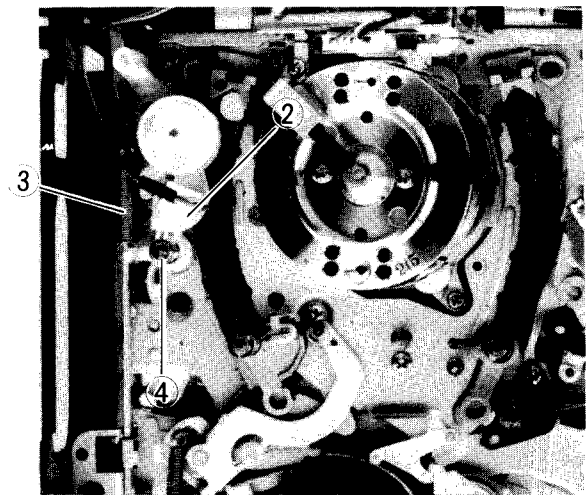


Fig. 3 FE Head

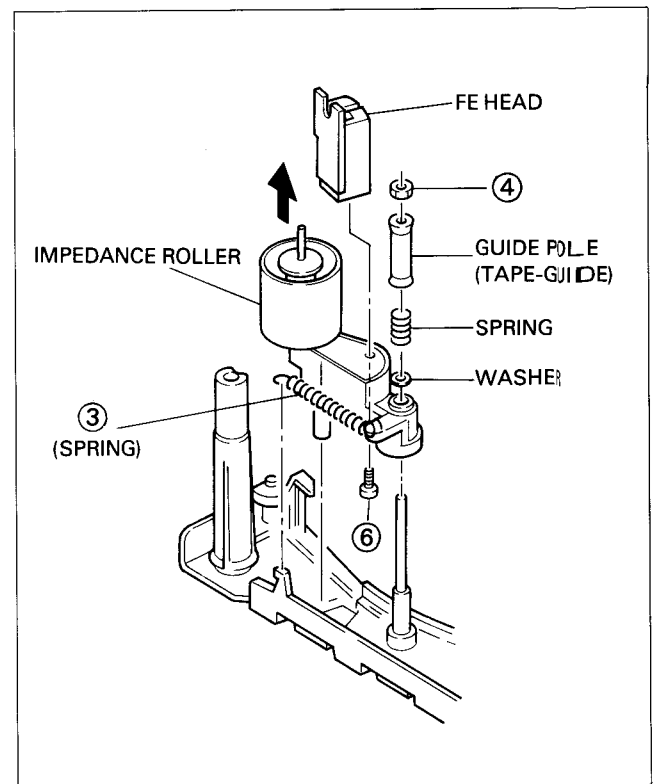


Fig. 4 FE Head

3. A/C (Audio/Control) Head (Figs. 5 and 6)

- 1) Remove the top cover (see item 2 in the section on case removal).
- 2) Release the lead from the wire guide. Pull out the connector.
- 3) Remove the lock nut and washer from the head base. Pull up the base and out.
 - * Apply the bottom of the spring under the head base to the stopper on the chassis, the top of the spring to the stopper on the base. (Fig. 6)

[Cautions during reassembly]

- * Make sure the tip of the A/C head lock screw protrudes 3 to 4 mm from the top surface of head base 1.
- * Make sure that head base 1 and head base 2 are parallel.

[Adjustments after reassembly]

- A/C head adjustment
- X value adjustment
- Audio playback level adjustment
- Audio bias level adjustment

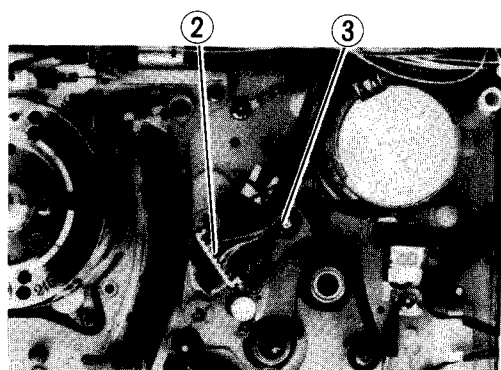


Fig. 5 AC Head

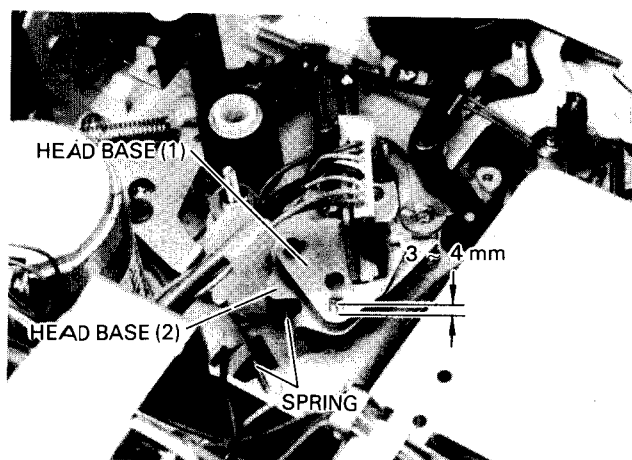


Fig. 6 Spring and Lock Screw

4. Cylinder Assembly

- 1) Remove the top cover and shield cover (see items 2 and 5 in the section on case removal).
- 2) Pull out the preamp circuit board.
- 3) Remove the bottom cover (see item 3 in the section on case removal.)
- 4) Disconnect the connector from the FG circuit board.
- 5) Remove the 3 screws holding the cylinder.
- 6) Remove the cylinder assembly from the top.

[Cautions during reassembly]

- * Since the screws position on the back of the assembly, place the unit with the left side down to remove the screws.
- * Do not touch the video head tips with fingers or tools.

[Adjustments after reassembly]

- Adjustments after replacing the cylinder

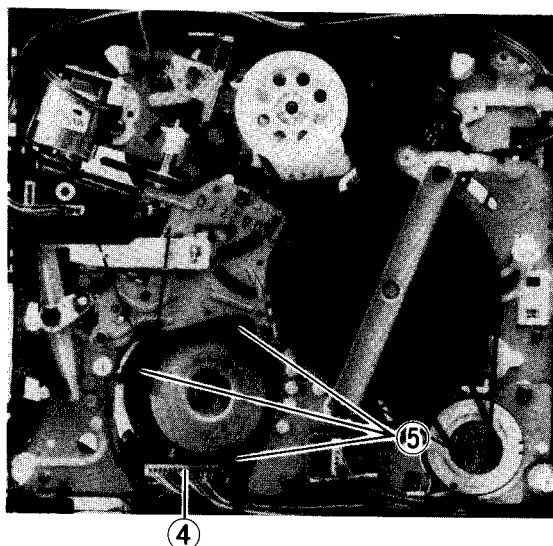


Fig. 7 Cylinder Assembly

MC-Service

[Removing only the rotor magnet and FG coil]

(Figs. 8 and 9)

- a) Remove the bottom cover (see item 3 in the section on case removal).
- b) Remove the 2 screws on the rotor. Pull the rotor magnet out.
- c) Remove the 3 screws holding the FG coil.

[Cautions during reassembly]

- * Fit the slot on the cylinder rotating spindle into the protrusion on the rotor side, then lock the rotor magnet with the screws.

[Adjustments after reassembly]

- Switching point adjustment

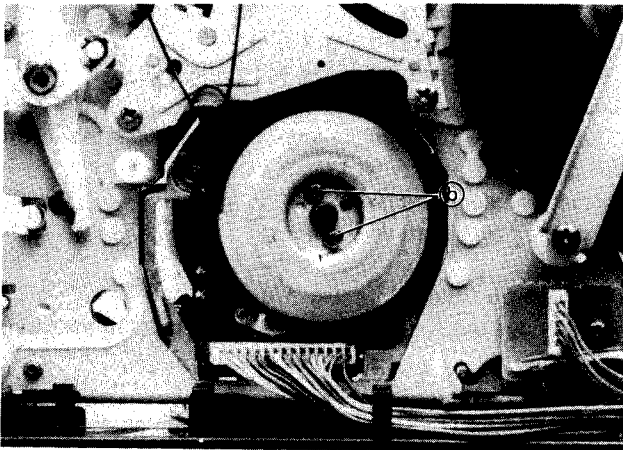


Fig. 8 Rotor Magnet

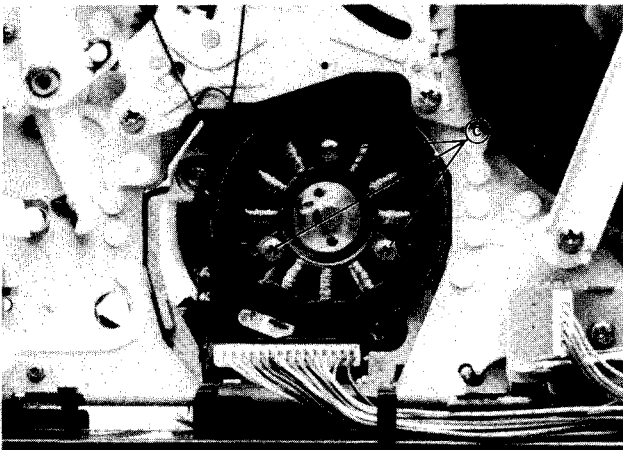


Fig. 9 FG Coil

MC-Service

5. Capstan Motor

- 1) Remove bottom cover (see item 3 in the section on case removal).
- 2) Remove the reel belt.
- 3) Remove the flywheel belt.
- 4) Disconnect the connector from the capstan motor circuit board.
- 5) Remove the 2 screws holding the capstan motor holder. Pull out the capstan motor holder.

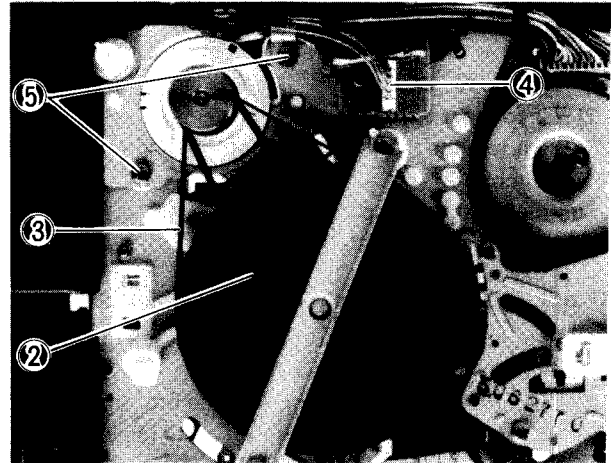


Fig. 10 Capstan Motor

6. Loading Motor

- 1) Remove the bottom cover (see item 3 in the section on case removal.)
- 2) Remove the loading belt.
- 3) Disconnect the connector from the loading motor circuit board.
- 4) Remove the screw holding the loading motor.

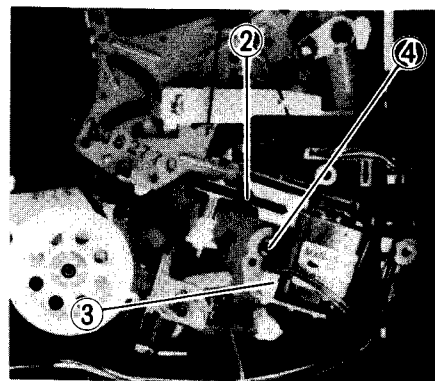


Fig. 11 Loading Motor

7. End Lamp (Fig. 13)

- 1) Remove the top cover (see item 2 in the section on case removal).
- 2) Remove the screw holding the end lamp.

8. Reel Sensor (Fig. 12)

- 1) Remove the bottom cover (see item 3 in the section on case removal).
- 2) Remove the screw holding the reel sensor.

9. Mechanism State Switch (Fig. 12)

- 1) Remove the bottom cover (see item 3 in the section on case removal).
- 2) Disconnect the connectors
- 3) Remove the screw holding the mechanism state switch.

[Adjustments after reassembly]

- Mechanism state switch adjustment

10. Safety Tab Switch (Figs. 12 and 13)

- 1) Remove the top and bottom covers (see items 2 and 3 in the section on case removal).
- 2) Disconnect the connector from the bottom side.
- 3) Remove the screw holding the safety tab switch.

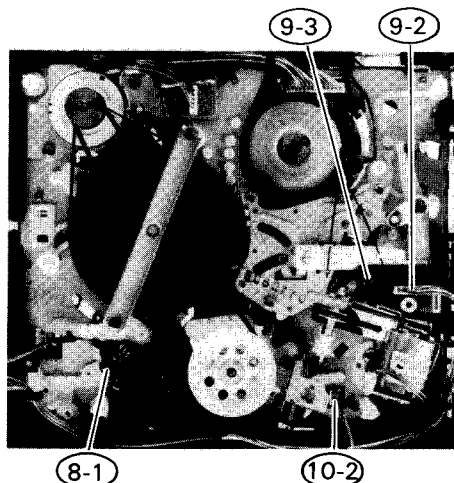


Fig. 12 Bottom View of Mechanism

* Components in items 11 to 17 are described as if the top cover has already been removed. See item 2 in the section on case removal.

11. Main Brakes (Fig. 13)

- 1) Remove the spring between the supply and take-up brakes.
- 2) Release each section engaged with the chassis.

12. Supply Subbrake (Fig. 13)

- 1) Remove the spring between the subchassis and the brake.
- 2) Release the section engaging the brake spindle.

13. Supply Guide Pole (Fig. 13)

- 1) Remove the screw holding the guide pole.

[Cautions during reassembly]

* Make sure the washer and spring are inserted in the guide pole attachment shaft.

[Adjustments after reassembly]

- Guide pole height adjustment

14. Take-up Guide Pole (Fig. 13)

- 1) Remove the cap. Remove the screw holding the guide pole.

[Cautions during reassembly]

* Make sure the spring is inserted in the guide pole attachment shaft.

[Adjustments after reassembly]

- Guide pole height adjustment

15. Reel Drive Gear (Fig. 13)

- 1) Push the spring holder in the direction of arrow to pull the spring holder up and out.

MC-Service

16. Take-up Reel Disk (Fig. 13)

- 1) Remove the rubber belt across the load pulley and reel disk.
- 2) Remove the washer from the top of the disk.

[Cautions during reassembly]

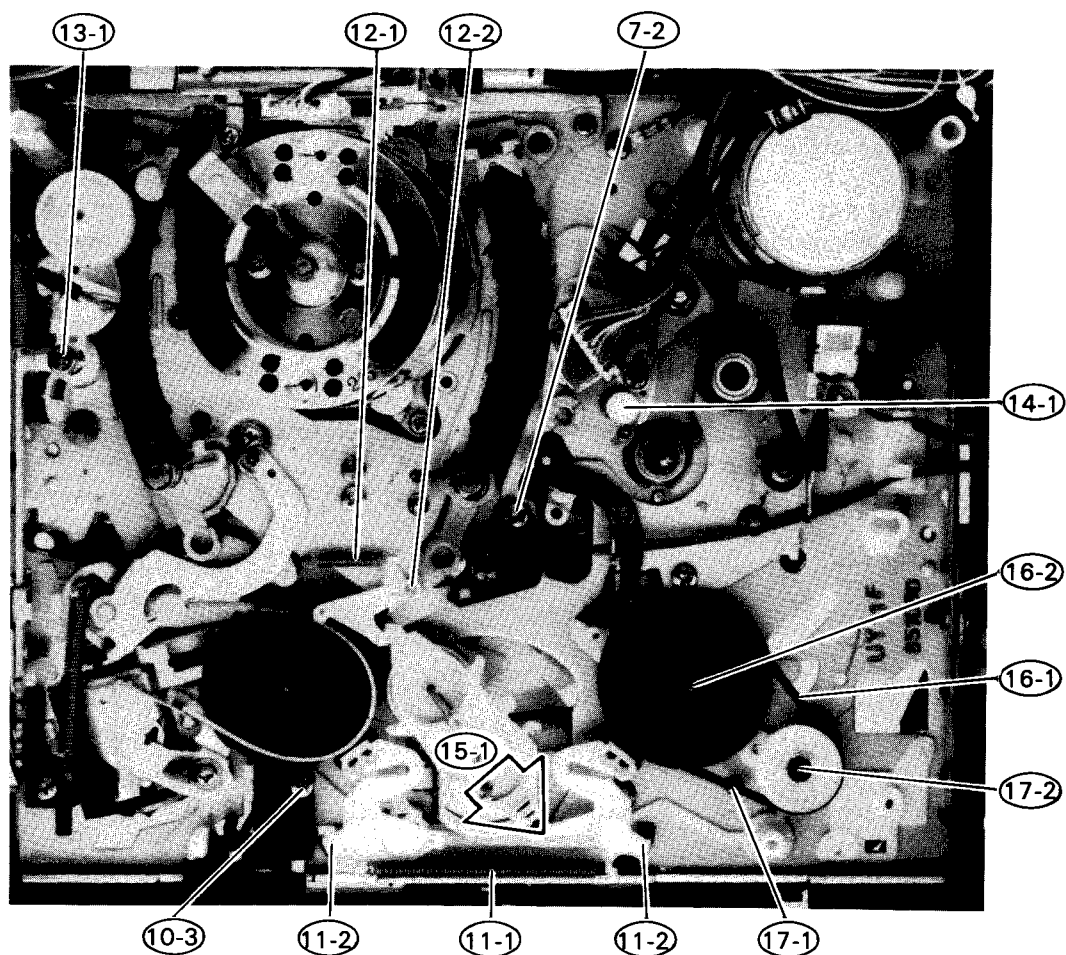
- * Make sure the washer is inserted in the reel disk attachment shaft.

[Adjustments after reassembly]

- Reel disk height adjustment

17. Load Pulley (Fig. 13)

- 1) Remove the rubber belt across the pulley and the reel disk.
- 2) Remove the washer from the top of the pulley.



MC-Service

Fig. 13 Top View of Mechanism

* Components in items 18 to 23 are described as if the top and bottom covers, the front panel, the shield cover, and cassette loading mechanism have already been removed. See item 4 in the section on cassette loading mechanism removal and items 2, 3, 4 and 5 in the section on case removal.

18. Tension Arm/Tension Band (Fig. 14)

- 1) Remove spring (18-1) across the tension arm and spring holder.
- 2) Remove the screw holding the tension band.
- 3) Release the engagement section with the tension arm. Pull out the tension arm and tension band.

[Adjustments after reassembly]

- Tension/tension pole position Adjustments

19. Guide Roller (Fig. 14)

- * Remove the supply and take-up sides in the same way.
- 1) Loosen the hex lock nut on the guide roller.
- 2) Turn the guide roller counterclockwise to remove.

[Adjustments after reassembly]

- Guide roller height adjustment

20. Supply Reel Disk (Fig. 14)

- 1) Remove the supply subbrake and tension arm/tension band (see items 12 and 18).
- 2) Remove the washer from the top of the disk.

[Cautions during reassembly]

- * Make sure the washer and collar are inserted in the reel disk attachment shaft.

[Adjustments after reassembly]

- Tension/tension pole position Adjustments
- Reel disk height adjustment

21. Pressure Roller (Fig. 14)

- 1) Remove washer.

22. Arm Bracket Assembly (Fig. 14)

- 1) Remove the take-up reel disk and pressure roller (see items 16 and 21).
- 2) Release the 2 leads from the chassis.
- 3) Remove the 2 screws. Pull out the arm bracket assembly.

[Cautions during reassembly]

- * Insert operation arm spindle into slot in take-up brake operation arm.
- * Insert drive arm spindle into slot in link piece.

23. Guide Base/Loading Link (Fig. 14)

- 1) Remove supply subbrake and tension band/tension arm. (See items 12 and 18)
- 2) Remove the 3 screws holding the subchassis. Remove the subchassis and guide base.

[Cautions during reassembly]

- * When reinstalling the loading link, make sure that the projection on the loading gear is aligned with the groove in the loading link.
- * When reinstalling the guide base, make sure that the pin on the back of the guide base is inserted into the slot in the loading link.

[Adjustments after reassembly]

- Tension/tension pole position Adjustments

MC-Service

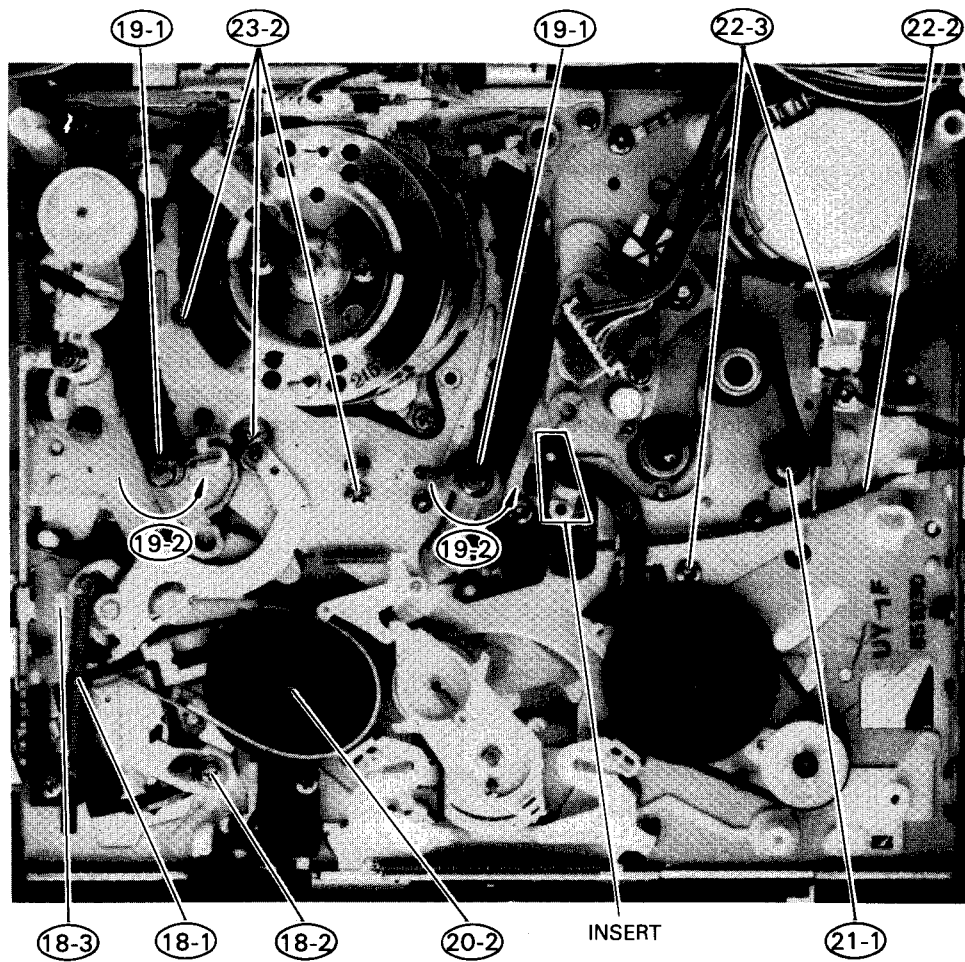


Fig. 14 Top View of Mechanism

MC-Service

* Components in items 24 to 26 are described as if the top and bottom covers have already been removed. (See items 2 and 3 in the section on case removal)

24. Clutch Plate Assembly (Fig. 15)

- 1) Remove the reel drive gear (see item 15).
- 2) Remove reel belt.
- 3) Remove the 2 screws holding the clutch plate assembly.

25. Brake Slider (Fig. 15)

- 1) Remove the reel drive gear and clutch plate assembly (See items 15 and 24).
- 2) Remove the screw holding the brake slider.

[Cautions during reassembly]

- * Make sure the pin on the brake drive arm is inserted into the groove on the slider operating section.

26. Capstan Flywheel (Fig. 15)

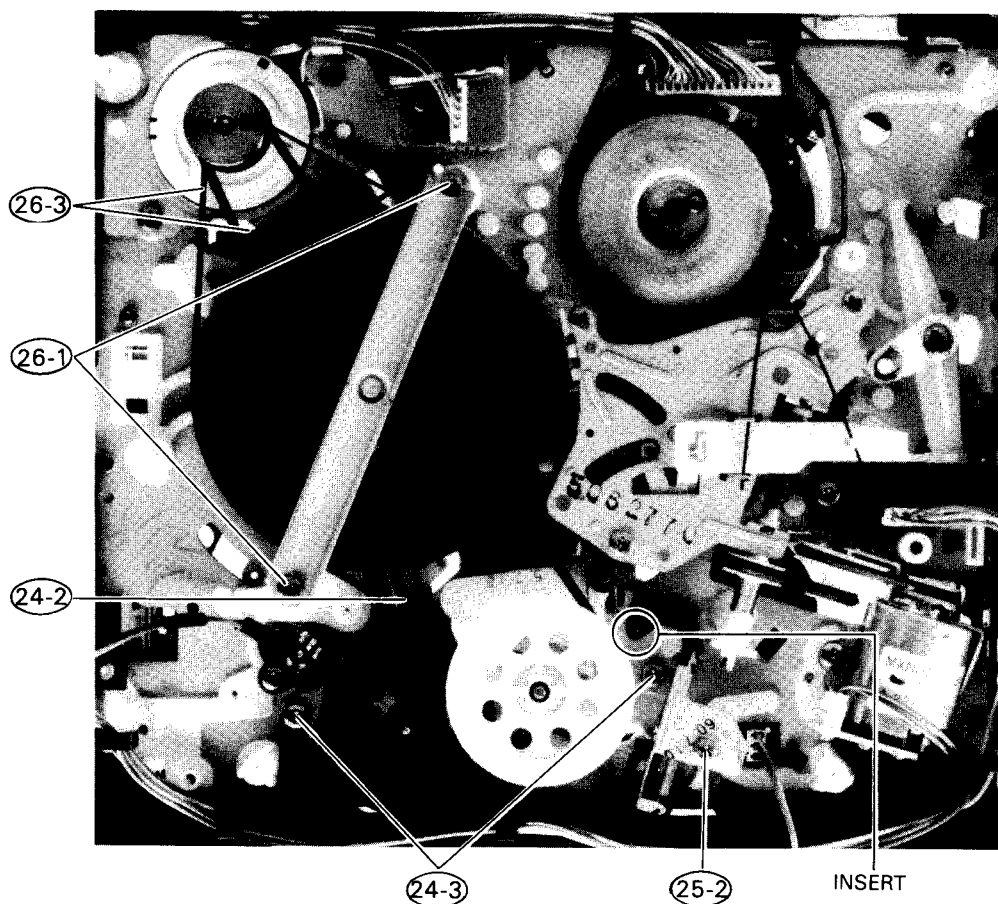
- 1) Remove the 2 screws holding the flywheel retainer bar. Remove the flywheel retainer bar.
- 2) Remove the nylon washer from the top of the capstan shaft.
- 3) Remove the reel belt and flywheel belt. Remove the flywheel.

[Cautions during reassembly]

- * Make sure the washer is inserted between the bottom side of the chassis and the flywheel.

[Adjustments after reassembly]

- Reference oscillation frequency adjustment



MC-Service

Fig. 15 Bottom View of Mechanism

27. Loading Gear Assembly (Figs. 16 and 17)

- 1) Remove the top and bottom covers (see items 2 and 3 in the section on case removal).

Top Side

- 2) Remove the 2 screws from the top of the subchassis.
- 3) Remove the reel drive gear. (See item 15)

Bottom Side

- 4) Remove the mechanism state switch, clutch plate assembly, brake slider and capstan flywheel. (See items 9, 24, 25 and 26.)
- 5) Remove the spring and switch slider from the loading gear assembly.
- 6) Remove tension release arm.
- 7) Remove loading belt.
- 8) Remove the 3 screws holding the loading gear assembly.

[Cautions during reassembly]

- * Insert the pin on the take-up subbrake drive arm into the slot on the take-up subbrake operation arm.
- * Insert the pin on the pressure roller drive arm into the slot on the pressure roller operation arm.

[Adjustments after reassembly]

- Mechanism state switch adjustment

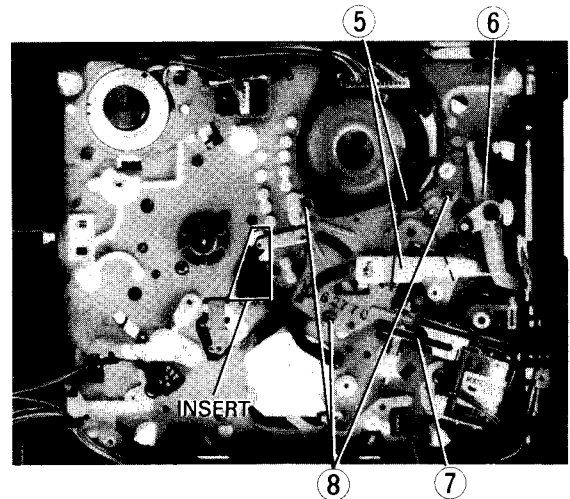


Fig. 17 Loading Gear Assembly
(with items in 9, 24, 25 and 26 removed)

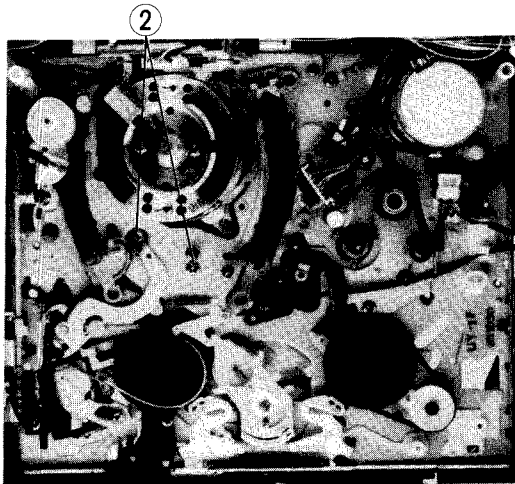


Fig. 16 Top View of Mechanism

MC-Service

ELECTRIC CIRCUIT ADJUSTMENT

Test equipment and tapes necessary for adjustment.

- 1) Oscilloscope
- 2) Colour bar generator
- 3) VTVM
- 4) Frequency counter
- 5) Monitor TV
- 6) Alignment tape
- 7) Blank tape

Cautions on adjustments

- 1) If there are no special instructions, the following conditions apply:
 - Oscilloscope probe: 10 : 1
 - Oscilloscope synchronization: Auto-Sync
 - Tracking control: center click.
- 2) When making more than one adjustment, make those adjustments in the order listed.

Resetting microprocessors

All microprocessors installed in the unit will be reset once the AC power lead is removed from the wall socket. However, the timer microprocessor's back-up circuit keeps it from resetting until about five minutes after power off.

The timer microprocessor can be reset by switch S759 on the timer circuit board. (Switch S759 can be operated by inserting a screwdriver into the round slot adjacent to the PRESET switch even when the front panel is attached.)

Adjust the main circuit board (servo and audio circuits) with the main circuit board open as shown in Fig. 1.

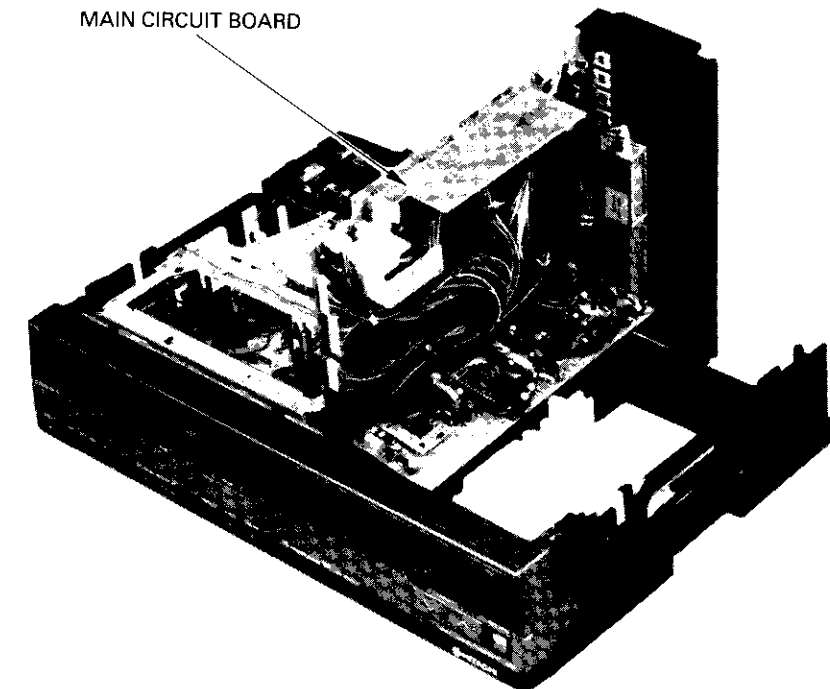


Fig. 1 Ready to Adjust Main Circuit Board

Adjust the Y/chroma circuit board with the left side down and the circuit board open as shown in Fig. 2.

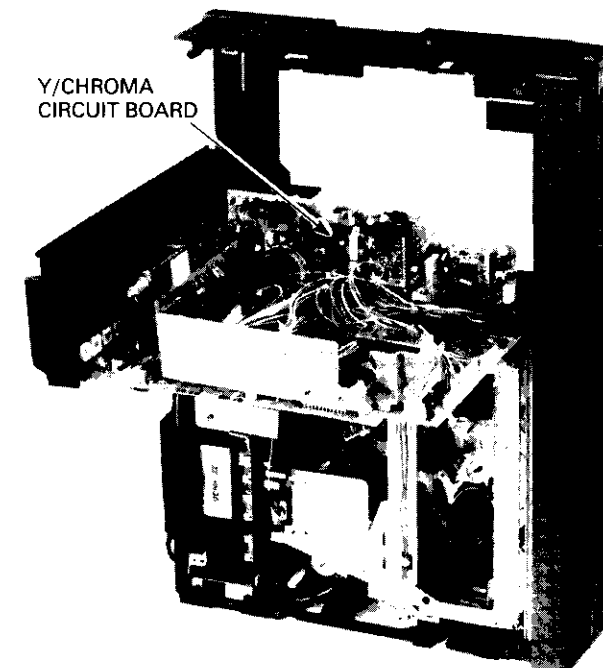


Fig. 2 Ready to Adjust Y/Chroma Circuit Board

* See item 1 in chapter 2 on circuit board removal, for details on main circuit board removal.

COMPONENTS LOCATIONS ON CIRCUIT BOARDS

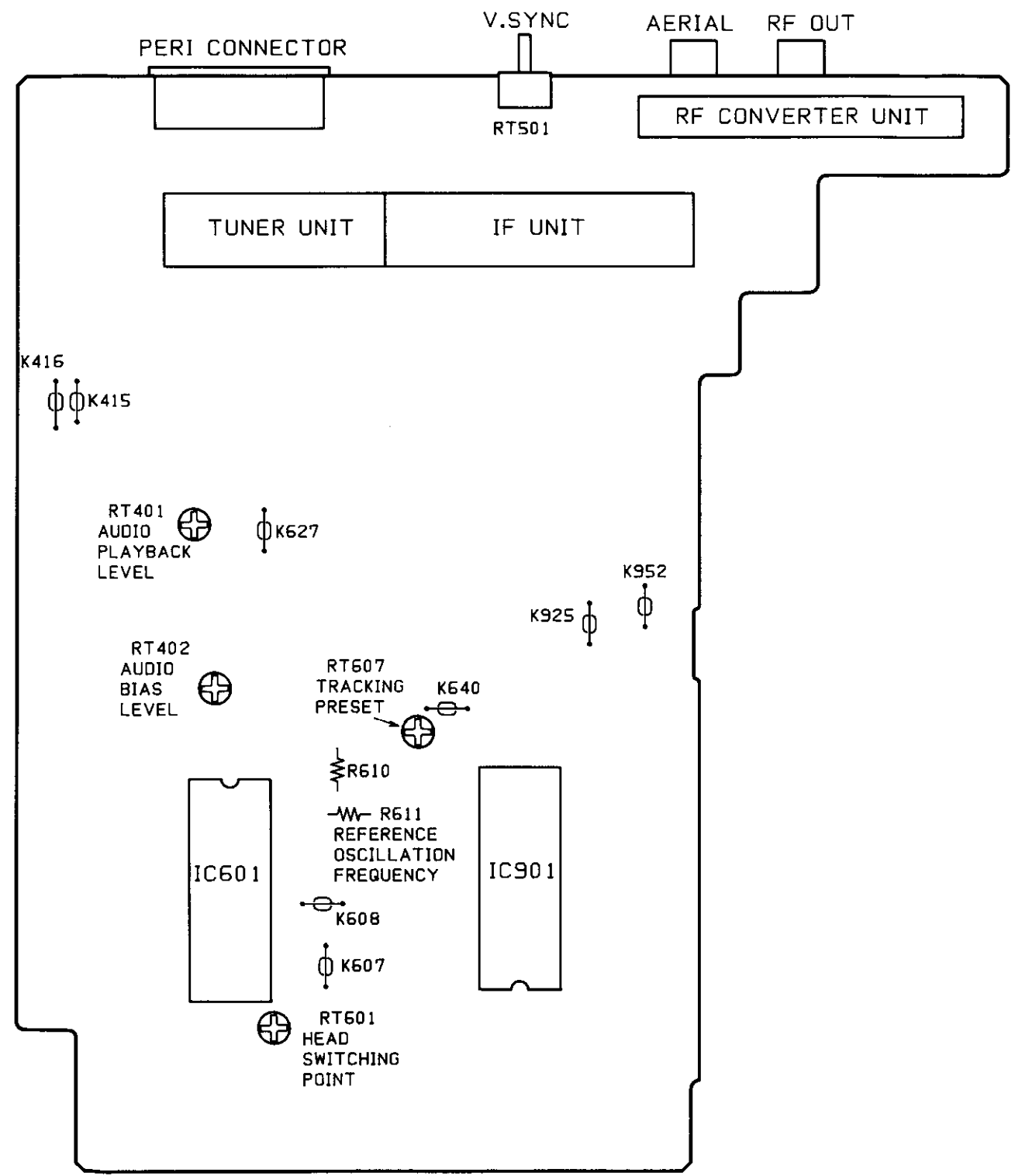


Fig. 3 Components on Main Circuit Board (Component Side)

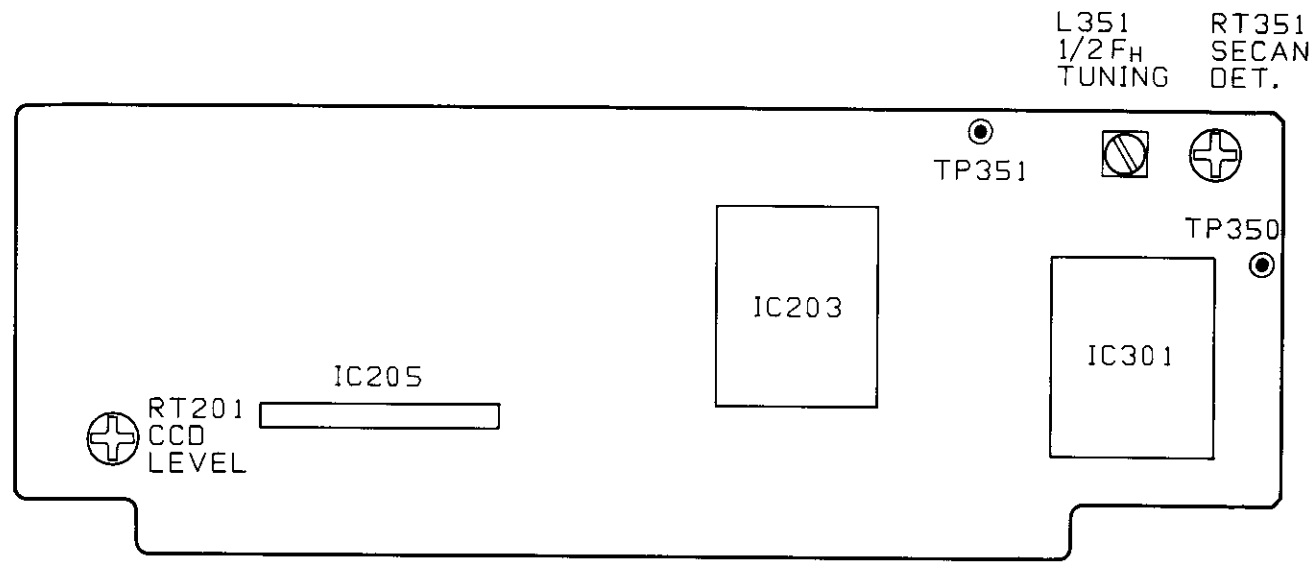


Fig. 4 Components on Y/Chroma Circuit Board (Component Side)

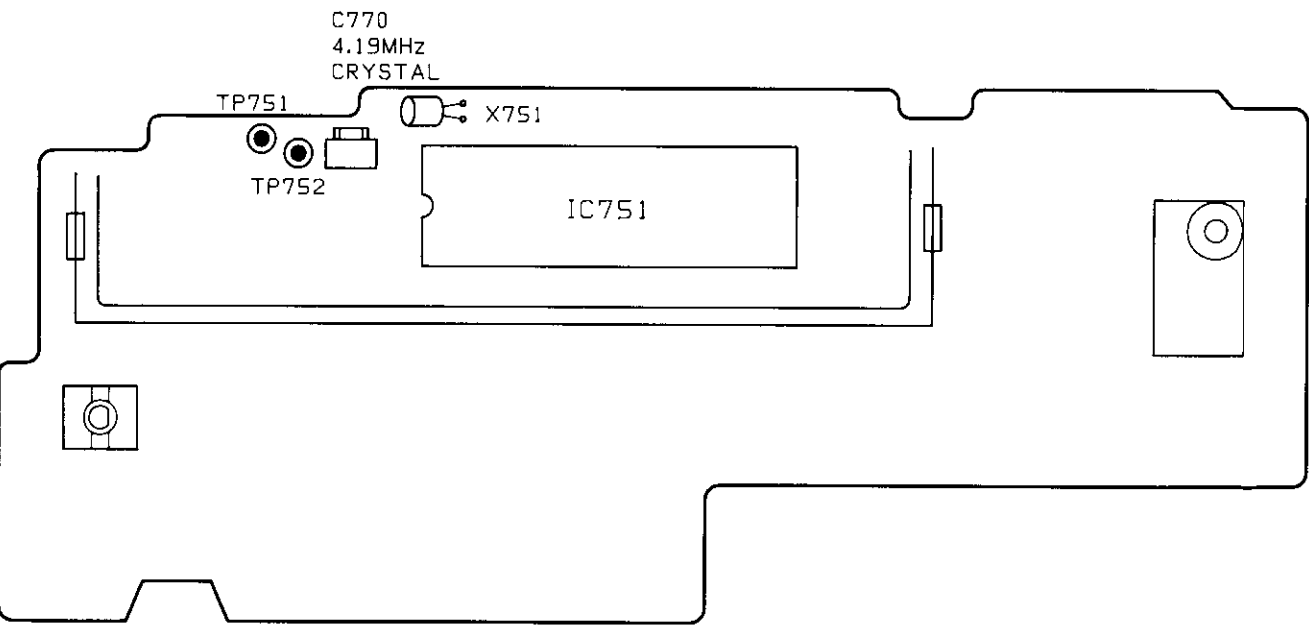


Fig. 5 Components on Timer Circuit Board (Component Side) — VT-110E —

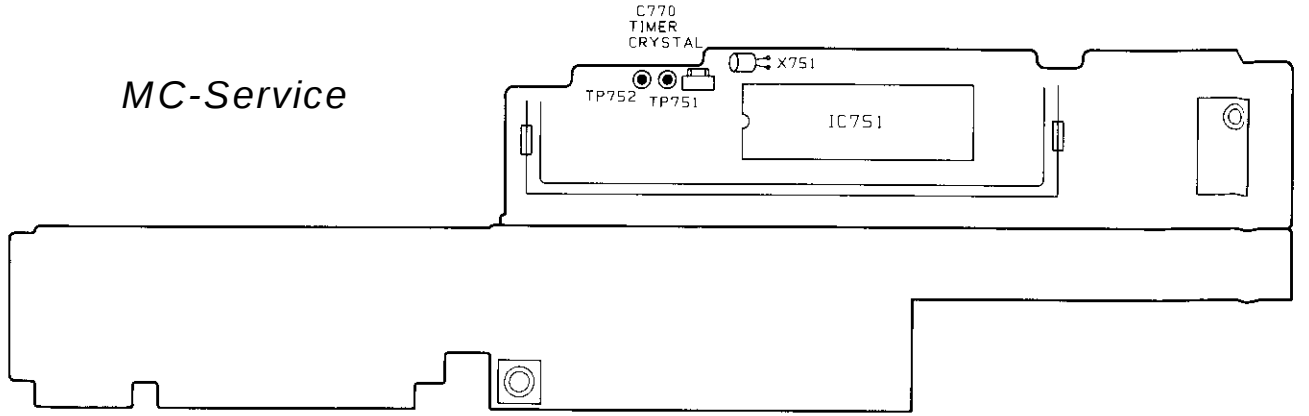


Fig. 6 Components on Timer Circuit Board (Component Side) — VT-120E —

1. SERVO CIRCUIT ADJUSTMENTS

1. Reference Oscillation Frequency Adjustment

Purpose of adjustment and fault occurring if incomplete

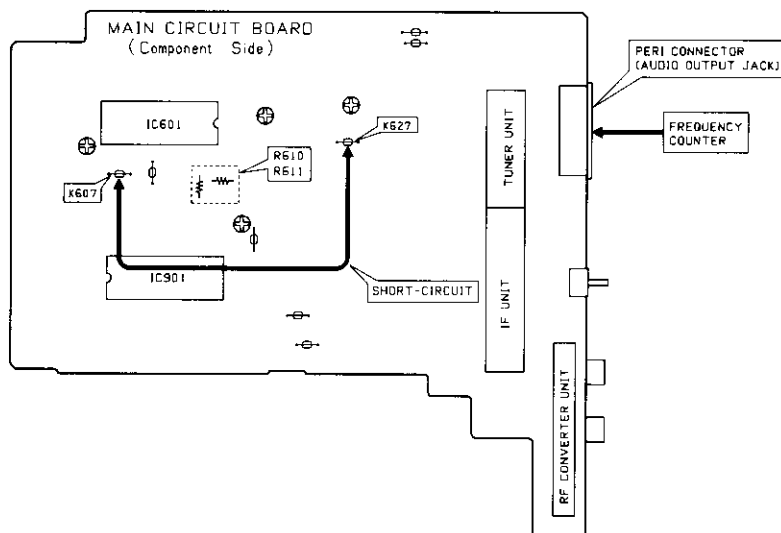
Purpose: Fine tune the reference oscillation frequency (REF25 Hz) in the phase control loop to correct variations in diameters of flywheel, pulley, etc.

Fault: ○ Noise appears in picture.

○ Tracking cannot be optimized.

Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment point
● Frequency counter ● Alignment tape	● Audio output jack	Alignment tape: Play back 3 kHz portion	● R610 (4.7K) ● R611 (3.9K)

Connection Diagram



Adjustment Procedure

Readings on frequency counter

- 3000 Hz $\pm$ 15 Hz : Adjustment unnecessary
- 3015 Hz or higher : Remove R611
- 2085 Hz or lower : Remove R610

Note: There are some units in which R610 or R611 is removed when shipped from the factory.

MC-Service

2. Switching Point Adjustment

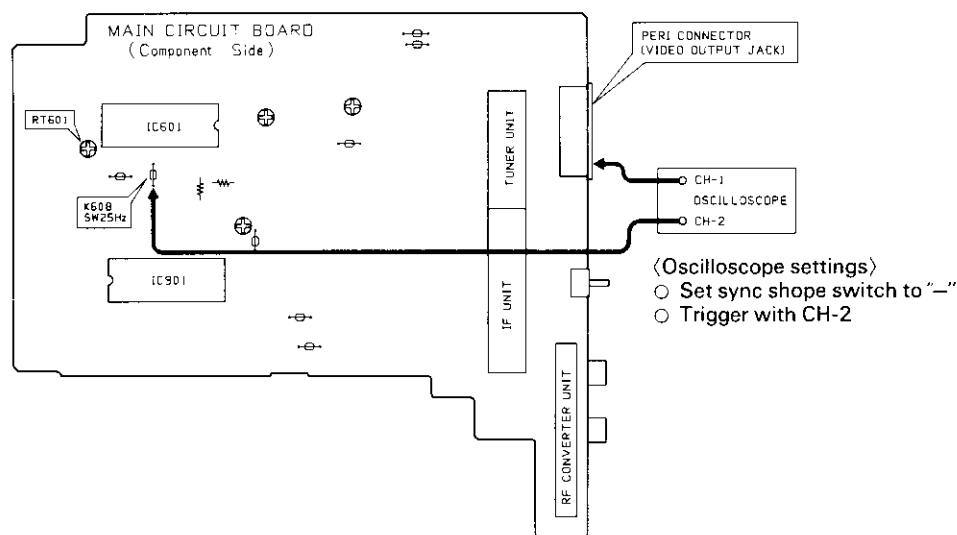
Purpose of adjustment and fault occurring if incomplete

Purpose: Set the video head switching point to almost centre where the CH-1 and CH-2 envelopes overlap each other during playback.

Fault: ○ The vertical sync signal is degraded and vertical jitter occurs.
○ Switching noise occurs in lower part of picture.

Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
● Oscilloscope ● Alignment tape	● CH-1: video output jack ● CH-2: K608	● Play back alignment tape	● RT601

Connection Diagram

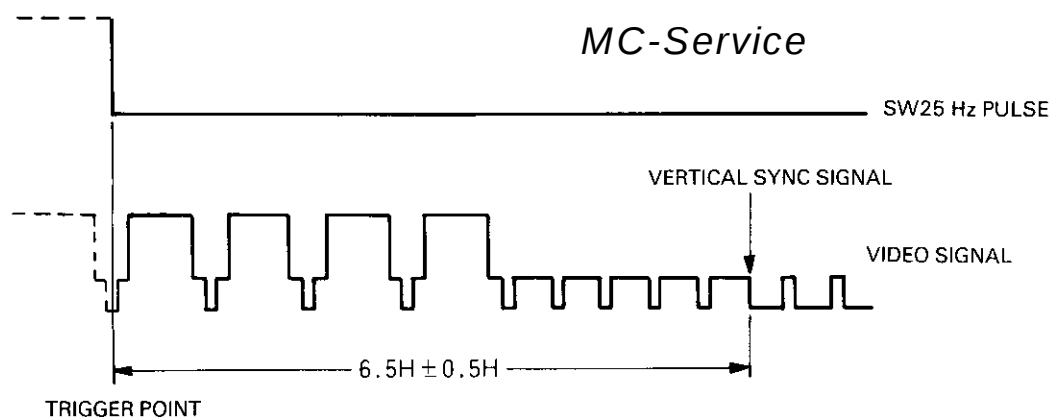


Adjustment Procedure

Vertical sync signal:

6.5H $\pm$ 0.5H from trailing edge (trigger point) of SW25 Hz pulse.

Waveform



3. Tracking Preset Adjustment

Purpose of adjustment and fault occurring if incomplete

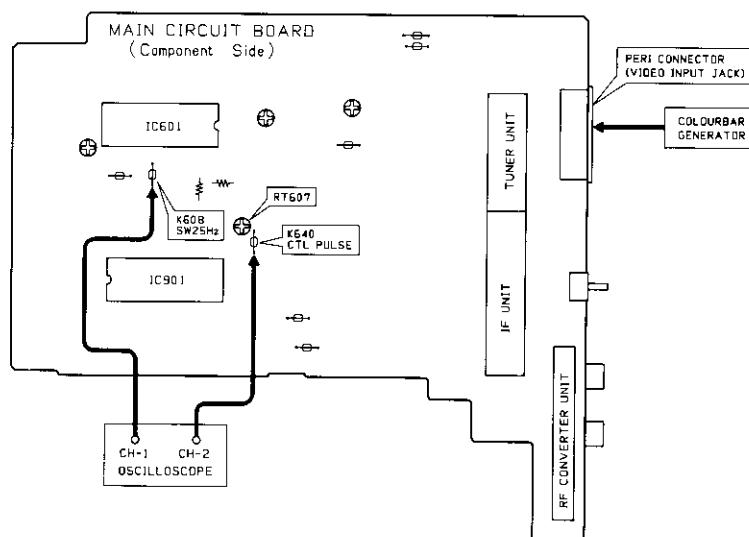
Purpose: Optimize tracking when playing back a tape recorded by this unit.

Fault: ○ Noise occurs even with tracking control centred.

○ Noise cannot be removed by turning the tracking control.

Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
● Oscilloscope ● Colour bar generator (or receive TV programme) ● Blank tape	● CH-1: K608 ● CH-2: K640	● Record colour bar signal and play it back with this unit.	● RT607

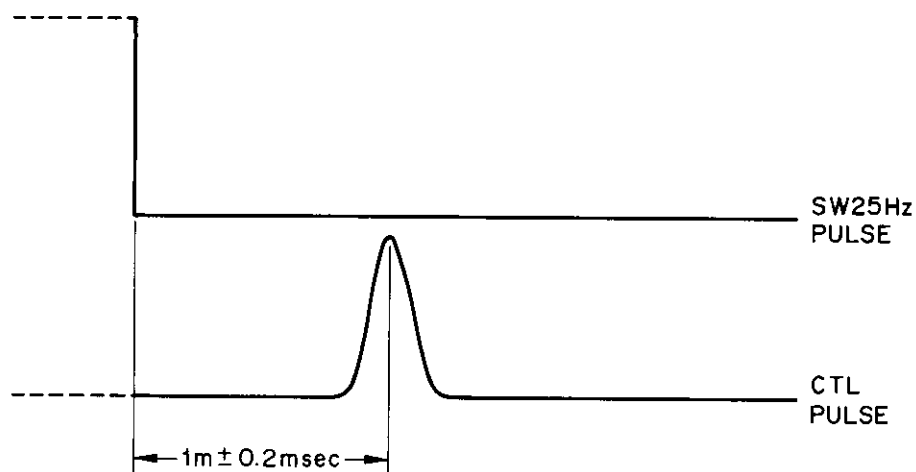
Connection Diagram



Adjustment Procedure

- 1) Tracking control: centred
- 2) It is 1 ± 0.2 ms from the fall of SW 25 Hz to the peak of CTL pulse.

Waveform



4. V Jitter Adjustment

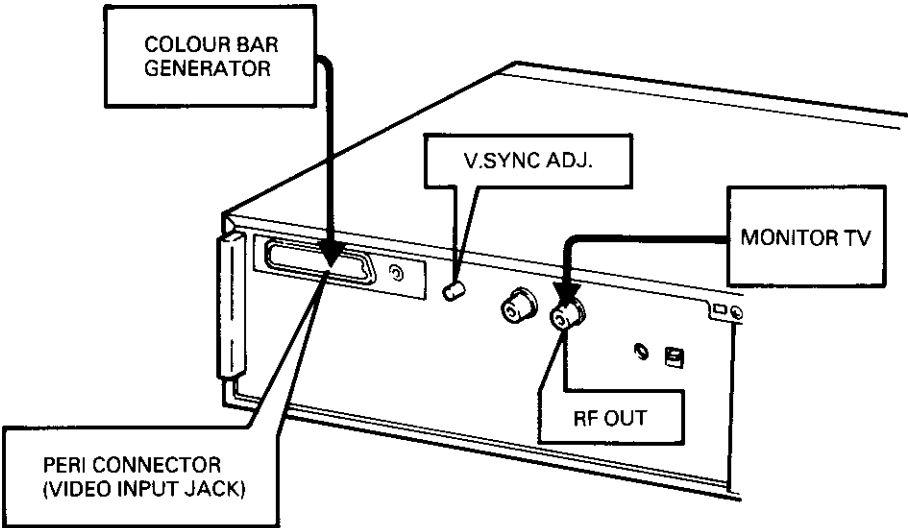
Purpose of adjustment and fault occurring if incomplete

Purpose: Change timing for adding vertical drive pulse and suppress vertical jitter in picture during trick play.

Fault: Vertical jitter during trick play.

Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
● Monitor TV ● Colour bar generator (or receive TV programme) ● Blank tape	● Check with monitor TV	● Record colour bar signal, play it back with this unit in F.ADV mode.	● RT501

Connection Diagram (Can be adjusted without removing any covers)



Adjustment Procedure

Suppress vertical jitter in picture.

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2. AUDIO CIRCUIT ADJUSTMENTS

1. Audio Playback Level Adjustment

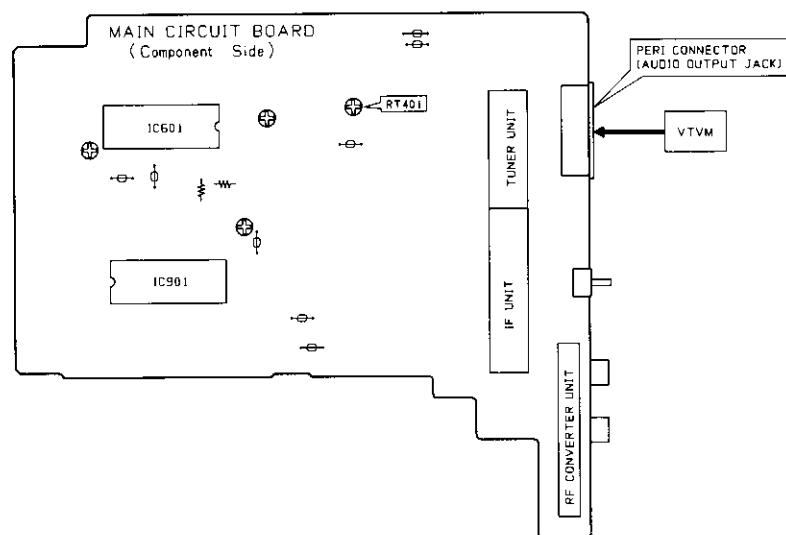
Purpose of adjustment and fault occurring if incomplete

Purpose: Set the audio playback level to the specified value.

Fault:

Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
● VTVM ● Alignment tape	● Audio output jack	● Play back alignment tape	● RT401

Connection Diagram



Adjustment Procedure

The VTVM reads $-8 \text{ dBm} \pm 1 \text{ dBm}$

2. Audio Bias Level Adjustment

Purpose of adjustment and fault occurring if incomplete

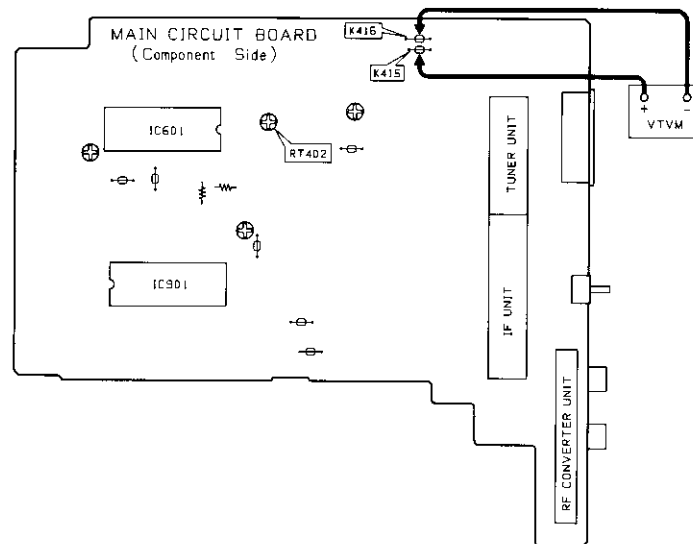
Purpose: Set audio bias during recording to optimum level.

Fault: ○ Bias too deep: High-frequency response deteriorates.

○ Bias too shallow: Sound tends to be distorted.

Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
● VTVM ● Blank tape	● K415 ● K416	● Non-signal recording	● RT402

Connection Diagram



Adjustment Procedure

The VTVM reads $2.3 \text{ mV} \pm 0.1 \text{ mVrms}$.

MC-Service

3. Y/CHROMA CIRCUIT ADJUSTMENT

1. CCD Level Adjustment

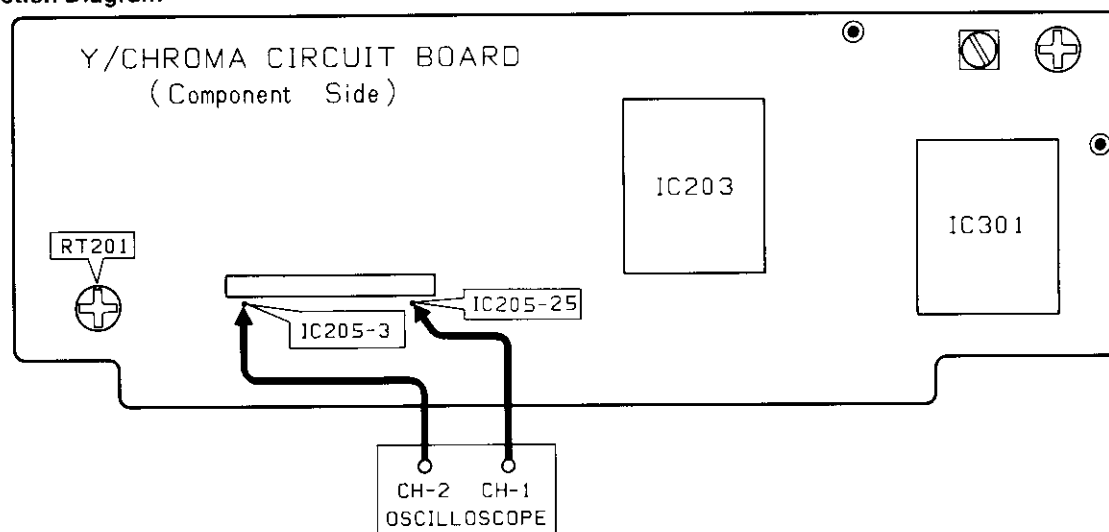
Purpose of adjustment and fault occurring if incomplete

Purpose:

Fault:

Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
● Oscilloscope ● Alignment tape	● CH-1: IC205-25 ● CH-2: IC205-3	● Play back alignment tape	● RT201

Connection Diagram



Adjustment Procedure

Align the CH-1 and CH-2 levels.

$CH-2 = CH-1 \pm 10 \text{ mVp-p}$

Note: CH-2 level is less than CH-1 level.

MC-Service

2. Secam Detect Level Adjustment

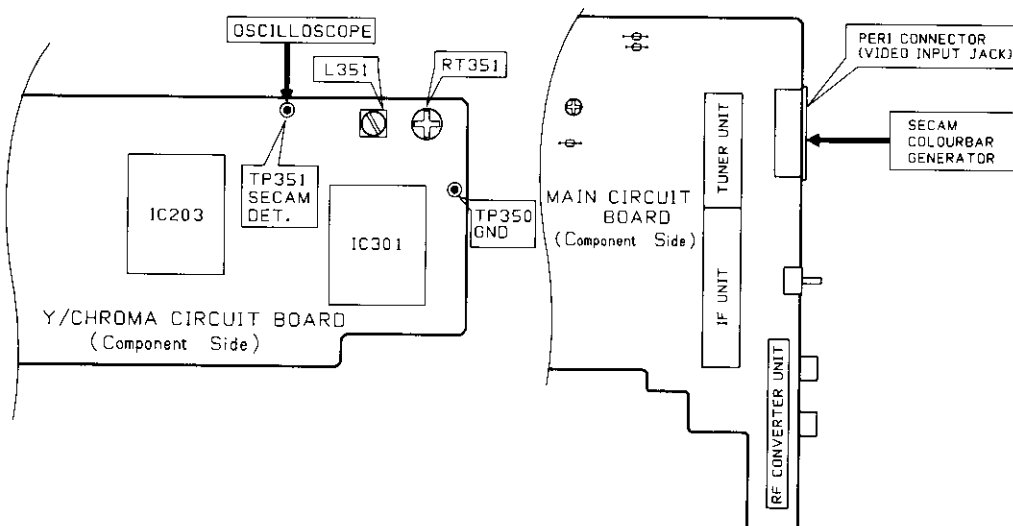
Purpose of adjustment and fault occurring if incomplete

Purpose:

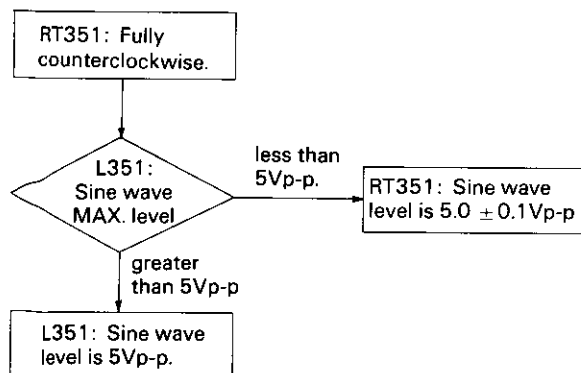
Fault:

Test Equipment/Jigs	Test Equipment Connection Points	VTR State	Adjustment Point
● SECAM colour bar generator ● Oscilloscope	● TP351 ● TP350 (GND)	● REC mode	● RT351

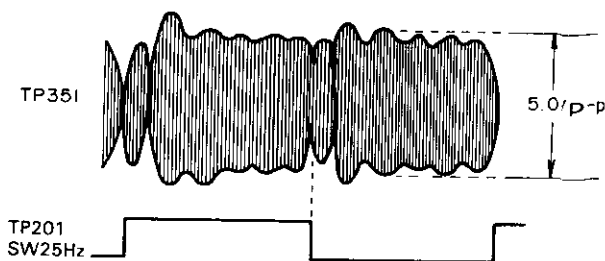
Connection Diagram



Adjustment Procedure



Wave form



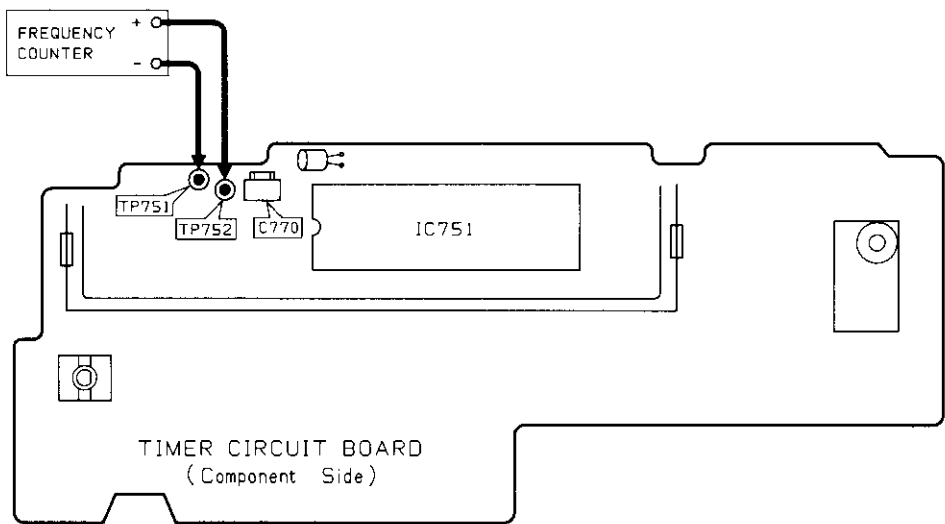
4. TIMER CIRCUIT ADJUSTMENTS

1. 4.19 MHz Crystal Adjustment

Purpose of adjustment and fault occurring if incomplete
Purpose: Suppress the time gain or lag of the timer less than 0.2 seconds per day.
Fault:

Test Equipment/Jig	Test Equipment Connection Points	VTR State	Adjustment Point
● Frequency counter	● TP751 (-) ● TP752 (+)	● Stop mode	● C770

Connection Diagram



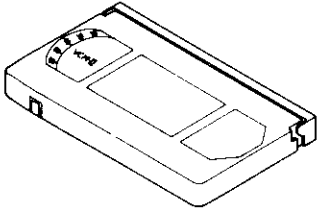
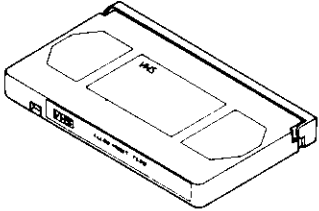
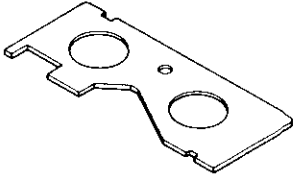
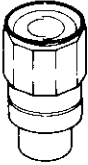
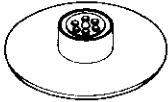
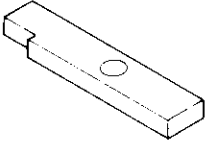
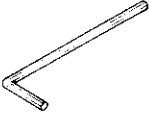
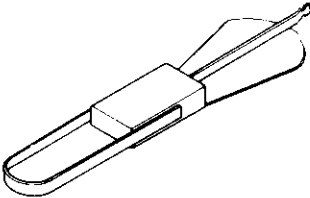
Adjustment Procedure
 1) Set the counter gate time to 10 seconds.
 2) The counter reads 4.1941902 MHz.

Note: Set the probe to 10 : 1 for use.

MC-Service

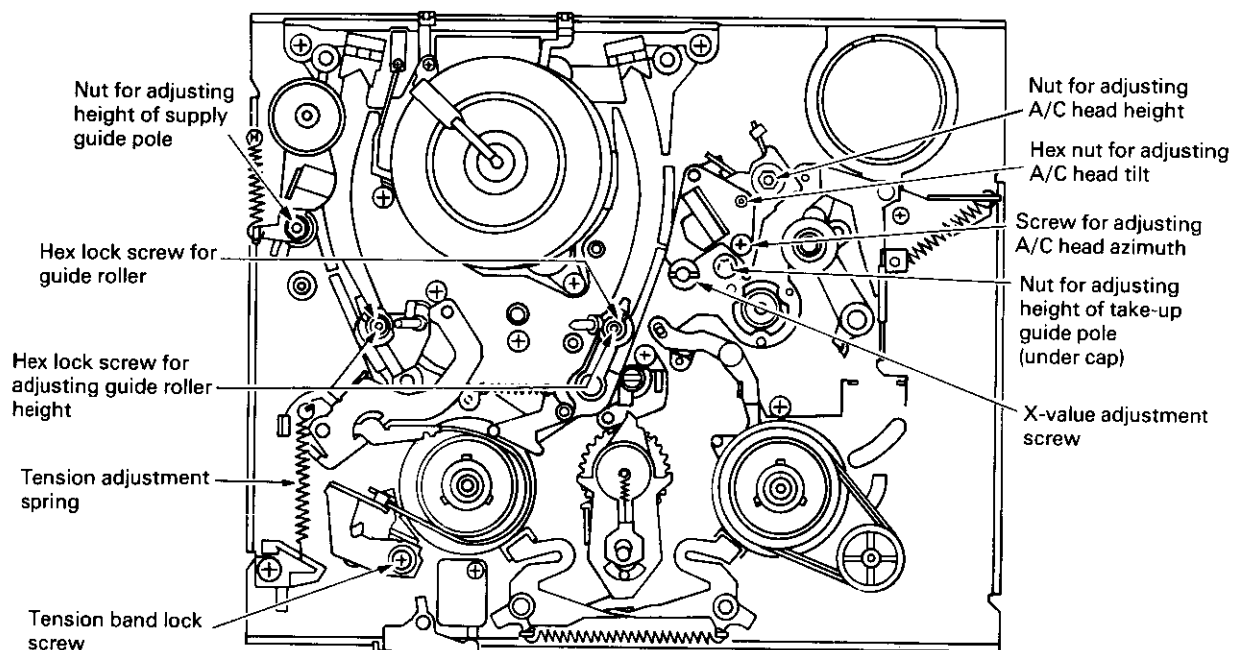
MECHANISM ADJUSTMENT

SERVICING JIGS AND TOOLS

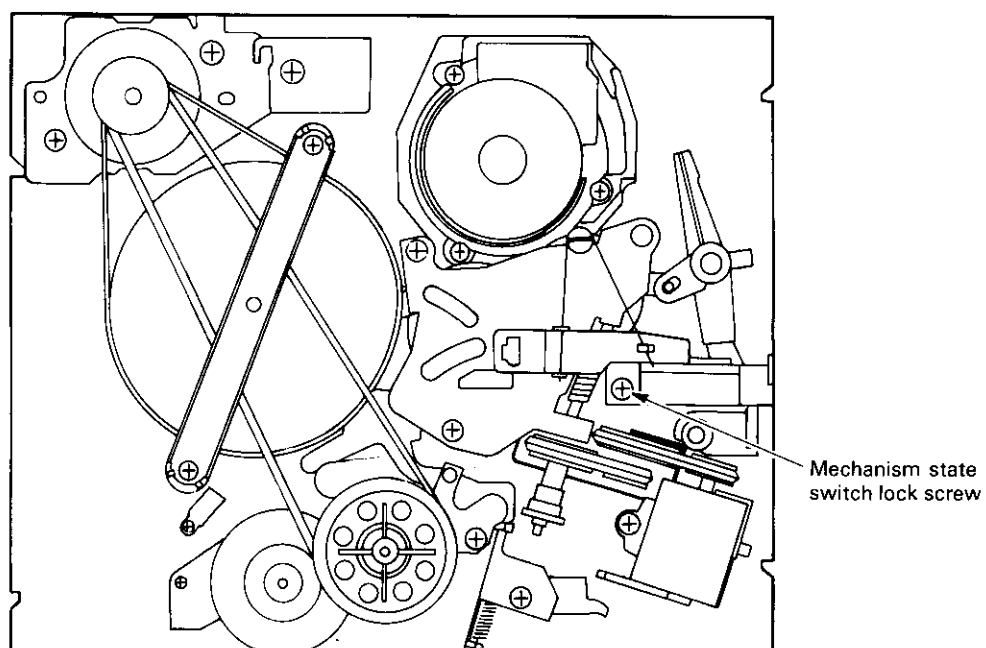
1. Back tension meter Parts No. 7099004 	2. Alignment tape Parts No. 7099052 	3. Height reference plate (master plane) Parts No. 7099041 
4. Torque gauge Parts No. 7099039 	5. Torque gauge adaptor Parts No. 7099035 	6. Dummy reel Parts No. 7099043 
7. Reel disk height jig Parts No. 7099038 	8. 1.5 mm hexagonal wrench 	9. Fan-shaped tension gauge 

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LIST OF ADJUSTMENT LOCATIONS



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MECHANICAL COMPONENT ADJUSTMENT

1. Mechanism State Switch Adjustment

Purpose: Accurately detect mechanism states and prevent malfunction.

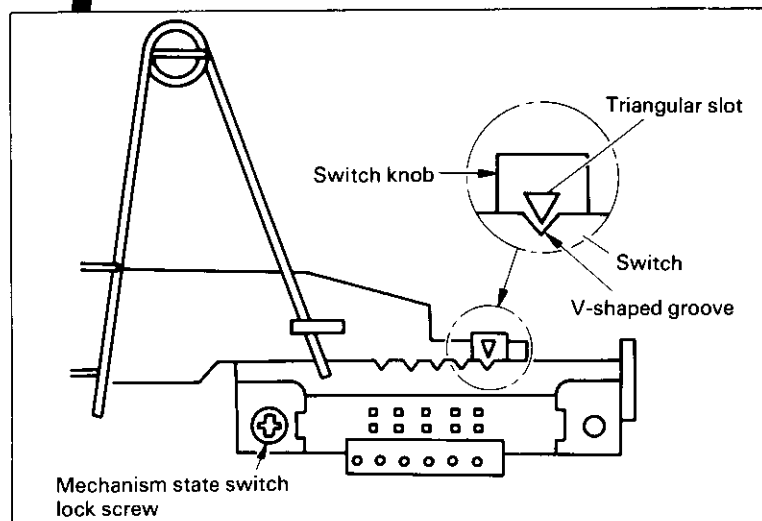
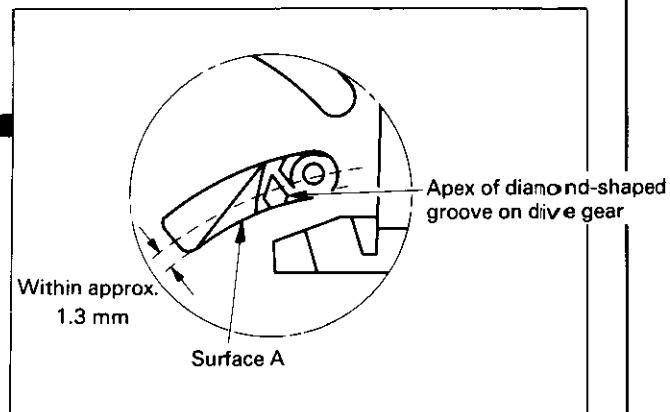
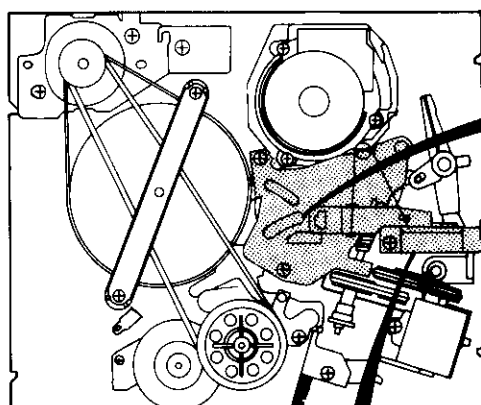
Test Equipment/Jigs	VTR State	Adjustment Point
● Blank tape	● Stop mode	● Mechanism state switch lock screw

Adjustment Procedure

- 1) Turn the worm pulley by hand. Position the apex of the diamond-shaped groove on the drive gear so that it is within 1.3 mm from the A surface of the gear plate.
- 2) Loosen the lock screw on the mechanism state switch. Slide the switch so that the apex of the triangular slot on the switch knob is aligned with the V-shaped groove on the extreme outside of the switch.
- 3) Loosen the lock screw. Insert the blank tape in the cassette holder. Check to make sure that all unloading and loading operations are correct.

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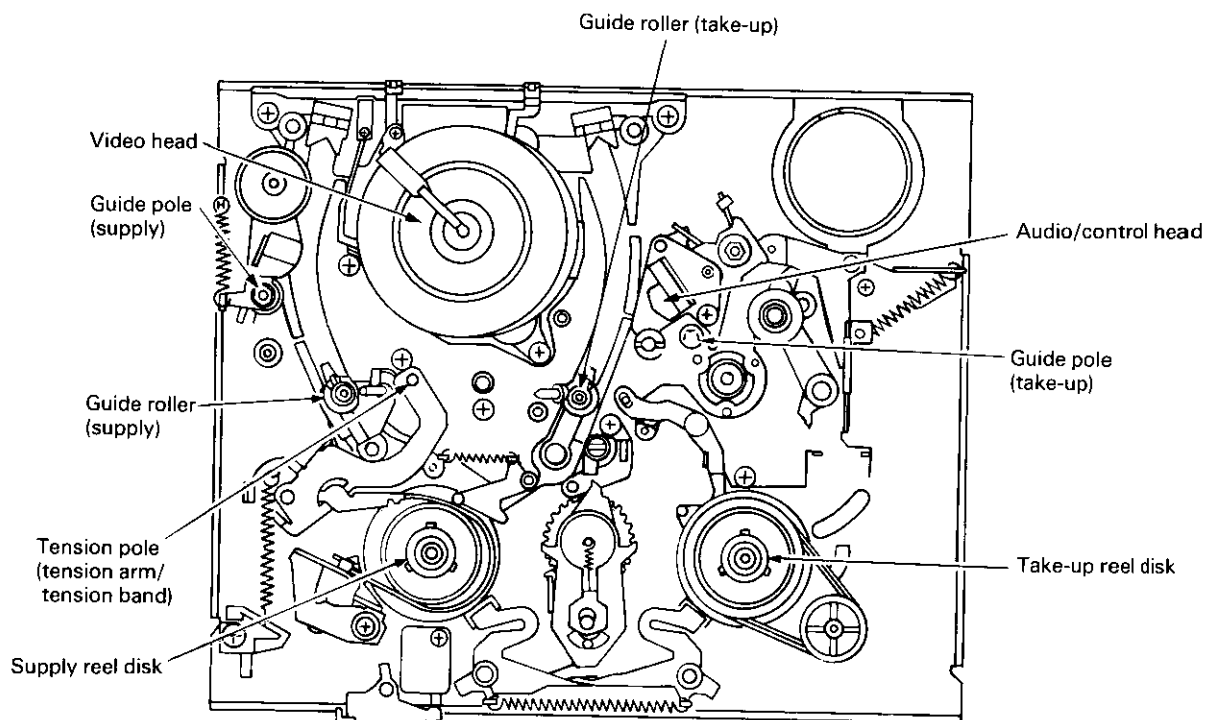
Adjustment Diagram



TAPE TRANSPORT SYSTEM ADJUSTMENT

The transport system is the system in which tape moves from the supply reel disk, over the video head and then to the take-up reel disk. The components in the tape transport system must be perfectly clean, particularly those that come in contact with the tape.

These components must have no scratches, no dust, no oil on them. The tape transport system is adjusted at the factory prior to shipping. When components need to be replaced, accurately adjusting the new components ensures that the tape transport system will operate stably.



MC-Service

Components Adjusted in Tape Transport System

1. Reel Disk Height Adjustment

Purpose: Determine correct tape height by setting cassette tape reel to the specified height.

Test Equipment/Jigs	VTR State	Adjustment Point
● Master plane ● Reel disk height jig	1) Remove chassis holder 2) Mount master plane and place reel disk height jig on it.	● Spacers in supply and take-up reel disks.

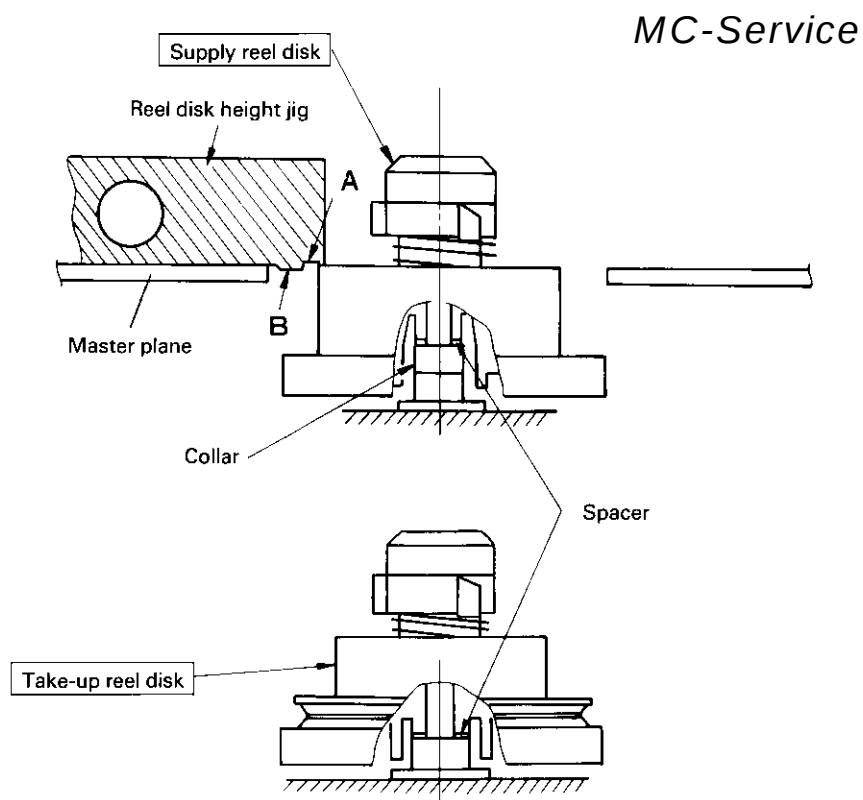
Adjustment Procedure

- 1) Make sure the reel disk is correctly positioned between points A and B on the reel disk height jig.
- 2) If the reel disk will not fit between points A and B, replace the spacer in the reel disk or adjust the number of spacers (0.25 mm and 0.5 mm thicknesses).

Caution:

If the tension arm/tension band have been removed, adjust the tension pole's position and tension after reassembling.

Adjustment Diagram



2. Tension/Tension Pole Position Adjustments

Purpose: Stabilize contact between video head and tape being supplied so that the tape tension is uniform throughout.

Test Equipment/Jigs	VTR State	Adjustment Point
● Flat-bladed screwdriver ● Tension cassette	1) Remove top cover 2) Place VTR in loading state without cassette insertion (see 4-17). Tension adjustment 3) Play tension cassette	Position adjustment: Tension band lock screw Tension: Tension spring hook position

Adjustment Procedure

Position Adjustment

- 1) Loosen lock screw on tension band. Insert flat bladed screwdriver in slot in bracket and chassis.
- 2) Use the screwdriver to slide the bracket for a 1 ~ 2 mm interval between the tension pole and chassis.
- 3) Tighten the lock screw on the tension band.
- 4) After adjusting, reload without inserting the tape and recheck the position of the tension pole.

Tension Adjustment

Reading of tension cassette:

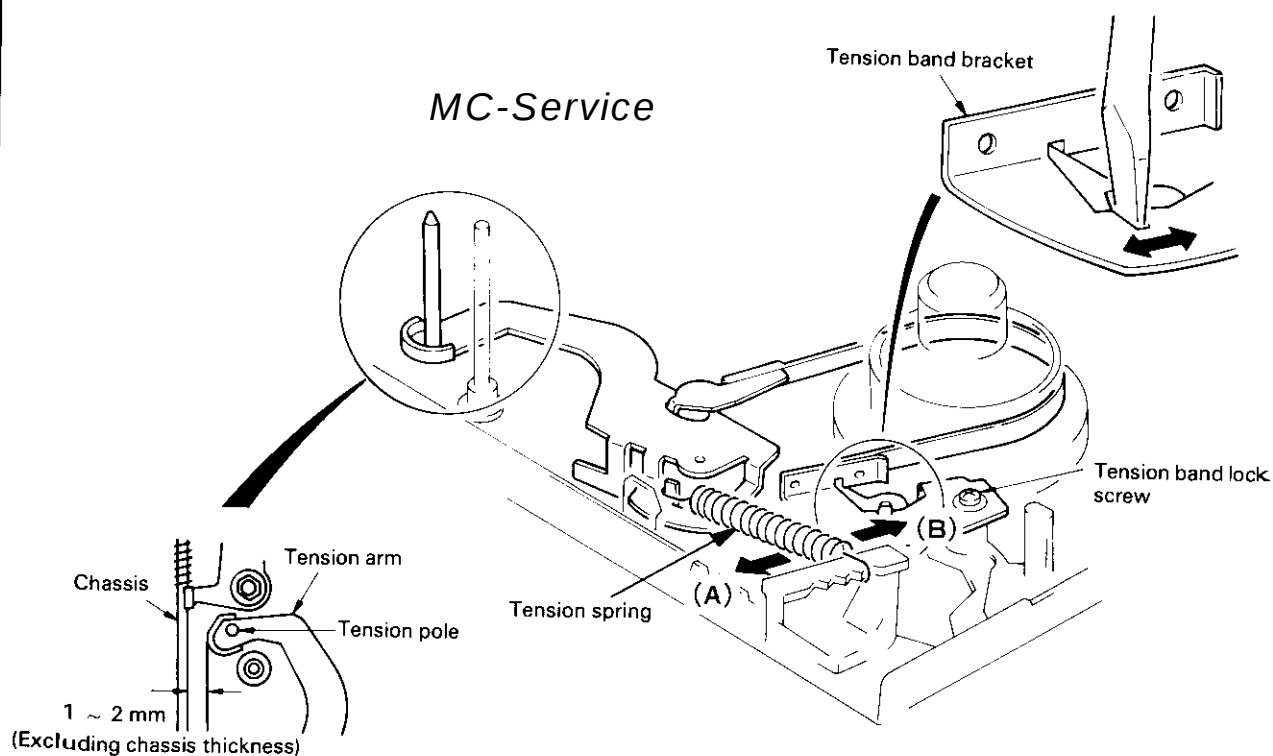
30 ~ 40 g-cm. (reference value)

If tension is higher than the reference value, move the spring in direction A.

If tension is lower than the reference value, move the spring in direction B.

Caution: If a 6 g-cm or larger change is made in tension position, recheck tension pole position. If the position is off, readjust the tension pole's position and tension.

Adjustment Diagram



3. Guide Pole Height Adjustment

Purpose: Control tape height.		
Test Equipment/Jigs	VTR State	Adjustment Point
● Master plane ● Reel disk height jig ● Blank tape	1) Remove chassis holder 2) Mount master plane and place the reel disk height jig on it.	● Nut for adjusting height of supply and take-up guide poles (take-up pole is under cap).
Adjustment Procedure		
1) Adjust gap between guide pole's upper flange and reel disk height jig to 0 ~ 0.2 mm. 2) Load and run the blank tape. Check to make sure the tape does not ride over the pole's upper or lower flange.		3) If the tape does ride over, adjust guide pole height. If tape rides over upper flange, turn adjustment nut counterclockwise. If tape rides over lower flange, turn adjustment nut clockwise.
Adjustment Diagram <i>MC-Service</i>		

4. Guide Roller Height Adjustments

Purpose: Control tape height so the tape's bottom edge runs along the cylinder's tape guideline.

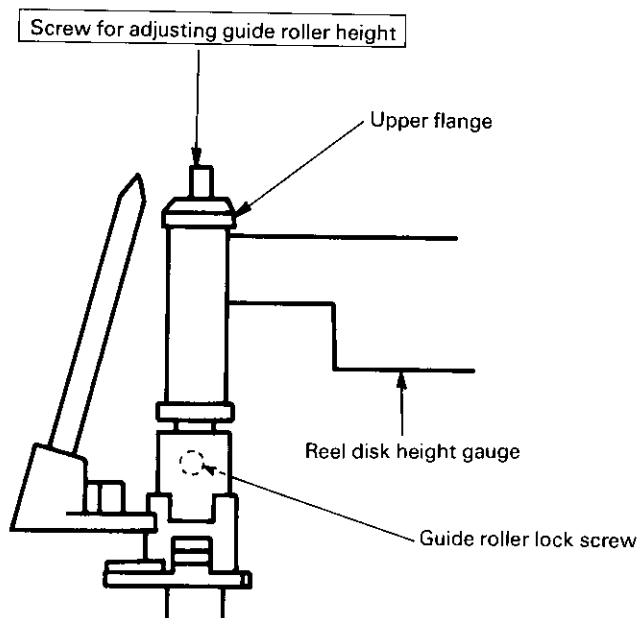
Coarse Adjustment

Test Equipment/Jigs	VTR State	Adjustment Point
● Master plane ● Reel disk height jig ● 1.5 mm hexagonal wrench	1) Remove chassis holder 2) Mount master plane and place reel disk height jig on it.	● Screws for adjusting height of supply and take-up guide roller

Adjustment Procedure

- | | |
|---|------------------------------------|
| 1) Loosen guide roller lock screw so that the guide roller does not turn during loading, unloading and playback.
2) Set the upper edge of the reel disk height jig to the same level as the guide roller's upper flange. | 3) Now make precision adjustments. |
|---|------------------------------------|

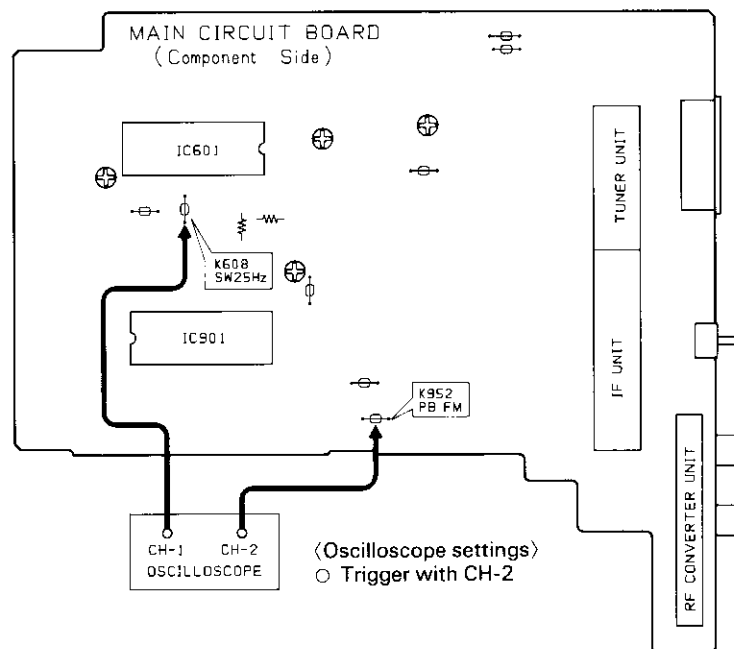
Adjustment Diagram



Precision Adjustment

Test Equipment/Jigs	Test Equipment Connection Point	VTR State	Adjustment Point
● Oscilloscope ● Alignment tape ● Hexagonal wrench	● CH-1: K952 ● CH-2: K608	● Playback alignment tape	● Screw for adjusting guide roller height

Connection Diagram

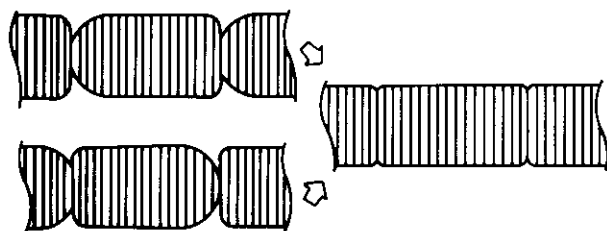


Adjustment Procedure

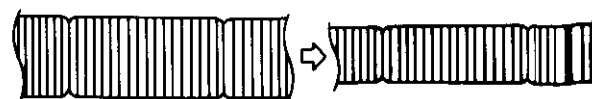
- 1) Tracking control: centered (when making this adjustment after replacing the cylinder, set the tracking control so the FM output is maximum.
- 2) Turn height adjustment screw to flatten the FM waveform.
- 3) Turn the tracking control clockwise.
- 4) Make sure that FM drops at the head and tail.
- 5) Tighten lock screw.

Waveform

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Turn guide roller height adjustment screw a little at a time to flatten waveform.

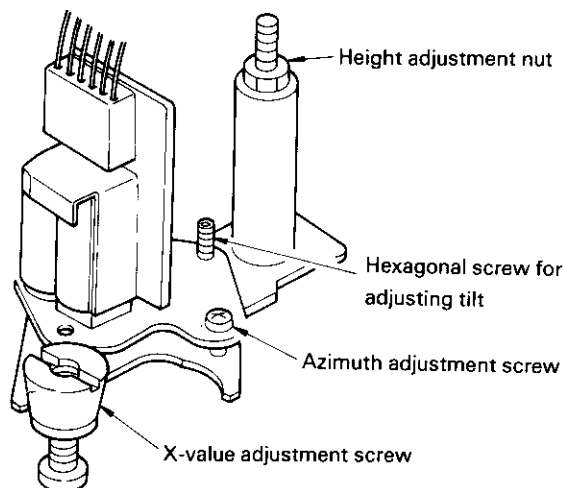


Tracking control centred

Turn tracking control clockwise

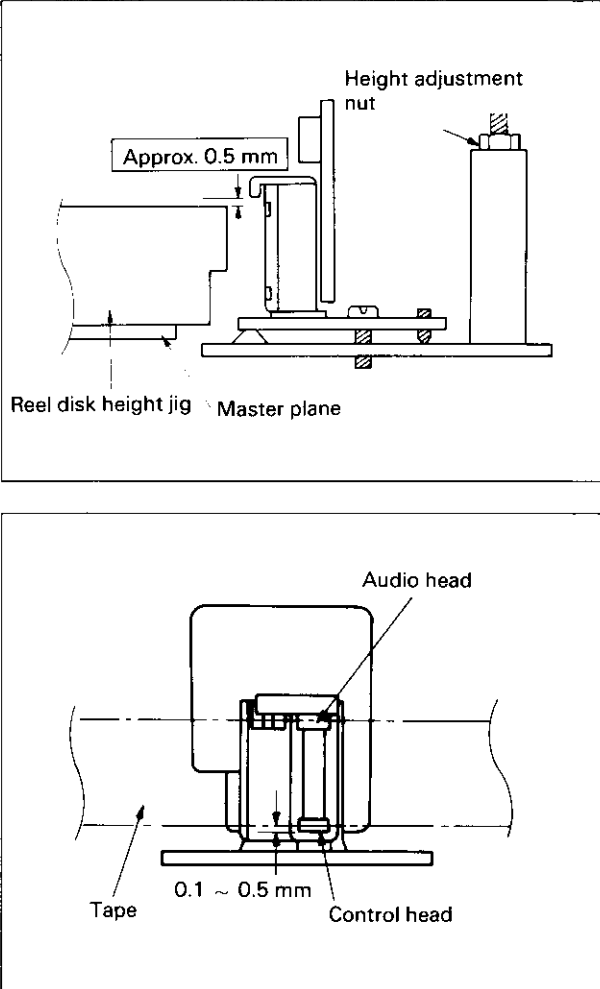
5. Audio and Control Head

Purpose: Ensure uniform contact between tape and head to record and play a prescribed track.

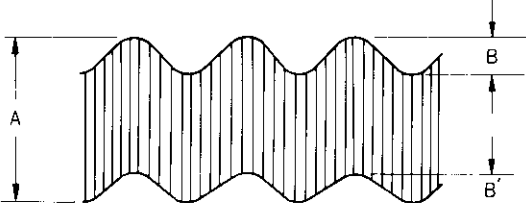


Coarse Adjustment

Test Equipment/Jigs	VTR State	Adjustment Point
● Master plane ● Reel disk height jig ● Blank tape ● Hexagonal wrench	1) Remove chassis holder 2) Mount master plane and place reel disk height jig on it.	● Azimuth adjustment screw ● Height adjustment nut ● Tilt adjustment screw
Adjustment Procedure		Adjustment Diagram
1) Tighten the A/C head lock screw through the spring from the bottom of head base (2) until the screw tip protrudes 3 ~ 4 mm from the top surface of head base (1). 2) Turn the tilt adjustment hexagonal screw and the azimuth adjustment screw so that head base (1) and head base (2) are parallel.		<i>MC-Service</i> A technical line drawing of the A/C head assembly. It shows two head bases, (1) and (2), mounted on a common base. A spring is positioned between them. An A/C head is mounted on top of head base (2). An A/C head lock screw is shown passing through the spring and head base (2) into head base (1). Labels include: A/C head: The main recording head assembly. Head base (1): The lower mounting base. Head base (2): The upper mounting base. A/C head lock screw: The screw used to secure the assembly. 3 ~ 4 mm: The required protrusion of the screw tip. Parallel: A label indicating the desired orientation of the head bases.

Adjustment Procedure	Adjustment Diagram
3) Turn the height adjustment nut until the gap between reel disk height jig and A/C head is approx. 0.5 mm. 4) Remove the adjustment jigs and insert a blank tape. Place in playback mode. Make sure the tape does not curl or ride over around the A/C head. If the tape curls or rides over, readjust the tilt adjustment hex screw, the azimuth adjustment screw and the height adjustment nut. The ideal A/C head height is with the tap's bottom edge 0.1 ~ 0.15 mm from the bottom edge of the control head's core. 5) Now move on to precision adjustments.	 The top diagram shows a side view of the reel disk height jig and the height adjustment nut. A gap of approximately 0.5 mm is indicated between the reel disk height jig and the master plane. The bottom diagram shows a top-down view of the tape head assembly, including the audio head, control head, and tape. A gap of 0.1 to 0.5 mm is indicated between the tape and the control head.

Precision Adjustment

Test Equipment/Jigs	Test Equipment Connection Point	VTR State	Adjustment Point
● Hexagonal wrench ● Oscilloscope ● Alignment tape	● Audio output jack	● Playback alignment tape (7 kHz portion)	● Azimuth adjustment screw ● Height adjustment nut ● Tilt adjustment screw
Adjustment Procedure	Waveform Diagram		
1) Alternate turning, a little at a time, of the azimuth adjustment screw, the height adjustment nut and the tilt adjustment hex screw to both maximize and flatten audio output (minimize fluctuation).	 A: maximum BB': minimum		

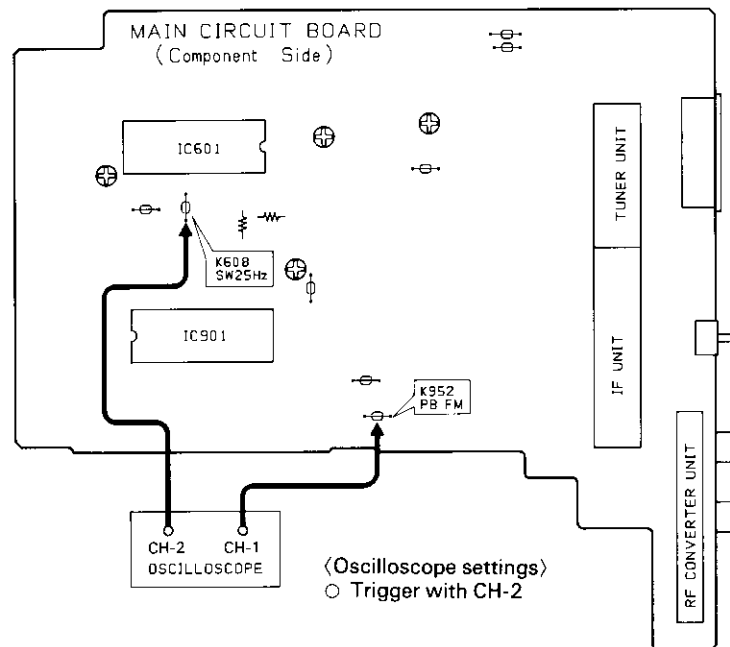
6. X Value Adjustment

Purpose: Ensure compatibility with other VTRs.

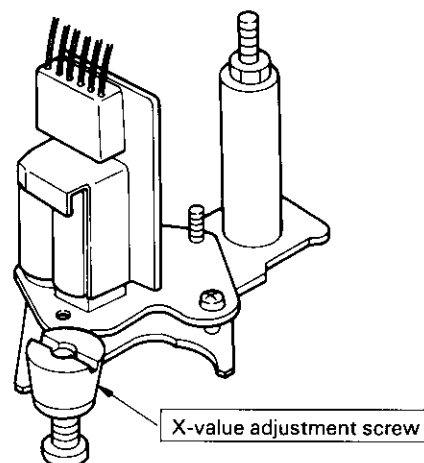
Caution: Be sure to adjust the tracking preset before making this adjustment.

Test Equipment/Jigs	Test Equipment Connection Point	VTR State	Adjustment Point
● Oscilloscope ● Alignment tape ● X-value adjustment screwdriver	● CH-1 : K952 ● CH-2 : K608	● Play back alignment tape	● X-value adjustment screw

Connections Diagram

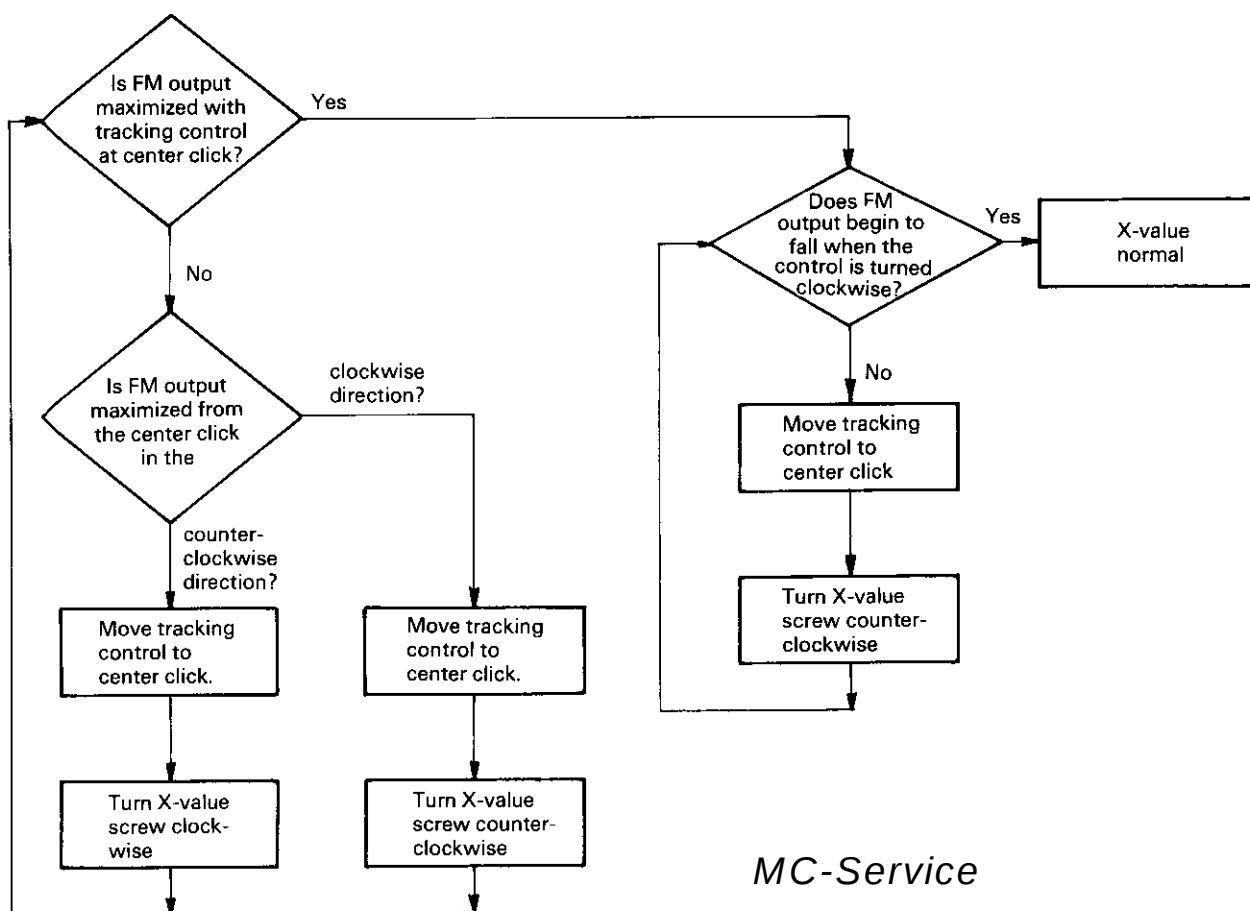


MC-Service

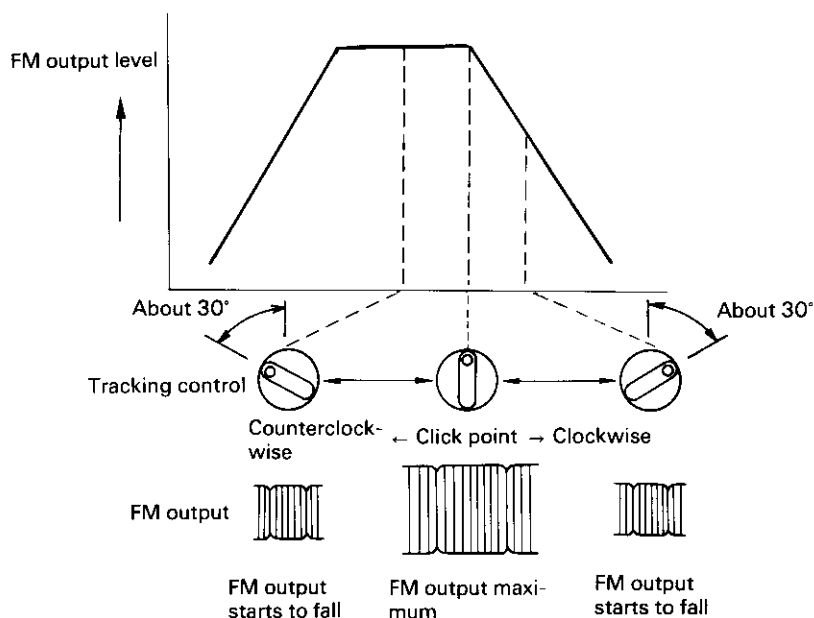


Adjustment Procedure

Since the 65 μm head will trace over 49 μm width track, center tracking control and make adjustments to maximize FM output, or turn the control clockwise about 30° and adjust so that FM output begins to fall. (Is FM output maximized with tracking control at center click?)



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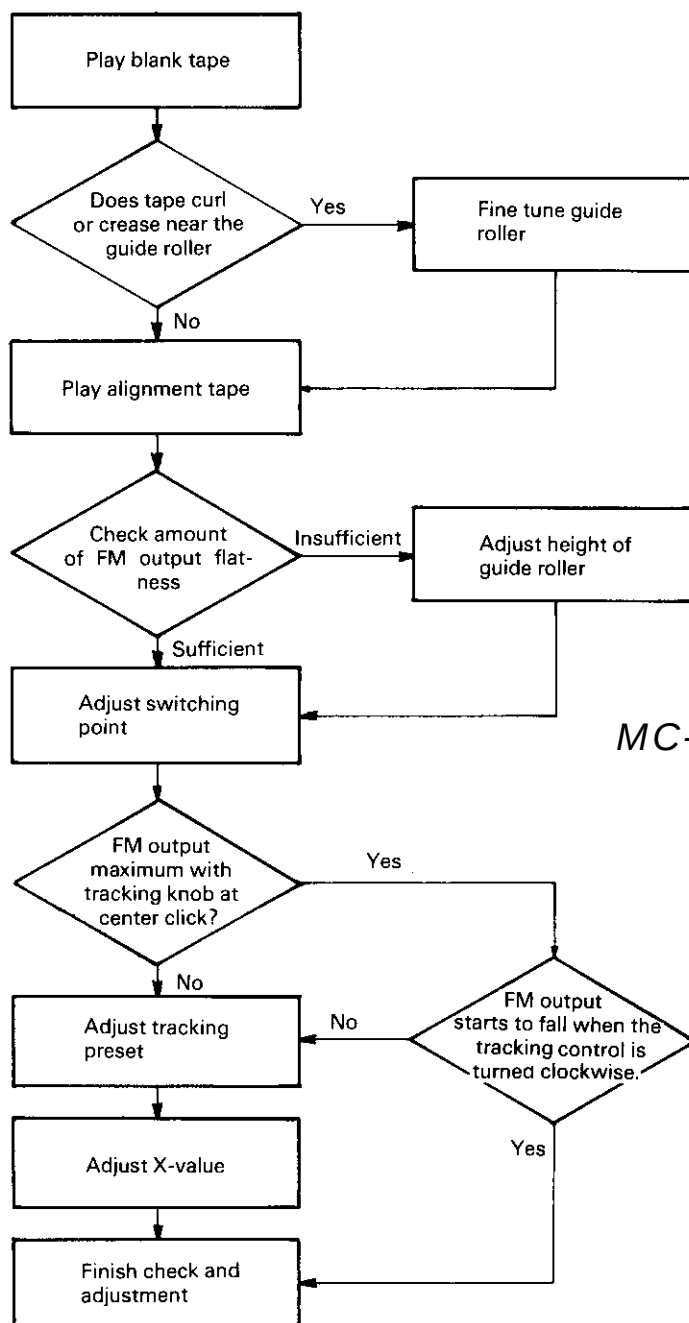


7. Adjustments after replacing Cylinder (Video Head)

Purpose: A new replacement cylinder will differ with the guide roller in X-value and relative height. But, correct replacement procedures will reduce this disparity to a minimum.

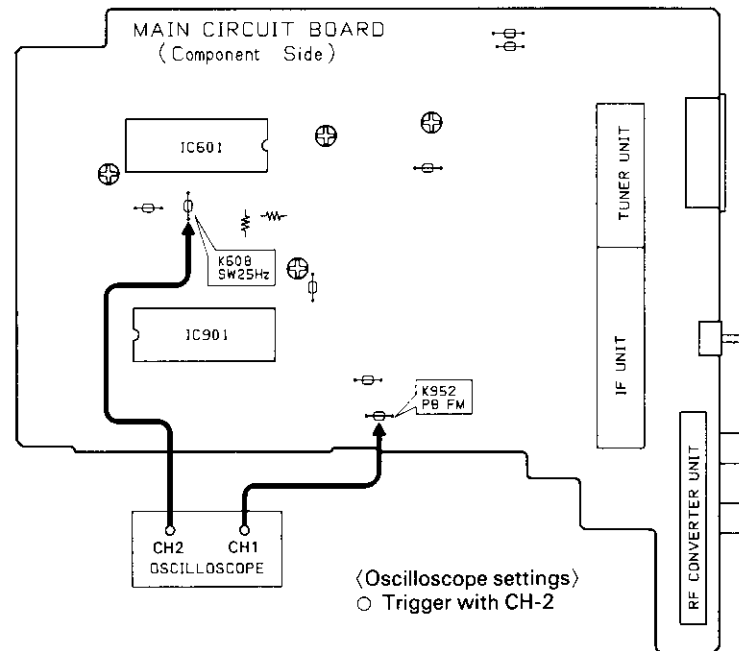
Test Equipment/Jigs	Test Equipment Connection Points	Adjustment Points
● Oscilloscope ● Alignment tape ● Blank tape ● Hexagonal wrench ● X-value adjustment screwdriver	● Check amount of flattening ● CH-1 : K952 ● CH-2 : K608	● Guide roller (see precision adjustment on page 4-9) ● Switching point (see section 3) ● Tracking preset (see section 3) ● X-value (see page 4-12)

Check and Adjustment Procedures



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Connection Diagram

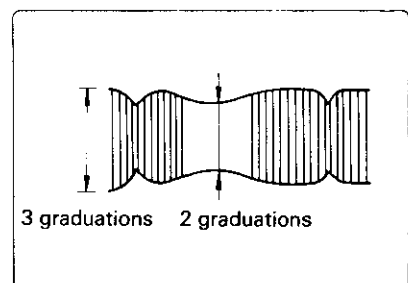
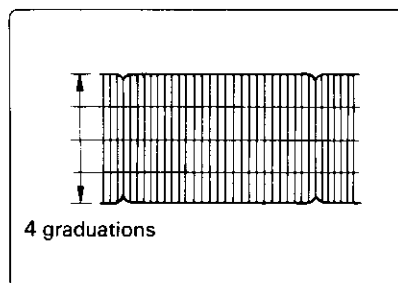
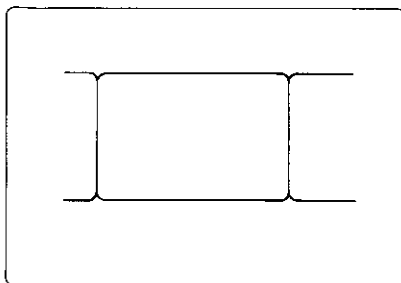


Procedures for checking amount of fluctuations and flatness in FM output

- 1) Use tracking control to maximize FM output.
- 2) Fine tune the oscilloscope's voltage level range to adjust FM output to 4 graduations.
- 3) Turn the tracking control to set the FM output's maximum amplitude at 3 graduations.
- 4) Make sure the minimum amplitude at this time is at 2 graduations or higher.
- 5) Make sure the difference between maximum and minimum level fluctuation is 13% or less.

Waveform Diagram

MC-Service

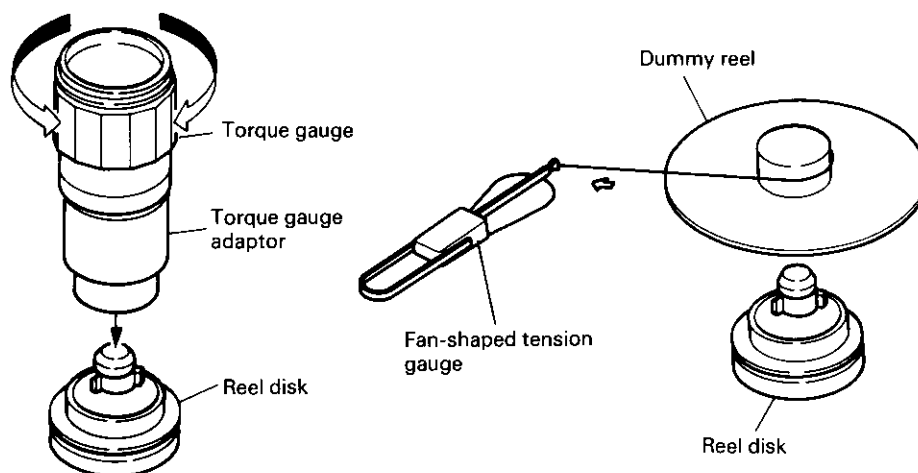


8. Checking Tension and Torque

Purpose: Checking tension torque and pressure on the components that wind and move the tape is necessary to ensure smooth tape run and fulfill the VTR's basic functions. Make this check when tape run is rough or tape speed is incorrect.

Test equipment/jigs			VTR state	
● Torque gauge ● Torque gauge adaptor ● Fan-shaped tension gauge ● Dummy reel			● Operate VTR without loading tape cassette (see page 4-17)	
Item	VTR Operation mode	Measurement reel	Measurement values	Remarks
Main brake torque	Stop	Supply and take-up reels	170 g·cm or more	Note 1
Slack removal torque	Unloading	Supply reel	90 ~ 190 g·cm	Note 1
Fast forward torque	Fast forward	Take-up reel	400 g·cm or more	Note 1
Rewind torque	Rewind	Supply reel	400 g·cm or more	Note 1
Reel winding torque	Play	Take-up reel	90 ~ 180 g·cm	Note 1
Back-tension torque	Fast forward	Supply reel	4 ~ 15 g·cm	Note 2
	Rewind	Take-up reel		
Note: 1. Value when using torque gauge and torque gauge adaptor for measurement with torque gauge sliding at 0.8 rps. However, main brake torque indicates measurement values during manual rotation of take-up reel, counterclockwise, and supply reel, clockwise, at 0.8 rps.			Note: 2. Indicates the value when the dummy reel and fan-shaped tension gauge are used to measure the take-up reel disk pulling counterclockwise and the supply reel disk pulling clockwise at 50 mm/s.	

Adjustment Diagram



Note: Method with VTR in loading state and no tape cassette inserted.

- 1) Remove top cover.
- 2) Remove AC plug from wall socket.
- 3) Disconnect the connector from the plug (PG-4) on the cassette loading motor circuit board.
- 4) Short-circuit pins 2 and 5 of the connector.
- 5) Insert AC plug into wall socket.
- 6) Turn VTR power on.

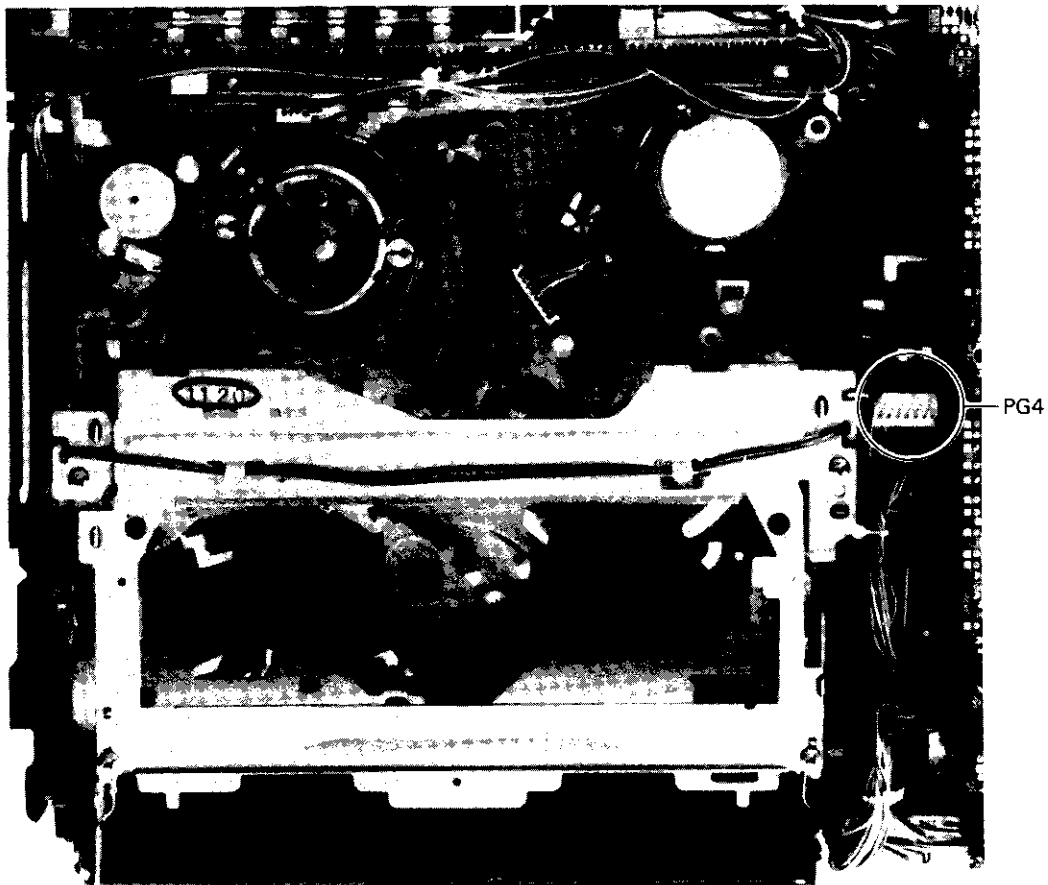
In this state, the VTR will accept all modes. However, rewind can be performed for only a few seconds because the take-up disk is in stop state and reel pulses cannot be detected.

[Caution]

After the above operations, always use the following steps to return to the original modes.

- 1) Remove short-circuit from connector and insert in plug.
- 2) Remove the AC plug from the wall socket once to reset the system control microprocessor.

MC-Service



SCHEMATIC/CIRCUIT BOARD DIAGRAMS

Note

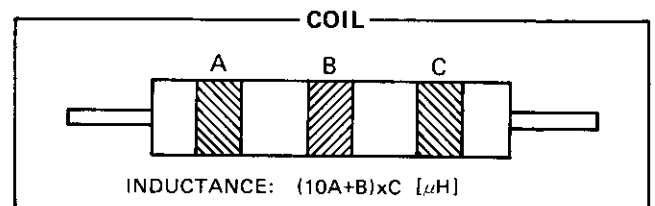
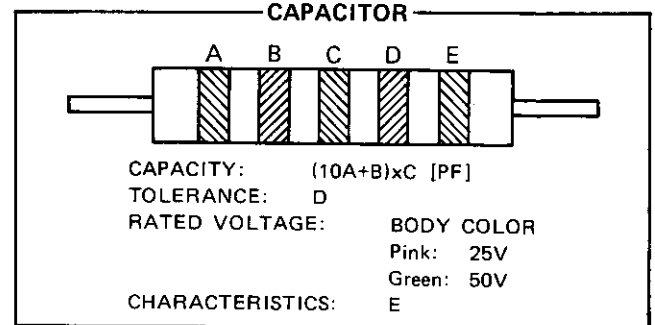
1. Voltage measured at base of chassis with minimum volume control and no signal.
() are shown in recording condition.
2. Nomenclature of Resistors and Capacitors.

Circuit No.	
Value	No indicated Ω (Ohm) M: 1000k Ω
Tolerance	No indicated $\pm 5\%$ K: $\pm 10\%$ M: $\pm 20\%$
Wattage	No indicated $\frac{1}{4}$ W
Sort	No indicated Carbon film RC: Composition RW: Wire wound RS: Oxide metal film RN: Fixed metal film

Circuit No.											
Value	No indicated μ F P: PF										
Tolerance	No indicated $\pm 10\%$ J: $\pm 5\%$ M: $\pm 20\%$ Z: $\pm 80\% - 20\%$ D: ± 0.5 pF C: ± 0.25 pF										
Sort	<table border="1"> <tr> <td>$\text{---}\text{---}\text{---}$</td><td>Ceramic</td></tr> <tr> <td>$\text{---}\text{---}\text{---}$</td><td>Electrolytic</td></tr> <tr> <td>$\text{---}\text{---}\text{---}$</td><td>Mylar</td></tr> <tr> <td>$\text{---}\text{---}\text{---}$</td><td>Polyester</td></tr> <tr> <td>$\text{---}\text{---}\text{---}$</td><td>Styrol</td></tr> </table>	$\text{---}\text{---}\text{---}$	Ceramic	$\text{---}\text{---}\text{---}$	Electrolytic	$\text{---}\text{---}\text{---}$	Mylar	$\text{---}\text{---}\text{---}$	Polyester	$\text{---}\text{---}\text{---}$	Styrol
$\text{---}\text{---}\text{---}$	Ceramic										
$\text{---}\text{---}\text{---}$	Electrolytic										
$\text{---}\text{---}\text{---}$	Mylar										
$\text{---}\text{---}\text{---}$	Polyester										
$\text{---}\text{---}\text{---}$	Styrol										
Voltage	No indicated 50WV										

3. Be sure to make your orders of resistors and capacitors with value, voltage, tolerance and sort.
4. When replacing capacitors marked with * use specified ones stated on parts list since required temperature characteristics.

HOW TO READ CAPACITY AND INDUCTANCE OF RESISTOR SHAPE CAPACITORS AND COILS



COLOR	A, B	C	D	E
Black	0	10^0	$\pm 20\%$	For temperature compensation
Brown	1	10^1		
Red	2	10^2		
Orange	3	10^3		
Yellow	4	10^4		
Green	5	10^5		
Blue	6			
Violet	7			
Grey	8		$\pm 30\%$	High dielectric constant type
White	9			For temperature compensation
Gold		10^{-1}	$\pm 5\%$	
Silver		10^{-2}	$\pm 10\%$	High dielectric constant type

Cautions on use of MOS IC

1. The MOS IC is inserted in black foam for shipment. This foam is a conductor which short-circuits between the leads to prevent damage. Do not remove ICs from this foam during their storage. Avoid removing ICs from this foam, placing them on plastic which is likely to be charged with static electricity or inserting them into styrol foam.
2. High voltages may be applied during soldering caused by leakages from the soldering iron, so be sure to ground the tip of the soldering iron or use a low voltage soldering iron.
3. The human body, clothes made of synthetic fibres or nylon gloves may be charged with several thousands volts of static electricity because of friction, so a worker should be grounded.
4. Be sure to ground measuring instruments such as oscilloscopes, VTVMs, etc. used for repairs.

MC-Service

SCHALTPLAN/LEITERPLATTEN-DIAGRAMM

Hinweise:

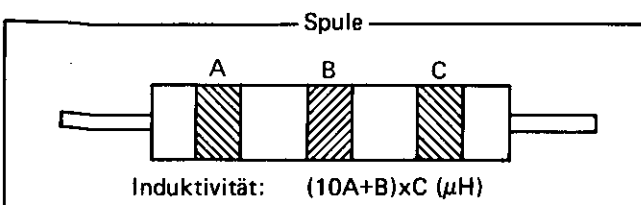
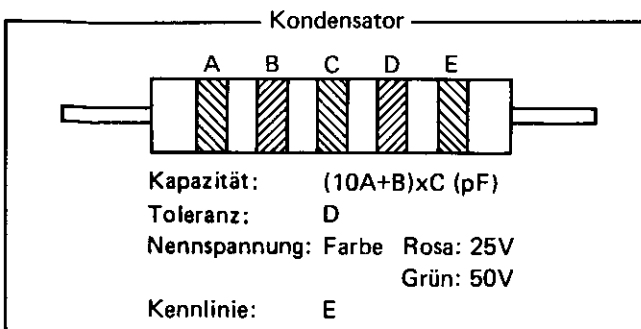
- Die aufgeführten Spannungswerte wurden bei auf Minimum gestelltem Lautstärkeregel und ohne Signal gemessen. Die in Klammern () gestellten Werte gelten für den Aufnahmehodus.
- Bezeichnung der Widerstände und Kondensatoren

Schaltkreis-Nr.	
Wert	Keine Angabe: Ohm M: 1000 kOhm
Toleranz	Keine Angabe: $\pm 5\%$ K: $\pm 10\%$ M: $\pm 20\%$
Wattzahl	Keine Angabe: 1/4W
Bauart	Keine Angabe: Kohlefilm RC: Verbundbauweise RW: Drahtspule RS: Metalloxydofilm RN: Fester Metalloxyd

Schaltkreis-Nr.											
Wert	Keine Angabe: μF P: PF										
Toleranz	Keine Angabe: $\pm 10\%$ J: $\pm 5\%$ M: $\pm 20\%$ Z: $\pm 80\%$ - 20% D: $\pm 0.5pF$ C: $\pm 0.25pF$										
Bauart	<table border="1"> <tr><td></td><td>Keramik</td></tr> <tr><td></td><td>Electrolyt</td></tr> <tr><td></td><td>Mylar</td></tr> <tr><td></td><td>Polyester</td></tr> <tr><td></td><td>Styrol</td></tr> </table>		Keramik		Electrolyt		Mylar		Polyester		Styrol
	Keramik										
	Electrolyt										
	Mylar										
	Polyester										
	Styrol										
Spannung	Keine Angabe: 50V										

- Bei der Bestellung von Widerständen und Kondensatoren unbedingt Wert, Spannung und Bauart angeben.
- Werden die mit "*" markierten Kondensatoren ausgetauscht, dann müssen die in der Stückliste spezifizierten Kondensatoren verwendet werden, da diese spezielle Temperatureigenschaften aufweisen.

Ablesen der Kapazität und Induktivität der in Form von Widerständen ausgeführten Kondensatoren und Spulen

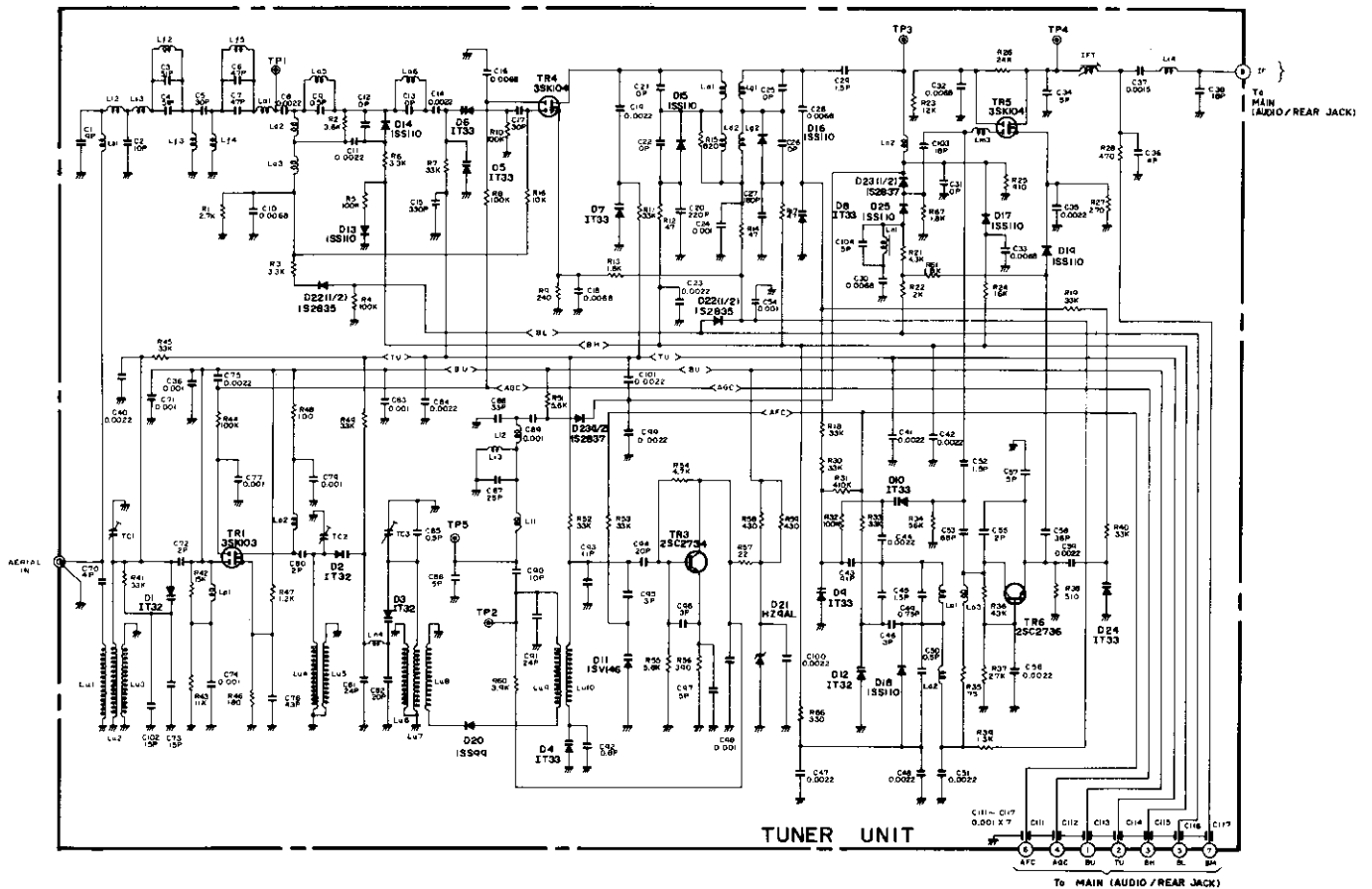


Vorsichtsmaßnahmen bei der Verwendung von MOS-ICs

- Die MOS-ICs werden für den Versand in schwarzem Schaumstoff verpackt. Dieser Schaumstoff ist elektrisch leitend und schließt die Leiter kurz, um Beschädigungen zu vermeiden. Die ICs während der Lagerung niemals aus der Schaumstoffverpackung entfernen. Die ICs nur unmittelbar vor der Verwendung auspacken und niemals auf Plastikteilen ablegen (statische Elektrizität!) bzw. in Styrol-Schaumstoff einsetzen.
- Aufgrund von Leckagen am LötKolben kann es während des Lötens zu Hochspannungen kommen; daher immer die Spitze des LötKolbens erden und nur einen Niederspannungs-LötKolben verwenden.
- Statische Elektrizität von einigen tausend Volt kann sich aufgrund von Reibung im menschlichen Körper bzw. in aus Kunstfasern hergestellten Kleidern und Handschuhen aufbauen. Daher sollten auch die mit der Handhabung von ICs betrauten Personen geerdet werden.
- Unbedingt die für die Reparaturen verwendeten Meßinstrumente wie Oszilloskop, Röhrenvoltmeter usw. erden.

Farbe	A, B	C	D	E
Schwarz	0	10^0	$\pm 20\%$	Für Temperature-Kompensation
Braun	1	10^1		
Rot	2	10^2		
Orange	3	10^3		
Gelb	4	10^4		
Grün	5	10^5		
Blau	6			
Violett	7			
Grau	8		$\pm 30\%$	Bauart mit hoher Dielektrizitätskonstanter
Weiß	9			Für Temperatur-Kompensation
Gold		10^{-1}	$\pm 5\%$	
Silber		10^{-2}	$\pm 10\%$	Bauart mit hoher Dielektrizitätskonstanter

TUNER UNIT/(TUNER-EINHEIT)

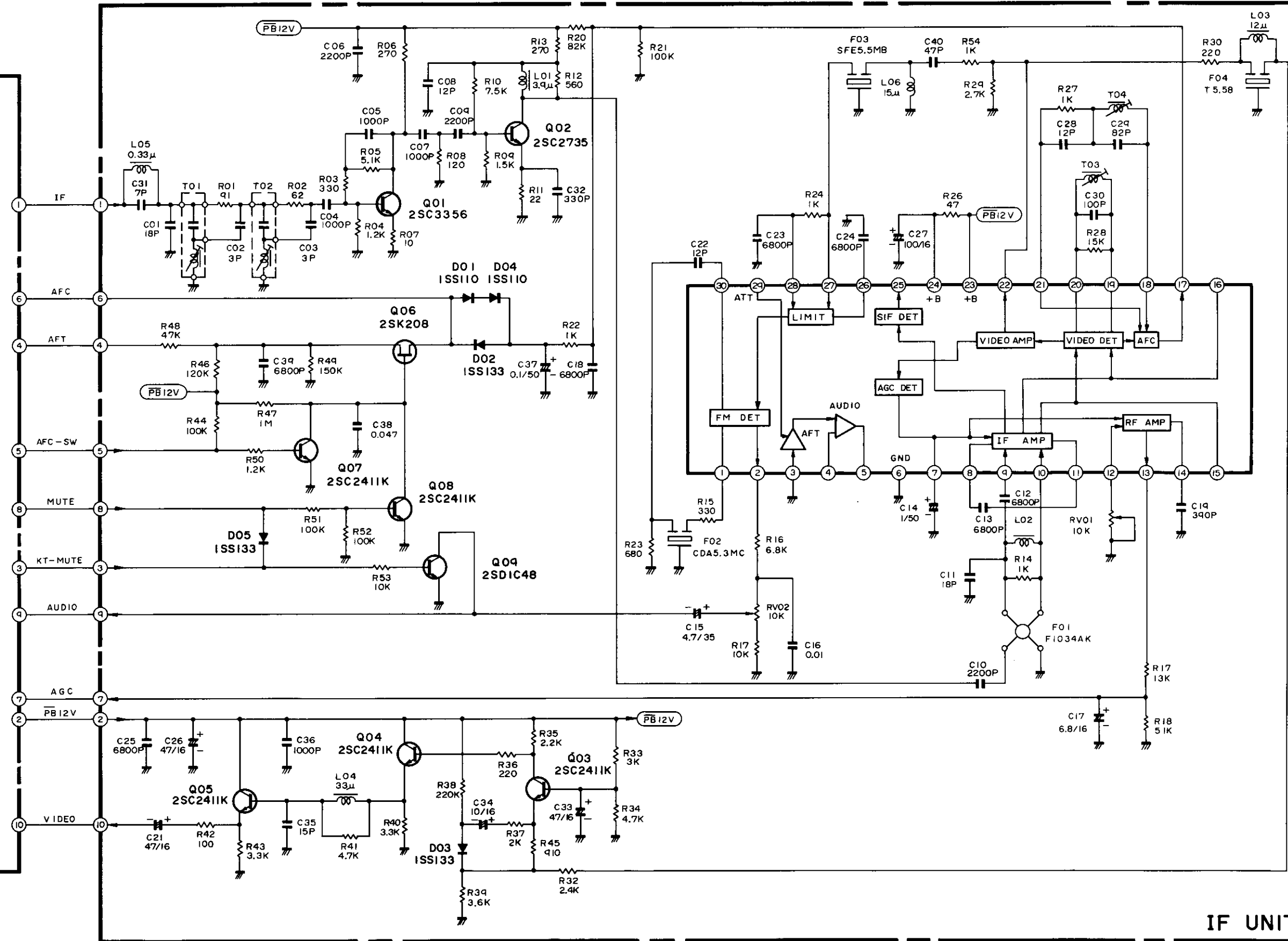


MC-Service

SCHEMATIC DIAGRAM	PAGE
TUNER UNIT	5-2
IF UNIT	5-3
V.S TUNING	5-5
TIMER/OPERATION SWITCH	
- VT-110E -	5-11
TIMER/OPERATION SWITCH	
- VT-120E -	5-14
SYSTEM CONTROL	5-20
REMOTE CONTROL	5-24
AUDIO/REAR JACK	5-26
RF CONVERTER	5-29
PREAMP	5-30
SERVO	5-39
Y/CHROMA	5-42
REGULATOR	5-51
INTERNAL WIRING DIAGRAM	5-55

IF UNIT (ZF-EINHEIT)

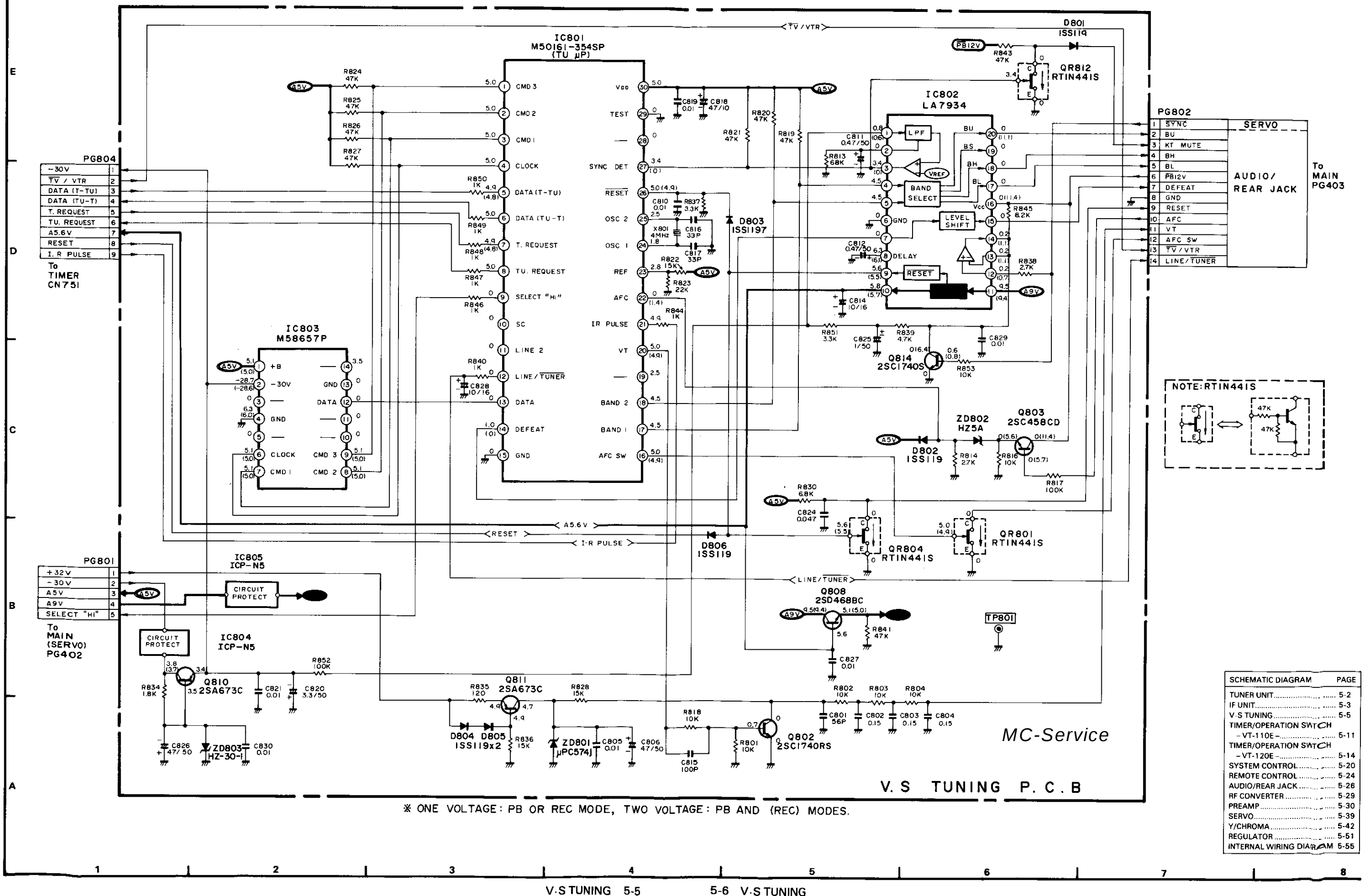
MAIN P.C.B.



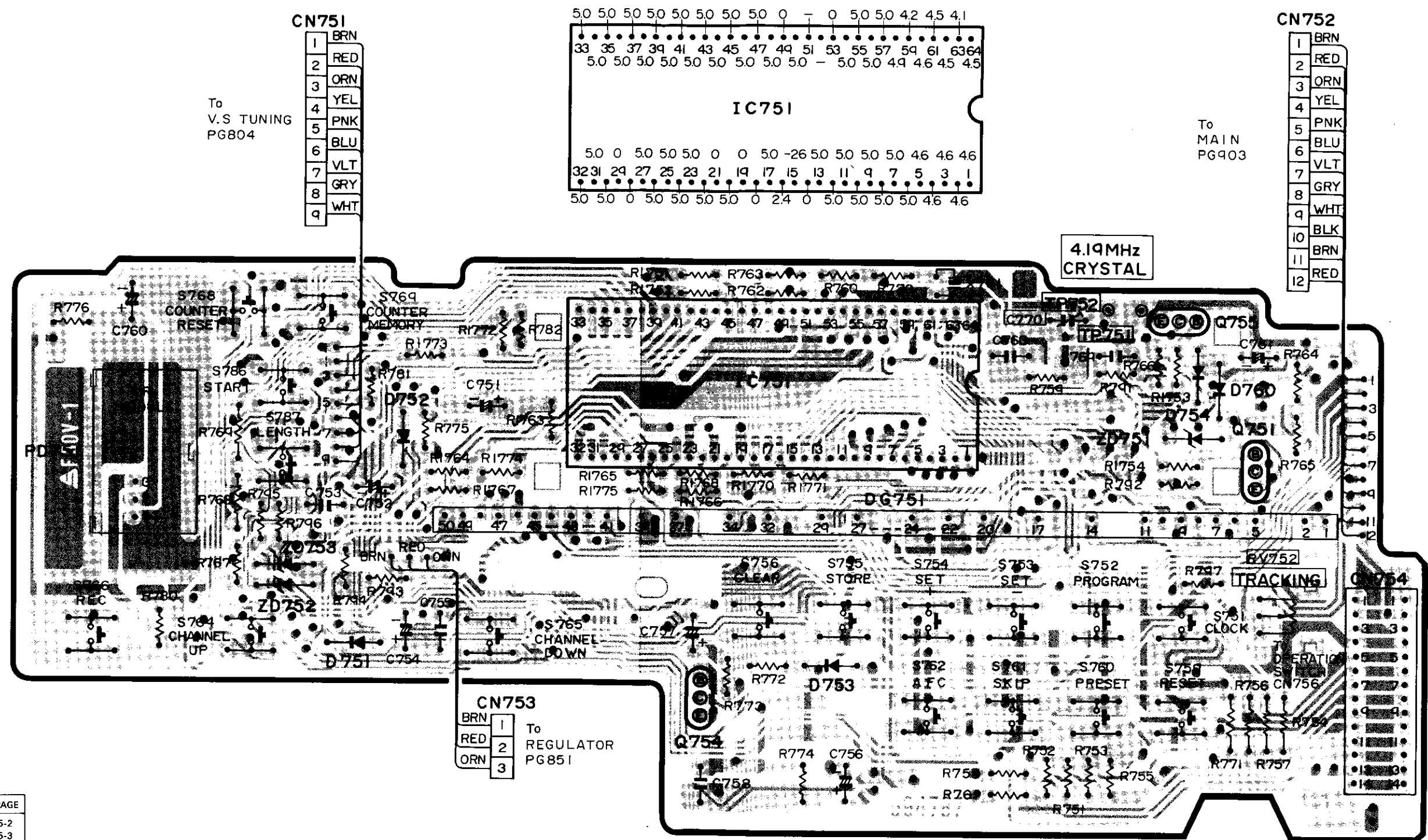
IC01
LA7522

IF UNIT

V.S TUNING (SPANNUNGSSYNTHESEIZER-TUNER)



TIMER - VT-110E -



SCHEMATIC DIAGRAM	PAGE
TUNER UNIT.....	5-2
IF UNIT.....	5-3
V.S. TUNING.....	5-5
TIMER/OPERATION SWITCH	
- VT-11 OE.....	5-11
TIMER/OPERATION SWITCH	
- VT-12 OE.....	5-14
SYSTEM CONTROL.....	5-20
REMOTE CONTROL.....	5-24
AUDIO/REAR JACK.....	5-26
RF CONVERTER.....	5-29
PREAMP.....	5-30
SERVO.....	5-39
Y/CHROMA.....	5-42
REGULATOR.....	5-51
INTERNAL WIRING DIAGRAM	5-55

Solderd side Parts side • Through hole

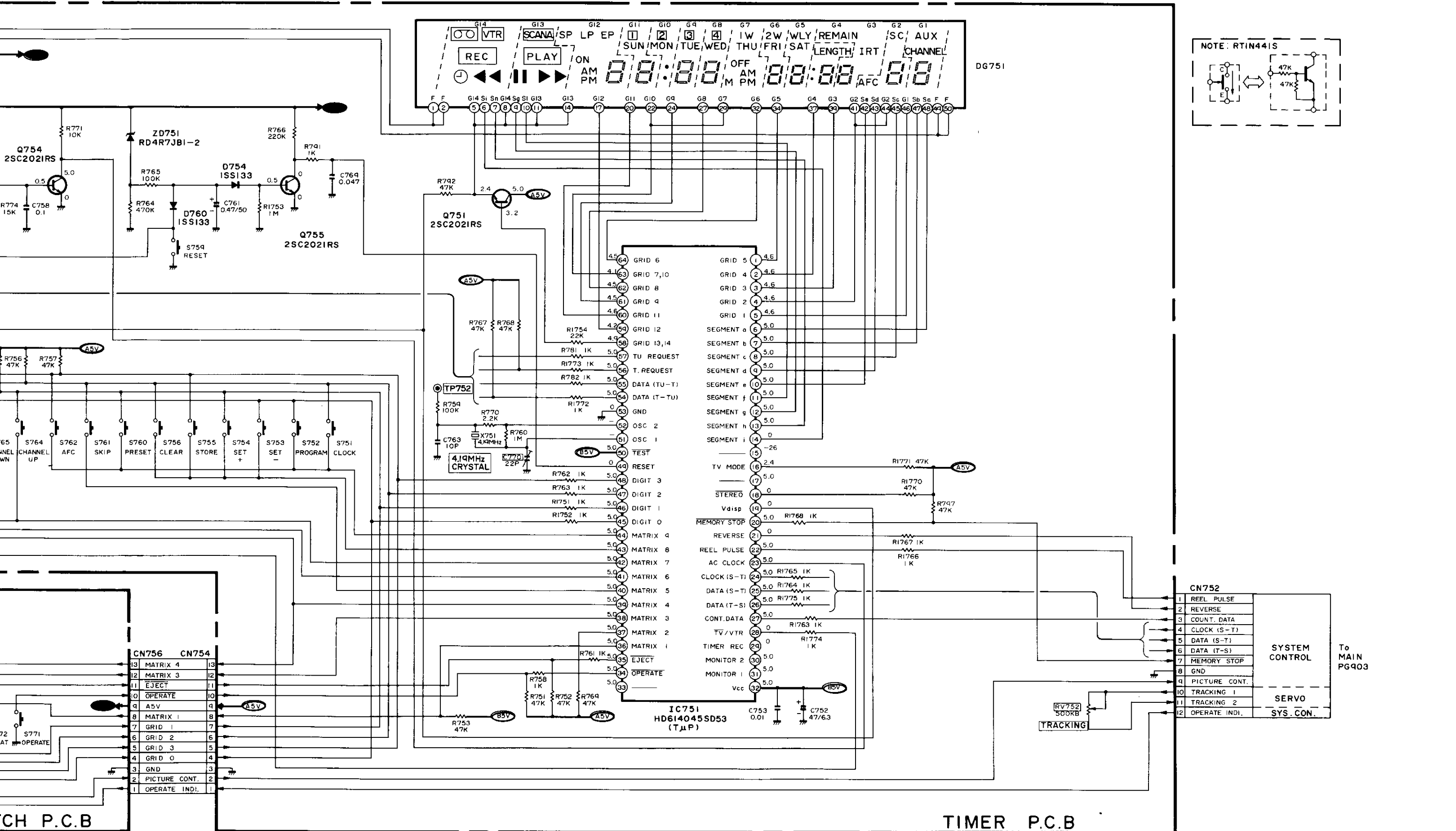
*VOLTAGES: ARE AS MEASURED IN THE STOP MODE

MC-Service

TIMER P.C.B

MC-Service

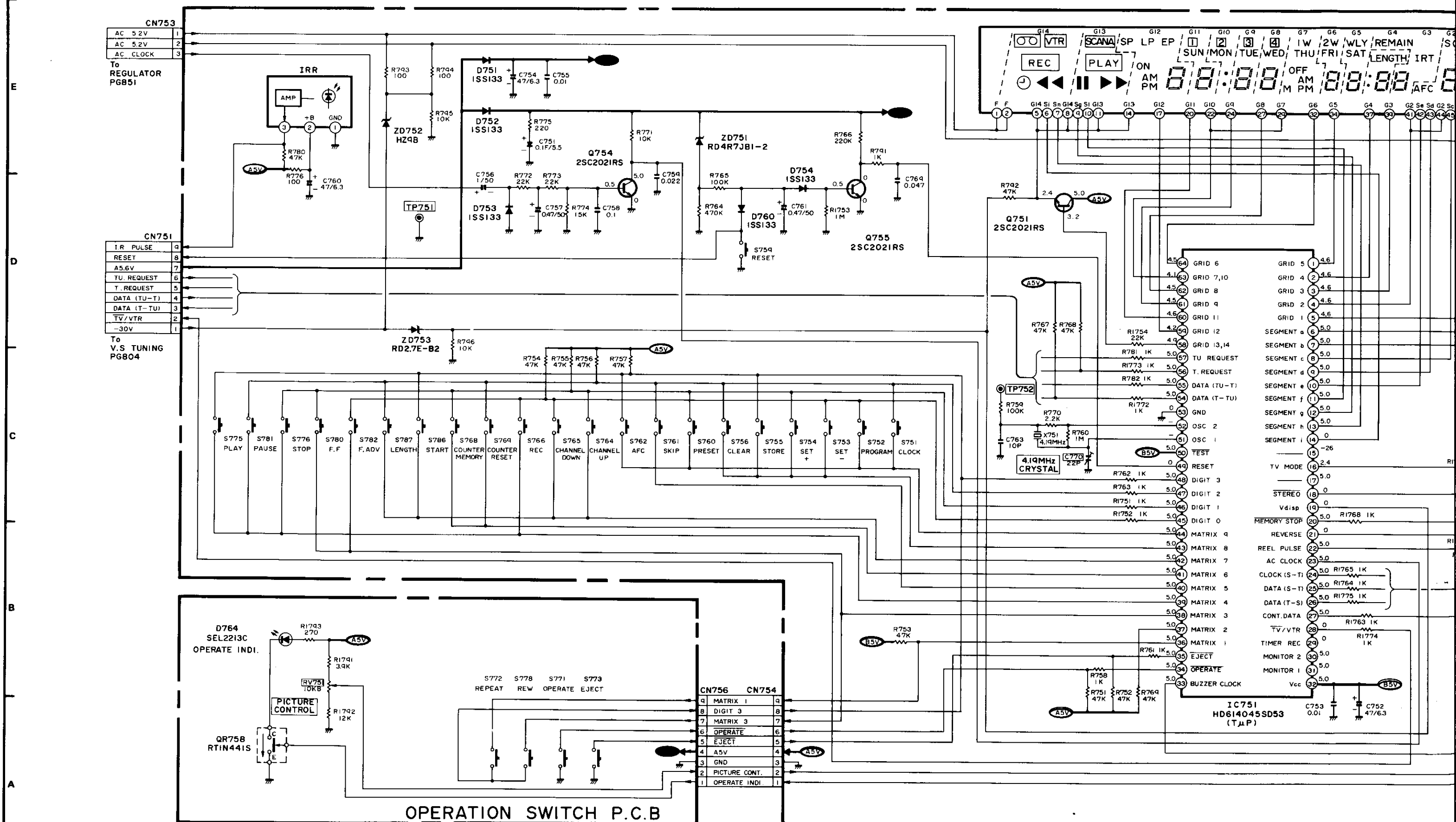




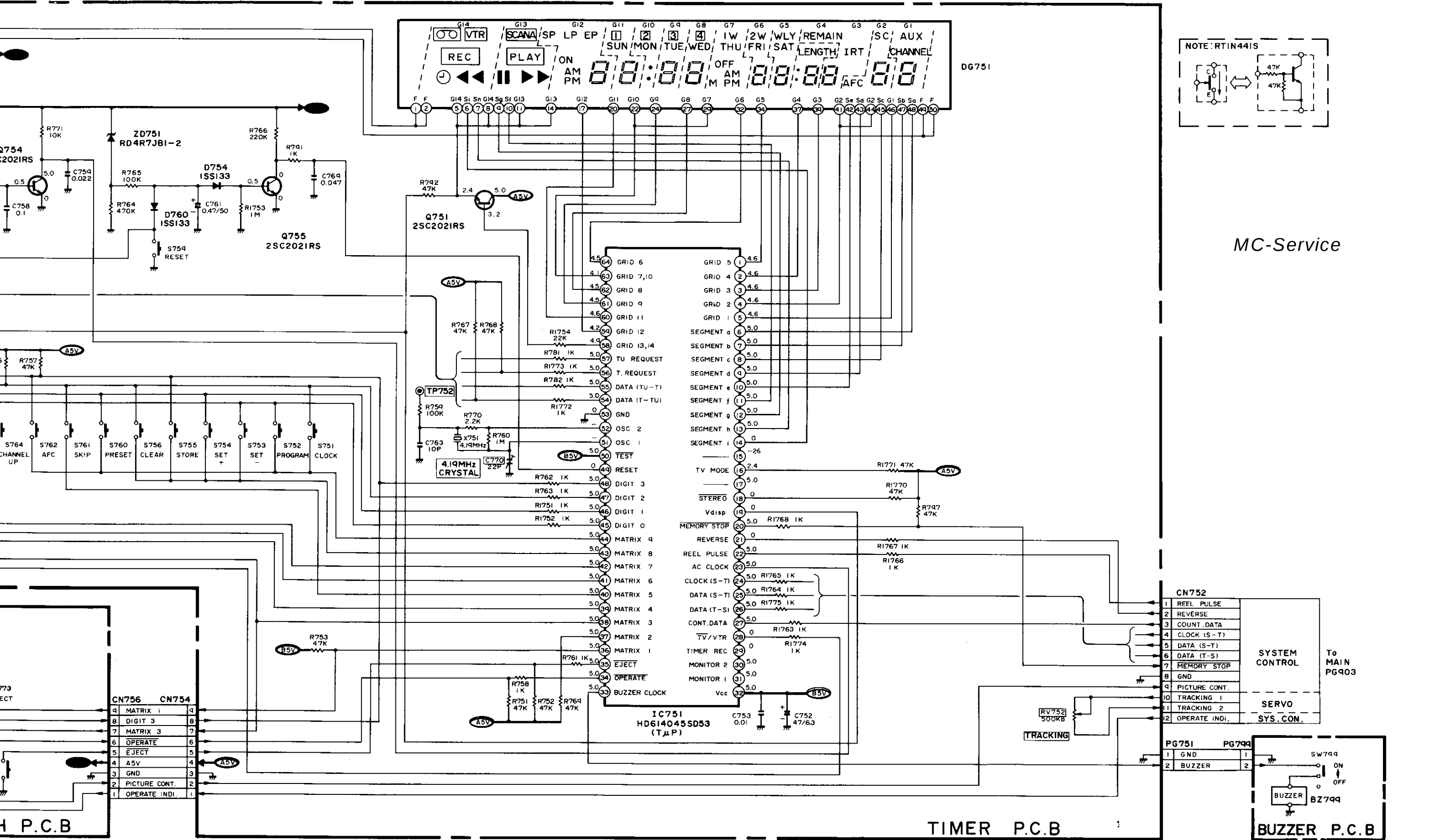
* VOLTAGES ARE AS MEASURED IN THE STOP MODE.

TIMER/OPERATION SWITCH (TIMER/FUNKTIONSSCHALTER)

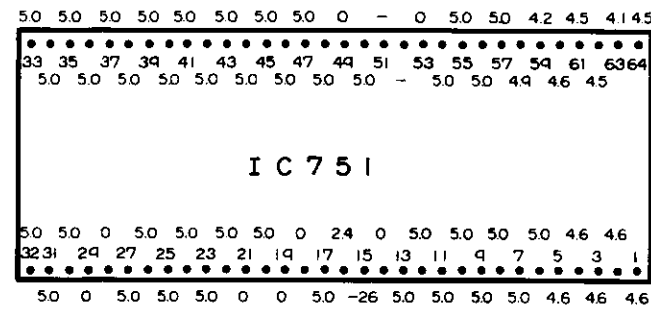
- VT-120E -



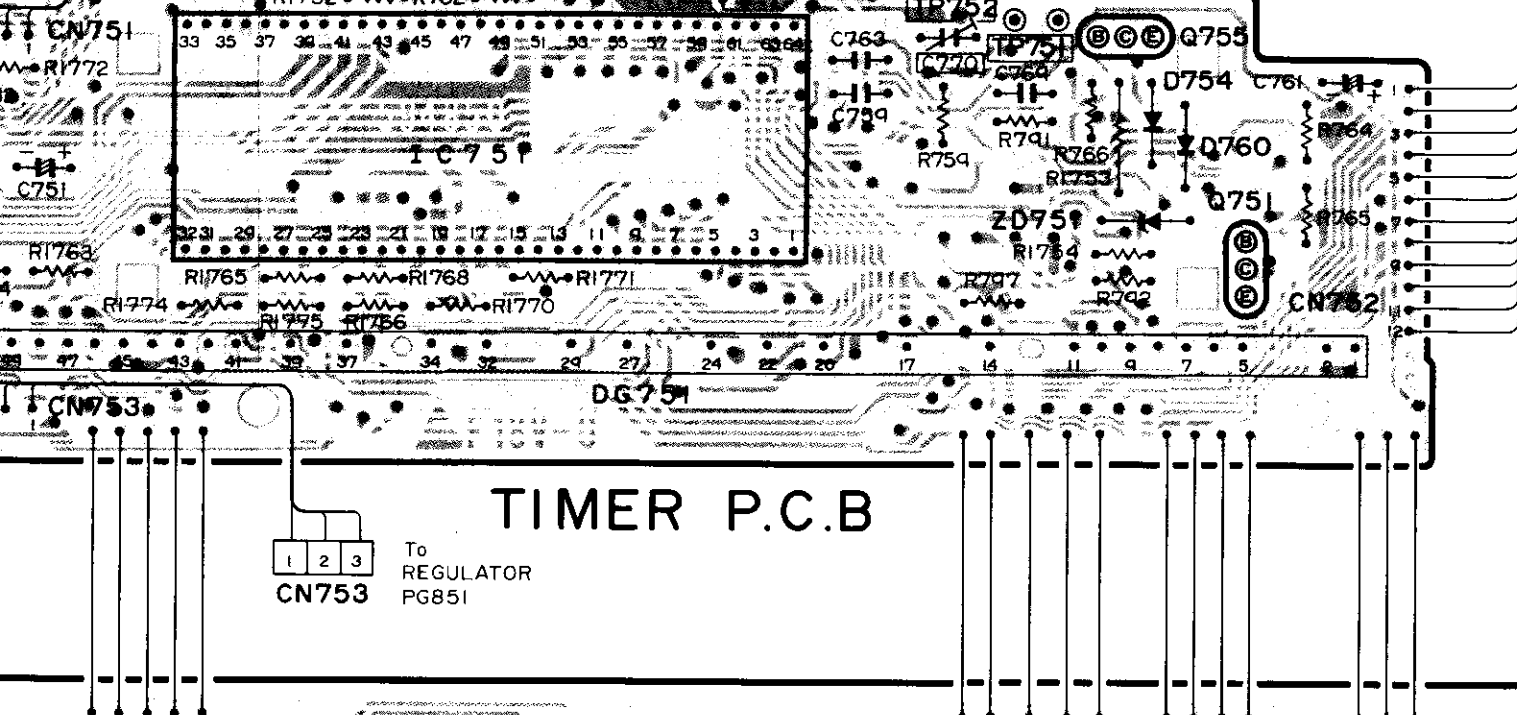
* VOLTAGE: STOP MODE.



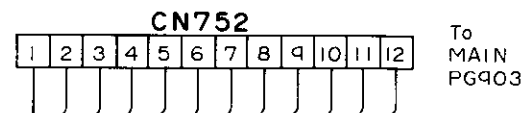




7 8 9

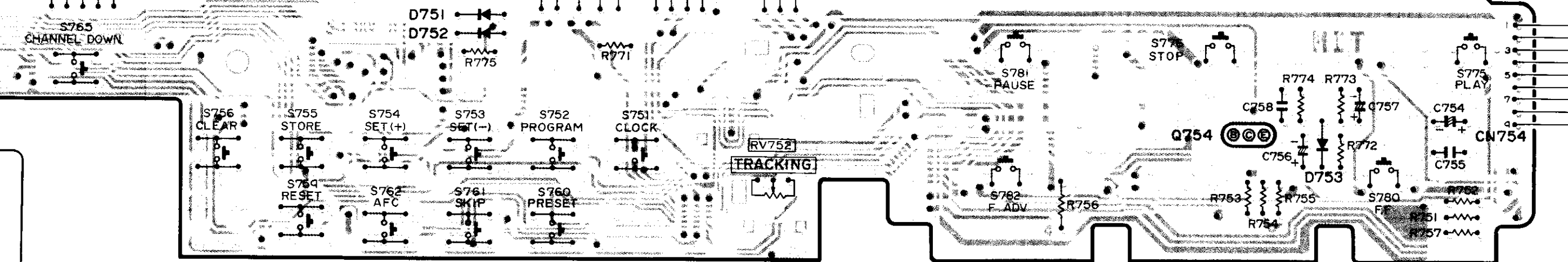
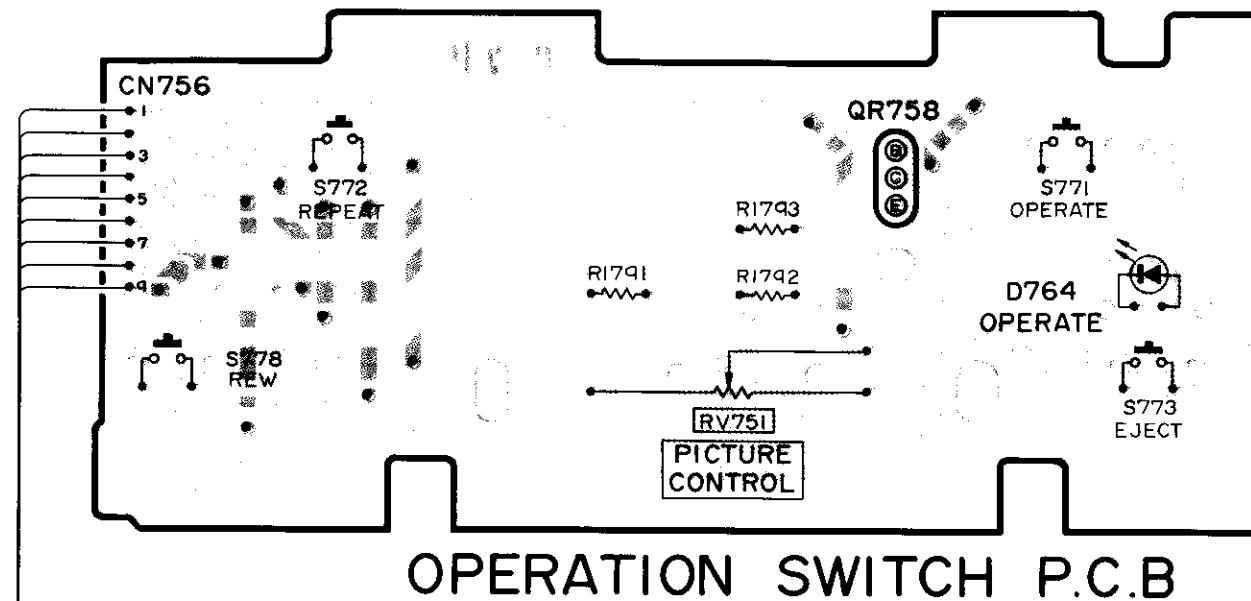


To
REGULATOR
PG851



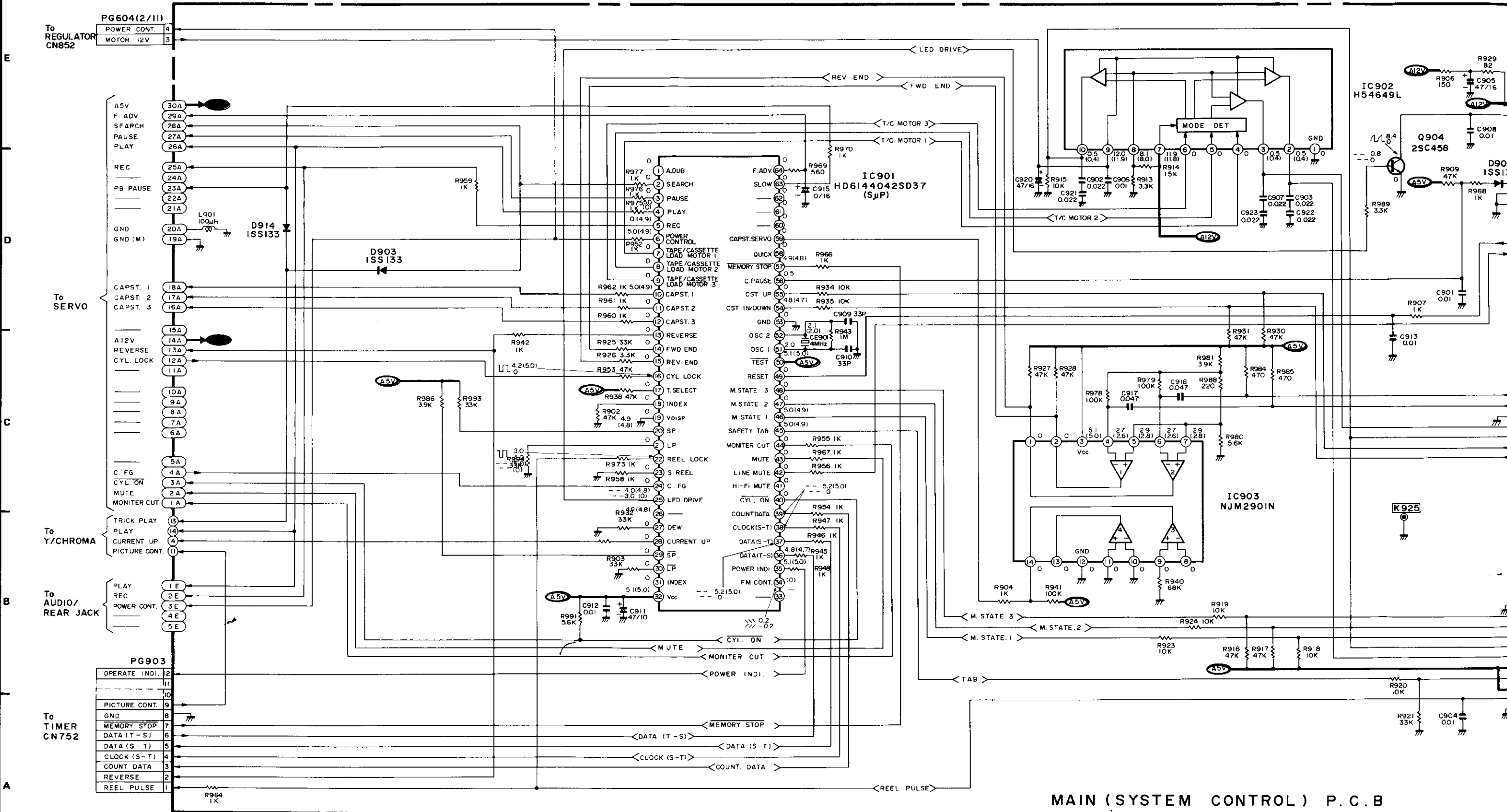
To
MAIN
PG903

MC-Service



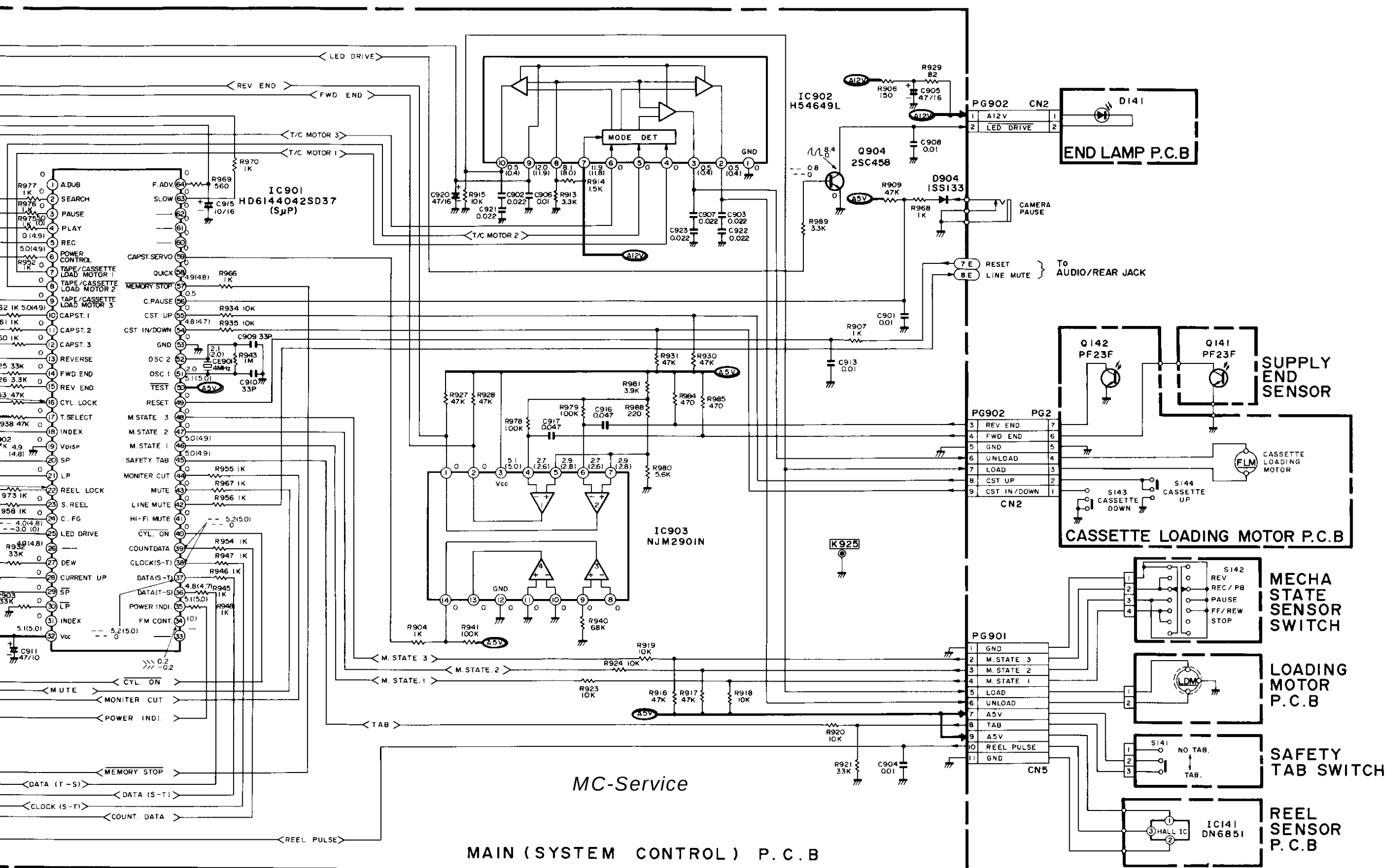
• Soldered side • Parts side • Through-hole

* VOLTAGE : STOP MODE.



* ONE VOLTAGE: PB OR REC MODE, TWO VOLTAGES: PB AND (REC) MODES.

MAIN (SYSTEM CONTROL) P.C.B

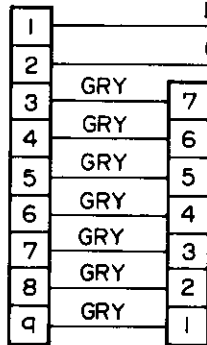


GES: PB AND (REC) MODES.

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RF CONVERTER	5-29
PREAMP	5-30
SERVO	5-39
Y/CHROMA	5-42
REGULATOR	5-51
INTERNAL WIRING DIAGRAM	5-55

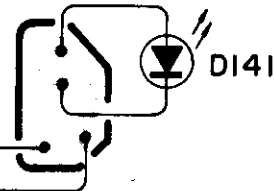
PERIPHERAL BOARD (PERIPHERIE-LEITERPLATTE)

CN2



To
SYSTEM CONTROL
(MAIN)
PG902

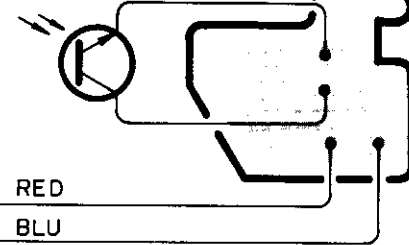
BRN
GRY



END LAMP P.C.B

SUPPLY END SENSOR P.C.B

Q141



PG2

RED
BLU



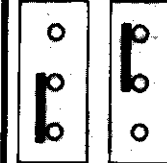
CASSETTE LOADING
MOTOR

MC-Service

SI43

SI44

Q142



CASSETTE
IN/DOWN

CASSETTE
UP



TAKE-UP END SENSOR

CASSETTE LOADING MOTOR P. C. B

CN5

MECHANISM
STATE SWITCH

LOADING MOTOR

SAFETY
TAB SWITCH

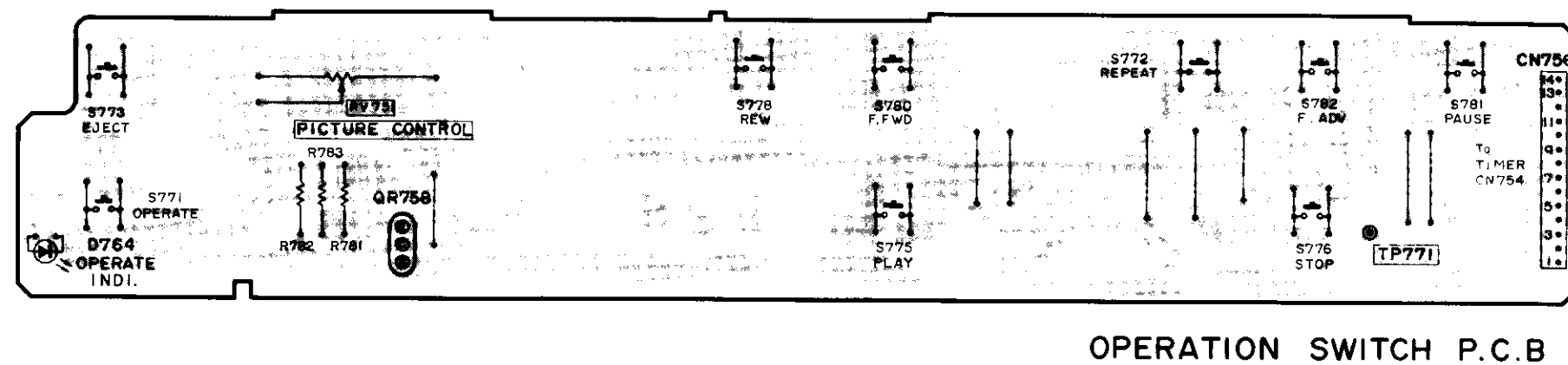
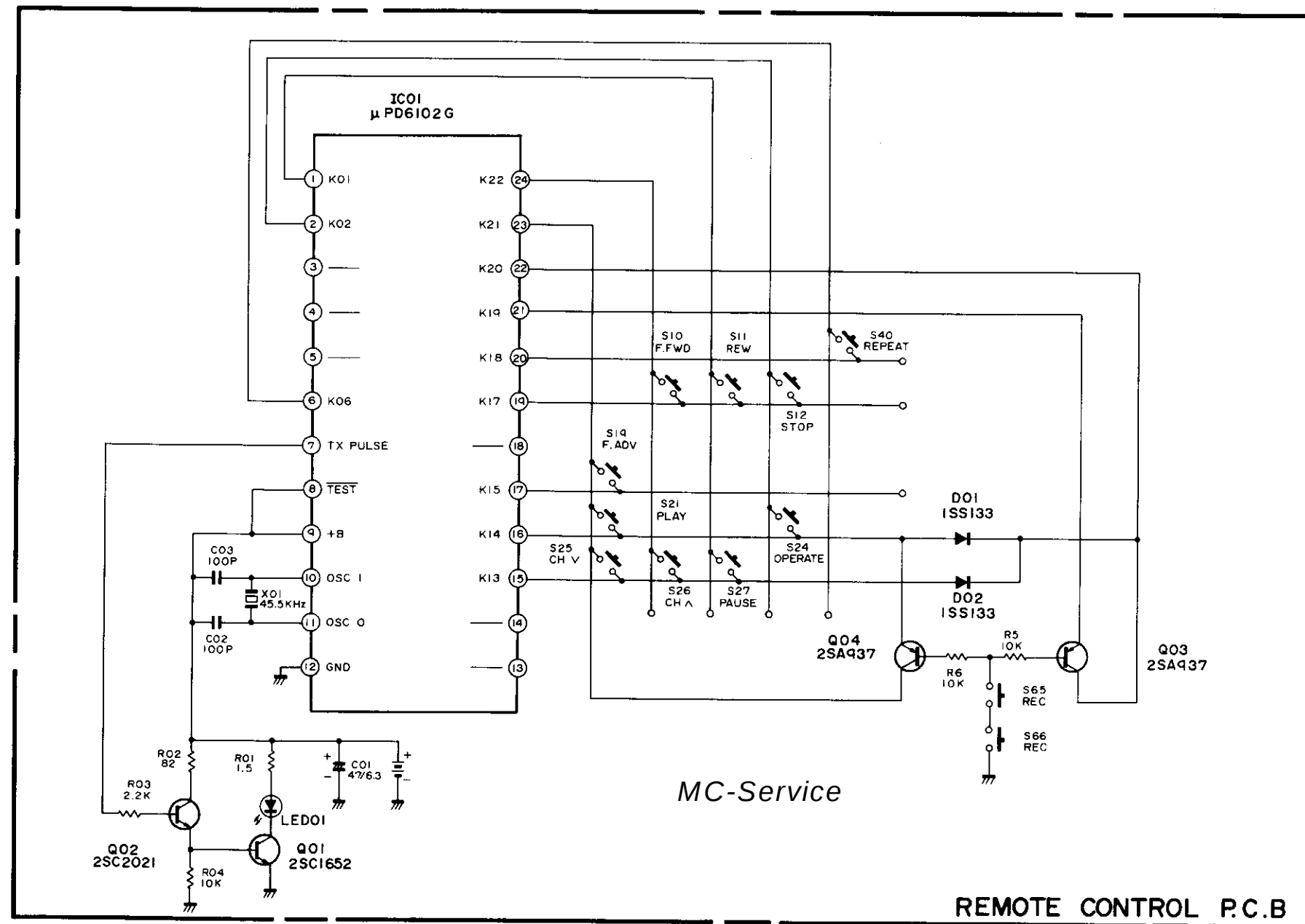


BRN
RED
ORN

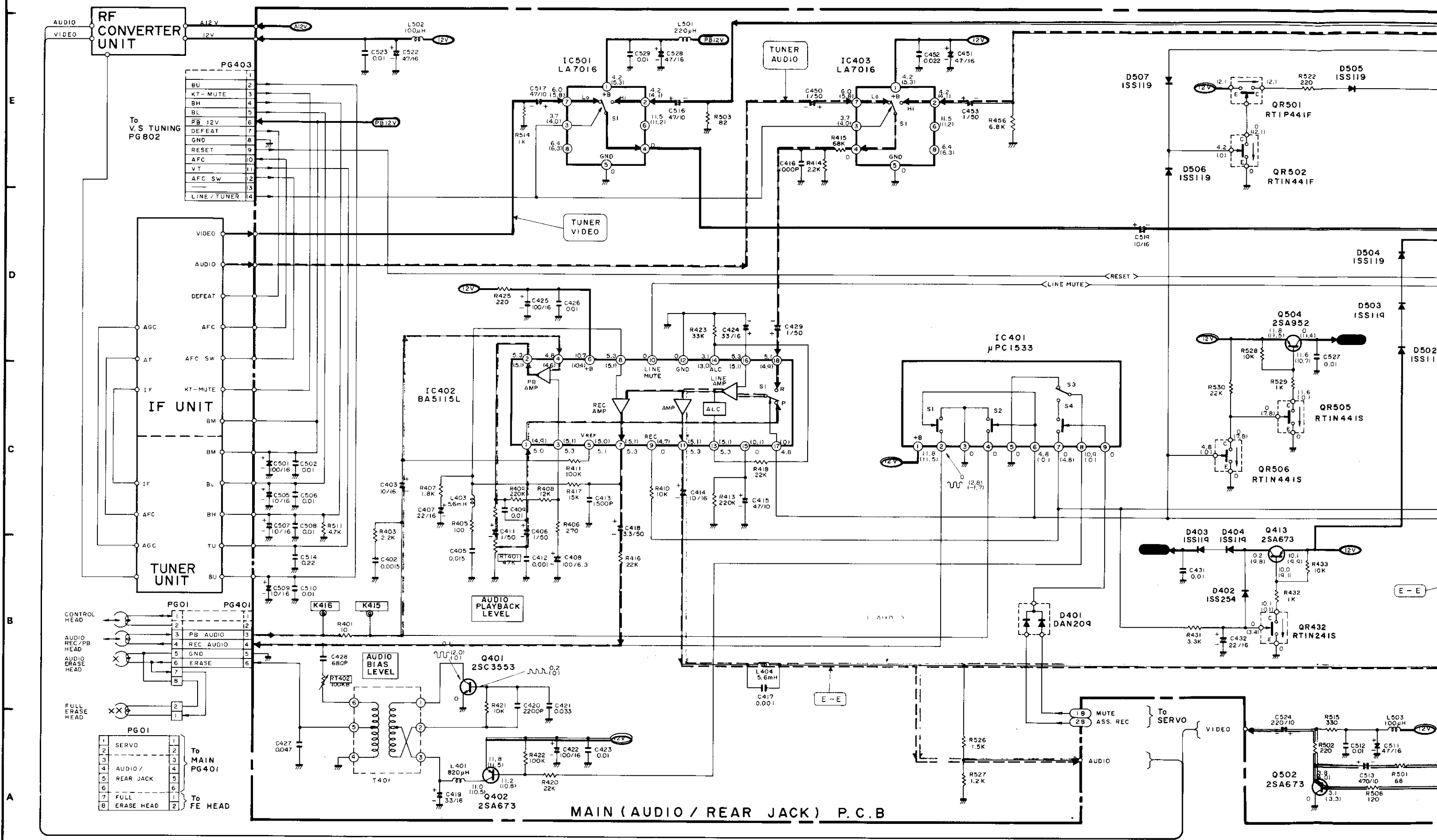
To
SYSTEM CONTROL
(MAIN)
PG901

TAKE-UP REEL SENSOR P. C. B

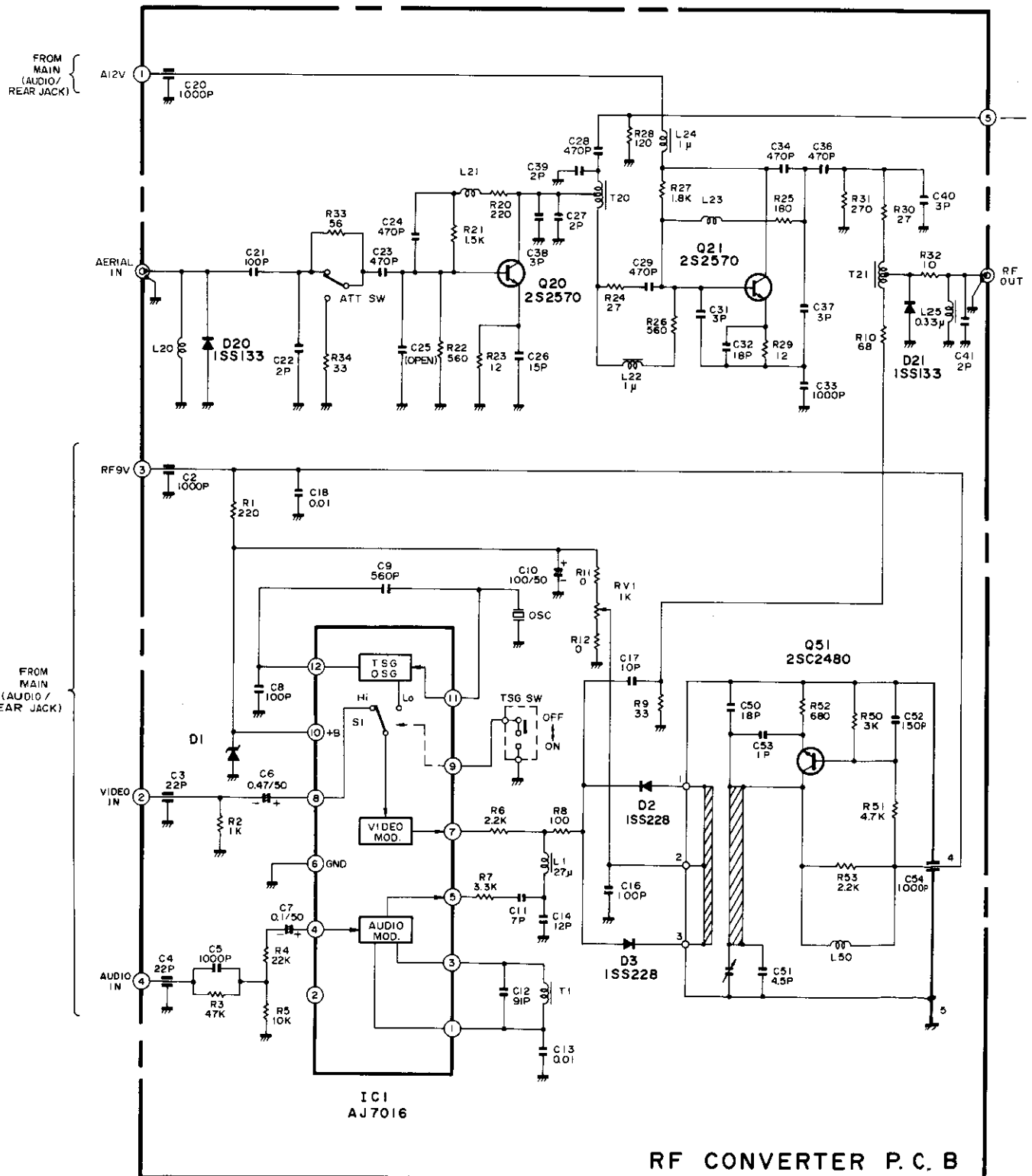
REMOTE CONTROL/OPERATION SWITCH (FERNBEDIENUNG/FUNKTIONSSCHALTER) – VT-110E –



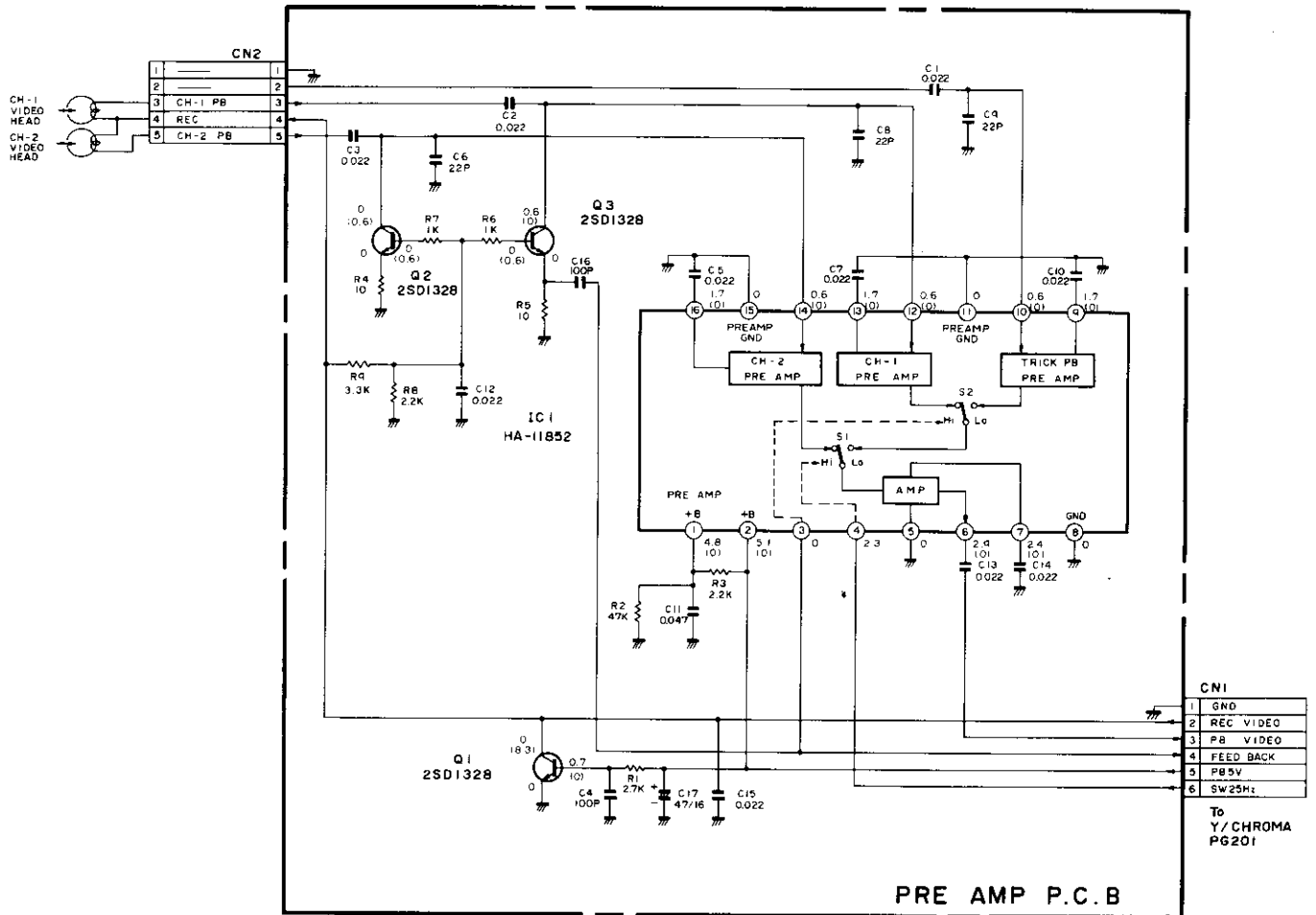
AUDIO/REAR JACK (AUDIO-BUCHSE)



RF CONVERTER (HF-KONVERTER)



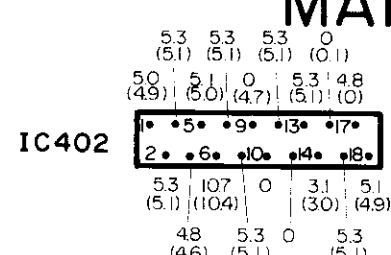
PREAMP (CORVERSTÄRKER)



*ONE VOLTAGE : PB OR REC MODE,
TWO VOLTAGES : PB AND (REC) MODE.

MC-Service

SCHEMATIC DIAGRAM	PAGE
TUNER UNIT.....	5-2
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TIMER/OPERATION SWITCH	
- VT-120E -.....	5-14
SYSTEM CONTROL.....	5-20
REMOTE CONTROL.....	5-24
AUDIO/REAR JACK.....	5-26
RF CONVERTER.....	5-29
PREAMP.....	5-30
SERVO.....	5-39
Y/CHROMA.....	5-42
REGULATOR.....	5-51
INTERNAL WIRING DIAGRAM	5-55



* ONE VOLTAGE : PB OR REC MODE.
TWO VOLTAGES: PB AND (REC) MODES.

. C . B



To
CONTROL HEAD/
AUDIO (REC/PB, ERASE) HEAD/
FULL ERASE HEAD.

MAIN P.C.B

IC402

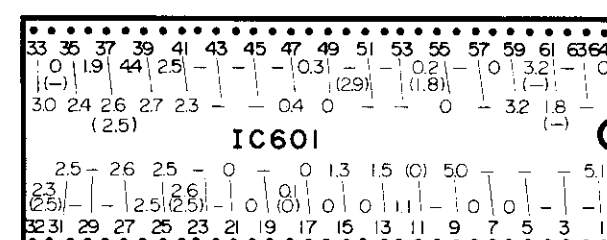
1	5	9	3	7
2	6	10	4	8

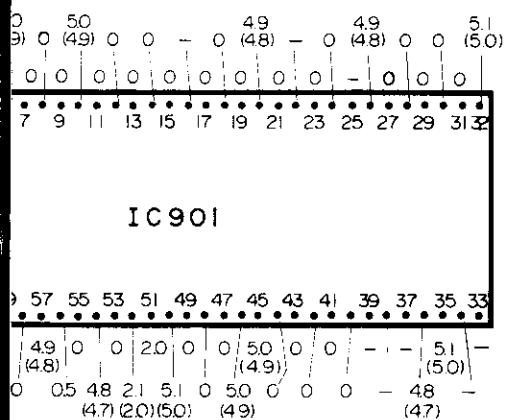
53 53 53 0
(5.1) (5.1) (5.1) (0.1)

50 5 5 5 48
(4.9) (5.0) (4.7) (5.1) (0)

48 53 0 53
(4.6) (5.1) (5.1)

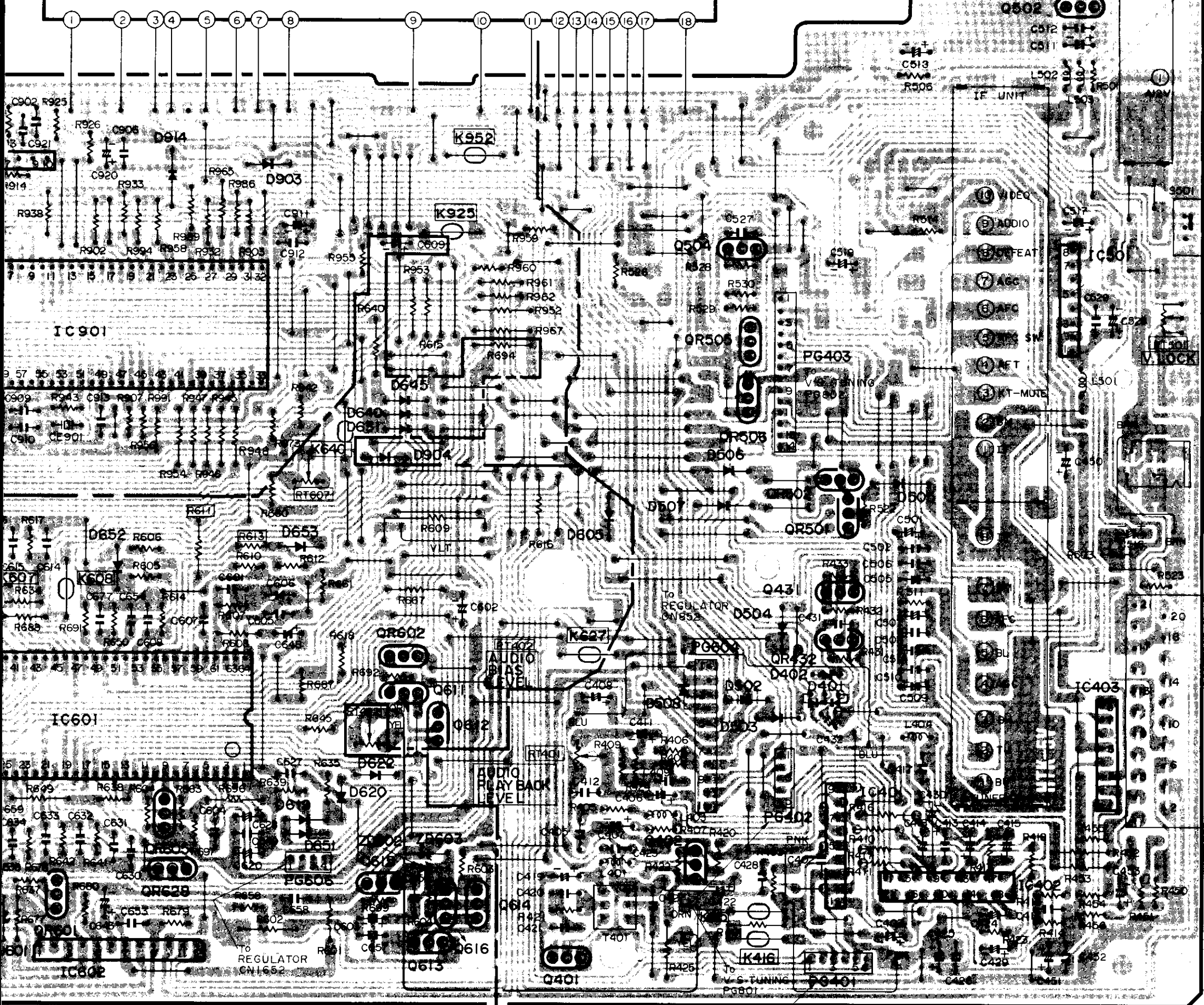
LTAGE : PB OR REC MODE.
LTAGES: PB AND (REC) MODES.





MC-Service

Y / CHROMA P.C.B



SERVO SECTION

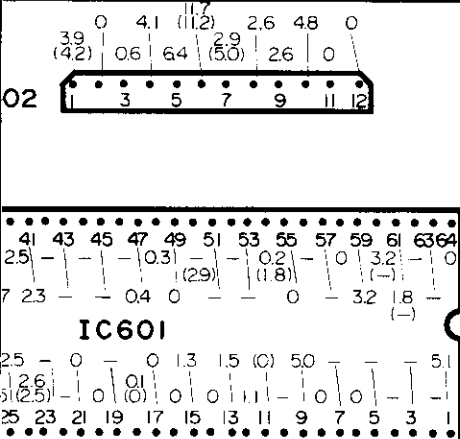
RT607
TRACKING
PRESET

R610, R611
REFERENCE
OSCILLATION
FREQUENCY

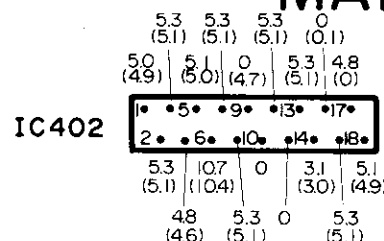
AUDIO / REAR JACK SECTION

TO
CONTROL HEAD /
AUDIO (REC / PB, ERASE) HEAD /
FULL ERASE HEAD.

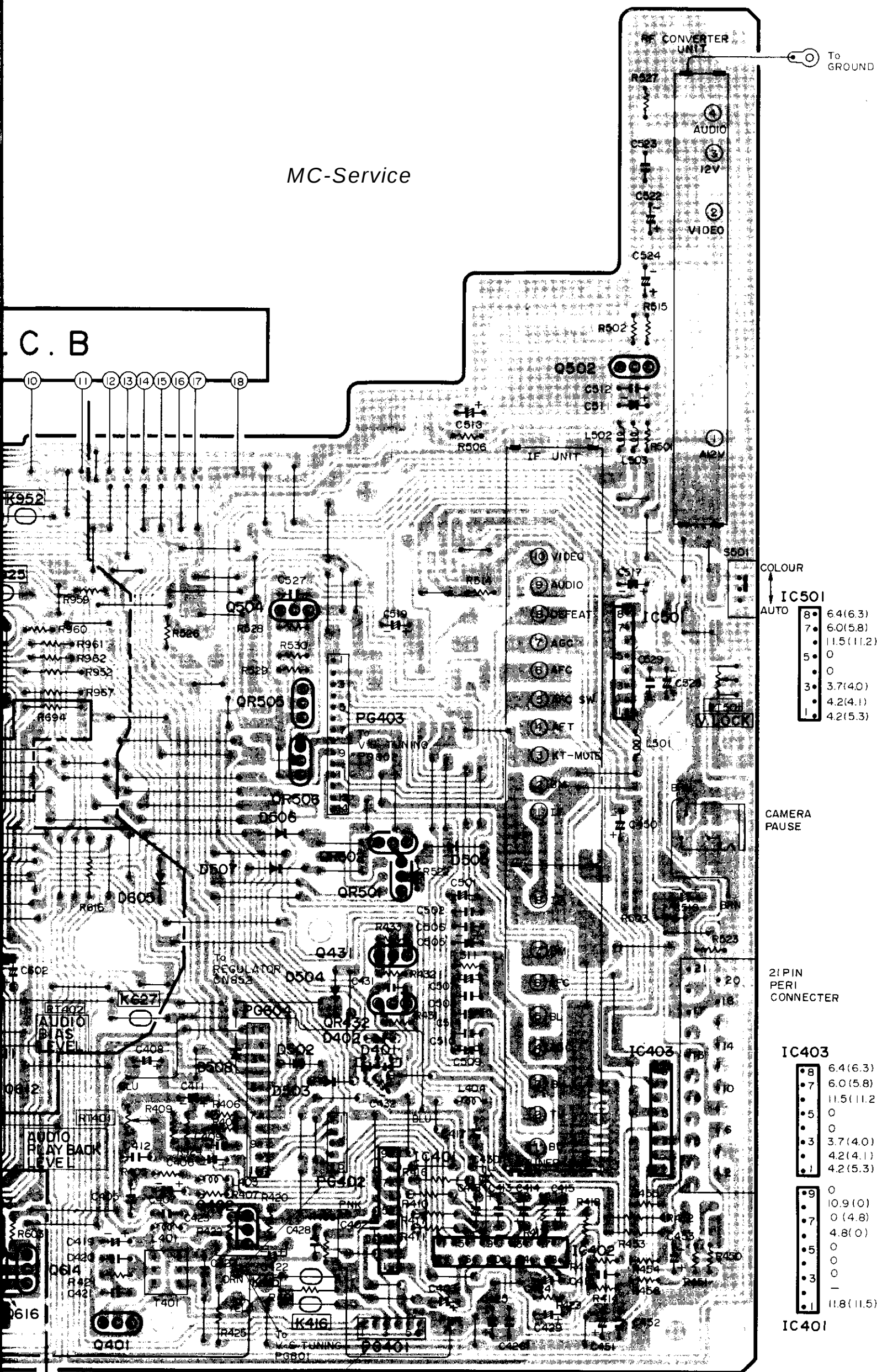
MAIN P.C.B



* ONE VOLTAGE : PB OR REC MODE.
TWO VOLTAGES: PB AND (REC) MODES.



MC-Service



IC501

8	6.4(6.3)
7	6.0(5.8)
6	11.5(11.2)
5	0
4	0
3	3.7(4.0)
2	4.2(4.1)
1	4.2(5.3)

IC403

8	6.4(6.3)
7	6.0(5.8)
6	11.5(11.2)
5	0
4	0
3	3.7(4.0)
2	4.2(4.1)
1	4.2(5.3)

IC401

9	0
8	10.9(0)
7	0(4.8)
6	4.8(0)
5	0
4	0
3	0
2	11.8(11.5)

AUDIO / REAR JACK SECTION

To CONTROL HEAD /
AUDIO (REC / PB, ERASE) HEAD /
FULL ERASE HEAD.

MAIN P.C.B.

IC402

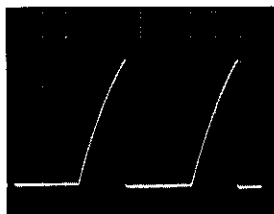
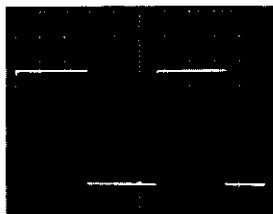
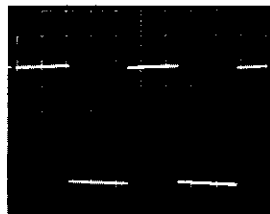
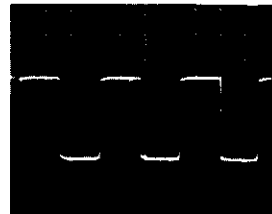
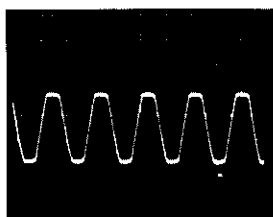
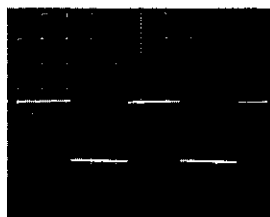
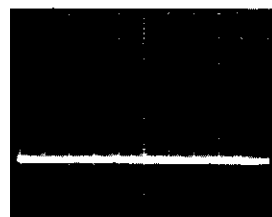
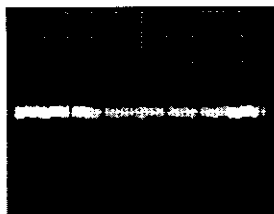
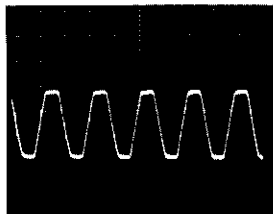
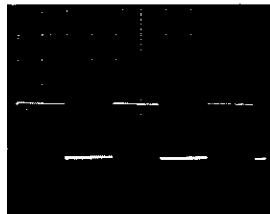
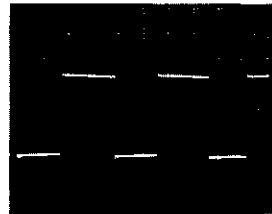
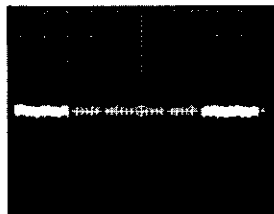
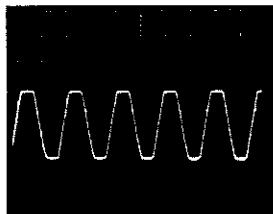
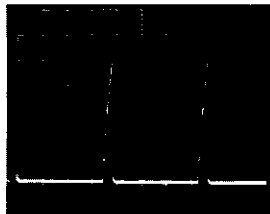
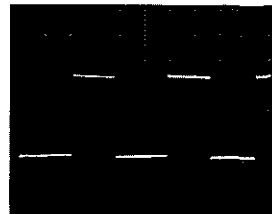
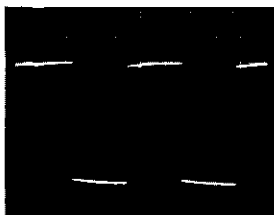
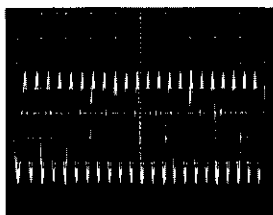
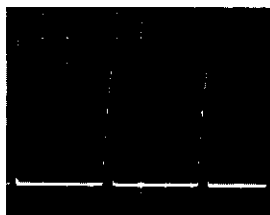
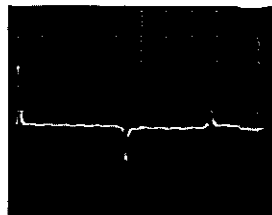
5.3	5.3	5.3	0
(5.1)	(5.1)	(5.1)	(0.1)
5.0	5.1	0	5.3 4.8
(4.9)	(5.0)	(4.7)	(5.1) (0)
5.3	10.7	0	3.1 5.1
(5.1)	(10.4)	(3.0)	(4.9)
4.8	5.3	0	5.3
(4.6)	(5.1)	(5.1)	

VOLTAGE : PB OR REC MODE.
VOLTAGES: PB AND (REC) MODES.

SERVO CIRCUIT WAVEFORMS (WELLENFORM)

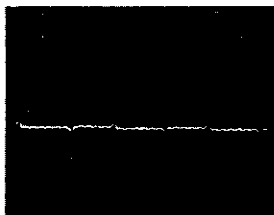
[IC601]

(REC: Colour bar Video in/PB: Alignment tape)

① PIN2 REC/PB
0.5V/10ms. div.⑥ PIN22 REC/PB
1V/20 μ s. div.⑪ PIN42 REC/PB
1V/0.1ms. div.⑯ PIN50 REC/PB
1V/1ms. div.② PIN3 REC/PB
0.1V/10ms. div.⑦ PIN28 REC/PB
0.5V/1ms. div.⑫ PIN43 REC/PB
2V/0.1ms. div.⑰ PIN53 REC/PB
1V/5ms. div.③ PIN4 REC/PB
50mV/10ms. div.⑧ PIN29 REC/PB
0.5V/1ms. div.⑬ PIN44 REC/PB
2V/10ms. div.⑱ PIN59 REC
1V/10ms. div.④ PIN5 REC/PB
50mV/10ms. div.⑨ PIN30 REC/PB
1V/1ms. div.⑭ PIN45 REC/PB
0.5V/5ms. div.⑲ PIN60 REC
1V/10ms. div.⑤ PIN11 REC/PB
1V/0.2ms. div.⑩ PIN32 REC/PB
50mV/0.5 μ s. div.⑮ PIN46 REC/PB
0.5V/5ms. div.⑳ PIN62 PB
1V/5ms. div.

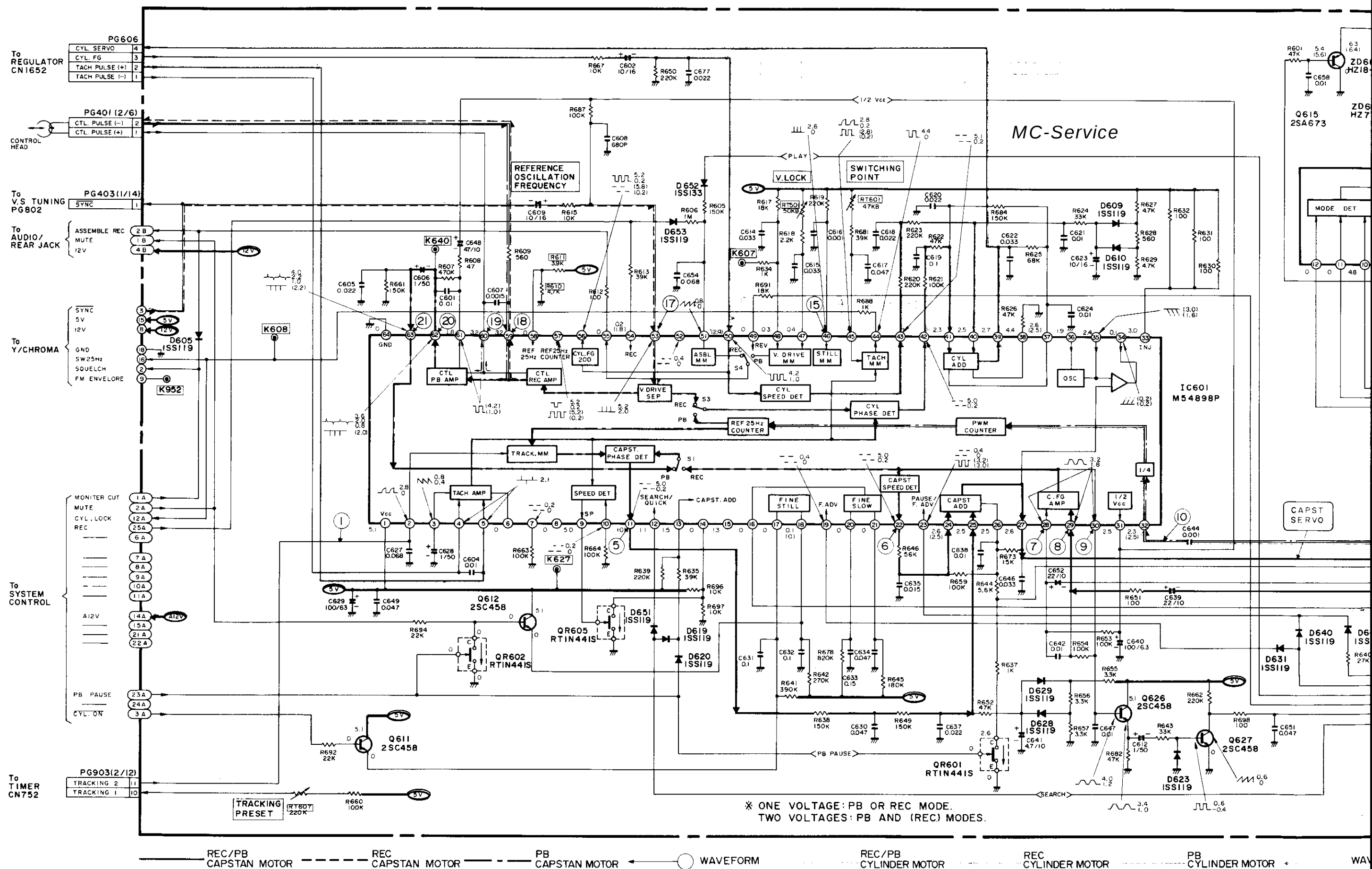
[IC601]

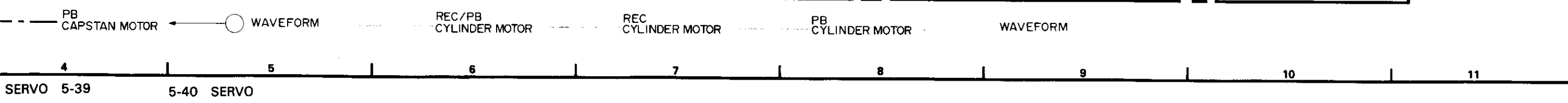
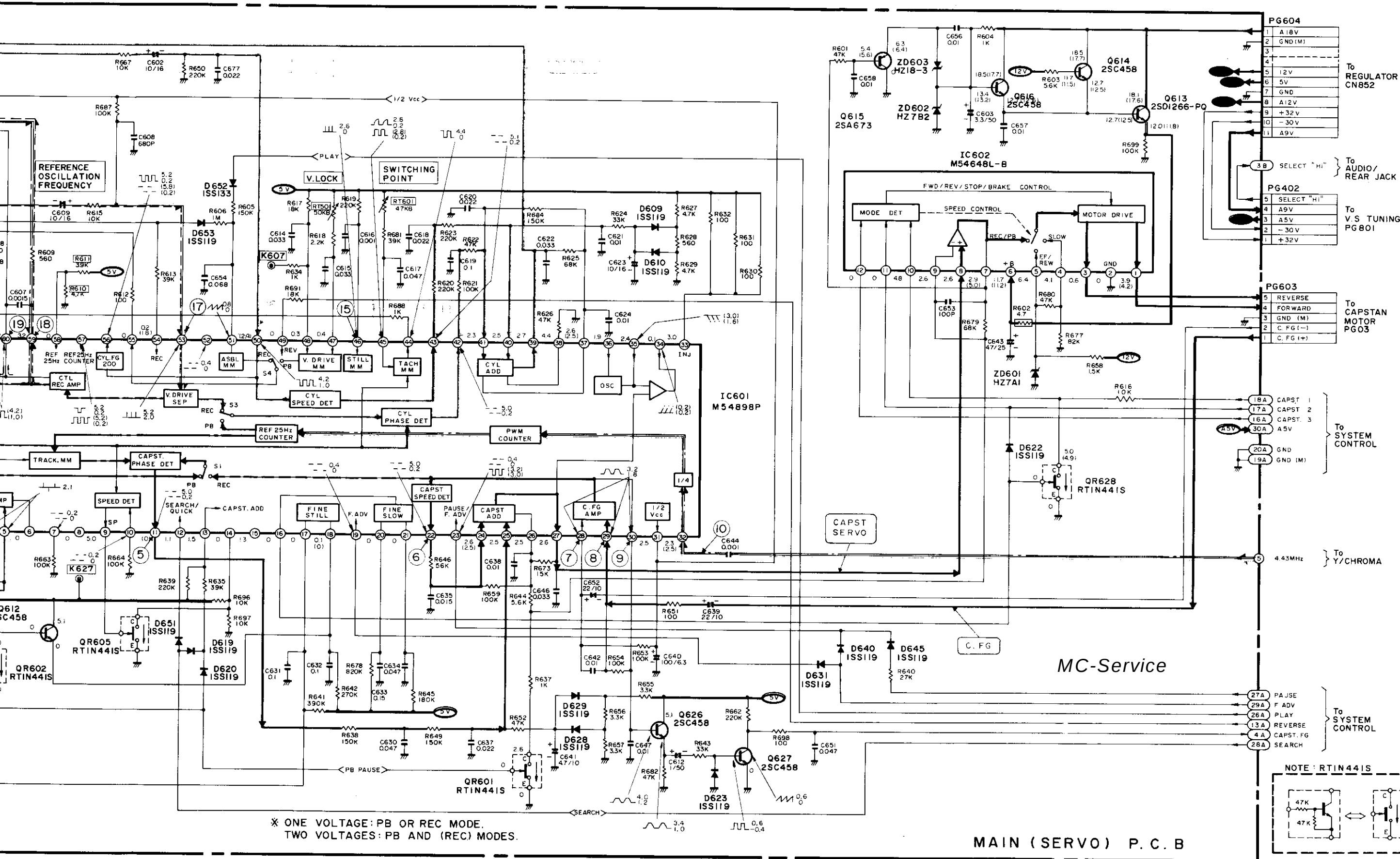
②1 PIN63 PB
1V/10ms. div.



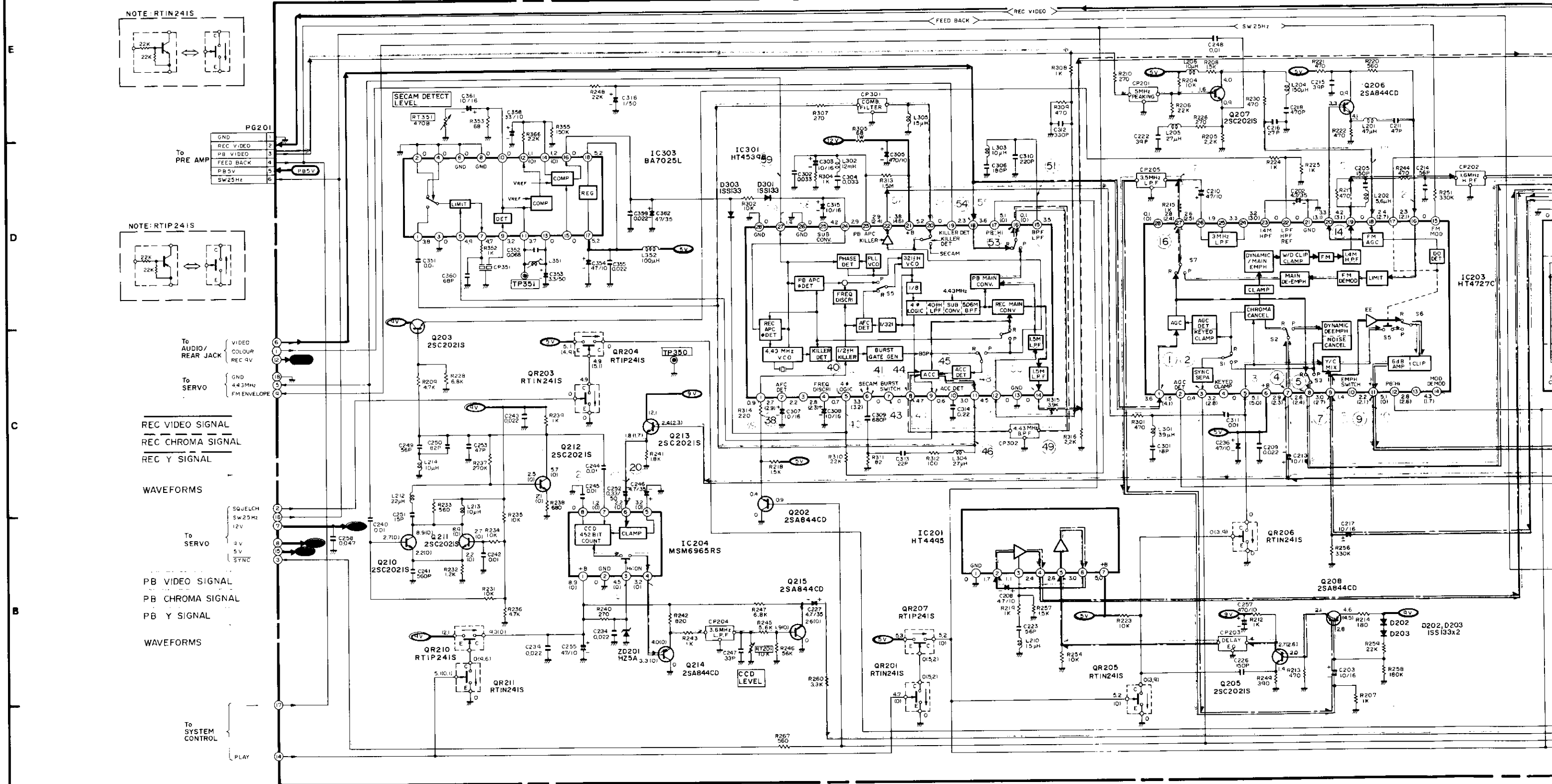
MC-Service

SCHEMATIC DIAGRAM	PAGE
TUNER UNIT.....	5-2
IF UNIT.....	5-3
V.S TUNING.....	5-5
TIMER/OPERATION SWITCH.....	5-11
- VT-110E -.....	5-11
TIMER/OPERATION SWITCH.....	5-14
- VT-120E -.....	5-14
SYSTEM CONTROL.....	5-20
REMOTE CONTROL.....	5-24
AUDIO/REAR JACK.....	5-26
RF CONVERTER.....	5-29
PREAMP.....	5-30
SERVO.....	5-39
Y/CHROMA.....	5-42
REGULATOR.....	5-51
INTERNAL WIRING DIAGRAM.....	5-55

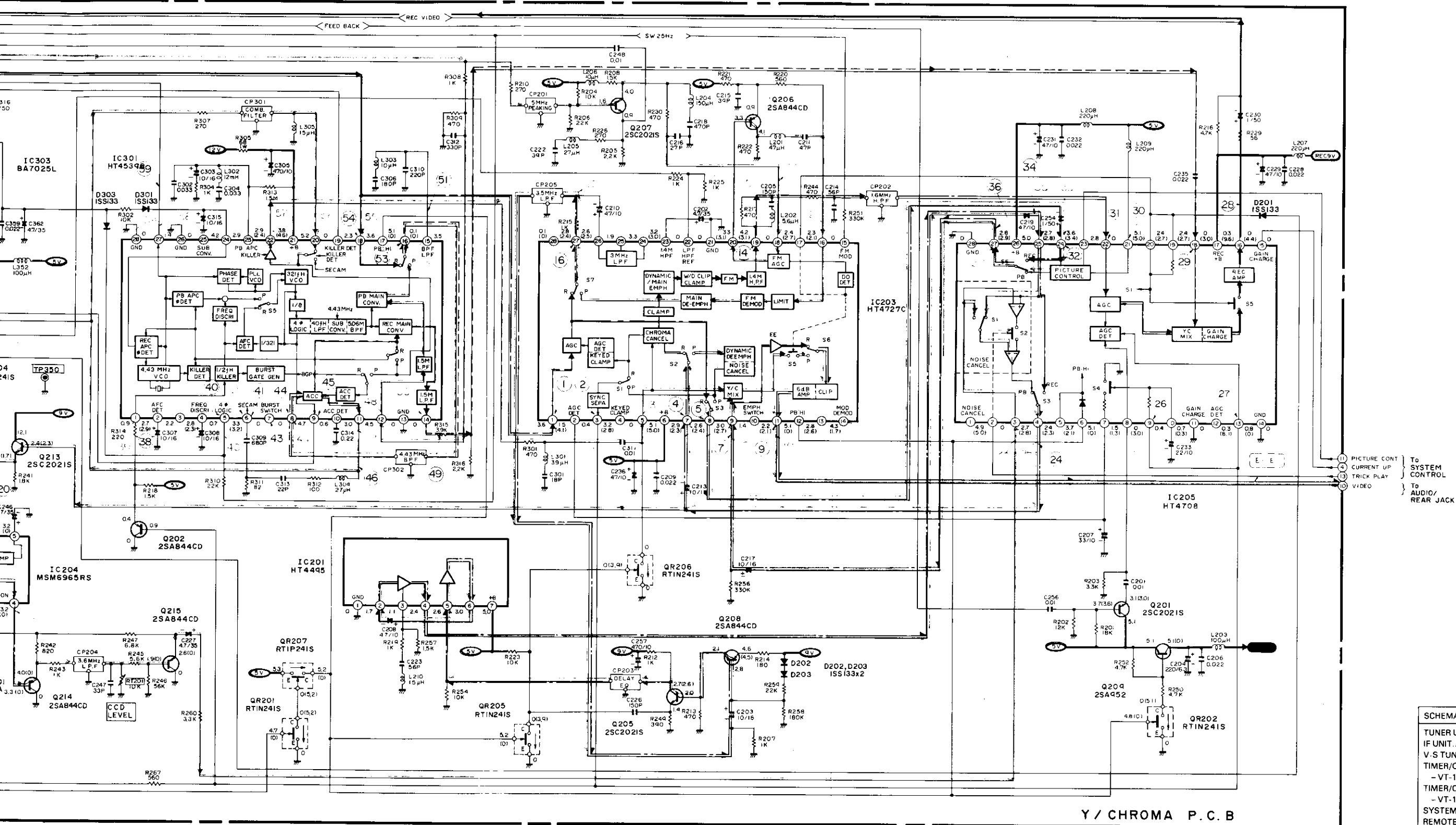




Y/CHROMA (LUMINANZ/CHROMINANZ)



ONE VOLTAGE: PB OR REC MODE, TWO VOLTAGES: PB AND (REC) MODES.



SCHEMATIC DIAGRAM	PAGE
TUNER UNIT	5-2
IF UNIT	5-3
V.S. TUNING	5-5
TIMER/OPERATION SWITCH	
- VT-110E -	5-11
TIMER/OPERATION SWITCH	
- VT-120E -	5-14
SYSTEM CONTROL	5-20
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RF CONVERTER	5-29
PREAMP	5-30
SERVO	5-39
Y/CHROMA	5-42
REGULATOR	5-51
INTERNAL WIRING DIAGRAM	5-55

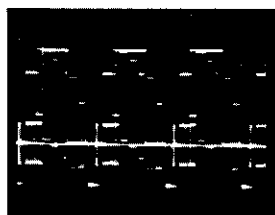
MODE, TWO VOLTAGES: PB AND (REC) MODES.

Y/CHROMA CIRCUIT WAVEFORMS (WELLENFORM)

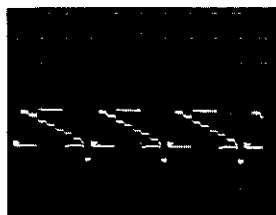
[IC203]

(REC: Colour bar Video in/PB: Alignment tape)

① PIN1 REC
0.1V/20 μ s. div.



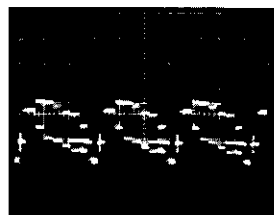
⑥ PIN8 PB
0.5V/20 μ s. div.



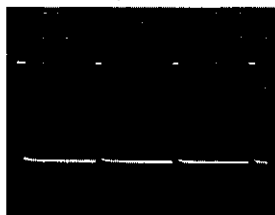
⑪ PIN14 PB
0.2V/20 μ s. div.



⑯ PIN27 REC
0.1V/20 μ s. div.



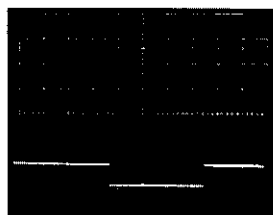
② PIN3 REC/PB
1V/20 μ s. div.



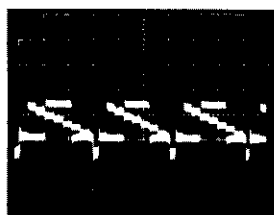
⑦ PIN9 REC
0.1V/20 μ s. div.



⑫ PIN16 PB
0.5V/5ms. div.

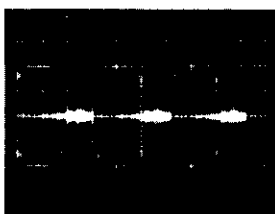


⑰ PIN27 PB
0.1V/20 μ s. div.

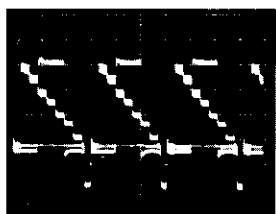


(SW25Hz: 5Vdiv.)

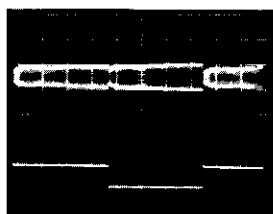
③ PIN5 PB
50mV/20 μ s. div.



⑧ PIN9 PB
0.2V/20 μ s. div.

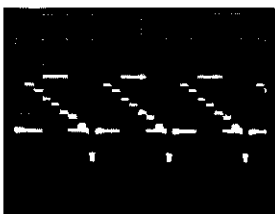


⑬ PIN18 PB
0.5V/5ms. div.

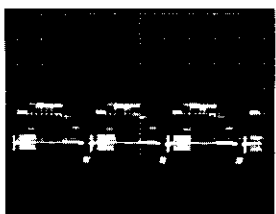


(SW25Hz: 5Vdiv.)

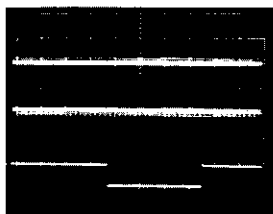
④ PIN7 REC/PB
0.1V/20 μ s. div.



⑨ PIN11 REC
0.1V/20 μ s. div.

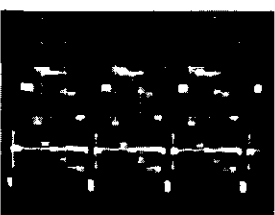


⑭ PIN19 REC
0.5V/5ms. div.

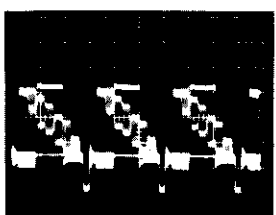


(SW25Hz: 5Vdiv.)

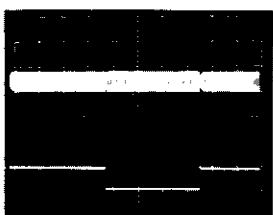
⑤ PIN8 REC
50mV/20 μ s. div.



⑩ PIN11 PB
0.5V/20 μ s. div.



⑮ PIN20 PB
0.5V/5ms. div.

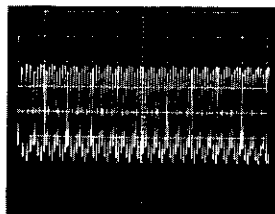


(SW25Hz: 5Vdiv.)

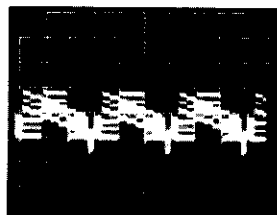
MC-Service

[IC204]

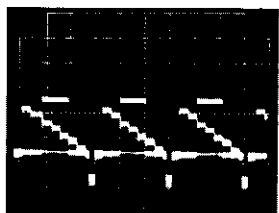
⑮ PIN3 PB
0.2V/0.5 μ s. div.



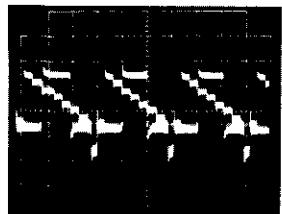
⑯ PIN4 PB
0.5V/20 μ s. div.



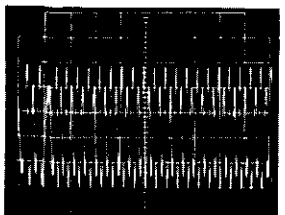
⑰ PIN6 REC
0.1V/20 μ s. div.



⑱ PIN6 PB
0.1V/20 μ s. div.

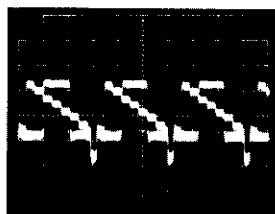


⑳ PIN7 PB
0.1V/0.5 μ s. div.

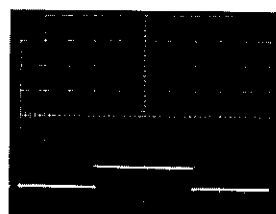


[IC205]

㉓ PIN3 PB
0.1V/20 μ s. div.

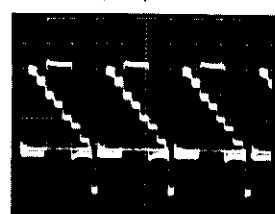


㉔ PIN16 REC
0.5V/5ms. div.

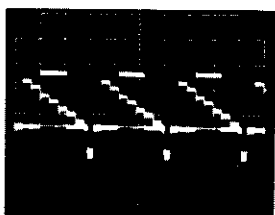


(SW25Hz: 5Vdiv.)

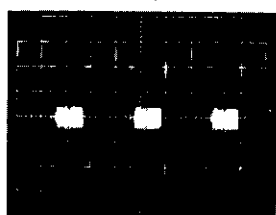
㉕ PIN24 PB
0.2V/20 μ s. div.



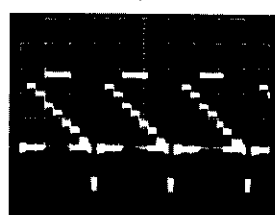
㉖ PIN 4 REC
10mV/20 μ s. div.



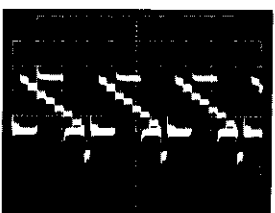
㉗ PIN18 REC
20mV/20 μ s. div.



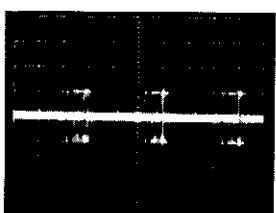
㉘ PIN25 REC
0.1V/20 μ s. div.



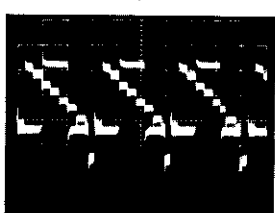
㉙ PIN4 PB
10mV/20 μ s. div.



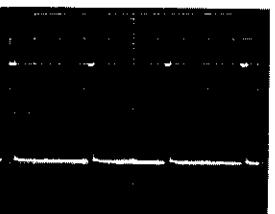
㉚ PIN21 REC
50mV/20 μ s. div.



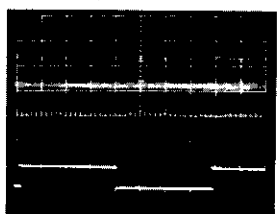
㉛ PIN25 PB
0.1V/20 μ s. div.



㉜ PIN9 REC/PB
1V/20 μ s. div.

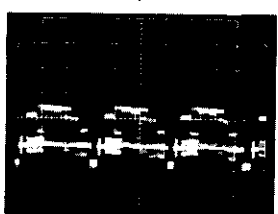


㉝ PIN22 REC
0.2V/5ms. div.

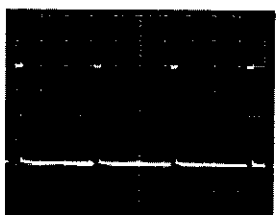


(SW25Hz: 5Vdiv.)

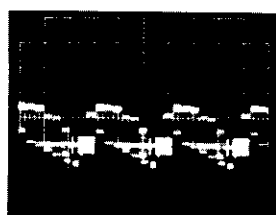
㉞ PIN27 REC
0.1V/20 μ s. div.



㉟ PIN13 REC/PB
1V/20 μ s. div.



㊱ PIN24 REC
0.1V/20 μ s. div.

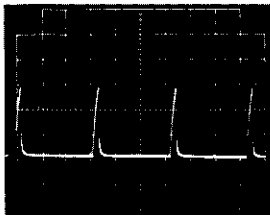


㊲ PIN27 PB
0.2V/20 μ s. div.

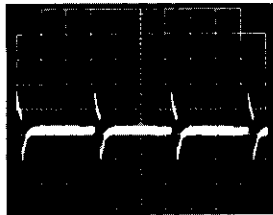


[IC301]

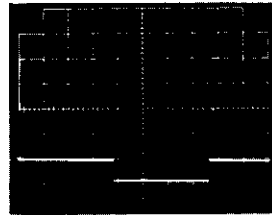
③⑧ PIN1 REC
1V/20 μ s. div.



④③ PIN7 REC/PB
0.1V/20 μ s. div.

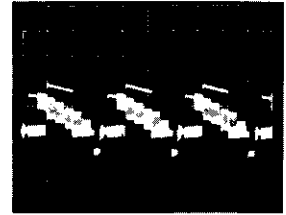


④⑧ PIN12 PB
50mV/0.5ms. div.

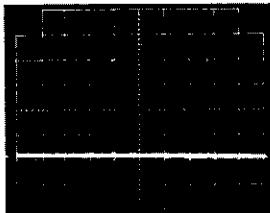


(SW25Hz: 5Vdiv.)

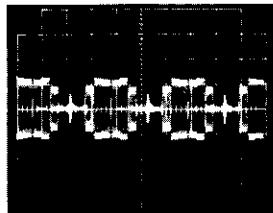
⑤③ PIN16 REC
0.2V/20 μ s. div.



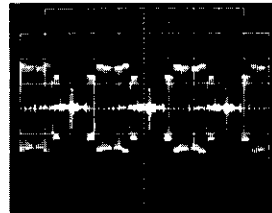
③⑨ PIN1 PB
1V/0.5ms. div.



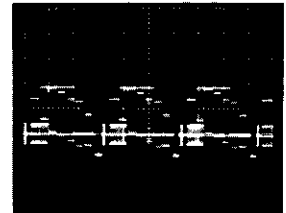
④④ PIN8 REC/PB
50mV/20 μ s. div.



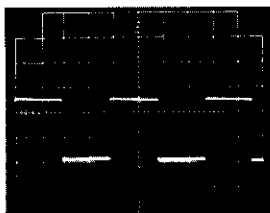
④⑨ PIN14 REC
0.1V/20 μ s. div.



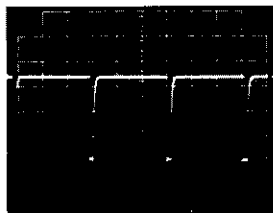
⑤④ PIN18 REC
0.2V/20 μ s. div.



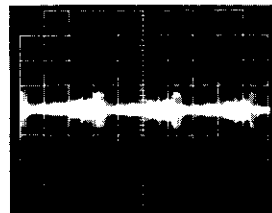
④⑩ PIN5 REC/PB
0.5V/10ms. div.



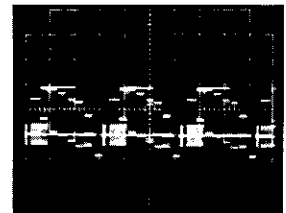
④⑤ PIN9 REC/PB
1V/20 μ s. div.



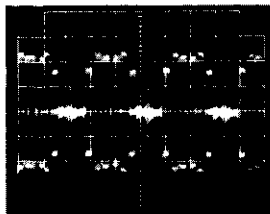
⑤⑩ PIN14 PB
50mV/20 μ s. div.



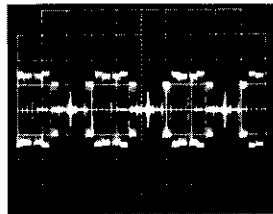
⑤⑤ PIN18 PB
0.2V/20 μ s. div.



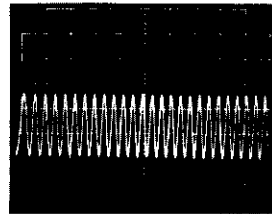
④① PIN6 REC
0.1V/20 μ s. div.



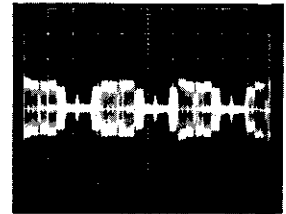
④⑥ PIN11 REC
0.2V/20 μ s. div.



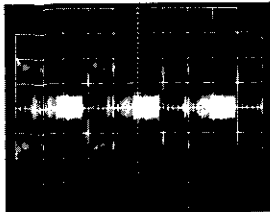
⑤① PIN15 REC
0.1V/0.5 μ s. div.



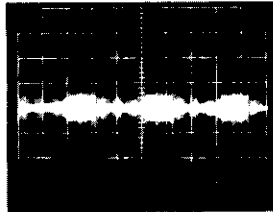
⑤⑥ PIN20 PB
50mV/20 μ s. div.



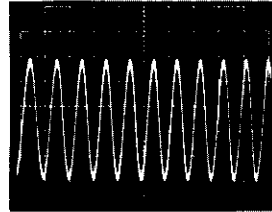
④② PIN6 PB
20mV/20 μ s. div.



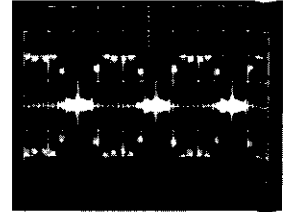
④⑦ PIN11 PB
0.2V/20 μ s. div.



⑤② PIN15 PB
50mV/0.2 μ s. div.

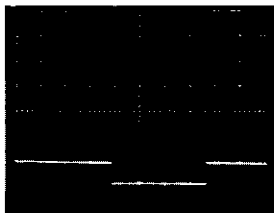


⑤⑦ PIN22 PB
0.1V/20 μ s. div.



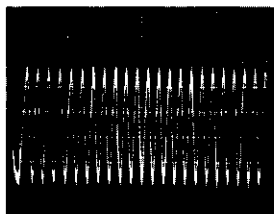
[IC301]

⑤⑧ PIN25 PB
0.1V/5ms. div.



(SW25Hz: 5Vdiv.)

⑤⑨ PIN27 REC/PB
50mV/0.5 μ s. div.



MC-Service

IC 303

Pinout diagram for IC 303 showing pin numbers (1-17) and associated input values (0, 3.8, 4.9, 4.7, 3.2, 0, 0, 5.2, 1.0, 1.2, 0, 0, 5.2).

Diagram of the MAIN P.C.B. showing 18 numbered pins along a top edge. The pins are arranged in a single row, numbered 1 through 18 from left to right. The text "MAIN P.C.B" is centered below the pins.

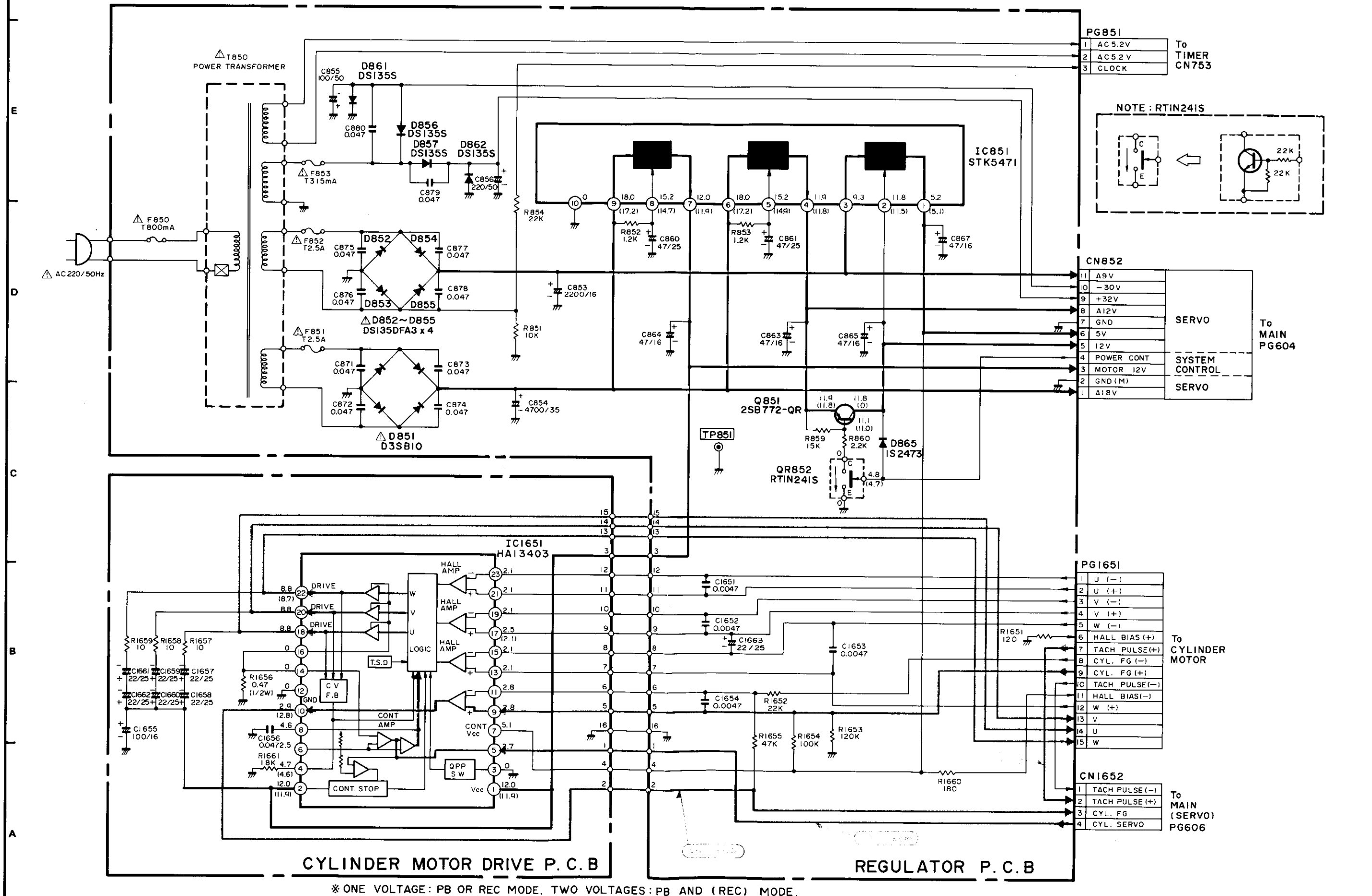
• 14 0	3.5 15 •
• 13 0	0.1 (0) •
• 4.5	5.1 (0) 17 •
• 11 3.0	3.6 •
• 0.6	2.3 19 •
• 4 4.7	0 •
• 0	5.2 21 •
• 7 0	3.8 (4.6) •
• 3.3 (3.2)	2.9 (2.7) 23 •
• 5 0.7	2.9 •
• 2.8 (2.3)	4.2 25 •
• 3 2.2	0 •
• 2.7 (2.9)	1.4 27 •
• 1 0.9	0 28 •

• 14 4.3(1.7)	0 15 •
• 13 2.8(2.6)	2.3(2.1) •
• 5.1(1.0)	2.4(2.7) 7 •
• 11 2.2(2.1)	0 •
• 1.4	4.2(3.1) 9 •
• 9 3.0(2.7)	3.3(3.1) •
• 2.6(2.4)	0 21 •
• 7 2.9(2.3)	0 •
• 5.1(5.0)	3.2(3.0) 23 •
• 5 0	3.3 •
• 3.2(2.8)	1.9 25 •
• 3 0.4	2.6(2.5) •
• 1.5(4.1)	2.8(2.4) 27 •
• 1 3.6	0.1(0) 28 •

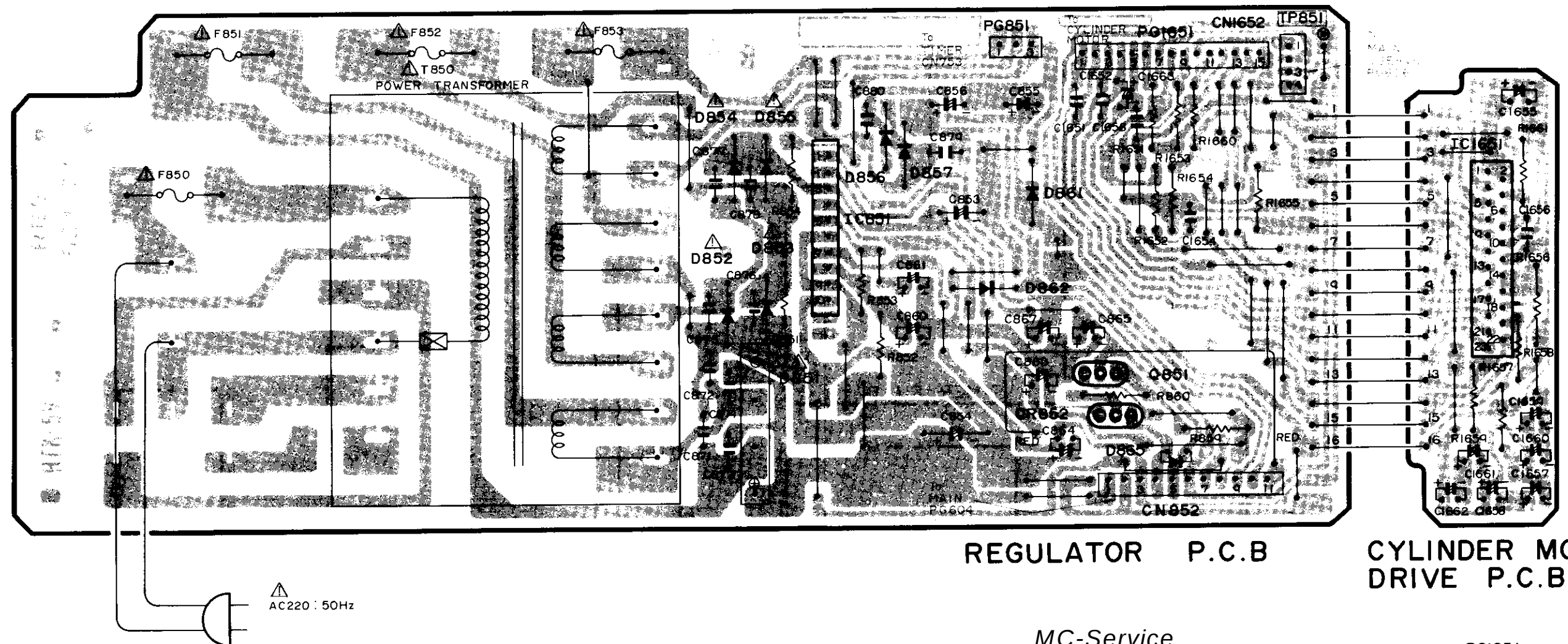
Y/CHROMA 5-49

5-50 Y/CHROMA

REGULATOR (REGLER)



* ONE VOLTAGE: PB OR REC MODE. TWO VOLTAGES: PB AND (REC) MODE.



REGULATOR P.C.B

CYLINDER MOTOR DRIVE P.C.B

MC-Service

IC851

1	5.2 (15.1)
2	11.8 (11.5)
3	4.3
4	11.9 (11.8)
5	15.2 (14.9)
6	18.0 (17.2)
7	12.0 (11.9)
8	10.2 (14.7)
9	18.0 (17.2)
10	0

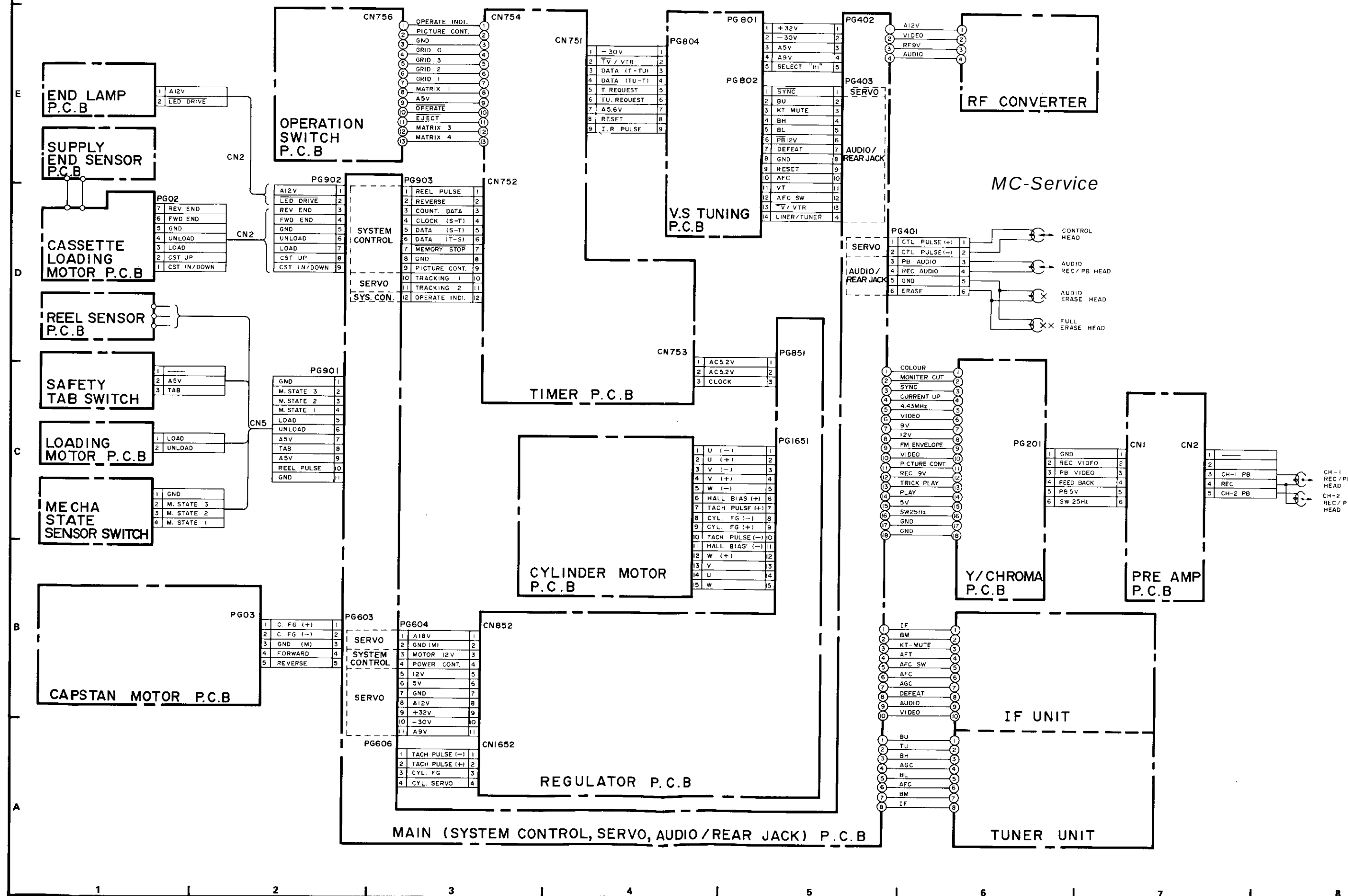
* ONE VOLTAGE : PB OR REC MODE.
TWO VOLTAGES : PB AND (REC) MODE.

IC1651

1	2	12.0 (11.9)
3	5	4.7 (4.6)
4	6	2.5
7	8	4.5
9	10	2.4 (2.8)
11	12	0
13	14	0
15	16	0
17	18	8.5
19	20	3.8
21	22	0.4 (5.7)
23	24	0

SCHEMATIC DIAGRAM	PAGE
TUNER UNIT	5-2
IF UNIT	5-3
V.S.TUNING	5-5
TIMER/OPERATION SWITCH	
VT-110E	5-11
TIMER/OPERATION SWITCH	
VT-120E	5-14
SYSTEM CONTROL	5-20
REMOTE CONTROL	5-24
AUDIO/REAR JACK	5-26
RF CONVERTER	5-29
PREAMP	5-30
SERVO	5-39
Y/CHROMA	5-42
REGULATOR	5-51
INTERNAL WIRING DIAGRAM	5-55

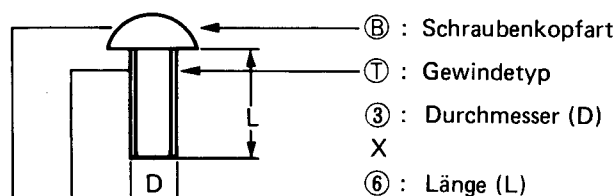
INTERNAL WIRING DIAGRAM (KABELANSCHLUSSDIAGRAMM)



EXPLOSIONSZEICHNUNGEN

Schrauben-Klassifikation

Beispiel: BT3 x 6



MC-Service

Unterlegescheiben und Muttern

Abkürzung	Bezeichnung	Form	Abkürzung	Bezeichnung	Form	Abkürzung	Bezeichnung	Form
Kein symbol	Rundkopfschraube		Kein symbol	Maschinenschraube		W	Unterlegescheibe	
P	Zylinderskopfschraube		t	Schneidschraube Typ 1 (selbstschneidend)		SW	Federscheibe	
B	Halbrundschrabe		T	Schneidschraube Typ 2 (selbstschneidend)		LW	Sicherungsscheibe	
O	Linsenkopf-Senkschraube		f	Blechschrabe (für Metall)		E	E-Ring	
F	Senkschraube		Hinweis: Blechschraben sind selbstschneidend; die selbstschneidenden maschinenschrauben können durch Schneidschrauben ersetzt werden.			N	Mutter	
						Hinweis: Für Muttern und Scheiben werden der Innendurchmesser angegeben.		

Schmierung

Die Schmierungspunkte sind in den Explosionszeichnungen durch Symbole (S, H) gekennzeichnet.

Die im Diagramm gezeigten Schmierungspunkte sind mit folgenden Schmiermittel zu schmieren:

S Sonic-Gleitöl (Nr. 1600)

H Hitazol (MO-138)

MECHANICAL PARTS LIST (CABINET ASSEMBLY SECTION)

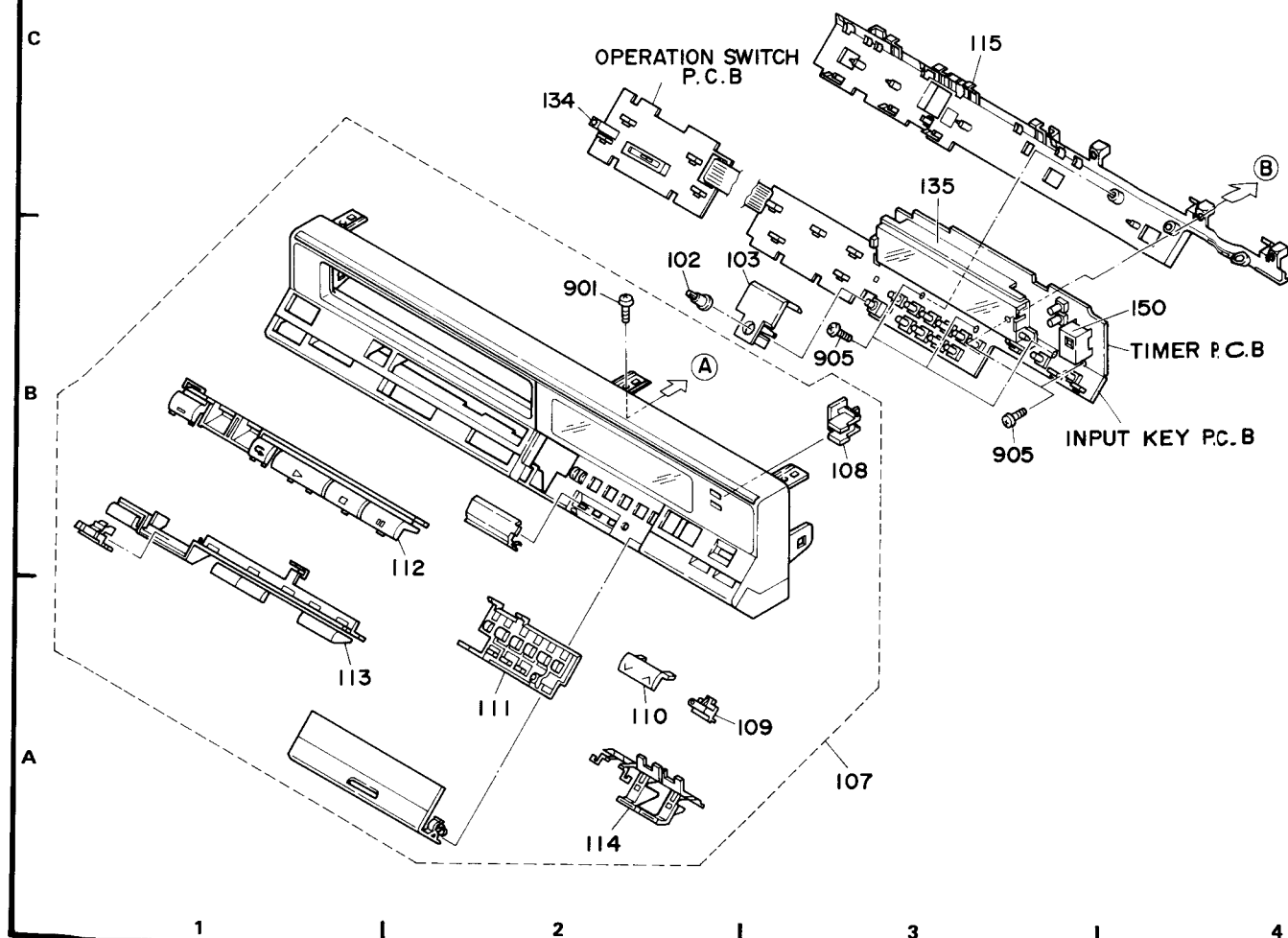
SYMBOL-NO.	P-NO.	DESCRIPTION	SYMBOL-NO.	P-NO.	DESCRIPTION
FOR FINAL ASSEMBLY			111	6083812	BUTTON - VT-110E -
101	6189398	DOOR-CASSETTE	111	6083603	BUTTON - VT-120E -
102	6076843	KNOB - VT-110E -	112	6083783	BUTTON (PLAY) - VT-110E -
102	6077031	ROTARY KNOB - VT-120E -	112	6083892	BUTTON - VT-120E -
103	6175503	PRESET COVER - VT-110E -	113	6084921	BUTTON - VT-110E -
103	6892333	HOLDER - VT-120E -	114	6083795	BUTTON - VT-110E -
104	7741444	FELT (LEG)	114	6083593	BUTTON - VT-120E -
105	6001561	BOTTOM COVER	115	6083832	BUTTON (POWER) - VT-110E -
106	6001894	TOP COVER ASSEMBLY	115	6890461	PCB HOLDER - VT-120E -
107	6238441	FRONT PANEL ASSEMBLY - VT-110E -	116	6864241	CAP
107	6238491	FRONT PANEL ASSEMBLY - VT-120E -	117	6592111	RUBBER CAP
108	6083802	BUTTON - VT-110E -	118	6083784	BUTTON (STOP)
108	6083613	BUTTON - VT-120E -	119	6753911	FUSE COVER
109	6083762	BUTTON - VT-110E -	120	6026751	REAR PANEL
109	6083572	BUTTON - VT-120E -	123	6795152	RIVET
110	6083752	BUTTON (CHANNEL) - VT-110E -	124	6890562	HINGE
110	6083582	BUTTON - VT-120E -	125	6890501	STUD

MECHANICAL PARTS LIST (CABINET ASSEMBLY SECTION)

SYMBOL-NO.	P-NO.	DESCRIPTION	SYMBOL-NO.	P-NO.	DESCRIPTION
126	6794591	BUSHING	908	8691414	BT SCREW 3MMD × 14MM
△ 127	5746157	POWER CORD WITH PLUG	909	8691408	BIND HEAD TAPPING SCREW 3MMD × 8MM
△ 128	5213811	POWER TRANSFORMER	FOR ACCESSORIES		
130	6890442	REAR PIECE - VT-110E -	801	4650102	OPERATING GUIDE - VT-110E -
130	6892513	REAR PIECE - VT-120E -	801	4650272	OPERATING GUIDE - VT-120E -
131	5658191	JACK PLATE - VT-110E -	802	5898876	CONNECTOR CORD
131	5672971	JACK PLATE - VT-120E -	803	5638871	REMOTE HAND SET - VT-110E -
132	5586591	TUNER IF BLOCK	803	5638902	REMOTE CONTROL BOX - VT-120E -
133	5587621	RF CONVERTOR	FOR CHASSIS ASSEMBLY		
134	6875562	LED HOLDER - VT-120E -	001	5959561	REGULATOR PCB ASSEMBLY
134	6890631	LED HOLDER - VT-120E -	002	5959551	TIMER PCB ASSEMBLY - VT-110E -
135	6891531	DISPLAY HOLDER	003	5959471	OPERATION SWITCH PCB ASSEMBLY - VT-110E -
150	5490295	IR MODULE	004	5927931	MAIN PCB ASSEMBLY
901	8699410	BT SCREW 3MMD × 10MM BLACK	005	7094711	END LED PCB
902	7784428	SCREW (M3)	006	7095031	REEL SENSOR PCB
903	8741406	BIND SCREW - 3MMD × 6MM			
904	8691408	BT SCREW 3MMD × 8MM			
905	8699410	BT SCREW 3MMD × 10MM BLACK			
906	8699412	BT SCREW 3MMD × 12MM BLACK			
907	8691608	SCREW 4 × 8BT			

MC-Service

CABINET SECTION (GEHÄUSEEINHEIT) - VT-120E -



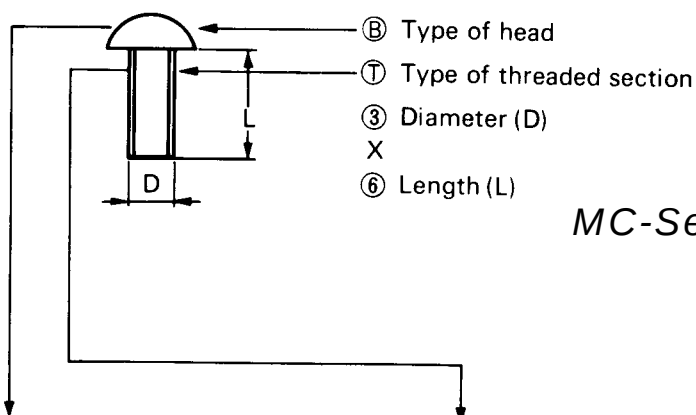
SYMBOL-NO.	P-NO.	DESCRIPTION	SYMBOL-NO.	P-NO.	DESCRIPTION
Q808	5321214	TRANSISTOR 2SD468BC SILICON 190MHZ 0.9W	L305	5159143	CHOKE COIL 15 μ H
Q810	5327031	TRANSISTOR 2SA673C	L351	5120849	TRAP COIL
Q811	5327031	TRANSISTOR 2SA673C	L352	5159077	CHOKE COIL 100 μ H $\pm$ 10%
Q814	5323902	TRANSISTOR 2SC1740-S	L401	5152349	CHOKE COIL 820 μ H
Q851	5323334	TRANSISTOR 2S8772-QR	L403	5159111	CHOKE COIL 5600 μ H
Q904	5327001	TRANSISTOR 2SC458CD	L404	5152346	CHOKE COIL 5.6mH
QR201	5327081	TRANSISTOR RT1N241S	L501	5159158	CHOKE COIL 220 μ H
QR203	5327081	TRANSISTOR RT1N241S	L502	5159154	CHOKE COIL 100 μ H
QR204	5327083	TRANSISTOR RT1P241S	L503	5159154	CHOKE COIL 100 μ H
QR205	5327081	TRANSISTOR RT1N241S	L901	5159077	CHOKE COIL 100 μ H $\pm$ 10%
QR206	5327083	TRANSISTOR RT1P241S	CRYSTALS		
QR210	5327083	TRANSISTOR RT1P241S	X751	5781611	CRYSTAL
QR211	5327081	TRANSISTOR RT1N241S	X801	5781121	XTAL
QR432	5327082	TRANSISTOR RT1N241S	MISCELLANEOUS		
QR501	5324094	TRANSISTOR RT1P441S	BZ799	5409271	BUZZER - VT120E -
QR502	5324092	TRANSISTOR RT1N441S	CE901	5781121	XTAL
QR505	5324092	TRANSISTOR RT1N441S	CP201	5123839	TRAP COIL
QR506	5324092	TRANSISTOR RT1N441S	CP202	5169002	HIGH PASS FILTER
QR601	5327082	TRANSISTOR RT1N441S	CP203	5169012	DELAY LINE
QR602	5327082	TRANSISTOR RT1N441S	CP204	5169003	LOW PASS FILTER
QR605	5327082	TRANSISTOR RT1N441S	CP205	5169022	LOW PASS FILTER
QR628	5327082	TRANSISTOR RT1N441S	CP301	5785814	DELAY LINE
QR758	5324092	TRANSISTOR RT1N441S	CP302	5163081	BAND PASS FILTER
QR801	5327082	TRANSISTOR RT1N441S	CP351	5160431	BAND PASS FILTER
QR804	5327082	TRANSISTOR RT1N441S	DG751	5311772	TIMER DISPLAY
QR812	5327082	TRANSISTOR RT1N441S	△ F850	5720175	FUSE 0.8A
QR852	5327081	TRANSISTOR RT1N241S	△ F851	5721064	FUSE 2.5A
ZD201	5331014	DIODE HZ5A SI ZENER	△ F852	5721064	FUSE 2.5A
ZD601	5339105	DIODE HZ7A1	△ F853	5720171	FUSE 315MA
ZD602	5339101	DIODE HZ7B2	PD751	5490295	IR MODULE
ZD603	5331271	DIODE HZ18-3	S143	5633362	PUSH SWITCH
ZD751	5332633	ZENER DIODE RD4R7J B1-2	S144	5633362	PUSH SWITCH
ZD752	5330322	DIODE HZ9B SI ZENER 1MHZ 0.4W	S501	5622462	SLIDE SWITCH
ZD753	5331588	DIODE RD2. 7E-B2	S751	5635061	SWITCH
ZD801	5366151	IC UPC574J	S752	5635061	SWITCH
ZD802	5339102	DIODE HZ5A	S753	5635061	SWITCH
ZD803	5331274	DIODE ZENER HZ30-1	S754	5635061	SWITCH
TRANSFORMERS			S755	5635061	SWITCH
T401	5262531	BIAS COIL	S756	5635061	SWITCH
COILS			S759	5635061	SWITCH
L201	5159145	CHOKE COIL 22 μ H	S760	5635061	SWITCH
L202	5159143	CHOKE COIL 15 μ H	S761	5635061	SWITCH
L204	5159158	CHOKE COIL 220 μ H	S762	5635061	SWITCH
L205	5159143	CHOKE COIL 15 μ H	S764	5635061	SWITCH
L207	5159082	CHOKE COIL 220 μ H $\pm$ 10%	S765	5635061	SWITCH
L208	5159082	CHOKE COIL 220 μ H $\pm$ 10%	S766	5635061	SWITCH
L209	5159158	CHOKE COIL 220 μ H	S768	5635061	SWITCH
L210	5159151	CHOKE COIL 56 μ H	S769	5635061	SWITCH
L212	5159145	CHOKE COIL 22 μ H	S771	5635061	SWITCH - VT-110E -
L213	5159141	CHOKE COIL 10 μ H	S772	5635061	SWITCH - VT-110E -
L214	5159141	CHOKE COIL 10 μ H	S773	5635061	SWITCH - VT-110E -
L301	5159148	CHOKE COIL 39 μ H	S775	5635061	SWITCH - VT-110E -
L302	5150577	CHOKE COIL 12mH	S776	5635061	SWITCH - VT-110E -
L303	5153031	CHOKE COIL 10 μ H	S778	5635061	SWITCH - VT-110E -
L304	5159146	CHOKE COIL 27 μ H	S780	5635061	SWITCH - VT-110E -
			S781	5635061	SWITCH - VT-110E -
			S782	5635061	SWITCH - VT-110E -
			S786	5635061	SWITCH - VT-110E -

SYMBOL-NO. P-NO. DESCRIPTION			SYMBOL-NO. P-NO. DESCRIPTION		
S787	5635061	SWITCH – VT-110E –	S778	5635111	SMK CONNECTOR (V-10) – VT-120E –
S771	5635111	SMK CONNECTOR (V-10) – VT-120E –	S780	5635111	SMK CONNECTOR (V-10) – VT-120E –
S772	5635111	SMK CONNECTOR (V-10) – VT-120E –	S781	5635111	SMK CONNECTOR (V-10) – VT-120E –
S773	5635111	SMK CONNECTOR (V-10) – VT-120E –	S782	5635111	SMK CONNECTOR (V-10) – VT-120E –
S774	5635111	SMK CONNECTOR (V-10) – VT-120E –	S786	5635111	SMK CONNECTOR (V-10) – VT-120E –
S775	5635111	SMK CONNECTOR (V-10) – VT-120E –	S787	5635111	SMK CONNECTOR (V-10) – VT-120E –
S776	5635111	SMK CONNECTOR (V-10) – VT-120E –	S799	5622801	SWITCH – VT-120E –

EXPLODED VIEWS

SCREW CLASSIFICATION

Example: BT3 × 6



MC-Service

Abbreviation	Name	Shape
No symbol	Brazier head	
P	Pan head	
B	Binding head	
O	Oval countersunk head	
F	Flat countersunk head	

Abbreviation	Name	Shape
No symbol	Machine (clamps without tapping)	
t	Tapping (clamps with tapping) Type 1	
T	Tapping (clamps with tapping) Type 2	
f	Forming tight (for metal)	
Note	Since the forming tight screw tightens while self-tapping, machine screws can be replaced by tapping screws.	

Washers and Nuts		
Abbreviation	Name	Shape
W	Washer	
SW	Spring washer	
LW	Locking washer	
E	E-ring	
N	Nut	
Note	Internal dia is indicated for nuts and washers.	

LUBRICATION

Lubrication points are shown in the exploded view diagrams by marks (Ⓢ, Ⓜ)

Lubricants shown in the diagram are as follows.

Ⓢ Sonic slider oil (≠ 1600)

Ⓜ Hitazol (MO-138)

MC-Service

SYMBOL-NO. P-NO. DESCRIPTION			SYMBOL-NO. P-NO. DESCRIPTION		
RV751	5027225	RESISTOR VARIABLE 10KOHM	IC303	5366641	IC BA7025L
RV752	5009131	VARIABLE 500KOHM	IC401	5366331	IC UPC1533HA
SEMI-CONDUCTORS			IC402	5364931	IC BA5115L
D201	5339071	DIODE 1SS119	IC403	5369431	IC LA7016
D301	5339071	DIODE 1SS119	IC501	5369431	IC LA7016
D303	5339071	DIODE 1SS119	IC601	5367301	IC M54898P
D401	5339091	DIODE DAN209	IC602	5369913	IC M54648L-B
D402	5339071	DIODE 1SS119	IC751	5361996	IC HD614045SD53
D502	5339071	DIODE 1SS119	IC801	5361834	IC M50161-354SP
D503	5339071	DIODE 1SS119	IC802	5366132	IC LA7934
D504	5339071	DIODE 1SS119	IC803	5361071	IC M58657P
D505	5339071	DIODE 1SS119	IC804	5721802	ICP-N5 IC PROTECTOR
D506	5339071	DIODE 1SS119	IC805	5721802	ICP-N5 IC PROTECTOR
D507	5339071	DIODE 1SS119	IC851	5353651	IC STK5471
D605	5339071	DIODE 1SS119	IC901	5361812	IC HD614042SD37
D609	5339071	DIODE 1SS119	IC902	5367111	IC M54649L
D610	5339071	DIODE 1SS119	IC903	5365673	IC NJM2901N
D619	5339071	DIODE 1SS119	IC1651	5355582	IC HA13403
D620	5339071	DIODE 1SS119	Q141	5381681	TRANSISTOR PT-23F-F PHOTO
D622	5339071	DIODE 1SS119	Q142	5381682	TRANSISTOR PT-23F-HLD PHOTO
D623	5339071	DIODE 1SS119	Q201	5327062	TRANSISTOR 2SC1740S
D628	5339071	DIODE 1SS119	Q202	5321255	TRANSISTOR 2SA844CD SILICON 200MHZ 0.3W
D629	5339071	DIODE 1SS119	Q203	5321292	TRANSISTOR 2SC1740S SILICON 250MHZ 0.3W
D631	5339071	DIODE 1SS119	Q205	5327062	TRANSISTOR 2SC1740S
D640	5339071	DIODE 1SS119	Q206	5327062	TRANSISTOR 2SC1740S
D645	5339071	DIODE 1SS119	Q207	5327062	TRANSISTOR 2SC1740S
D651	5339071	DIODE 1SS119	Q208	5321255	TRANSISTOR 2SA844CD
D652	5339071	DIODE 1SS119	Q209	5322732	TRANSISTOR 2SA952ML2 SILICON 160MHZ 0.6W
D653	5339071	DIODE 1SS119	Q210	5327062	TRANSISTOR 2SC1740S
D751	5339021	DIODE 1SS133	Q211	5327062	TRANSISTOR 2SC1740S
D752	5339021	DIODE 1SS133	Q212	5327062	TRANSISTOR 2SC1740S
D753	5339021	DIODE 1SS133	Q213	5327062	TRANSISTOR 2SC1740S
D754	5331592	DIODE 1SS133	Q214	5321255	TRANSISTOR 2SA844CD SILICON 200MHZ 0.3W
D760	5331592	DIODE 1SS133	Q215	5321255	TRANSISTOR 2SA844CD SILICON 200MHZ 0.3W
D764	5381211	LED SEL-2213C	Q401	5327101	TRANSISTOR 2SC3553BC
D801	5339071	DIODE 1SS119	Q402	5327031	TRANSISTOR 2SA673C
D802	5339071	DIODE 1SS119	Q431	5327031	TRANSISTOR 2SA673C
D803	5339071	DIODE 1SS119	Q502	5327031	TRANSISTOR 2SA673C
D804	5339071	DIODE 1SS119	Q504	5322732	TRANSISTOR 2SA952ML2 SILICON 160MHZ 0.6W
D805	5339071	DIODE 1SS119	Q611	5327001	TRANSISTOR 2SC458CD
D806	5339071	DIODE 1SS119	Q612	5327001	TRANSISTOR 2SC458CD
△ D851	5332741	DIODE D3SB10	Q613	5323461	TRANSISTOR 2SD1266PQ
△ D852	5331671	DIODE DS135D-FA3	Q614	5327001	TRANSISTOR 2SC458CD
△ D853	5331671	DIODE DS135D-FA3	Q615	5327031	TRANSISTOR 2SA673C
△ D854	5331671	DIODE DS135D-FA3	Q616	5327001	TRANSISTOR 2SC458CD
△ D855	5331671	DIODE DS135D-FA3	Q626	5327001	TRANSISTOR 2SC458CD
D856	5331671	DIODE DS135D-FA3	Q627	5327001	TRANSISTOR 2SC458CD
D857	5331671	DIODE DS135D-FA3	Q751	5321663	TRANSISTOR 2SC2021RS SILICON 180MHZ 0.3W
D861	5331671	DIODE DS135D-FA3	Q754	5321663	TRANSISTOR 2SC2021RS SILICON 180MHZ 0.3W
D862	5331671	DIODE DS135D-FA3	Q755	5321663	TRANSISTOR 2SC2021RS SILICON 180MHZ 0.3W
D865	5330571	DIODE 1S2473VE SI 100MHZ 250MW 10NS	Q802	5327011	TRANSISTOR 2SC1740RS
D903	5339071	DIODE 1SS119	Q803	5327001	TRANSISTOR 2SC458CD
D904	5339071	DIODE 1SS119			
D914	5339071	DIODE 1SS119			
IC201	5370821	IC HT4495			
IC203	5370844	IC HT4727			
IC204	5362262	IC MSM6965RS			
IC205	5370502	IC HT4408			
IC301	5370273	IC HT4539B			

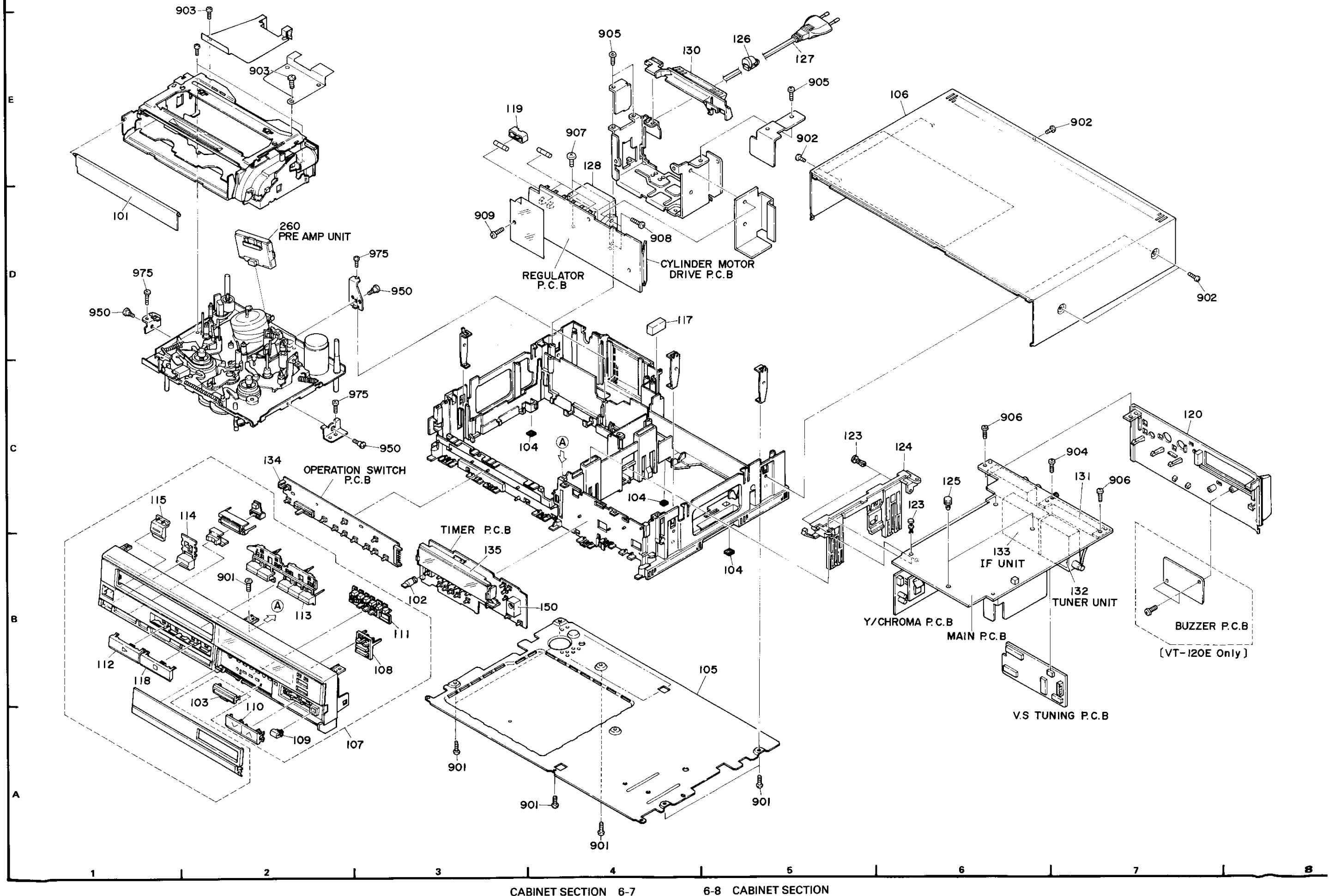
REPLACEMENT PARTS LIST (ERSATZTEILLISTE)

ELECTRICAL PARTS LIST

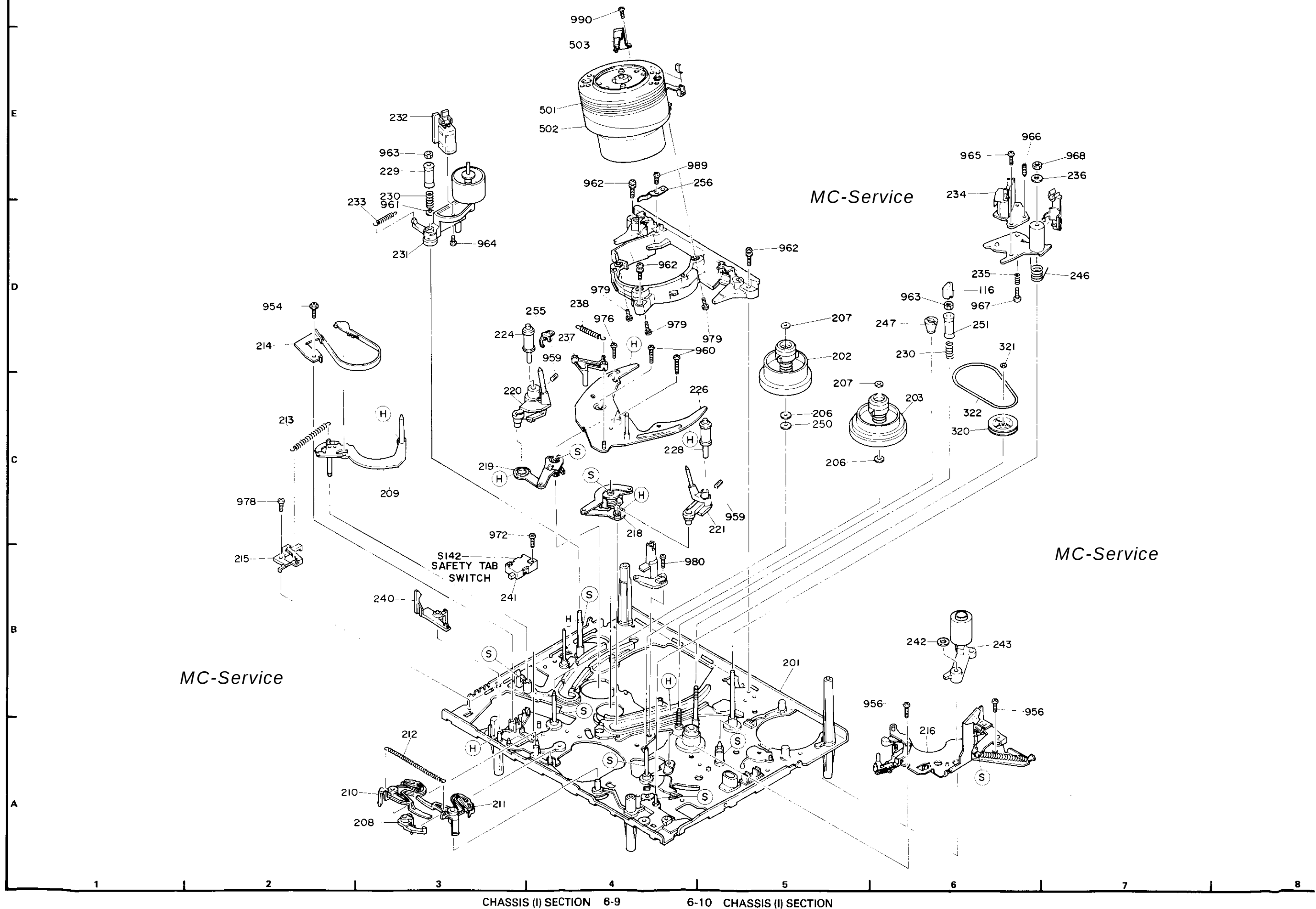
SYMBOL-NO.	P-NO.	DESCRIPTION	SYMBOL-NO.	P-NO.	DESCRIPTION
CAPACITORS					
C201	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	C618	0208375	CERAMIC DISC 0.022 μ F $\pm$ 10% 50V
C204	0256608	ELECTROLYTIC 220 μ F 6.3V	C620	0208375	CERAMIC DISC 0.022 μ F $\pm$ 10% 50V
C208	0256613	ELECTROLYTIC 4.7 μ F 35V	C621	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V
C209	0208375	CERAMIC DISC 0.022 μ F $\pm$ 10% 50V	C624	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V
C211	0208357	CERAMIC DISC 56pF $\pm$ 5% 50V	C637	0208375	CERAMIC DISC 0.022 μ F $\pm$ 10% 50V
C214	0208360	CERAMIC DISC 100pF $\pm$ 5% 50V	C638	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V
C217	0256613	ELECTROLYTIC 4.7 μ F 35V	C641	0256475	TANTALUM 4.7 μ F $\pm$ 30% 10V
C218	0208363	CERAMIC DISC 330 pF $\pm$ 10% 50V	C642	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V
C222	0208352	CERAMIC DISC 22pF 50V	C644	0208367	CERAMIC DISC 1000pF $\pm$ 10% 50V
C223	0208360	CERAMIC DISC 100pF $\pm$ 5% 50V	C653	0208360	CERAMIC DISC 100pF $\pm$ 5% 50V
C228	0208375	CERAMIC DISC 0.022 μ F $\pm$ 10% 50V	C751	0256488	CAPACITOR 0.1F 5.5V
C232	0208375	CERAMIC DISC 0.022 μ F $\pm$ 10% 50V	C770	5058562	TRIMMER 22pF
C234	0208375	CERAMIC DISC 0.022 μ F $\pm$ 10% 50V	C801	0208357	CERAMIC DISC 56pF $\pm$ 5% 50V
C236	0207085	ELECTROLYTIC 47MF, 10V	C815	0208360	CERAMIC DISC 100pF $\pm$ 5% 50V
C240	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	C816	0208354	CERAMIC DISC 33pF $\pm$ 5% 50V
C241	0249592	CERAMIC DISC 560pF $\pm$ 10% 50V	C817	0208354	CERAMIC DISC 33pF $\pm$ 5% 50V
C242	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	C825	0256180	CAPACITOR 1 μ F 50V ELECTROLYTIC
C244	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	C854	0256657	ELECTROLYTIC 4700 μ F 35V
C245	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	C856	0256635	ELECTROLYTIC 220 μ F 50V
C248	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	C860	0256607	ELECTROLYTIC 47 μ F 25V
C249	0208357	CERAMIC DISC 56pF 50V	C861	0256607	ELECTROLYTIC 47 μ F 25V
C250	0208364	CERAMIC DISC 82pF 50V	C863	0256627	ELECTROLYTIC 47MF, 16V
C251	0208350	CERAMIC DISC 15pF $\pm$ 5% 50V	C864	0256627	ELECTROLYTIC 47MF, 16V
C253	0208356	CERAMIC DISC 47pF 50V	C865	0256627	ELECTROLYTIC 47MF, 16V
C254	0207064	ELECTROLYTIC 1MF, 50V	C867	0256627	ELECTROLYTIC 47MF, 16V
C255	0207085	ELECTROLYTIC 47MF, 10V	C901	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V
C256	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	C902	0208375	CERAMIC DISC 0.022 μ F $\pm$ 20% 50V
C301	0208351	CERAMIC DISC 18pF 50V	C903	0208375	CERAMIC DISC 0.022 μ F $\pm$ 20% 50V
C309	0208365	CERAMIC DISC 680pF $\pm$ 10% 50V	C904	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V
C313	0208352	CERAMIC DISC 22pF 50V	C906	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V
C351	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	C907	0208375	CERAMIC DISC 0.022 μ F $\pm$ 20% 50V
C355	0208375	CERAMIC DISC 0.022 μ F $\pm$ 10% 50V	C908	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V
C360	0208358	CERAMIC DISC 68pF $\pm$ 5% 50V	C909	0208354	CERAMIC DISC 33pF $\pm$ 5% 50V
C416	0208367	CERAMIC DISC 1000pF $\pm$ 10% 50V	C910	0208354	CERAMIC DISC 33pF $\pm$ 5% 50V
C423	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	C912	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V
C425	0207092	ELECTROLYTIC 100 μ F 16V	C913	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V
C426	0208374	CERAMIC DISC 0.01 μ F $\pm$ 10% 50V	C1657	0256618	ELECTROLYTIC 22 μ F 25V
C428	0208365	CERAMIC DISC 680pF $\pm$ 10% 50V	C1658	0256618	ELECTROLYTIC 22 μ F 25V
C502	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	C1659	0256618	ELECTROLYTIC 22 μ F 25V
C506	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	C1660	0256618	ELECTROLYTIC 22 μ F 25V
C508	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	C1661	0256618	ELECTROLYTIC 22 μ F 25V
C510	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	C1662	0256618	ELECTROLYTIC 22 μ F 25V
C512	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	C1663	0256618	ELECTROLYTIC 22 μ F 25V
C513	0256789	CAPACITOR 470 μ F 10V ELECTROLYTIC	RESISTORS		
C522	0207086	CAPACITOR 47 μ F 16V ELECTROLYTIC	R215	0170348	CARBON FILM 4700HM $\pm$ 5% 1/3W
C523	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	R305	0171015	METAL FILM 680HM $\pm$ 5% 1W
C524	0256782	ELECTROLYTIC 220 μ F 10V	R602	0249681	POSISTOR 4.70HM
C527	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	RT201	5007435	RESISTOR SEMI VARIABLE 10K Ω -1M
C529	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	RT351	5007431	RESISTOR SEMI VARIABLE 470 Ω -1M
C604	0208374	CERAMIC DISC 0.01 μ F $\pm$ 20% 50V	RT401	5007899	SEMI VARIABLE 47KOHM
C605	0208375	CERAMIC DISC 0.022 μ F $\pm$ 20% 50V	RT402	5007901	SEMI VARIABLE 100KOHM
C607	0208368	CERAMIC DISC 1500pF $\pm$ 20% 50V	RT501	5009142	RESISTOR VARIABLE 50KOHM
C608	0208365	CERAMIC DISC 680pF $\pm$ 10% 50V	RT601	5007899	SEMI VARIABLE 47KOHM
C616	0208367	CERAMIC DISC 1000pF $\pm$ 10% 50V	RT607	5007902	SEMI VARIABLE 220KOHM

CABINET SECTION (GEHÄUSEEINHEIT) - VT-110E -

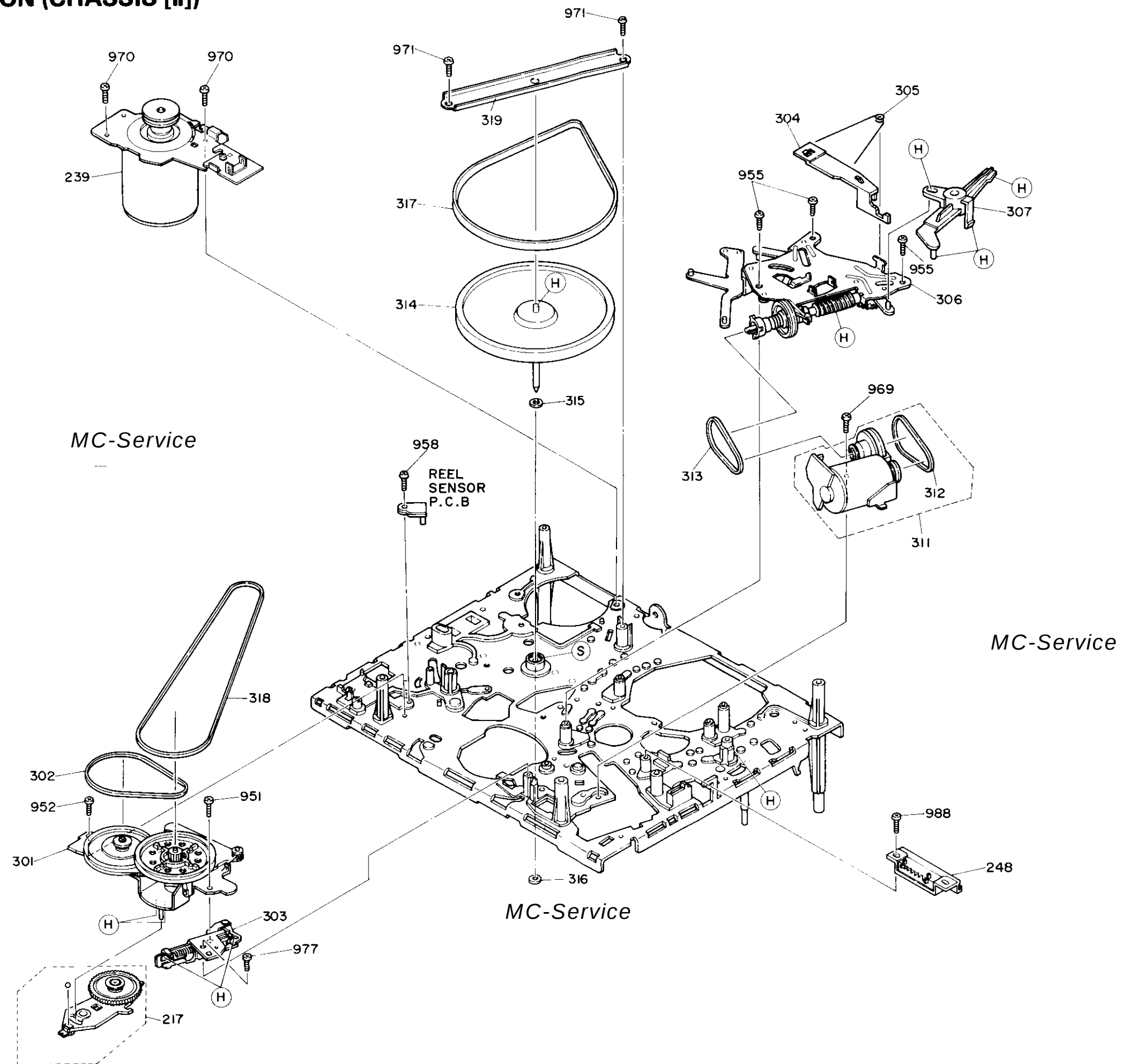
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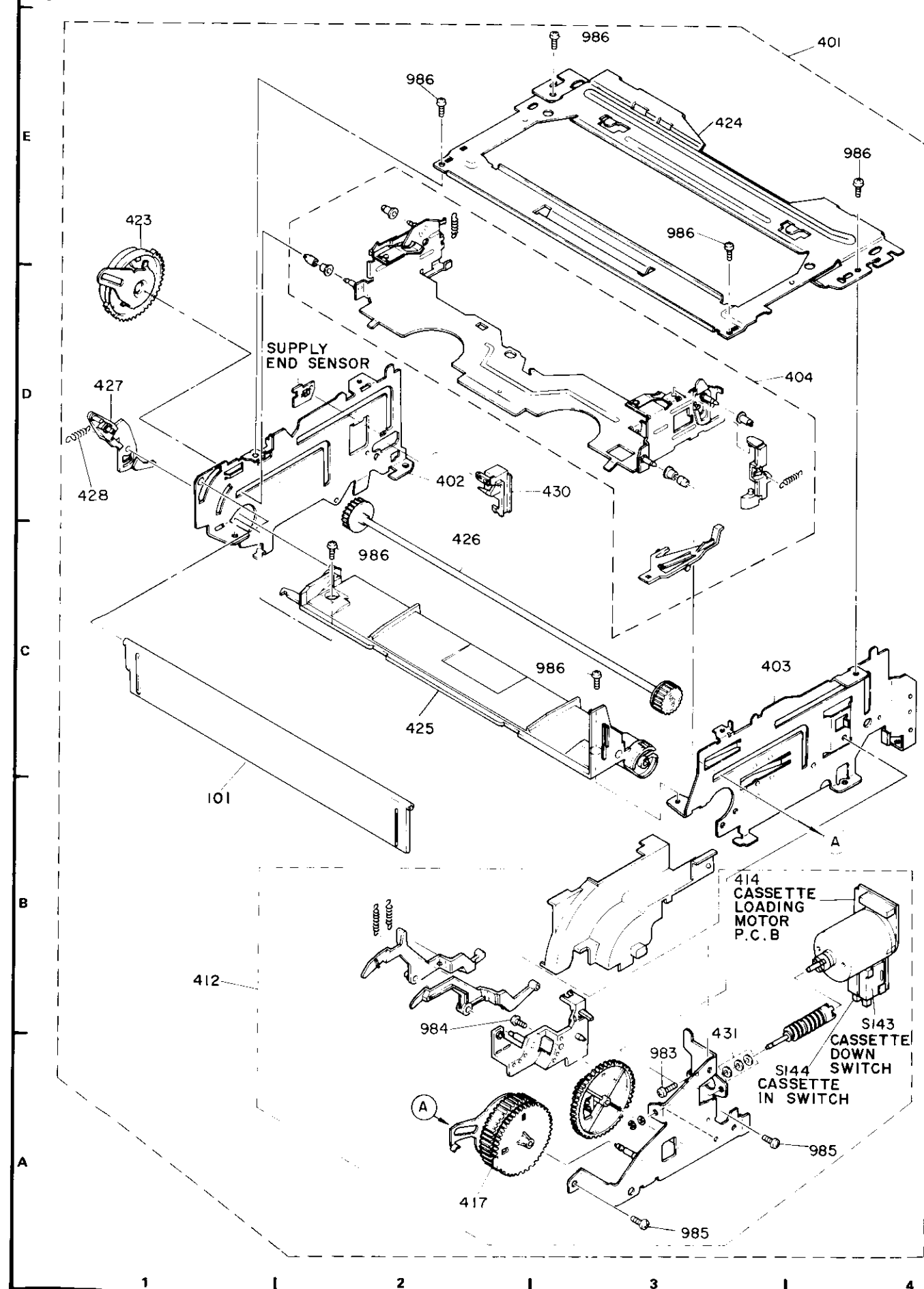
CHASSIS (I) SECTION (CHASSIS [I])



CHASSIS (II) SECTION (CHASSIS [II])



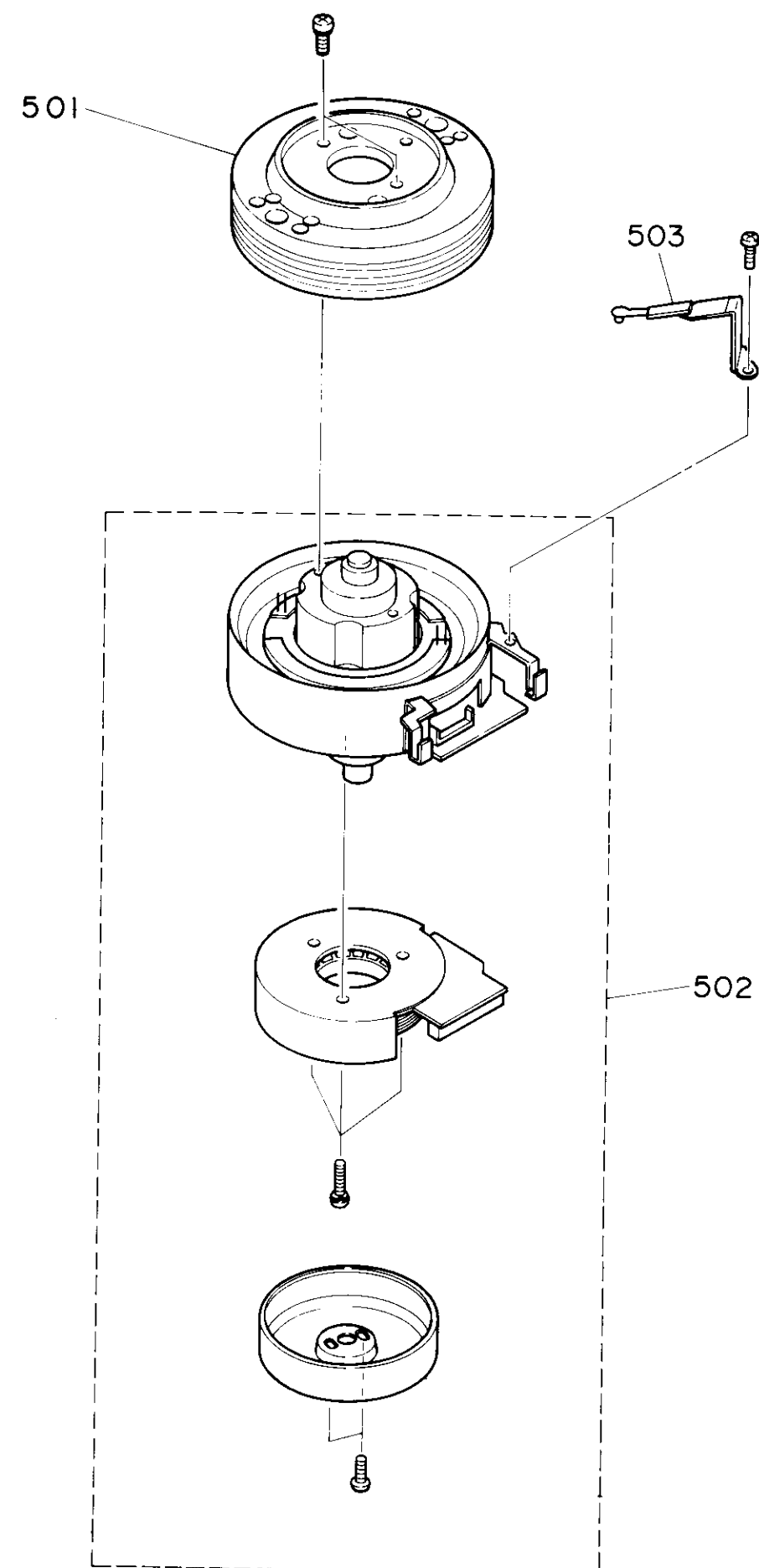
CASSETTE LOADING MECHANISM SECTION (CASSETTEN-LADEMECHANISMUS)



CASSETTE LOADING MECHANISM SECTION 6-13

CYLINDER MOTOR SECTION (KOPFTROMMELMOTOR)

MC-Service



6-14 CYLINDER MOTOR SECTION

MECHANICAL PARTS LIST (CHASSIS/CASSETTE LOADING MECHANISM/CYLINDER MOTOR ASSEMBLY SECTION)

SYMBOL-NO	P-NO	DESCRIPTION	SYMBOL-NO	P-NO	DESCRIPTION
FOR FINAL ASSEMBLY			311	7386931	MOTOR(DC) 3.7W 65G LOADING
202	6415391	REEL TABLE-SUPPLY	312	6356111	BELT
203	6415412	REEL TABLE-TAKE UP	313	6356451	BELT
206	7787412	WASHER	314	6375031	FLYWHEEL
207	7778859	POLYSLIDER WASHER	315	7788142	POLYSLIDER WASHER (THRUST)
208	6865662	ARM-BRAKE	316	7788861	WASHER
209	7386841	TENSION ARM	317	6356101	BELT
210	6865804	BRAKE L	318	6356081	BELT
211	6865812	BRAKE R	319	7386833	PLATE
212	6302471	SPRING	320	6869291	PULLEY
213	6543864	SPRING	321	7778859	POLYSLIDER WASHER
214	7376271	TENSION BAND	322	6355561	BELT
215	6879421	BT.SPRING HOLDER	401	7397052	FRONT LOADING ASSEMBLY
216	7386882	ARM BRACKET	402	7386744	BRACKET
217	6886792	ARM	403	7386701	BRACKET(R)
218	7376303	LOADING LINK (RIGHT) ASSEMBLY	404	7386813	HOLDER-CASSETTE
219	7376313	LOADING LINK (LEFT) ASSEMBLY	412	7394493	BRACKET-MOTOR
220	6978301	GUIDE ROLLER BASE (I)	414	5946911	MOTOR CBA
221	6974661	BASE	417	6879104	LOADING GEAR ASSEMBLY (R)
224	6869481	GUIDE ROLLER	423	6879093	LOADING GEAR ASSEMBLY (L)
226	7386892	GUIDE BASE HOLDER	424	7390551	PLATE
228	6868061	GUIDE ROLLER ASSEMBLY (OUT)	425	6887322	FRONT HOLDER
229	7570671	TAPE GUIDE (I)	426	4500402	SHAFT
230	6304903	SPRING	427	6879153	DOOR ARM
231	6879902	IMPEDANCE ARM ASSEMBLY	428	6301027	SPRING
232	5446151	FULL ERASE HEAD	430	6879182	GUIDE PIECE
233	6302391	SPRING	501	5457471	UPPER CYLINDER
234	5446161	AUDIO CONTROL HEAD	502	5457481	LOWER CYLINDER
235	6304906	SPRING	503	5792631	BRUSH
236	7786245	WASHER	950	7541395	SPECIAL SCREW
237	6878932	SUB BRAKE	951	8691408	BIND HEAD TAPPING SCREW 3MMD X 8MM
238	6300084	SPRING	952	8741408	SCREW (B3X8)
239	5578761	MOTOR-CAPSTAN	954	7781133	BT SCREW 3MMD
240	6865675	RECORDING PREVENTION ARM	955	8691408	BIND HEAD TAPPING SCREW 3MMD X 8MM
241	5633971	SWITCH (S142)	956	8691408	BIND HEAD TAPPING SCREW 3MMD X 8MM
242	7788143	POLYSLIDER WASHER	958	8691408	BIND HEAD TAPPING SCREW 3MMD X 8MM
243	6979842	PRESSURE ROLLER ASSEMBLY	959	7773083	SCREW
246	6547811	SPRING	960	8741408	SCREW (B3X8)
247	6979042	SCREW	961	8812114	WASHER - 3MMD SMALL
248	5625141	SWITCH	962	8650412	SCREW 3X12 WITH SPRING WASHER
250	6873291	COLLAR	963	8821114	3D NUT
251	4504401	TAPE GUIDE	964	8741103	SCREW(2X3B)
255	6877521	COLLAR	965	7781872	SCREW-3MMDX8MM
256	6539101	SPRING	966	7773086	SCREW
260	5372041	PRE AMP PCB ASSEMBLY	967	8741414	BINDING SCREW - 3MMD X 14MM
301	6886824	CLUCH PLATE ASSEMBLY	968	8821114	3D NUT
302	6355561	BELT	969	8741408	SCREW (B3X8)
303	7386971	SLIDER-BRAKE	970	8691408	BIND HEAD TAPPING SCREW 3MMD X 8MM
304	6865733	MODE SLIDER	971	8691408	BIND HEAD TAPPING SCREW 3MMD X 8MM
305	6547821	SPRING	972	8691312	BT BIND SCREW-2.6MMDX12MM
306	6889552	GEAR	975	8699410	BT BIND HEAD SCREW 3MMD X 14MM BLACK
307	6865791	TENTION ARM	976	7782781	SCREW 3X8BT

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SYMBOL-NO	P-NO	DESCRIPTION
977	8691408	BIND HEAD TAPPING SCREW 3MMD X 8MM
978	8741408	SCREW (B3X8)
979	8650408	SCREW
980	8741406	BIND SCREW - 3MMD X 6MM
983	8741403	BIND SCREW-3MMDX3MM
985	8671406	DT SCREW-3MMDX6MM
986	8678405	DT SCREW-3MMDX5MM (BLACK)
988	8691410	SCREW
989	8711103	PAN HEAD SCREW 2X3
990	8741406	BIND SCREW - 3MMD X 6MM

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