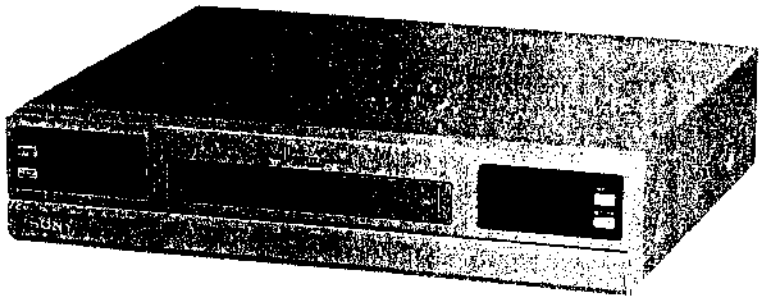
SVT-5000P

SERVICE MANUAL

AEP Model



SPECIFICATIONS

General

Recording method	Dual-azimuth dual-head rotating helical scanning system
Audio recording	Only in 3-, 12-, and 24-hour modes
Tape speed	23.39 mm/sec (3-hour mode)
Specified video cassette tape	VHS 1/2 video cassette tape
Recording/playback time	3, 12, 24, 48, 72, 96, 120, 168, 240, 480, 720, and 960 hours (when using E-180 tape) (one-shot mode is also available)
Fast-forward/rewind time	Approx. 5 minutes (when using E-180 tape)
Television system	PAL colour TV system

Video

Recording method	Luminance signal: FM method Colour signal: Low-pass band-pass Transformation direct recording method
Input	1 Vp-p, BNC, 75 ohms unbalanced
Output	1 Vp-p, BNC, 75 ohms unbalanced
Horizontal resolution	Black & white mode: 350 lines or more Colour mode: 240 lines or more

Audio

Input	3.6 mV (–7.8 dBs), phono jack 100 kilohms unbalanced
Output	3.6 mV (–7.8 dBs), phono jack 600 ohms unbalanced
Microphone input	–60 dBs, 3.5 mm minijack, high impedance

Connector

Alarm input	Contact closes with no voltage
Alarm output	+5 V, 5.7 kilohms
Alarm reset input	Contact closes with no voltage
Tape end output	+5 V, 5.7 kilohms
Clock output	+5 V, 5.7 kilohms
One-shot input	Contact closes with no voltage
Series input	Contact closes with no voltage
Series output	+5 V, 5.7 kilohms
Switch output	+5 V, 5.7 kilohms
Remote control input	3.5 mm minijack

Other specifications

Operating temperature range	5° C to 40° C
Operating humidity range	80% or less
Power supply	220-240 V AC, 50 Hz
Power consumption	18W
External dimensions	Approx. 420 × 100 × 340 mm (w/h/d) (16 5/8 × 4 × 13 1/2 in.)
Weight	Approx. 5.8 Kg (12 lb 13 oz)

Design and specifications are subject to change without notice.

MICROFILM

TIME LAPSE VIDEO CASSETTE RECORDER

SONY®

SAFETY CHECK-OUT

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

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

SAFETY-RELATED COMPONENT WARNING!!

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

TABLE OF CONTENTS

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

CAUTION
The format used in the time lapse recorder SVT-5000P differs from the regular VHS video format. This unit cannot be used to play VHS video cassettes. However, cassettes recorded in three-hour mode on this unit may be viewed on a normal VHS video cassette recorder.

Note
This appliance conforms with EEC Directive 87/308/EEC regarding interference suppression.

Precautions

On safety
- Operate the unit only on 220-240 V AC, 50 Hz.
- Should anything fall into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- If you are not using the unit for an extended period of time, unplug it from the wall outlet by pulling it out by the plug. Never pull the cord itself.
- The nameplate indicating operating voltage, power consumption, etc. is located on the rear of the unit.

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

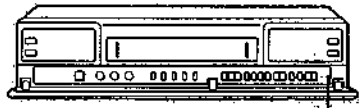
On operation
When the unit is not in use, turn the power off to conserve energy and to extend its life.

On moisture condensation
If the unit is brought directly from a cold to a warm location, moisture may condense on the video head drum. In this condition, the tape may adhere to the head drum and cause serious damage to the head. To avoid damage caused by moisture condensation, be sure not to leave a cassette inside the compartment when the unit will not be used.
If moisture condensation is present, the "dddd" indicator blinks in the display window and the unit will not operate. When the "dddd" indicator disappears, you can operate the unit.

On video cassette
Remove and store video cassettes after recording or playback.

On cleaning
- Clean the cabinet, panel and controls with a dry soft cloth, or a soft cloth slightly moistured with a mild detergent solution.
- Do not use any type of solvents, such as alcohol or benzine, which might damage the finish.

On memory reset
When you use this unit the first time or install to a new location, reset the memory.



T/D RESET

Turn on the power and press T/D RESET.
When the memory is reset, the time/date setting are erased and the security lock function is released.
The unit is automatically turned off.

If you have any questions about the unit, contact your Sony dealer.

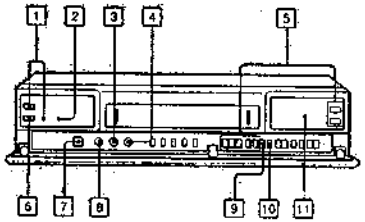
What is Time Lapse Video?
- A normal VTR records 50 fields per second, while this time lapse VTR records in a range from 0.156 to 12.5 fields per second. Through reduction of the number of fields recorded per second, this VTR is capable of recording for extended periods of time on a standard video tape (up to a maximum of 960 hours).
- As a result, this unit is extremely useful for long-term monitoring or recording events that take place slowly (such as the blooming of a flower).
- If a tape that has been recorded in time lapse mode is played back in the normal three-hour mode, the speed of the tape will be increased from 4 to 320 times, depending on the speed the original recording was made at, so that the slow changes that were recorded can be viewed at a much faster speed.

This section is extracted from instruction manual.

Labeling Parts and Controls

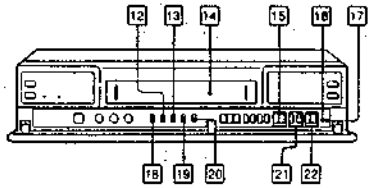
Refer to pages in circles for details.

Front Panel



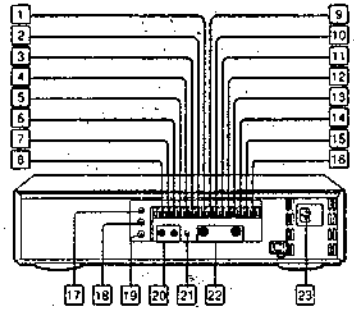
[1] POWER switch and indicator
[2] REPEAT indicator ⑲
[3] TRACKING NORMAL control ⑱
[4] TRACKING SLOW control ⑱
[5] Tape operation buttons
◀◀ REW button
▶ PLAY/REC CHECK button
▶▶ FF button
II STILL/REC PAUSE button
SEARCH/REV button
■ STOP button
● REC button
[6] ≙ EJECT button ⑭
[7] TIMER/AUDIO ON button ⑰, ⑲, ㉗
[8] SHARPNESS control ㉗
[9] CLOCK/COUNT button ⑫, ㉑
[10] PAGE button ⑦, ⑱
[11] Display window ⑬

Front Panel



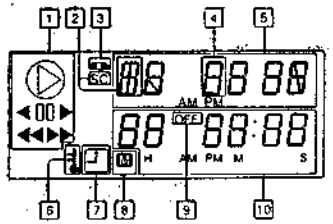
[12] ALARM SPEED switch ㉔
[13] ALARM DURATION switch ㉕
[14] Cassette compartment ⑪
[15] SHIFT ▼/▶ buttons ⑧, ⑩, ⑯
[16] AL/PL RESET button ㉒
[17] T/D (time/date) RESET button ⑨
[18] COLOR SW switch ㉙
[19] REPEAT REC switch ⑲
[20] ON-SCREEN switch ⑦
[21] COUNTER RESET/MEMORY/–/+ buttons ⑧, ⑩
[22] REC/PLAY SPEED –/+ buttons ⑮, ⑰

Rear Panel



[1] CLOCK terminal
[2] TAPE END terminal ⑬
[3] COM (common) terminal
[4] ALARM RESET terminal ㉒
[5] ALARM OUT terminal ㉓
[6] ALARM COM (common) terminal ㉓, ㉔
[7] ALARM IN terminal ㉔
[8] AUDIO SENSOR terminal ㉕
[9] 1 SHOT COM (common) terminal ㉖
[10] 1 SHOT IN terminal ㉖
[11] SERIES IN terminal ㉗
[12] SERIES COM (common) terminal ㉗
[13] SERIES OUT terminal ㉗
[14] SW COM (switch common) terminal ㉙
[15] SW OUT (switch out) terminal ㉙
[16] NOP terminal
[17] STILL V. LOCK (Vertical synchronization volume) control ㉘
[18] REMOTE jack (mini type) ㉜
[19] MIC IN jack (mini type) ㉕
[20] AUDIO IN/OUT jacks (phono type)
[21] SENSOR LEVEL control ㉕
[22] VIDEO IN/OUT jacks (BNC type) ㉕
[23] AC IN (inlet) ㉛

Display Window



[1] Tape operation indicators
[2] Head select indicators
[3] Cassette indicator
[4] Power interruption indicator
[5] Tape speed/Alarm/One shot recording/Moisture condensation
[6] Security lock indicator
[7] ⏱ (timer recording standby) indicator
[8] M (memory) indicator
[9] OFF indicator
[10] Current time/Linear time counter/One shot recording/Timer recording indicator

Overview of the VTR

Field recording/field playback
Because single fields can be recorded one by one in time lapse mode and all fields can be viewed separately during playback, you can record more information.

Audio recording in 12-/24-mode
You can record audio information with video information in 12- or 24-hour mode and listen to it by selecting audio mode during playback.

Various recording functions
- **Autorepeat recording:** After the end of the tape is reached, the unit rewinds the tape and starts recording again from the beginning of the tape.
- **Timer recording:** You can set the timer on daily recording or weekly recording.
- **Alarm recording:** If an externally connected alarm sensor is triggered, you can make a complete recording of the situation that triggered the alarm.
- **One-shot recording:** Recording can be done on a single-field basis.

Series recording function
This function permits long-term continuous recording using two or more time lapse VTRs.

Mode settings on monitor
You can set the modes for all functions, such as the internal timer setting, the alarm recording mode settings, etc. on the monitor.

Multiple recording modes
The time lapse intervals for recording can be set in 11 steps. At the longest interval setting, available recording time is a full 960 hours (40 days) with one 180-minute tape.

Used time indicator
This unit has a built-in microprocessor equipped with a calendar function and shows used time of head drum and power on time on the monitor.

Time and date retrieval function
Because this unit uses a high-performance VASS, recordings made in time lapse mode can be searched by date and time, a valuable type of search function in time lapse VTRs.

Alarm search/scan function
Searches the alarm recording or plays it back for five seconds.

Forward/reverse field advance
This unit offers improved search functions with the ability to move both forwards and backwards between fields.

Automatic headcleaning function
The head is cleaned automatically each time a tape is loaded or unloaded.

Clock operation backup
When a power interruption occurs, the built-in rechargeable battery will provide backup power for the clock for up to 15 days.
Essential data, such as setting data, internal timer settings, recording time, mode settings, and alarm recording mode settings, are also retained.

Security lock
To guard against operation errors, this unit locks all of the buttons except the one in current operation mode.

Subhead selection function
If a problem develops with one head, the subhead is used to regain a good video image.

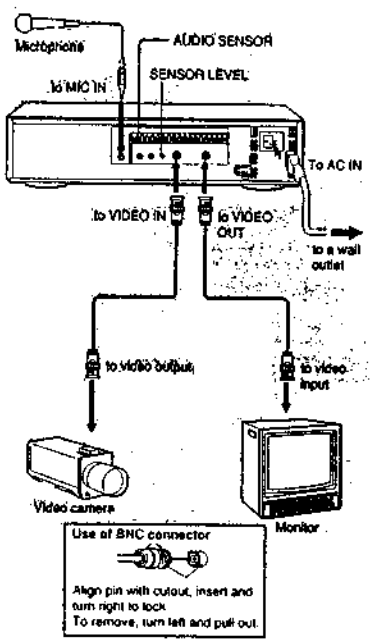
Recording check function
You can check the recorded image during recording by pressing a single button.

Connections

Turn all the power off before making connections.
Connect the power cord last.

Connecting a camera, monitor and microphone

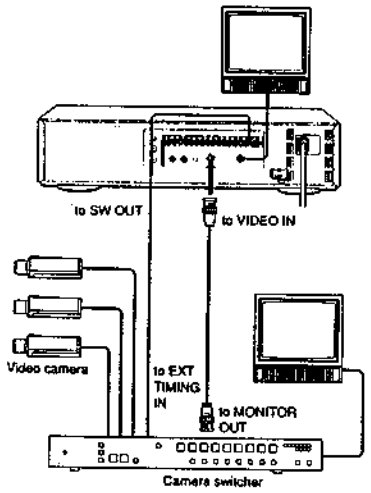
You can monitor the picture and sound.



For alarm sensor connection, refer to page 20.
SENSOR LEVEL control is used to set the level from the MIC input at which the AUDIO SENSOR output switches on and off.

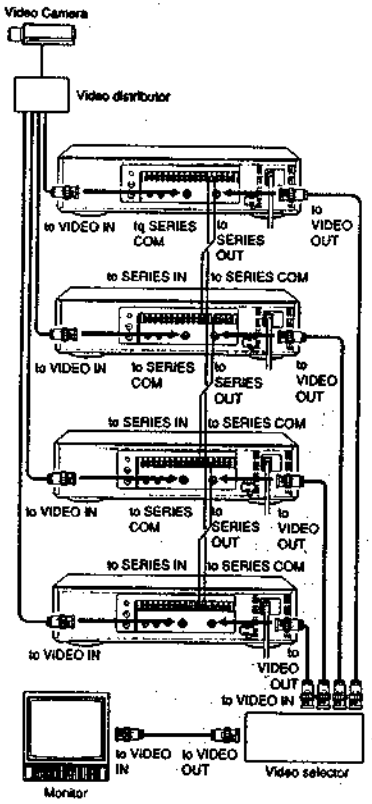
Connections

Connecting a Switcher



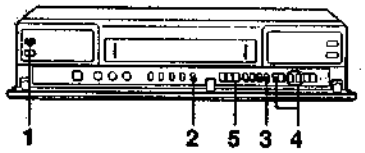
Note
When several cameras are used, synchronize the cameras. If not, the picture will be disturbed.

Connecting Another Unit in Series



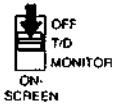
Notes
- Install the tape in the 2nd and subsequent recorders also and turn off the power.
- Set REPEAT REC to OFF.
- Press COUNTER MEMORY so that the M indicator disappears.
- Set the security lock to the ON condition (indicator lights in the display window.)

Setting the Buzzer

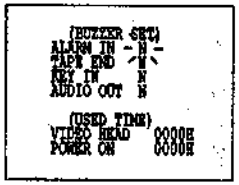


1 Turn on the power of the equipment to be used.

2 Set ON-SCREEN to T/D.



3 Press PAGE five times to display (BUZZER SET) on the monitor.



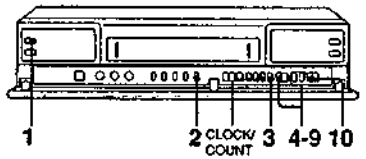
4 Press SHIFT ▼ so that the item to be set blinks and select Y (yes) or N (no) by pressing +/–.
- ALARM IN: Set to Y for getting sounds during alarm recording
- TAPE END: Set to Y for getting sounds when the end of the tape is reached
- KEY IN: Set to Y for getting sounds when a button is pressed.
- AUDIO OUT: Set to Y for output the beep signal on the AUDIO OUT jack when any of the above settings are set to Y.

5 Press CLOCK/COUNT to display the normal picture.

Note
Even if KEY IN is specified, during the timer recording, security lock, moisture condensation, and alarm recording modes, the unit does not beep except for the buttons that can be used in those modes.

Setting Date and Clock

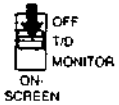
Set the clock to the current time and date on the monitor.



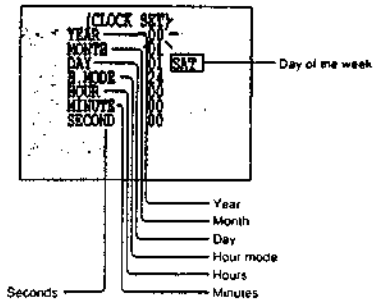
Example:
Set the date and clock to 15:20 on October 15, 1992

1 Turn on the power of the equipment to be used

2 Set ON-SCREEN to T/D.



3 Press PAGE once to display (CLOCK SET) on the monitor.
The first screen shows January 1, 2000.



4 Set the year by pressing +/–.

Press SHIFT ▼.

5 Set the month by pressing +/–.

Press SHIFT ▼.

6 Set the day by pressing +/–.

Press SHIFT ▼.

7 Set the hour mode by pressing +/–.

Press SHIFT ▼.

8 Set the hour by pressing +/–.

Press SHIFT ▼.

9 Set minutes by pressing +/–.

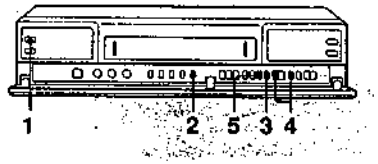
Press SHIFT ▼.

10 Press REC/PLAY SPEED – simultaneously with a time signal.
You can set the clock at the 00 second point.

After setting the date and time, press CLOCK/COUNT to display the normal screen.

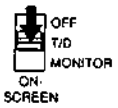
Setting Time/Date Display

You can display four items of information, date, time, number of alarm recordings and recording/playback speed and turn off each item which you do not want to display.

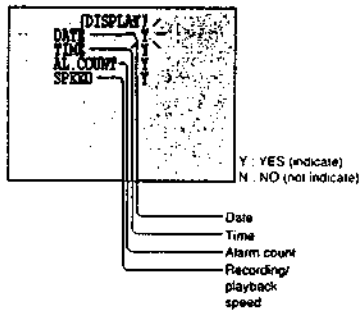


1 Turn on the power of the equipment to be used.

2 Set ON-SCREEN to T/D.

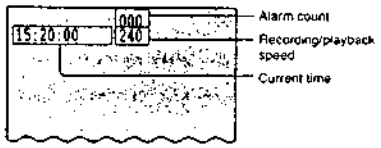


3 Press PAGE twice to display (DISPLAY) on the monitor



4 Press SHIFT ▼ so that the item to be set blinks and +/– to set to Y or N.
Example: When you set the date display to N.

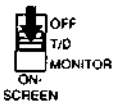
5 Press CLOCK/COUNT to display the normal picture (time/date screen)

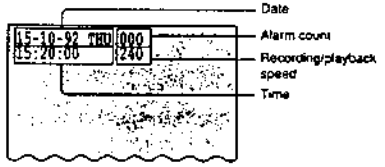


Changing the Display Position of the Normal Screen

Changing the position of the time/date screen

1 Set ON-SCREEN to T/D.

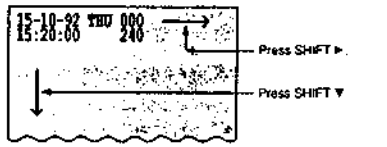




2 Change the display position.

To move the display downwards, press SHIFT ▼.
(When the bottom of the screen is reached, the display position returns to the top of the screen.)

To move the display rightwards, press SHIFT ▶.
(When the right-hand edge of the screen is reached, the display position returns to the left-hand edge of the screen.)

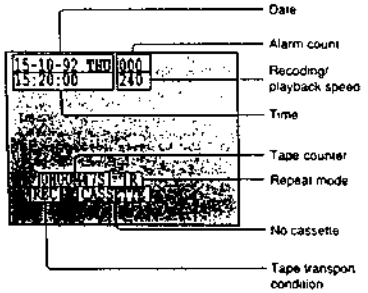


Setting Date and Clock

Changing the position of the monitor screen

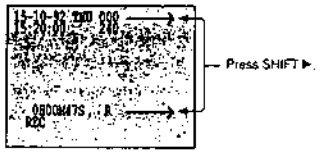
You can check the operation mode of the unit on the monitor.

1 Set ON-SCREEN to MONITOR.



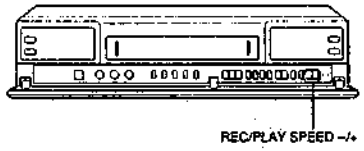
2 Change the display position.
You cannot move the monitor screen downwards.

To move the display rightwards, press SHIFT ▶.
(When the right-hand edge of the screen is reached, the display position returns to the left-hand edge of the screen.)



Selecting the Recording Speed

You can set the normal recording or the time lapse intervals for recording in 11 steps.



Press REC/PLAY SPEED – or REC/PLAY SPEED + to set the recording speed.

Recording time and intervals

Recording speed	Maximum recording time with 180-minute tape (hour)		Interval (sec.)	Audio recording	Tape motion
3	Standard mode	3	1/50	Possible	Continuous
12	Time lapse mode	12	0.08		
24		24	0.16		
48		48	0.32	Impossible	Intermittent
72		72	0.48		
96		96	0.64		
120		120	0.8		
168		168	1.12		
240		240	1.6		
480		480	3.2		
720		720	4.8		
960		960	6.4		

On cassette

This unit is designed and calibrated with 180-minute tape (Sony E-180). To ensure stable operation and optimum picture quality, the use of Sony 180-minute tape is recommended.

The principle of extended recording

The extremely long recording times offered by the unit are made possible by moving the tape only for small incremental steps while a video picture is recorded.

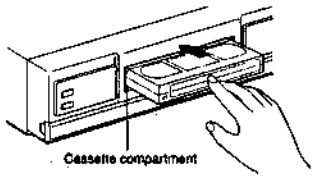
Note

"000" is displayed in the display window after the recording speed "960" is displayed. This is used for the one-shot recording on page 25.

Handling Video Cassette

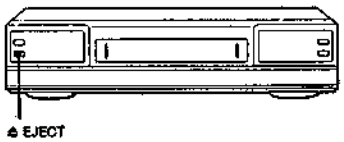
This section shows you how to insert a video cassette into the VTR.

Loading a Video Cassette



Insert the cassette into the cassette compartment by slowly pressing its center with the arrow on the top.
When the cassette is loaded, the VTR automatically turns on and the ⏏ indicator lights in the display window.
If the cassette without its safety tab is used for recording, the cassette is ejected automatically.

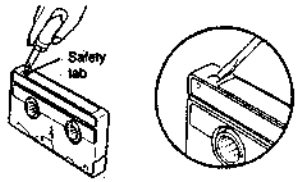
Ejecting the video cassette



Press ⏏ EJECT on the VTR.
You can eject the cassette even when the power is off.
When you press ⏏ EJECT, the VTR turns on automatically. After ejecting the cassette, the VTR turns off again.

Protecting your cassette from being erased

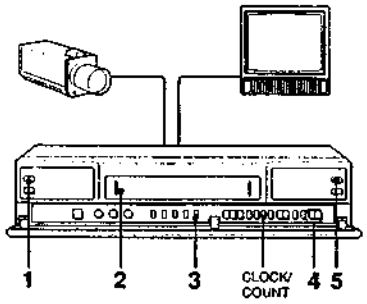
Remove the tab on the cassette with a screwdriver or a similar tool as shown. This protects against an accidental recording.



If you want to record again on the cassette without its safety tab, simply cover the safety tab hole with a piece of plastic tape.

Recording

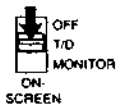
This section shows you how to record the signal from the video camera in the normal or time lapse mode, set the security lock, record repeatedly on the same cassette, continue recording on another VTR after the tape on the 1st VTR is reached at the end.



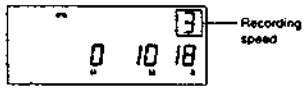
1 Turn on the power of the equipment to be used.

2 Insert the cassette.

3 Set ON-SCREEN to T/D.



4 Set the recording speed by pressing REC/PLAY SPEED +/–.



5 Press ● REC.
Recording starts.

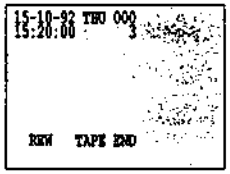
To stop recording
Press ■ STOP.

If recording does not start and the cassette is ejected
The tab on the cassette is removed to protect against the accidental recording. (See page 11.)

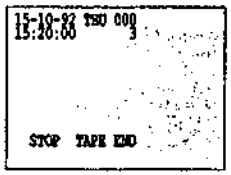
When the tape end is reached
The tape is rewound at the beginning of the tape and stops, when REPEAT REC is set to OFF.

The information on the screen appears when the ON-SCREEN switch is set to MONITOR.

During rewinding



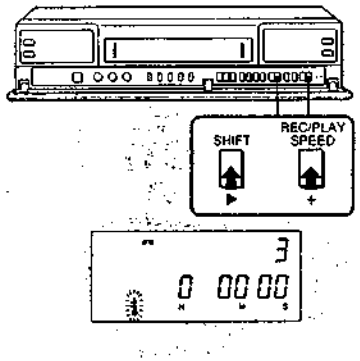
In stop mode



Security Lock Function

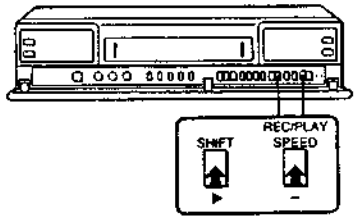
Locking the record mode is useful to guard against accidental recording interruptions when the unit is used for surveillance or monitoring purposes.

To set the security lock
While pressing SHIFT ▶, press REC/PLAY SPEED +.
The 🔒 indicator lights in the display window.

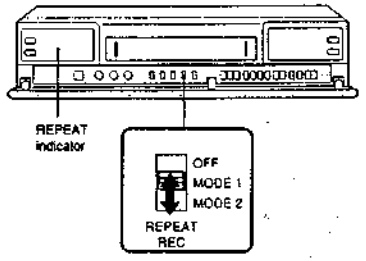


The security lock function also works in other modes.
The buttons except the one used in the current mode do not work.
However, you can use SHARPNESS, TRACKING, and STILL V. LOCK.

To release the security lock
While pressing SHIFT ▶, press REC/PLAY SPEED –.
The 🔒 indicator turns off.



Repeated Recording on the Same Cassette



Set REPEAT REC to MODE 1 or MODE 2 and then press ● REC.
The R and REPEAT indicators light and recording begins.

MODE 1: If an alarm input is received during autorepeat recording, the recording mode switches to alarm recording. (The R indicator disappears.) After the end of the tape is reached, the tape is rewound and stops at the beginning.
MODE 2: If an alarm input is received during autorepeat recording, the recording mode switches to alarm recording. Repeat recording is performed regardless of whether an alarm input is received or not.

Note
If REPEAT REC is set to OFF while autorepeat recording is in progress, recording proceeds until the end of the tape is reached and then stops automatically after the tape is rewound at the beginning.

Series Recording

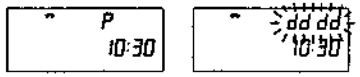
Connect another SVT-5000P for series recording (page 6) and set each of the units as follows.

Item	Unit #1	Unit #2	Unit #3 and subsequent unit
SERIES on (ALARM SET)/ (1 SHOT SET)screen	Y	Y	Y
Operating status	Recording	Stopped	Stopped
REPEAT REC switch	OFF	OFF	OFF
Memory rewind	Released	Released	Released
Security lock	Locked	Locked	Locked
Timer	OFF	OFF	OFF
Cassette tape	Loaded	Loaded	Loaded

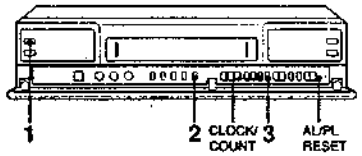
When all of the settings are complete, set unit #1 in recording mode and turn off the power of unit #2 and subsequent unit. When recording on unit #1 is complete, the power for unit #2 turns on and recording begins (The recording cannot be done for about 5 seconds.).
The unit #1 rewinds its tape and turns off.

Recording after power interruption or moisture condensation

If a power interruption occurs, the P indicator lights in the display window and if a moisture condensation occurs, the dddd indicator blinks. Even if a power interruption or moisture condensation occurs while recording, the internal batteries provide backup power for memory for at least 15 days. After power is restored, press ● REC to start recording in preset mode. The internal batteries can be charged in about 48 hours.
If the power is interrupted during recording with the security locked, the recording starts automatically after power is restored.

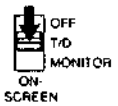


To check power interruptions or moisture condensation

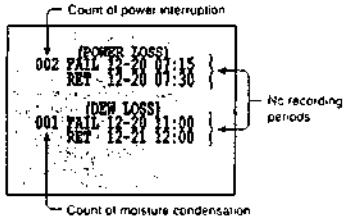


1 Turn on the power of the equipment to be used.

2 Set ON-SCREEN to T/D.

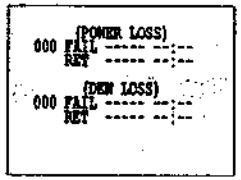


3 Press PAGE six times to display (POWER LOSS)/(DEW LOSS).
This shows a count of the power interruption and moisture condensation and the period when the recording was interrupted



To clear the P indicator

Press AL/PL RESET with a ball point pen or similar object
The contents on the monitor also disappears.

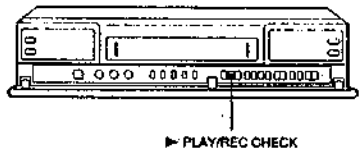


To display the normal picture

Press CLOCK/COUNT.

Monitoring the recording condition

You can check the recording condition by pressing
► PLAY/REC CHECK while recording in time lapse mode

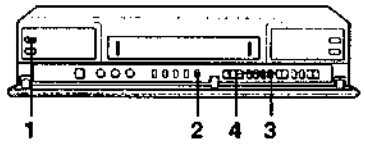


Press ► PLAY/REC CHECK while recording.
After the tape is rewound for about three seconds and played back for about two seconds, the unit returns to the original recording mode.

Note

While monitoring the recording condition, recording is interrupted

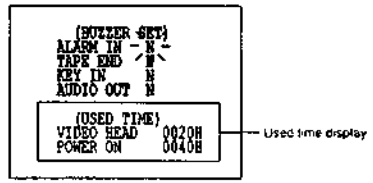
Checking the Used Time



1 Turn on the power of the equipment to be used.

2 Set ON-SCREEN to T/D.

3 Press PAGE five times to display (BUZZER SET)/(USED TIME).
The VIDEO HEAD reading indicates the amount of time the video head has been used, and the POWER ON reading indicates the amount of time the power has been on.

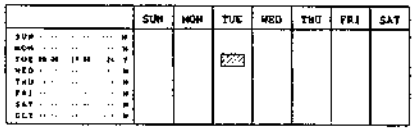


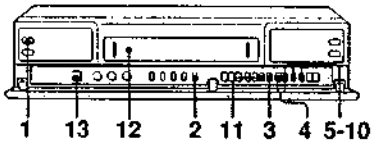
4 Press CLOCK/COUNT to display the normal picture

Timer Recording

You can set the timer recording in two methods : day of the week recording and daily recording.
Before starting, make sure that the time and date are set properly.

Ex.1 Making a recording from 8:00 on Tuesday to 17:00 the same day with the recording speed set to 24-hour mode.

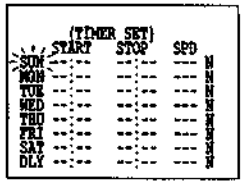




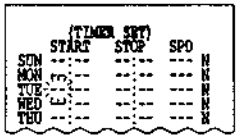
1 Turn on the power of the equipment to be used

2 Set ON·SCREEN to T/D.

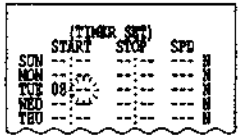
3 Press PAGE three times to display (TIMER SET).



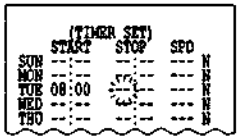
4 Press SHIFT ▼ to move the blinking to TUE and then SHIFT ▶ to move it to the hour position of START.



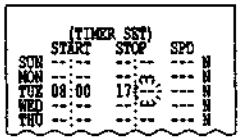
5 Set the start hour by pressing +/– and press SHIFT ▶



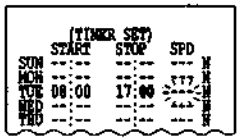
6 Set the start minute by pressing +/– and press SHIFT ▶.



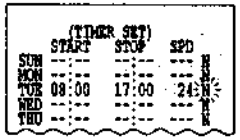
7 Set the stop hour by pressing +/– and press SHIFT ▶.



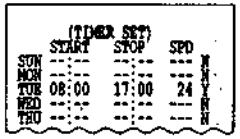
8 Set the stop minute by pressing +/– and press SHIFT ▶



9 Set the recording speed by pressing +/– and press SHIFT ▶



10 Select Y (yes) to execute the timer recording by pressing +/–



For another program presetting, repeat steps 4 to 10.

11 When all of the settings are completed, press CLOCK/COUNT to display the normal picture.

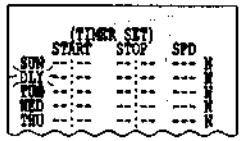
12 Insert the cassette.

13 Press TIMER/AUDIO ON.
The VTR turns off automatically, and enters the timer recording standby mode. The ⏲ indicator appears.
When no cassette is inserted, the ⏲ indicator blinks and the beep sounds are heard.

To stop the beep sounds
Press TIMER/AUDIO ON. After you insert the cassette, press TIMER/AUDIO ON again.

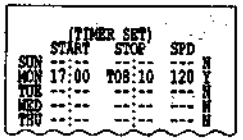
When the ⏲ indicator appears in the display window, the buttons except TIMER/AUDIO ON does not work.

Daily recording
You can preset the timer to start recording each day of the week. Move the blinking to the appropriate day of the week by pressing SHIFT ▼ and set the day to DLY by pressing +/– before setting the hour position of START in step 4.



Note
When you want to set the timer according to the following example 2, do not use the bottom two lines (SAT and DLY).

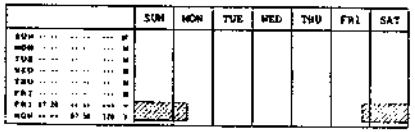
When the time set in the STOP column is earlier than the time set in the START column
The STOP time is assumed to be for the next day, and the T (tomorrow) indicator is displayed before the stop time.

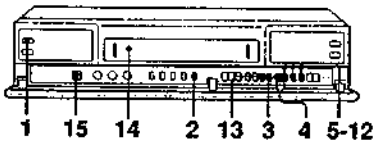


Timer recording is interrupted in the following case:
When the power is interrupted.
After the power recovers, the recording resumes.

To stop the timer recording
Press TIMER/AUDIO ON. The recording stops and the power is turned off.

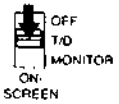
Ex. 2 Making a recording from 17:20 on Friday to 7:50 on Monday with the recording speed set to 120-hour mode.



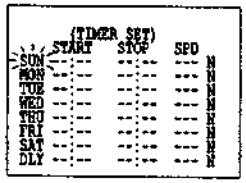


1 Turn on the power of the equipment to be used.

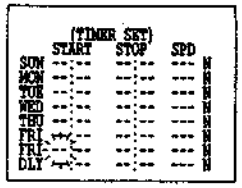
2 Set ON·SCREEN to T/D



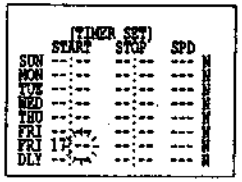
3 Press PAGE three times to display (TIMER SET).



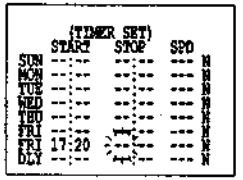
4 Press SHIFT ▼ to move the blinking to SAT (7th line), change SAT (the day of the week) to FRI by pressing +/– and press SHIFT ►.



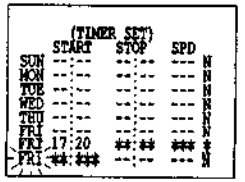
5 Set the start hour by pressing +/– and press SHIFT ►.



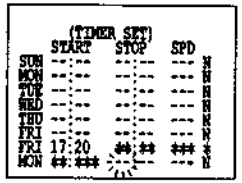
6 Set the start minute by pressing +/– and press SHIFT ►.



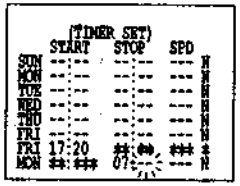
7 Set the stop time, recording speed and timer execution to "** ** *** *" by pressing +/– and press SHIFT ►. The day of the week in the last line is set to FRI and the start time is set to **:***.



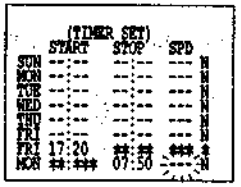
8 Set blinking FRI to MON by pressing +/– and press SHIFT ► to move it to the hour position of STOP.



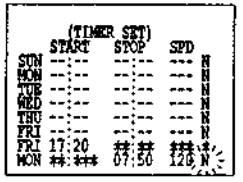
9 Set the stop hour by pressing +/– and press SHIFT ►.



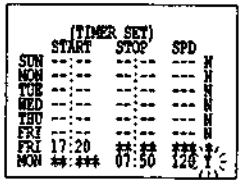
10 Set the stop minute by pressing +/– and press SHIFT ►.



11 Set the recording speed by pressing +/– and press SHIFT ►.



12 Select Y (yes) to execute the timer recording by pressing +/–.



13 When all of the settings are completed, press CLOCK/COUNT to display the normal picture.

14 Insert the cassette.

15 Press TIMER/AUDIO ON.
The VTR turns off automatically, and enters the timer recording standby mode. The ⏲ indicator appears. When no cassette is inserted, the ⏲ indicator blinks and the beep sounds are heard.

To stop the beep sounds
Press TIMER/AUDIO ON. After you insert the cassette, press TIMER/AUDIO ON again.

When the ⏲ indicator appears in the display window, the buttons except TIMER/AUDIO ON does not work.

Timer recording is interrupted in the following case:
When the power is interrupted.
After the power recovers, the recording resumes.

To stop the time recording
Press TIMER/AUDIO ON. The recording stops and the power is turned off.

When the ⏲ indicator appears in the display window, press TIMER/AUDIO ON to clear it and operate the followings.

Changing the Timer Settings

1 Display the (TIMER SET) screen.

2 Press SHIFT ► or ▼ to move the blinking to the portion where you want to change

3 Press +/– to change the setting.

4 Press CLOCK/COUNT to display the normal picture.

Cancelling the Timer Setting

1 Display the (TIMER SET) screen.

2 Press SHIFT ▼ to move the blinking to the portion where you want to cancel.

3 Press SHIFT ► to move the blinking to the timer execution.

4 Press +/– to set the timer execution to N.

Cancelling All Timer Settings

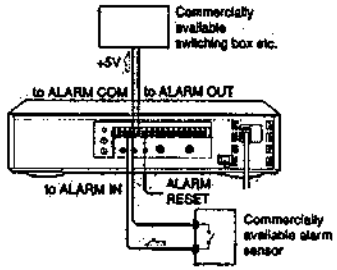
1 Display the (TIMER SET) screen.

2 Press AL/PL RESET.

Alarm Recording

A door switch or alarm sensor can be used to trigger alarm recording. You can make alarm recording in recording mode, stop mode, power off mode and one-shot mode.

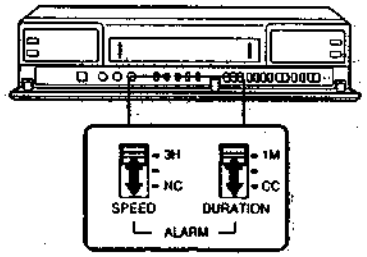
Alarm Sensor Connection



Setting the Alarm Speed and Alarm Duration

You can set the alarm speed and alarm duration by the following two ways:
- Setting ALARM SPEED to 3H or NC and ALARM DURATION to 1M or CC.
- Setting them on the monitor after setting ALARM SPEED and ALARM DURATION to PROG.

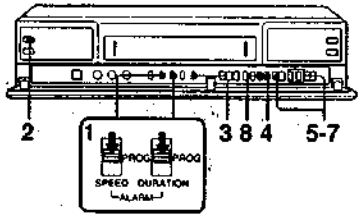
Setting with ALARM SPEED and ALARM DURATION on this unit



1 Set ALARM SPEED to 3H or NC.
3H: for recording in 3-hour mode
NC: for recording at the same speed as before the alarm was received.

2 Set ALARM DURATION to 1M or CC.
1M: for recording for one minute
CC: for recording as long as the alarm signal is being input

Setting the alarm speed and alarm duration on the monitor



Example: To set the alarm speed to 12-hour mode and the alarm duration to three minutes.

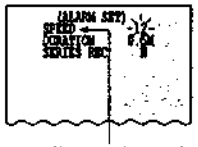
1 Set ALARM SPEED and ALARM DURATION to PROG.

2 Turn on the power of the equipment to be used

3 Set ON-SCREEN to T/D.

4 Press PAGE four times to display (ALARM SET) on the monitor.

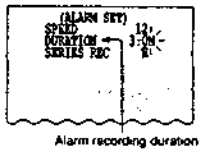
5 Set the alarm speed by pressing +/–.
You can set the alarm speed to 3H, 12H, 24H or NC.



Alarm recording speed

Press SHIFT ▼.

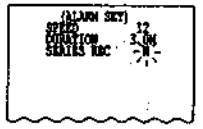
6 Set the alarm duration by pressing +/–.
You can set the alarm duration in units of 30 seconds, up to five minutes.



Alarm recording duration

Press SHIFT ▼.

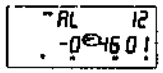
7 Set in which mode the alarm recording begins by pressing +/–.
Y (yes): accepts alarms only in recording mode.
N (no): accepts alarm in recording mode, stop mode, power off mode or one-shot recording mode



8 Press CLOCK/COUNT to display the normal picture.

Notes

- While alarm recording is in progress, other buttons are inoperable.
- If an alarm signal is received while the power is off, the unit is turned off after the alarm recording is performed.
- If an alarm input is received while the unit is in autorepeat recording MODE 1, autorepeat recording is reset and the REPEAT indicator goes off. After the end of the tape is reached, the tape is rewound and the unit goes into stop mode. The OFF indicator lights in the display window.

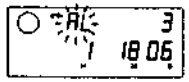


When the OFF indicator lights, in order to prevent accidental erasure of a recorded tape, timer recording and alarm recording cannot be executed.
If any of ● REC, ►► FF, ◄◄ REW, ► PLAY/REC CHECK is pressed, the OFF indicator goes off.

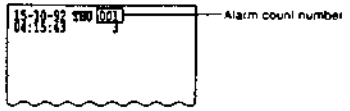
- If another alarm is received while alarm recording is in progress, the second alarm is ignored.
- If the power is interrupted while alarm recording is in progress and restored again, the operation before the alarm occurred resumes.

Alarm Recording

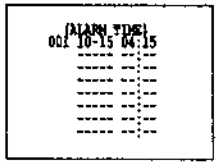
Indicators during alarm recording
The AL indicator flashes in the display window



The count (left digit) of the alarm recording flashes on the monitor.
The alarm recording can be counted up to 999.
When the alarm function has worked 1000 times, the count number returns to 000.

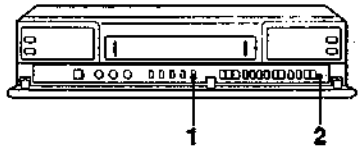


To display the alarm list
Press PAGE seven times to display (ALARM TIME) on the monitor



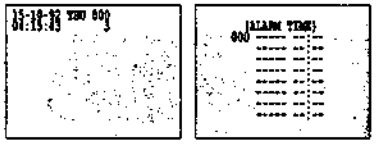
Press CLOCK/COUNT to display the normal picture.

To reset the alarm count

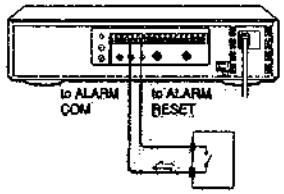


1 Set ON-SCREEN to T/D.

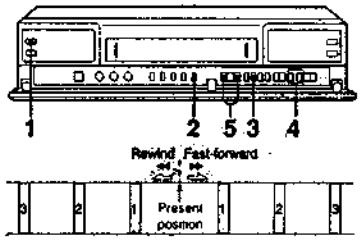
2 Press AL/PL RESET. The count on the monitor are reset to 000.



To stop the alarm recording
Shortcircuit the ALARM RESET and COM terminals during alarm recording.
When the shortcircuiting is released and the alarm signal is received, the alarm recording is started again.

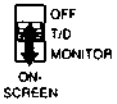


Searching the Picture When the Alarm Function Worked—Alarm Search

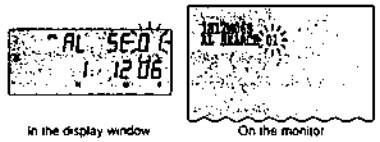


1 Turn on the power of the equipment to be used

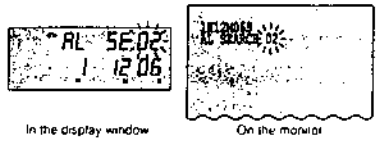
2 Set ON-SCREEN to T/D or MONITOR.



3 Press SEARCH/REV in stop mode.
The alarm search indicator blinks in the display window and on the monitor.



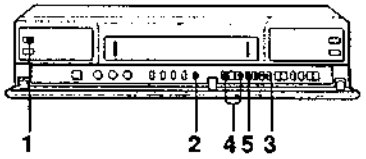
4 Press + or – to set the alarm search number



5 Press ▶▶ FF or ◀◀ REW.
The cassette stops at the portion where the alarm function worked and the still picture playback is displayed.
The alarm search mode is cleared automatically.

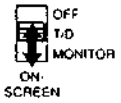
Notes
- If the tape is reached at its end during searching, the tape is rewound and the unit goes into stop mode at the beginning of the tape.
- For alarm search operation, set the alarm speed to 3H and alarm duration to 1M.
- You can search the recording up to 99 times.

Scanning the Picture When the Alarm Function Worked—Alarm Scan

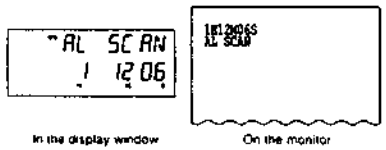


1 Turn on the power of the equipment to be used

2 Set ON-SCREEN to T/D or MONITOR



3 Press SEARCH/REV twice in stop mode.
The alarm scan indicator lights in the display window or on the monitor.



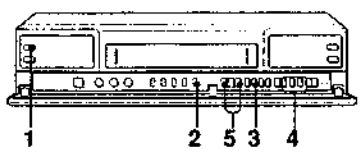
4 Press ▶▶ FF or ◀◀ REW.
The portion where the alarm function worked is sequently played back for five seconds.

5 Press ⏸ STILL/REC PAUSE to stop the scan.
The alarm scan mode is cleared automatically.
To play back the tape, press ▶ PLAY/REC CHECK or ⏸ STILL/REC PAUSE again

Notes

- If the tape is reached at its end during scanning, the tape is rewound and the unit goes into stop mode at the beginning of the tape
- For alarm scan operation, set the alarm speed to 3H and alarm duration to 1M.

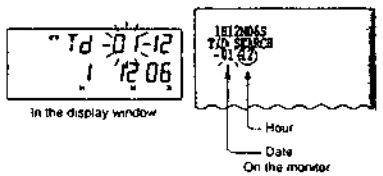
Searching the Time and Date When the Alarm Function Worked—Time/Date Search



1 Turn on the power of the equipment to be used.

2 Set ON-SCREEN to T/D or MONITOR

3 Press SEARCH/REV three times in stop mode.
The time/date search indicator blinks in the display window and on the monitor



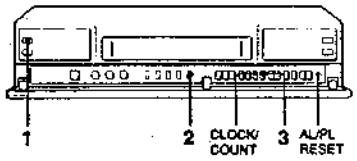
4 Press + or – to set the date and SHIFT ▶ to move the blinking to the time.
Press + or – to set the time.

5 Press ▶▶ FF or ◀◀ REW.
The cassette stops at the portion when you set the time and date and the still picture playback is displayed
The time/date search mode is cleared automatically

Notes

- The time/date function works in 12 to 240 hours recording speed mode.
- If the tape is reached at its end during searching, the tape is rewound and the unit goes into stop mode at the beginning of the tape.

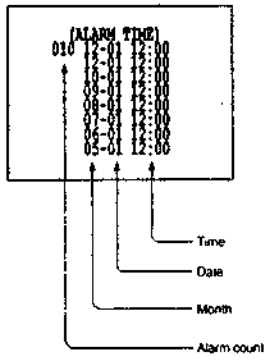
Displaying the Alarm List—Alarm Recall



1 Turn on the power of the equipment to be used

2 Set ON-SCREEN to T/D or MONITOR.

3 Press PAGE seven times to display (ALARM TIME).
The alarm count, date and time are displayed.
The date and time are displayed up to recent eight times.

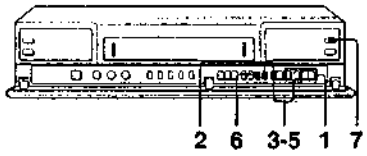


To clear the alarm list on the monitor
Press CLOCK/COUNT The display shows the normal picture.

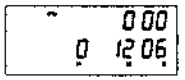
To clear the alarm count in the display window
Press AL/PL RESET.

One-Shot Recording

Aside from long-term recording in time-lapse mode, this unit is capable of one-shot recording, which has applications with data files and animation

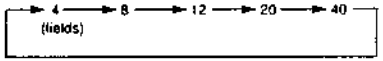


1 Set the recording speed in the display window to "0 00" by pressing REC/PLAY SPEED –/+.

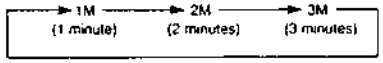


2 Press PAGE four times to display (ALARM SET)/(1 SHOT SET) and SHIFT ▼.

3 Press +/– to specify FIELD (the number of fields) to be recorded during one-shot recording and then press SHIFT ▼.
The specified number of fields is recorded at 0.48 second intervals



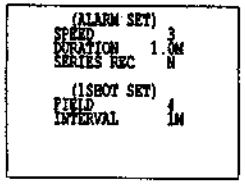
4 Press +/– to set the one-shot time in INTERVAL.



Press SHIFT ▼

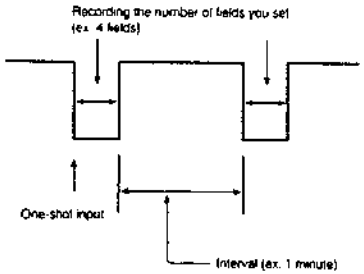
One-Shot Recording

5 Press +/– to set SERIES REC on the (ALARM SET) screen to N

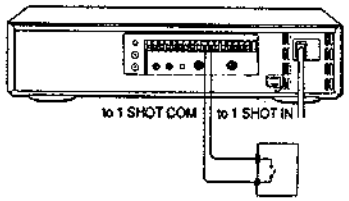


6 Press CLOCK/COUNT to display the normal picture

7 Press ● REC.
The unit enters into the recording pause mode. After the interval to be set passes, one shot recording starts

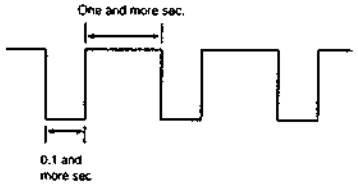


To start one-shot recording immediately
Press ● REC again or short-circuit the 1 SHOT IN and 1 SHOT COM terminals.



When you shortcircuit the 1 SHOT IN and 1 SHOT COM terminals for one-shot recording
You can set the desired interval up to three minutes. (However, the number of fields specified in step 3 is recorded.)
In step 4 of the above operations, set INTERVAL to the same and longer interval than the one made by short-circuiting 1 SHOT IN and 1 SHOT COM terminals
In step 7, shortcircuit the 1 SHOT IN and 1 SHOT COM terminals.

Notes on use 1 SHOT IN and 1 SHOT COM terminals
- 0.1 and more sec. are required when the switch is turned on and one and more sec. is required for the one-shot interval.

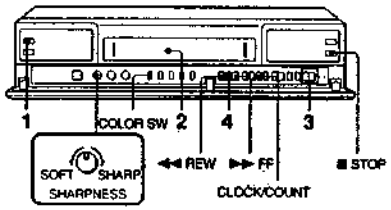


If a one-shot recording input is not received from terminals, one-shot recording is performed according to the settings on (1 SHOT SET) screen.

To stop the one-shot recording
Press ■ STOP.

If an alarm input is received while one-shot recording is in progress
The alarm recording can be performed.
The alarm recording speed is automatically set to the 3-hour mode.

Playback



1 Turn on the power of the equipment to be used

2 Insert the cassette.

3 Select the play back speed by pressing REC/PLAY SPEED +/-.
The selected playback speed is displayed in the display window.

4 Press ► PLAY/REC CHECK.
Playback starts.

To stop playback
Press ■ STOP.

To rewind the tape
Press ■ STOP and then ◄◄ REW.

To fast-forward the tape
Press ■ STOP and then ►► FF.

To adjust the sharpness of the picture
Turn SHARPNESS to SHARP for a sharper picture or to SOFT for a softer picture

Setting the COLOR SW switch
COLOR SW should normally be set to AUTO for the automatic colour/black and white switching circuit to work properly.
However, a weak signal will result in poor picture quality and S/N ratio.
In this case, set the switch to COLOR or B/W (for the black and white picture.)

Resetting the tape counter
The tape counter in the display window helps you to locate a certain scene after playback. Press CLOCK/COUNT to display the counter in the display window and COUNTER RESET to set the counter to "0H00M00S" (counter zero) position before playing back the tape. The unit keeps counting the length of the tape being played back.
Note, however, that the tape counter will not count the portions without video signals recorded.

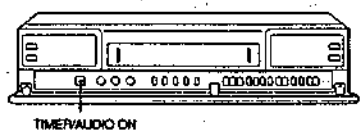
Note
You cannot play back the tapes recorded on other time-lapse VTR on this unit and vice versa.

Audio Playback

You can play back the sound with the picture in 3-hour mode, 12-hour mode, and 24-hour mode.
Play back the tape at the same speed at which it was recorded so that you can monitor the sound normally

For audio playback in 3-hour mode
Play back the tape normally.

For audio playback in 12-hour or 24-hour mode
Press TIMER/AUDIO ON in playback mode
"A12" or "A24" is displayed in the display window.
To turn off the sound, press TIMER/AUDIO ON again.



Note
Noise appears on the screen and the sound is distorted when you play back the picture in 12- or 24-hour mode.

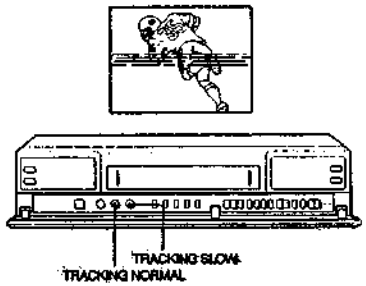
Playback speed
You can view the playback picture at a following speed.

Recording speed (H)	Playback speed (H)											
	3	12	24	48	72	96	120	168	240	480	720	960
3	1	1/4	1/8	1/16	1/24	1/32	1/40	1/56	1/80	1/160	1/240	1/320
12	4	1	1/2	1/4	1/6	1/8	1/10	1/14	1/20	1/40	1/60	1/80
24	8	2	1	1/2	1/3	1/4	1/5	1/7	1/10	1/20	1/30	1/40
48	16	4	2	1	2/3	1/2	2/5	2/7	1/5	1/10	1/15	1/20
72	24	6	3	3/2	1	3/4	3/5	3/7	3/10	3/20	1/10	3/40
96	32	8	4	2	4/3	1	4/5	4/7	2/5	1/5	2/15	1/10
120	40	10	5	5/2	5/3	5/4	1	5/7	1/2	1/4	1/6	1/8
168	56	14	7	7/2	7/3	7/4	7/5	1	7/10	7/20	7/30	7/40
240	80	20	10	5	10/3	5/2	2	10/7	1	1/2	1/3	1/4
480	160	40	20	10	20/3	5	4	20/7	2	1	2/3	1/2
720	240	60	30	15	10	15/2	6	30/7	3	3/2	1	3/4
960	320	80	40	20	40/3	10	8	40/7	4	2	4/3	1

For example, when a tape recorded in 120-hour mode is played back in 12-hour mode, you can view the playback picture at a speed 10 times faster than the recorded one.

Adjusting Pictures

If streaks or noise bands appear on the playback picture, adjust the tracking condition.

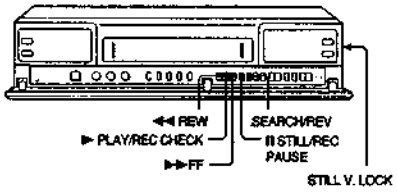


For the picture recorded in 3-hour mode: Use TRACKING NORMAL.

For the picture recorded in 12- to 960-hour mode: Use TRACKING SLOW.

Various Playback Mode

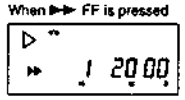
You can play back the picture at various modes: reverse playback mode, still and frame-by-frame pictures, and high-speed playback in both forward and reverse directions.



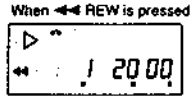
Picture Search

During playback, press ►► FF(forward direction) or ◄◄ REW(reverse direction). A high-speed picture (about five times the normal speed in 3-hour mode) without sound appears on the TV screen.
To resume normal playback, press ► PLAY/REC CHECK.

When ►► FF is pressed



When ◄◄ REW is pressed



Note
During picture search, streaks or noise band appear on the TV monitor.

Still Picture

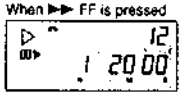
During playback, press II STILL/REC PAUSE.
To resume normal playback, press II STILL/REC PAUSE or ► PLAY/REC CHECK.
When the pause mode lasts for more than approximately five minutes, the unit will automatically enter the playback mode

If the picture shakes while in the still mode
Adjust the picture with STILL V. LOCK on the rear panel.

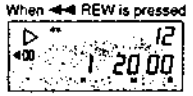
Frame-by-frame Picture

In the still mode, press ►► FF or ◄◄ REW.
Each time you press the button, the picture advances or rewinds by one field.

When ►► FF is pressed

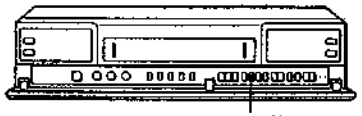


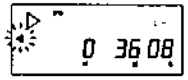
When ◄◄ REW is pressed



Reverse Playback

During playback, keep pressing SEARCH/REV. Reverse playback picture appears on the TV screen.

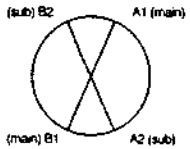




Note
During reverse playback, streaks appears.

Using the Subheads

This unit uses a four-head dual-azimuth system; during normal recording and playback, the main heads A1 and B1 are used.



If trouble occurs on the main heads and the playback picture cannot be viewed, the subheads are used for the operation. (If this should happen, contact your Sony dealer as soon as possible.)

If trouble occurs on the main heads, operate as following step ① to ③.

	Heads to be used	Operation	Indicator in the display
①	A1, A2	During playback, press COUNTER MEMORY + while pressing ● REC.	+
②	B1, B2	During playback, press COUNTER RESET – while pressing ● REC.	–
③	A2, B2	During playback, press REC/PLAY SPEED + while pressing ● REC.	SC
④	A1, B1	During playback, press REC/PLAY SPEED – while pressing ● REC.	no indication

In cases ① and ②, the picture is played back as follows:

3-hour mode: Clear picture (tracking adjustment may be required)

12- or 24-hour mode: Noise band appears.

Reverse playback mode: Noise band appears.

48- to 960-hour mode: Noise band appears and disappears repeatedly.

Still and frame-by-frame pictures: Noise band appears and disappears repeatedly.

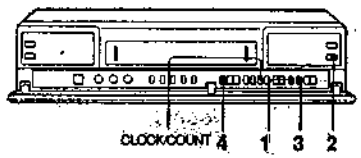
Note

If the subheads are used and any of the following occur, the main heads are used again:

- the end of the tape is reached.
- the tape stops.
- the cassette is ejected.
- the power is interrupted.

Locating the Counter Zero Point

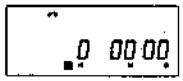
The unit can memorize the counter zero point and can automatically stop at that point. Thus, you can search for a desired point quickly during playback or recording.
To display the counter, press CLOCK/COUNT.



1 During playback or recording, press COUNTER RESET at the point you want to locate later.
The counter shows "0H00M00S".

2 When recording or playback is finished, press ■ STOP.

3 Press COUNTER MEMORY so that the M indicator appears.



4 Press ◄◄ REW.
The unit rewinds the tape and stops automatically at the position close to the counter zero point.

If you press ◄◄ REW again, the unit shows a negative counter value. To locate the counter zero point, press ►► FF.

To cancel the memory
Press COUNTER MEMORY again

Notes

- The counter will not advance during any portion of a tape that is unrecorded.
- The counter works as a linear time counter only when the recording speed is 3-hour mode, indicating the tape movement in terms of hours, minutes, and seconds. With other recording speeds, the counter reflects the ratio of the recording speed to that of 3-hour mode. For example, in 12-hour mode, each second on the counter reflects six actual seconds (12/3=4).
- There may be a slight discrepancy between the position shown on the tape counter and the actual tape position.

Maintenance

We recommend to check the unit daily to confirm that the unit function correctly.

Perform the following checks before starting to record.

1 Turn on the camera, monitor, and this unit.
2 Confirm that the picture from the camera is shown on the monitor.
3 Confirm that the date and time display on the monitor is correct.
4 To check the recording condition of the previous day, rewind the tape for a few tape counter digits and set the unit to playback.
5 Confirm that playback is normal.
6 Confirm that recorded date and time information is correct.

If any malfunction is detected, switch all units off, unplug the unit from the AC outlet, and consult your Sony dealer.

Note

When the security lock is in effect, release it before operating.

Video Head Cleaning

After prolonged use, the video heads may become contaminated, which results in impaired picture quality (snow) or loss of picture. To avoid this, head cleaning should be performed regularly.

Video Head Life

Like the pickup of a record player, video heads do not last indefinitely. If optimum picture quality is not restored even after cleaning, head replacement may be necessary. Please consult your Sony dealer.

Periodic Maintenance Every 1000 Hours

A video cassette recorder is a high-precision piece of equipment because the unit records or plays back the picture on a magnetic tape. In particular, the video head and other mechanical parts become dirty or worn. To maintain a clean picture, we recommend maintenance every 1000 hours. To identify the service time, display the (USED TIME) screen. (See page 15.)

Extended Non-use Periods

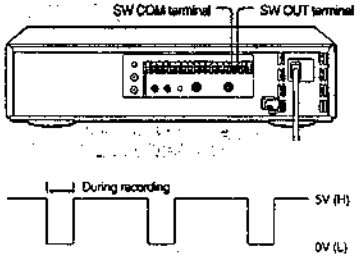
When not used for long periods, the unit should be switched on now and then and set to the playback mode for about three minutes. This helps to prevent mechanical deterioration.

Periodic Servicing

To maintain optimum operating conditions and picture quality, unit servicing (cleaning, lubrication, parts replacement) should be performed regularly. Please consult your Sony dealer.
If the unit is to be used for critical monitoring purposes, it may be preferable to perform servicing at shorter intervals.

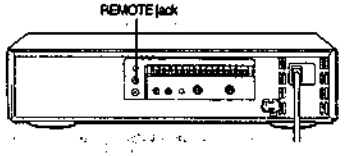
SW (switch) OUT Terminal

The system outputs a pulse signal from the SW OUT terminal every time one field of intermittent recording in 12 to 960-hour mode is conducted.



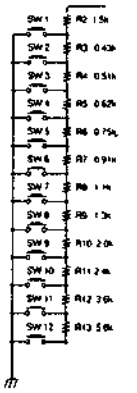
REMOTE Jack

The system can be remotely controlled by adding the circuit shown below to this jack.



SW1 ....STOP
SW2 .... STILL
SW3 ....REW
SW4 ....FF
SW5 .....PLAY
SW6 .....REC
SW7 .....PAGE
SW8 ..... .SEARCH/RVS
SW9 .....REC/PLAY SPEED ÷
SW10 ....COUNTER MEMORY ÷
SW11 ....SHIFT ▼
SW12 .....SHIFT ▶

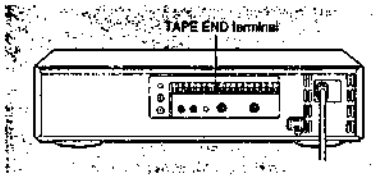
Resistor tolerance should be equal to or less than ± 2%



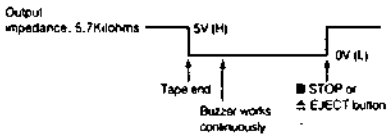
Note
Use the shield cord less than 5m (16 ft.) in length.

TAPE END Terminal

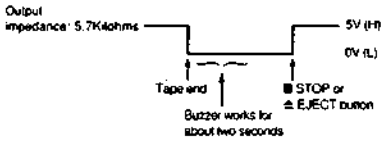
When the unit detects the tape end during recording, the output level becomes 0 V DC and the OFF indicator and buzzer work. To resume the 5V output, press ■ STOP or ≜ EJECT.



REPEAT REC → OFF/MODE 1 (with alarm input)



REPEAT REC → MODE 1/MODE 2 (without alarm input)



SECTION 2
DISASSEMBLY

2-1. REMOVAL OF UPPER CASE

It is widen on both sides the back of upper case and remove up direction.

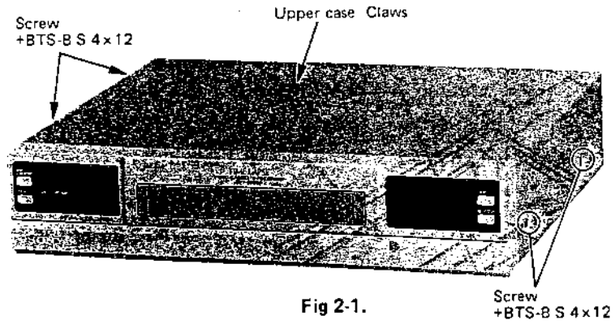


Fig 2-1.

Then remove the upper case.

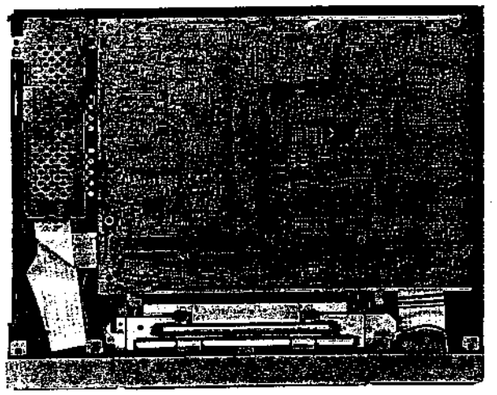


Fig 2-2.

2-2. REMOVAL OF BOTTOM PLATE

Then remove the bottom plate.

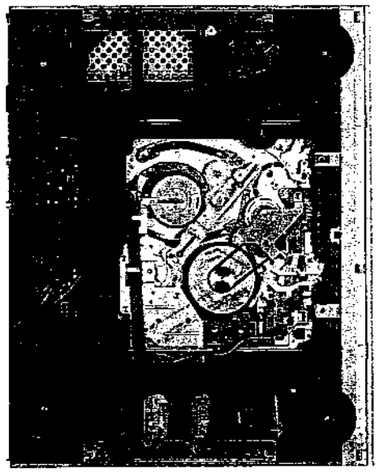


Fig 2-4.

2-3. REMOVAL OF FRONT CABINET

Then remove the upper case, and screws (+BTP 3×10), bottom plate and raise up the claws of front cabinet as shown by Fig 2-5, and remove front cabinet in the arrow direction.

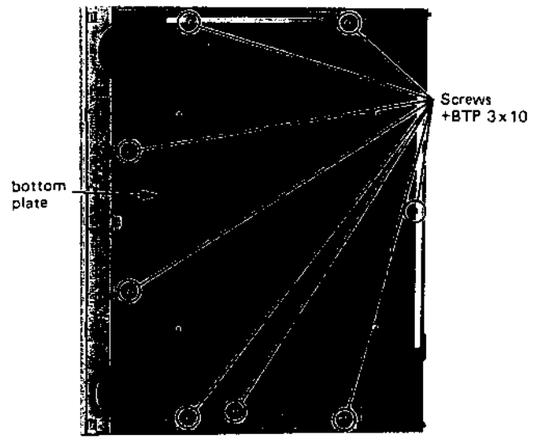


Fig 2-3.

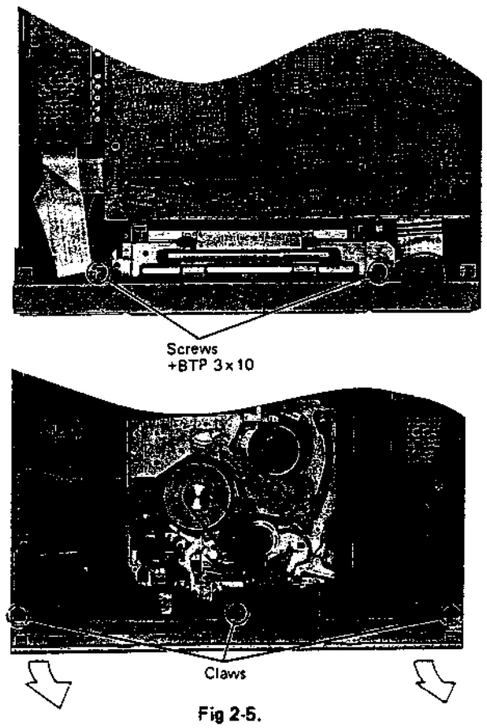
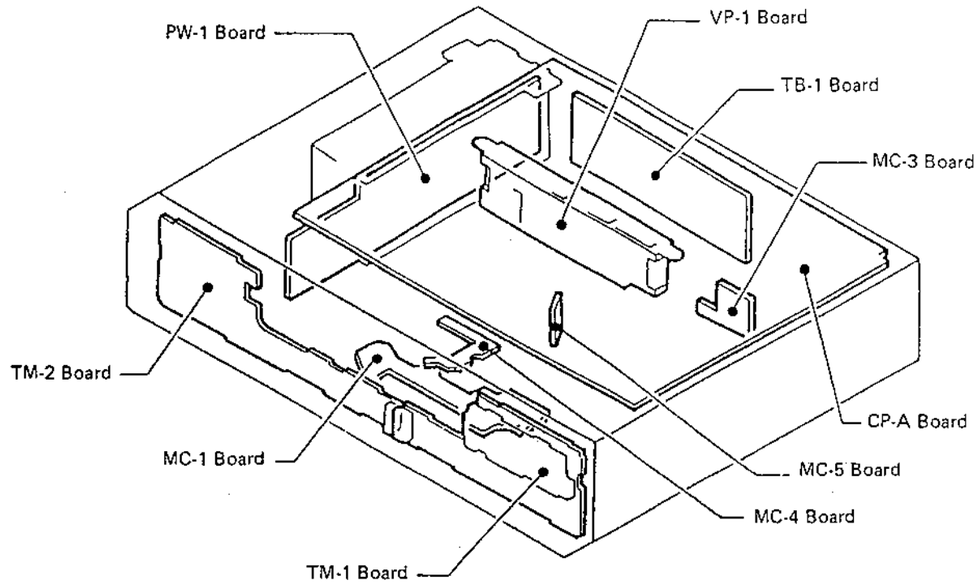


Fig 2-5.

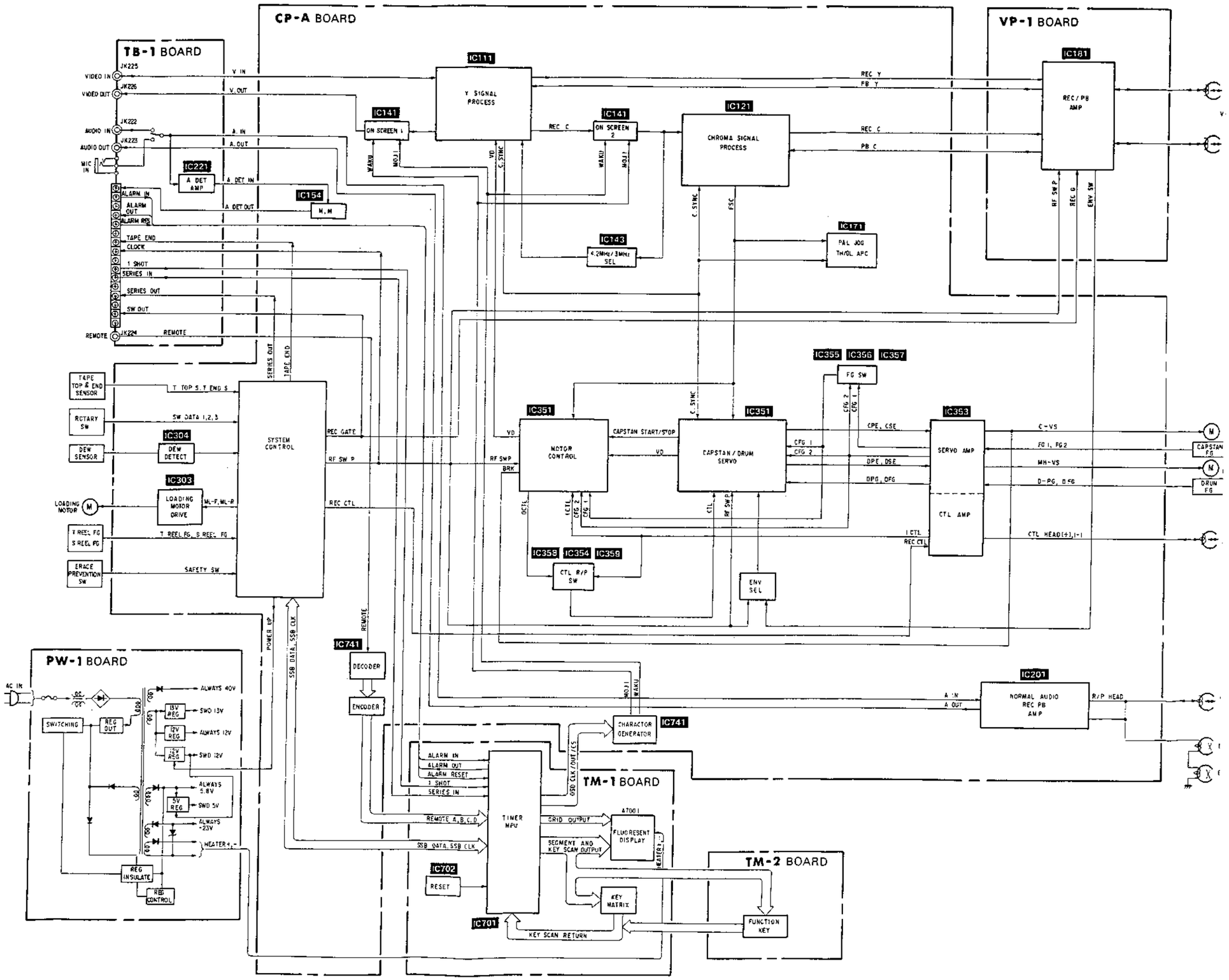
SECTION 3
DIAGRAMS

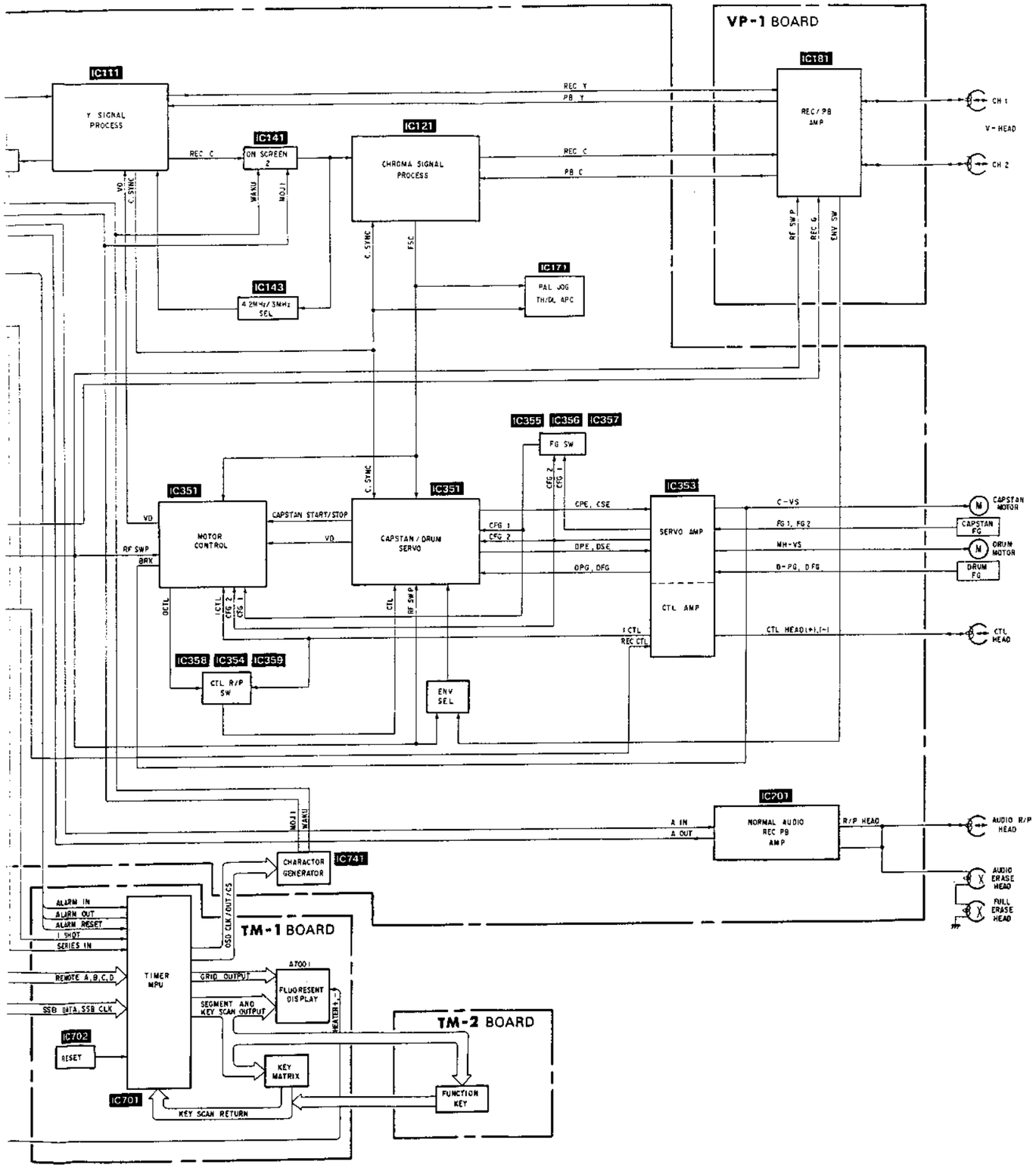
3-1. CIRCUIT BOARD LOCATIONS



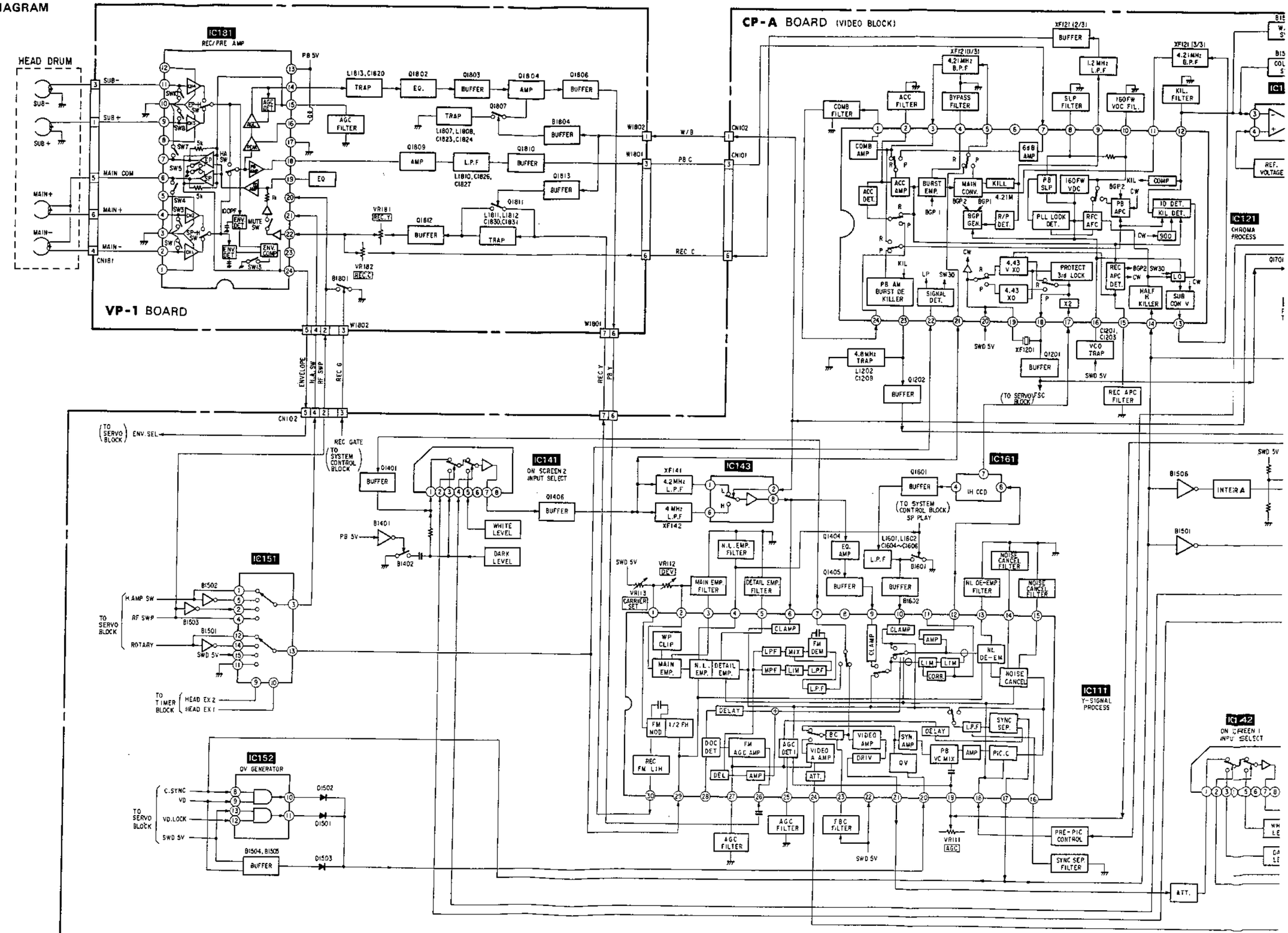
Note: CP-1 board contains VD-A, SY-A, SV-A, AD-A and TM-A boards.

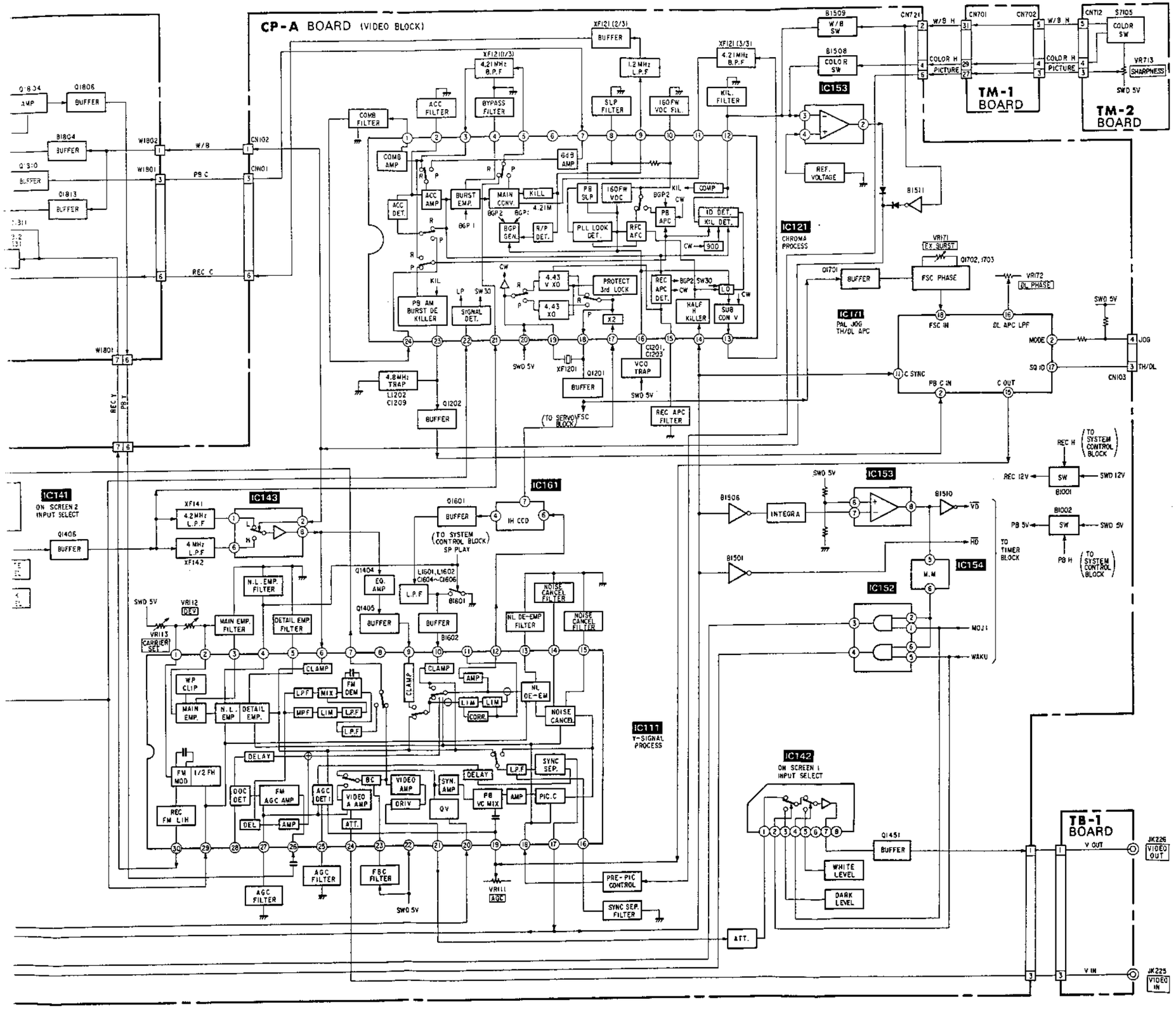
3-2. OVER ALL BLOCK DIAGRAM



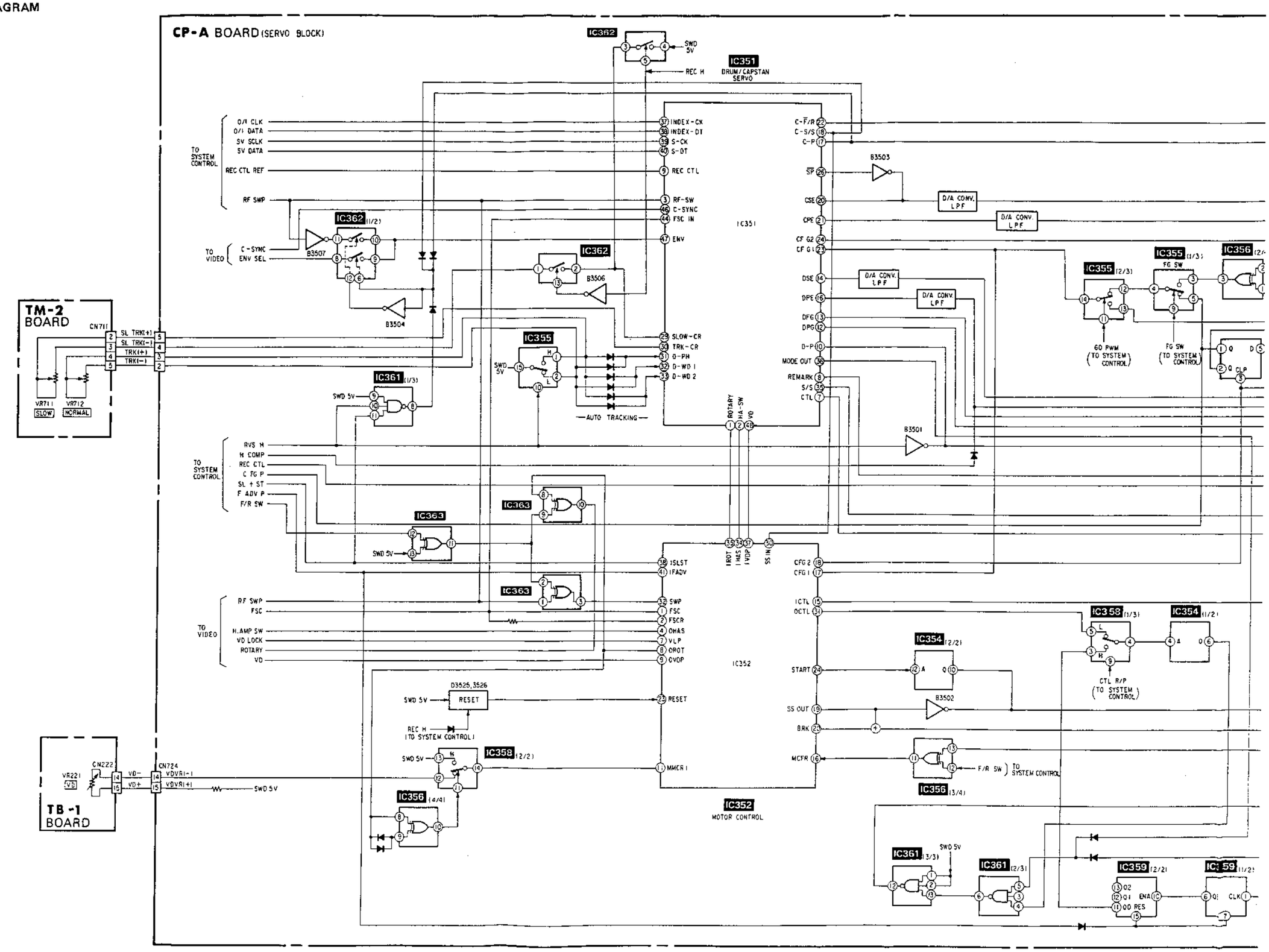

VP-1 BOARD
IC111
Y SIGNAL PROCESS
IC141
ON SCREEN 2
IC121
CHROMA SIGNAL PROCESS
IC143
4.2MHz/3MHz SEL
IC171
PAL JOG TH/DA APC
IC181
REC/PB AMP
CH 1
V-HEAD
CH 2
REC Y
PB Y
REC C
PB C
RF SWP
REC 6
ENV SW
VD
C. SYNC
WAKU
MOJI
FSC
IC355 IC356 IC357
FG SW
CFG 2
CFG 1
IC351
MOTOR CONTROL
CAPSTAN START/STOP
RF SWP
ARX
CAPSTAN / DRUM SERVO
CPE, CSE
CFG 1
CFG 2
DPE, DSE
DPG, DFG
IC353
SERVO AMP
CTL AMP
C-VS
FG1, FG2
MH-VS
D-PG, D FG
CAPSTAN MOTOR
CAPSTAN FG
DRUM MOTOR
DRUM FG
CTL
REC CTL
CTL HEAD(+), (-)
CTL HEAD
OCTL
ICTL
IC358 IC354 IC359
CTL R/P SW
ENV SEL
IC201
NORMAL AUDIO REC PB AMP
A IN
A OUT
R/P HEAD
AUDIO R/P HEAD
AUDIO ERASE HEAD
FULL ERASE HEAD
IC741
CHARACTOR GENERATOR
OSD CLK/OUT/CS
TM-1 BOARD
ALARM IN
ALARM OUT
ALARM RESET
1 SHOT
SERIES IN
REMOTE A,B,C,D
SSB DATA, SSB CLK
IC701
TIMER MPU
GRID OUTPUT
SEGMENT AND KEY SCAN OUTPUT
A7001
FLUORESENT DISPLAY
HEATER(+), (-)
IC702
RESET
KEY MATRIX
KEY SCAN RETURN
TM-2 BOARD
FUNCTION KEY

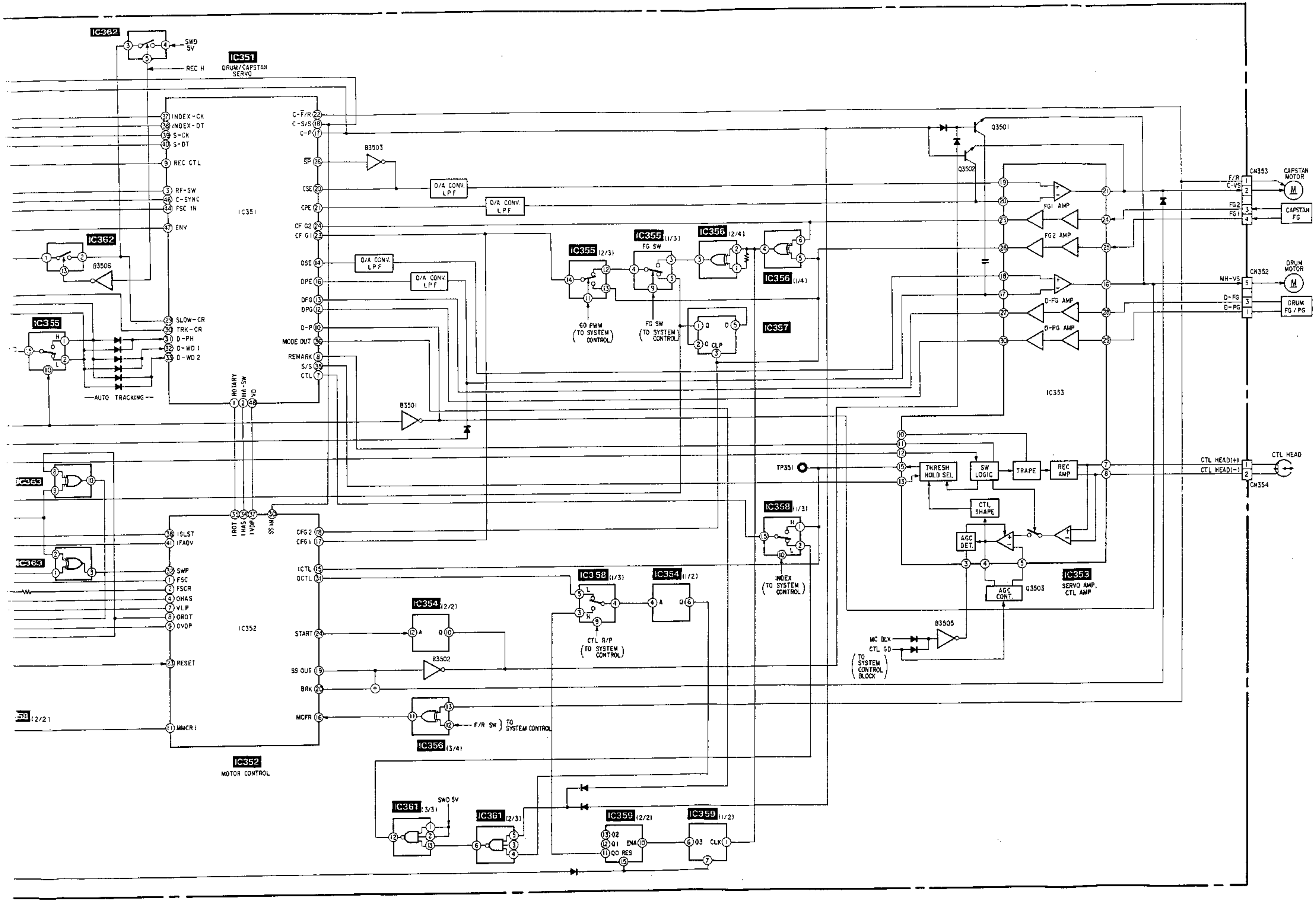
3-3. VIDEO BLOCK DIAGRAM



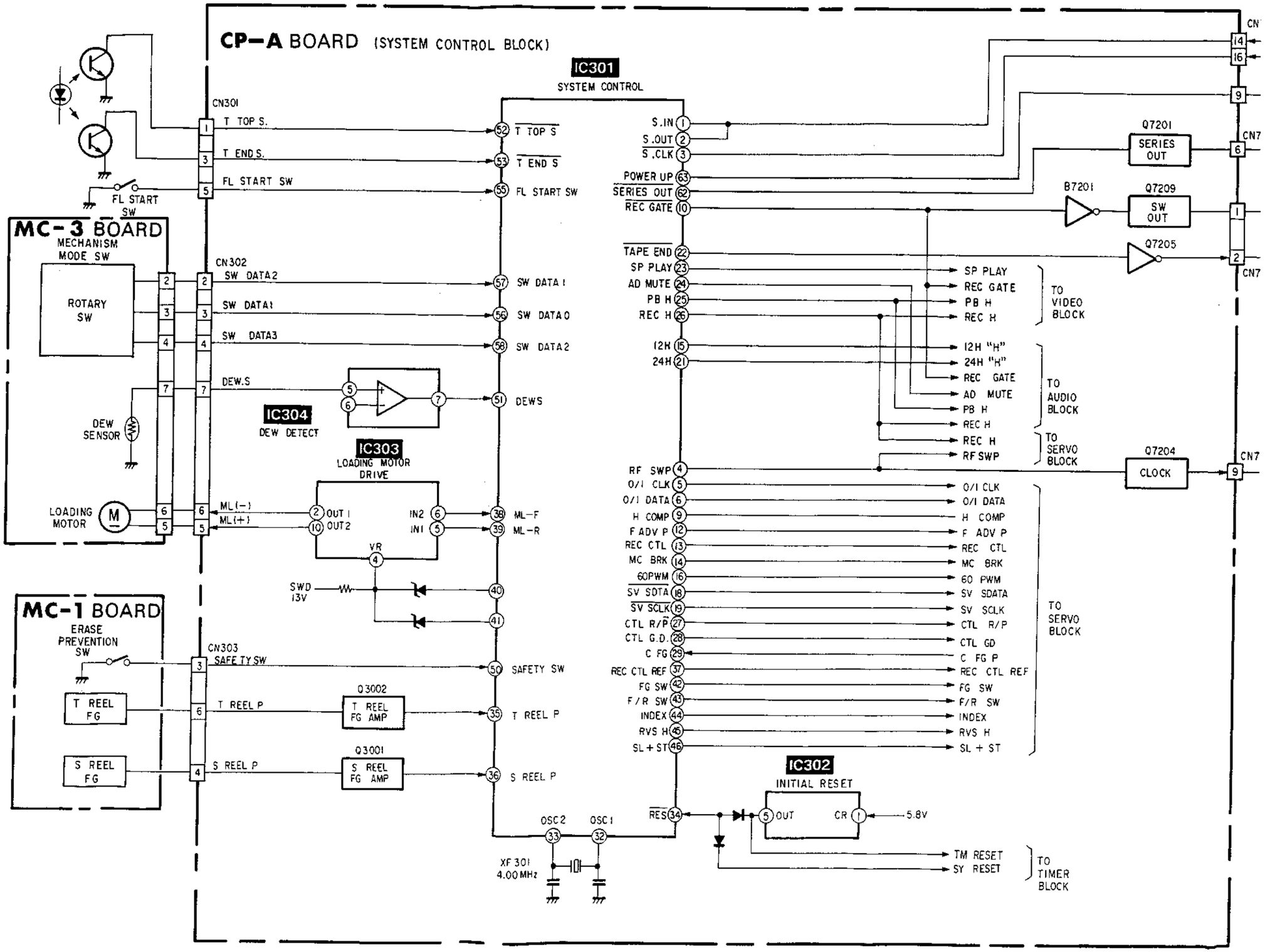

CP-A BOARD (VIDEO BLOCK)
IC121 CHROMA PROCESS
IC161
IC111 Y-SIGNAL PROCESS
IC141 ON SCREEN 2 INPUT SELECT
IC143
IC142 ON SCREEN 1 INPUT SELECT
IC153
IC154
IC152
IC171 PAL JOG TH/DL APC
TM-1 BOARD
TM-2 BOARD
TB-1 BOARD
COMB FILTER
ACC FILTER
BYPASS FILTER
SLP FILTER
160FW VOC FIL.
KIL. FILTER
COMB AMP
ACC AMP
BURST EMP.
MAIN CONV.
KILL
PB SLP
160FW VOC
COMP
ACC DET.
PB APC
ID DET.
KIL DET.
BGP GEN.
R/P DET.
PLL LOOK DET.
RFC AFC
4.43 V XO
4.43 X0
PROTECT 3rd LOCK
REC APC DET.
HALF H KILLER
SUB CON V
PB AM BURST DE KILLER
SIGNAL DET.
4.8MHz TRAP
BUFFER
REC APC FILTER
VCO TRAP
(TO SERVO) FSC BLOCK
REF. VOLTAGE
W/B SW
COLOR SW
W/B H
COLOR H
PICTURE
SHARPNESS
FSC PHASE
DL PHASE
EX. BURST
FSC IN
DL APC LPF
C SYNC
PB C IN
C OUT
MODE
SQ ID
JOG
TH/DL
(TO SYSTEM CONTROL BLOCK)
REC H
REC 12V
PB 5V
PB H
INTEGRA
M.M
MOJI
WAKU
N.L. EMP. FILTER
MAIN EMP. FILTER
DETAIL EMP FILTER
NOISE CANCEL FILTER
NL DE-EMP FILTER
CLAMP
WP CLIP
MAIN EMP.
N.L. EMP
DETAIL EMP.
FM DEM
LPF
MIX
MPF
LIM
CORR.
DELAY
FM MOD
1/2 FH
REC FM LIM
DOC DET
FM AGC AMP
AGC DET
VIDEO AMP
DRIV
SYN. AMP
QV
FB VC MIX
PIC.C
SYNC SEP.
DEL
ATT.
AGC FILTER
FBC FILTER
PRE-PIC CONTROL
SYNC SEP. FILTER
WHITE LEVEL
DARK LEVEL
VIDEO OUT
VIDEO IN
W/B
PB C
REC C
REC Y
PB Y
SW5V
SW12V
CARRIER SET
DEV
AGC

3-4. SERVO BLOCK DIAGRAM




IC362
IC351
DRUM/CAPSTAN SERVO
IC351
IC352
MOTOR CONTROL
IC353
SERVO AMP, CTL AMP
IC355
IC356
IC357
IC358
IC354
IC359
IC361
IC363
CN353
CN352
CN354
CAPSTAN MOTOR
CAPSTAN FG
DRUM MOTOR
DRUM FG/PG
CTL HEAD
D/A CONV. LPF
FG SW
THRESH HOLD SEL
SW LOGIC
TRAPE
REC AMP
CTL SHAPE
AGC DET.
AGC CONT.
FG1 AMP
FG2 AMP
D-FG AMP
D-PG AMP
AUTO TRACKING
TP351
Q3501
Q3502
Q3503
B3501
B3502
B3503
B3505
B3506
60 PWM (TO SYSTEM CONTROL)
FG SW (TO SYSTEM CONTROL)
INDEX (TO SYSTEM CONTROL)
CTL R/P (TO SYSTEM CONTROL)
F/R SW TO SYSTEM CONTROL
MC BLK
CTL GD
(TO SYSTEM CONTROL BLOCK)
SWD 5V
REC H

3-5. SYSTEM CONTROL BLOCK DIAGRAM



TROL BLOCK)

IC301
SYSTEM CONTROL

52 T TOP S
53 T END S
55 FL START SW
57 SW DATA 1
56 SW DATA 0
58 SW DATA 2
51 DEWS
38 ML-F
39 ML-R
40
41
50 SAFETY SW
35 T REEL P
36 S REEL P

S.IN 1
S.OUT 2
S.CLK 3
POWER UP 63
SERIES OUT 62
REC GATE 10
TAPE END 22
SP PLAY 23
AD MUTE 24
PB H 25
REC H 26
12H 15
24H 21
RF SWP 4
0/I CLK 5
0/I DATA 6
H COMP 9
F ADV P 12
REC CTL 13
MC BRK 14
60PWM 16
SV SDTA 18
SV SCLK 19
CTL R/P 27
CTL G.D. 28
C FG 29
REC CTL REF 37
FG SW 42
F/R SW 43
INDEX 44
RVS H 45
SL+ST 46

SP PLAY
REC GATE
PB H
REC H
} TO VIDEO BLOCK

12H "H"
24H "H"
REC GATE
AD MUTE
PB H
REC H
} TO AUDIO BLOCK

REC H
RF SWP
} TO SERVO BLOCK

0/I CLK
0/I DATA
H COMP
F ADV P
REC CTL
MC BRK
60 PWM
SV SDATA
SV SCLK
CTL R/P
CTL GD
C FG P
REC CTL REF
FG SW
F/R SW
INDEX
RVS H
SL + ST
} TO SERVO BLOCK

IC302
INITIAL RESET
RES 34
5 OUT
CR 1
5.8V

TM RESET
SY RESET
} TO TIMER BLOCK

OSC2 33
OSC1 32
XF 301
4.00 MHz

Q7201 SERIES OUT
B7201
Q7209 SW OUT
Q7205
Q7204 CLOCK

CN721
14 SSB I/O
16 SSB CLK
} TO TIMER
9 POWER UP
} TO POWER

CN723
6
1
CN724
2
CN723
9

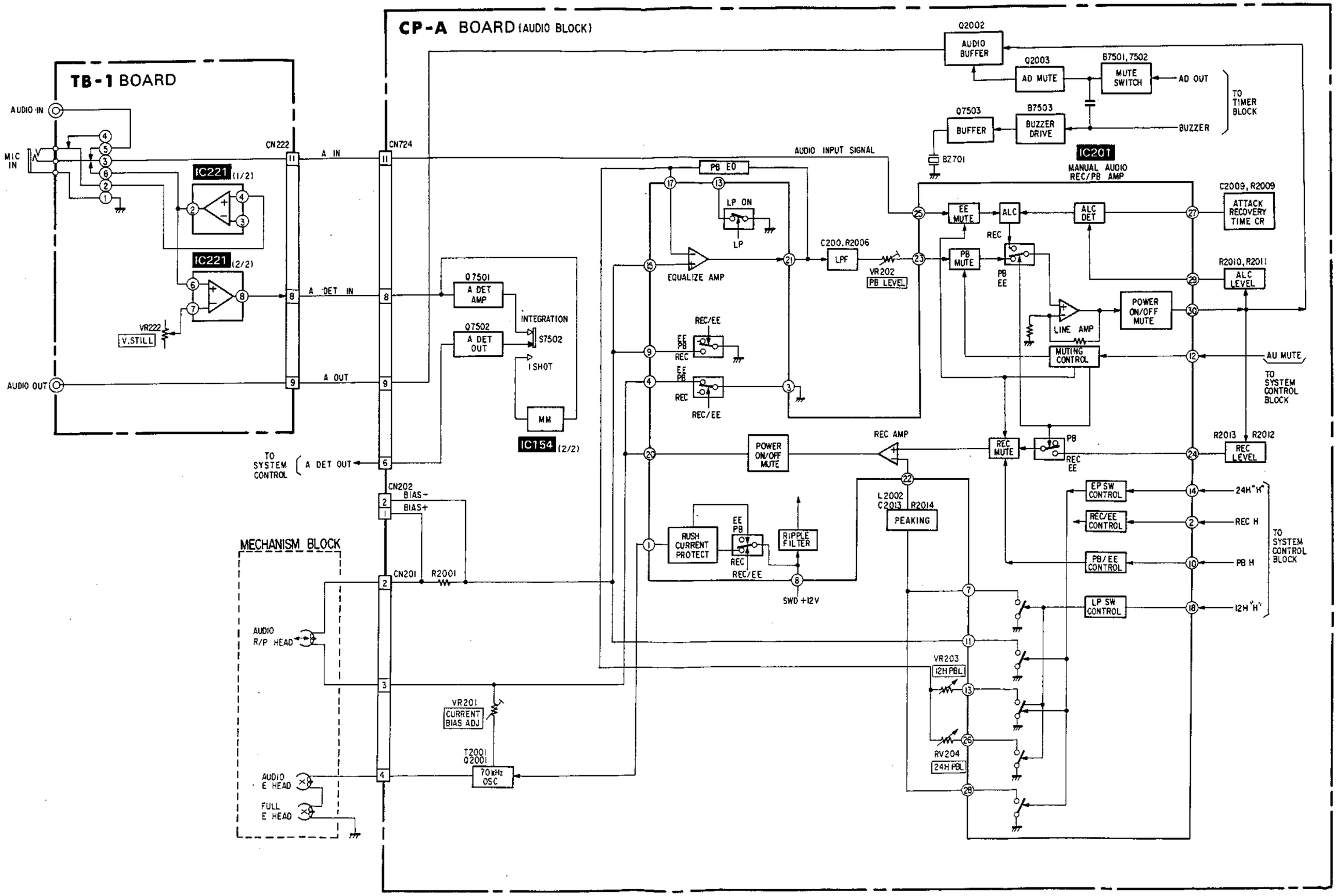
TB-1 BOARD

6	SERIES OUT	
7	SERIES IN	TO TIMER
8	I SHOT	
1	SW OUT	
2	TAPE END	
3	ALARM RESET	TO TIMER
4	ALARM OUT	
5	ALARM IN	TO TIMER
6	A DET OUT	TO AUDIO
9	CLOCK	
12	REMOTE	TO TIMER

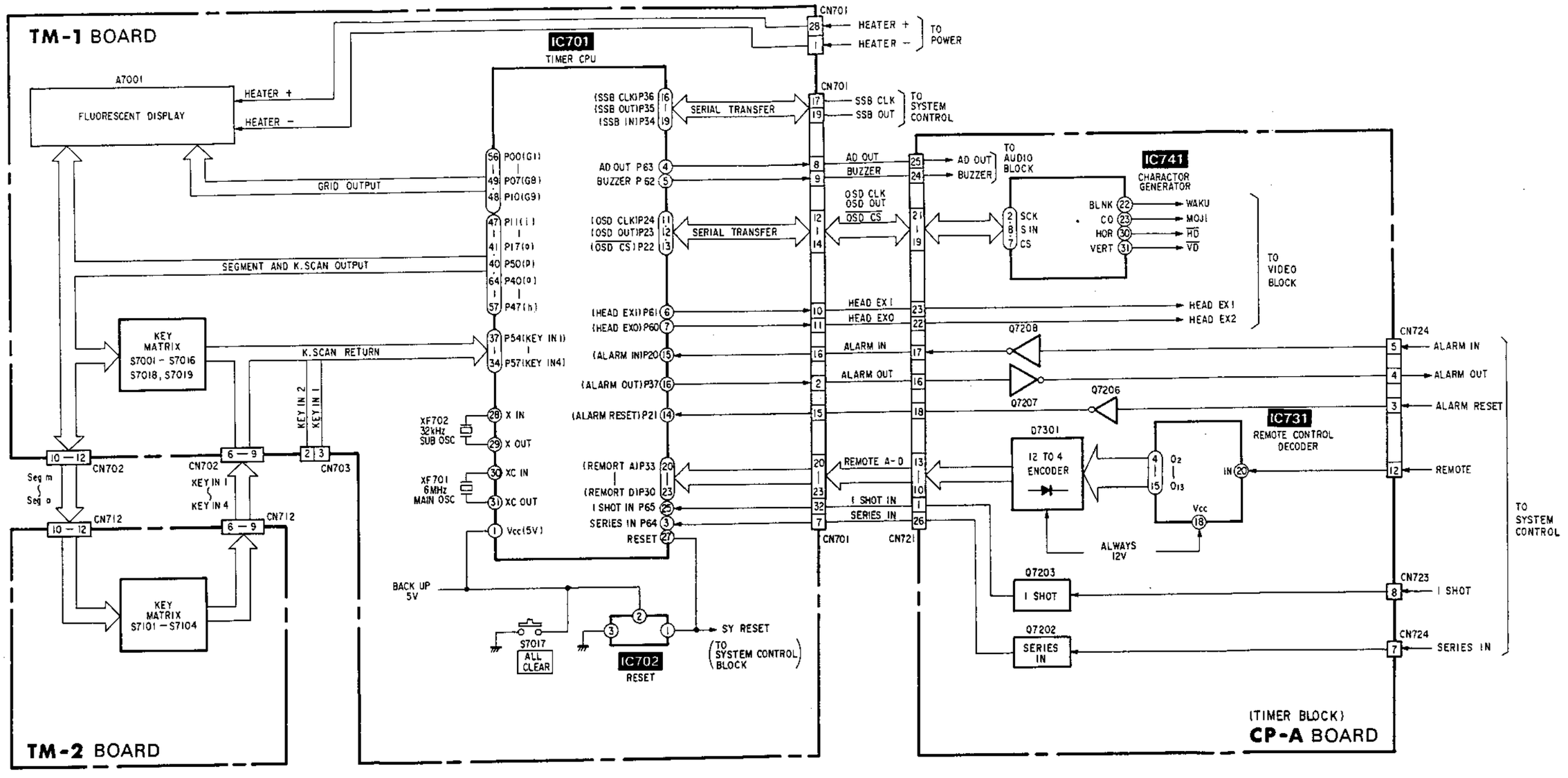
16
NOP
SW OUT
COM
OUT
COM
IN
} SERIES
I SHOT
COM
CLOCK
TAPE END
COM
RESET
OUT
COM
IN
} ALARM
SENSOR DET

REMOTE

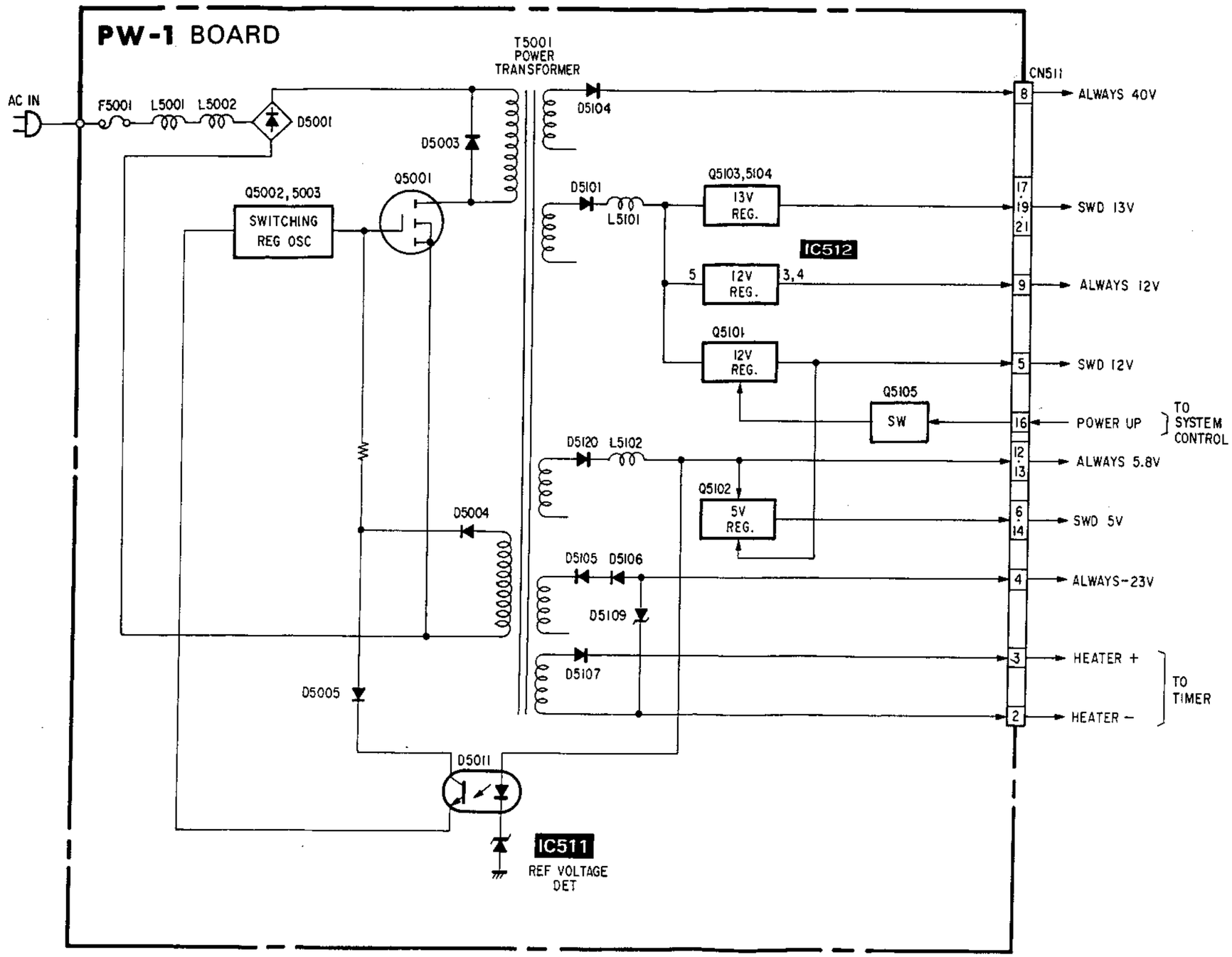
3-6. AUDIO BLOCK DIAGRAM



3-7. TIMER BLOCK DIAGRAM

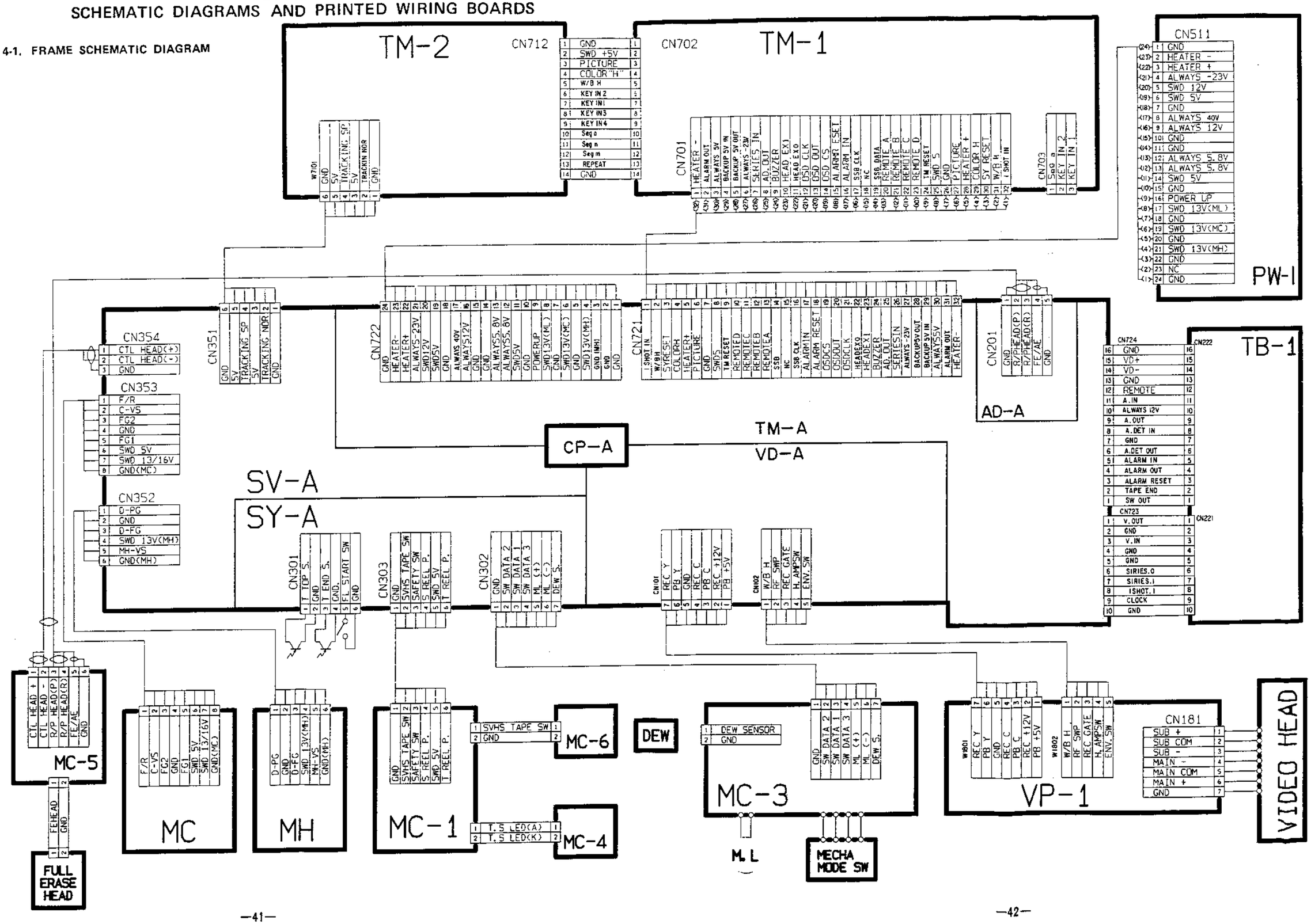


3-8. POWER SUPPLY BLOCK DIAGRAM



SECTION 4
SCHEMATIC DIAGRAMS AND PRINTED WIRING BOARDS

4-1. FRAME SCHEMATIC DIAGRAM



THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this , the necessary note is printed in each block.)

- **For printed wiring boards.**
- O— : indicated a lead wire mounted on the component side.
- **For schematic diagrams.**
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minuts side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/4W unless otherwise noted.
  Chip resistor are 1/10W unless otherwise noted.
  kΩ : 1000Ω , MΩ : 1000kΩ .
- All capacitors are in μF unless otherwise noted. pF: μμF.
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : panel designation.
- : adjustment for repeair.
- —— : B+ Line.
- – – – : B– Line.
- Circled numbers refer to waveforms.
- Voltages are dc between ground and measurement points.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
  no mark: E-E/PLAY/REC
  ( ): REC
  [ ] : PLAY
  ⟨ ⟩: E-E
- Voltages are taken with a VOM (Input impedance 10MΩ).
- Voltage variations may be noted due to normal production tolerances.

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

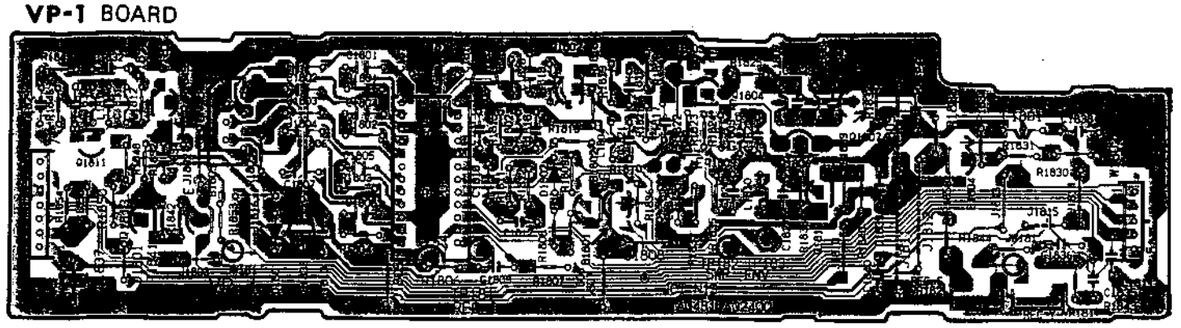
When indicating parts by reference number, please include the board name.

1 2 3 4 5 6 7 8 9 10 11

A B C D E F G H I J

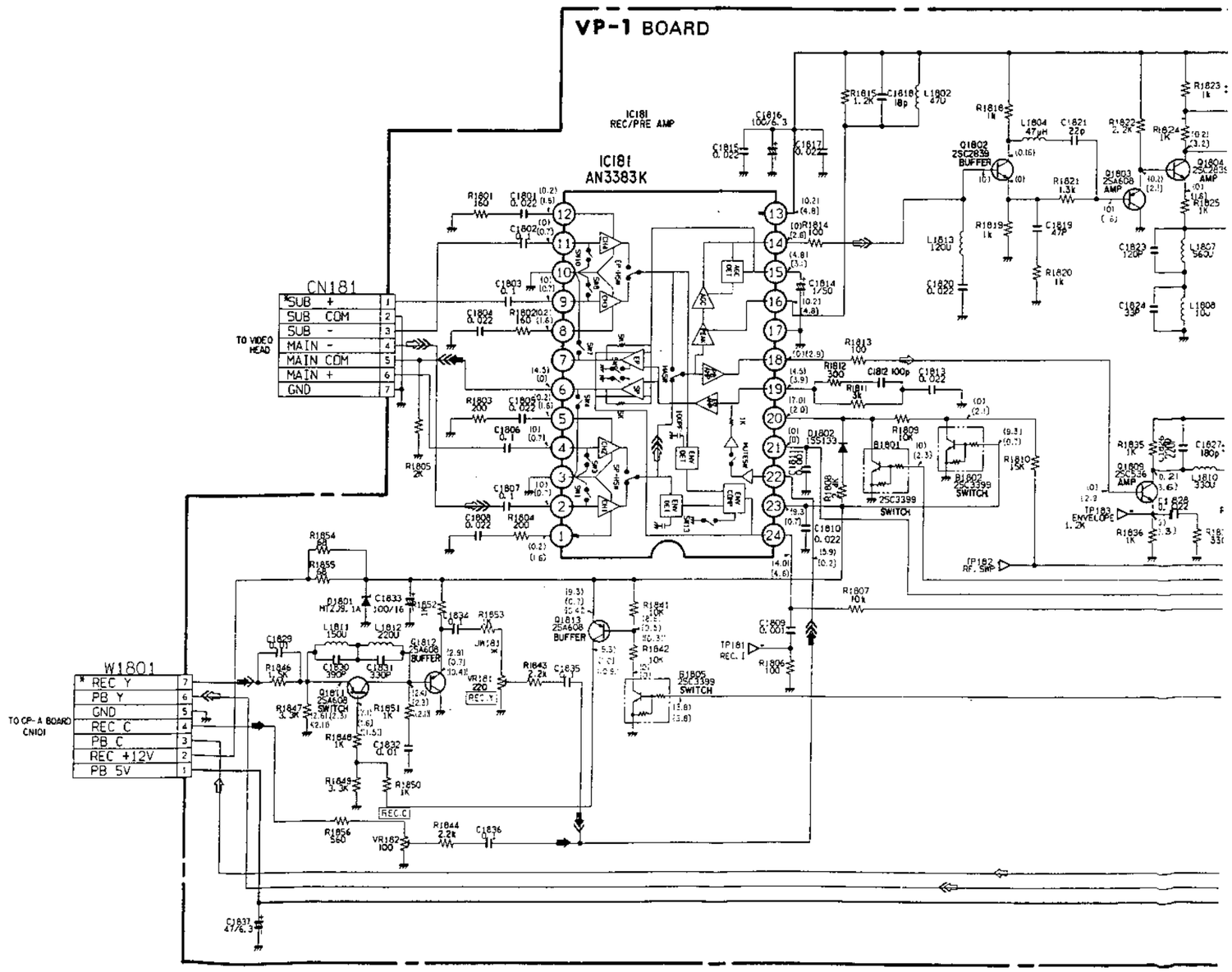
VP-1 PRINTED WIRING BOARD

VP-1 BOARD

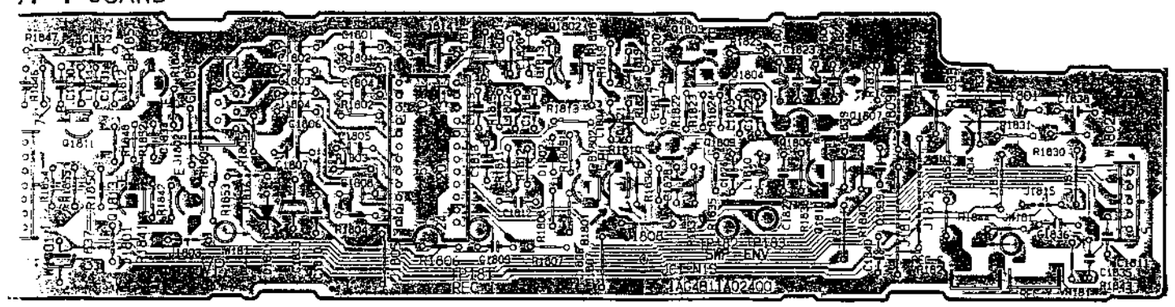


VP-1 SCHEMATIC DIAGRAM

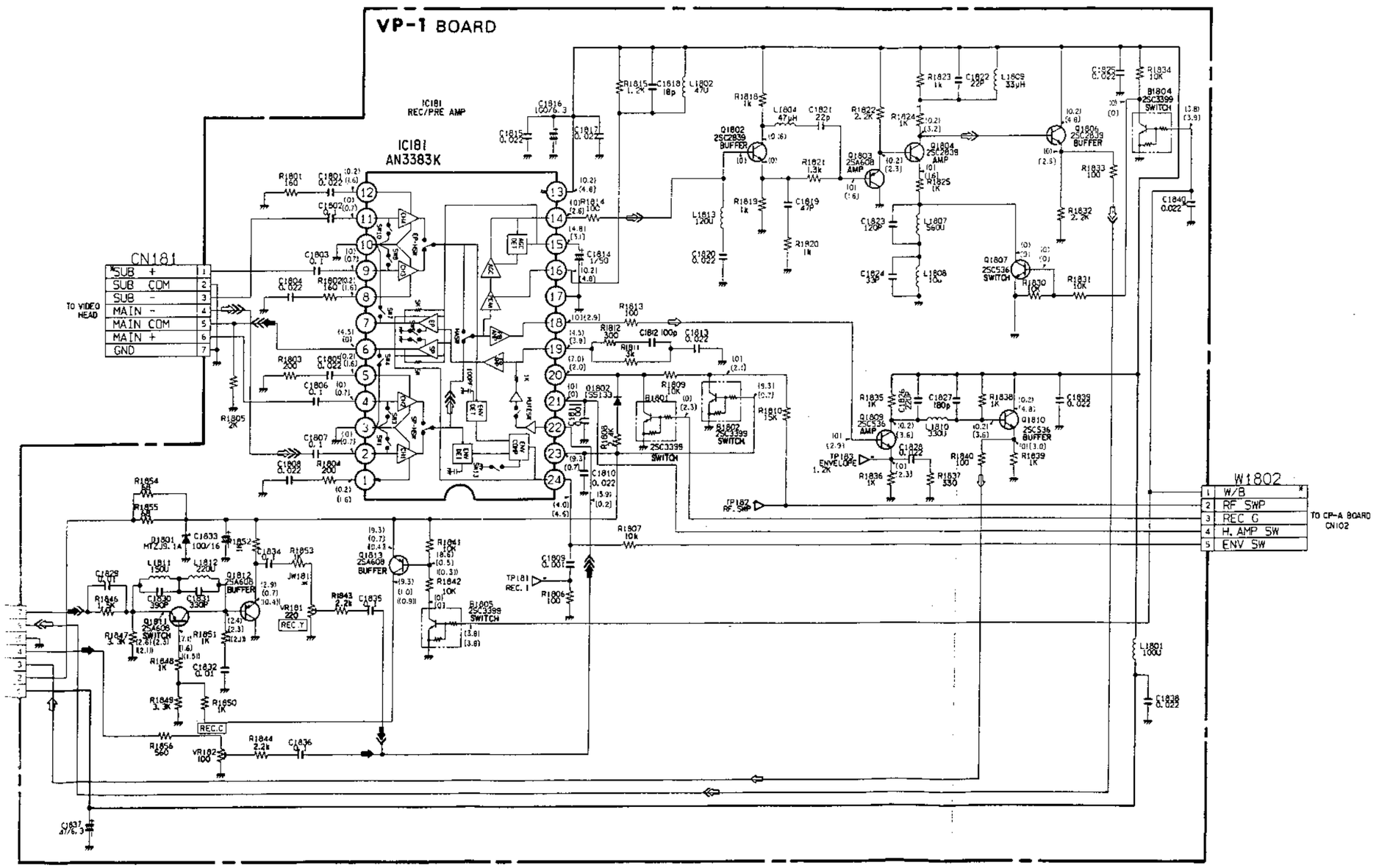
VP-1 BOARD



/P-1 BOARD



VP-1 BOARD

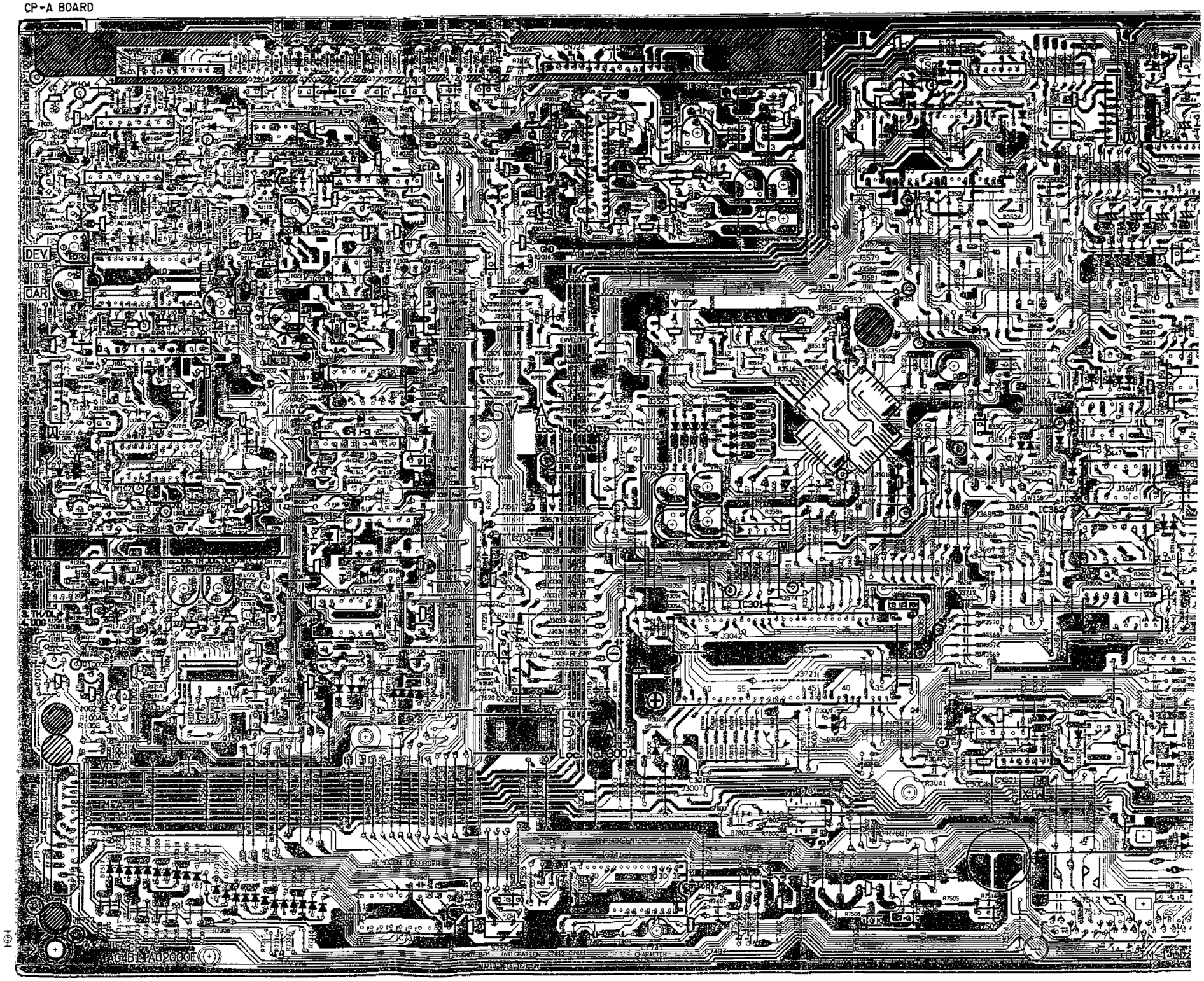


• Signal path

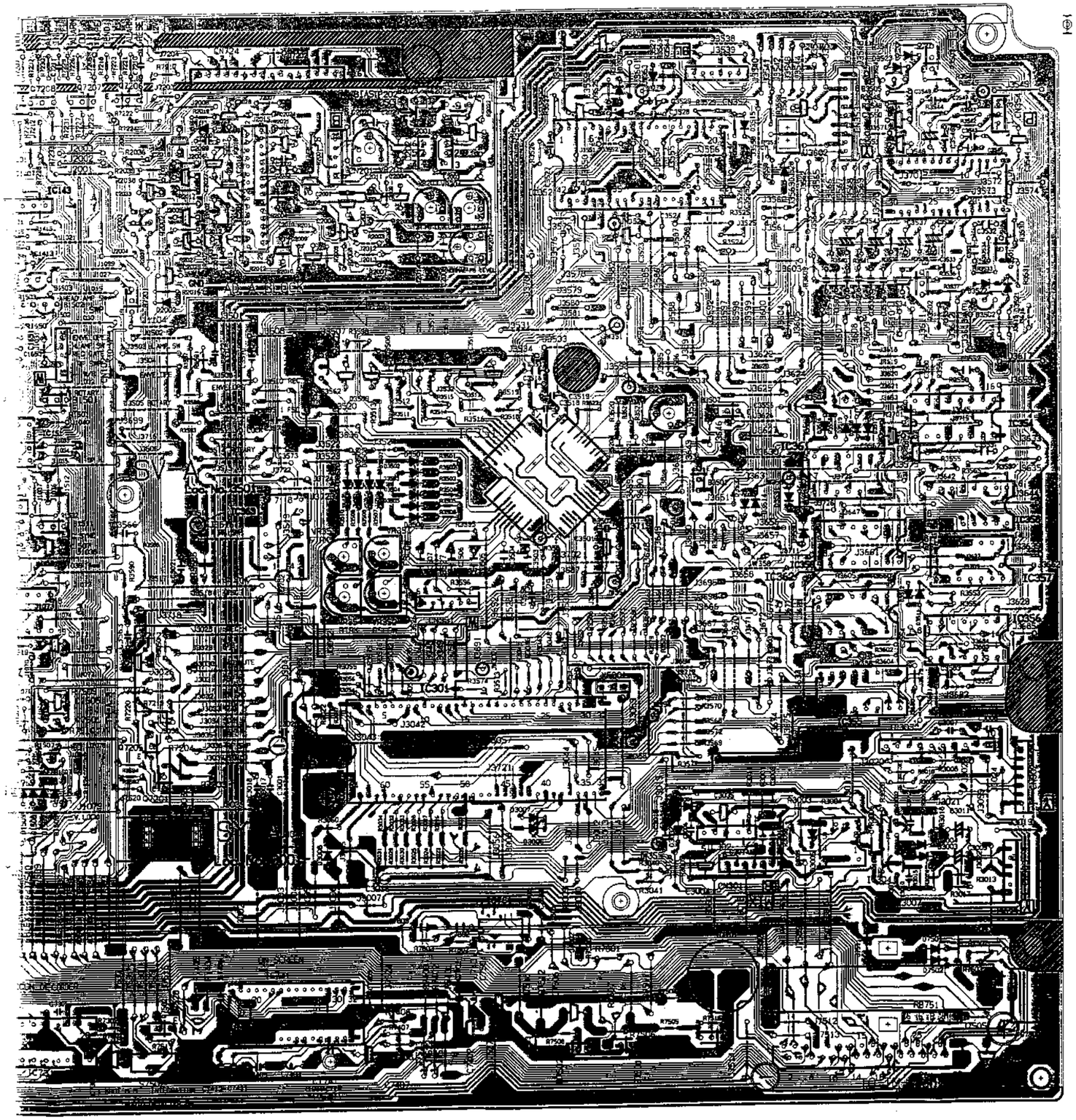
	VIDEO SIGNAL		
	CHROMA	Y	Y/CHROMA
REC	➡	➡	➡
PB	⇨	⇨	⇨

CP-A PRINTED WIRING BOARD

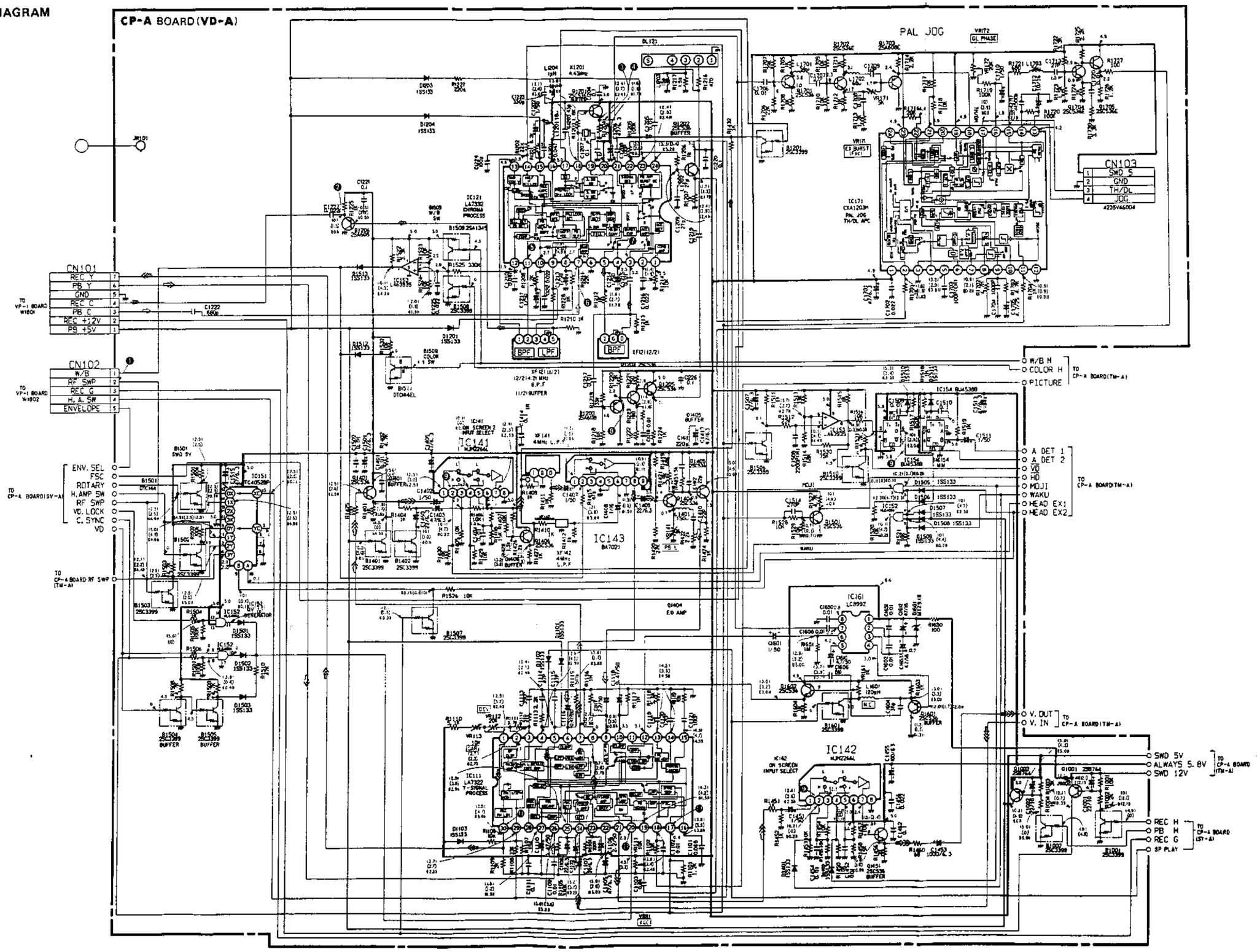
CP-A BOARD



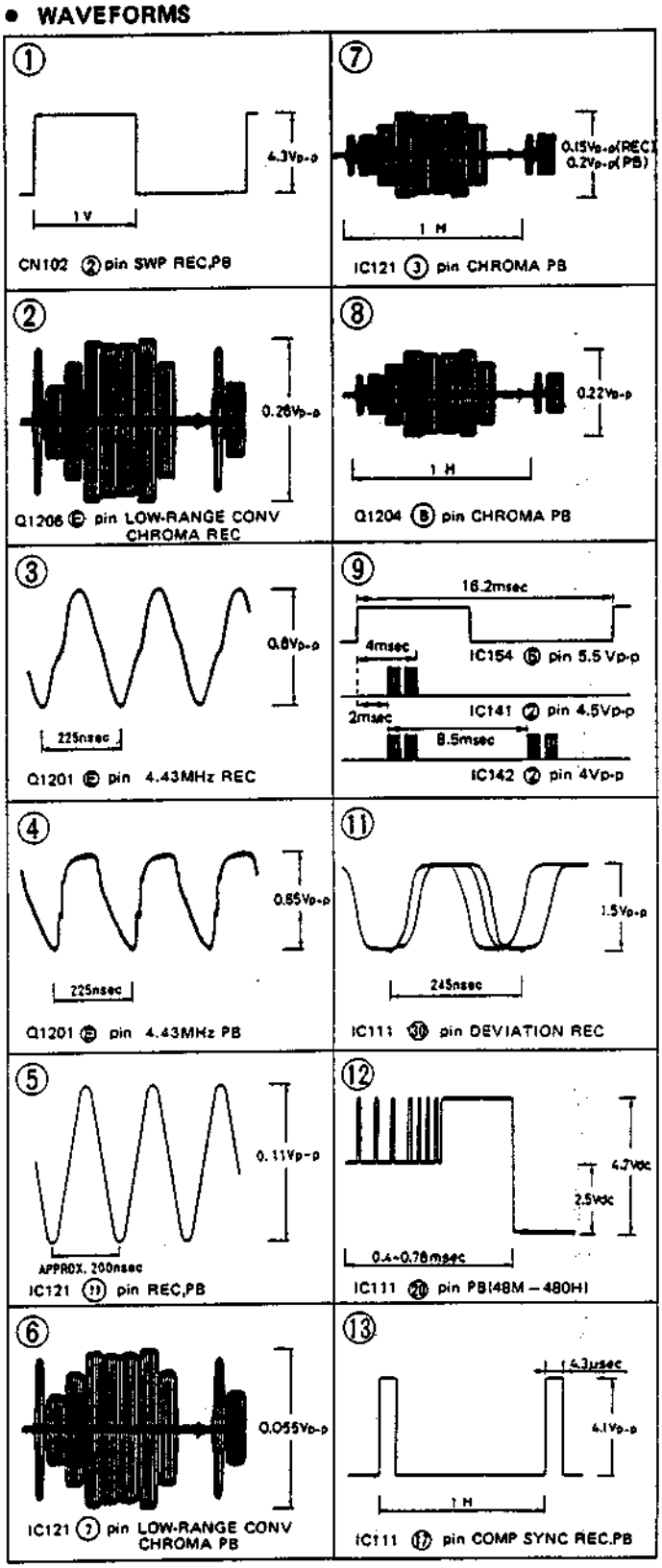
8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23



VD-A SCHEMATIC DIAGRAM



• WAVEFORMS

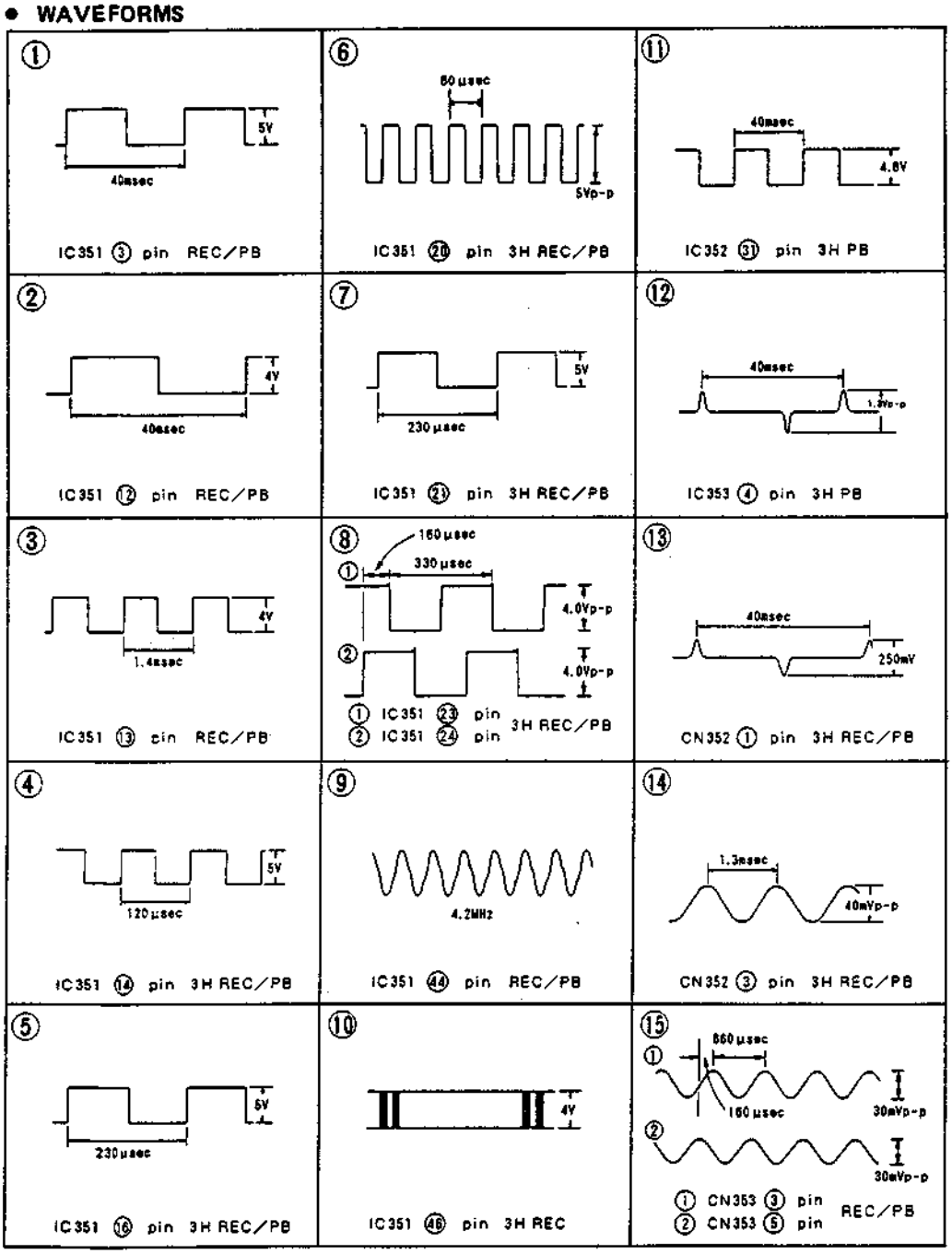


• Signal path

	VIDEO SIGNAL		
	CHROMA	Y	Y/CHROMA
REC	⇨	⇨	⇨
PB	⇨	⇨	⇨

SV-A SCHEMATIC DIAGRAM

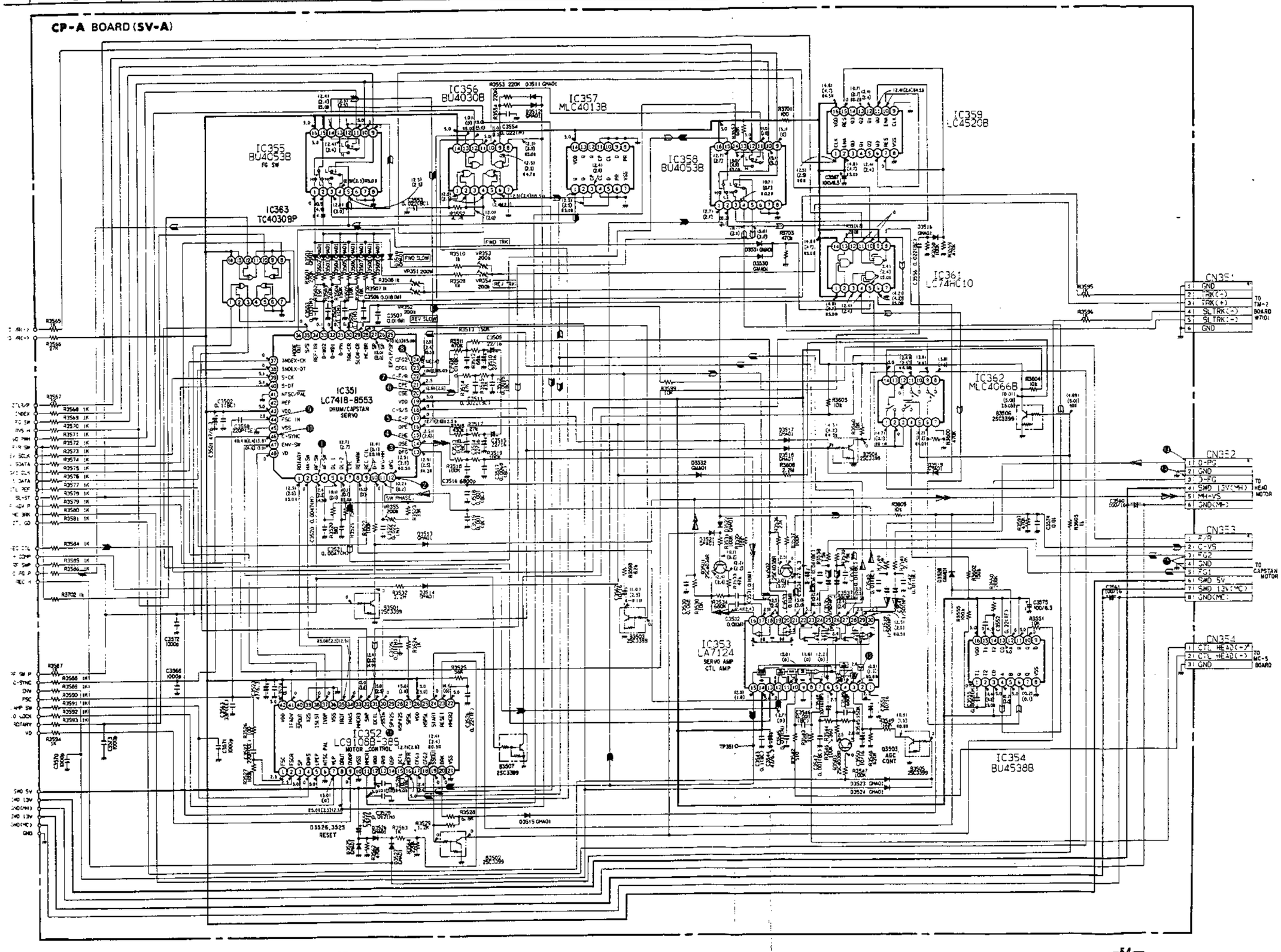
• WAVEFORMS



• Signal path

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

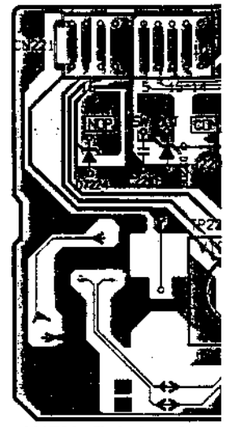
CP-A BOARD (SV-A)



SY-A SCHEMATIC DIAGRAM

TB-1 PRINTED WIRING BO

TB-1 BOARD



TB-1 SCHEMATIC DIAGRA

TB-1 BOARD

CP-A BOARD (SY-A)

IC301 LC66516B-
SYSTEM CONTROL

IC304
LA6393D
DEW DETECT

IC303
LOADING MOTOR
DRIVE

IC303
LB1641

IC302
INITIAL RESET
IC302
M51953A

CN301
T TOP S.
GND
T END S.
GND
F START SW
GND

CN302
GND
SW DATA2
SW DATA1
SW DATA3
ML(+)
ML(-)
DEW S.

CN303
GND
SVHS TAPE SW
SAFETY SW
S REEL P
SW 5V
T REEL P

TO MC-3 BOARD

TO MC-1 BOARD

ALWAYS 5.8V
SW0 13V
SW0 5V
POWER UP
GND

TO CP-A BOARD(TM-A)

S REEL FG AMP

T REEL FG AMP

XF301
CST 4.90MGW

SSB DATA
SSB CLK
SY RESET
TM RESET

TO CP-A BOARD(TM-A)

REC H
PB H
SP PLAY
REC GATE

TO CP-A BOARD(VD-A)

REC GATE
24H
TAPE END
AD MUTE
PB H
REC H
12H
SERIES OUT

TO CP-A BOARD(TM-A)

REC H
CTL R/P
INDEX
FG SW
RVS H
60PWM
F/R SW
5V SCLK
5V SDATA
D/I CLK
D/I DATA
REC CTL REF
SL+ST
F ADV P
MC BRK
CTL GD
REC CTL
H COMP
RF SW P
C FG P

TO CP-A BOARD(SY-A)

TO CP-A BOARD CN723

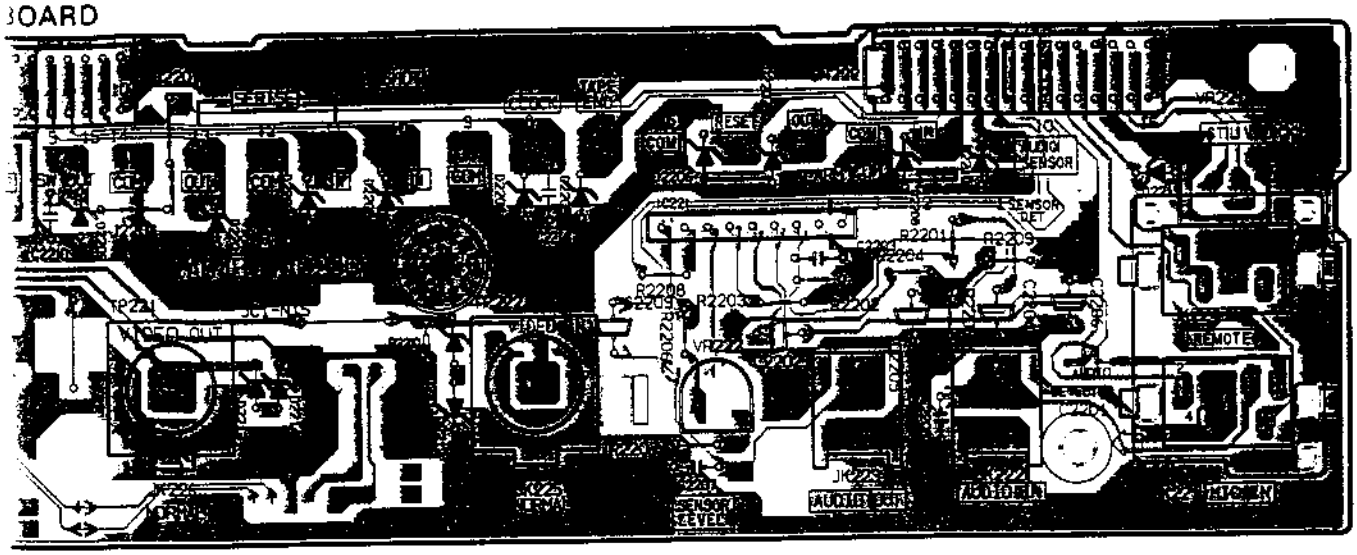
V OUT
GND
V IN
GND
GND
SERIES O
SERIES I

• Signal path

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

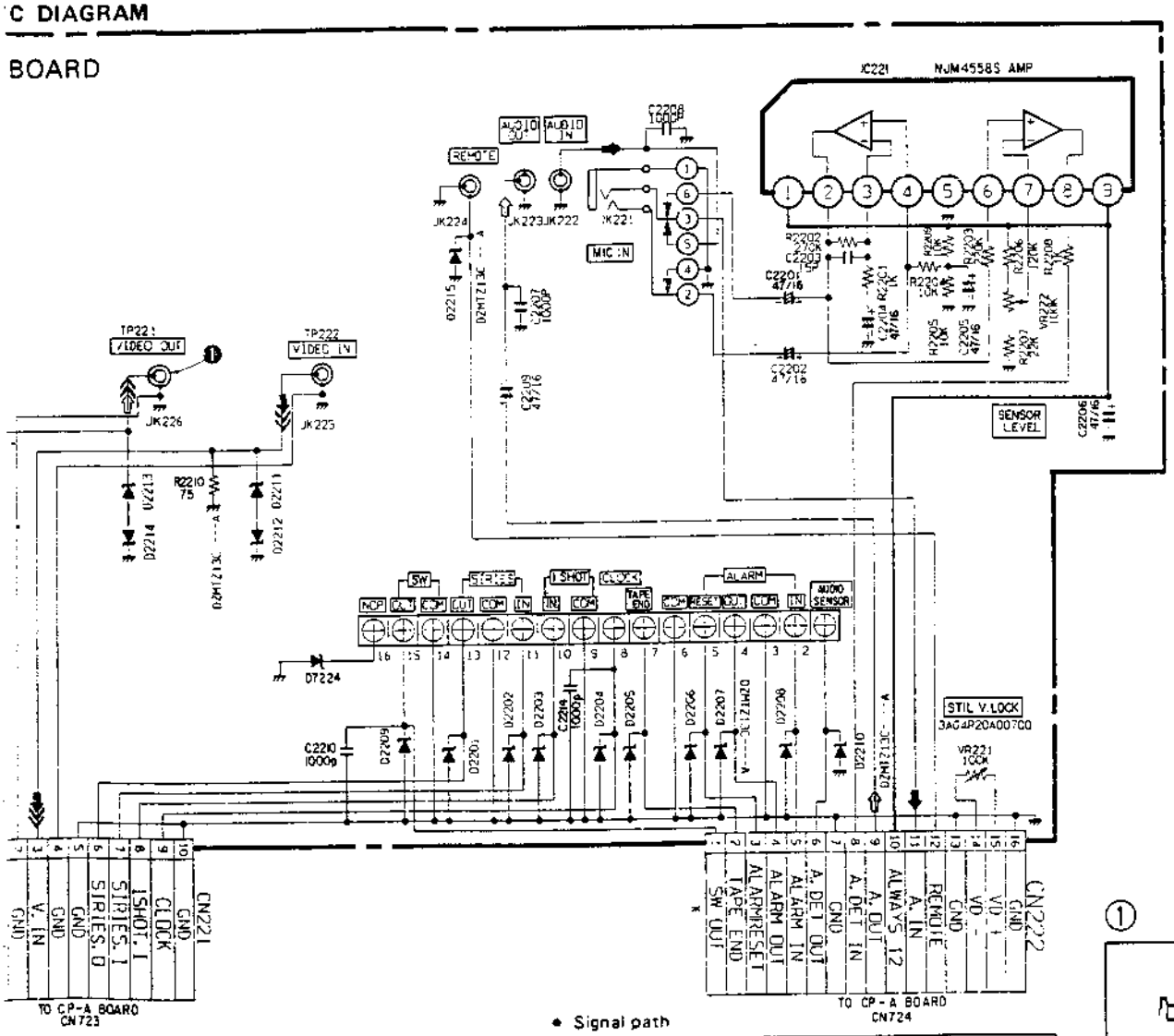
WIRING BOARD

BOARD



C DIAGRAM

BOARD



• Signal path

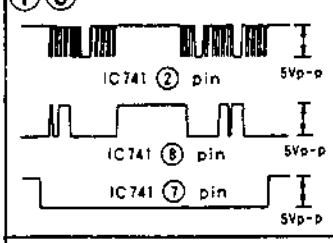
	VIDEO Signal			AUDIO Signal
	CHROMA	Y	Y/CHROMA	
REC			➡	➡
PB			⇨	⇨

①

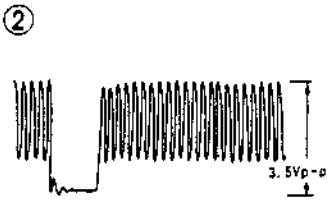
TP221 V.OUT REC. PB

• WAVEFORMS

①③

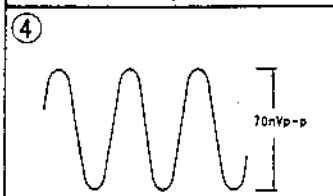


②



IC741 ⑤ pin

④

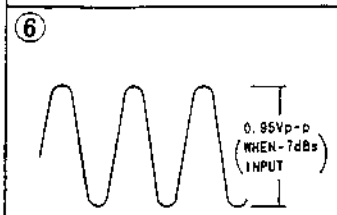


IC201 ⑨ pin (GND)
CN201 ② pin

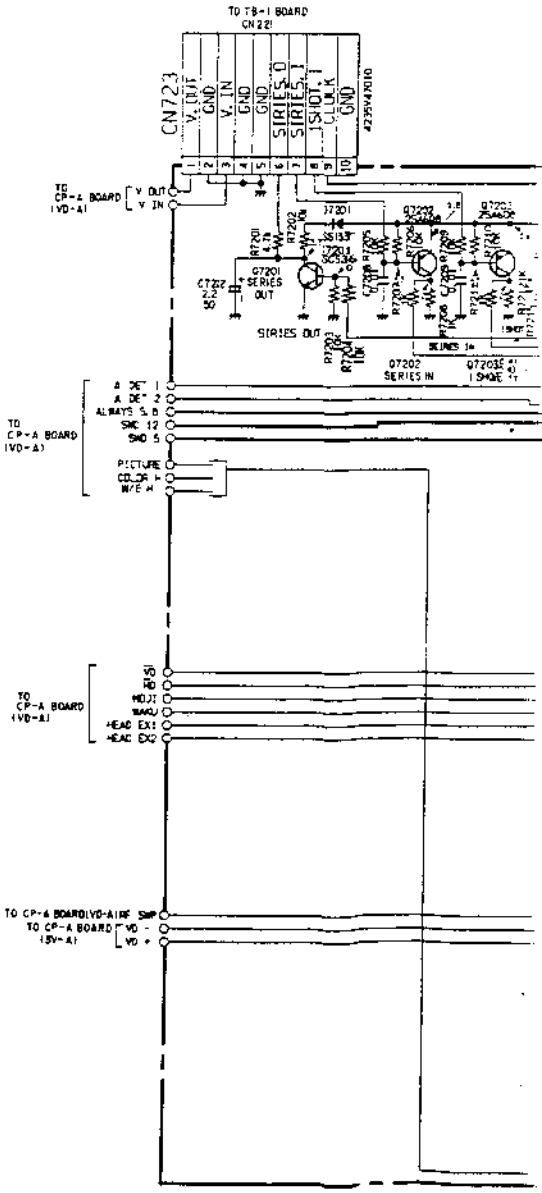
⑤

Q2001 Ⓑ 70kHZ OSC

⑥



Q2002 Ⓔ OUTPUT WAVE REC/PB



CP-A BOARD (AD-A, TM-A)

AD-A

TM-A

CN201
GND 1
R/P HEAD 2
R/P HEAD 3
FF, AE 4
GND 5
4235V46005
TO MC-5 BOARD

CN724
SW OUT 1
TAPE END 2
ALARMRESET 3
ALARM OUT 4
ALARM IN 5
A. DET OUT 6
GND 7
A. DET IN 8
A. OUT 9
ALWAYS 12 10
A. IN 11
REMOTE 12
GND 13
VD - 14
VD + 15
GND 16
4235V47016
TO TB-1 BOARD CN222

CN722
24 GND
23 HEATER -
22 HEATER +
21 ALWAYS -23V
20 SWD +12V
19 SWD +5V
18 GND
17 ALWAYS 40V
16 ALWAYS 12V
15 GND
14 GND
13 ALWAYS 5.8
12 ALWAYS 5.8
11 SWD +5V
10 GND
9 POWER UP
8 SWD 13V(ML)
7 GND
6 SWD 13V(MC)
5 GND
4 SWD 13V(MH)
3 GND (MM)
2 GND
1 GND
4235V49624
TO PW-1 BOARD CN511

CN721
32 HEATER -
31 ALARM OUT
30 ALWAYS 5
29 BACKUPS IN
28 BACKUPS OUT
27 ALWAYS -23
26 SERIES IN
25 AD OUT
24 BUZZER
23 HEAD EX1
22 HEAD EX2
21 OSD CLK
20 OSD OUT
19 OSD CS
18 ALARMRESET
17 ALARM IN
16 SSB CLK
15 SSB DATA
14 SSB DATA
13 REMOTE A
12 REMOTE B
11 REMOTE C
10 REMOTE D
9 TM RESET
8 SWD 5V
7 GND
6 PICTURE
5 HEATER
4 COLOR H
3 SY RESET
2 W/B H
1 I Shot IN
4235V49632
TO TM-1 BOARD CN701

IC731 LB1475
IC741 M50556-001SP
IC781 TC40118F
IC2001 LA7254 MAIN/SUB AUDIO REC/PB AMP

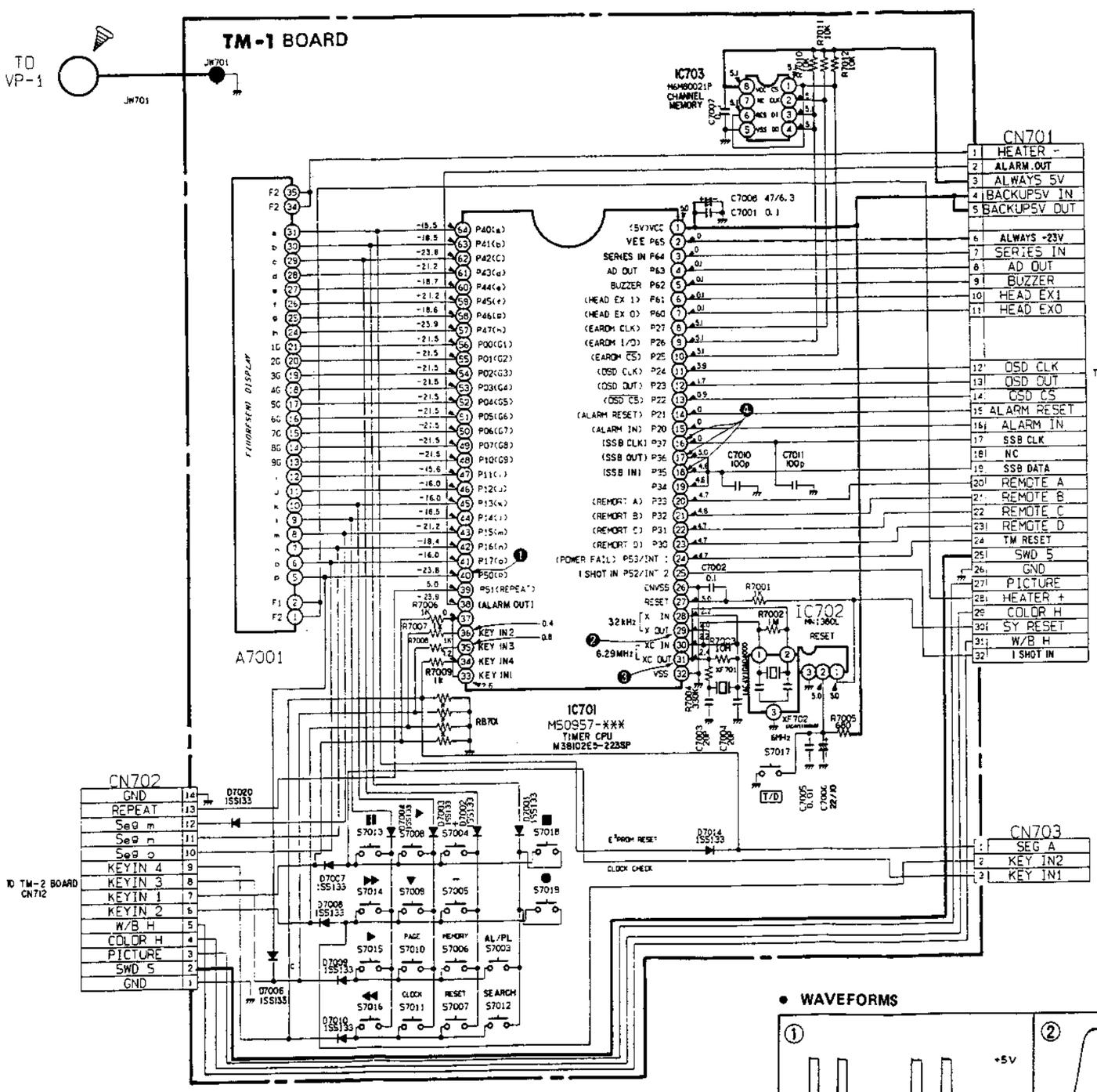
TO CP-A BOARD (5V-A)
TO CP-A BOARD (8V-A)
TO CP-A BOARD (5V-A)

• Signal path

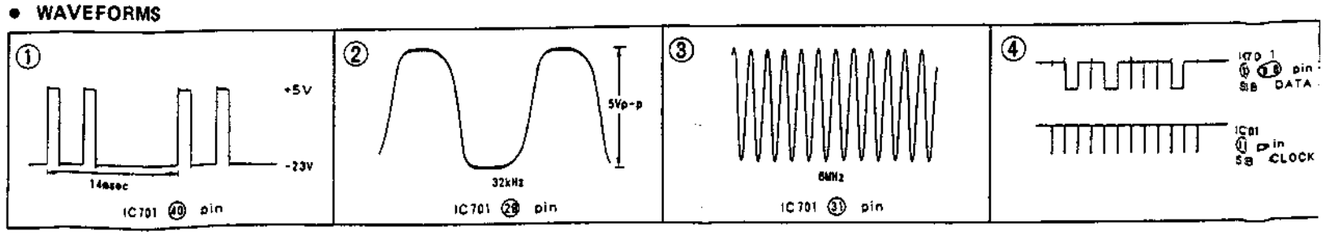
	AUDIO Signal
REC	➡
PB	⇨

TM-1 SCHEMATIC DIAGRAM

TM-2 SCHEMATIC DIAGRAM



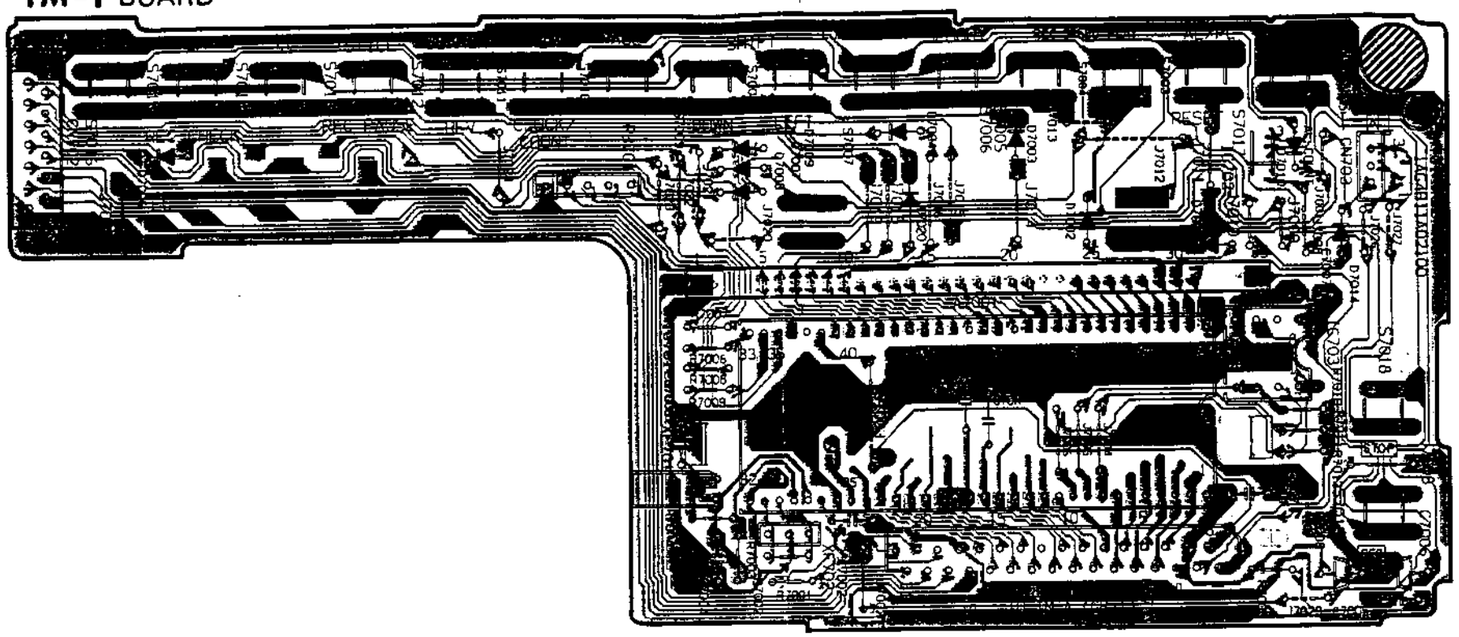
• WAVEFORMS



16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

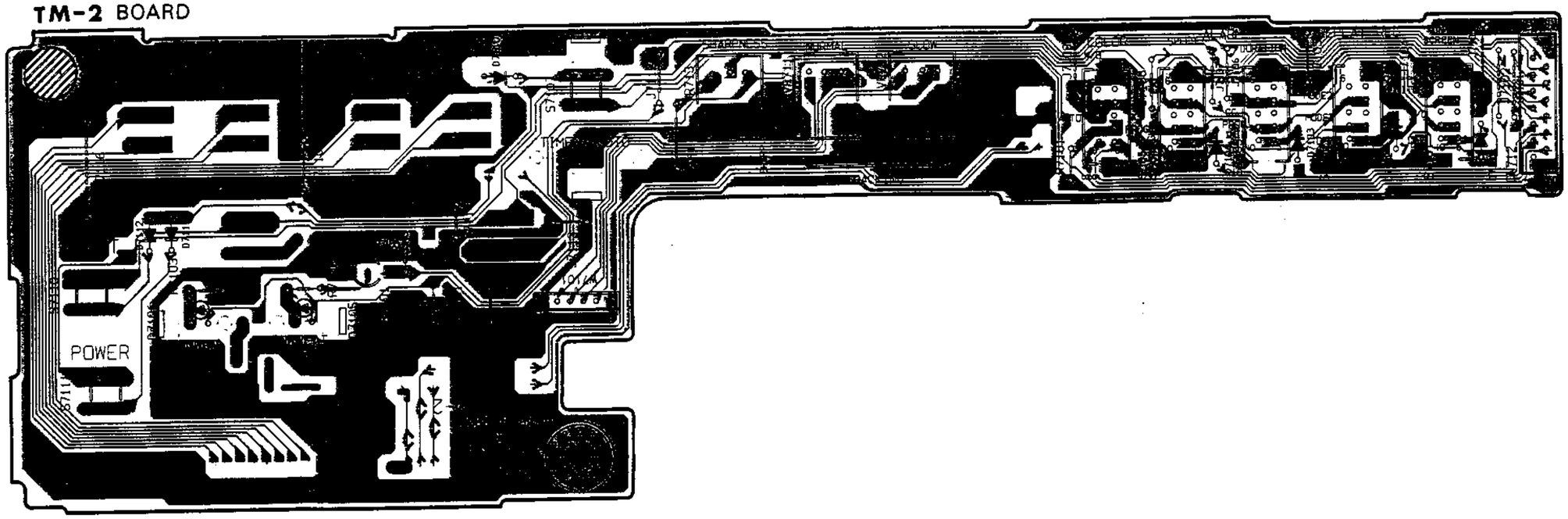
TM-1 PRINTED WIRING BOARD

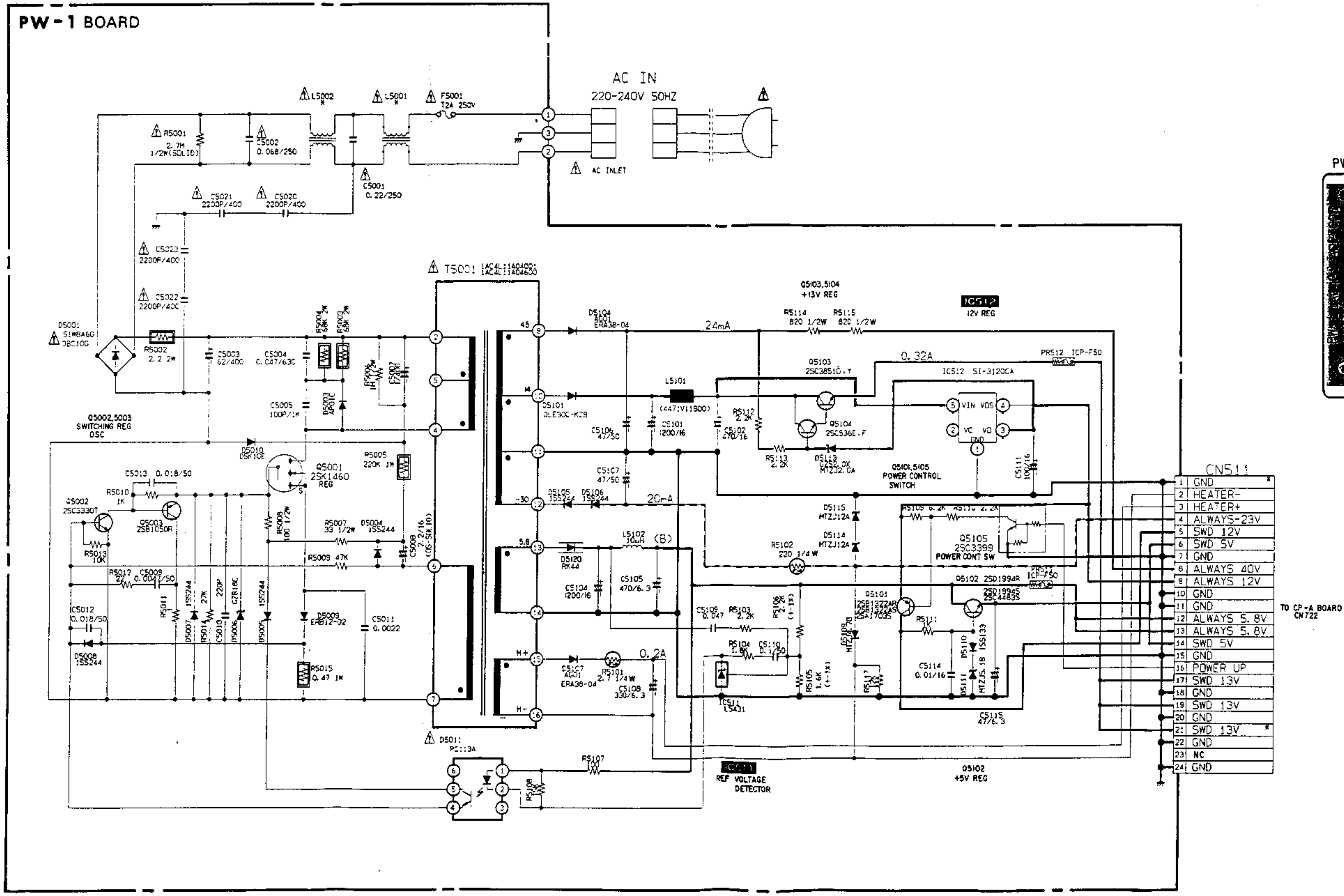
TM-1 BOARD

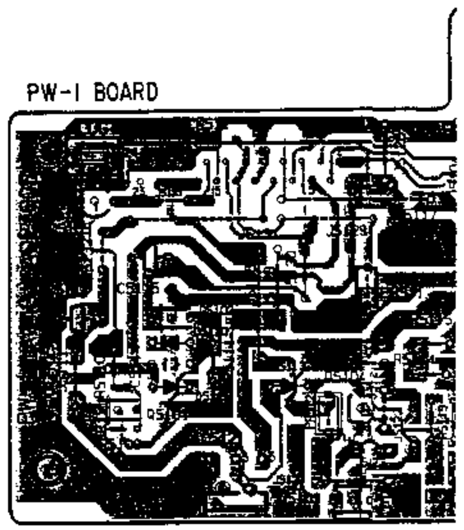


TM-2 PRINTED WIRING BOARD

TM-2 BOARD

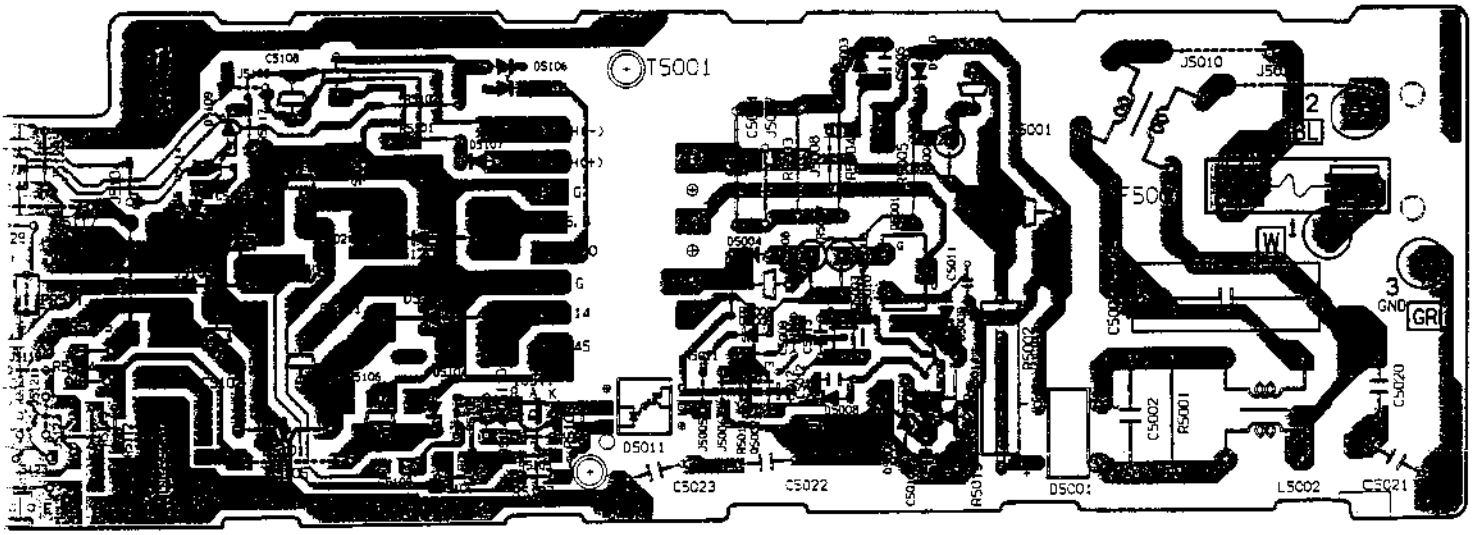



PW-1 BOARD
AC IN
220-240V 50HZ
AC INLET
F5001 T2A 250V
L5002
L5001
R5001 2.7M 1/2W(SOLID)
C5002 0.068/250
C5001 0.22/250
C5021 2200P/400
C5020 2200P/400
C5023 2200P/400
C5022 2200P/400
D5001 S1WBA60 D3SB10G
R5002 2.2 2W
C5003 82/400
C5004 0.047/630
C5005 100P/1K
T5001
Q5002,5003 SWITCHING REG OSC
D5010 D5K10E
Q5001 2SK1460 REG
R5005 220K 1W
C5013 0.018/50
R5010 1K
Q5002 2SC3330T
Q5003 2SB1050R
R5013 10K
R5007 33 1/2W
D5004 1SS244
R5009 47K
C5011 0.0022
R5015 0.47 1W
D5009 ERB12-02
C5012 0.018/50
D5008 1SS244
D501 PC113A
R5107
R5108
D5104 ERA38-04
24mA
L5101
D5101
C5106 47/50
C5101 1200/16
C5102 470/16
C5107 47/50
D5105 1SS244
D5106 1SS244
20mA
L5102 (B)
D5120 RK44
C5104 1200/16
C5105 470/6.3
D5107 ERA38-04
R5101 2.7 1/4W
C5108 330/6.3
0.2A
Q5103,5104 +13V REG
R5114 820 1/2W
R5115 820 1/2W
Q5103 2SC3851O.Y
Q5104 2SC536E.F
R5112 2.2K
R5113 2.2K
D5113
0.32A
IC512 12V REG
IC512 SI-3120CA
PR512 ICP-F50
VIN VDS
VC VO
GND
C5111 100/16
Q5101,5105 POWER CONTROL SWITCH
D5115 HTZJ12A
D5114 HTZJ12A
R5102 220 1/4W
Q5105 2SC3399 POWER CONT SW
Q5102 2SD1994A
Q5101
C5109 0.047
R5103 2.2K
R5104 1.8K
C5110 0.1/50
R5105 1.6K
IC511 L5431
IC511 REF VOLTAGE DETECTOR
C5114 0.01/16
C5115 47/6.3
Q5102 +5V REG
CN511
1 GND
2 HEATER-
3 HEATER+
4 ALWAYS-23V
5 SWD 12V
6 SWD 5V
7 GND
8 ALWAYS 40V
9 ALWAYS 12V
10 GND
11 GND
12 ALWAYS 5.8V
13 ALWAYS 5.8V
14 SWD 5V
15 GND
16 POWER UP
17 SWD 13V
18 GND
19 SWD 13V
20 GND
21 SWD 13V
22 GND
23 NC
24 GND
TO CP-A BOARD CN722


PW-1 BOARD

16	17	18	19	20	21	22	23

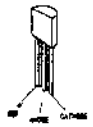
/IRING BOARD



4-3. SEMICONDUCTOR LEAD LAYOUTS

BA7021
LA6393S
RC4558S

L5431

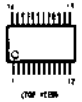


DTC114ES
2SA1175-HFE
2SC2785-HFE

2SC2668

GZS2.0X-BT
MTZ13C-T-77
RD5.1ES-B2
RD5.6ES-B2
RD8.2ES-B2
RD9.1ES-B3
UZ-4.7BSC
1SS119

CXA1203M



RJM2268L

KSC900-L
2SD734-E

2SC3330-T

S1WBA60

LA7294

MN1380-L

2SA1428-Y
2SC4483

2SC3851-0

EBR3668S

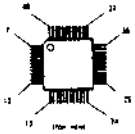
LB1641

M51953AL

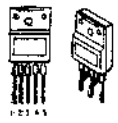
2SB764-F-AE

2SK1460-YA

LC7418

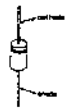


SI3120CA



2SB1050-R
2SC4038-R-TL2

AG01-V2
AP01C-V0
DLE30C-KC9
EM-1Z
FDH300
QZB18C
RK44LF-M1
1SS83
10E2



4-4. IC CIRCUIT DESCRIPTION

IC301 (LC66516B) System Control MPU Pin Names and Functions

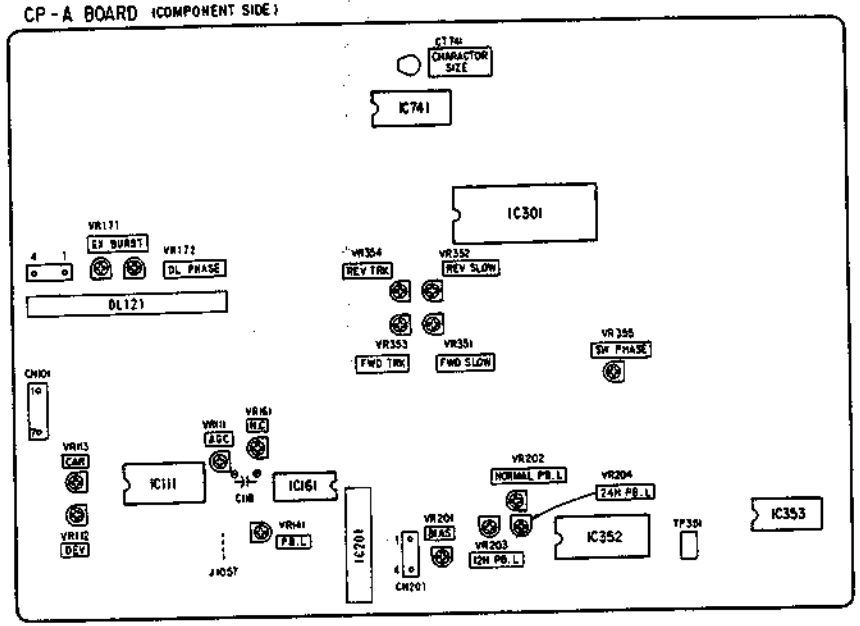
Pin No.	Signal Name	I/O	Function
1	S.IN	I	Inputs the serial data from the timer microprocessor
2	S.OUT	O	Outputs the serial data from the timer microprocessor
3	$\overline{S.CLK}$	O	Outputs the clock signal catching the timing for the serial transmission to the timer microprocessor
4	RF SW P	I	Inputs the head switching signal used as the timing for drum rotation detection and servo circuit
5	0/1 CLK	I	Inputs the CTL pulse used for the tracking during detection of unrecorded parts of the tape and 48H to 960H playback.
6	0/1 DATA	I	"0" or "1" data of CTL pulse (for starting position search)
7	4 k-PWM	O	Outputs the 4 kHz PWM during a certain period at the start of FF or REW (for slow starting)
8		I	Fixed at HIGH (Pulled up to 5V)
9	H COMP	O	Outputs signal for drum rotation speed correction during intermittent recording.
10	$\overline{REC\ GATE}$	O	Signal specifying recording by video head during REC mode
11	SW SIG	O	Outputs pulse output with every recording of 1 field
12	F ADV P	O	Synchronizes with RF SW. P. during each mode; STILL, F. ADV, 48H to 960H REC/PLAY, and outputs a pulse intermittently
13	REC CTL	O	Outputs the control signal for recording
14	MC BRK	O	Signal specifying for the brake to be applied on the rotation of the capstan motor (MC).
15	12H	O	Outputs "H" during REC 2 mode 12H recording and PLAY 2 mode 12H continuous drive operation playback
16	60PWM	O	Outputs the 60 Hz PWM during speed reduction of FF and REW for high speed FF and REW
17	T LAP ON	O	Outputs during 12 to 960H recording.
18	$\overline{SV\ SDATA}$	O	Data for performing serial output to SV IC.
19	$\overline{SV\ SCLK}$	O	Clock for performing serial output to SV IC.
20	VD MUTE	O	Output specifying playback display output prohibition during alarm search, alarm scan, T/D search
21	24H	O	Outputs "H" during REC 2 mode 24H recording and PLAY 2 mode 24H continuous drive operation playback
22	$\overline{TAPE\ END}$	O	Outputs when T END S input is present during recording.
23	SP PLAY	O	Outputs during special playback (Normal/reverse search, STILL, F. ADV and PLAY 3, etc.) mode
24	AD MUTE	O	Audio signal recording/playback output prohibition specification signal
25	PB H	O	Outputs during mode outputting playback image
26	REC H	O	Signal specifying the recording, outputs during REC mode.
27	CTL R/$\overline{P}$	O	CTL AMP record/playback switching specification signal.
28	CTL G D	O	CTL AMP GAIN switching signal
29	C FG P	O	0 to approx. 6 kHz pulse, Frequency requiring recognition is approx. 1 kHz
30		I	Connected to ground
31	(GND)	—	Connected to ground
32		I	Clock oscillation terminal
33		O	Clock oscillation terminal

Pin No.	Signal Name	I/O	Function
34		I	Inputs reset signal for the initial condition
35	T REEL P	I	0 to approx. 500 Hz pulse. Cycle changes with the rotation of the reel table of TAKE UP side.
36	S REEL P	I	0 to approx. 500 Hz pulse. Cycle changes with the rotation of the reel table of SUPPLY side
37	REC CTL REF	I	30 (or 25) Hz pulse. Reference signal of REC CTL output during 2H (or 3 H) recording
38	ML-F	O	Signal specifying the tape loading motor (ML) to be rotated in the normal direction
39	ML-R	O	Signal specifying the tape loading motor (ML) to be rotated in the reverse direction
40	$\overline{\text{ML-L}}$	O	Signal specifying the tape loading motor (ML) to be rotated at low speed
41	$\overline{\text{ML-M}}$	O	Signal specifying the tape loading motor (ML) to be rotated at medium speed
42	C FG SW	O	Signal for switching capstan FG signal frequency division ratioCapstan motor rotation direction
43	F/G SW	O	Capstan motor rotation direction specification signal ("H" when in normal direction)
44	INDEX	O	Signal for switching CTL pulse for VISS/VASS signal detection during alarm T/D search
45	RVS H	O	Outputs the MC-F/R of SV serial output as it isOutputs during STILL, R. STILL, PLAY 3, R-
46	SL+ST	O	Outputs during STILL, R. STILL, PLAY 3, R-PLAY 3 mode, F. ADV, R. F-ADV.
47	FF+REW	O	Outputs during FF or REW mode (for switching the GAIN of MIX AMP)
48	MII-ON	O	Outputs the MH-ON of SV serial output as it issensor
49	V REF	I	Inputs reference voltage for comparator input for sensor
50	SAFETY SW	I	SW for determining if recording of cassette is possible or not
51	DEW S	I	Sensor input for detecting dew condensation. Input signal becomes high in dew condensation
52	$\overline{\text{T TOP S}}$	I	Sensor input detecting tape top
53	$\overline{\text{T END S}}$	I	Sensor input detecting tape end
54	(GND)	I	Connected to GND
55	FL START SW	I	Front loading mechanism SW (Changes at beginning of front loading)
56	$\overline{\text{SW DATA 0}}$	I	SW indicating mechanism position
57	$\overline{\text{SW DATA 1}}$	I	SW indicating mechanism position
58	$\overline{\text{SW DATA 2}}$	I	SW indicating mechanism position
59	SEARCH	O	Output during search (CUE, REV)
60	NTSC/PAL	I	For NTSC/PAL switching
61	POWER CONT	I	For POWER ON/OFF function switching
62	$\overline{\text{SERIES OUT}}$	O	Outputs immediately before tape end during recording (Determines with tape remaining amount)
63	POWER UP	O	Outputs except during POWER OFF
64	(+5V)	—	5V power supply terminal

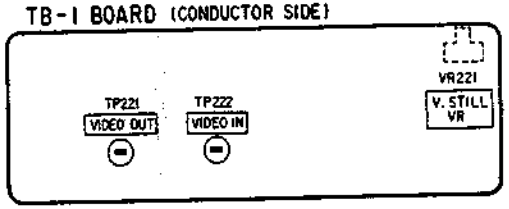
SECTION 5
ELECTRICAL ADJUSTMENTS

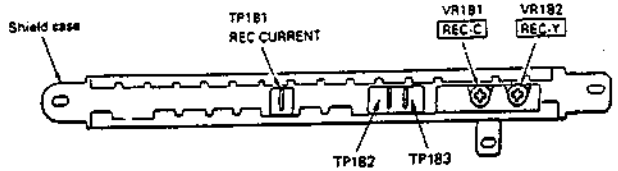
1. CIRCUIT BOARD LOCATIONS

CP-A BOARD (COMPONENT SIDE)



TB-I BOARD (CONDUCTOR SIDE)





Pre-amp Unit (VP-1 BOARD)

2.ELECTRICAL ADJUSTMENT

2-1. PREPARATION

2-1-1. EQUIPMENT

- Color TV monitor
- PAL Color-bar generator (with RF and LINE OUTPUT)
- Audio signal generator
- Oscilloscope (dual trace, frequency response:30MHz or more)
  (Use a 10:1 probe unless specified otherwise.)
- Vectorscope
- Frequency counter
- AC voltmeter
- In/Output probes

In making the adjustment, an alignment tape for VHS (PAL). If a model is specified, be sure to use a tape of the model.

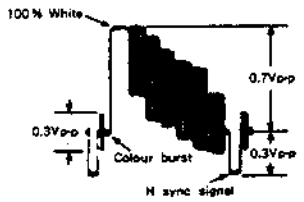
(Alignment Tape (MH-2)) (H-7099-052-H) (PAL)

	Mode	Time	Video signal	Audio signal
1	SP	10 minutes	Stair-step	6kHz
2	SP	5 minutes	–	3kHz
3	SP	10 minutes	Color bar	1kHz
4	SP	3 minutes	RF sweep	–

2-1-2. SET-UP

Because the RF input signal is used for circuit adjustments, connect the color-bar generator to the VIDEO IN terminal of the VCR. It is important that the video output signal satisfies the items shown in Fig.2-1. Connect the oscilloscope to the VIDEO OUTPUT terminal of the TB-1 BOARD and terminate with a 75 Ω load, and then check the video output signal.

- The amplitude of the sync signal should be approximately 0.3Vp-p.
- The amplitude of the video signal should be approximately 0.7Vp-p.
- While observing the oscilloscope or TV screen, make fine-tuning adjustments so that the color burst amplitude is approximately 0.3Vp-p.
- Check to be sure that there is no spike noise in the sync part of the horizontal sync signal.



2-2. SERVO CIRCUIT ADJUSTMENTS

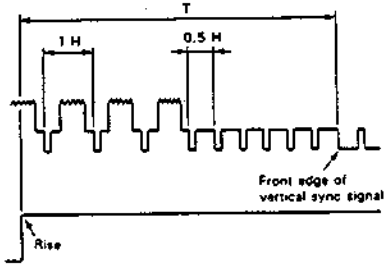
NOTES:

- Self-recording means "Record any broadcasting or color bar signal and play back the just-recorded portion".
- It is possible to use the SLOW function only with remote control operation.

2-2-1. SW PHASE ADJUSTMENT

ADJ. Point	Measuring Point	Measuring
VR355	VIDEO OUT TP182 (RF. SW. PULSE)	Oscilloscope

1. Perform the operation check tape MH-2 (SP mode) 3H playback.
2. Obtain the trigger at the rising of RF. SW. PULSE (TP182). Then adjust VR355 so that the front edge of the vertical sync signal is delayed by **6.5 ± 0.5H** from the rising of the RF. SW. PULSE. The normal tracking VR (TRACKING NORMAL) should be set to the center click.

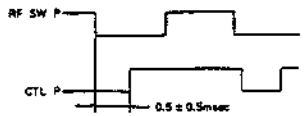


T = 6.5 H ± 0.5 H

2-2-2. FORWARD PB TRACKING ADJUSTMENT

ADJ. Point	Measuring Point	Measuring Instrument
VR353	TP351(CTL PULSE) TP182(RF.SW.PULSE)	Oscilloscope

1. Check that the normal tracking VR (TRACKING NORMAL) is set to the center click.
2. If not, set it to center click.
3. Perform the operation check tape MH-2 (SP mode) 3H playback.
4. Obtain the trigger at the falling of RF. SW. PULSE (TP182). Then adjust VR353 so that the CTL PULSE falling is delayed by **0.5 ± 0.5 msec.** from the falling of the RF. SW. PULSE.

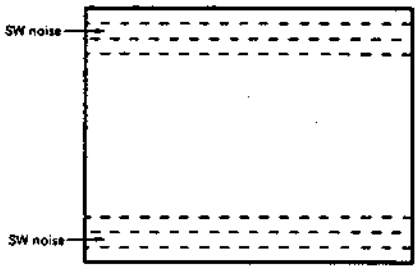


2-2-3. REVERSE PB TRACKING ADJUSTMENT

ADJ. Point	Measuring Point	Measuring Instrument
VR354	Picture of monitor TV	Monitor TV

1. Check that the normal tracking VR (Tracking normal) is set to the center click.
2. If not, set it to center click.
3. Playback in monoscope pattern self-recording/playback (3H mode), 3H reverse playback mode.
4. While monitoring the tracking center on the screen, adjust VR354 finely so that the top and bottom of switching noises on the screen become symmetrical.

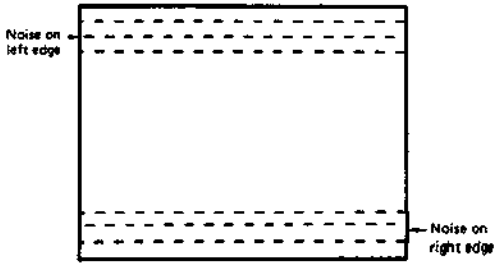
Note) Adjust for about 2 seconds until the capstan motor phase system stabilizes.



2-2-4. SP MODE FORWARD SLOW TRACKING ADJUSTMENT

ADJ. Point	Measuring Point	Measuring Instrument
VR351	Picture of monitor TV	Monitor TV

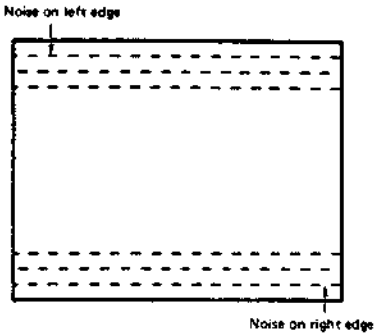
1. Playback in monoscope pattern self-recording/playback.(3H recording , 12Hplay back)
2. While monitoring the slow tracking center on the screen, adjust VR351 so that the noise on the screen is driven outside.
   Rotate the slow tracking VR, and check that the noise position appearing on the left edge of the screen is symmetrical to that on the right edge at the top and bottom.
   If not, adjust VR351.



2-2-5. SP MODE REVERSE SLOW TRACKING ADJUSTMENT

ADJ. Point	Measuring Point	Measuring Instrument
VR352	Picture of monitor TV	Monitor TV

1. Playback in monoscope pattern self-recording/playback.(3H recording, 12H reverse playback)
2. While monitoring the slow tracking center on the screen, adjust VR352 so that the noise on the screen is driven outside.
   Rotate the slow tracking VR, and check that the noise position appearing on the left edge of the screen is symmetrical to that on the right edge at the top and bottom.
   If not, adjust VR352.



2-3. VIDEO CIRCUIT ADJUSTMENTS

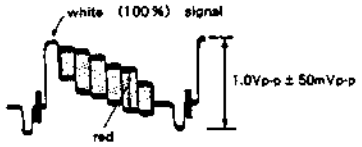
Before making the following adjustments, Section 2-2 SERVO and Section 2-3 VIDEO should be completed.

2-3-1. AGC LEVEL ADJUSTMENT

ADJ. Point	Measuring Point	Measuring Instrument
VR111	TP221(TB-1) VIDEO OUT	Oscilloscope

1. Terminate V.OUT at 75 Ω, and adjust the voltage from the sync chip to the 100% white level to **1.0 ± 0.05 Vp-p**.

Note) Input the signal (color-bar signal) including the 100% white signal. E-E condition

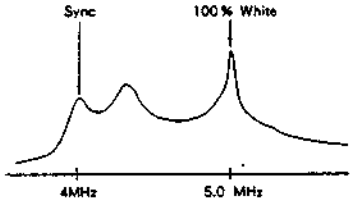


2-3-2. DEVIATION ADJUSTMENT

ADJ. Point	Measuring Point	Measuring Instrument
VR112 (Deviation) VR113 (Carrier)	CN101 Pin ⑦ or TP181 (VP-1) in REC condition	Spectrum analyzer

1. Adjust the sync chip frequency to **4.0 ± 0.05 MHz**, and the frequency of 100% white to **5.0 ± 0.05 MHz**.

Note) Input the signal including the 100% white signal. E-E condition

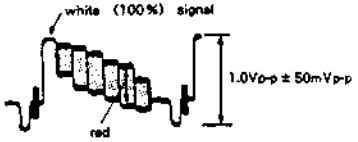


2-3-3. PB LEVEL ADJUSTMENT

ADJ. Point	Measuring Point	Measuring Instrument
VR141	TP221(TB-1) VIDEO OUT	Oscilloscope

1. Terminate V.OUT at 75 Ω, and adjust the voltage from the sync chip to the 100% white level to **1.0 ± 0.05 Vp-p**.

Note) Input the signal (color-bar signal) including the 100% white signal to self-recording/playback.



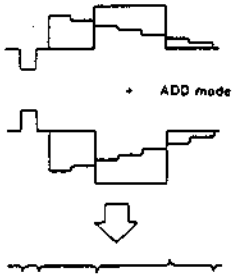
2-3-4. NOISE CANCEL LEVEL ADJUSTMENT

ADJ. Point	Measuring Point	Measuring Instrument
VR161	(1) ○ of C1118, J1057 Method (1) (2) TP221 (TB-1) Method (2)	Oscilloscope

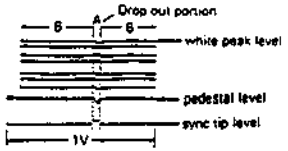
1. Obtain ○ of C1118 at CH1 and J1057 at CH2, reverse either CH at the same range (INV), use in the ADD mode to add the 2 signals, and adjust so that the waveform becomes minimum.

Note) (1)Playback of standard playback tape (or selfrecording/playback)
(2) DOC tape playback (PC-SID-PAL)

Method (1)



Method (2)

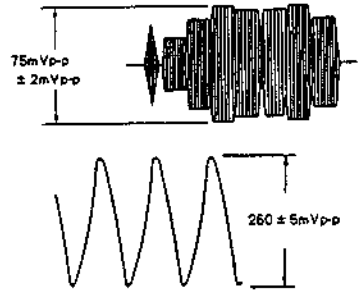


2-3-5. REC C / REC Y

ADJ. Point	Measuring Point	Measuring Instrument
VR181(Y) VR182(C)	TP181 (Inside pre-amplifier)	Oscilloscope

1. Rotate VR181 in the recording condition and adjust Y-FM to minimum, and rotate VR182 to adjust the chroma current to **75 mVp-p**. Rotate VR181 in the non-signal input condition and adjust Y-FM to **260 mVp-p**.

Note) Color bar signal input recording condition and non-signal input recording condition

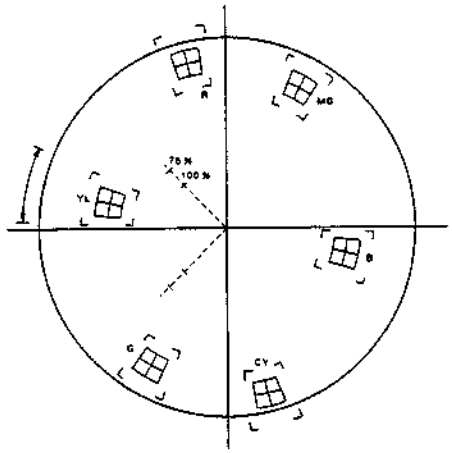


2-3-6. EX BURST ADJUSTMENT

ADJ. Point	Measuring Point	Measuring Instrument
VR171 CN103	TP221(TB-1) VIDEO OUT	Vectorscope

1. Connect a vectorscope to VIDEO OUT, set its ϕ REF to "BURST", and playback the color-bar.
2. Connect pin ④ (JOG) and pin ② (GND) of CN103, and pin ③ (TH/DL) and pin ① (+5V) of CN103 to the jumper wires respectively (TH signal selsection), and adjust the GAIN and PHASE of vectorscope so that luminance point of the color-bar Y_L is at the standard frame on it's screen.
3. In this condition, remove the two jumper wires, and adjust VR171 so that the luminance point of the color-bar Y_L is within ± 5° in respect to the standard frame on the screen of the vectorscope.

Note) Playback of standard playback tape (or selfrecording / playback).

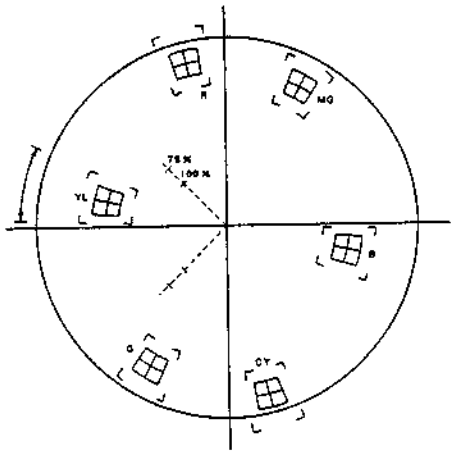


2-3-7. DL PHASE ADJUSTMENT

ADJ. Point	Measuring Point	Measuring Instrument
VR172 CN103	TP221(TB-1) VIDEO OUT	Vectorscope

1. Connect a vectorscope to VIDEO OUT, set its ϕ REF to "BURST", and playback the color-bar.
2. Connect pin ④ (JOG) and pin ② (GND) of CN103, and pin ③ (TH/DL) and pin ⑦ (GND) of CN103 to the jumper wires respectively (DL signal selsection), and adjust the GAIN and PHASE of vectorscope so that luminance point of the color-bar YL is at the standard frame on it's screen.
3. In this condition, remove the jumper wire of pin ④ to pin ②, and adjust VR172 so that the luminance point of the color-bar YL is within $\pm 5°$ in respect to the standard frame on the screen of the vectorscope.

Note) Playback of standard playback tape (or selfrecording / playback).



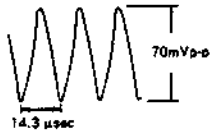
2-4. AUDIO CIRCUIT ADJUSTMENTS

2-4-1. BIAS ADJUSTMENT AND FREQUENCY CHECK

ADJ. Point	Measuring Point	Measuring Instrument
VR201	Pin ② of CN201 Pin ⑨ of IC201(GND)	AC voltmeter Frequency counter

1. Load the cassette tape, and adjust the voltage of both terminals to **70mVp-p** in the recording condition. Check that the oscillation frequency is **70 kHz ± 5 kHz**.

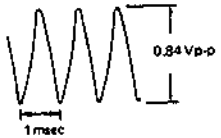
Note) Non-signal input, recording condition



2-4-2. NORMAL PB LEVELADJUSTMENT

ADJ. Point	Measuring Point	Measuring Instrument
VR202	AUDIO OUT	AC Voltmeter

1. Playback the standard tape, and adjust the output voltage to **0.84Vp-p**.

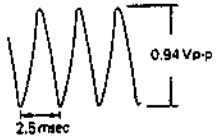


2-4-3. 12H MODE PB LEVEL ADJUSTMENT

ADJ. Point	Measuring Point	Measuring Instrument
VR203 (12H mode)	AUDIO OUT	AC voltmeter

1. Set ON SCREEN SW to T/D.
2. Input the reference input (400 Hz) to the audio input (AUDIO IN) terminal, record in the 12H mode, play it back in the same mode as the recording (A12), and adjust the playback output level to **0.94Vp-p**.
   Adjust the 2H mode and then the 12H mode.

Note) Standard input (400 Hz) recording/playback condition.
The playback mode A12 can be set by pressing the TIMER / AUDIO ON button in the 12H mode playback. A12 is displayed on the CRT.

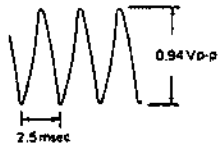


2-4-4. 24H MODE PB LEVEL ADJUSTMENT

ADJ. Point	Measuring Point	Measuring Instrument
VR204 (24H mode)	AUDIO OUT	AC Voltmeter

1. Set the ON-SCREEN SW to T/D.
2. Input the reference input (400 Hz) to the audio input (AUDIO IN) terminal, record in the 24H mode, play back on the same mode as the recording (A24), and adjust the playback output level to **0.94Vp-p**.
   Adjust the playback level of the standard mode, the 12H mode and then the 24H mode.

Note) Standard input (400 Hz) recording/playback condition Perform the procedures for A12 for playback mode A24 as well.



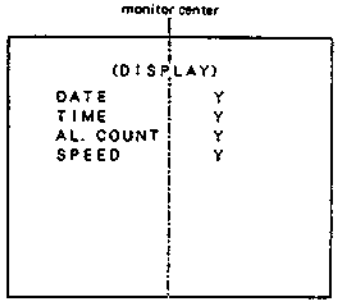
2-5. TIMER CIRCUIT ADJUSTMENT

2-5-1. CHARACTER SIZE ADJUSTMENT

ADJ. Point	Measuring Point	Measuring Instrument
CT741	Picture of monitor TV	Monitor TV

1. Use the ON SCREEN SW and PAGE button to display the DISPLAY image on the screen. Adjust so that the space between characters P and L come to the center of the circular pattern. (Center in the horizontal direction)

Note) Video signal input (Signal recognizing circular pattern, center in the horizontal direction). E-E condition



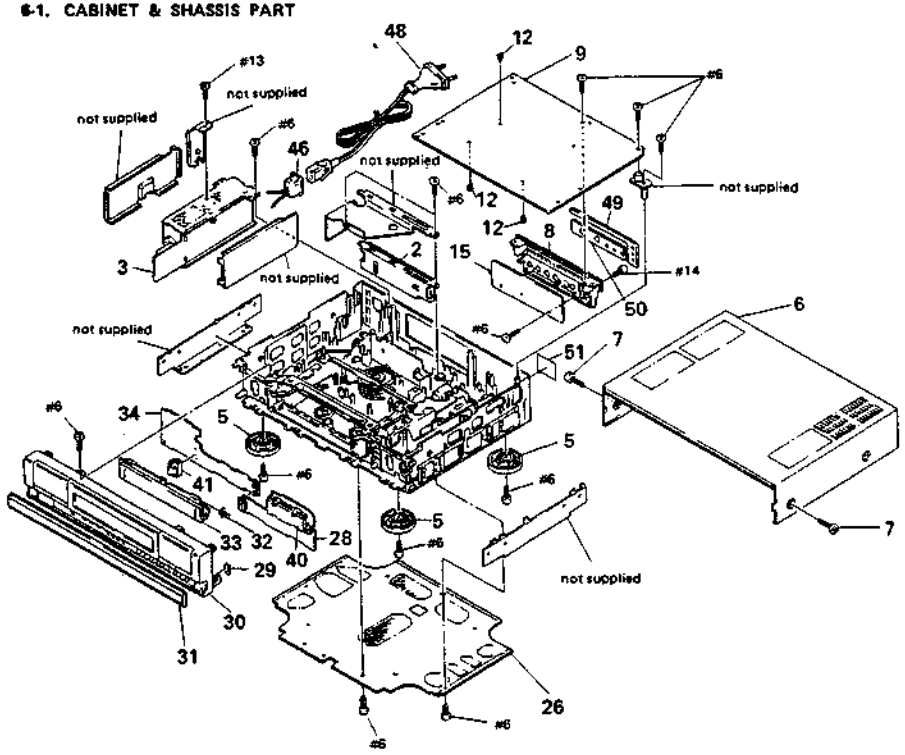
SECTION 6
EXPLODED VIEWS

NOTE:

- -XX,-X mean standardized parts, so they may have some difference from the original one.
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.

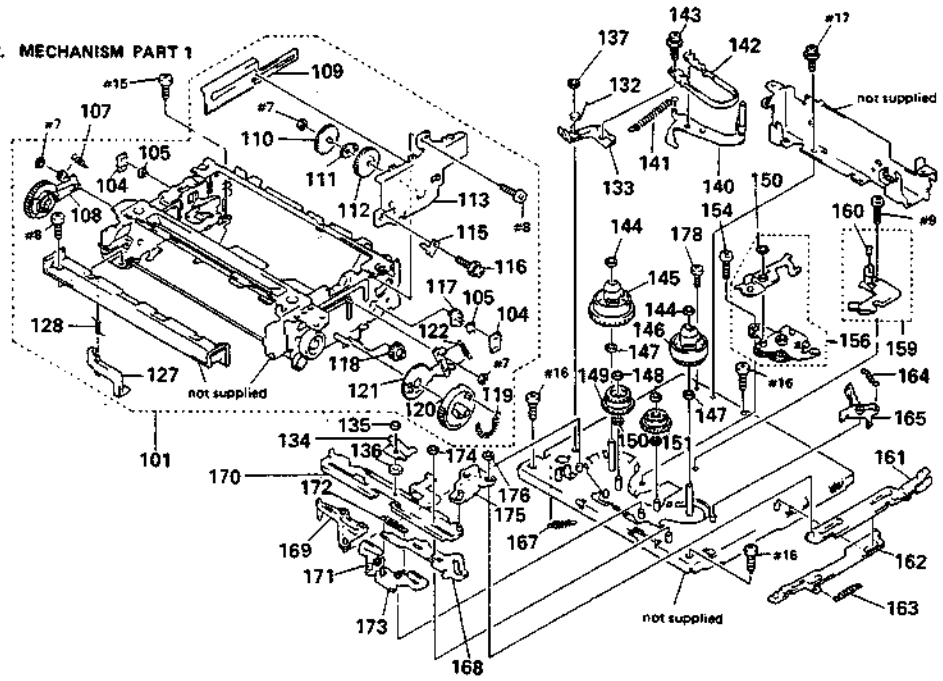
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

6-1. CABINET & SHASSIS PART

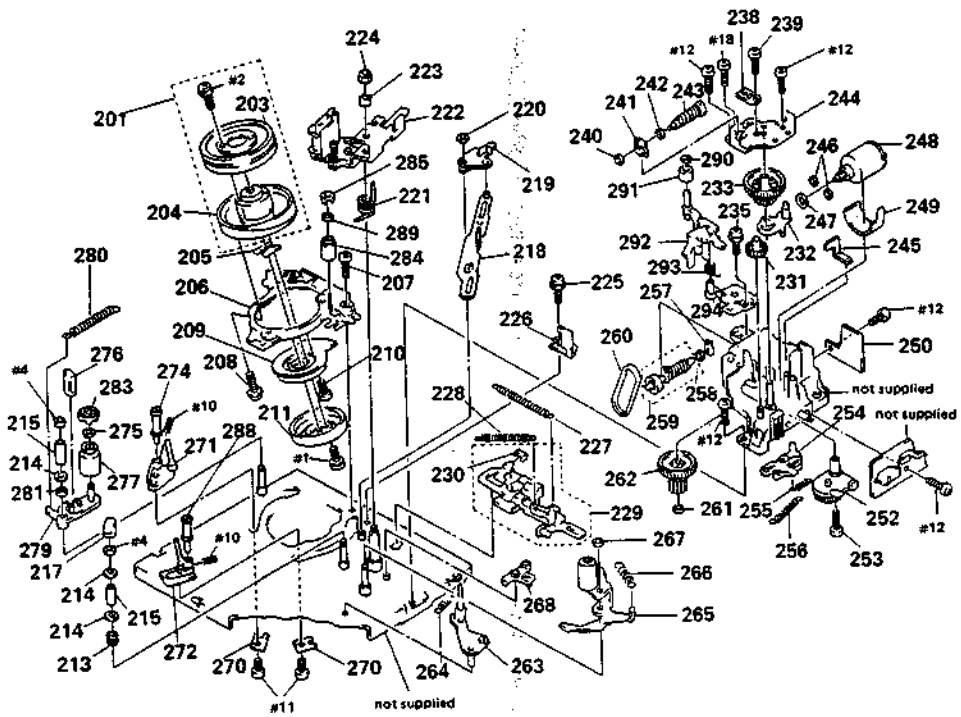


Ref. No.	Part No.	Description	Remark
* 2	A-6756-416-A	VP-1 BOARD, COMPLETE	
* 3	A-6756-418-A	PH-1 BOARD, COMPLETE	
5	3-946-553-01	STAND	
6	3-946-564-01	COVER, TOP	
7	3-740-382-01	+BTS-B S 4X12	
8	3-946-700-01	BRACKET, TERMINAL	
* 9	A-6756-400-A	CP-A BOARD, COMPLETE	
12	3-747-603-11	FIXER	
* 15	A-6756-366-A	TB-1 BOARD, COMPLETE	
26	3-946-561-01	COVER, BOTTOM	
* 28	A-6756-419-A	TH-1 BOARD, COMPLETE	
29	3-740-230-01	LOCK	
30	3-704-602-A	CABINET ASSY, FRONT	
31	A-6704-594-A	DOOR ASSY	
32	3-735-605-01	SPRING	
33	3-946-585-01	DOOR, CASSETTE	
* 34	A-6756-404-A	TH-2 BOARD, COMPLETE	
40	3-946-546-01	INDICATOR	
41	3-946-790-01	BUTTON (TIMER/AUDIO)	
⚠46	1-573-623-11	CONNECTOR, INLET	
⚠48	1-580-224-11	CORD, POWER	
49	3-946-554-01	INDICATOR (UPPER)	
50	3-946-555-01	INDICATOR (LOWER)	
* 51	3-947-048-01	LABEL, MODEL NUMBER	

6-2. MECHANISM PART 1

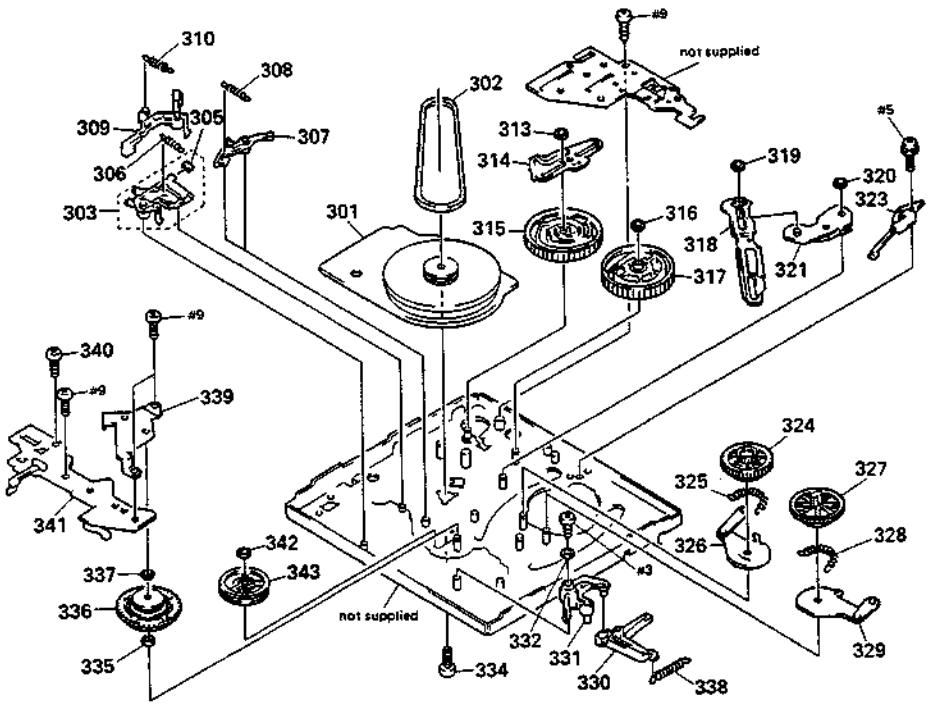


Ref. No.	Part No.	Description	Remark
101	A-6773-655-A	MECHANICAL ASSY, CASSETTE	
104	3-735-734-01	L10	
105	1-808-710-11	PHOTO TRANSISTOR PH150SAN	
107	3-735-720-01	SPRING	
108	3-735-719-01	LEVER (L) ASSY, GEAR	
109	3-740-344-01	LOCK	
110	3-735-731-01	GEAR, LOCK	
111	3-735-732-01	LEVER ASSY, PINION	
112	3-735-730-01	GEAR, PINION	
113	3-740-342-01	BRACKET, GEAR	
115	3-735-729-01	SW, LEAF	
116	3-735-775-01	SCREW (2X9), +PSW	
* 117	3-735-733-01	HOLDER, TR	
118	3-735-728-01	GEAR, IDLER	
119	3-735-725-01	SPRING	
120	3-735-724-01	GEAR, MAIN	
121	3-735-723-01	GEAR ASSY, LEVER	
122	3-735-726-01	SPRING	
127	3-942-686-01	LEVER, SAFETY SWITCH	
128	3-942-686-01	SPRING, SAFETY SWITCH	
132	3-946-535-01	SPRING, LEVER BRAKE	
133	3-946-527-01	BAND (ASSY), LEVER BRAKE	
134	3-947-594-01	LEVER, ONE-WAY LOCK	
135	3-947-302-01	WASHER, SPECIAL	
136	3-947-301-01	WASHER (Y)	
137	3-946-498-01	WASHER, SPECIAL	
140	3-946-528-01	TENSION (ASSY), LEVER	
141	3-946-532-01	SPRING, LEVER TENSION	
142	3-946-520-01	HOLDER (ASSY), BAND	
143	3-946-498-01	SCREW (2.6X2.4), SCR PAN +FLG	
144	3-735-755-01	WASHER (DIA.2.6)	
145	3-946-510-01	REEL (SUPPLY) (ASSY)	
146	3-946-509-01	REEL (TAKE-UP) (ASSY)	
147	3-735-754-01	WASHER (DIA.3), ADJUSTMENT	
148	3-741-401-01	WASHER Y 2.1X600.25	
149	3-946-525-01	GEAR (ASSY), ONE-WAY	
150	3-735-750-01	WASHER (DIA.2.6), SPECIAL	
151	3-946-530-01	GEAR, REEL TAKE-UP	
154	3-942-657-01	SCREW (2.6X4), SPECIAL	
156	A-6773-660-A	CLUTCH ASSY, IDLER	
* 159	A-6756-374-A	MC-4 BOARD, COMPLETE	
160	1-808-722-11	DIODE LN59	
161	3-946-523-01	PLATE (ASSY), ACT, SLIDE	
* 162	3-735-626-01	BRAKE (C) ASSY	
163	3-735-627-01	SPRING	
164	3-735-665-01	SPRING	
165	3-740-349-01	ASSY, BRAKE SUB T	
167	3-740-348-01	SPRING	
* 168	3-735-628-01	BRAKE, SLIDE ACT	
169	3-735-655-01	BRAKE SUB, S	
170	A-6773-695-A	PLATE ASSY, M, SLIDE	
171	3-735-656-01	BRAKE ASSY, S	
172	3-735-658-01	SPRING	
173	3-946-515-01	BRAKE (ASSY), TAKE-UP	
174	3-735-761-01	WASHER (DIA.2.5)	
175	3-735-663-01	LEVER, CONTROL	
176	3-746-725-01	WASHER, SPECIAL	
178	3-746-714-01	SCREW (3X12), SPECIAL	



Ref. No.	Part No.	Description	Remark
201	A-6050-874-A	COMPLETE PCB(2N4P-Q), CYLINDER	
203	3-947-053-01	CYLINDER (UPR 2N4P-Q) (ASSY)	
204	3-746-722-01	CYLINDER (LWR4)	
205	3-735-738-01	SPACER, MOTOR	
206	3-946-547-01	CYLINDER (BASE) (ASSY)	
207	3-748-398-01	SCR PAN+FLG 3X6	
208	3-748-370-01	SCREW (2.6X8), SPECIAL	
209	1-462-284-11	STATOR	
210	3-741-416-01	SCR PAN+SW+W 2.3X10	
* 211	1-461-917-11	MOTOR	
213	3-735-677-01	SPRING	
214	3-741-406-01	WASHER, SPECIAL	
215	3-735-676-01	GUIDE, TAPE	
217	3-943-187-01	CAP	
* 218	3-735-672-01	SLIDE ASSY, PINCH	
* 219	3-735-673-01	PINCH LEVER ASSY	
220	3-735-759-01	WASHER (DIA.3)	
221	3-735-680-01	SPRING	
222	3-735-679-01	BRACKET, COMPL	
223	3-749-186-01	SPACER	
224	3-735-682-01	NUT (M5), SPECIAL	
225	3-741-410-01	SCR PAN+SE+W 2.6X5	
226	3-942-871-01	STOPPER, BRACKET	
227	3-735-669-01	SPRING	
228	3-946-534-01	SPRING, SLIDE BRAKE	
229	3-946-521-01	CAM (ASSY), SLIDE	
230	3-735-668-01	DAMPER	
231	3-735-704-01	GEAR	
232	3-740-366-01	LEVER, FRONT	
233	3-735-703-01	GEAR (F), HELICAL	
235	3-741-414-01	SCR PAN+SW+W 2.6X6	
238	3-735-711-01	SENSOR ASSY, DEW	
239	3-740-355-01	SCREW (+P) (2.6X5)	
240	3-741-412-01	WASHER, SPECIAL	
241	3-735-696-01	HOLDER, WORM	
242	3-740-357-01	WASHER	
243	3-735-706-01	WORM ASSY, F	
244	3-942-065-01	BRACKET, HOLDER	
245	3-740-354-01	PLATE, NUT	
246	3-740-385-01	DAMPER, MOTOR	
247	3-735-708-01	DAMPER, WORM	

Ref. No.	Part No.	Description	Remark
248	3-942-091-01	MOTOR ASSY, THREADING	
249	3-740-358-01	DAMPER, MOTOR	
* 250	1-589-269-11	MC-3 BOARD	
252	1-572-383-11	SWITCH, ROTARY	
253	3-741-411-01	SCR PAN 2.6X13	
254	3-740-362-01	SLIDE, FRONT	
255	3-740-363-01	SPRING	
256	3-740-364-01	SPRING	
257	3-741-413-01	HOLDER WORM	
258	3-735-774-01	WASHER (DIA.2)	
259	3-740-359-01	LOAD WORM	
260	3-735-709-01	BELT (LOADING)	
261	3-740-367-01	WASHER, SLIT	
262	3-740-361-01	GEAR, HELICAL	
263	3-749-823-01	GUIDE (REV), LEVER ASSY	
264	3-735-660-01	SPRING	
265	3-735-674-01	PINCH ROLLER, COMPL	
266	3-735-675-01	SPRING	
267	3-735-757-01	WASHER (DIA.3.6)	
268	3-735-671-01	LEVER, ACT BRAKE	
270	3-735-831-01	PLATE, GUIDE	
271	3-946-544-01	ROLLER (S) (BASE) (ASSY)	
272	3-735-632-01	ROLLER (T) ASSY, BASE	
274	3-735-630-01	ROLLER ASSY, GUIDE	
275	3-946-500-01	WASHER (SLIT) (1.6X4X0.25)	
276	3-946-507-01	HEAD, FULL ERASE	
277	3-946-517-01	ROLLER	
279	3-946-516-01	LEVER (ASSY), FE HEAD	
280	3-735-686-01	SPRING	
281	3-735-770-01	WASHER (DIA.8)	
283	3-947-300-01	BRACKER, IMPEDANCE	
284	3-946-514-01	ROLLER	
285	3-946-513-01	BRACKET	
288	3-735-630-01	ROLLER ASSY, GUIDE	
289	3-946-496-01	WASHER (Y) (1.6X3.2X0.25)	
290	3-735-758-01	WASHER (DIA.2.6)	
291	3-944-844-01	CLEANER ASST, ROLLER	
292	3-942-090-01	LEVER ASSY, CLEANER	
293	3-942-068-01	SPRING	
294	3-942-089-01	BRACKET ASSY, CLEANER	



Ref.No.	Part No.	Description	Remark
301	3-946-560-01	CAPSTAN (MOTOR)	
302	3-946-511-01	BELT, REEL DRIVE	
303	3-948-502-01	CLUTCH (ASSY), LEVER	
305	3-735-645-01	DAMPER, LEVER CLUTCH	
306	3-735-646-01	SPRING	
307	3-735-647-01	LEVER, CONVERSION CLUTCH	
308	3-735-648-01	SPRING	
309	3-735-649-01	BRAKE ASSY, CAP	
310	3-949-581-01	SPRING, CAPSTAN	
313	3-735-758-01	WASHER (DIA.3)	
* 314	3-735-643-01	PLATE ASSY, CAM	
315	3-946-519-01	CAM, MODE	
316	3-735-756-01	WASHER (DIA.3)	
317	3-946-559-01	CAM, MAIN	
318	3-735-642-01	RACK, LOAD	
319	3-735-758-01	WASHER (DIA.2.6)	
320	3-735-757-01	WASHER (DIA.3.6)	
321	3-735-641-01	LEVER ASSY, LOAD CAM	
323	3-735-693-01	PLATE ASSY, GROUND	
324	3-749-022-01	LOAD, GEAR T	
325	3-735-637-01	SPRING (T)	
326	3-735-636-01	LOAD (T) ASSY, LEVER	
327	3-746-724-01	ROAD (S), GEAR	
328	3-735-634-01	SPRING	
329	3-735-633-01	LOAD (S) ASSY, LEVER	
330	3-946-518-01	LEVER, RETURN TENSION	
331	3-740-368-01	CONTROL ASSY, LEVER	
332	3-735-765-01	WASHER (DIA.2.6)	
334	3-740-355-01	SCREW (+P) (2.6X5)	
335	3-735-760-01	WASHER (DIA.3), SPECIAL	
336	3-946-524-01	FRICTION (ASSY), GEAR	
337	3-735-755-01	WASHER (DIA.2.6)	
338	3-946-533-01	SPRING, REVERSE TENSION	
339	3-946-529-01	PULLEY, BRACKET	
340	3-740-396-01	SCR STPG BIN 2.6X5	
* 341	A-6756-462-A	MC-1 BOARD, COMPLETE	
342	3-735-755-01	WASHER (DIA.2.6)	
343	3-946-531-01	PULLEY, REEL	

SECTION 7
ELECTRICAL PARTS LIST

NOTE:
- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL:Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F:nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u:μ, for example:
  uA...: μA.. uPA..: μPA..
  uPB..: μPB.. uPC..: μPC.. uPD..: μPD..
- CAPACITORS
  uF: μF
- COILS
  uH: μH

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

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

Ref.No.	Part No.	Description	Remark
*	A-6756-400-A	CP-A BOARD, COMPLETE	
		**********	
	1-528-400-11	BATTERY (CADNICA 3N-100AAS)	
		< TRANSISTOR >	
B1001	8-729-900-89	TRANSISTOR DTC144ES	
B1002	8-729-900-89	TRANSISTOR DTC144ES	
B1201	8-729-900-89	TRANSISTOR DTC144ES	
B1401	8-729-900-89	TRANSISTOR DTC144ES	
B1402	8-729-900-89	TRANSISTOR DTC144ES	
B1501	8-729-900-89	TRANSISTOR DTC144ES	
B1502	8-729-900-89	TRANSISTOR DTC144ES	
B1503	8-729-900-89	TRANSISTOR DTC144ES	
B1504	8-729-900-89	TRANSISTOR DTC144ES	
B1505	8-729-900-89	TRANSISTOR DTC144ES	
B1506	8-729-900-89	TRANSISTOR DTC144ES	
B1507	8-729-900-89	TRANSISTOR DTC144ES	
B1508	8-729-900-89	TRANSISTOR DTC144ES	
B1509	8-729-900-65	TRANSISTOR DTA144ES	
B1510	8-729-900-89	TRANSISTOR DTC144ES	
B1511	8-729-900-89	TRANSISTOR DTC144ES	
B1601	8-729-900-89	TRANSISTOR DTC144ES	
B3501	8-729-900-89	TRANSISTOR DTC144ES	
B3502	8-729-900-89	TRANSISTOR DTC144ES	
B3503	8-729-900-89	TRANSISTOR DTC144ES	
B3504	8-729-900-89	TRANSISTOR DTC144ES	
B3505	8-729-900-89	TRANSISTOR DTC144ES	
B3506	8-729-900-89	TRANSISTOR DTC144ES	
B3507	8-729-900-89	TRANSISTOR DTC144ES	
B7201	8-729-900-89	TRANSISTOR DTC144ES	
B7501	8-729-900-89	TRANSISTOR DTC144ES	
B7502	8-729-900-89	TRANSISTOR DTC144ES	
		< BUZZER >	
BZ701	1-529-111-11	PZ BZR PKM17EPP-4001	
		< CAPACITOR >	
C1001	1-124-234-00	ELECT 22uF 20% 16V	
C1002	1-124-234-00	ELECT 22uF 20% 16V	
C1101	1-161-061-11	CERAMIC 0.068uF 10% 50V	
C1102	1-161-379-00	CERAMIC 0.01uF 20% 25V	
C1103	1-161-379-00	CERAMIC 0.01uF 20% 25V	
C1105	1-124-589-11	ELECT 47uF 20% 16V	
C1106	1-124-767-00	ELECT 2.2uF 20% 50V	
C1107	1-126-153-11	ELECT 22uF 20% 6.3V	
C1108	1-126-153-11	ELECT 22uF 20% 6.3V	
C1109	1-161-379-00	CERAMIC 0.01uF 20% 25V	
C1110	1-126-529-11	ELECT 0.47uF 20% 50V	
C1111	1-161-772-11	CERAMIC 0.1uF 10% 25V	
C1113	1-162-289-31	CERAMIC 390PF 10% 50V	
C1114	1-101-880-00	CERAMIC 47PF 5% 50V	
C1115	1-101-880-00	CERAMIC 47PF 5% 50V	
C1116	1-126-529-11	ELECT 0.47uF 20% 50V	
C1117	1-124-767-00	ELECT 2.2uF 20% 50V	
C1118	1-126-529-11	ELECT 0.47uF 20% 50V	
C1119	1-162-209-31	CERAMIC 15PF 5% 50V	
C1120	1-164-072-11	CERAMIC 120PF 5% 50V	
C1121	1-164-073-11	CERAMIC 100PF 10% 50V	
C1122	1-126-157-11	ELECT 10uF 20% 16V	
C1201	1-161-021-11	CERAMIC 0.047uF 10% 25V	
C1202	1-126-301-11	ELECT 1uF 20% 50V	
C1203	1-162-214-31	CERAMIC 43PF 5% 50V	
C1204	1-161-063-00	CERAMIC 0.1uF 20% 50V	
C1205	1-161-379-00	CERAMIC 0.01uF 20% 25V	
C1206	1-126-154-11	ELECT 47uF 20% 6.3V	
C1207	1-161-063-00	CERAMIC 0.1uF 20% 50V	
C1208	1-164-073-11	CERAMIC 100PF 10% 50V	
C1209	1-162-209-31	CERAMIC 27PF 5% 50V	
C1210	1-161-021-11	CERAMIC 0.047uF 10% 25V	
C1211	1-126-301-11	ELECT 1uF 20% 50V	
C1212	1-161-494-00	CERAMIC 0.022uF 25V	
C1213	1-126-301-11	ELECT 1uF 20% 50V	
C1214	1-126-301-11	ELECT 1uF 20% 50V	
C1215	1-161-379-00	CERAMIC 0.01uF 20% 25V	
C1216	1-161-494-00	CERAMIC 0.022uF 25V	
C1217	1-161-379-00	CERAMIC 0.01uF 20% 25V	
C1218	1-161-379-00	CERAMIC 0.01uF 20% 25V	

Ref.No.	Part No.	Description			Remark
C1219	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1220	1-161-063-00	CERAMIC	0.1uF	20%	50V
C1221	1-161-063-00	CERAMIC	0.1uF	20%	50V
C1222	1-162-232-31	CERAMIC	680P	10%	50V
C1223	1-102-820-00	CERAMIC	330PF	5%	50V
C1224	1-164-073-11	CERAMIC	100PF	10%	50V
C1225	1-161-494-00	CERAMIC	0.022uF		25V
C1226	1-161-063-00	CERAMIC	0.1uF	20%	50V
C1227	1-161-494-00	CERAMIC	0.022uF	20%	25V
C1401	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1402	1-126-301-11	ELECT	1uF	20%	50V
C1403	1-124-589-11	ELECT	47uF	20%	16V
C1404	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1405	1-124-589-11	ELECT	47uF	20%	16V
C1407	1-126-301-11	ELECT	1uF	20%	50V
C1408	1-126-301-11	ELECT	1uF	20%	50V
C1409	1-126-153-11	ELECT	22uF	20%	6.3V
C1410	1-162-207-31	CERAMIC	22PF	5%	50V
C1411	1-164-077-11	CERAMIC	220PF	10%	50V
C1412	1-162-207-31	CERAMIC	22PF	5%	50V
C1413	1-124-589-11	ELECT	47uF	20%	16V
C1414	1-161-772-11	CERAMIC	0.1uF	10%	25V
C1451	1-126-301-11	ELECT	1uF	20%	50V
C1452	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1453	1-126-168-11	ELECT	1000uF	20%	6.3V
C1454	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1455	1-126-177-11	ELECT	100uF	20%	10V
C1456	1-161-494-00	CERAMIC	0.022uF		25V
C1460	1-124-638-11	ELECT	22uF	20%	6.3V
C1462	1-161-063-00	CERAMIC	0.1uF	20%	50V
C1501	1-124-589-11	ELECT	47uF	20%	16V
C1502	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1507	1-124-589-11	ELECT	47uF	20%	16V
C1508	1-130-475-00	MYLAR	0.0022uF	5%	50V
C1509	1-130-483-00	MYLAR	0.01uF	5%	50V
C1510	1-130-495-00	MYLAR	0.1uF	5%	50V
C1511	1-126-301-11	ELECT	1uF	20%	50V
C1513	1-124-589-11	ELECT	47uF	20%	16V
C1514	1-162-287-31	CERAMIC	270PF	10%	50V
C1515	1-124-589-11	ELECT	47uF	20%	16V
C1601	1-126-301-11	ELECT	1uF	20%	50V
C1602	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1604	1-162-212-31	CERAMIC	36PF	5%	50V
C1606	1-162-216-31	CERAMIC	51PF	5%	50V
C1608	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1610	1-124-631-11	ELECT	4.7uF	20%	25V
C1612	1-124-126-00	ELECT	47uF	20%	25V
C1650	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1651	1-161-379-00	CERAMIC	0.01uF	20%	25V

Ref.No.	Part No.	Description			Remark
C1653	1-124-126-00	ELECT	47uF	20%	25V
C1701	1-126-154-11	ELECT	47uF	20%	6.3V
C1702	1-161-494-00	CERAMIC	0.022uF		25V
C1703	1-164-073-11	CERAMIC	100PF	10%	50V
C1704	1-161-039-00	CERAMIC	0.001uF	10%	50V
C1705	1-124-631-11	ELECT	4.7uF	20%	25V
C1706	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1707	1-162-209-31	CERAMIC	27PF	5%	50V
C1708	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1709	1-162-199-31	CERAMIC	10PF	5%	50V
C1710	1-126-301-11	ELECT	1uF	20%	50V
C1711	1-161-374-11	CERAMIC	0.0015uF	20%	50V
C1712	1-126-157-11	ELECT	10uF	20%	16V
C1713	1-162-209-31	CERAMIC	27PF	5%	50V
C1720	1-161-379-00	CERAMIC	0.01uF	20%	25V
C2001	1-124-791-11	ELECT	1.0uF	20%	100V
C2002	1-162-292-31	CERAMIC	680PF	10%	50V
C2004	1-124-034-51	ELECT	33uF	20%	16V
C2005	1-161-053-00	CERAMIC	0.015uF	10%	50V
C2006	1-124-252-00	ELECT	0.33uF	20%	50V
C2007	1-124-034-51	ELECT	33uF	20%	16V
C2008	1-161-050-00	CERAMIC	0.0082uF	10%	50V
C2009	1-124-126-00	ELECT	47uF	20%	10V
C2010	1-126-096-11	ELECT	10uF	20%	35V
C2011	1-124-034-51	ELECT	33uF	20%	16V
C2012	1-161-021-11	CERAMIC	0.047uF	10%	25V
C2013	1-161-057-00	CERAMIC	0.0332uF	10%	50V
C2016	1-126-301-11	ELECT	1uF	20%	50V
C2017	1-124-589-11	ELECT	47uF	20%	16V
C2018	1-126-096-11	ELECT	10uF	20%	35V
C2019	1-124-589-11	ELECT	47uF	20%	16V
C2020	1-164-077-11	CERAMIC	220PF	10%	50V
C2021	1-130-309-00	FILM	0.033uF	5%	100V
C2022	1-161-379-00	CERAMIC	0.01uF	20%	25V
C2023	1-161-379-00	CERAMIC	0.01uF	20%	25V
C2024	1-126-528-11	ELECT	0.47uF	20%	50V
C2025	1-126-163-11	ELECT	4.7uF	20%	50V
C2027	1-126-163-11	ELECT	4.7uF	20%	50V
C2028	1-126-163-11	ELECT	4.7uF	20%	50V
C2029	1-124-871-11	ELECT	3.3uF	20%	35V
C2031	1-126-163-11	ELECT	4.7uF	20%	50V
C2032	1-161-045-00	CERAMIC	0.0033uF	10%	50V
C2033	1-124-034-51	ELECT	33uF	20%	16V
C2099	1-161-063-00	CERAMIC	0.1uF	20%	50V
C3001	1-124-472-11	ELECT	470uF	20%	10V
C3002	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3003	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3004	1-126-177-11	ELECT	100uF	20%	10V
C3006	1-161-063-00	CERAMIC	0.1uF	10%	50V

Ref.No.	Part No.	Description			Remark
C3007	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3008	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3009	1-124-006-11	ELECT	10uF	20%	25V
C3010	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3011	1-124-006-11	ELECT	10uF	20%	25V
C3012	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3013	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3014	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3015	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3016	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3017	1-161-039-00	CERAMIC	1000PF	10%	50V
C3018	1-161-039-00	CERAMIC	1000PF	10%	50V
C3020	1-161-039-00	CERAMIC	1000PF	10%	50V
C3021	1-161-039-00	CERAMIC	1000PF	10%	50V
C3035			0.033uF		
C3501	1-126-154-11	ELECT	47uF	20%	6.3V
C3502	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3503	1-130-489-00	MYLAR	0.033uF	5%	50V
C3504	1-130-495-00	MYLAR	0.1uF	5%	50V
C3505	1-130-495-00	MYLAR	0.1uF	5%	50V
C3506	1-130-498-00	MYLAR	0.18uF	5%	50V
C3507	1-130-495-00	MYLAR	0.1uF	5%	50V
C3508	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3509	1-124-234-00	ELECT	22uF	20%	16V
C3510	1-124-234-00	ELECT	22uF	20%	16V
C3511	1-161-043-00	CERAMIC	0.0022uF	10%	50V
C3512	1-161-374-11	CERAMIC	0.0015uF	20%	50V
C3513	1-161-053-00	CERAMIC	0.015uF	10%	50V
C3514	1-124-234-00	ELECT	22uF	20%	16V
C3515	1-124-234-00	ELECT	22uF	20%	16V
C3516	1-161-329-00	CERAMIC	0.0068uF	30%	25V
C3517	1-161-329-00	CERAMIC	0.0068uF	30%	25V
C3518	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3519	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3520	1-130-479-00	MYLAR	0.0047uF	5%	50V
C3521	1-130-479-00	MYLAR	0.0047uF	5%	50V
C3522	1-130-487-00	MYLAR	0.022uF	5%	50V
C3523	1-126-154-11	ELECT	47uF	20%	6.3V
C3524	1-161-083-00	CERAMIC	0.1uF	10%	50V
C3525	1-130-483-00	MYLAR	0.01uF	5%	50V
C3526	1-130-499-00	MYLAR	0.22uF	5%	50V
C3527	1-162-286-11	CERAMIC	220PF	10%	50V
C3528	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3529	1-130-484-00	MYLAR	0.012uF	5%	50V
C3530	1-161-081-11	CERAMIC	0.068uF	10%	50V
C3531	1-130-495-00	MYLAR	0.1uF	5%	50V
C3532	1-130-483-00	MYLAR	0.01uF	5%	50V
C3533	1-130-495-00	MYLAR	0.1uF	5%	50V
C3534	1-126-154-11	ELECT	47uF	20%	6.3V

Ref.No.	Part No.	Description			Remark
C3535	1-124-499-11	ELECT, NONPOLARR	1uF	20%	50V
C3536	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3537	1-124-499-11	ELECT, NONPOLARR	1uF	20%	50V
C3538	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3539	1-124-499-11	ELECT, NONPOLARR	1uF	20%	50V
C3540	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3541	1-124-499-11	ELECT, NONPOLARR	1uF	20%	50V
C3542	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3543	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3544	1-126-154-11	ELECT	47uF	20%	6.3V
C3545	1-130-489-00	MYLAR	0.033uF	5%	50V
C3546	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3547	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3548	1-124-242-00	ELECT	33uF	20%	25V
C3549	1-162-292-31	CERAMIC	680PF	10%	50V
C3550	1-126-157-11	ELECT	10uF	20%	16V
C3551	1-126-157-11	ELECT	10uF	20%	16V
C3552	1-130-499-00	MYLAR	0.22uF	5%	50V
C3553	1-161-055-00	CERAMIC	0.022uF	10%	50V
C3554	1-130-487-00	MYLAR	0.022uF	5%	50V
C3555	1-130-481-00	MYLAR	0.0068uF	5%	50V
C3556	1-161-055-00	CERAMIC	0.022uF	10%	50V
C3558	1-162-286-31	CERAMIC	220PF	10%	50V
C3559	1-124-034-51	ELECT	33uF	20%	16V
C3560	1-124-455-00	ELECT	100uF	20%	16V
C3561	1-124-455-00	ELECT	100uF	20%	16V
C3562	1-126-157-11	ELECT	10uF	20%	16V
C3563	1-162-211-31	CERAMIC	33PF	5%	50V
C3566	1-161-039-00	CERAMIC	1000PF	20%	50V
C3567	1-126-155-11	ELECT	100uF	20%	6.3V
C3570	1-161-039-00	CERAMIC	1000PF	20%	50V
C3571	1-161-039-00	CERAMIC	1000PF	20%	50V
C3572	1-161-039-00	CERAMIC	1000PF	20%	50V
C3573	1-161-039-00	CERAMIC	1000PF	20%	50V
C3574	1-161-379-00	CERAMIC	0.01uF	20%	16V
C3575	1-126-155-11	ELECT	100uF	20%	6.3V
C7201	1-124-581-11	ELECT	220uF	20%	16V
C7202	1-161-061-00	CERAMIC	0.1uF	20%	50V
C7208	1-161-379-00	CERAMIC	0.01uF	20%	25V
C7209	1-161-379-00	CERAMIC	0.01uF	20%	25V
C7210	1-161-379-00	CERAMIC	0.01uF	20%	25V
C7211	1-161-379-00	CERAMIC	0.01uF	20%	25V
C7212	1-124-767-00	ELECT	2.2uF	20%	50V
C7301	1-161-379-00	CERAMIC	0.01uF	20%	25V
C7302	1-124-234-00	ELECT	22uF	20%	16V
C7401	1-161-379-00	CERAMIC	0.01uF	20%	25V
C7402	1-124-589-11	ELECT	47uF	20%	16V
C7403	1-161-379-00	CERAMIC	0.01uF	20%	25V
C7405	1-164-073-11	CERAMIC	100PF	10%	50V

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Ref.No.	Part No.	Description			Remark
C7405	1-161-379-00	CERAMIC	0.01uF	20%	25V
C7407	1-126-301-11	ELECT	1uF	20%	50V
C7411	1-164-673-11	CERAMIC	150PF	20%	50V
C7412	1-164-673-11	CERAMIC	100PF	20%	50V
C7502	1-126-168-11	BL-ELECT	1000uF	20%	6.3V
C7503	1-124-591-11	ELECT	220uF	20%	16V
C7504	1-124-234-00	ELECT	22uF	20%	16V
C7505	1-126-157-11	ELECT	10uF	20%	16V
C7506	1-124-234-00	ELECT	22uF	20%	16V
C7802			1800PF		
C7803			1800PF		
C7804	1-161-063-00	CERAMIC	0.1uF	20%	50V

< TRIMMER >

CT741	1-141-440-11	CAP, TRIMMER	

< DIODE >

D1101	8-719-911-19	DIODE	1SS119
D1102	8-719-911-19	DIODE	1SS119
D1103	8-719-911-19	DIODE	1SS119
D1201	8-719-911-19	DIODE	1SS119
D1203	8-719-911-19	DIODE	1SS119
D1204	8-719-911-19	DIODE	1SS119
D1401	8-719-911-19	DIODE	1SS119
D1403	8-719-911-19	DIODE	1SS119
D1501	8-719-911-19	DIODE	1SS119
D1502	8-719-911-19	DIODE	1SS119
D1503	8-719-911-19	DIODE	1SS119
D1505	8-719-911-19	DIODE	1SS119
D1506	8-719-911-19	DIODE	1SS119
D1507	8-719-911-19	DIODE	1SS119
D1508	8-719-911-19	DIODE	1SS119
D1509	8-719-911-19	DIODE	1SS119
D1510	8-719-911-19	DIODE	1SS119
D1511	8-719-911-19	DIODE	1SS119
D1512	8-719-911-19	DIODE	1SS119
D1513	8-719-911-19	DIODE	1SS119
D1601	8-719-110-14	DIODE	RD9.1ES-B3
D2001	8-719-911-19	DIODE	1SS119
D2002	8-719-911-19	DIODE	1SS119
D3001	8-719-912-20	DIODE	FDH300
D3002	8-719-912-20	DIODE	FDH300
D3003	8-719-912-20	DIODE	FDH300
D3004	8-719-912-20	DIODE	FDH300
D3005	8-719-912-20	DIODE	FDH300
D3006	8-719-120-06	DIODE	RD6.2ES-B2
D3007	8-719-109-89	DIODE	RD5.6ES-B2
D3008	8-719-912-20	DIODE	FDH300

Ref.No.	Part No.	Description		Remark
D3501	8-719-912-20	DIODE	FDH300	
D3502	8-719-912-20	DIODE	FDH300	
D3503	8-719-912-20	DIODE	FDH300	
D3504	8-719-912-20	DIODE	FDH300	
D3505	8-719-912-20	DIODE	FDH300	
D3506	8-719-912-20	DIODE	FDH300	
D3507	8-719-912-20	DIODE	FDH300	
D3508	8-719-912-20	DIODE	FDH300	
D3509	8-719-912-20	DIODE	FDH300	
D3510	8-719-912-20	DIODE	FDH300	
D3511	8-719-912-20	DIODE	FDH300	
D3512	8-719-912-20	DIODE	FDH300	
D3513	8-719-912-20	DIODE	FDH300	
D3514	8-719-912-20	DIODE	FDH300	
D3515	8-719-912-20	DIODE	FDH300	
D3516	8-719-912-20	DIODE	FDH300	
D3517	8-719-912-20	DIODE	FDH300	
D3518	8-719-912-20	DIODE	FDH300	
D3519	8-719-912-20	DIODE	FDH300	
D3521	8-719-912-20	DIODE	FDH300	
D3522	8-719-912-20	DIODE	FDH300	
D3523	8-719-912-20	DIODE	FDH300	
D3524	8-719-912-20	DIODE	FDH300	
D3525	8-719-912-20	DIODE	FDH300	
D3526	8-719-912-20	DIODE	FDH300	
D3527	8-719-912-20	DIODE	FDH300	
D3528	8-719-912-20	DIODE	FDH300	
D3530	8-719-912-20	DIODE	FDH300	
D3531	8-719-912-20	DIODE	FDH300	
D3532	8-719-912-20	DIODE	FDH300	
D7201	8-719-911-19	DIODE	1SS119	
D7301	8-719-911-19	DIODE	1SS119	
D7302	8-719-911-19	DIODE	1SS119	
D7303	8-719-911-19	DIODE	1SS119	
D7304	8-719-911-19	DIODE	1SS119	
D7305	8-719-911-19	DIODE	1SS119	
D7306	8-719-911-19	DIODE	1SS119	
D7307	8-719-911-19	DIODE	1SS119	
D7308	8-719-911-19	DIODE	1SS119	
D7309	8-719-911-19	DIODE	1SS119	
D7310	8-719-911-19	DIODE	1SS119	
D7311	8-719-911-19	DIODE	1SS119	
D7312	8-719-911-19	DIODE	1SS119	
D7313	8-719-911-19	DIODE	1SS119	
D7314	8-719-911-19	DIODE	1SS119	
D7315	8-719-911-19	DIODE	1SS119	
D7316	8-719-911-19	DIODE	1SS119	
D7317	8-719-911-19	DIODE	1SS119	
D7318	8-719-911-19	DIODE	1SS119	

Ref.No.	Part No.	Description		Remark
D7319	8-719-911-19	DIODE	1SS119	
D7320	8-719-911-19	DIODE	1SS119	
D7321	8-719-911-19	DIODE	1SS119	
D7322	8-719-911-19	DIODE	1SS119	
D7501	8-719-901-83	DIODE	1SS83	
D7502	8-719-901-83	DIODE	1SS83	

< DELAY LINE >

DL121	1-415-707-11	DELAY	

< IC >

IC111	1-808-711-11	IC	LA7322
IC121	8-759-822-29	IC	LA7332
IC141	1-809-590-11	IC	NJM2266L
IC142	1-809-590-11	IC	NJM2266L
IC143	8-759-927-56	IC	BA7021
IC151	8-759-208-08	IC	TC40528BPNB
IC152	1-809-587-11	IC	MLC4081B
IC153	1-808-865-11	IC	LA6393S
IC154	8-759-932-48	IC	BU4538B
IC161	8-759-821-51	IC	LC8882
IC171	8-752-031-49	IC	CXA1203M
IC201	1-808-886-11	IC	LA7294
IC301	1-809-634-11	IC	LC88P516-P4933
IC302	8-759-634-97	IC	M51953AL
IC303	8-759-822-09	IC	LB1641
IC304	1-809-584-11	IC	LA6393D
IC351		IC	7418-8553
IC352	1-809-586-11	IC	LC81088-385
IC353	1-809-033-11	IC	LA7124
IC354	8-759-932-49	IC	BU4538B
IC355	8-759-308-71	IC	TC4053BF
IC356	8-759-932-40	IC	BU4030B
IC357	8-759-340-13	IC	HD14013BP
IC358	8-759-308-71	IC	TC4053BF
IC359	1-809-588-11	IC	MLC4520B
IC361	8-759-803-71	IC	LC74HC10
IC362	8-759-932-33	IC	BU4066B
IC363	8-759-207-73	IC	TC4030BPNB
IC731	1-809-585-11	IC	LB1475
IC741	1-809-589-11	IC	M50556-001SP
IC781	8-759-008-78	IC	MC14011BF

< COIL >

L1201	1-410-512-11	INDUCTOR	18uH
L1202	1-410-514-11	INDUCTOR	27uH
L1203	1-410-511-11	INDUCTOR	15uH
L1204	1-410-316-11	INDUCTOR	1uH
L1401	1-412-618-11	INDUCTOR	150uH

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Ref.No.	Part No.	Description		Remark
L1601	1-410-522-11	INDUCTOR	120uH	
L1701	1-410-518-41	INDUCTOR	56uH	
L1702	1-410-519-11	INDUCTOR	68uH	
L1703	1-410-518-41	INDUCTOR	56uH	
L2002	- - -	INDUCTOR	6.8mH	
L2003	1-412-271-11	COIL, CHOKE		
L7401	1-410-316-11	INDUCTOR	1uH	
L7403	1-410-511-11	INDUCTOR	15uH	

< TRANSISTOR >

Q1001	1-809-601-11	TRANSISTOR	2SB764-F-AE
Q1002	1-809-601-11	TRANSISTOR	2SB764-F-AE
Q1201	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1202	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1203	8-729-119-76	TRANSISTOR	2SA1175-HFE
Q1204	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1205	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1206	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1401	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1404	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1405	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1406	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1451	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1501	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1601	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1602	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1701	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1702	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1703	8-729-119-76	TRANSISTOR	2SA1175-HFE
Q1704	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q1705	8-729-119-76	TRANSISTOR	2SC2785-HFE
Q2001	8-729-873-40	TRANSISTOR	2SD734-E
Q2002	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q2003	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q3001	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q3002	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q3501	1-809-603-11	TRANSISTOR	2SC4038-R-TL2
Q3502	1-809-603-11	TRANSISTOR	2SC4038-R-TL2
Q3503	1-809-603-11	TRANSISTOR	2SC4038-R-TL2
Q7201	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q7202	8-729-119-76	TRANSISTOR	2SA1175-HFE
Q7203	8-729-119-76	TRANSISTOR	2SA1175-HFE
Q7204	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q7205	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q7206	8-729-119-76	TRANSISTOR	2SA1175-HFE
Q7207	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q7208	8-729-119-76	TRANSISTOR	2SA1175-HFE
Q7209	8-729-119-78	TRANSISTOR	2SC2785-HFE
Q7501	8-729-119-76	TRANSISTOR	2SA1175-HFE

Ref.No.	Part No.	Description	Remark
Q7502	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q7503	8-729-119-78	TRANSISTOR 2SC2785-HFE	
		< RESISTOR >	
R3007	1-212-948-00	FUSIBLE 3.3 5% 1/2W F	
		< R-NETWORK >	
RB751	1-239-256-11	R-NETWORK 10KX4	
		< SWITCH >	
S7502	1-692-045-11	SWITCH, SLIDE (SSS212)	
		< OSC COIL >	
T2001	1-406-386-11	COIL, OSC	
		< VARIABLE RESISTOR >	
VR111	1-228-994-00	RES, ADJ, METAL 10K	
VR112	1-241-214-11	SEMI VR 20KB	
VR113	1-228-994-00	RES, ADJ, METAL 10K	
VR141	1-241-805-11	SEMI VR 3K	
VR151	1-228-990-00	RES, ADJ, METAL 1K	
VR171	1-241-806-11	SEMI VR 5K	
VR172	1-241-214-11	SEMI VR 20KB	
VR201	1-228-997-00	RES, ADJ, METAL 100K	
VR202	1-228-994-00	RES, ADJ, METAL 10K	
VR203	1-237-523-21	RES, ADJ 500	
VR204	1-237-523-21	RES, ADJ 500	
VR351	1-241-206-11	SEMI 200KB	
VR352	1-241-206-11	SEMI 200KB	
VR353	1-241-206-11	SEMI 200KB	
VR354	1-241-206-11	SEMI 200KB	
VR355	1-241-206-11	SEMI 200KB	
		< VIBRATOR >	
X1201	1-577-667-11	CRYSTA, OSC (4.43MHz)	
XF121	1-236-603-11	LC PACK	
XF141	1-236-602-11	LC PACK (4MHz)	
XF142	1-239-258-12	FILTER 4MHZ L.P	
XF301	1-579-299-11	RESONATOR CERAMIC (4.0MHz)	

A-6050-874-A CYLINDER (2N4P-Q) BOARD, COMPLETE

3-746-722-01 CYLINDER (LM84)
3-947-953-01 CYLINDER (UPR 2N4P-Q) (ASSY)
7-682-648-09 SCREW (3X8), +PW

Ref.No.	Part No.	Description	Remark
*	A-6756-462-A	MC-1 BOARD, COMPLETE	
	1-808-723-11	PHOTO COUPLER SPI-315-04-C	
*	A-6756-374-A	MC-4 BOARD, COMPLETE	
	1-868-722-11	DIODE LM59	
*	A-6756-418-A	PW-1 BOARD, COMPLETE	
	1-533-163-11	HOLDER, FUSE	
		< CAPACITOR >	
⚠C5001	1-130-711-00	FILM 0.22uF 20% 250V	
⚠C5002	- - -	FILM 0.068uF 20% 250V	
C5003	1-128-508-11	CAP, ELECT 82uF 400V	
C5004	1-137-869-11	MT-POLYEST 0.047uF 630V	
C5005	1-165-113-11	CAP, CERAMIC 100PF 1K	
C5007	1-128-507-11	CAP, ELECT 1uF 400V	
C5008	1-127-549-11	ELECT(SOLID) 2.2uF 20% 16V	
C5009	1-130-479-00	MYLAR 0.0047uF 5% 50V	
C5010	1-164-077-11	CERAMIC 220PF 10% 50V	
C5011	1-161-375-00	CERAMIC 0.0022uF 20% 50V	
C5012	1-130-486-00	MYLAR 0.018uF 10% 50V	
C5013	1-130-486-00	MYLAR 0.018uF 10% 50V	
⚠C5020	1-161-742-00	CERAMIC 0.0022uF 20% 400V	
⚠C5021	1-161-742-00	CERAMIC 0.0022uF 20% 400V	
⚠C5022	1-161-742-00	CERAMIC 0.0022uF 20% 400V	
⚠C5023	1-161-742-00	CERAMIC 0.0022uF 20% 400V	
C5101	1-128-381-11	CAP, ELECT 1200uF 16V	
C5102	1-126-103-11	ELECT 470uF 20% 16V	
C5104	1-128-381-11	CAP, ELECT 1200uF 16V	
C5105	1-124-472-11	ELECT 470uF 20% 10V	
C5106	1-124-910-11	ELECT 47uF 20% 50V	
C5107	1-124-910-11	ELECT 47uF 20% 50V	
C5108	1-124-442-00	ELECT 330uF 20% 6.3V	
C5109	1-161-021-11	CERAMIC 0.047uF 10% 25V	
C5110	1-136-165-00	FILM 0.1uF 5% 50V	
C5111	1-124-455-00	ELECT 100uF 20% 16V	
C5114	1-161-379-00	CERAMIC 0.01uF 20% 25V	
C5115	1-126-154-11	ELECT 47uF 20% 6.3V	
		< DIODE >	
⚠D5001	1-808-505-11	DIODE S1WBA60	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref.No.	Part No.	Description	Remark
D5003	1-808-898-11	DIODE APOIC-VO	
D5004	8-719-901-83	DIODE 1SS83	
D5005	8-719-901-83	DIODE 1SS83	
D5006	1-809-646-11	DIODE GZB15C	
D5007	8-719-901-83	DIODE 1SS83	
D5008	8-719-901-83	DIODE 1SS83	
D5009	8-719-300-45	DIODE EN-1Z	
D5010	8-719-200-02	DIODE 10E2	
⚠D5011	8-719-971-88	DIODE PC113A	
D5101	1-809-507-11	DIODE DLE30C-HC9	
D5104	1-808-899-11	DIODE AG01-Y2	
D5105	8-719-901-83	DIODE 1SS83	
D5106	8-719-901-83	DIODE 1SS83	
D5107	1-808-899-11	DIODE AG01-Y2	
D5109	8-719-010-34	DIODE UZ-4.7BSC	
D5110	8-719-911-19	DIODE 1SS119	
D5111	8-719-109-85	DIODE RD5.1ES-B2	
D5113	1-809-647-11	DIODE GZS2.0X-BT	
D5114	8-719-923-78	DIODE MTZJ-T-77-12A	
D5115	8-719-923-79	DIODE MTZJ-T-77-12A	
D5120	1-809-649-11	DIODE RK44 LF-HL	
		< FUSE >	
⚠F5001	1-532-203-00	FUSE, TIME-LAG (2A 250V)	
		< IC >	
IC511	8-759-820-97	IC L5431	
IC512	1-808-795-11	IC SI3120CA	
		< COIL >	
⚠L5001	1-414-089-11	LF CHOKE 1MH (1A 250V)	
⚠L5002	1-414-088-11	LF CHOKE	
L5101	1-543-699-11	CORE	
L5102	1-412-464-11	INDUCTOR, COIL 10uH	
		< IC SINK >	
PR511	1-576-147-11	SINK, IC	
PR512	1-576-147-11	SINK, IC	
		< TRANSISTOR >	
Q5001	1-809-502-11	TRANSISTOR 2SK1460-YA	
Q5002	8-729-820-24	TRANSISTOR 2SC3330-T	
Q5003	1-809-503-11	TRANSISTOR 2SB1050-R	
Q5101	8-729-205-95	TRANSISTOR 2SA1428-Y	
Q5102	8-729-205-97	TRANSISTOR 2SC4483S	
Q5103	8-729-303-58	TRANSISTOR 2SC3851-O	
Q5104	8-729-261-53	TRANSISTOR KSC900-L	
Q5105	8-729-900-89	TRANSISTOR DTC144ES	

Ref.No.	Part No.	Description	Remark
		< RESISTOR >	
⚠RS001	1-202-724-00	SOLID 2.7M 10% 1/2W	
RS002	1-219-126-11	RES, WIREWOUND 2.2 2W	
RS003	1-215-903-11	METAL OXIDE 68K 5% 2W F	
RS004	1-215-903-11	METAL OXIDE 68K 5% 2W F	
RS005	1-220-378-11	OXIDE-MT 220K 1W	
RS006	1-260-135-11	CARBON 1M 5% 1/2W	
RS007	1-260-081-11	CARBON 33 5% 1/2W	
RS008	1-260-087-11	CARBON 100 5% 1/2W	
RS015	1-216-345-11	METAL 0.47 5% 1W F	
RS101	1-236-872-11	FUSIBLE 2.7 1/4W F	
RS102	1-212-889-00	FUSIBLE 220 5% 1/4W F	
RS105	1-215-426-00	METAL 1.5K 1% 1/8W	
RS106	1-214-737-00	METAL 2.2K 1% 1/4W	
RS114	1-247-751-11	CARBON 820 5% 1/2W	
RS115	1-247-751-11	CARBON 820 5% 1/2W	
		< TRANSFORMER >	
⚠T5001	1-450-676-11	TRANSFORMER, POWER	

A-6756-366-A TB-1 BOARD, COMPLETE

1-535-991-11 TERMINAL
* 3-946-543-01 HOLDER
3-946-554-01 INDICATOR (UPPER)
3-946-555-01 INDICATOR (LOWER)
3-946-700-01 BRACKET, TERMINAL

7-685-647-78 SCREW +BTP 3X10 TYPE2 N-S
7-685-648-79 SCREW +BTP 3X12 TYPE2 N-S

		< CAPACITOR >		
C2201	1-124-589-11	ELECT	47uF	20% 16V
C2202	1-124-589-11	ELECT	47uF	20% 16V
C2203	1-162-203-31	CERAMIC	15PF	5% 50V
C2204	1-124-589-11	ELECT	47uF	20% 16V
C2205	1-124-589-11	ELECT	47uF	20% 16V
C2206	1-124-589-11	ELECT	47uF	20% 16V
C2207	1-162-294-31	CERAMIC	0.001uF	10% 50V
C2208	1-162-294-31	CERAMIC	0.001uF	10% 50V
C2209	1-124-589-11	ELECT	47uF	20% 16V
C2210	1-162-294-31	CERAMIC	0.001uF	10% 50V
C2214	1-162-294-31	CERAMIC	0.001uF	10% 50V
		< DIODE >		
D2201	1-808-605-11	DIODE	MTZ13C-T-77	
D2202	1-808-605-11	DIODE	MTZ13C-T-77	
D2203	1-808-605-11	DIODE	MTZ13C-T-77	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

TB-1 TM-1

Ref. No.	Part No.	Description				Remark
D2204	1-809-605-11	DIODE MTZ13C-T-77				
D2205	1-809-605-11	DIODE MTZ13C-T-77				
D2206	1-809-605-11	DIODE MTZ13C-T-77				
D2207	1-809-605-11	DIODE MTZ13C-T-77				
D2208	1-809-605-11	DIODE MTZ13C-T-77				
D2209	1-809-605-11	DIODE MTZ13C-T-77				
D2210	1-809-605-11	DIODE MTZ13C-T-77				
D2211	1-809-605-11	DIODE MTZ13C-T-77				
D2212	1-809-605-11	DIODE MTZ13C-T-77				
D2213	1-809-605-11	DIODE MTZ13C-T-77				
D2214	1-809-605-11	DIODE MTZ13C-T-77				
D2215	1-809-605-11	DIODE MTZ13C-T-77				
D7224	1-809-605-11	DIODE MTZ13C-T-77				
		< IC >				
IC221	8-759-981-95	IC RC4558S				
		< SOCKET >				
JK224	1-691-608-11	JACK, PIN (REMOTE)				
JK225	1-691-606-11	SOCKET (VIDEO IN)				
JK226	1-691-606-11	SOCKET (VIDEO OUT)				
		< VARIABLE RESISTOR >				
VR221	1-241-809-11	VR ROTARY 100K				
VR222	1-241-804-11	SEMI VR 100K				

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Ref. No.	Part No.	Description				Remark
*	A-6756-419-A	TM-1 BOARD, COMPLETE ********************				
*	3-946-542-01	HOLDER				
		< INDICATOR TUBE >				
A7001	1-519-675-11	INDICATOR TUBE, FLUORESCENT				
		< CAPACITOR >				
C7001	1-161-772-11	CERAMIC	0.1uF	10%	25V	
C7002	1-161-772-11	CERAMIC	0.1uF	10%	25V	
C7003	1-102-958-00	CERAMIC	20PF	5%	50V	
C7004	1-102-958-00	CERAMIC	20PF	5%	50V	
C7005	1-161-379-00	CERAMIC	0.01uF	20%	25V	
C7006	1-124-638-11	ELECT	22uF	20%	10V	
C7007	1-161-772-11	CERAMIC	0.1uF	10%	25V	
C7008	1-126-154-11	ELECT	47uF	20%	6.3V	
C7010	1-164-073-11	CERAMIC	100PF	10%	50V	
C7011	1-164-073-11	CERAMIC	100PF	10%	50V	
		< DIODE >				
D7001	8-719-911-19	DIODE 1SS119				

Ref. No.	Part No.	Description	Remarks
D7002	8-719-911-19	DIODE 1SS119	
D7003	8-719-911-19	DIODE 1SS119	
D7004	8-719-911-19	DIODE 1SS119	
D7006	8-719-911-19	DIODE 1SS119	
D7007	8-719-911-19	DIODE 1SS119	
D7008	8-719-911-19	DIODE 1SS119	
D7009	8-719-911-19	DIODE 1SS119	
D7010	8-719-911-19	DIODE 1SS119	
D7014	8-719-911-19	DIODE 1SS119	
D7020	8-719-911-19	DIODE 1SS119	
		< IC >	
IC701	1-809-773-11	IC M38102E5-223SP	
IC702	1-809-380-11	IC MN1380-L	
IC703	1-808-855-11	IC M6M80021P	
		< COMPOSITION CIRCUIT BLOCK >	
RB701	1-239-256-11	R-NETWORK 10K04	
		< SWITCH >	
S7003	1-692-046-11	SWITCH, PUSH (AL/PL)	
S7004	1-692-046-11	SWITCH, PUSH (SPEED +)	
S7005	1-692-046-11	SWITCH, PUSH (SPEED -)	
S7006	1-692-046-11	SWITCH, PUSH (MEMORY)	
S7007	1-692-046-11	SWITCH, PUSH (RESET)	
S7008	1-692-046-11	SWITCH, PUSH (SHIFT)	
S7009	1-692-046-11	SWITCH, PUSH (SHIFT)	
S7010	1-692-046-11	SWITCH, PUSH (PAGE)	
S7011	1-692-046-11	SWITCH, PUSH (CLOCK/COUNT)	
S7012	1-692-046-11	SWITCH, PUSH (SEARCH)	
S7013	1-692-046-11	SWITCH, PUSH (STILL)	
S7014	1-692-046-11	SWITCH, PUSH (FF)	
S7015	1-692-046-11	SWITCH, PUSH (PLAY)	
S7016	1-692-046-11	SWITCH, PUSH (REW)	
S7017	1-692-046-11	SWITCH, PUSH (T/D)	
S7018	1-572-415-11	PUSH SWITCH (STOP)	
S7019	1-572-415-11	PUSH SWITCH (REC)	
		< VIBRATOR >	
XF701	1-579-220-11	CRYSTAL, OSC (32KHz)	
XF702	1-577-683-11	RESONATOR, CERAMIC (6MHz)	

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TM-2 VP-1

Ref. No.	Part No.	Description				Remark
*	A-6756-404-A	TM-2 BOARD, COMPLETE ********************				
*	3-946-545-01	HOLDER				
		< TRANSISTOR >				
B7101	8-729-900-89	TRANSISTOR DTC144ES				
		< CAPACITOR >				
C7101	1-126-157-11	ELECT	10uF	20%	16V	
		< CONNECTOR >				
* CN712	1-691-607-11	PLUG 14P				
		< DIODE >				
D7101	8-719-911-19	DIODE 1SS119				
D7102	8-719-911-19	DIODE 1SS119				
D7103	8-719-911-19	DIODE 1SS119				
D7104	8-719-911-19	DIODE 1SS119				
D7105	1-809-606-11	LED EBR3668S (REPEAT)				
D7106	1-809-606-11	LED EBR3668S (ON)				
D7110	8-719-911-19	DIODE 1SS119				
D7111	8-719-911-19	DIODE 1SS119				
D7112	8-719-911-19	DIODE 1SS119				
		< SWITCH >				
S7101	1-692-047-11	SWITCH, SLIDE 2-3 (ON SCREEN)				
S7102	1-692-047-11	SWITCH, SLIDE 2-3 (REPEAT REC)				
S7103	1-692-047-11	SWITCH, SLIDE 2-3 (ALARM)				
S7104	1-692-047-11	SWITCH, SLIDE 2-3 (ALARM)				
S7105	1-692-047-11	SWITCH, SLIDE 2-3 (COLOR SW)				
S7107	1-692-046-11	SWITCH, PUSH (TIMER/AUDIO)				
S7110	1-572-415-11	PUSH SWITCH (EJECT)				
S7111	1-572-415-11	PUSH SWITCH (ON/STANDBY)				
		< VR ROTARY >				
VR711	1-241-808-11	VR ROTARY 100K (TRACKING)				
VR712	1-241-808-11	VR ROTARY 100K (TRACKING)				
VR713	1-241-807-11	VR ROTARY 20K (SHARPNESS)				

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Ref. No.	Part No.	Description				Remark
*	A-6756-416-A	VP-1 BOARD, COMPLETE ********************				
		< TRANSISTOR >				
B1801	8-729-900-89	TRANSISTOR DTC144ES				
B1802	8-729-900-89	TRANSISTOR DTC144ES				
B1804	8-729-900-89	TRANSISTOR DTC144ES				
B1805	8-729-900-89	TRANSISTOR DTC144ES				

Ref. No.	Part No.	Description				Remark
		< CAPACITOR >				
C1801	1-161-055-00	CERAMIC	0.022uF	10%	50V	
C1802	1-161-772-11	CERAMIC	0.1uF	10%	25V	
C1803	1-161-772-11	CERAMIC	0.1uF	10%	25V	
C1804	1-161-055-00	CERAMIC	0.022uF	10%	50V	
C1805	1-161-055-00	CERAMIC	0.022uF	10%	50V	
C1806	1-161-772-11	CERAMIC	0.1uF	10%	25V	
C1807	1-161-772-11	CERAMIC	0.1uF	10%	25V	
C1808	1-161-055-00	CERAMIC	0.022uF	10%	50V	
C1809	1-162-294-31	CERAMIC	0.001uF	10%	50V	
C1810	1-161-494-00	CERAMIC	0.022uF		25V	
C1811	1-162-294-31	CERAMIC	0.001uF	10%	50V	
C1812	1-164-073-11	CERAMIC	100PF	10%	50V	
C1813	1-161-055-00	CERAMIC	0.022uF	10%	50V	
C1814	1-126-301-11	ELECT	1uF	20%	50V	
C1815	1-161-494-00	CERAMIC	0.022uF		25V	
C1816	1-126-155-11	ELECT	100uF	20%	6.3V	
C1817	1-161-494-00	CERAMIC	0.022uF		25V	
C1818	1-162-205-11	CERAMIC	68PF	5%	50V	
C1819	1-101-880-00	CERAMIC	47PF	5%	50V	
C1820	1-161-055-00	CERAMIC	0.022uF	10%	50V	
C1821	1-162-207-31	CERAMIC	22PF	5%	50V	
C1822	1-162-207-31	CERAMIC	22PF	5%	50V	
C1823	1-164-072-11	CERAMIC	120PF	5%	50V	
C1824	1-162-211-31	CERAMIC	33PF	5%	50V	
C1825	1-161-494-00	CERAMIC	0.022uF		25V	
C1826	1-164-077-11	CERAMIC	220PF	10%	50V	
C1827	1-162-285-31	CERAMIC	180PF	10%	50V	
C1828	1-161-055-00	CERAMIC	0.022uF	10%	50V	
C1829	1-161-379-00	CERAMIC	0.01uF	20%	25V	
C1830	1-162-289-31	CERAMIC	390PF	10%	50V	
C1831	1-102-820-80	CERAMIC	330PF	5%	50V	
C1832	1-161-379-00	CERAMIC	0.01uF	20%	25V	
C1833	1-124-455-00	ELECT	100uF	20%	16V	
C1834	1-161-772-11	CERAMIC	0.1uF	10%	25V	
C1835	1-161-772-11	CERAMIC	0.1uF	10%	25V	
C1836	1-161-772-11	CERAMIC	0.1uF	10%	25V	
C1837	1-126-154-11	ELECT	47uF	20%	6.3V	
C1838	1-161-494-00	CERAMIC	0.022uF		25V	
C1839	1-161-494-00	CERAMIC	0.022uF		25V	
C1840	1-161-494-00	CERAMIC	0.022uF	20%	25V	
		< VIBRATOR >				
D1801	8-719-110-14	DIODE RD9.1ES-B3				
D1802	8-719-911-19	DIODE 1SS119				
		< IC >				
IC181	1-809-583-11	IC AN3363K				

VP-1

Ref. No.	Part No.	Description	Remark
		< COIL >	
L1801	1-410-521-11	INDUCTOR 100uH	
L1802	1-410-517-11	INDUCTOR 47uH	
L1804	1-410-517-11	INDUCTOR 47uH	
L1807	1-410-491-11	INDUCTOR 560uH	
L1808	1-410-509-11	INDUCTOR 10uH	
L1809	1-410-515-11	INDUCTOR 33uH	
L1810	1-412-463-11	CHOKE, HF 330uH	
L1811	1-412-818-11	INDUCTOR 150uH	
L1812	1-410-525-11	INDUCTOR 220uH	
L1813	1-410-522-11	INDUCTOR 120uH	
		< TRANSISTOR >	
Q1802	8-729-266-83	TRANSISTOR 2SC2668	
Q1803	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1804	8-729-266-83	TRANSISTOR 2SC2668	
Q1806	8-729-266-83	TRANSISTOR 2SC2668	
Q1807	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1809	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1810	8-729-119-76	TRANSISTOR 2SC2785-HFE	
Q1811	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1812	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1813	8-729-119-76	TRANSISTOR 2SA1175-HFE	
		< VARIABLE RESISTOR >	
VR181	1-228-998-00	RES, ADJ, METAL 220	
VR182	1-228-997-00	RES, ADJ, METAL 100	

MISCELLANEOUS

⚠46	1-573-623-11	CONNECTOR, INLET	
⚠48	1-590-224-11	CORD, POWER	
105	1-608-710-11	PHOTO TRANSISTOR PN150SAN	
209	1-462-284-11	STATOR	
* 211	1-461-017-11	ROTOR	
252	1-572-383-11	SWITCH, ROTARY	

ACCESSORIES & PACKING MATERIALS

	3-754-690-11	MANUAL, INSTRUCTION (ENGLISH, FRENCH, GERMAN, ITALIAN)
*	3-948-551-01	CUSHION (FRONT), INNER
*	3-948-552-01	CUSHION (BACK), INNER
	3-948-819-01	INDIVIDUAL CARTON

HARDWARE LIST

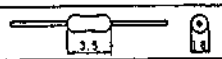
Ref. No.	Part No.	Description	Remark
#1	7-628-253-20	SCREW (2.3X6), +PSW	
#2	7-682-648-09	SCREW (3X8), +PW	
#3	7-685-107-01	SCREW (2.3X12), +PTP	
#4	7-684-023-04	NUT (DIA.3), SPECIAL	
#5	7-682-903-01	SCREW (3X4), +PWH	
#6	7-685-647-79	SCREW +BTP 3X10 TYPE2 N-S	
#7	7-624-105-04	STOP RING 2.3, TYPE -E	
#8	7-685-131-19	SCREW +BTP 2.6X4 TYPE2 N-S	
#9	7-685-534-19	SCREW +BTP 2.6X8 TYPE2 N-S	
#10	7-621-732-08	SET-SCT, HEX. 2X3 FLAT POINT	
#11	7-621-775-28	SCREW +B 2.6X5	
#12	7-685-133-19	SCREW, TOTSU PTP 2.6X6 TYPE2	
#13	7-685-645-79	SCREW +BTP 3X6 TYPE2 N-S	
#14	7-685-648-79	SCREW +P 3X12 TYPE2 SLIT	
#15	7-682-547-09	SCREW +B 3X6	
#16	7-685-661-19	SCREW +BVTP 4X12 TYPE2 N-S	
#17	7-682-947-01	SCREW +PSW 3X6	
#18	7-685-134-19	SCREW, TOTSU PTP 2.6X8 TYPE2	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

Description

CARBON RESISTOR 5% ¼W, 5% ½W

A



Value	Part No.	Value	Part No.	Value	Part No.	Value	Part No.	Value	Part No.	Value	Part No.
0.22Ω		11Ω	1-247-764-00	200Ω	1-247-814-11	3.6kΩ	1-247-844-11	62kΩ	1-247-874-11	1.2MΩ	
0.27Ω		12Ω	1-249-394-11	220Ω	1-249-406-11	3.9kΩ	1-249-424-11	68kΩ	1-249-439-11	1.5MΩ	
0.33Ω		13Ω	1-247-786-11	240Ω	1-247-818-11	4.3kΩ	1-247-848-11	75kΩ	1-247-878-11	1.8MΩ	
0.39Ω		15Ω	1-249-395-11	270Ω	1-249-410-11	4.7kΩ	1-249-425-11	82kΩ	1-249-440-11	2.0MΩ	
0.47Ω	1-249-377-11	16Ω	1-247-788-00	300Ω	1-247-819-11	5.1kΩ	1-247-849-11	91kΩ	1-247-879-00	2.2MΩ	1-259-830-11
0.56Ω	1-249-378-11	18Ω	1-249-396-11	330Ω	1-249-411-11	5.6kΩ	1-249-426-11	100kΩ	1-249-441-11	2.7MΩ	
0.68Ω	1-249-379-11	20Ω	1-247-790-11	360Ω	1-247-820-11	6.2kΩ	1-247-850-11	110kΩ	1-247-880-11	3.3MΩ	
0.82Ω	1-249-380-11	22Ω	1-249-397-11	390Ω	1-249-412-11	6.8kΩ	1-249-427-11	120kΩ	1-247-881-00	3.9MΩ	
1.0Ω	1-249-381-11	24Ω	1-247-792-11	430Ω	1-247-822-11	7.5kΩ	1-247-852-11	130kΩ	1-247-882-11	4.7MΩ	
1.2Ω	1-249-382-11	27Ω	1-249-398-11	470Ω	1-249-413-11	8.2kΩ	1-249-428-11	150kΩ	1-247-883-00	5.6MΩ	
1.5Ω	1-249-383-11	30Ω	1-247-794-11	510Ω	1-249-442-11	9.1kΩ	1-247-854-11	160Ω	1-247-884-11	6.2MΩ	
1.6Ω		33Ω	1-249-399-11	560Ω	1-249-414-11	10kΩ	1-249-429-11	180Ω	1-247-885-00	6.2MΩ	
1.8Ω	1-249-384-11	36Ω	1-247-796-11	620Ω	1-247-826-00	11kΩ	1-247-856-00	200Ω	1-247-886-11	10MΩ	
2.2Ω	1-249-385-11	39Ω	1-249-400-11	680Ω	1-249-415-11	12kΩ	1-249-430-11	220Ω	1-247-887-00	12MΩ	
2.4Ω	1-247-768-00	43Ω	1-247-798-11	750Ω	1-247-828-11	13kΩ	1-247-858-11	240Ω	1-247-888-11	15MΩ	
2.7Ω	1-249-386-11	47Ω	1-249-401-11	820Ω	1-249-416-11	15kΩ	1-249-431-11	270Ω	1-247-889-00	16MΩ	
3.0Ω	1-247-770-00	51Ω	1-247-800-11	910Ω	1-247-830-11	16kΩ	1-247-860-11	300Ω	1-247-890-11	22MΩ	
3.3Ω	1-249-387-11	56Ω	1-249-402-11	1.0kΩ	1-249-417-11	18kΩ	1-249-432-11	330Ω	1-247-891-00		
3.6Ω	1-247-772-00	62Ω	1-247-802-11	1.1kΩ	1-247-832-11	20kΩ	1-247-862-11	360Ω	1-247-892-11		
3.9Ω	1-249-388-11	68Ω	1-249-403-11	1.2kΩ	1-249-418-11	22kΩ	1-249-433-11	390Ω	1-247-893-11		
4.3Ω	1-247-774-00	75Ω	1-247-804-11	1.3kΩ	1-247-834-11	24kΩ	1-247-864-11	430Ω	1-247-894-11		
4.7Ω	1-249-389-11	82Ω	1-249-404-00	1.5kΩ	1-249-419-11	27kΩ	1-249-434-11	470Ω	1-247-895-00		
5.1Ω	1-247-776-00	91Ω	1-247-806-11	1.6kΩ	1-247-836-11	30kΩ	1-247-866-11	510Ω	1-247-896-11		
5.6Ω	1-249-390-11	100Ω	1-249-405-11	1.8kΩ	1-249-420-11	33kΩ	1-249-435-11	560Ω	1-247-897-11		
6.2Ω	1-247-778-00	110Ω	1-247-808-11	2.0kΩ	1-247-838-00	36kΩ	1-247-868-11	620Ω	1-247-898-11		
6.8Ω	1-249-391-11	120Ω	1-249-406-11	2.2kΩ	1-249-421-11	39kΩ	1-249-436-11	680Ω	1-247-899-11		
7.5Ω	1-247-780-00	130Ω	1-247-810-11	2.4kΩ	1-247-840-00	43kΩ	1-247-870-11	750Ω	1-247-900-11		
8.2Ω	1-249-392-11	150Ω	1-249-407-11	2.7kΩ	1-249-422-11	47kΩ	1-249-437-11	820Ω	1-247-901-11		
9.1Ω	1-247-782-00	160Ω	1-247-812-11	3.0kΩ	1-247-842-11	51kΩ	1-247-872-11	910Ω	1-247-902-11		
10Ω	1-249-393-11	180Ω	1-249-408-11	3.3kΩ	1-249-423-11	56kΩ	1-249-438-11	1.0MΩ	1-247-903-00		