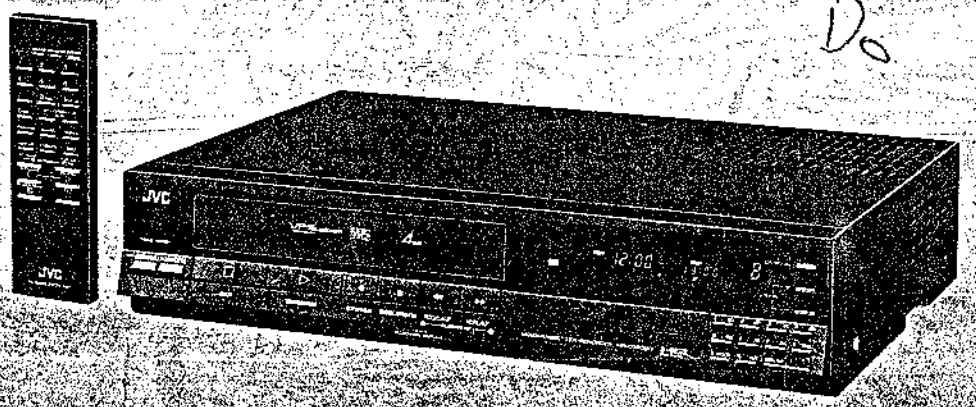
JVC

SERVICE MANUAL

COLOUR VIDEO CASSETTE RECORDER VHS

HR-D180E/EG/EK



The VPS UNIT (model VU-V90E) can be usen with models HR-D180E and HR-D180EG.

SPECIFICATIONS

Format	: VHS PAL standard
Recording system	: Rotary, slant azimuth two-head helical scan system with two pairs of video heads, one for the SP mode and the other for the LP mode
Video signal system	: PAL colour and CCIR monochrome signals, 625 lines
Tape width	: 12.65 mm
Playing time (SP)	: 240 min. with E-240 video cassette
(LP)	: 480 min. with E-240 video cassette
Temperature	
Operating	: 5°C to 40°C
Storage	: –20°C to 60°C
Channel coverage	: VHF 47 – 89 MHz, 104 – 300 MHz, 302 – 470 MHz UHF 470 – 862 MHz
Aerial output	: UHF channels 32 – 40 (adjustable)
Power consumption	: 33 watts
Power requirement	: 220 V~, 50/60 Hz
Video	
Input	: 0.5 to 2.0 Vp-p, 75 ohms, unbalanced
Output	: 1.0 Vp-p, 75 ohms, unbalanced
Signal-to-noise ratio	: 43 dB (Rohde & Schwarz noise meter) with BILDSCHARFE control at centre position
Horizontal resolution	: 250 lines with BILDSCHARFE control at centre position
Audio	
Input	: AUDIO connector (5-pin DIN), –20 dBs, more than 50 k-ohms, unbalanced AUDIO/VIDEO socket (21-pin Peri connector), –3.8 dBs (CENELEC standard), more than 10 k-ohms, unbalanced
Output level	: AUDIO connector (5-pin DIN), -6 dBs, high impedance load AUDIO/VIDEO socket (21-pin Peri connector), -3.8 dBs (CENELEC standard), high impedance load
Output impedance	: Less than 1 k-ohm, unbalanced
Signal-to-noise ratio	: More than 40 dB
Frequency range	: 70 Hz to 10,000 Hz
Timer	: 1-Year/8-event timer
Dimensions	: 435 mm(W) x 95 mm(H) x 341 mm(D)
Weight	: 7.0 kg
Provided accessories	: Aerial cable Video cassette tape Infrared remote control unit "R03" battery x 2 VPS unit

Specifications shown are for SP mode unless otherwise specified.
Design and specifications subject to change without notice.

No. 8457
June 1986

NOTE: For a technical description, please refer to Technical Guide T-8049 HR-D180 PAL.

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NOTE: For a technical description, please refer to Technical Guide T-8049 HR-D180 PAL.

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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded ( ) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors

5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

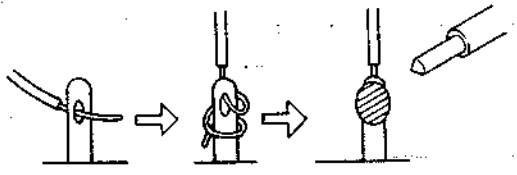


Fig. 1

6. Observe that wires do not contact heat producing parts (heat-sinks, oxide metal film resistors, fusible resistors, etc.)

7. Check that replaced wires do not contact sharp edged or pointed parts.

8. When a power cord has been replaced, check that 10—15 kg of force in any direction will not loosen it.

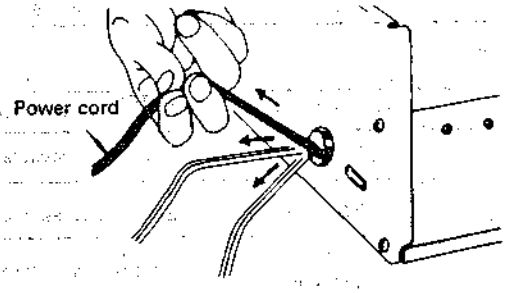


Fig. 2

9. Also check areas surrounding repaired locations.

10. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

11. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

    1) **Connector part number** : E03830-001
    2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

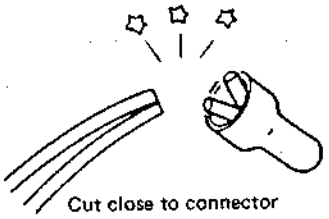


Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

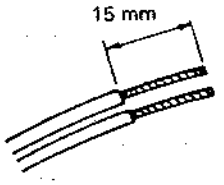


Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

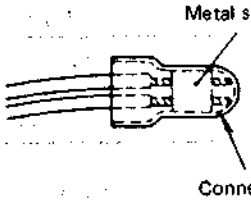


Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

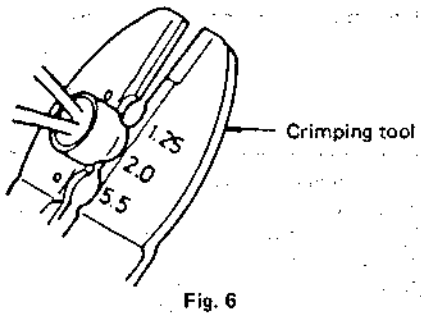


Fig. 6

(5) Check the four points noted in Fig. 7.

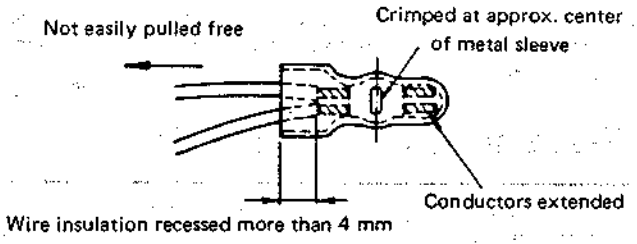


Fig. 7

Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.

2. **Dielectric strength test**
Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.

3. **Clearance distance**
When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table below.

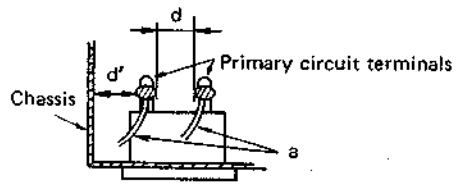


Fig. 8

4. **Leakage current test**
Confirm specified or lower leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method: (Power ON)
Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure and following table.

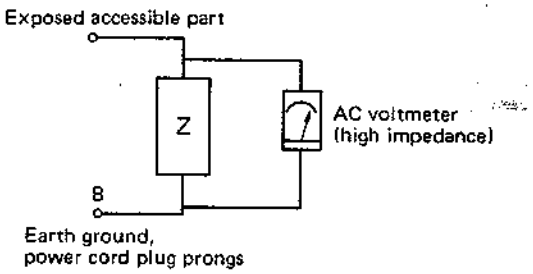


Fig. 9

AC Line Voltage	Region	Insulation Resistance	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	≧ 1 mΩ/500 V DC	1 kV 1 minute	≧ 3 mm
110 to 130 V	USA & Canada	—	900 V 1 minute	≧ 3.2 mm
*110 to 130 V 200 to 240 V	Europe Australia	≧ 10 mΩ/500 V DC	4 kV 1 minute	≧ 6 mm (d) ≧ 8 mm (d') (a: Power cord)

*Class II model only.

Table 1 Ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (b) to:
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 μF, 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current ratings for selected areas

Note: This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

SECTION 1
MECHANISM ADJUSTMENT

1.1 GENERAL

1.1.1 Precautions

IMPORTANT:

1. Disconnect unit from power before removing or soldering components.
2. When removing a fastener (screw, washer, etc.), be careful not to drop it into the mechanism. If a fastener should be dropped, be sure to retrieve it.
3. The tape transport mechanism has been precisely adjusted at the factory and ordinarily does not require readjustment.
4. When removing a part, be very careful not to damage or displace other parts. (Be especially careful with the tape guides and rotary video head drum.)
5. For service procedures that call for operation of the set with the cassette housing is separated from the main-deck, perform as below.

1) Disable the photo transistor sensor (END SENSOR) on the main-deck by applying an opaque cover.
2) Supply power and select required mades with front panel operation buttons.

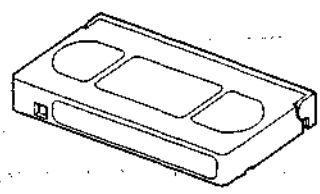
1.1.2 Required test equipment, fixtures and tools

For proper mechanical adjustment, the following test equipment, fixtures and tools are strongly recommended. Without them, a long trial-and-error period would be necessary, resulting in possible damage. In addition, general-purpose tools are required.

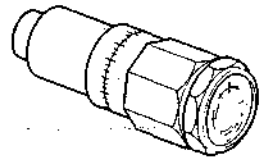
1. Test equipment required:

Color television or monitor
Oscilloscope: Wide-band, dual trace, triggered, delayed sweep
Recording tape
Alignment tapes

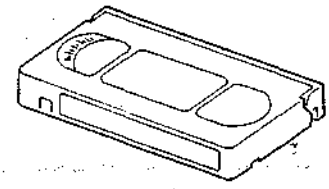
JVC alignment tape MH-2



Torque gauge assembly PUJ48075-2
(Torquemeter : 600ATG
Torquemeterhead : PUJ48016-2)



Back tension cassette gauge PUJ48076



A/CTL head position tool PUJ47351-2

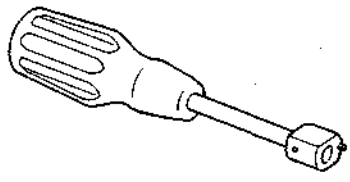


Table 1-1-1 Fixtures and tools

1.1.3 Disassembly

1. Top cover
1) Take out four screws located on right and left sides.
2) Shift the top cover a little to the rear direction, then remove it upwards.

2. Front panel
1) Remove the top cover.
2) Bend three portions (A) of the front panel upwards to disengage them from the chassis.
3) Then pull the front panel outwards.
4) Disengage three portions (B) of the front panel from the chassis, then remove the front panel.

3. Bottom cover
1) Remove the top cover.
2) Loosen the screws of the four feet, then pull out the feet from the chassis.
3) Take out four screws, then remove the bottom cover.

4. Cassette housing door
1) Pull the center of the cassette housing door to bend it out, then remove the cassette housing door. Use care regarding the torsion spring on the left.

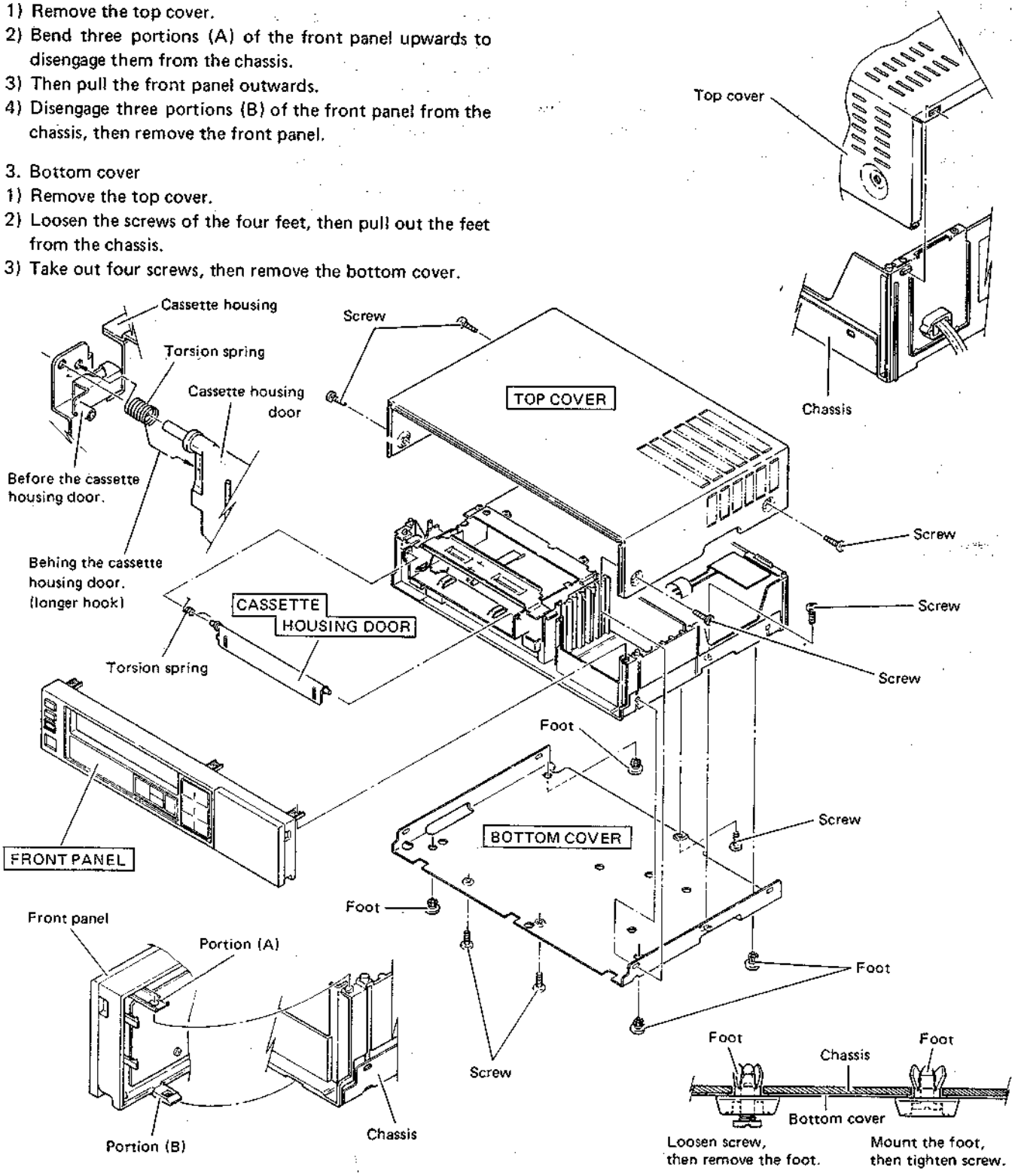


Fig. 1-1-1 Removal of external covers

1.1.4 Layout of main parts

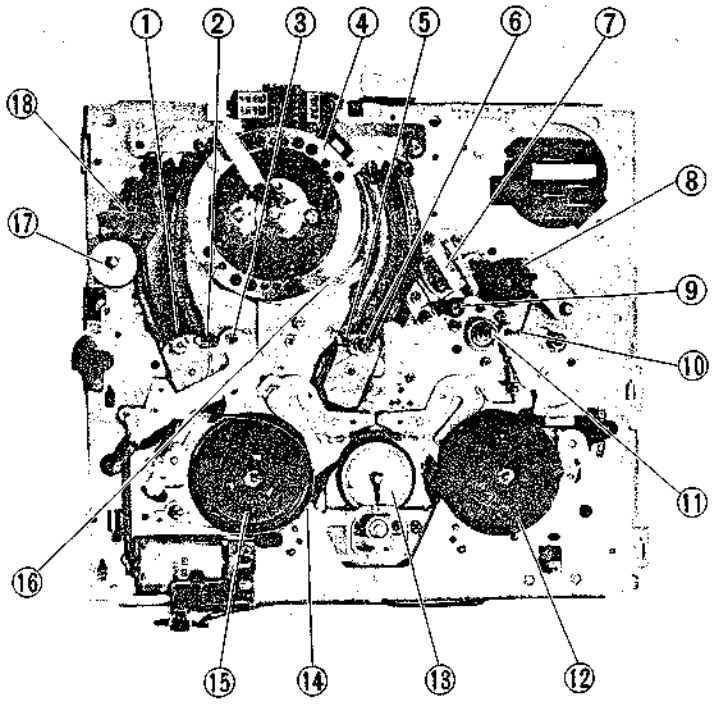


Fig. 1-1-2 Top view of main-deck

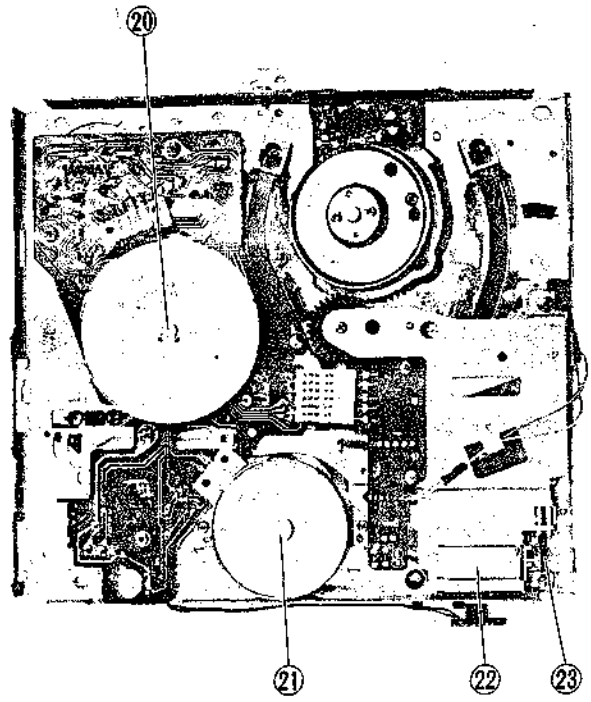


Fig. 1-1-3 Bottom view of main-deck

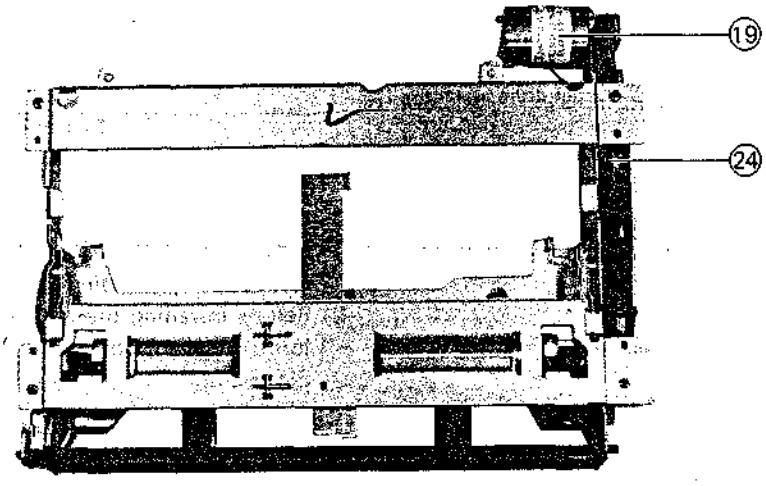


Fig. 1-1-4 Cassette housing

1. Supply guide roller
2. Supply slant pole
3. Tension pole
4. Upper drum
5. Take-up slant pole
6. Take-up guide roller
7. A/C head
8. Pinch roller
9. Take-up guide pole
10. Guide arm
11. Capstan
12. Take-up reel disk
13. Reel idler
14. Tension band
15. Supply reel disk
16. Lower drum
17. Impedance roller
18. Full erase head
19. Cassette motor
20. Capstan motor
21. Reel motor
22. Mode motor
23. Mode belt
24. Cassette belt

1.2 MAIN ASSEMBLY REPLACEMENT

1.2.1 Upper drum assembly

Notes: When handling and installing the upper drum assembly, avoid directly touching the head tips on the upper drum assembly.
For cleaning the head tips, push and hold a lint-free cloth or chamois dampened with alcohol to the upper drum assembly by the fingers, then turn the upper drum assembly clockwise. Do not clean the upper drum assembly with a vertical stroke.

1. Removal
1) Take out a screw and remove the brush assembly from the drum assembly.
2) Unsolder all soldered portions on the DRUM PWB. Remove excess solder, then remove the DRUM PWB from the upper drum assembly.
Note: Soldered portion can be easily removed by removing solder with sucker or wick.
3) Take out two screws and remove the upper drum assembly upwards.

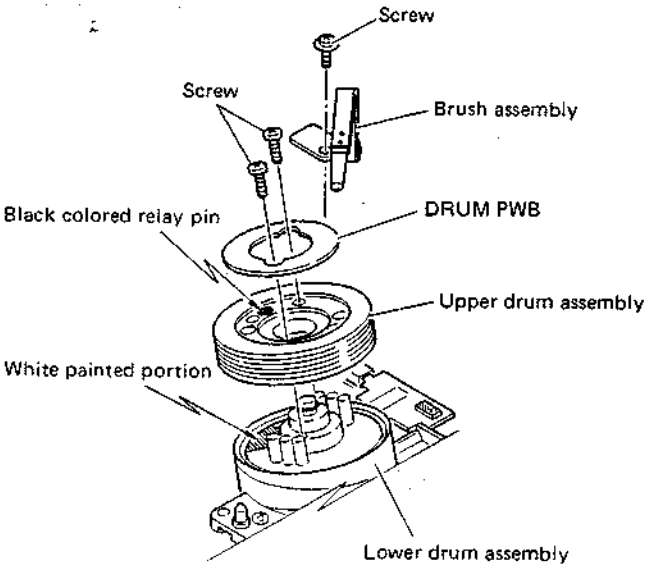


Fig. 1-2-1 Upper drum assembly

2. Installation
1) Install a new upper drum assembly so that the black-colored relay pin of the upper drum assembly overlies the white painted portion of the lower drum assembly, as shown in Fig. 1-2-1.
2) Tighten two screws in a balanced manner.
3) Set the DRUM PWB on the upper drum assembly, then resolder it.
4) Clean the drum unit (particularly clean the upper drum assembly).
5) Mount the brush assembly on the original position, then tighten a screw to fix the brush assembly.

3. Confirmation and adjustment
1) Perform the FM envelope confirmation. Refer to section 1.6.1.
2) Perform the PB switching point adjustment of the Servo circuit. Refer to section 2.3.1.

1.2.2 A/C head (Audio/control head)

1. Removal
1) Disconnect connectors from the A/C HEAD PWB.
2) Take out two screws, then remove the A/C head and the head base together.
3) Unsolder and separate the A/C HEAD PWB from the A/C head.
4) Take out a screw and remove the shield cap from the A/C head.
5) Take out three screws and separate the A/C head from the head base. Use care regarding springs. Do not lose them.

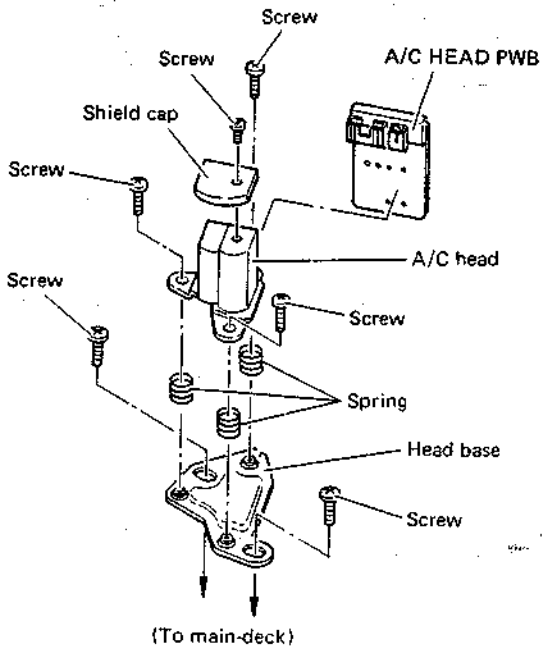


Fig. 1-2-2 A/C head

2. Installation
1) Mount a new A/C head and other peripheral parts on the main-deck by reversing the removal procedure.
2) Before installing the A/C head on the main-deck, perform rough-adjustment of A/C head height as shown in Fig. 1-2-3.

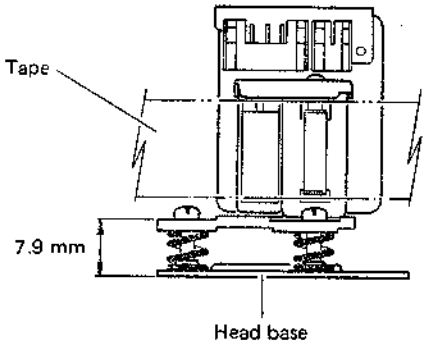


Fig. 1-2-3 A/C head height

3. Confirmation and adjustment
1) Use a recording tape and confirm correct tape transport operation, then perform interchangeability adjustment. Refer to sections 1.5 and 1.6.

1.2.3 Tension band assembly

1. Removal

1) Take out a screw, then pry the A portion of the tension band assembly upwards to separate it from the tension arm assembly.

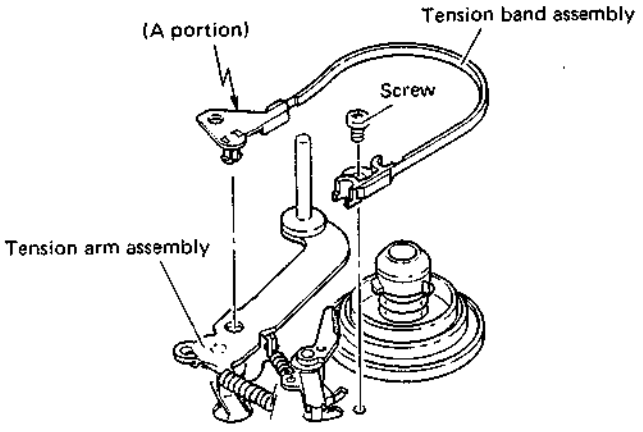


Fig. 1-2-4 Tension band assembly

2. Installation

1) Install a new tension band assembly by reversing the removal procedure.

3. Confirmation and adjustment

1) Perform tension pole position adjustment. Refer to section 1.4.1.

1.3 ASSEMBLY PROCEDURE OF MECHANISM

The mechanism of this model is mostly engaged to the mechanism control circuit, through the mode select switch. Therefore, the relation between the mode select switch and the control arm decides all mechanical movement of the mechanical parts such as levers, gears, rollers and so on. If these parts are not properly positioned, the unit will be unloaded or compulsorily stopped. This will result in damage of mechanical or electrical parts.

1.3.1 Loading arm assembly

Loading arm assembly consists of loading gear, torsion spring and loading arm.

1. Set up the loading arm assembly correctly as shown in Fig. 1-3-1.

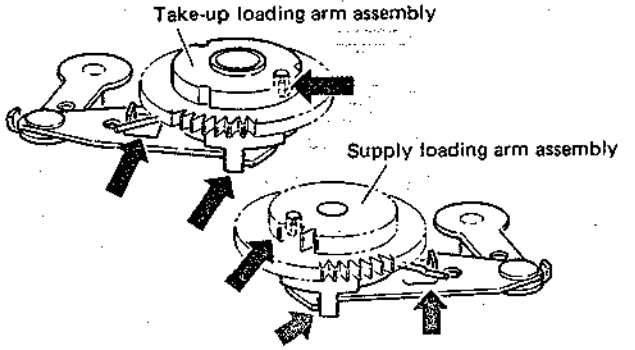


Fig. 1-3-1 Loading arm assembly (1)

2. Install the take-up loading arm assembly and the supply loading arm assembly so that the holes on the loading gears face each other, as shown in Fig. 1-3-2. Do not move the loading arm assemblies from this position for the next step.

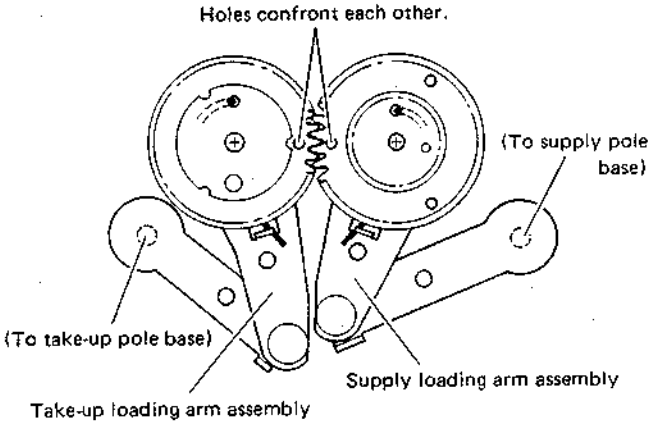


Fig. 1-3-2 Loading arm assembly (2)

1.3.2 Control cam

1. Set the arm gear assembly on the cam bracket assembly so that the hole of the arm gear assembly overlaps the hole of the cam bracket assembly.

2. Install the control cam on the cam bracket assembly so that the hole of the control cam overlaps the hole which is indicated in the step 1), as shown in Fig. 1-3-3. Do not turn the control cam from this position for the next step.

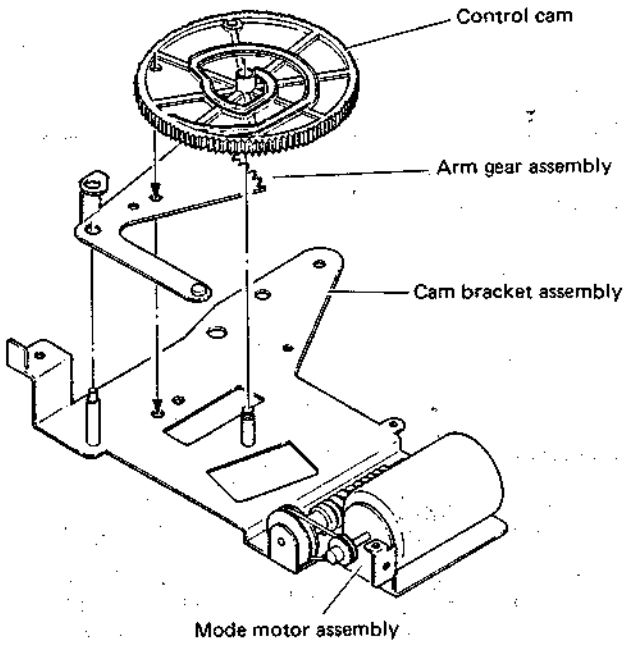


Fig. 1-3-3 Control cam

1.3.3 Cam bracket assembly

1. Push and hold the plate assembly so that the hole of the plate assembly overlaps the hole of the main-deck, as shown in Fig. 1-3-4.
2. Then mount the cam bracket assembly.

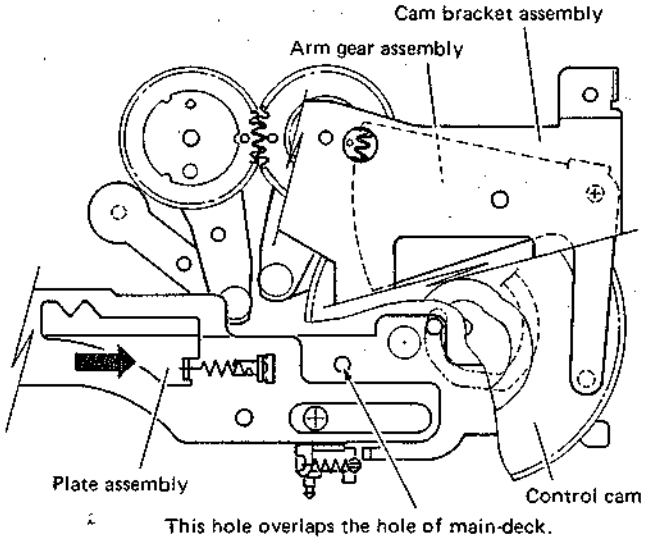


Fig. 1-3-4 Cam bracket assembly

1.4 CONFIRMATION AND ADJUSTMENT

1.4.1 Tension pole position adjustment

1. Without loading a tape, set for the Play mode.
2. Loosen screw a little bit, then adjust the tension band holder so that the distance, shown in Fig. 1-4-1, becomes zero (0 mm).
3. Tighten screw to fix the tension band holder.

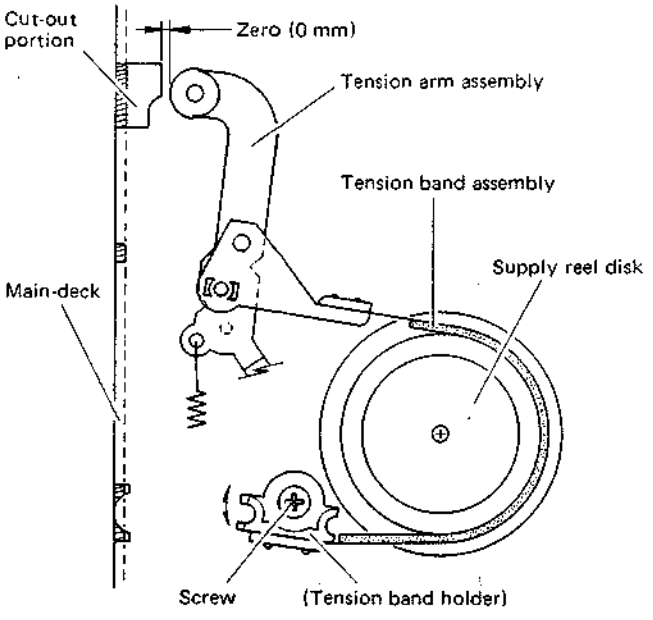


Fig. 1-4-1 Tension pole position

Note: By this adjustment, back tension is within normal specification, in spite of parts tolerances.

4. Use the back tension cassette gauge and set for the Play mode.
5. Confirm that the indication is between 24—40.

1.4.2 Take-up torque confirmation

1. Set the Play mode without the cassette housing assembly.
2. Set the torque gauge on the take-up reel disk.
3. The torque gauge consists of upper and lower sections connected by a spring mechanism. Relax the grip on the torque gauge so that the indicator needle and scale rotate at equal speed, then read the indication. The correct value is between 50 — 150.
4. If necessary, replace the take-up and supply clutches.

1.5 TAPE TRANSPORT SYSTEM CONFIRMATION AND ADJUSTMENT

Once adjusted to the complete condition, readjustment of the tape transport system is not necessary, except when the parts that compose the tape transport system are replaced due to troubles by long usage or unexpected accidents.

1.5.1 Tape transport system adjustment

1. Guide roller

   To get the FM envelope into ideal shape for interchangeability, the height adjustment of the guide roller is needed.

   Before turning the guide roller, slightly loosen the setscrew located under the guide roller. For loosening the setscrew, use the hex key (1.25 mm).

   Note: Loosen the setscrew enough to allow the guide roller to be turned. If excessively loose, tape motion may turn the guide roller inadvertently.

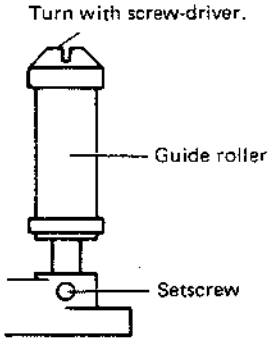


Fig. 1-5-1 Guide roller

2. Impedance roller
Normally, do not adjust the height of the impedance roller. Only when the defects of tape travel are noted at the impedance roller, after complete adjustment for interchangeability, adjust the height of impedance roller to obtain smooth tape travel. For adjustment of impedance roller height, use the nut-driver (5.5 mm).
Note: Do not lower the impedance roller excessively to avoid the defects of tape travel. Tape must be along the lower flange located under the impedance roller.

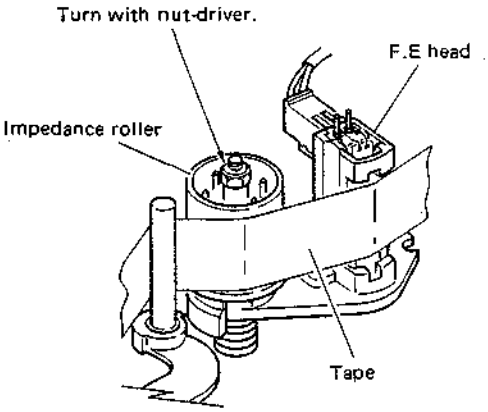


Fig. 1-5-2 Impedance roller

3. A/C head (audio/control head)
When defects of tape travel are noted at the take-up guide pole, adjust the inclination of A/C head to obtain smooth tape travel.

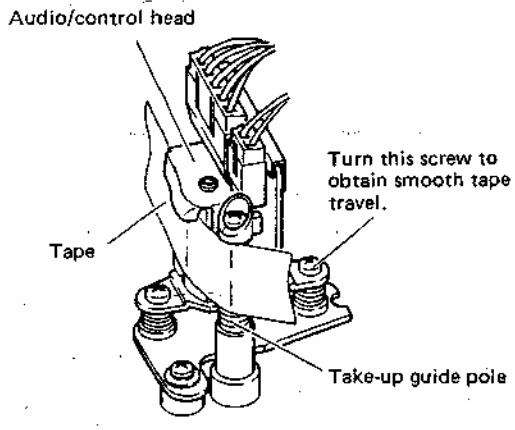


Fig. 1-5-3 A/C head

1.6 INTERCHANGEABILITY CONFIRMATION AND ADJUSTMENT

Before using an alignment tape, use a recording tape and confirm correct tape transport operation.
For the FM envelope output, connect an oscilloscope to TP106 of the MAIN PWB. For audio output, connect to the AUDIO OUT terminal, and trigger the oscilloscope externally with the signal from TP110 of the MAIN PWB. Use only the stairstep segment of the alignment tape MH-2, do not another segment for interchangeability.

1.6.1 FM envelope confirmation and adjustment

1. Turn the TRACKING knob to obtain the maximum FM envelope output corresponding to (a) level in Fig. 1-6-1. Ovserve the FM envelope, read the maximum level (a) and the minimum levels (b), (c) and (d).
Confirm that:

$$\frac{b}{a} \geqq 0.7,\ \frac{c}{a} \geqq 0.5 \text{ and } \frac{d}{a} \geqq 0.5$$

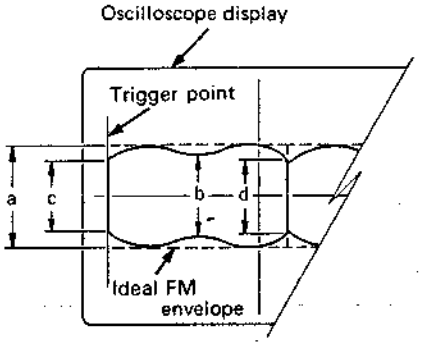


Fig. 1-6-1 FM envelope

2. If defects are noted, following adjustments are required.
1) Observe the oscilloscope display and turn the TRACKING knob to vary the FM output from maximum to minimum.
2) If the variation is not parallel at the rising portion (drum entrance) of the FM envelope, turn the supply guide roller so that the rising portion of the envelope becomes nearly flat, as shown in Fig. 1-6-2.

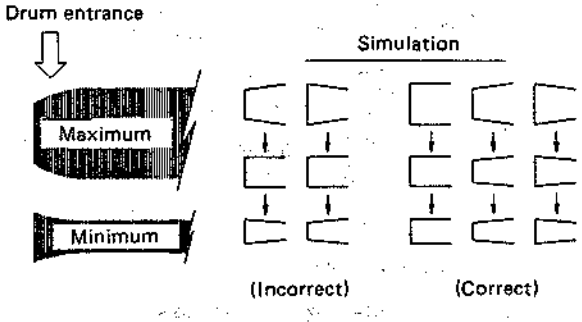


Fig. 1-6-2 Drum entrance

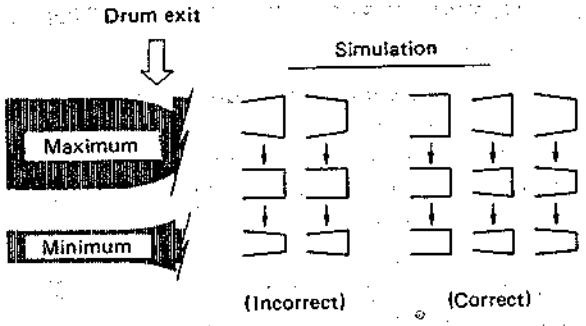


Fig. 1-6-3 Drum exit

3) In the same manner as for the rising portion, turn the take-up guide roller to adjust the falling portion (drum exit) of the FM envelope. See Fig. 1-6-3.
4) In addition to observing the envelope, confirm absence of tape curling or wrinkling at the impedance roller and take-up guide pole. If it occurs at the impedance roller, adjust the impedance roller height. If it occurs at the take-up guide pole, adjust the A/C head inclination.
5) Vary the FM envelope output level and perform fine adjustments of the guide rollers.

1.6.2 A/C head height and azimuth adjustments

Incorrect A/C head height can impair audio signal-to-noise ratio when playing back a pre-recorded tape.

1. For A/C head inclination, adjust screw (A) so that small tape wrinkles are not produced at the take-up guide pole. Turn screw (A) clockwise so that the tape wrinkles are apparent with the lower flange of the take-up guide pole, then turn screw (A) counter-clockwise so that the wrinkles smooth out.
2. Adjust azimuth with screw (B).
   Turn screw (B) to obtain maximum audio output.
3. For A/C head height, turn screws (A), (B) and (C) in succession by small and equal increments at a time and adjust for maximum audio output level.

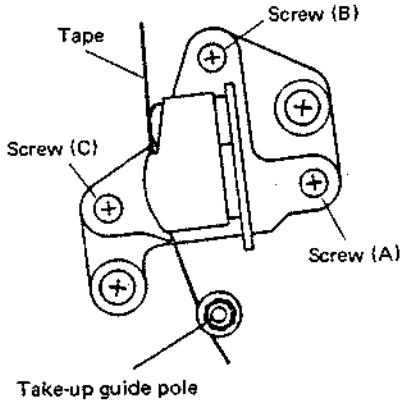


Fig. 1-6-4 A/C head

1.6.3 Control head phase adjustment

1. Set the TRACKING knob to AUTO (center detent position).
2. Loosen screws (D) and (E) a little bit, then cover screw (D) with the A/CTL head position tool and set the pin of the tool into the hole next to screw (D).
3. Turn the tool counter-clockwise to shift the A/C head fully in the direction of the capstan, and then gradually turn the tool clockwise and observe the FM envelope output.
4. Set the A/C head at the point of the first output peak.

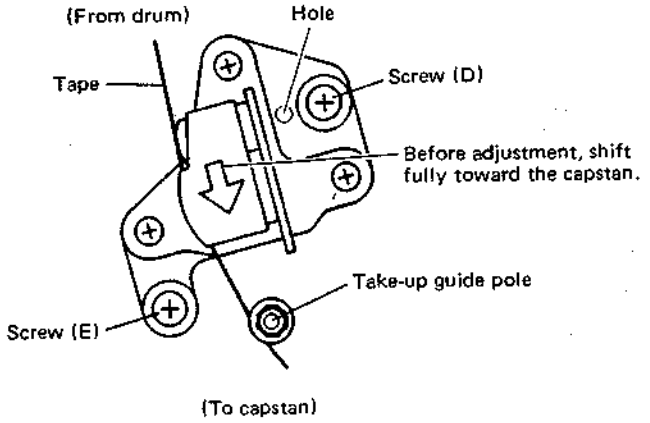


Fig. 1-6-5 Control head phase

1.6.4 Setscrew tightening

1. After confirming absence of tape wrinkling and other transport irregularities, tighten the setscrews located under the guide rollers while in the Stop mode.
   Note: Since the guide rollers are easily moved, use care when tightening.
2. Again perform the FM envelope confirmation.

1.6.5 Final confirmation

1. Supply a video signal and perform recording, then play back.
   Confirm that the FM envelope satisfies the specifications during playback of alignment tape MH-2.
2. Perform the PB switching point adjustment of the Servo circuit. Refer to section 2.3.1.
3. Perform the audio PB level adjustment of the Audio circuit. Refer to section 2.5.2.
4. Perform overall confirmation of the Video circuit. Refer to section 2.4.

SECTION 2
ELECTRICAL ADJUSTMENTS

2.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts.
It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

2.1.1 Required test equipment

1. Color television or monitor
2. Oscilloscope: wide-band, dual-trace, triggered delayed sweep
3. Frequency counter
4. Audio oscillator
5. Audio voltmeter
6. Digital voltmeter
7. Signal generator: RF/IF sweep/marker
8. Signal generator: PAL colour bar, stairstep
9. Recording tape
10. Alignment tapes: (MH-2)

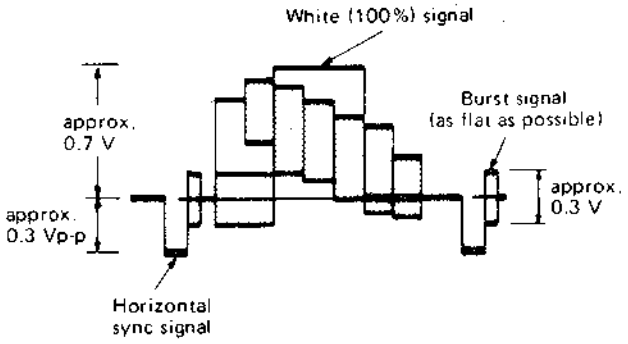


Fig. 2-1-1 Colour bar signal of pattern generator

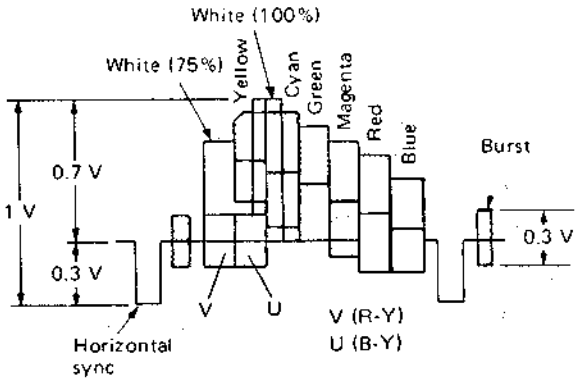


Fig. 2-1-2 Colour bar signal waveform

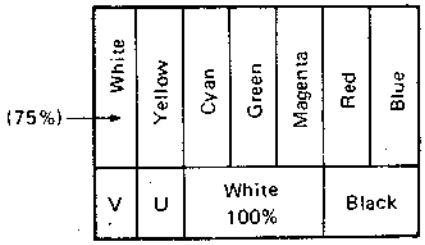


Fig. 2-1-3 Colour bar pattern

2.1.2 Check and adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

No.	Checks and adjustments are numbered in the recommended sequence in which they are to be performed.
Item	Name assigned to the particular check and adjustment step.
Check Point	Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.
Adjustment Parts	Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (—) indicates check only.
Signal & Mode	• Input signal required to perform adjustment. Dash (—) indicates that special signal is not required. • Equipment operating mode at time of check or adjustment.
Colour bar	Colour bar signal as video input
Stairstep	Stairstep signal as video input
1 kHz	Supply a 1 kHz sinewave as audio input signal.
MH-2 Colour bar	Play colour bar segment of MH-2 alignment tape.
MH-2 Stairstep	Play stairstep segment of MH-2 alignment tape.
MH-2 1 kHz	Play 1 kHz audio signal segment of MH-2 alignment tape.
MH-2 RF sweep	Play RF sweep segment of MH-2 alignment tape.
Stop	Power on and machine in Stop mode.
REC	Recording mode
PB	Playback mode
REC ↓ (another mode)	Use blank tape, record, then play back in the mode specified.
Search	Search (FWDS and REVS) playback mode
Slow	Slow motion playback mode
Still	Playback then Pause
A DUB	Audio dubbing mode
Description and Waveform	This column provides an explanation of the step, notes, adjustment values and waveform diagrams.

2.2 TIMER CIRCUIT ([1][5] TIMER board)

Note: Unless otherwise specified, test points and variable rasistors are located on the TIMER board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Timer Clock	TP2	C102	• E-E	1) Connect the frequency counter to TP2 and GND. 2) Short TP1 (TEST) and GND. Then short the plus (+) terminal of C7 and GND once in order to reset. 3) Adjust period T with C102 so that: T = 0.999995 ± 0.000001 sec.

2.3 SERVO CIRCUIT ([0][8] SERVO board)

Notes: Unless otherwise specified, test points and variable resistors are located on the SERVO board.
Before steps 1 and 2 adjustments "Control head phase adjustment" must be completed. (Refer to Sec. 1.6.3)

1	PB Switching Point	VIDEO OUT or CN2, pin 12 ([0][3] VIDEO board)	R35 (CH-1) PB SW POINT	• PB • MH-2 Stairstep • Trigger slope (—) • SP mode	1) Connect an oscilloscope to VIDEO OUT or CN2 pin 12 of the VIDEO board. 2) Play back the stairstep segment of MH-2 alignment tape. 3) Trigger the oscilloscope externally (— slope) with the signal from TP11 (DRUM FF). 4) Adjust R35 to position the trigger point 6.5 ± 0.5H from V. sync.
2	CTL Head Position	VIDEO OUT or CN2, pin 12 ([0][3] VIDEO board)	R46 CTL Head Position	• PB • Colour bar	1) Connect an oscilloscope to VIDEO OUT or CN2 pin 12 of the VIDEO board. 2) Play back the colour bar segment of MH-2 alignment tape. 3) Adjust R46 for maximum output level.
3	V. Pulse Position	MONITOR	R1 ([0][6] TERMINAL board)	• Still • REC then PB • Colour bar • SP mode	1) Record the color bar signal, then playback. 2) In the Still mode, observe the monitor and adjust R1 for the minimum vertical jitter.

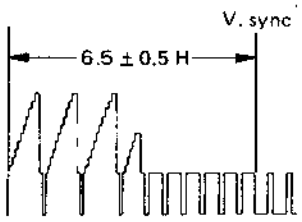
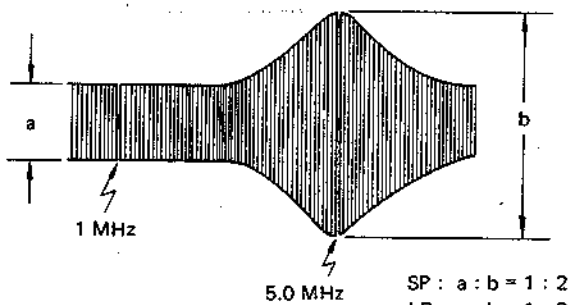


Fig. 2-3-1

2.4 VIDEO CIRCUIT ([0][3] MAIN board)

Note: Unless otherwise specified, test points and variable resistors are located on the Main board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Video Head Resonance & Quality Factor ([4][3] PRE/REC Amp board)	TP2 (CH1 SP REC FM) TP5 (PB FM) TP1 (CH2 SP REC FM) TP3 (CH1 LP REC FM) TP4 (CH2 LP REC FM)	C7 (SP CH1 fo) R2 (SP CH1 Q) C5 (SP CH2 fo) R1 (SP CH2 fo) C13 (LP CH1 fo) R3 (LP CH1 Q) C15 (LP CH2 fo) R4 (LP CH2 Q)	• RF Sweep • PB • SP mode • RF Sweep • PB • LP mode	1) Set for the playback mode without a tape. (Refer to mechanical adjustment 1.1.1.) 2) Connect a sweep generator to TP2 (CH1) and TP1 (CH2). 3) At TP5, adjust C7 (CH1) and C5 (CH2) for 5.0 MHz peaking, and R2 (CH1) and R1 (CH2) so that the ratio between 1 MHz and 5 MHz level becomes 1 : 2 as shown in Fig. 2-4-1. 4) Perform adjustment in the same manner as SP mode CH1, CH2. Connect a sweep generator to TP3 (CH1) and TP4 (CH2). 5) At TP5, adjust C13 (CH1) and C15 (CH2) for 5.0 MHz peaking, and R3 (CH1) and R4 (CH2) so that the ratio between 1 MHz and 5 MHz level becomes 1 : 2 as shown in Fig. 2-4-1.
2	VXO	TP306 FSC	R328 VXO	• PB • MH-2 colour bar • SP mode	1) Connect a frequency counter to TP306. 2) Play back the colour bar segment of MH-2 alignment tape. 3) Adjust R328 for 4.433619 MHz ± 50 Hz.
3	REC FM level	TP2 (CH1 SP REC FM) ([4][3] PRE/REC Amp board)	R119 (REC FM ADJ)	• Colour bar • REC • LP mode • Colour bar • REC • SP mode	1) Supply a color bar input signal. 2) Connect an oscilloscope to TP2 on PRE/REC Amp board. 3) In the LP mode, adjust R119 so that the pedestal level of the vertical blanking component becomes 1 Vp-p. 4) In the SP mode, confirm that the pedestal leve of the vertical blanking component becomes 1.3 Vp-p.



SP : a : b = 1 : 2
LP : a : b = 1 : 2

Fig. 2-4-1

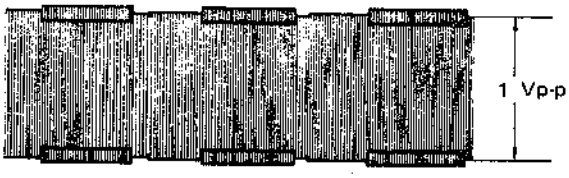


Fig. 2-4-2

1 Vp-p : LP mode
1.3 Vp-p : SP mode

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
4	SP REC Colour Level	TP304	R322	•PB •SP mode •REC then PB •Colour bar •SP mode	1) Connect an oscilloscope to TP304 playback a colour bar segment of the MH-2 and observe colour signal level. 2) Adjust the Tracking control (R401) of the OPERATION board for maximum level of the colour waveform and make a note of the higher colour level. 3) Set the Tracking contorl (R401) of the OPERATION board to the center click position. 4) Record the colour bar signal, then playback. Before recording, adjust R322 so that the higher level channel becomes 95 to 105% of the noted level during playback. At this time, confirm that the channel difference is within 3 dB.
5	LP REC Colour Level	TP304	R438	•PB •LP mode •REC then PB •Colour bar •LP mode	1) Connect an oscilloscope to TP304 playback a colour bar segment of the MH-2 and observe colour signal level. 2) Adjust the Tracking control (R401) of the OPERATION board for maximum level of the colour waveform and make a note of the higher colour level. 3) Set the Tracking contorl (R401) of the OPERATION board to the center click position. 4) Record the colour bar signal, then playback. Before recording, adjust R438 so that the higher level channel becomes 75 to 85% of the noted level during playback. At this time, confirm that the channel difference is within 3 dB.
6	Inverted Colour Level	TP405 (PB COLOUR 4.43 MHz)	R401 (INVERTED COLOUR LEVEL)	•MH-2 Colour bar •PB	1) Connect an oscilloscope to TP405 and observe signal level. 2) Connect jump wires between TP434, TP435 and GND. Again check the TP405 level. 3) Adjust R401 to obtain the same level in both cases as shown in Fig. 2-4-4
7	0.5 H Delayed Video Level	TP222 (ORIGINAL VIDEO IN) TP221 (0.5 H DELAYED VIDEO)	R223 (0.5 H DELAYED VIDEO LEVEL)	•MH-2 Colour bar •PB •LP mode	**Note:** Perform the 0.5 H Delayed Video Level adjustment after completing Inverted Colour Level. 1) Connect one channel of a dual trace oscilloscope to TP222 and the other channel to TP221. 2) Adjust R223 to obtain the same level in both cases as shown in Fig. 2-4-5.

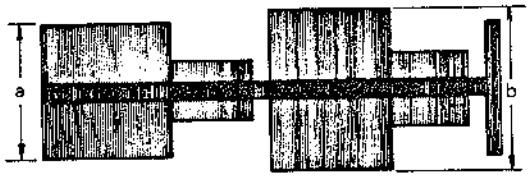


Fig. 2-4-3

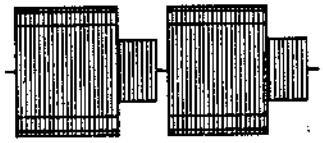


Fig. 2-4-4

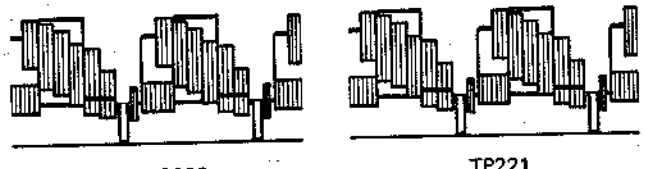
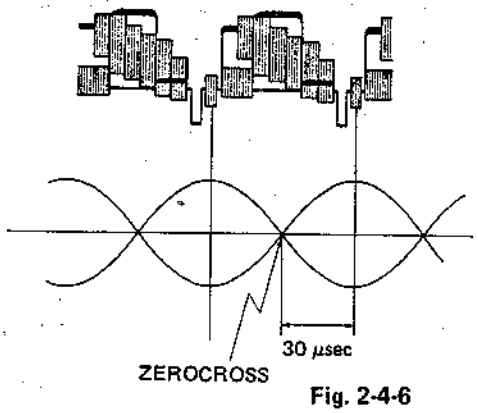
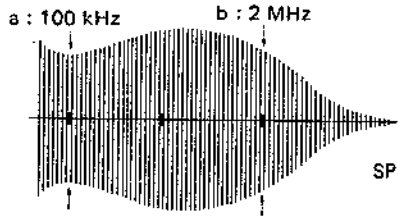
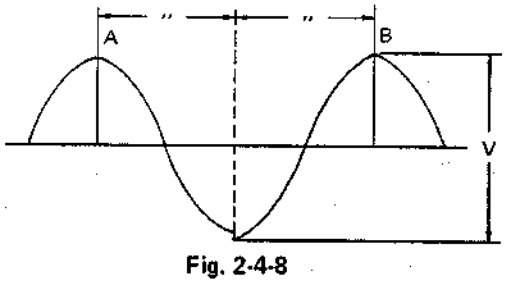


Fig. 2-4-5

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
8	APC Error Phase	TP405 (PB Colour) TP433 (7.8 kHz)	L401 (7.8 kHz TUNING)	• MH-2 Colour bar	1) Connect one channel of a dual trace oscilloscope to TP405 and the other channel to TP433 and observe the waveforms. 2) Adjust L401 to position the zero-cross 30 μsec ± 3 μsec from the center of the burst signal as shown in Fig. 2-4-6.
	 Fig. 2-4-6				
9	0.5 H Delayed Jump DET	TP432 (VCO OUTPUT)	R418 (0.5 H DELAYED Jump DET)	• No. Signal (AUX) • E-E	1) Connect a jump wires between TP431 and TP SWD 5 V. 2) Connect a frequency counter to TP432. 3) Adjust R418 to obtain 30 ± 0.2 kHz.
10	SP PB Frequency response	TP110 (VIDEO OUT)	R110 (SP RF EQ)	• Video Sweep • REC then PB • SP mode	1) Connect an oscilloscope to TP110. 2) Set the Sharpness control (R402) of OPERATION board to center click position. 3) Record and playback a video sweep (with sync) signal. 4) Adjust R110 so that the 2 MHz level become 0 ± 1 dB (79 – 96%) with reference to 100 kHz.
	 SP : $\frac{b}{a}$ = 0 ± 1 dB LP : $\frac{b}{a}$ = –4 ± 1 dB Fig. 2-4-7				
11	LP PB Frequency response	TP110 (VIDEO OUT)	R202 (LP RF EQ)	• Video Sweep • REC then PB • LP mode	1) Connect an oscilloscope to TP110. 2) Set the sharpness control to center click position. 3) Record and playback a video sweep (with sync) signal. 4) Adjust R202 so that the 2 MHz level become –4 ± 1 dB with reference to 100 kHz as shown in Fig. 2-4-7.
12	SECAM DET (*E/EG Model)	TP310 (S DET ADJ)	L351 (1/2 fH TUNING) R355 SECAM DET. ADJ	• SECAM Colour bar • E-E	1) Connect an oscilloscope to TP310. 2) Adjust L351 so that transistion step becomes centered between "A" and "B" as shown in Fig. 2-4-8.
	Set this point to center position between points "A" and "B". V = more than 5.5 Vp-p in REC V = 6.5 ± 0.5 Vp-p in PB			• REC → PB	 Fig. 2-4-8 3) Record then playback. 4) Adjust R355 for 6.0 ± 0.5 Vp-p.

2.5 AUDIO & CUE CIRCUIT ([0][9] AUDIO & CUE board)

Note: Unless otherwise specified, test point and variable resistors are located on the AUDIO & CUE board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Audio Bias Level	TP31 BIAS LEVEL	R20 BIAS LEVEL	• REC • SP mode	1) Connect a digital voltmeter between TP31 and 32. 2) Set for the REC mode without signal. 3) Adjust R20 for 12.5 V ± 0.2 mVrms.
2	Audio PB Level	AUDIO OUT	R5 PB LEVEL	• REC • SP ro EP mode	1) Connect an oscilloscope to AUDIO OUT. 2) Supply an audio signal (−8 dBs/1 kHz) to AUDIO IN and record together with a VIDEO signal, then play back. 3) Adjust R5 so that the audio output level during playback becomes −6 ± 2 dBs.

2.6 TUNER/IF CIRCUIT ([0][7] TU/IF board)

Note: Unless otherwise specified, test points and variable resistors are located on the TUNER/IF board.

Equipment required

1. Oscilloscope
2. IF sweep signal generator with suitable markers (PIF, SIF, etc.)
3. DC power supplies — For power bias (12.0 V)
   — For IF AGC bias (approx. 5 V variable)
4. Sweeper probe (sweep signal supply cable) as shown below.

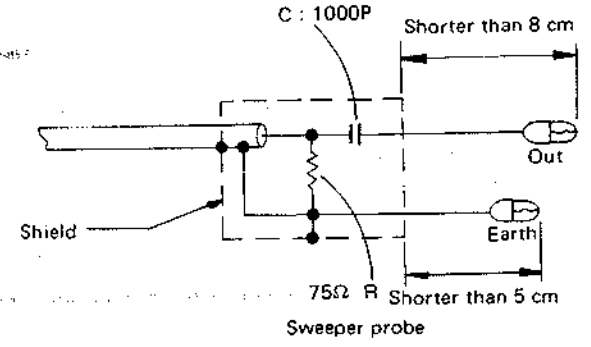


Fig. 2-6-1

1	VCO E/EG : 38.9 EK : 39.5	IC1 pin 28	T2	• Sweep • Generator	1) Use the probe shown in the figure (for IF adjustment) and connect IF sweep signal to the SAW 1 input terminal. 2) Apply DC 4.5 V to pin 6 of IC1 (IF AGC). Connect oscilloscope to pin 28 (VIDEO DET OUT) and adjust T2 to align the waveform with the frequency marker indicated at left. **Note:** Sweep generator output level is 70 dB μ/75 Ω.
2	Front End IF E/EG : 38.15 EK : 39.5	U/V Tuner (Inside the tuner unit)	IF Coil	• Sweep • Generator	1) Use the IF adjustment probe to connect the IF sweep signal to the front end (U/V TUNER) test point (TP). 2) Use the IF adjustment probe to connect the SAW 1 input terminal with the IF detector. 3) Adjust the IF core of the front end for maximum frequency.

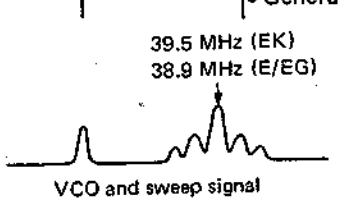
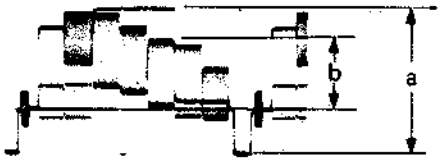


Fig. 2-6-2

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
3	FTZ Trap E/EG only	U/V Tuner (Inside the tuner Unit)	T1	• Colour Bar	1) Supply a 32.4 MHz with 400 Hz AM modulation signal to the U/V tuner TP. 2) Connect oscilloscope to pin 28 of IC1 and adjust the output side core of T1 for minimum level.
4	RF AGC E/EG/EK	U/V Tuner (Inside the tuner Unit)	R11	• Colour Bar	1) Receive a colour bar signal and connect oscilloscope to the front end IF terminal. 2) Adjust R11 for maximum level. Then again turn R11 to reduce the level by 10 dB.
5	VPS Y Level E/EG only	CN3-pin 1 (VPS OUT)	R16	• Modulated signal	1) Receive an 87.5% modulated signal. Adjust R16 to obtain a maximum Y level (including sync) of 2.0 Vp-p from pin 1 (VPS OUT) of CN3.
6	Colour Level E/EG/EK	CN2-pin 3 (VIDEO OUT)	R42	• Colour Bar	1) Receive a colour bar signal. With Y level taken as 100%, adjust R42 for a magenta level of 48% at pin 3 (VIDEO OUT) of CN2.



b : magenta a : b = 1 : 0.48

Fig. 2-6-3

ABSCHNITT 3
ELEKTRISCHE EINSTELLUNGEN FÜR HR-D180EG

3. 1 VORBEREITUNGEN

Elektrische Einstellungen sind erforderlich, wenn Bauteile oder in einigen Fällen auch mechanische Teile ausgetauscht werden.
Abgleich und Einstellarbeiten sollten erst begonnen werden, wenn der Austauch von Teilen oder deren Reparatur beendet ist. Abgleicharbeiten sollten unterbleiben, falls die dafür erforderlichen Meßeinrichtungen nicht verfügbar sind.

3. 1. 1 Erforderliche Meßgeräte

1. Farbmonitor
2. Oszilloskop: Zweikanal-Oszilloskop mit verzögerter Zeitbasis
3. Frequenzzähler
4. NF-Generator
5. NF-Voltmeter
6. Digital-Voltmeter
7. Signalgenerator: HF/ZF Wobbler mit Markengenerator
8. Signalgenerator: PAL-Farbbalken, Grautreppe
9. Videocassette für Aufnahmen
10. Abgleichband MH-2

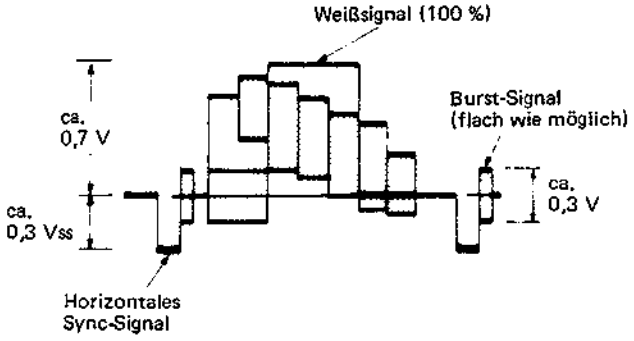


Abb. 3-1-1 Farbbalken des Signalgenerators

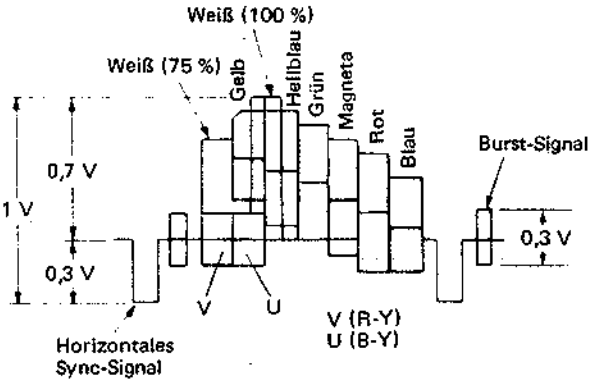


Abb. 3-1-2 Farbbalkensignalform

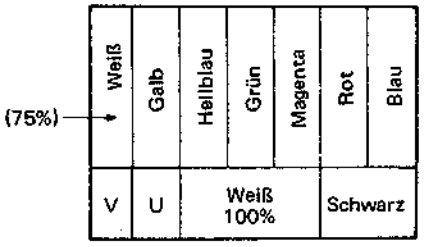


Abb. 3-1-3 Farbbalkenaufteilung

3.1.2 Prüf- und Abgleichschritte

Die erforderlichen Prüf- und Abgleichschritte sind in Form von Tafeln zusammengefaßt. Im folgenden werden die verwendeten Angaben erläutert.

Nr. Prüf- und Abgleicharbeiten werden in empfohlener Ausführungsreihenfolge angegeben.

Position Bezeichnung des spezifischen Prüf- oder Abgleichschrittes.

Testpunkt Anschlußpunkt für zu verwendende Meßinstrumente (Oszilloskop, falls nicht anders angegeben).

Abgleichpunkt Regelbares Teil (Widerstand, Kondensator), das bei diesem Schritt justiert werden muß. Ein Strichsymbol zeigt an, daß nur eine Überprüfung erforderlich ist.

Signal & Betriebsart

- Das erforderliche Eingangssignal. Ein Strichsymbol zeigt an, daß kein Signal erforderlich ist.
- Für Prüf- und Abgleicharbeit erforderliche Betriebsart.

Farbbalken	Farbbalkensignal als Videoeingang
Grautreppe	Grautreppensignal als Videoeingang
MH-2 1 kHz	Als Audio-Eingangssignal einen 1-kHz-Sinuston anlegen.
MH-2 Fabbalken	Abschnitt Farbbalken von Abgleichcassette MH-2 abspielen.
MH-2 Grautreppe	Abschnitt Grautreppe von Abgleichcassette MH-2 abspielen.
MH-2 Wobbelsignal	Abschnitt Wobbelsignal von Abgleichcassette MH-2 abspielen.
Stop	Gerät einschalten, Stopbetriebsart
Aufnahme	Aufnahmebetriebsart
Wiedergabe	Wiedergabebetriebsart
Aufnahme ↓ (Andere Betriebsart)	Ein Band neu bespielen und in der angegebenen Betreibsart wiedergeben.
Suchlauf	Bildsuchlauf vorwärts/rückwärts
Zeitlupe	Zeitlupewiedergabe
Standbild	Wiedergabepause
Nachv.	Nachvertonungsbetriebsart

Beschreibung Diese Spalte enthält Angaben zu Bedienschritten, Einstellwerten, Wellenformen sowie Hinweise.

3.2 ABBREVIATIONS USED IN THE SCHEMATIC DIAGRAM

A

AC	: Alternating Current
ACC	: Automatic Color Control
A/CTL	: Audio/Control
ADC	: Analog to Digital Converter
ADD	: Adder
ADJ	: Adjustment
A DUB	: Audio Dubbing
AE	: Audio Erase
AEF	: Automatic Editing Function
AFC	: Automatic Frequency Control
AFT	: Automatic Fine Tuning
AGC	: Automatic Gain Control
AH	: Audio Head
AHD	: Audio High Density Disk
AL	: After Loading
ALC	: Automatic Light Compensation Automatic Level Control
ALM	: Alarm
ALU	: Arithmetic Logic Unit
AM	: Amplitude Modulation
AMP	: Amplifier
ANT	: Antenna
APC	: Automatic Pedestal Control Automatic Phase Control
APL	: Average Picture Level
A/S/M	: Audio/Servo/Mechacon
ASS'Y	: Assembly
ATT	: Attenuator
AUD	: Audio
AUTO	: Automatic
AUX	: Auxiliary

B

B	: Base
BAL	: Balance
BATT	: Battery
BBD	: Bucket Brigade Device
BCD	: Binary Coded Decimal
BEG	: Beginning
BFP	: Burst Flag Pulse
BIT	: Binary Digit
BLK	: Black, Blanking
BLU	: Blue
BNC	: Bayonet Connector
BOT	: Beginning of Tape
BPF	: Bandpass Filter
BRK	: Brake
BRN	: Brown
BRT	: Brightness
BT	: Band Tuning
BUFF	: Buffer
BW or B/W	: Black and White

C

C	: Capacitance, Collector, Color
CAL	: Calibration
CAP	: Capstan, Capacitor
CAR	: Carrier
CARR	: Carrier
CASS	: Cassette
CC	: Cassette Compartment
CCD	: Charge Coupled Device
CCT	: Circuit
CdS	: Cadmium Sulphide
CD	: Count Down
CE	: Chip Enable
CF	: Ceramic Filter, Color Frame
CH	: Channel
CHG	: Charge
CHROMA	: Chrominance
CLK	: Clock
CLR	: Clear
CMD	: Command
CMOS	: Complementary Metal Oxide Semiconductor
CNT	: Count, Counter
COL	: Color
COM	: Common
COMB	: Combination Comb Filter
COMP	: Comparator Composite Compensation
CONN	: Connector
CONV	: Converter
CP	: Circuit Protector Clamp Pulse
CPC	: Capstan Phase Control
CPU	: Central Processing Unit
CTC	: Crosstalk Cancel
CTL	: Control

D

D	: Drum, Digital, Diode, Drain
DAC	: Digital to Analog Converter
dB	: Decibel
DC	: Direct Current
DD	: Direct Drive
DEC	: Decoder
DEMOD	: Demodulator
DEMUX	: Demultiplexer
DET	: Detector
DEV	: Deviation
DFRS	: Drum Free Running Stop
DG	: Differential Gain
DIF	: Differential
DISCR	: Discriminator
DL	: Delay Line
DOC	: Dropout Compensator
DOD	: Drop Out Detector
DP	: Differential Phase
DPC	: Drum Phase Control
DYAC	: Dynamic Aperture Control

E

E	: Edit, Emitter
EDP	: Electronic Data Processing
E-E	: Electric to Electric
EF	: Emitter-Follower
EMP	: Emphasis
EN	: Enable
ENC	: Encoder
ENV	: Envelope
EOT	: End of Tape
EP	: Extended Play
EQ	: Equalizer
ES	: Electronic Switch
ESNS	: End Sensor
EXP	: Expander
EXT	: External

F

F	: Farad, Fuse
F ADV	: Frame Advance
FDP	: Fluorescent Display Panel
FE	: Full Erase
FET	: Field Effect Transistor
FF	: Fast Forward Flipflop
FG	: Frequency Generator
FM	: Frequency Modulation
FMA	: FM Audio
FR	: Full Recording, Frame, Fusible Resistor
FREQ	: Frequency
F-V CONV	: Frequency to Voltage Converter
FWD	: Forward
FWD S	: Forward Search

G

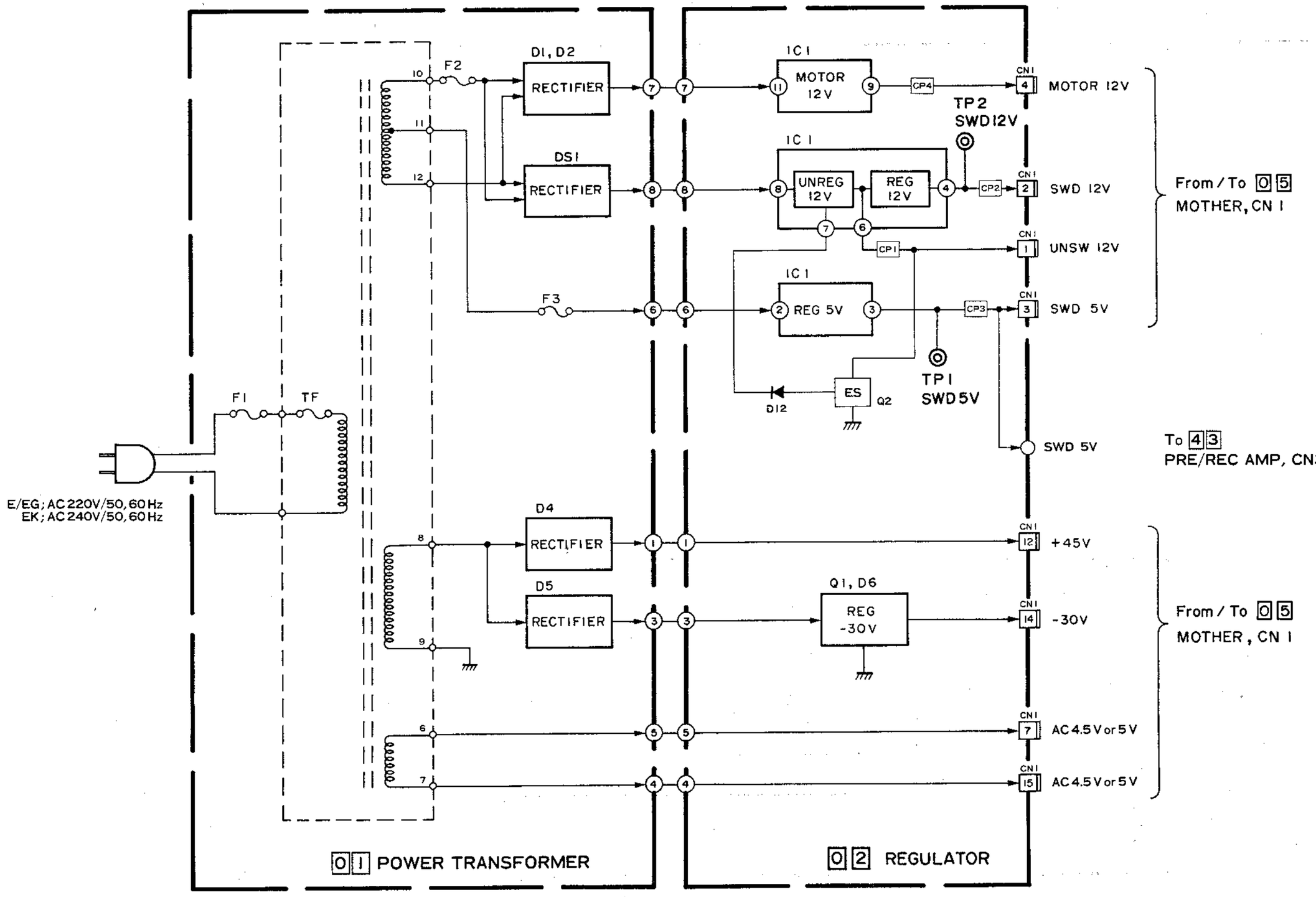
G	: Green, Gate, Grid
GEN	: Generator
GND	: Ground
GRN	: Green
GRY	: Gray

H

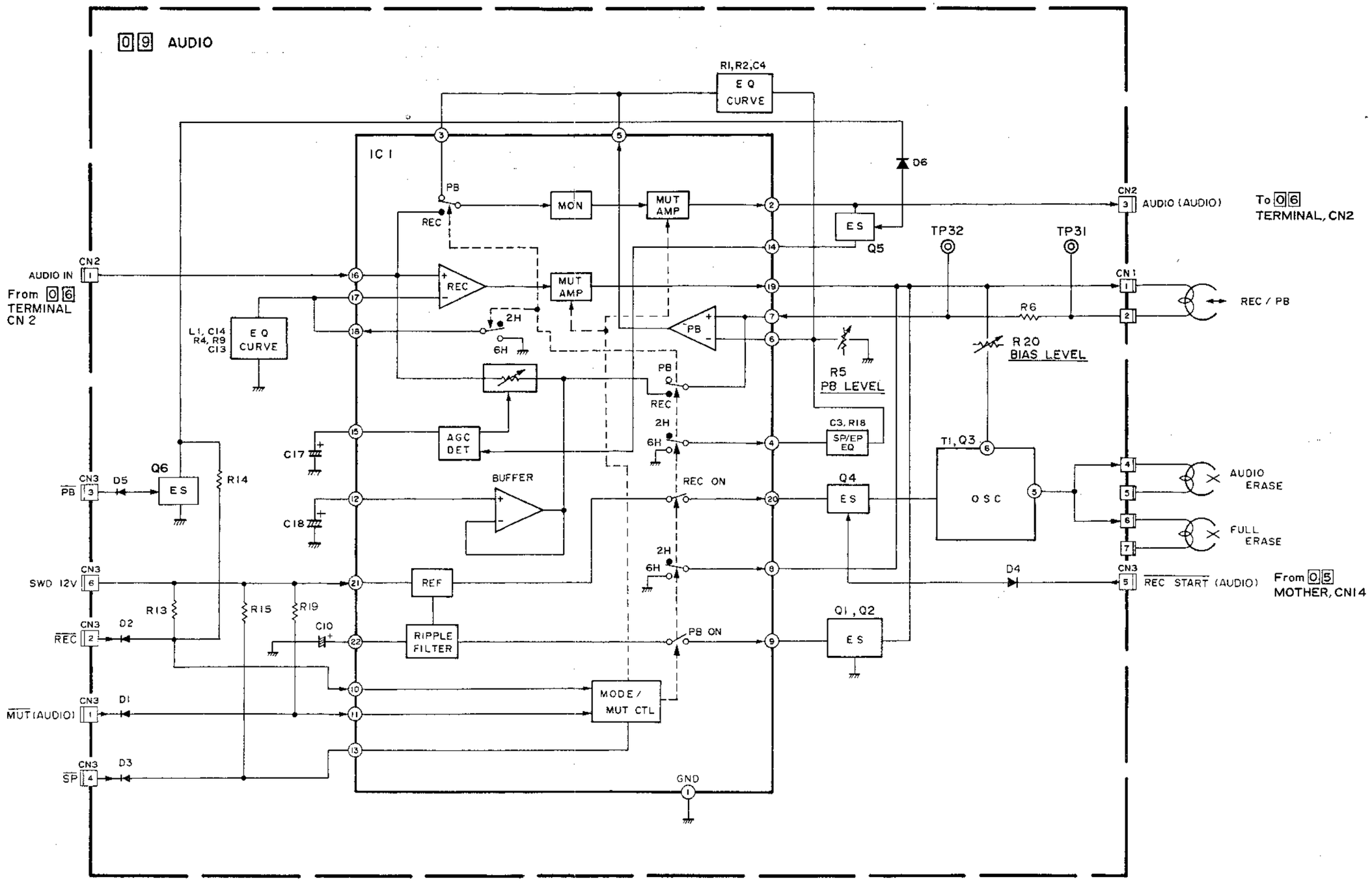
H	: High, Henry, Hour
HBF	: Horizontal Burst Flag
HD	: Horizontal Drive
HG	: Hall Generator
HPF	: Highpass Filter
Hz	: Herz

I	IC	: Integrated Circuit
	ID	: Identification (Pulse)
	IF	: Intermediate Frequency
	IFR	: Infrared
	IFT	: Intermediate Frequency Transformer
	IND	: Indicator
	INH	: Inhibit
	INS	: Insert
	INT	: Internal, Interrupt
	INV	: Inverter
	I/O	: Input/Output
	IR	: Infrared
L	L	: Low, Left
	LCD	: Liquid Crystal Display
	LED	: Light Emitting Diode
	LIM	: Limiter
	LIN	: Linearity
	LOAD	: Loading (Cassette)
	LP	: Long Play
	LPF	: Lowpass Filter
	LSB	: Lower Sideband
M	M	: Motor, Mega
	MAX	: Maximum
	MDA	: Motor Drive Amplifier
	MECHACON	: Mechanism Control
	MIC	: Microphone
	MIN	: Minimum
	MIX	: Mixer, Mixing
	MMV	: Monostable Multivibrator
	MNOS	: Metal Nitride Oxide Semiconductor
	MOD	: Modulation, Modulator
	MODEM	: Modulator-Demodulator
	MON	: Monitor
	MOS	: Metal Oxide Semiconductor
	MPX	: Multiplexer, Multiplex
	MS	: Mode Select
	MUT	: Muting
N	NAND	: Not-And
	NC	: Not Connected, Normally Closed
	NFB	: Negative Feedback
	NLN	: Non-Linear
	NO	: Normally Open
	NOR	: Normal, Not-Or
	NR	: Noise Reduction
O	OP	: Operation
	OPAMP	: Operational Amplifier
	ORN	: Orange
	OSC	: Oscillator
P	PB	: Playback
	PC	: Photocoupler, Pulse Counter
	PCM	: Pulse Code Modulation
	PG	: Pulse Generator
	PGM	: Program
	PI	: Photo Interrupter
	PIF	: Picture Intermediate Frequency
	PLA	: Programmable Logic Array
	PLL	: Phase Locked Loop
	POS	: Position
	p-p	: Peak-to-Peak
	PR	: Pinch Roller
	PREAMP	: Preamplifier
	PRL	: Preroll
	P/S	: Pause/Still
	PSC	: Pulse Swallowing Control
	PU	: Pickup
	PUT	: Programmable Unijunction Transistor
	PWB	: Printed Wiring Board
	PWM	: Pulse Width Modulation
	PWR	: Power
Q	Q	: Quality Factor
R	R	: Red, Right
	RA	: Resistor Array
	RAM	: Random Access Memory
	REC	: Recording
	REF	: Reference
	REG	: Regulated, Regulator
	REM	: Remote
	REMOCON	: Remote Control (Unit)
	REV	: Reverse
	REV S	: Reverse Search
	REW	: Rewind
	RF	: Radio Frequency
	ROM	: Read Only Memory
	R/P	: Record/Playback
	RPT	: Repeat
	RS FF	: RS Flipflop
	RST	: Reset
	RT	: Rotary Transformer
	RUN	: Running
	RY	: Relay
S	SAW	: Sawtooth, Surface Acoustic Wave
	SC	: Subcarrier, Simulcast
	SCH	: Search
	SEL	: Select, Selector
	SENS	: Sensor
	SEP	: Separator
	SF	: Source Follower
	SFF	: Short Fast Forward
	SIF	: Sound Intermediate Frequency
	SN	: Signal to Noise Ratio
	SOL	: Solenoid
	SOS	: Sound on Sound
	SP	: Standard Play
	SR	: Supply Reel
	SREV	: Search Reverse
	SREW	: Short Rewind
	S/S	: Slow/Still
	SSG	: Sync Signal Generator
	SSNS	: Start Sensor
	STD	: Strobe Data, Standard
	SUP	: Supply
	SW	: Switch
	SWD	: Switched
	SYNC	: Synchronization
	SYSCON	: System Control
T	TAL	: Tally
	TBC	: Time Base Corrector
	TC	: Tension Control, Time Code
	TEN	: Tension
	TF	: Thermal Fuse
	TIM	: Timing
	TK	: Tracking
	TNR	: Tuner
	TP	: Test Point
	TPZD	: Trapezoid
	TR	: Transistor, Trimmer
	TRANS	: Transformer
	T/T	: Tuner/Timer
	TU	: Take-up
U	UL	: Unloading
	UNREG	: Unregulated
	UNSW	: Unswitched
V	V	: Vertical, Volt
	VACT	: Video Action
	VCO	: Voltage Controlled Oscillator
	VD	: Vertical Drive
	VIF	: Video Intermediate Frequency
	VLT	: Violet
	VR	: Variable Resistor
	VS	: Video and Sync
	VSCH	: Variable Search
	V/T	: Video/Television
	V/U	: VHF/UHF
	VXO	: Variable Crystal Oscillator
W	W	: Watt
	WARN	: Warning
	W & D	: White and Dark
	WHT	: White
	WV	: Working Voltage
X	XTAL	: Crystal
Y	Y	: Luminance
	YEL	: Yellow

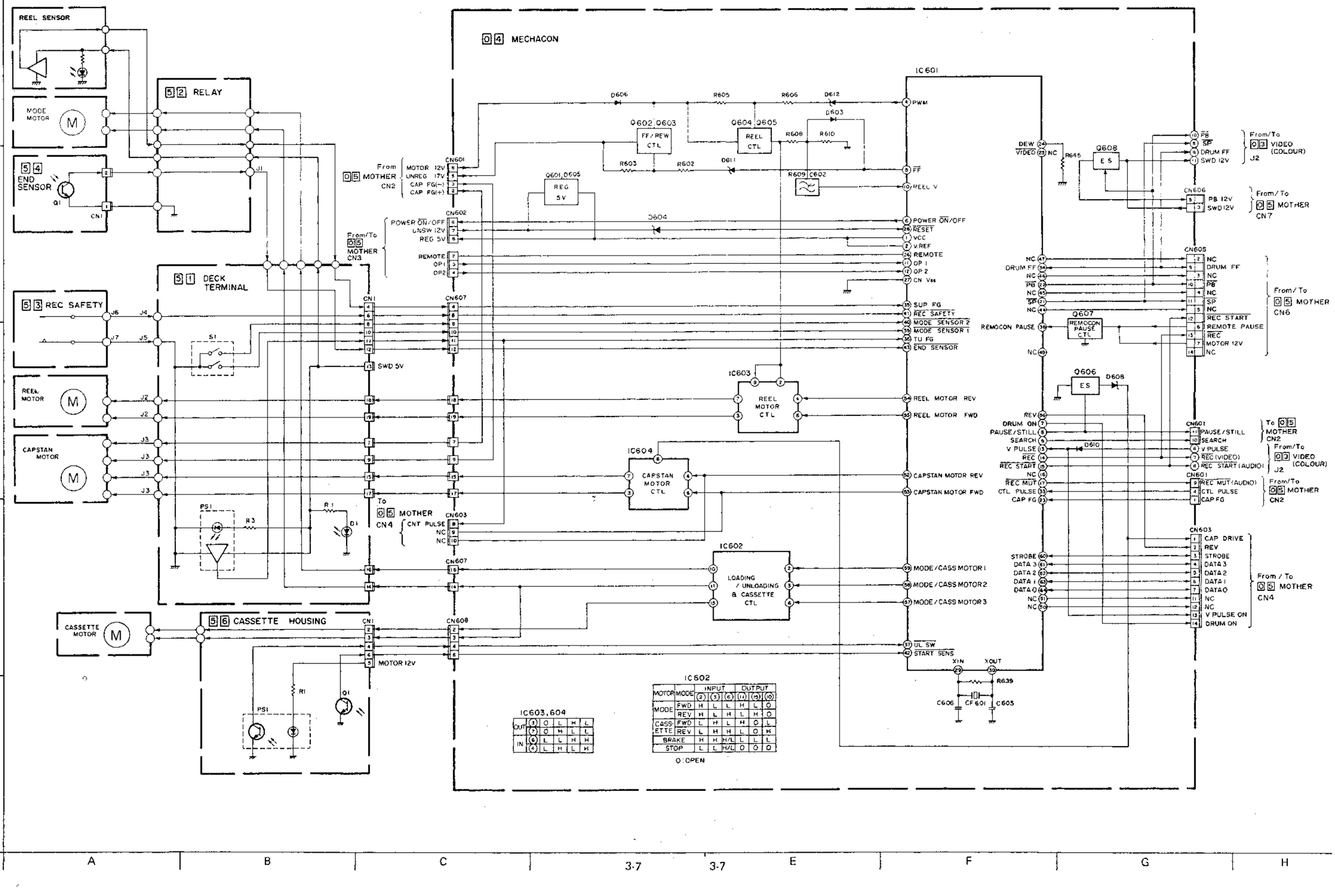
3.3 POWER SUPPLY BLOCK DIAGRAM



3.4 AUDIO BLOCK DIAGRAM

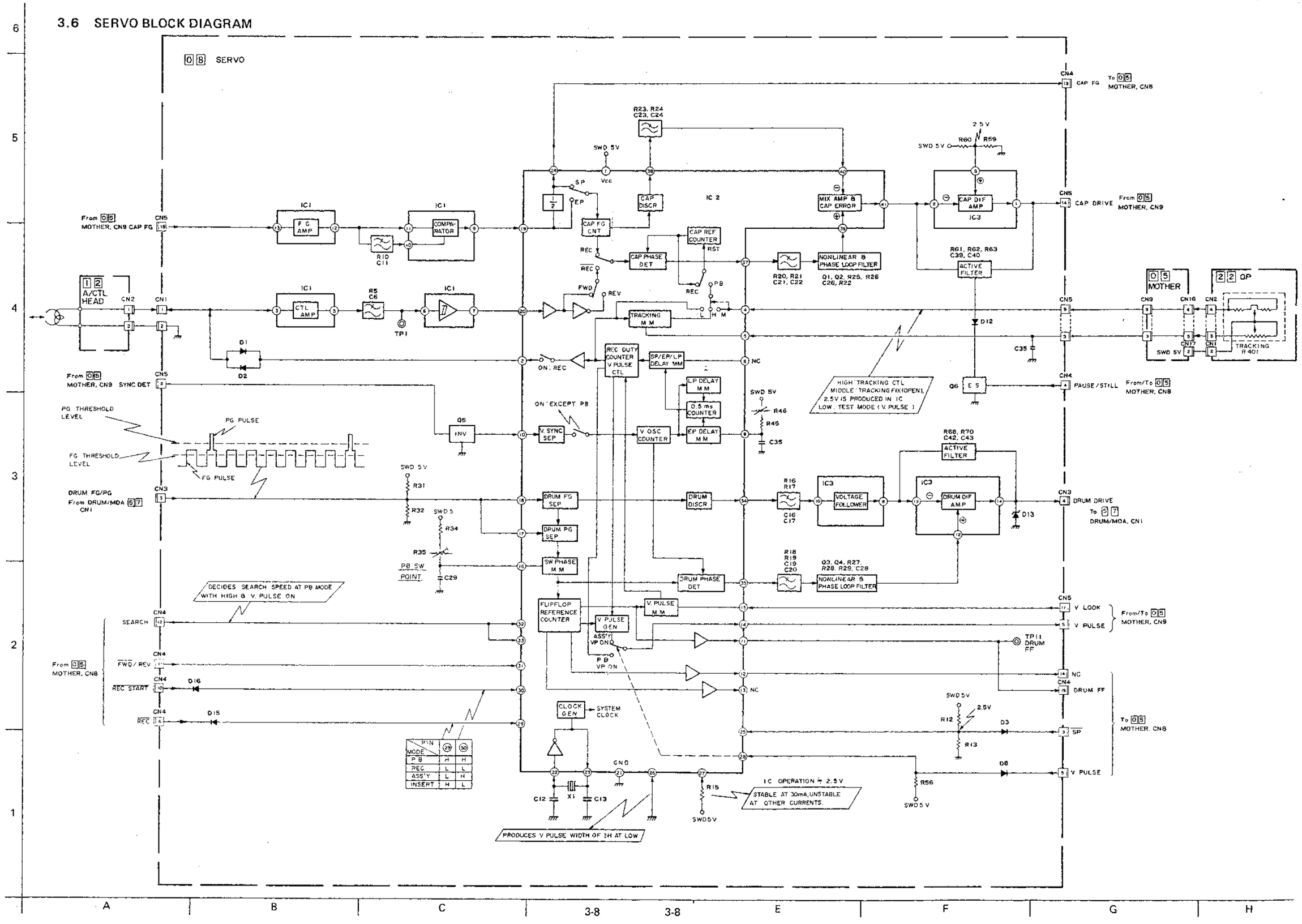


3.5 MECHANISM CONTROL BLOCK DIAGRAM

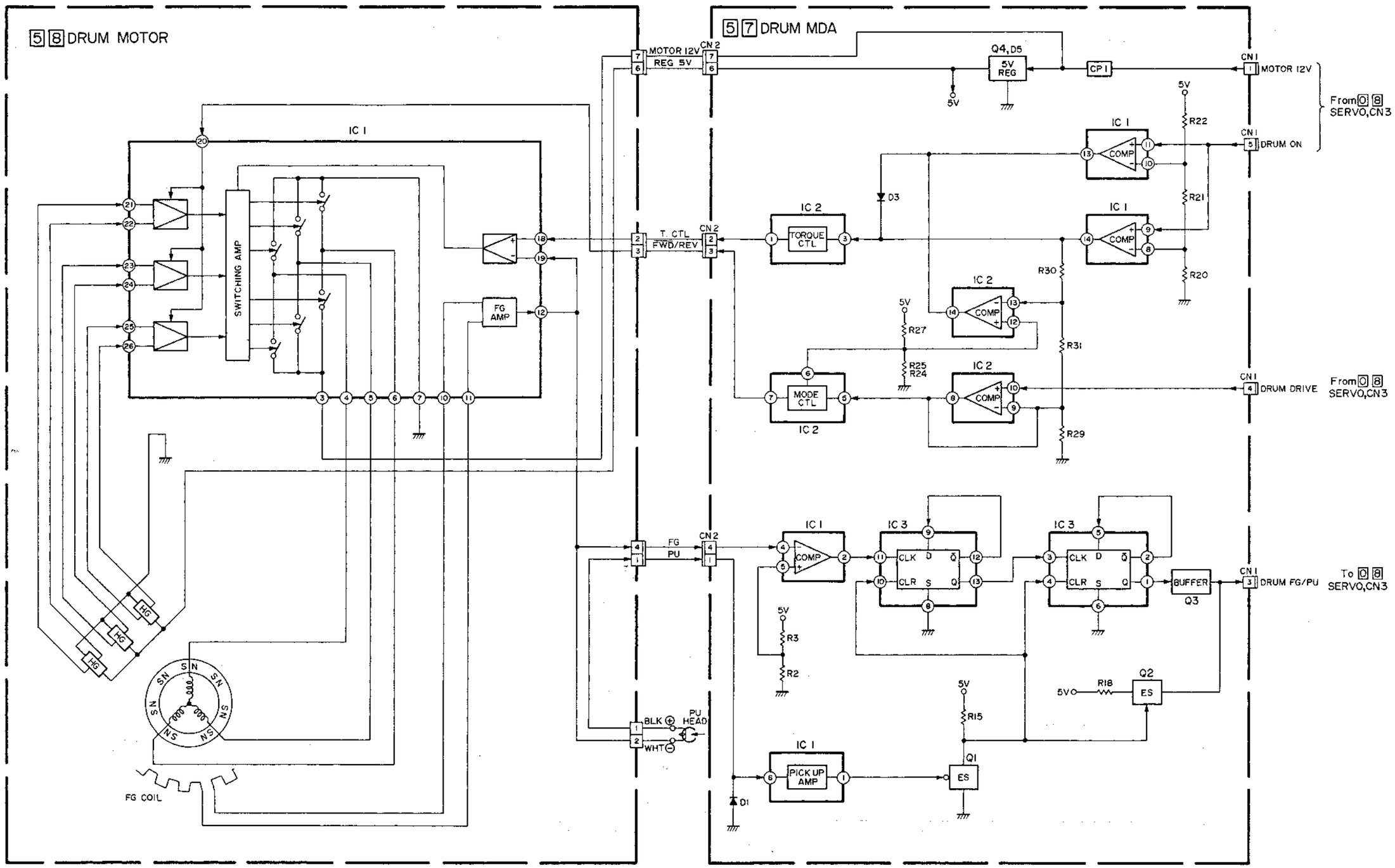


A B C 3-7 3-7 E F G H

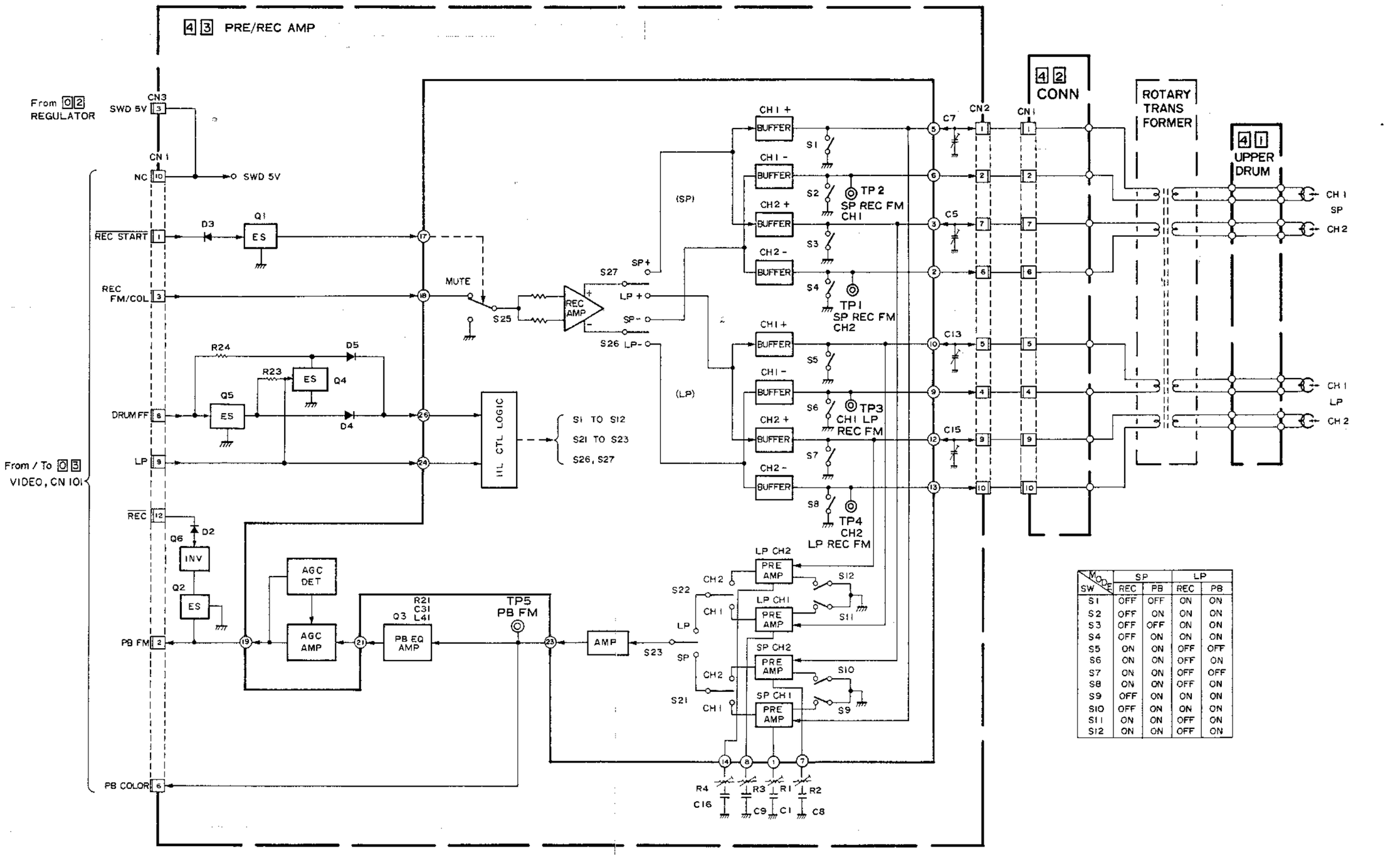
3.6 SERVO BLOCK DIAGRAM



3.7 DRUM MDA BLOCK DIAGRAM

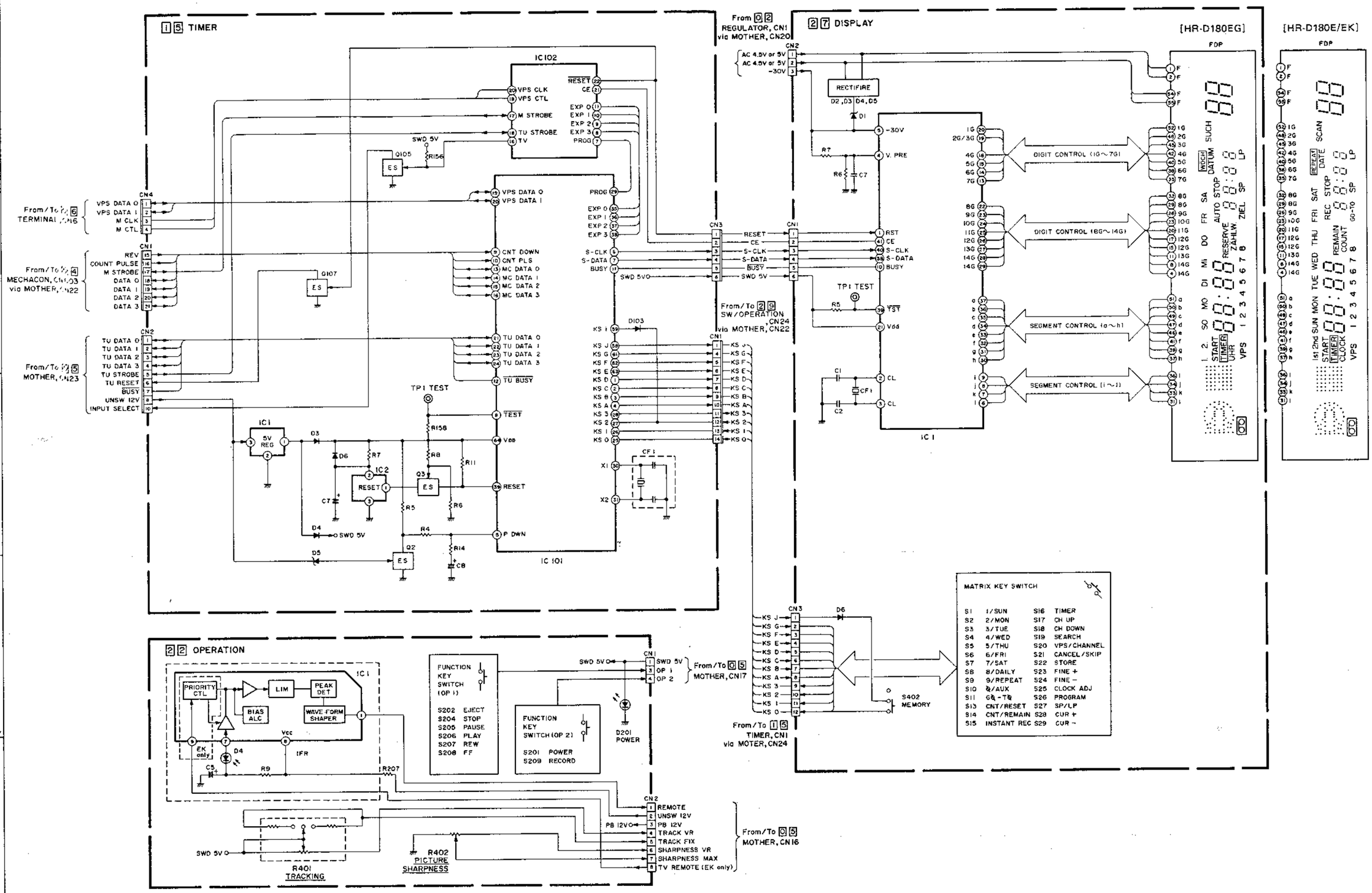


3.8 PRE/REC AMP BLOCK DIAGRAM

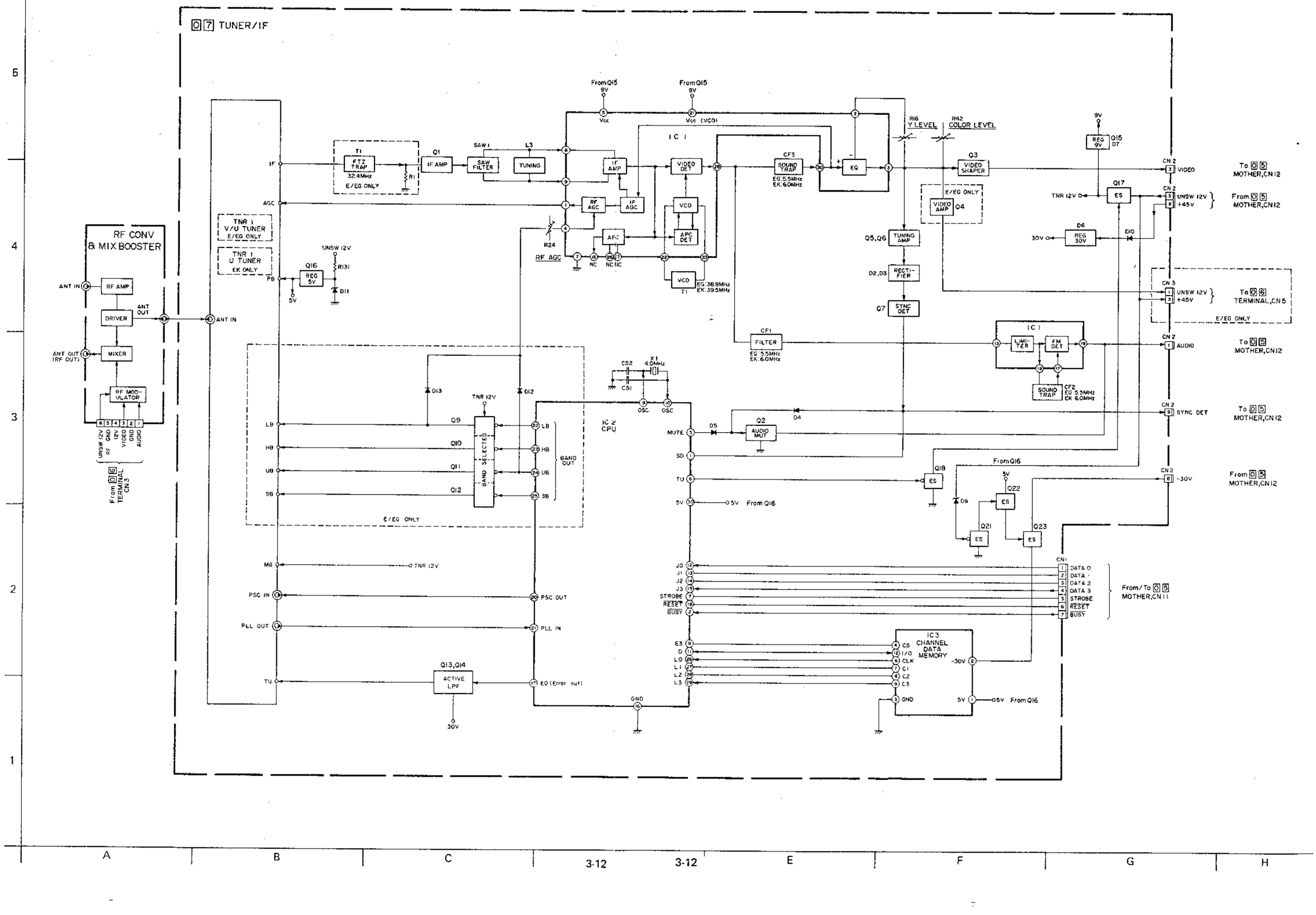


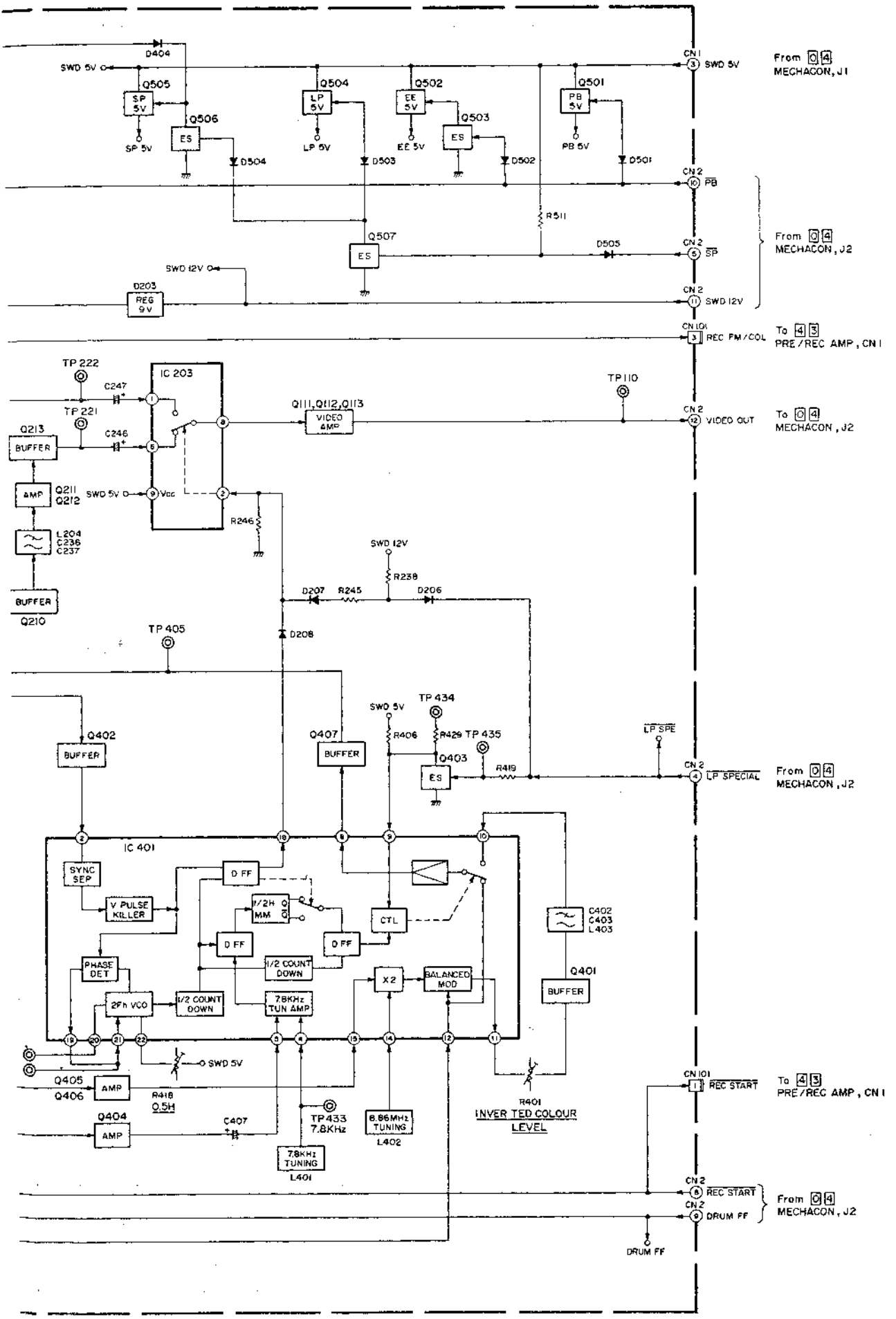
MODE / SW	SP		LP	
	REC	PB	REC	PB
S1	OFF	OFF	ON	ON
S2	OFF	ON	ON	ON
S3	OFF	OFF	ON	ON
S4	OFF	ON	ON	ON
S5	ON	ON	OFF	OFF
S6	ON	ON	OFF	ON
S7	ON	ON	OFF	OFF
S8	ON	ON	OFF	ON
S9	OFF	ON	ON	ON
S10	OFF	ON	ON	ON
S11	ON	ON	OFF	ON
S12	ON	ON	OFF	ON

3.9 TIMER, OPERATION AND SWITCH/DISPLAY BLOCK DIAGRAMS

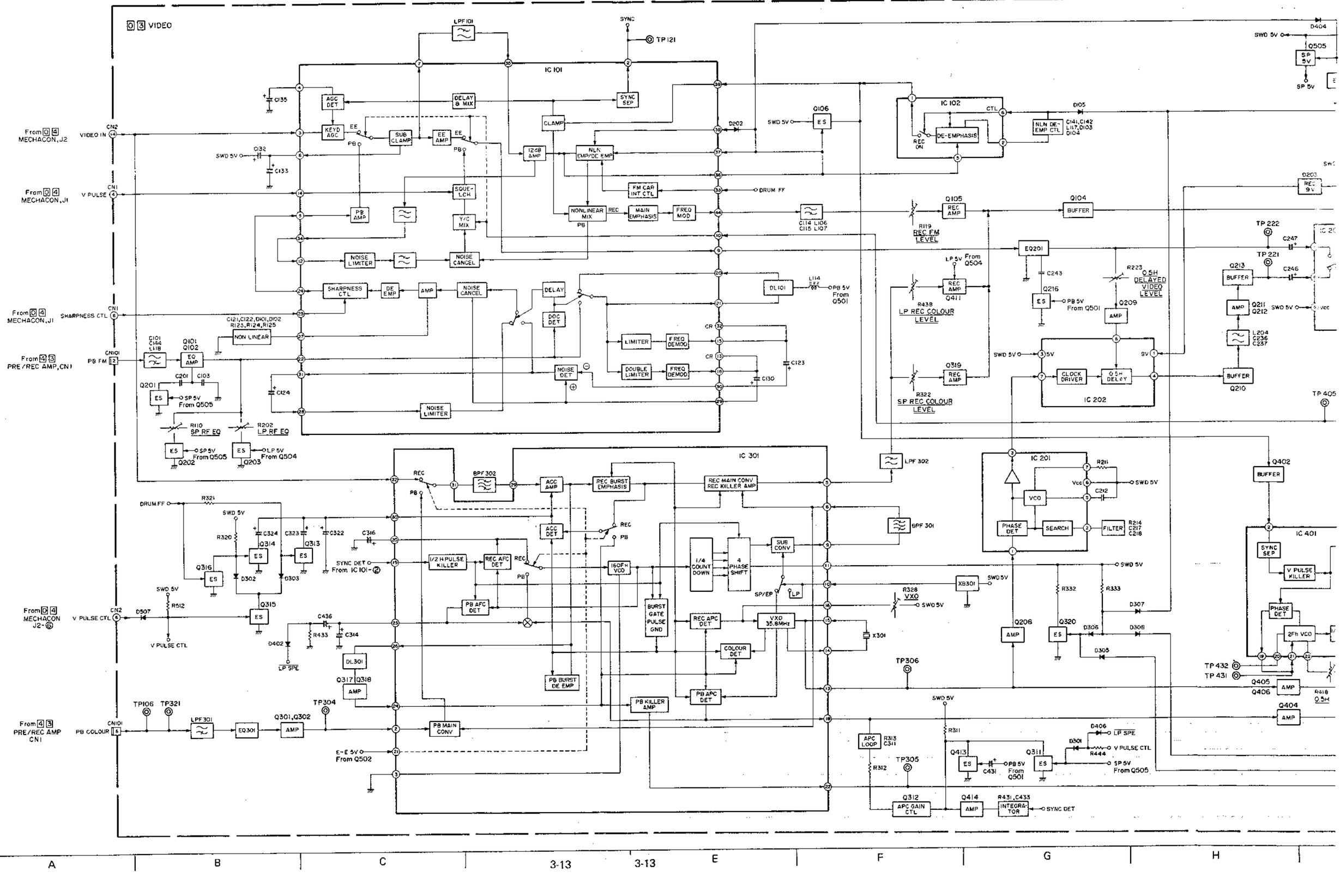


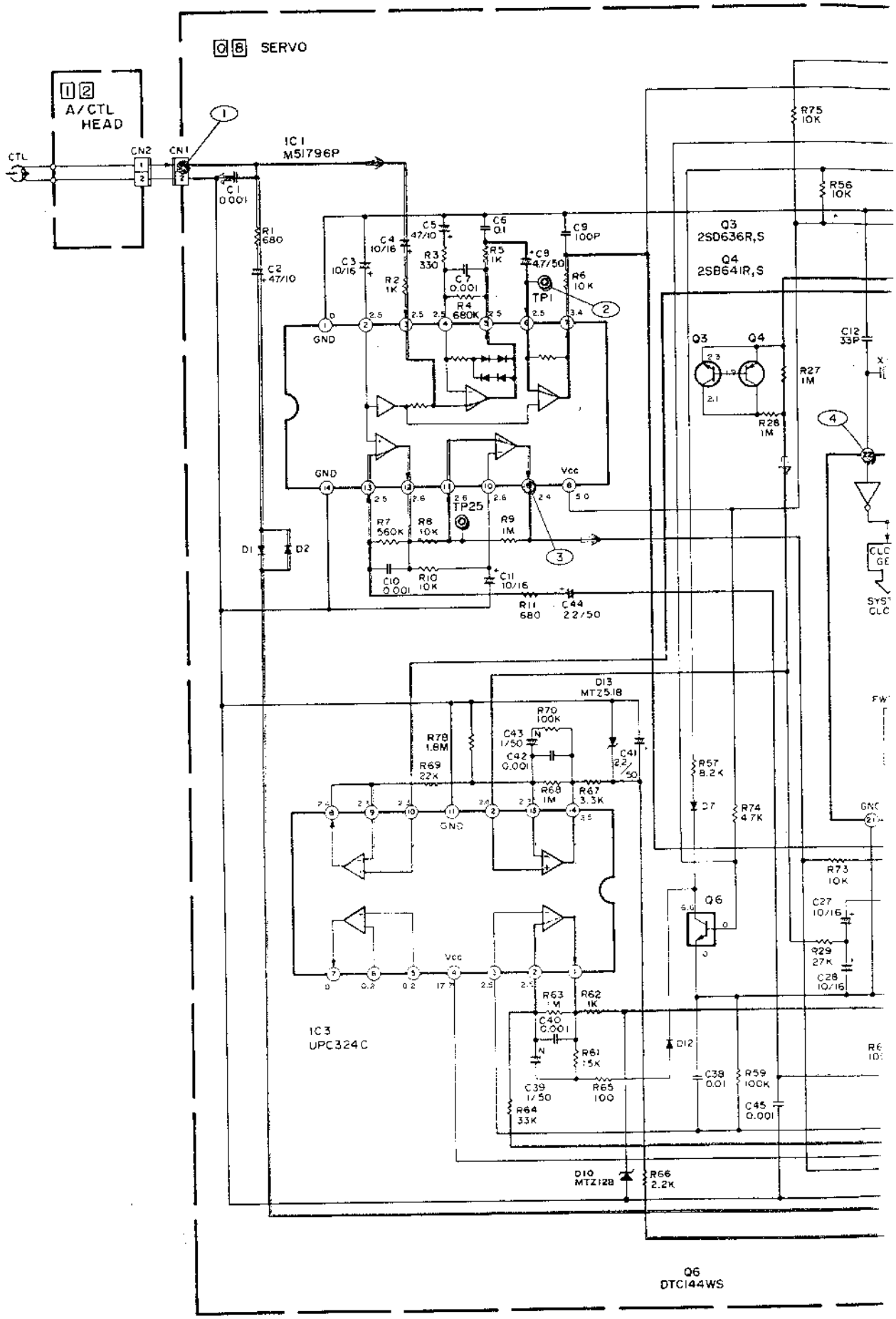
3.10 TUNER/IF BLOCK DIAGRAM

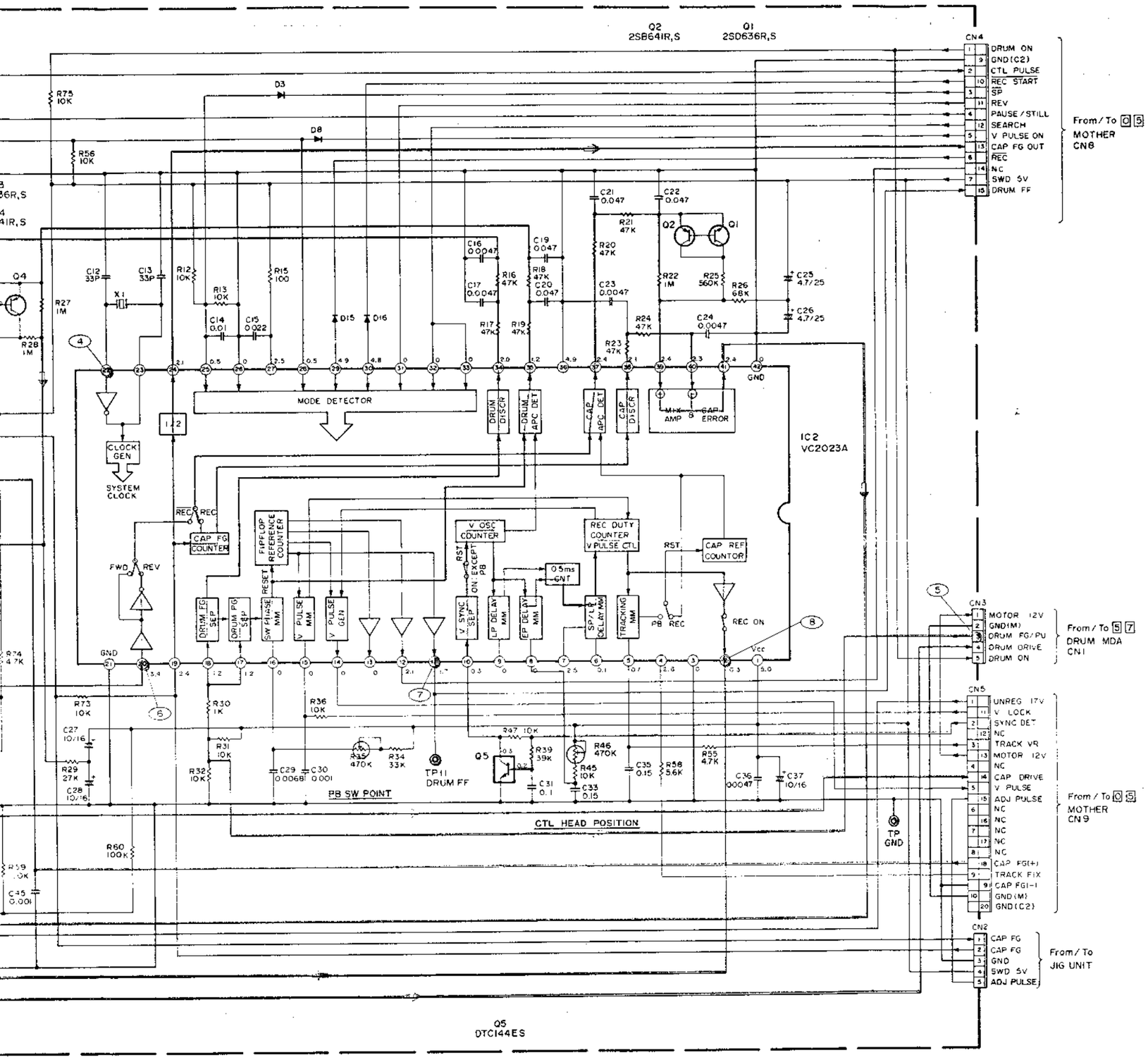



D404
SWD 5V
Q505
SP 5V
Q506
ES
Q504
LP 5V
Q502
EE 5V
Q503
ES
Q501
PB 5V
SP 5V
LP 5V
EE 5V
PB 5V
D504
D503
D502
D501
CN1
3 SWD 5V
From 04 MECHACON, J1
CN2
10 PB
R511
Q507
ES
D505
CN2
5 SP
From 04 MECHACON, J2
SWD 12V
D203
REG 9V
CN2
11 SWD 12V
CN101
3 REC FM/COL
To 43 PRE/REC AMP, CN1
TP 222
C247
IC 203
TP 221
C246
Q213
BUFFER
AMP
Q211
Q212
SWD 5V
9 Vcc
L204
C236
C237
BUFFER
Q210
R246
Q111, Q112, Q113
VIDEO AMP
TP110
CN2
12 VIDEO OUT
To 04 MECHACON, J2
SWD 12V
R238
D207
R245
D206
D208
TP 405
TP 434
SWD 5V
R406
R429
TP 435
Q403
ES
R419
LP SPE
CN2
4 LP SPECIAL
From 04 MECHACON, J2
Q402
BUFFER
Q407
BUFFER
IC 401
SYNC SEP
D FF
V PULSE KILLER
1/2H MM
CTL
D FF
D FF
PHASE DET
1/2 COUNT DOWN
2Fh VCO
1/2 COUNT DOWN
7.8KHz TUN AMP
X2
BALANCED MOD
C402
C403
L403
Q401
BUFFER
SWD 5V
Q405
Q406
AMP
R418
0.5H
Q404
AMP
C407
TP 433
7.8KHz
7.8KHz TUNING
L401
6.86MHz TUNING
L402
R401
INVERTED COLOUR LEVEL
CN101
1 REC START
To 43 PRE/REC AMP, CN1
CN2
5 REC START
CN2
9 DRUM FF
From 04 MECHACON, J2
DRUM FF

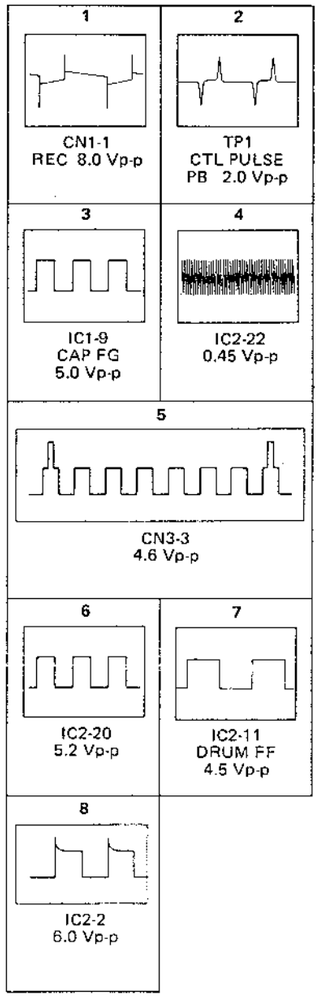
3.11 VIDEO BLOCK DIAGRAM



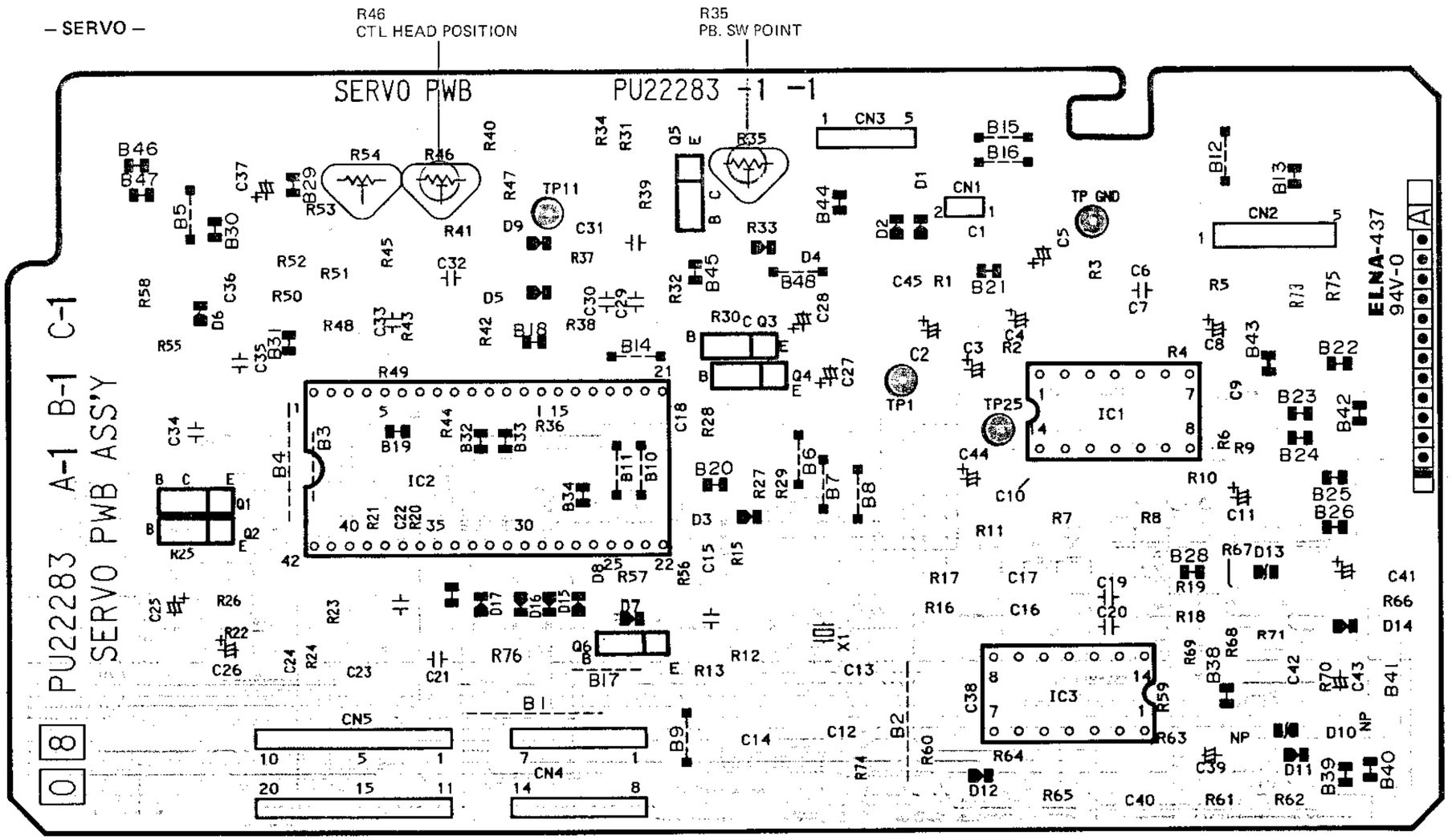

08 SERVO
12 A/CTL HEAD
CTL
CN2
CN1
IC1 M51796P
C1 0.001
R1 680
C2 47/10
C3 10/16
C4 10/16
C5 47/10
C6 0.1
C7 0.001
C8 47/50
C9 100P
R2 1K
R3 330
R4 680K
R5 1K
R6 10K
TP1
GND
Vcc
TP25
R7 560K
R8 10K
R9 1M
R10 10K
C10 0.001
C11 10/16
R11 680
C44 22/50
D1
D2
Q3 2SD636R,S
Q4 2SB641R,S
R75 10K
R56 10K
C12 33P
R27 1M
R28 1M
D13 MTZ5.18
R70 100K
C43 1/50
C42 0.001
C41 22/50
R78 1.8M
R69 22K
R68 1M
R67 3.3K
R57 8.2K
D7
R74 4.7K
R73 10K
Q6
C27 10/16
R29 27K
C28 10/16
R63 1M
R62 1K
C40 0.001
R61 1.5K
C39 1/50
R65 100
R64 33K
D12
C38 0.01
R59 100K
C45 0.001
D10 MTZ12B
R66 2.2K
IC3 UPC324C
Q6 DTC144WS



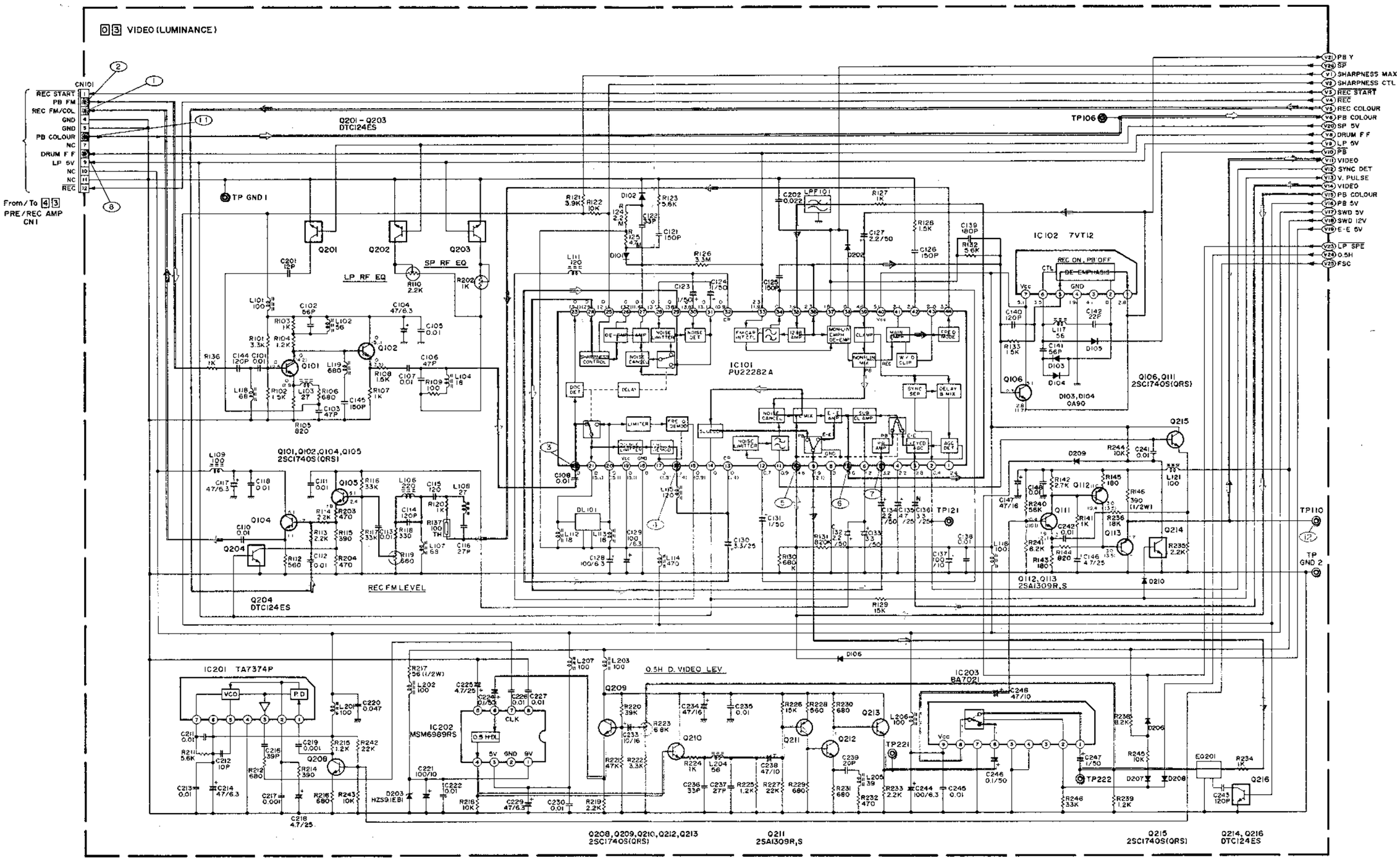
— Waveforms of servo circuit —



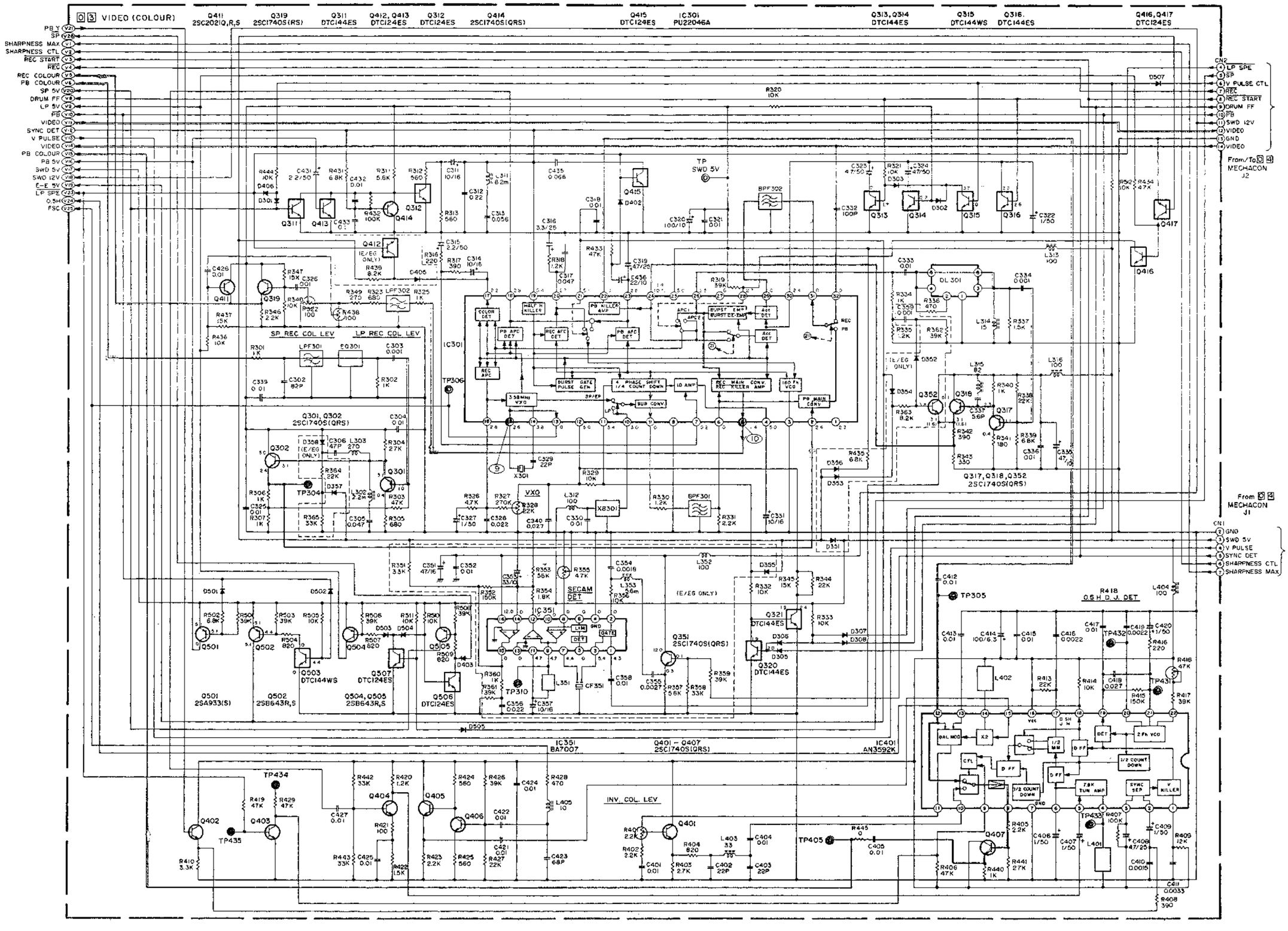
3.13 SERVO CIRCUIT BOARD



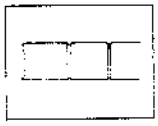
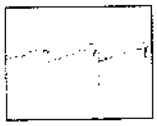
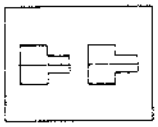
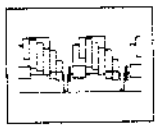
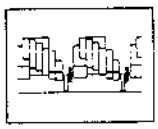
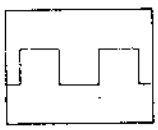
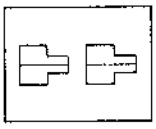
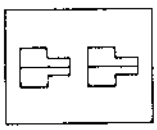
3.14 VIDEO SCHEMATIC DIAGRAM (Y section)



3.15 VIDEO SCHEMATIC DIAGRAM (C section)



– Waveforms of video circuit –

1  CN101, 3 REC FM 0.05 Vp-p	2  CN101, 2 PB FM PB 0.4 Vp-p
3  IC101-22 PB FM 0.3 Vp-p	4  IC101-16 PB 0.3 Vp-p
5  IC101-10 PB 0.4 Vp-p	6  IC101-7 REC/PB 0.5 Vp-p
7  IC101-5 PB 0.2 Vp-p	8  CN101-8 DRUM FF 4.4 Vp-p
9  IC301, 15 VXO 0.5 Vp-p	10  IC301, 5 PB 0.4 Vp-p
11  CN101, 6 PB COLOUR PB 0.25 Vp-p	12  TP110 VIDEO OUT 1.8 Vp-p

3.16 AUDIO SCHEMATIC DIAGRAM

— Waveforms of audio circuit —

1
IC1-2
2.3 Vp-p
REC, PB

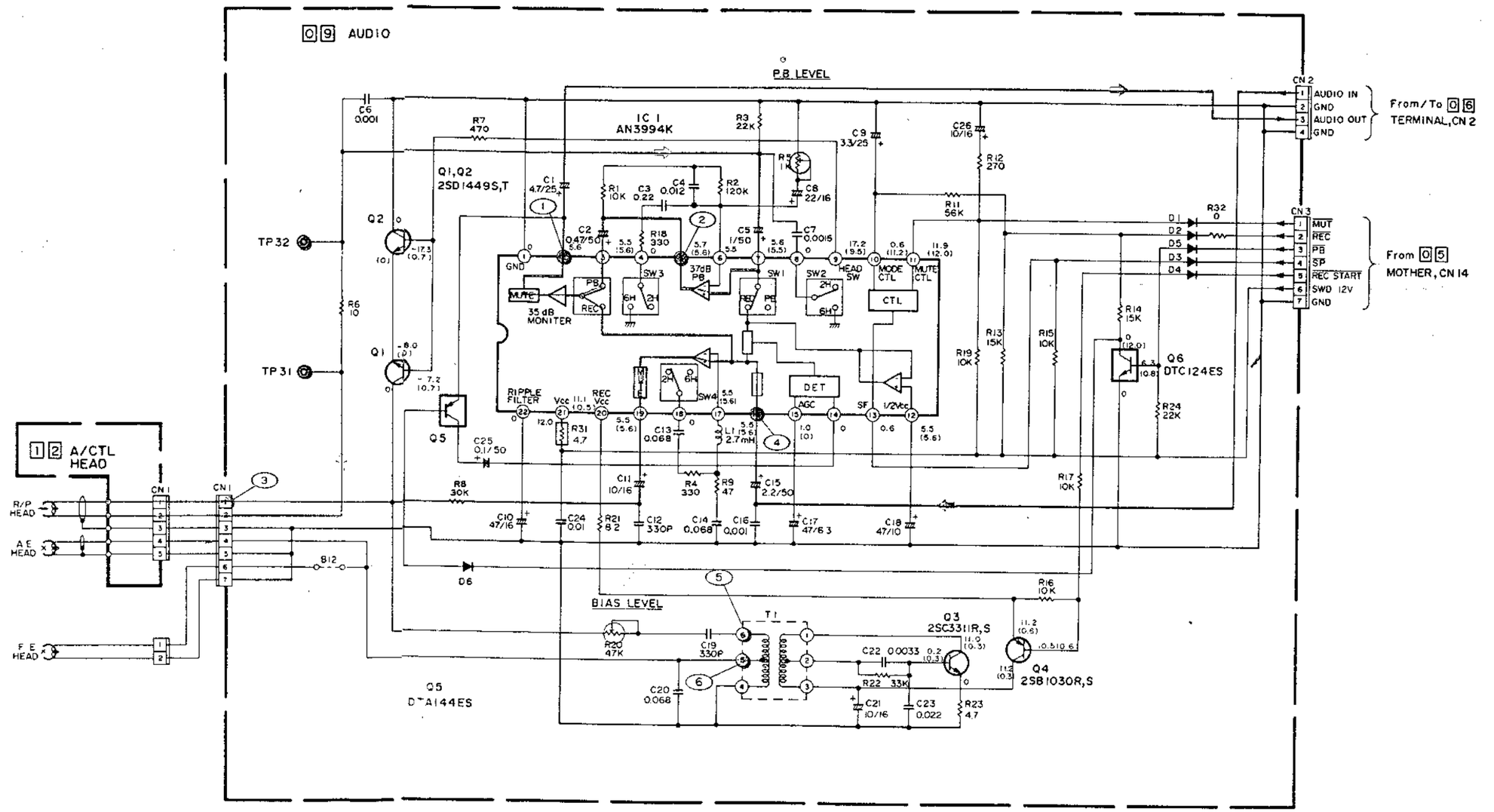
2
IC1-5
PB 40 mVp-p

3
CN1-1
REC 41 Vp-p

4
IC1-16
REC 50 mVp-p

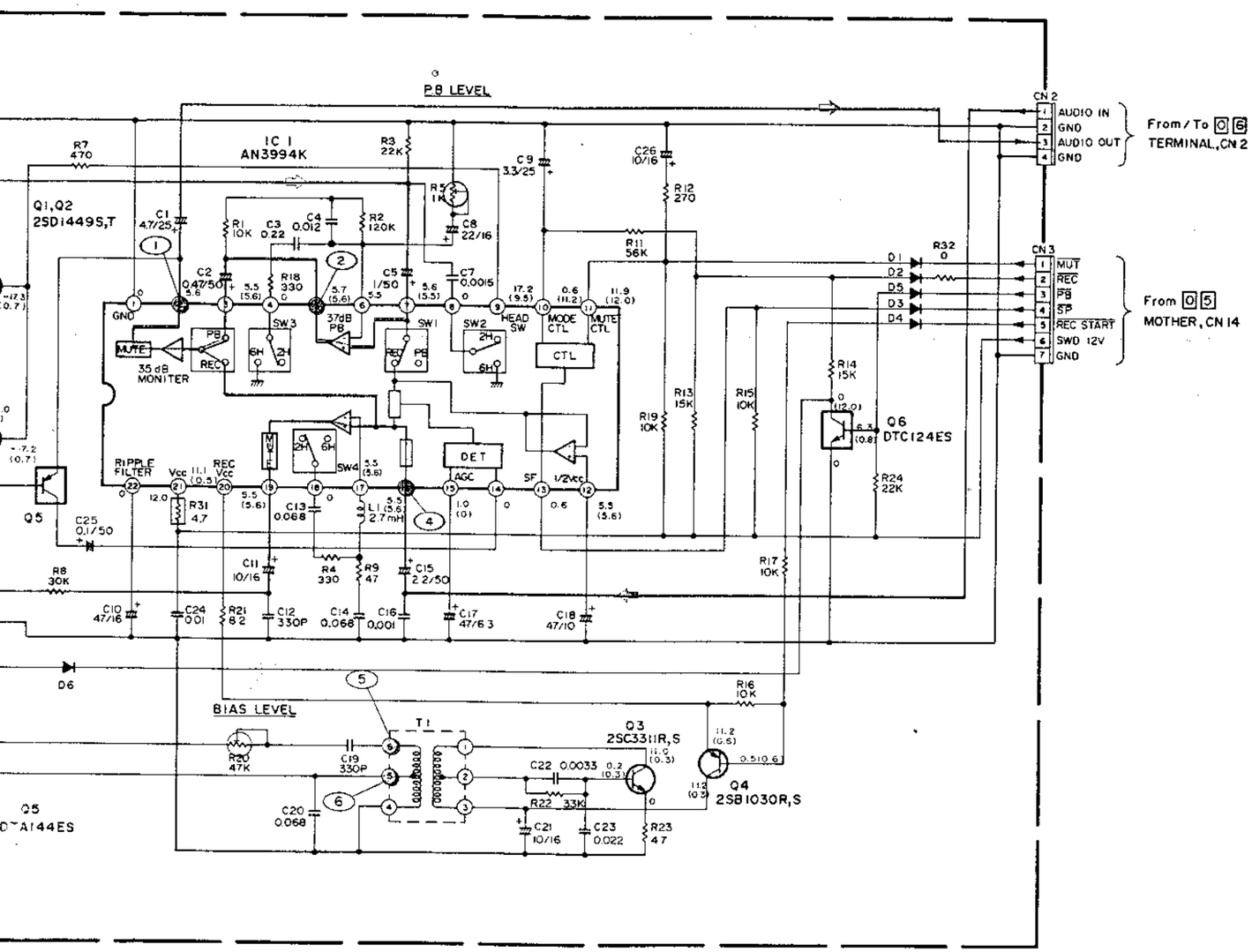
5
T1-6
REC 58 Vp-p

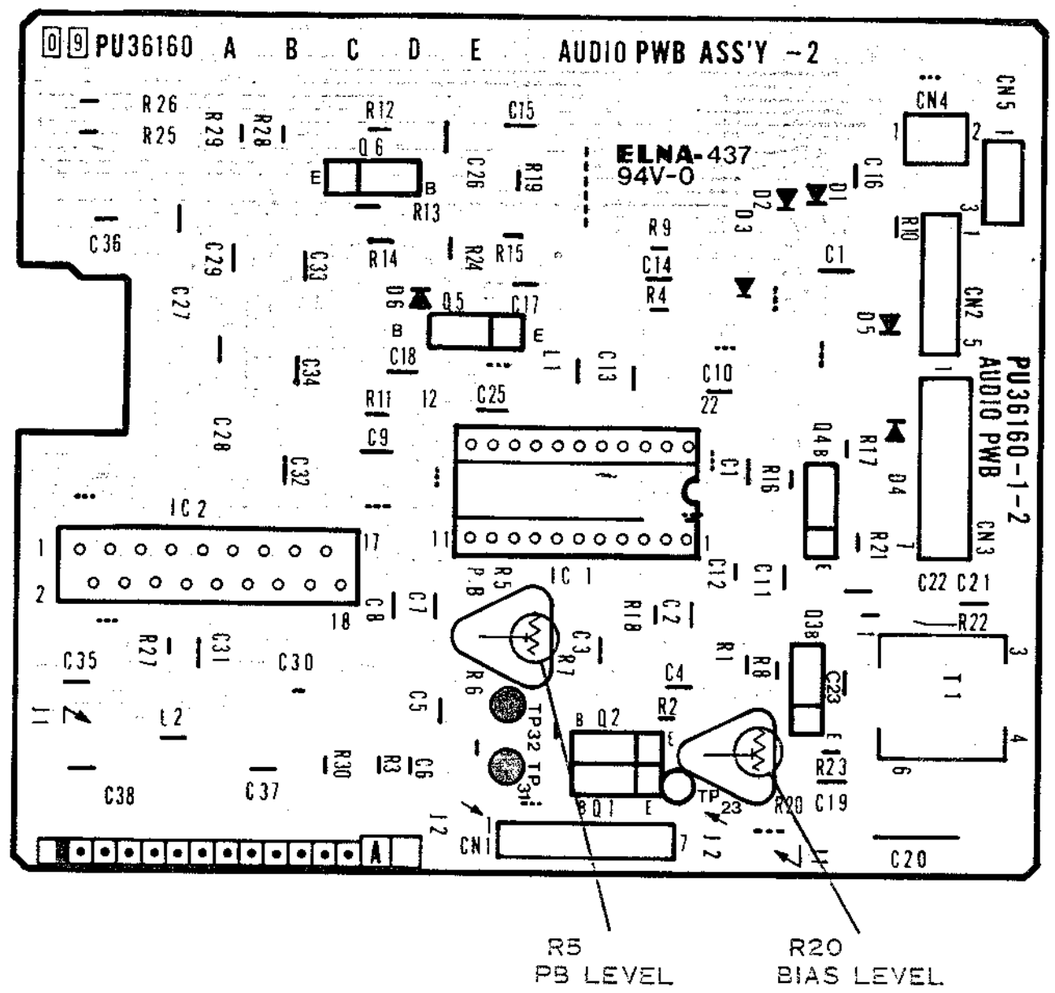
6
T1-5
REC 35 Vp-p



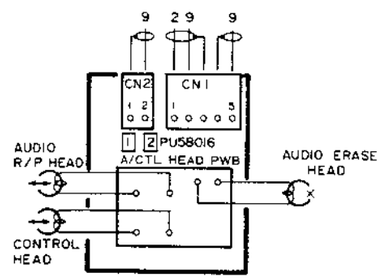
3.17 AUDIO AND A/CTL HEAD CIRCUIT BOARDS

– AUDIO –

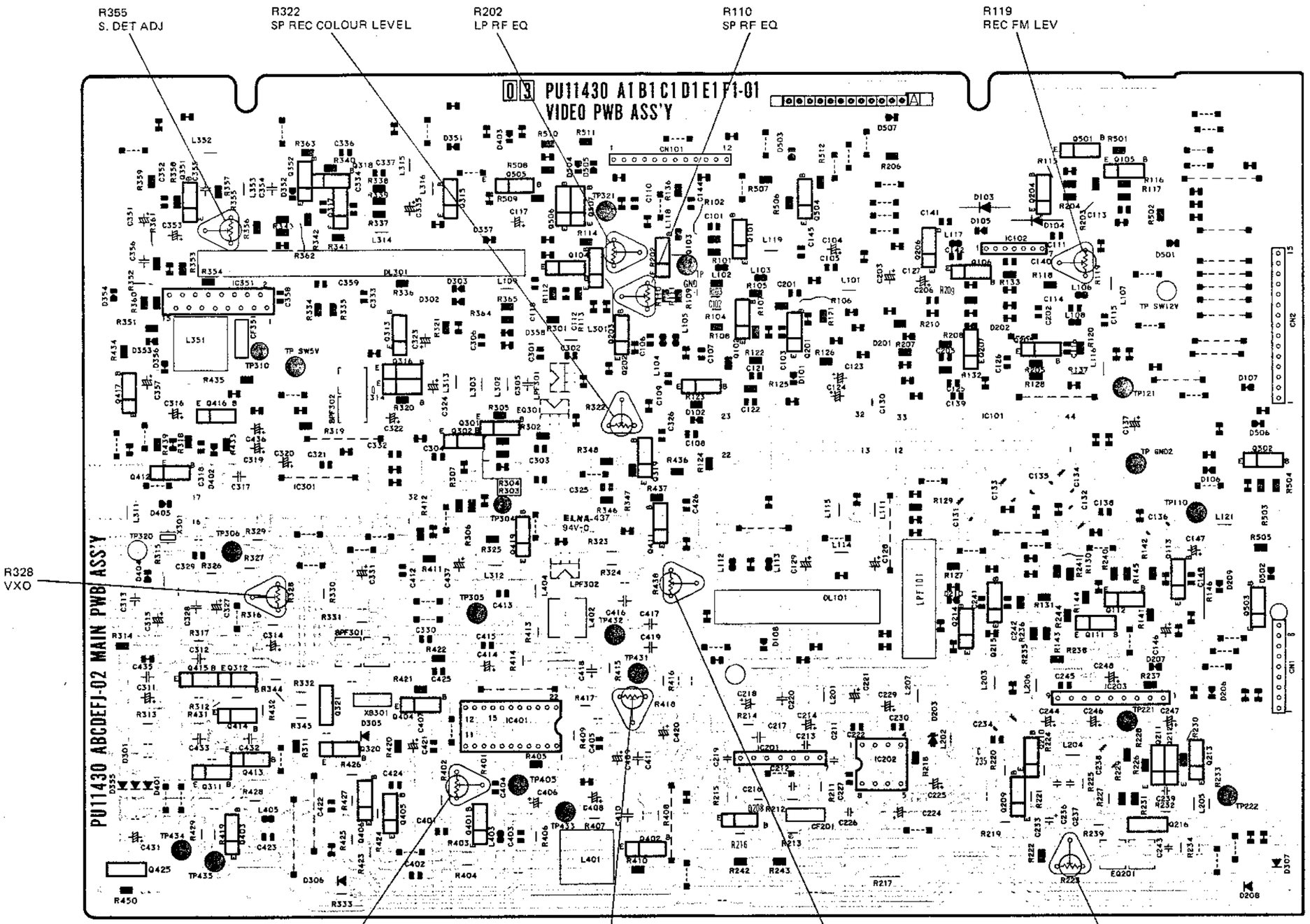




– A/CTL HEAD –

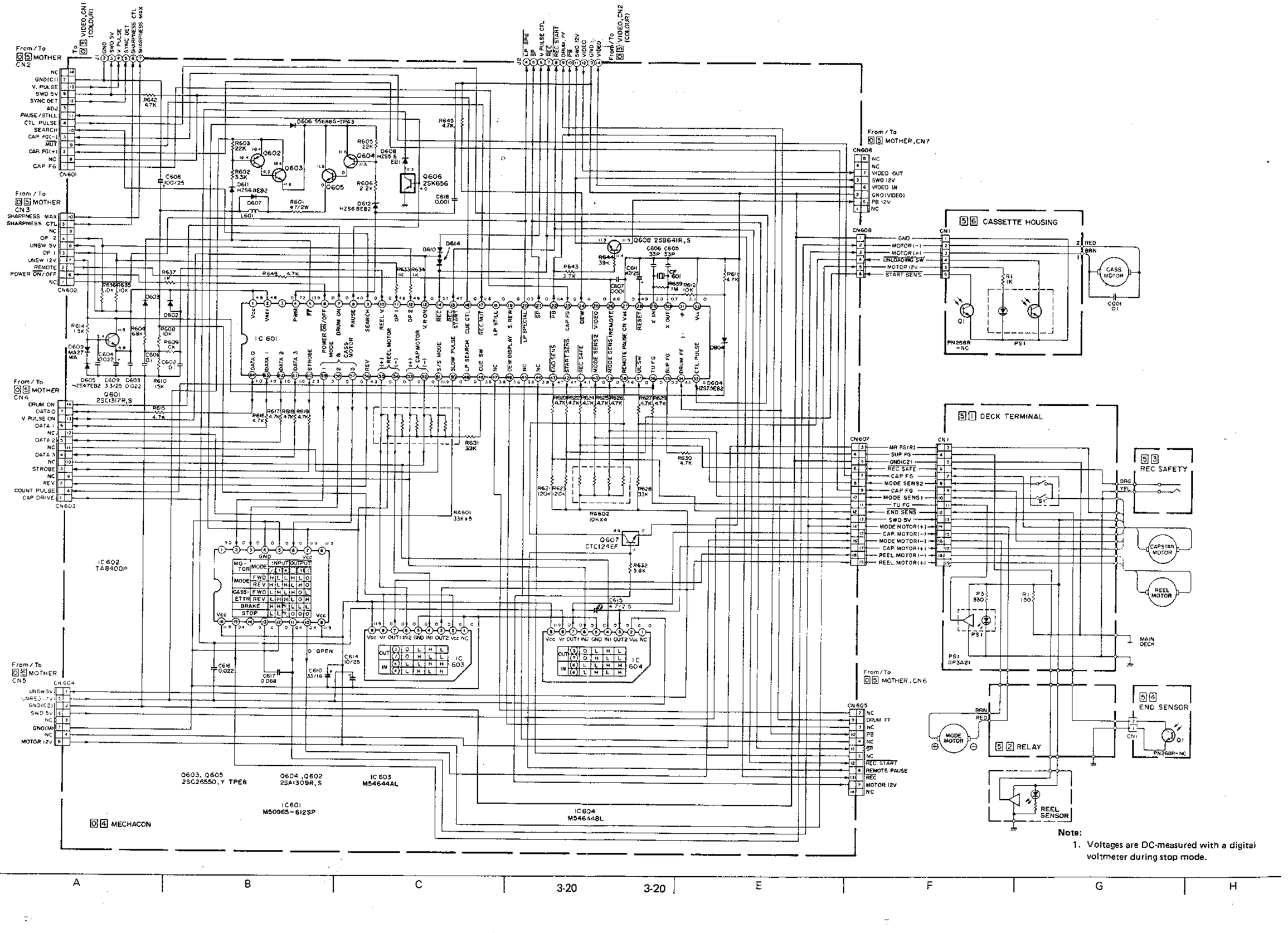


3.18 VIDEO CIRCUIT BOARD



3-19

3.19 MECHANISM CONTROL SCHEMATIC DIAGRAM

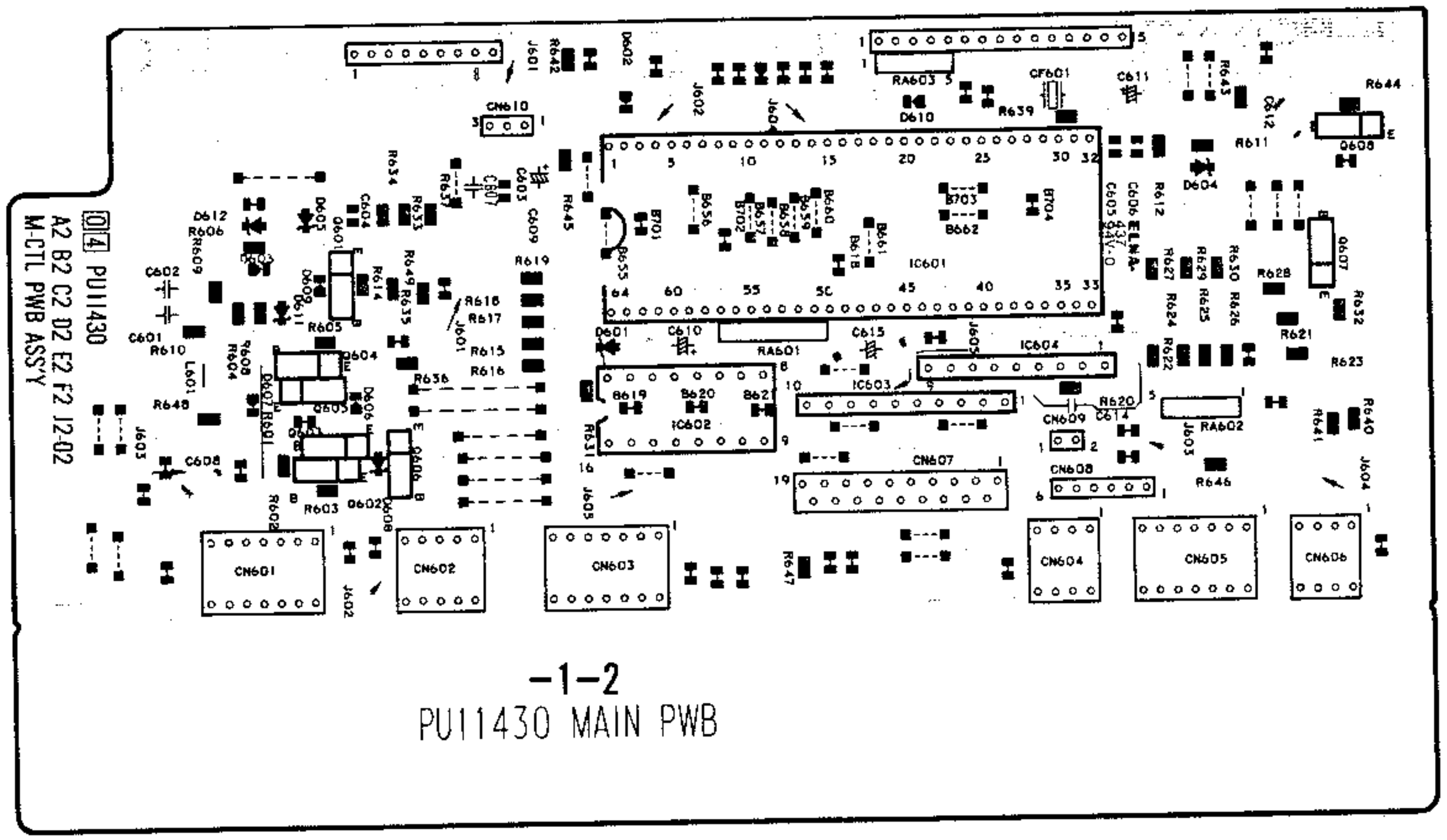


Note:

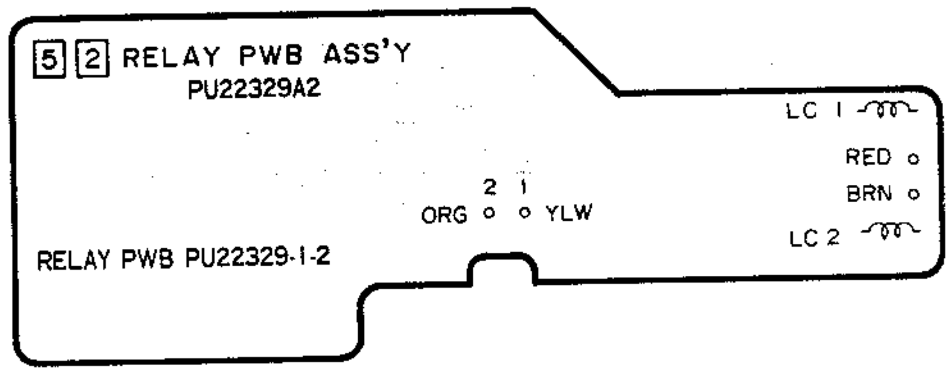
1. Voltages are DC-measured with a digital voltmeter during stop mode.

3.20 MECHANISM CONTROL CIRCUIT BOARD

– MECHACON –

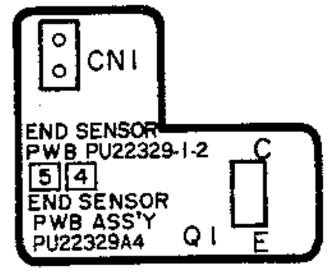


– RELAY –

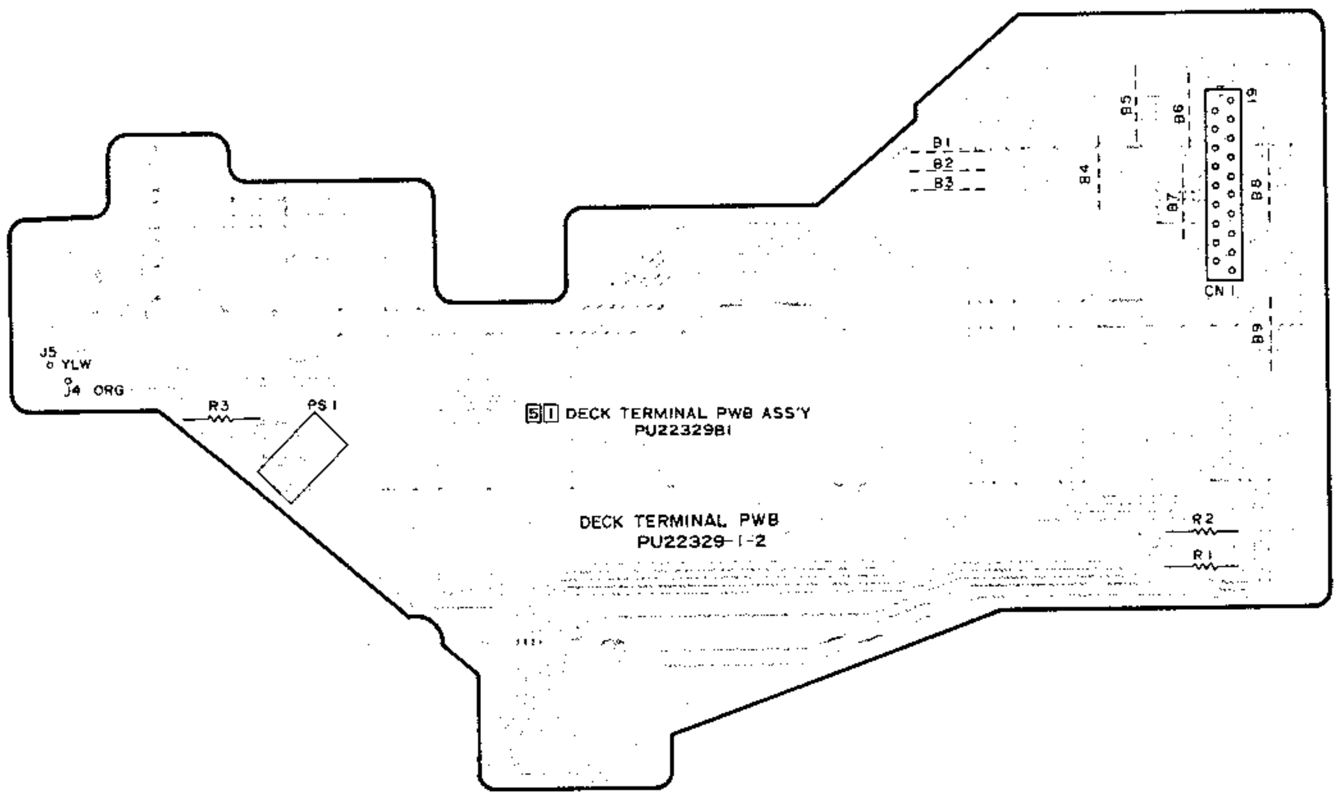


– REC SEFETY –

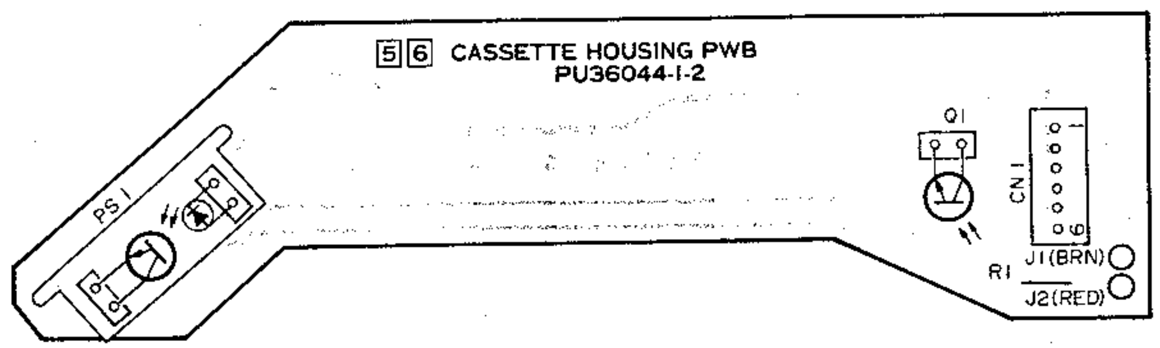
– END SENSOR –



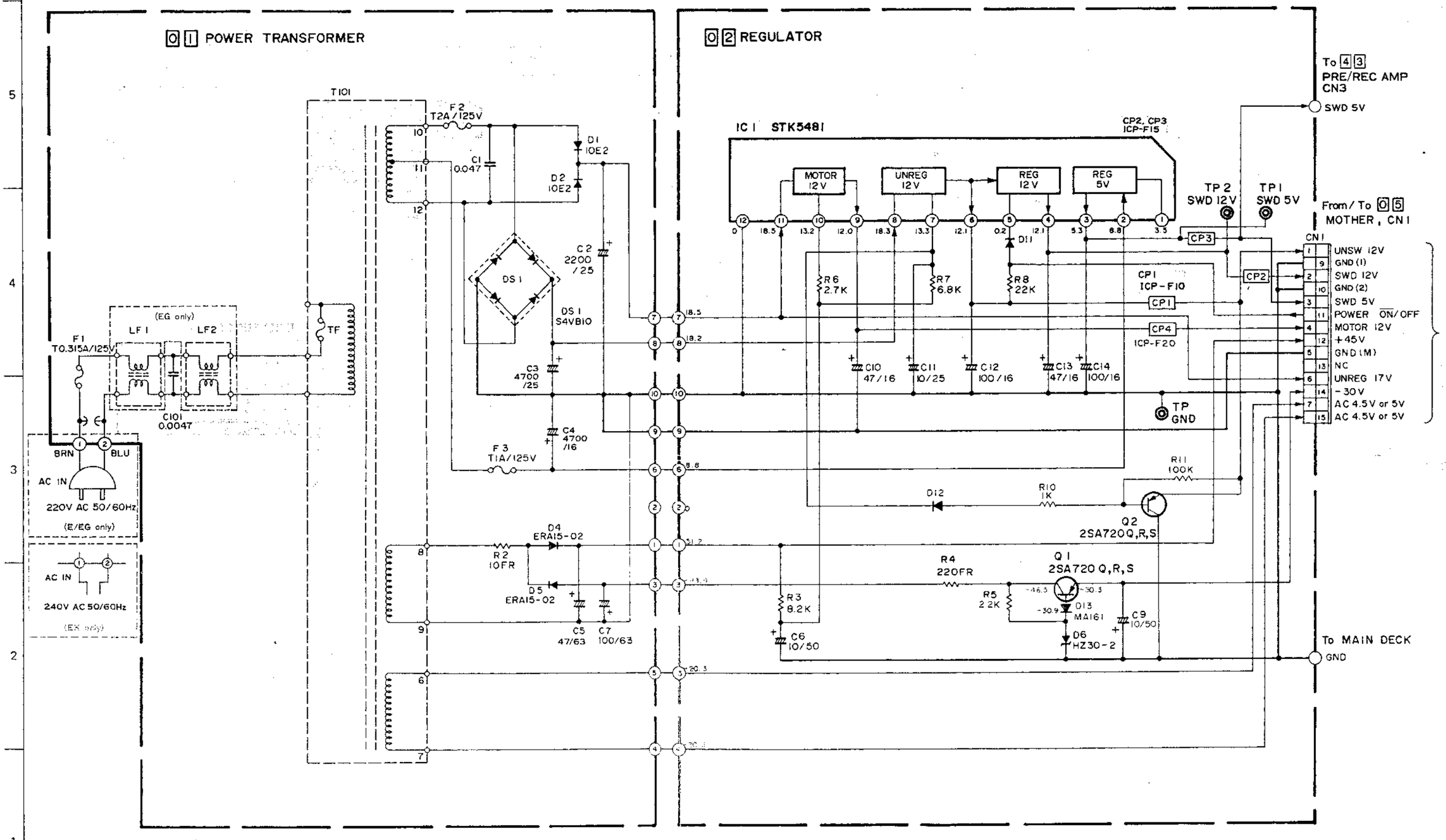
– DECK TERMINAL –



– CASSETTE HOUSING –



3.21 POWER SUPPLY SCHEMATIC DIAGRAM



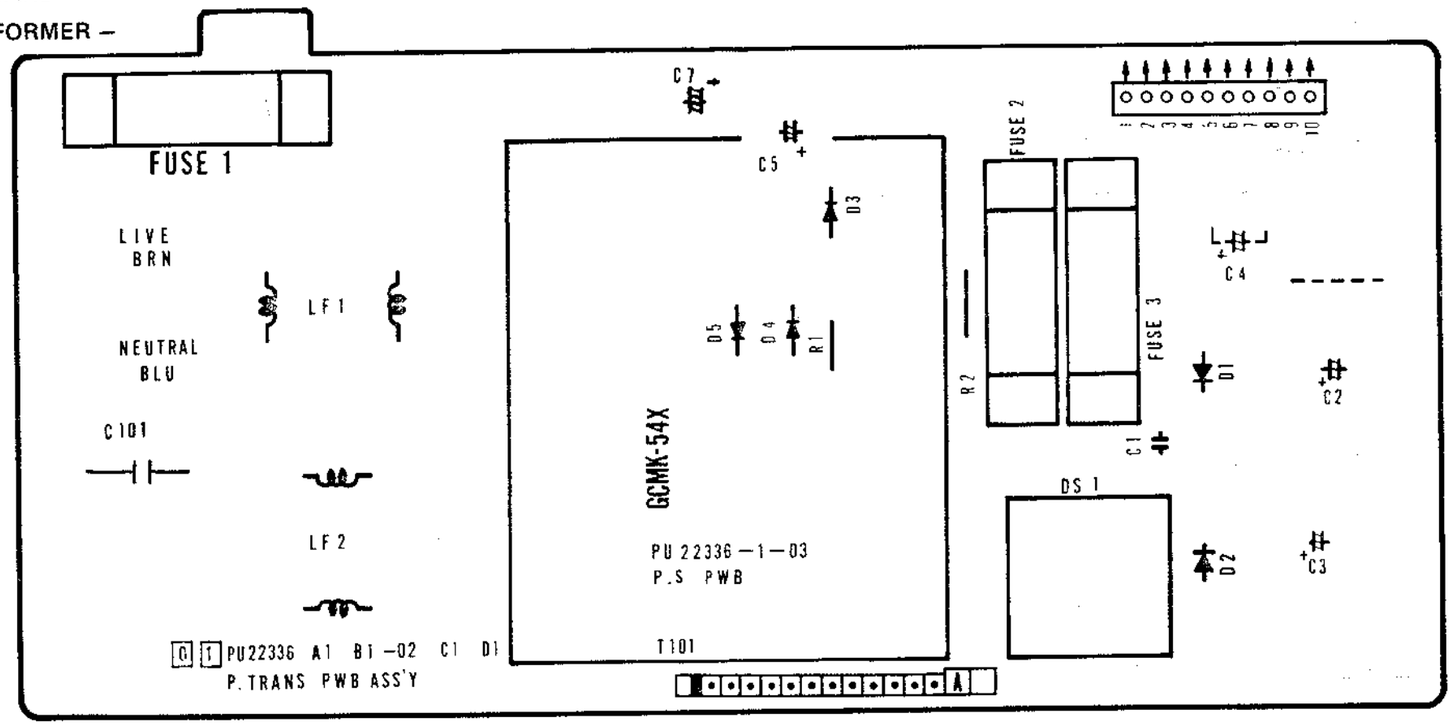
Note:

1. Voltages are DC-measured with a digital voltmeter during stop mode.

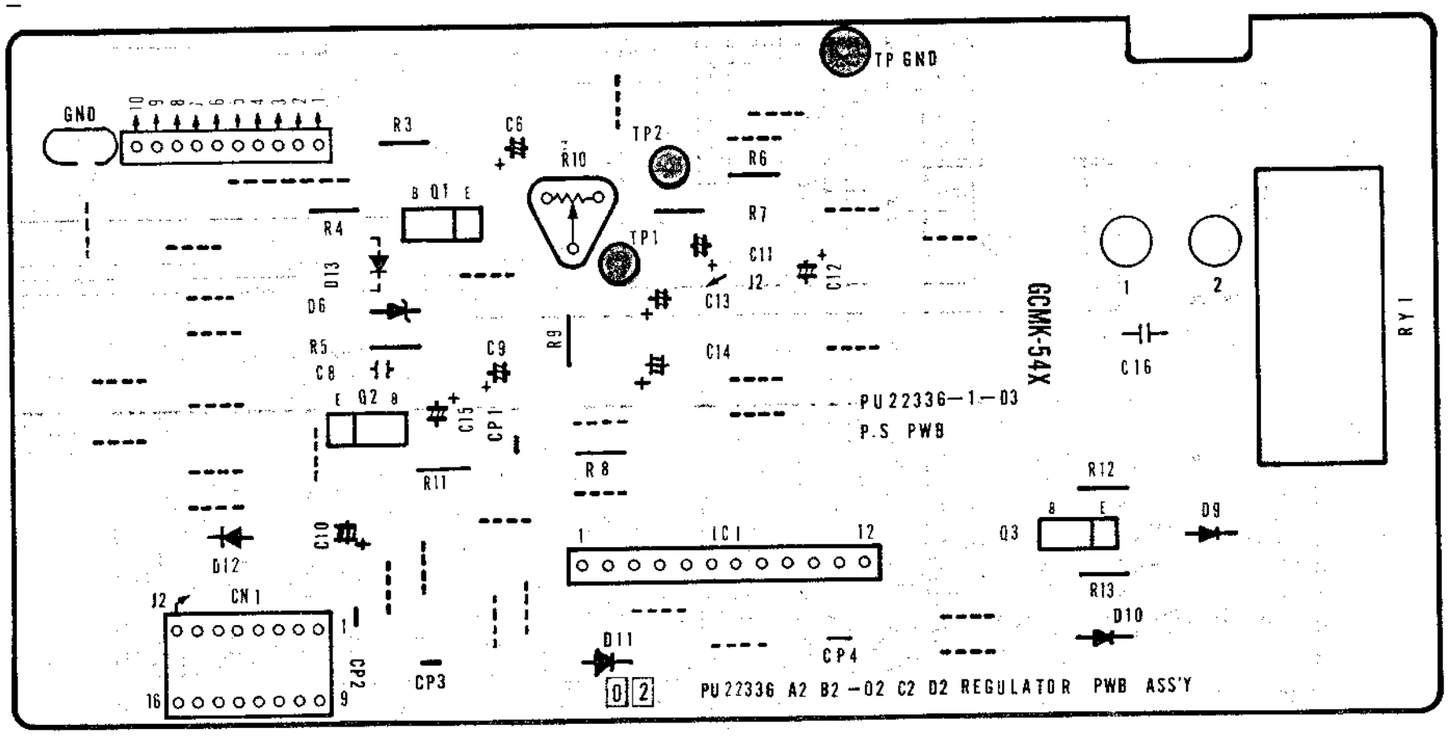
3-22

3.22 POWER SUPPLY CIRCUIT BOARD

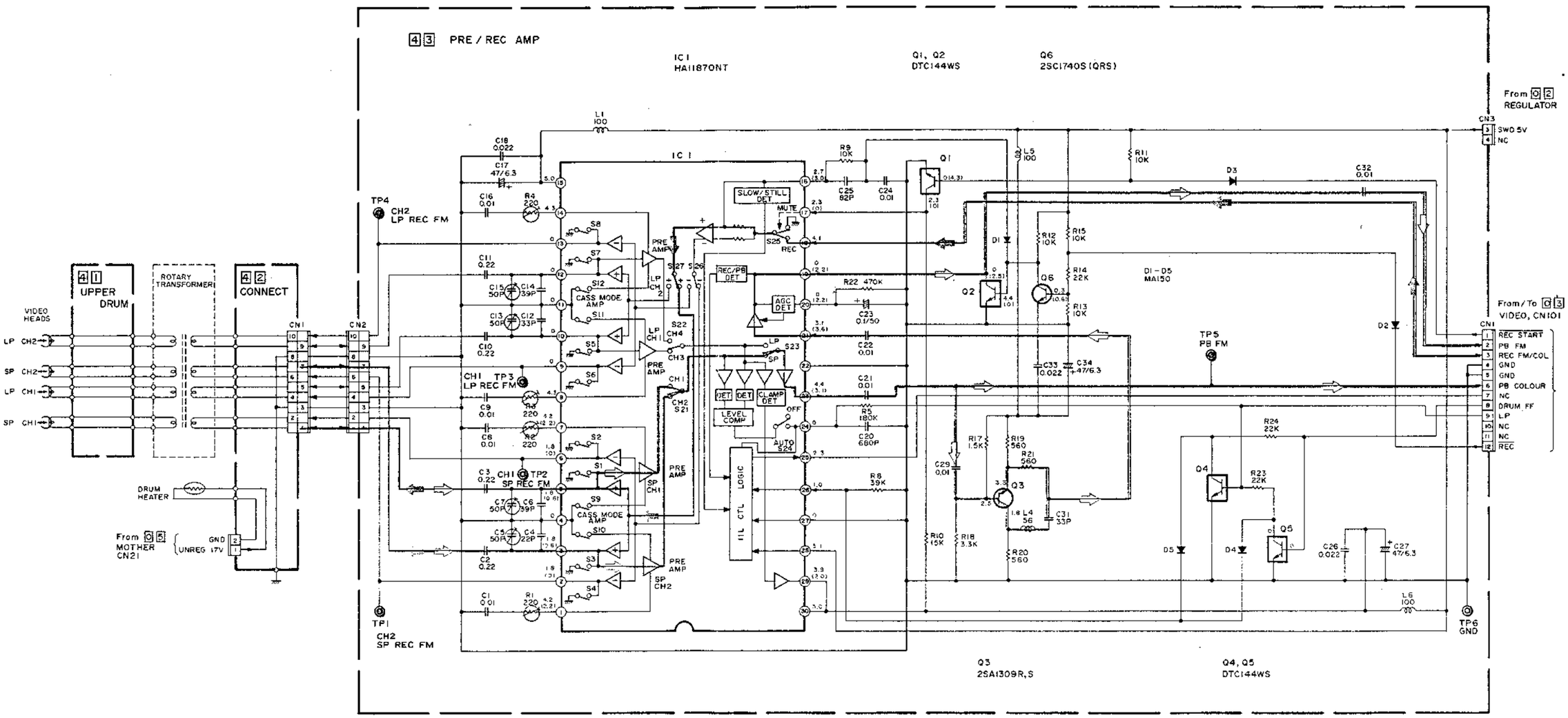
– POWER TRANSFORMER –



– REGULATOR –



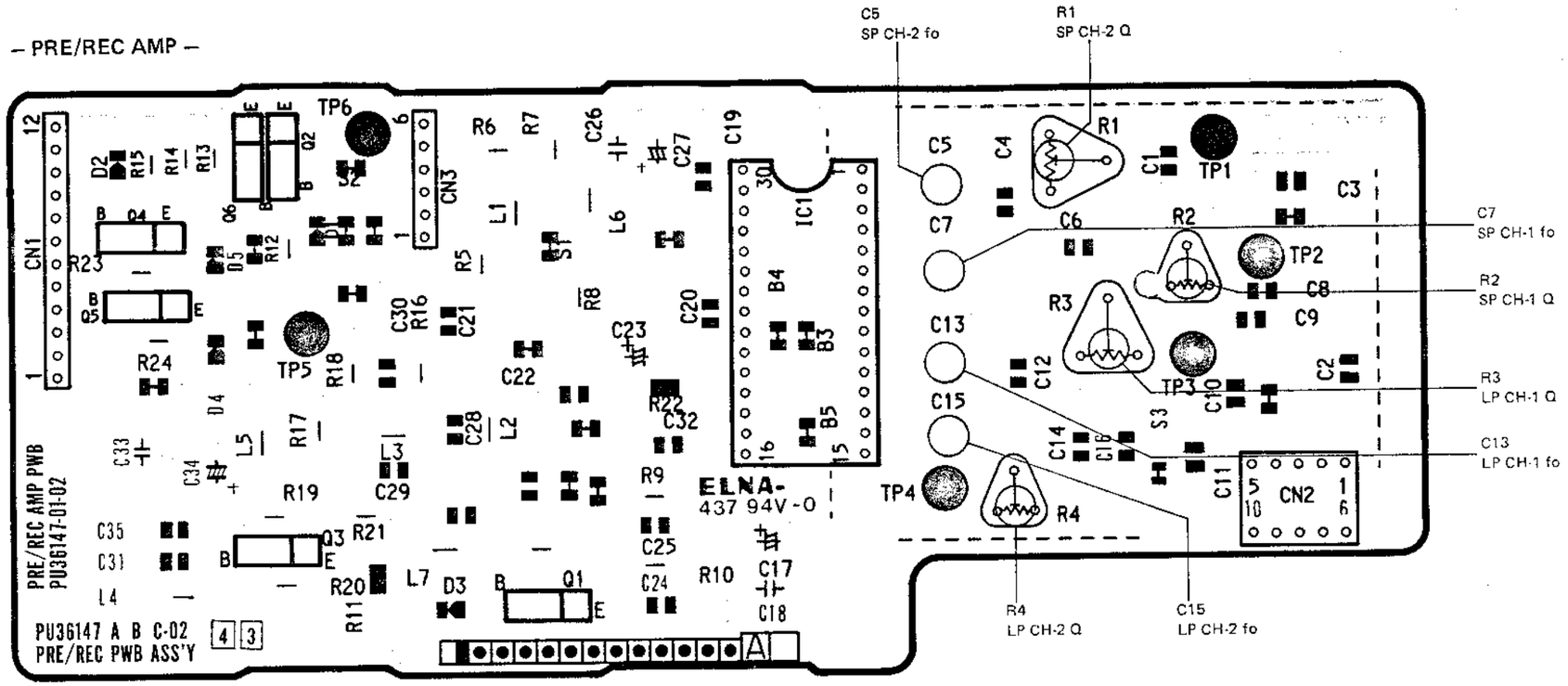
3.23 PRE/REC AMP SCHEMATIC DIAGRAM



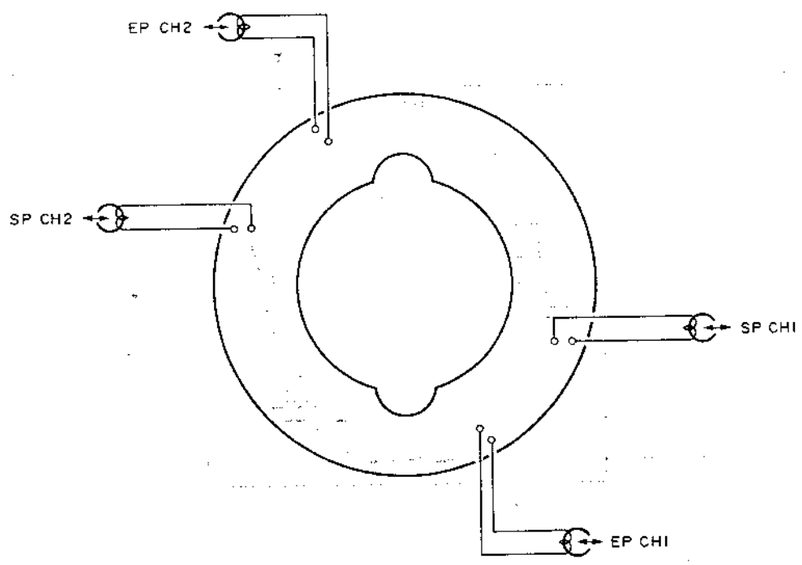
3-24

3.24 PRE/REC AMP CIRCUIT BOARD

– PRE/REC AMP –

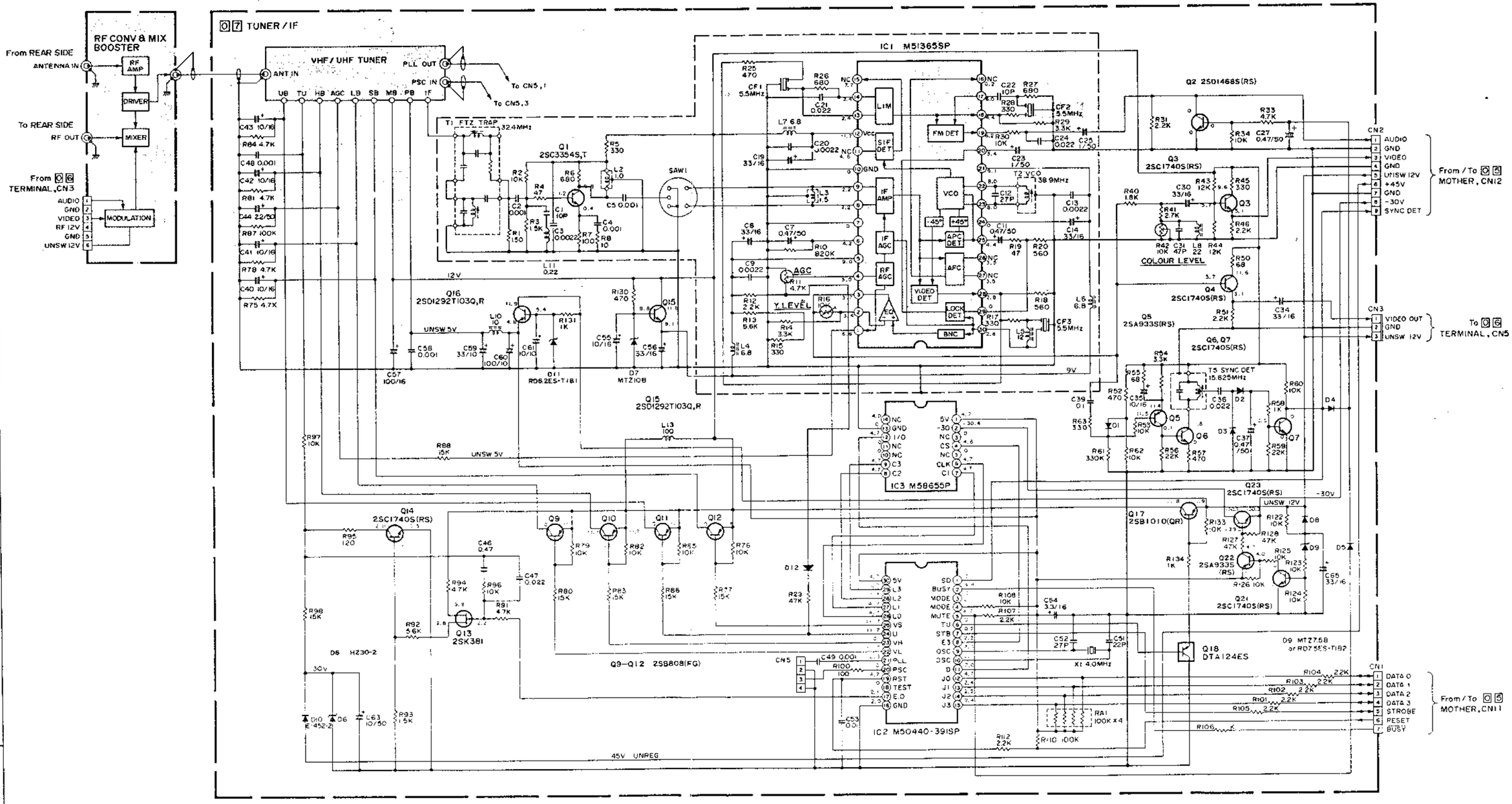


– UPPER DRUM –



4 1 UPPER DRUM PWB
PDM3018

3.25 TUNER/IF SCHEMATIC DIAGRAM
(HR-D180E/EG only)

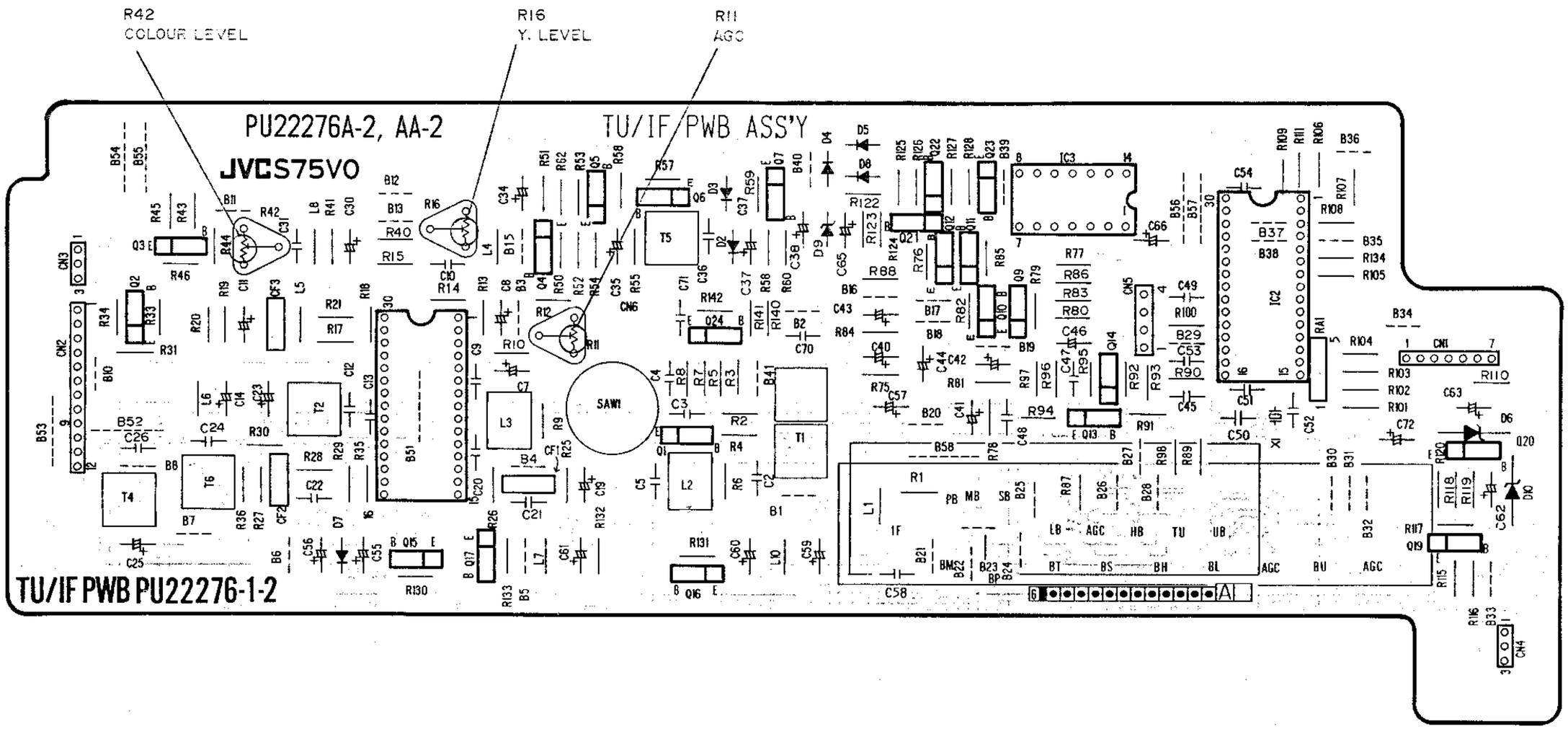


Note:

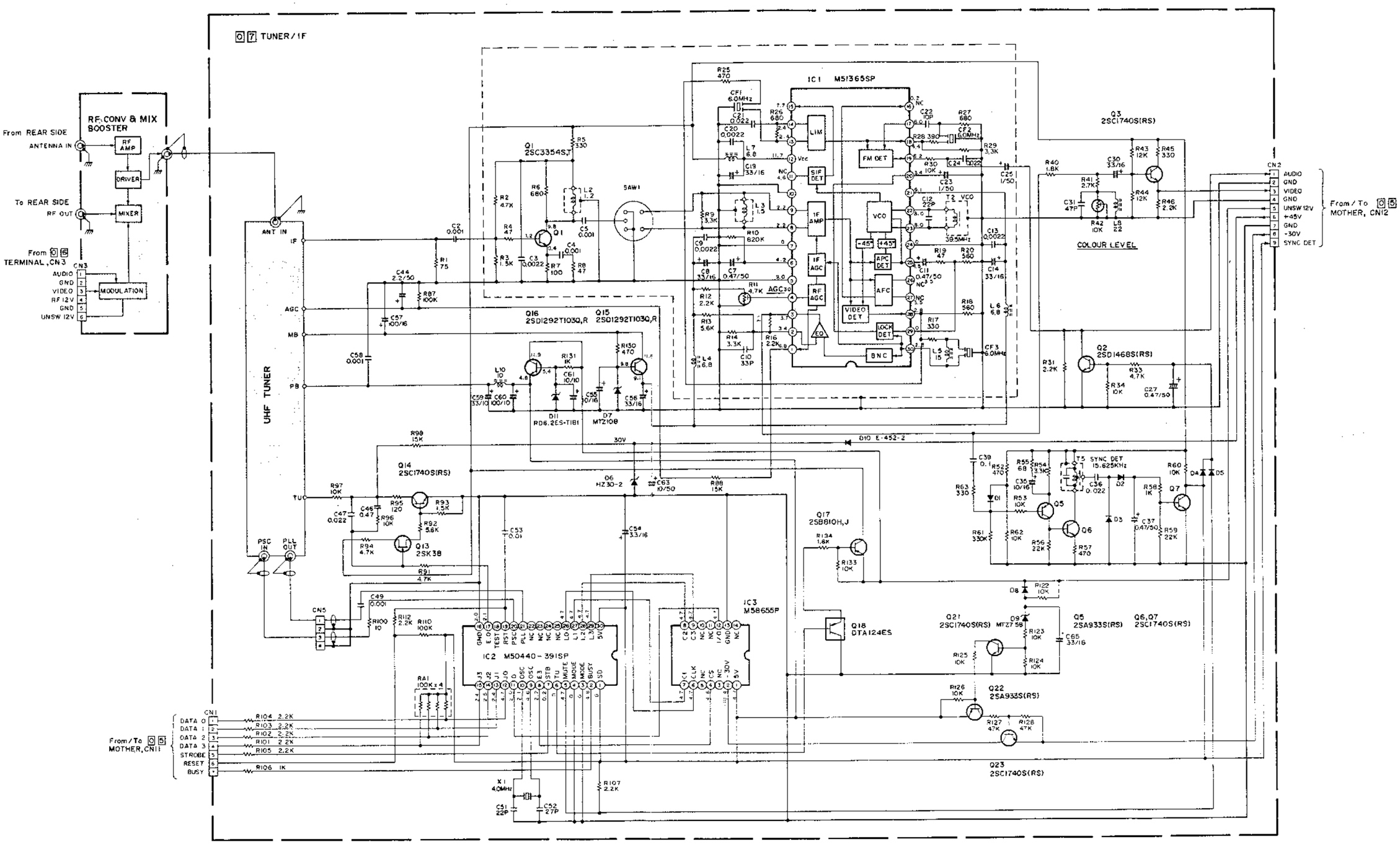
1. Voltages are DC-measured with a digital voltmeter during stop mode.

3-26

3.26 TUNER/IF CIRCUIT BOARD
(HR-D180E/EG only)



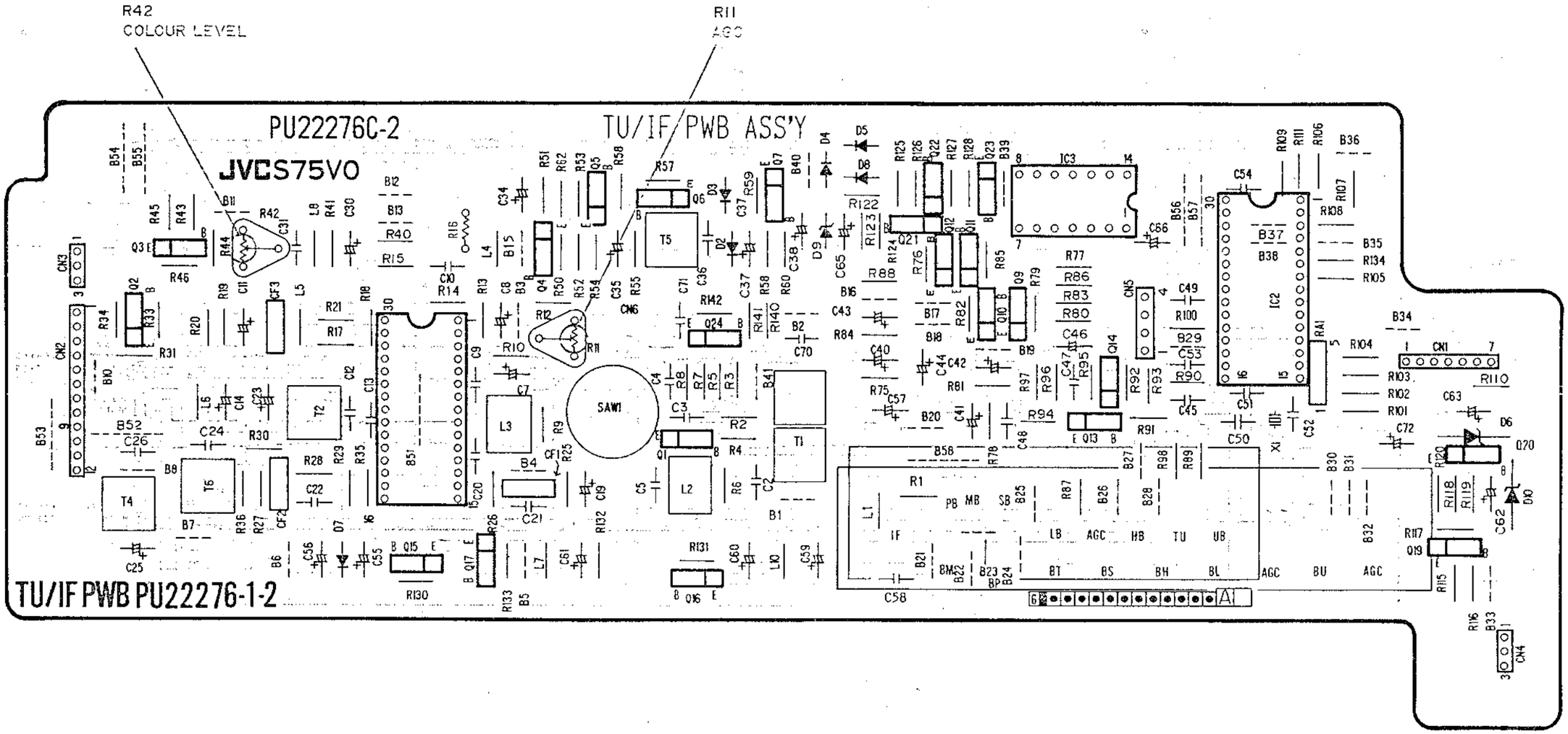
3.27 TUNER/IF SCHEMATIC DIAGRAM
(HR-D180EK only)



Note:

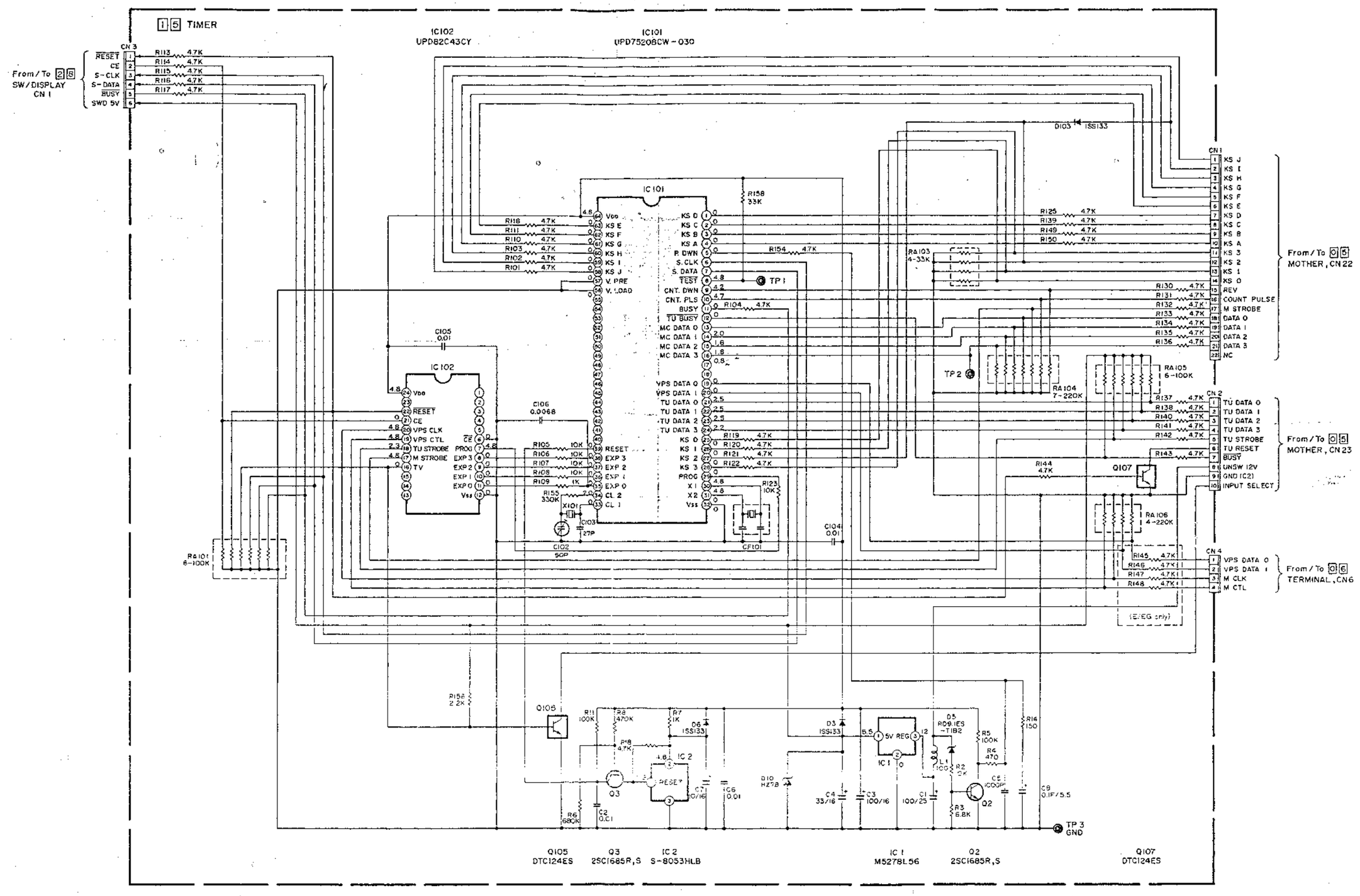
1. Voltages are DC-measured with a digital voltmeter during stop mode.

3.28 TUNER/IF CIRCUIT BOARD
(HR-D180EK only)



3-29

3.29 TIMER SCHEMATIC DIAGRAM

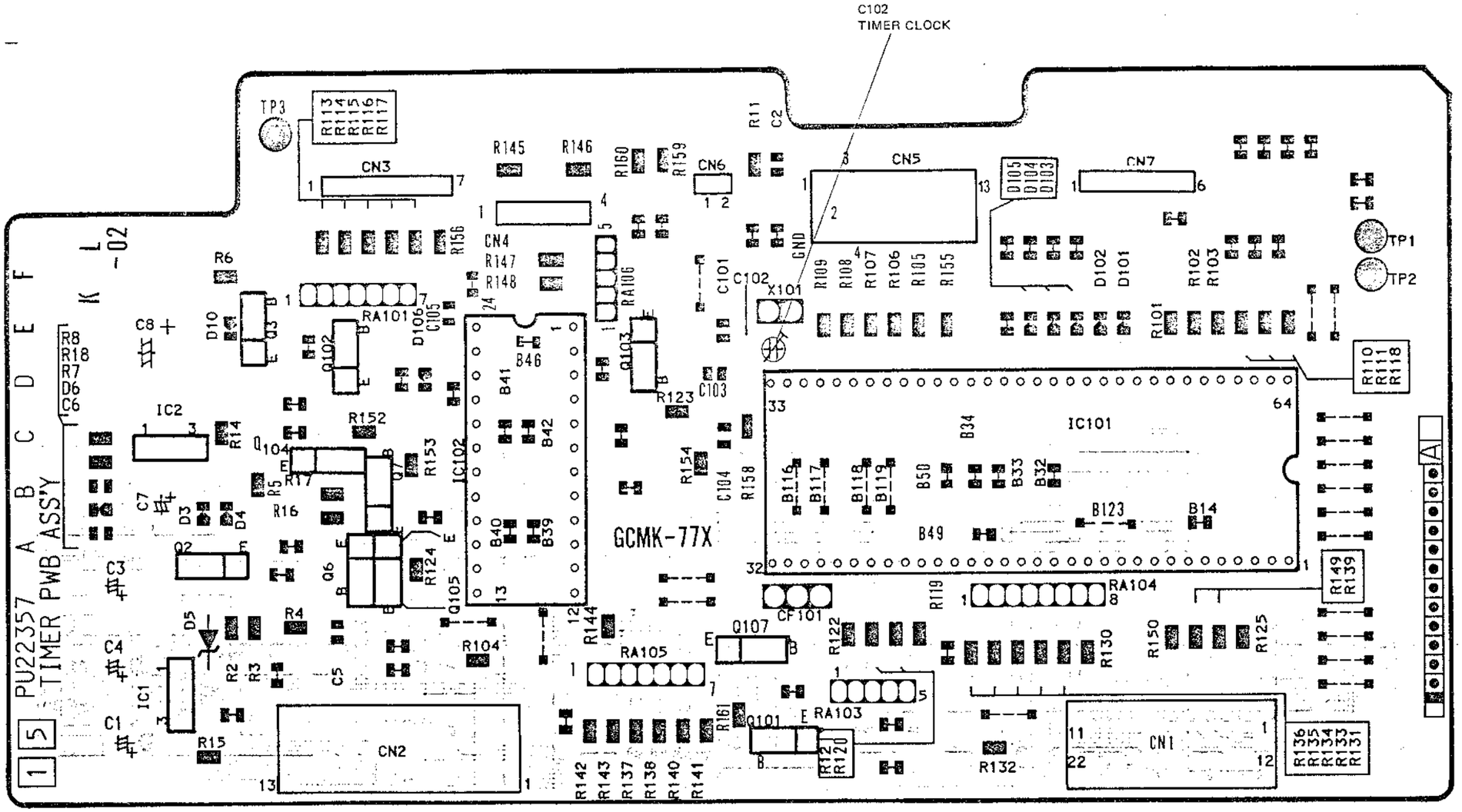


Note:

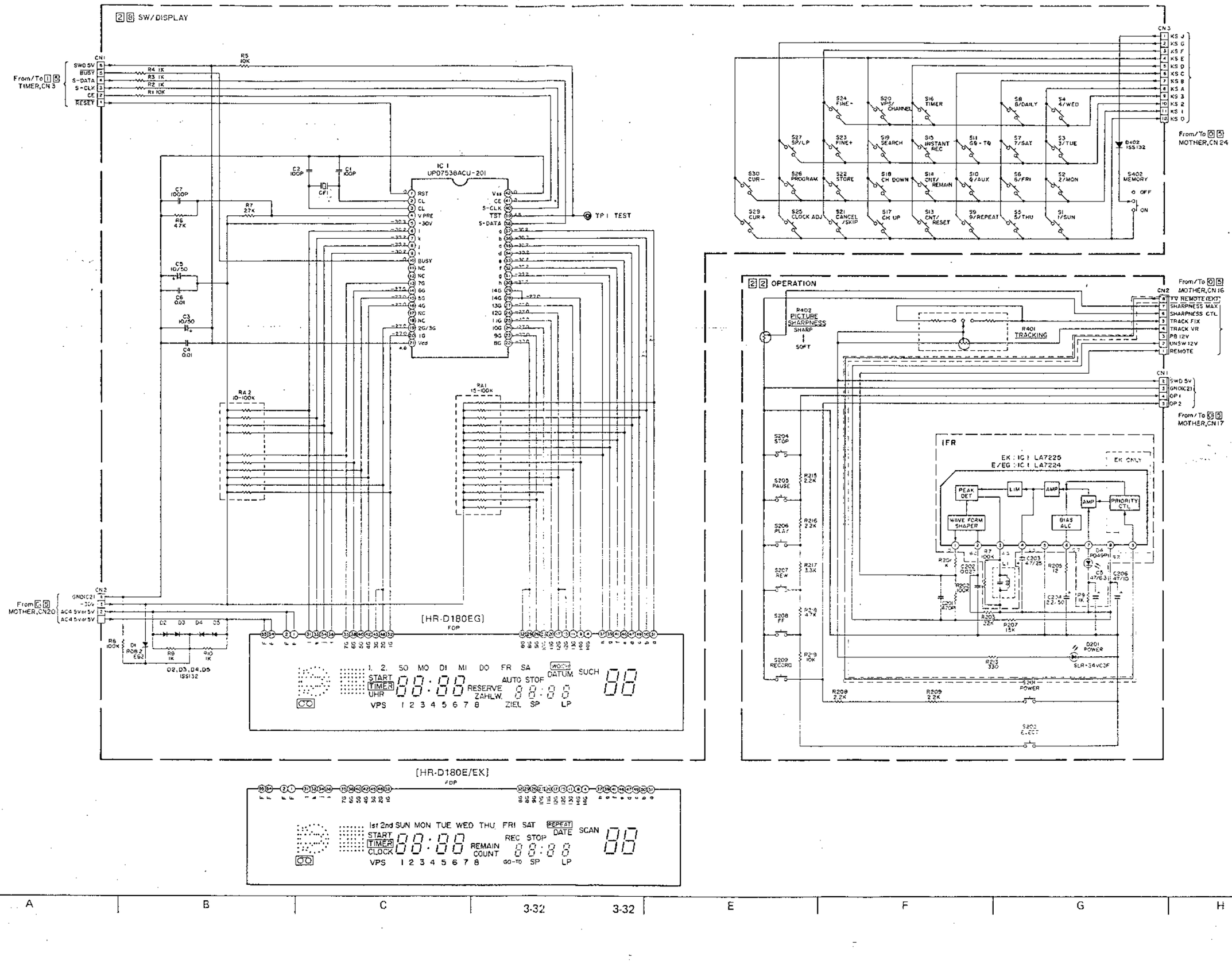
1. Voltages are DC-measured with a digital voltmeter during stop mode.

3.30 TIMER CIRCUIT BOARD

– TIMER –

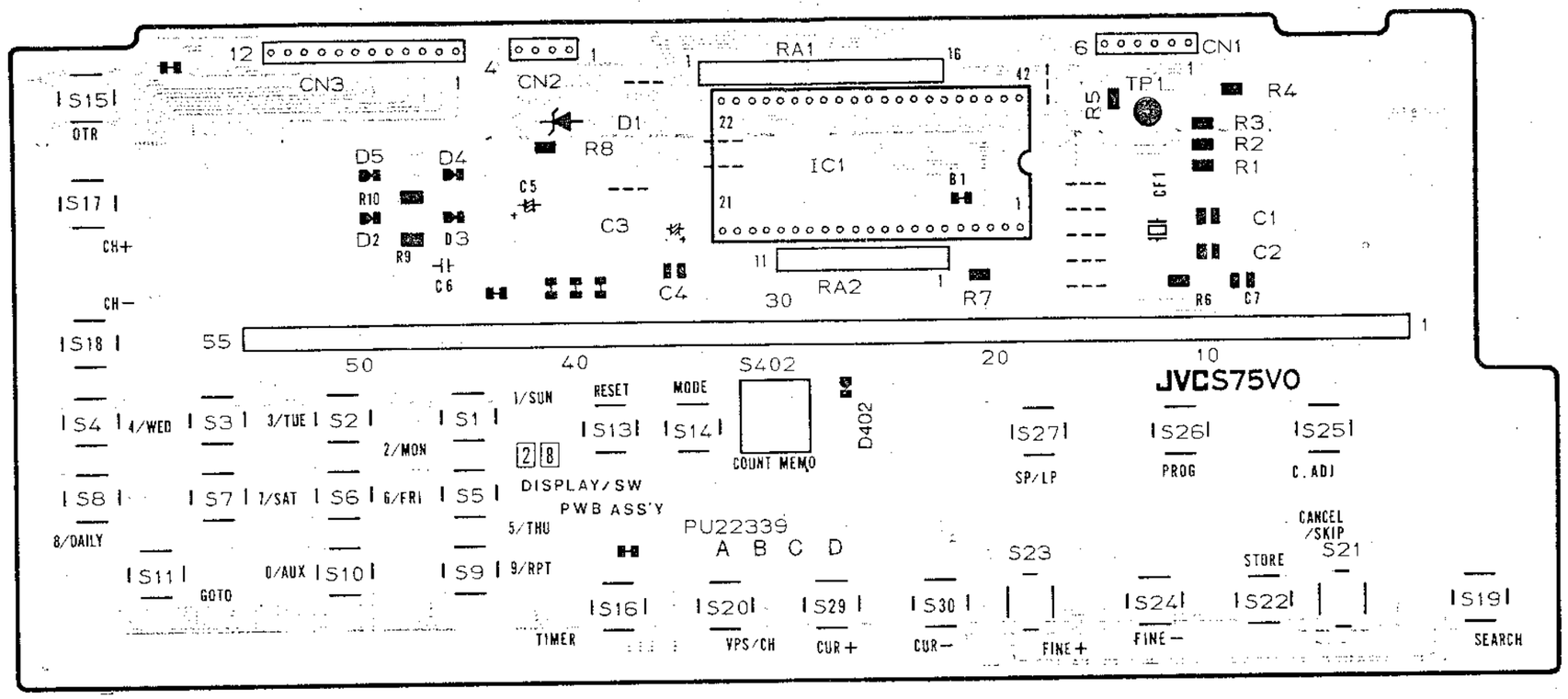


3.31 SWITCH/DISPLAY AND OPERATION SCHEMATIC DIAGRAMS



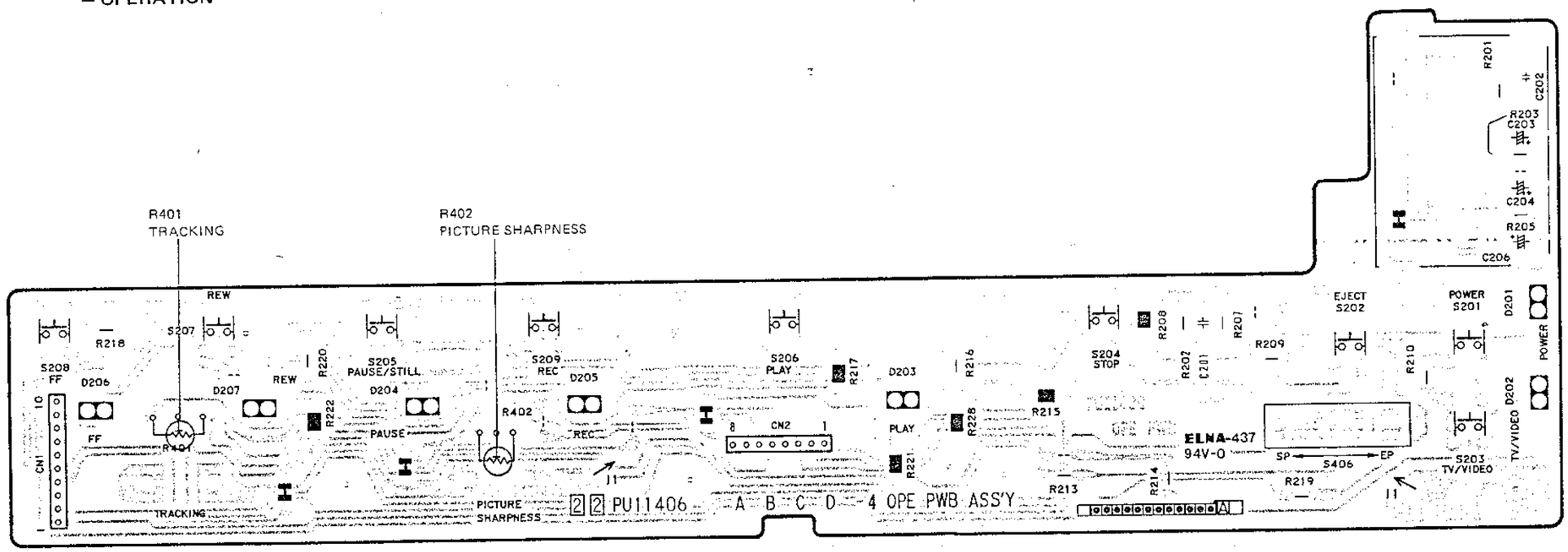
3-32

3.32 SWITCH/DISPLAY CIRCUIT BOARD

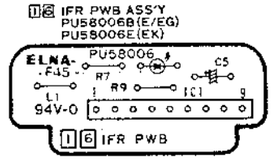


3.33 OPERATION AND IFR CIRCUIT BOARDS

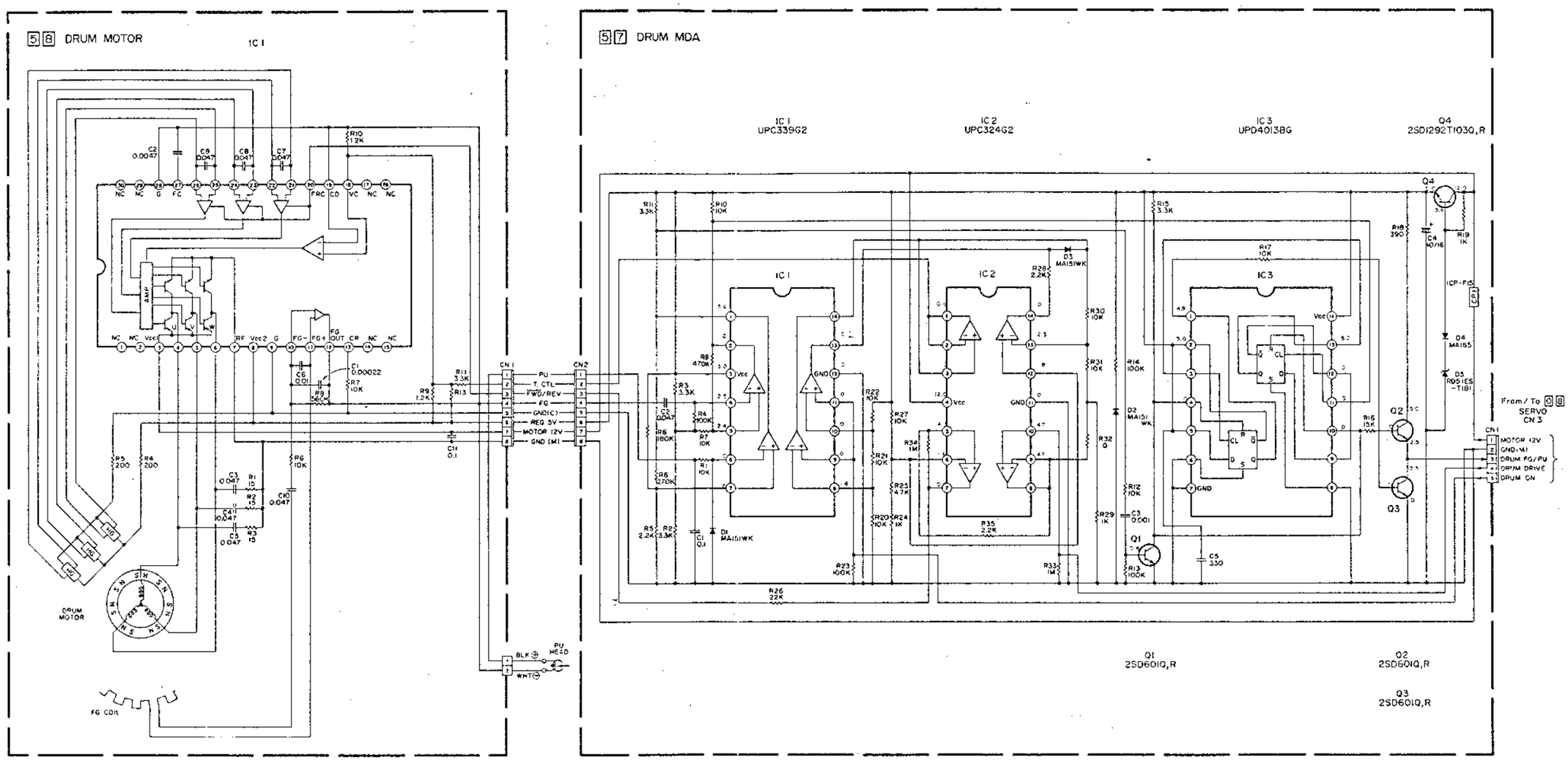
– OPERATION –



– IFR –

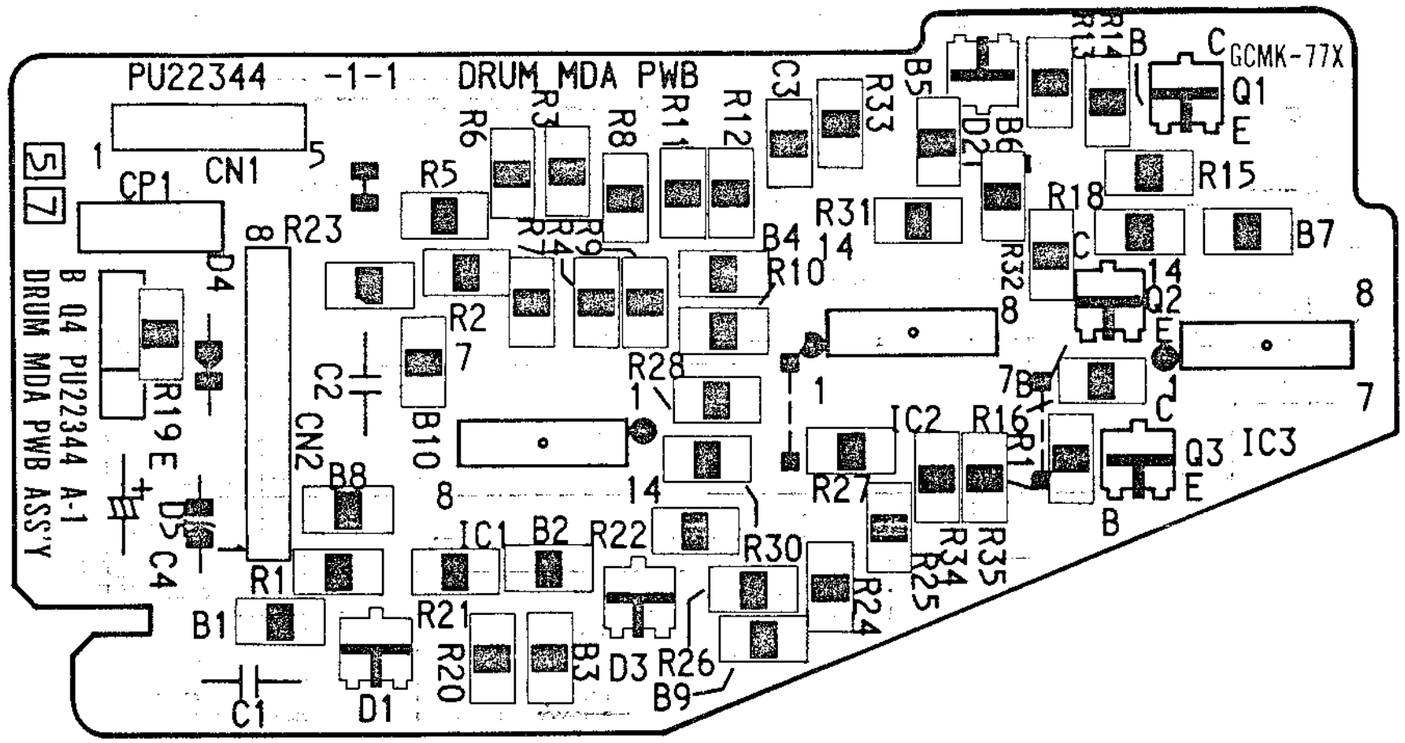


3.34 DRUM MDA AND DRUM MOTOR SCHEMATIC DIAGRAMS

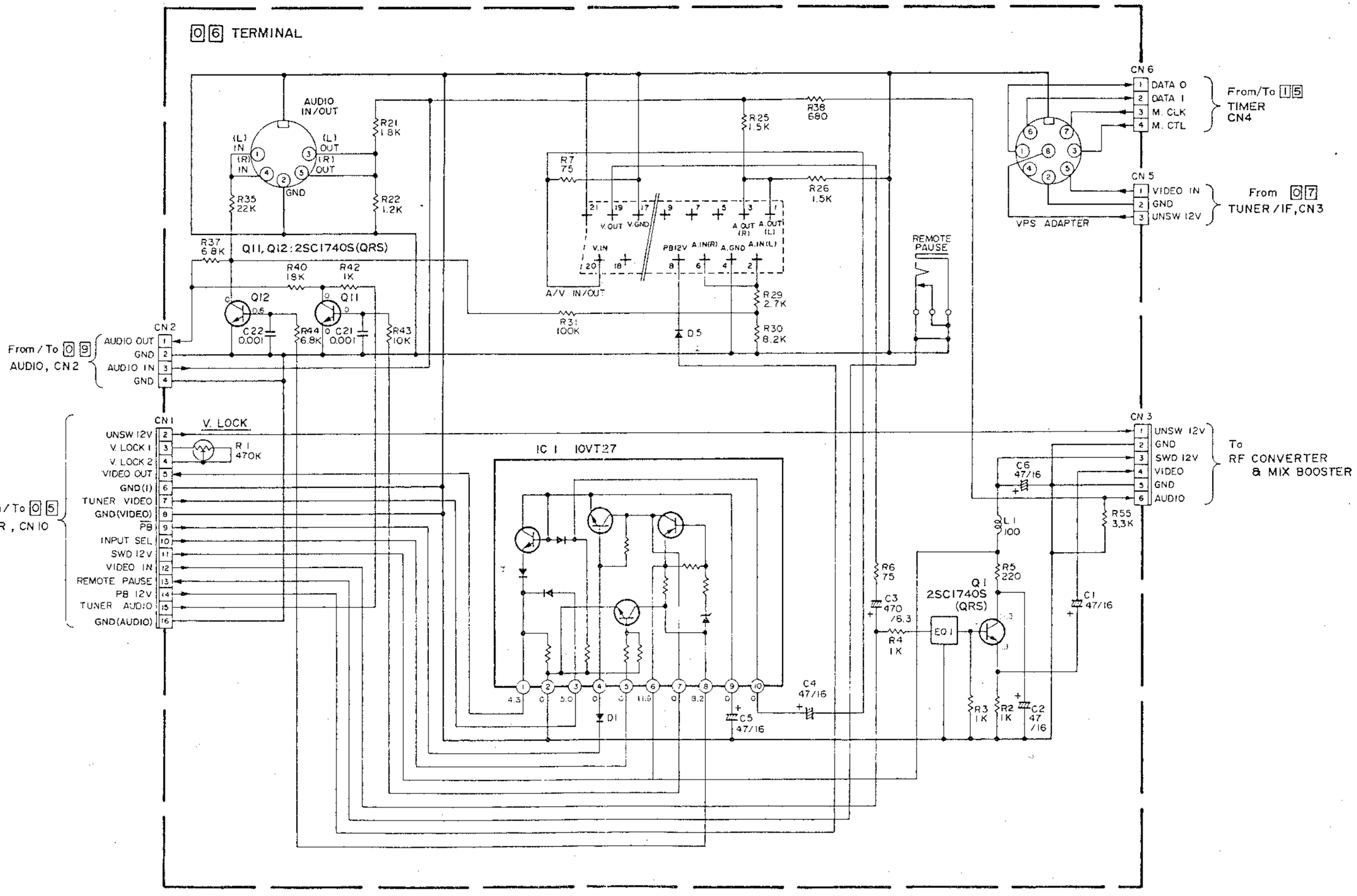


Note: Voltages are DC-measured with a digital voltmeter during stop mode.

3-34

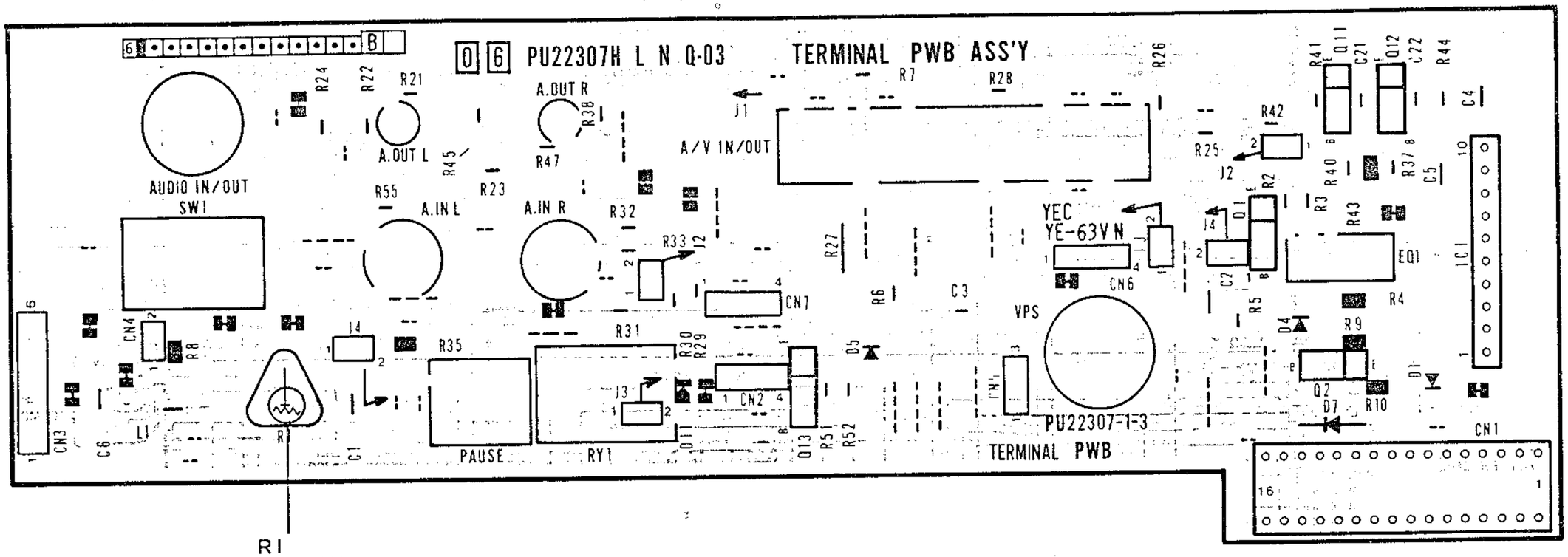

PU22344 -1-1 DRUM MDA PWB
GCMK-77X
CN1
CP1
CN2
IC1
IC2
IC3
Q1
Q2
Q3
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R26
R27
R28
R30
R31
R32
R33
R34
R35
C1
C2
C3
C4
D1
D2
D3
D4
D5
B1
B2
B3
B4
B5
B6
B7
B8
B9
B10
DRUM MDA PWB ASS'Y B Q4 PU22344 A-1

3.36 TERMINAL SCHEMATIC DIAGRAM
(HR-D180E/EG only)

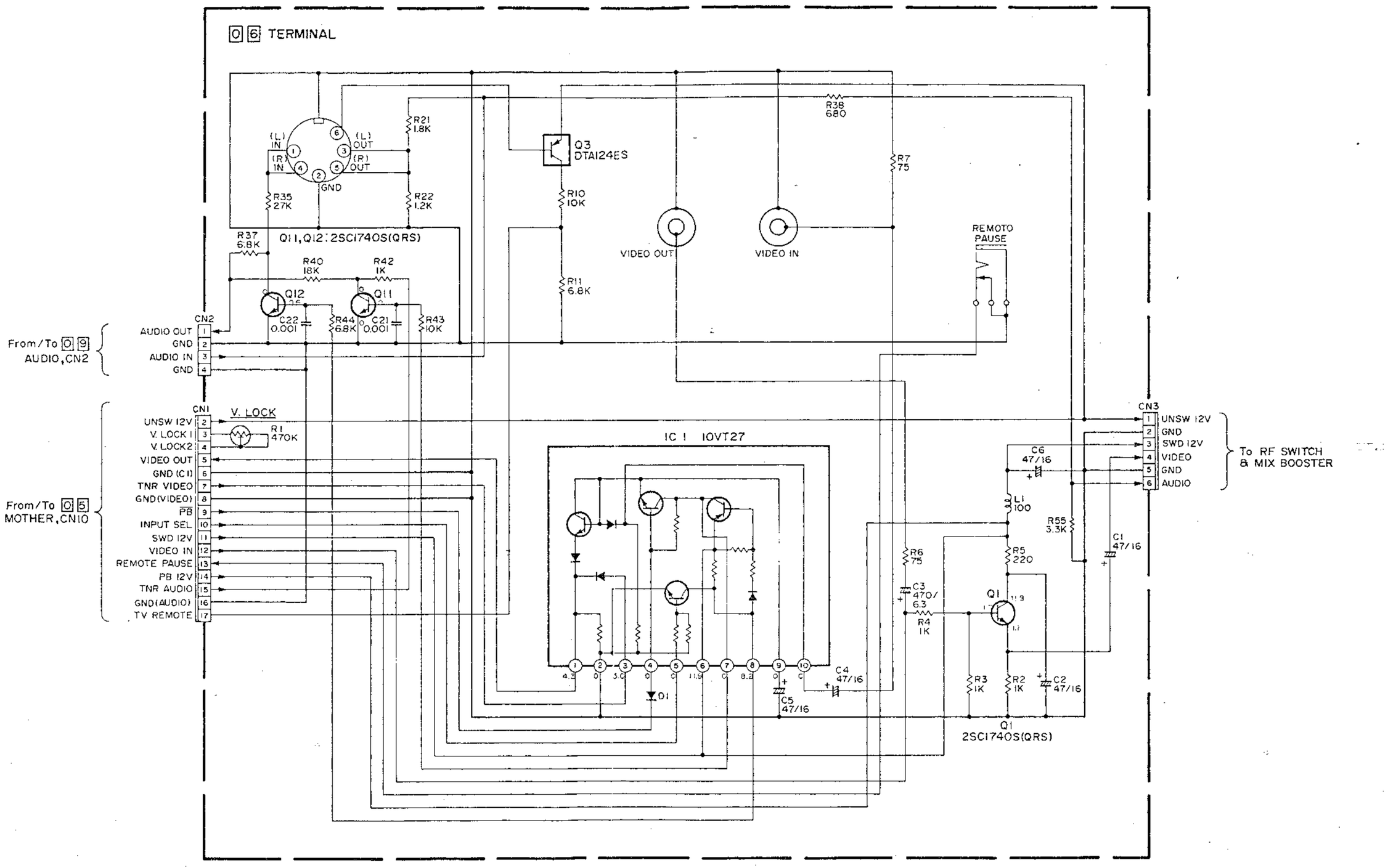


Note:
1. Voltages are DC-measured with a digital voltmeter during stop mode.

3.37 TERMINAL CIRCUIT BOARD
(HR-D180E/EG only)

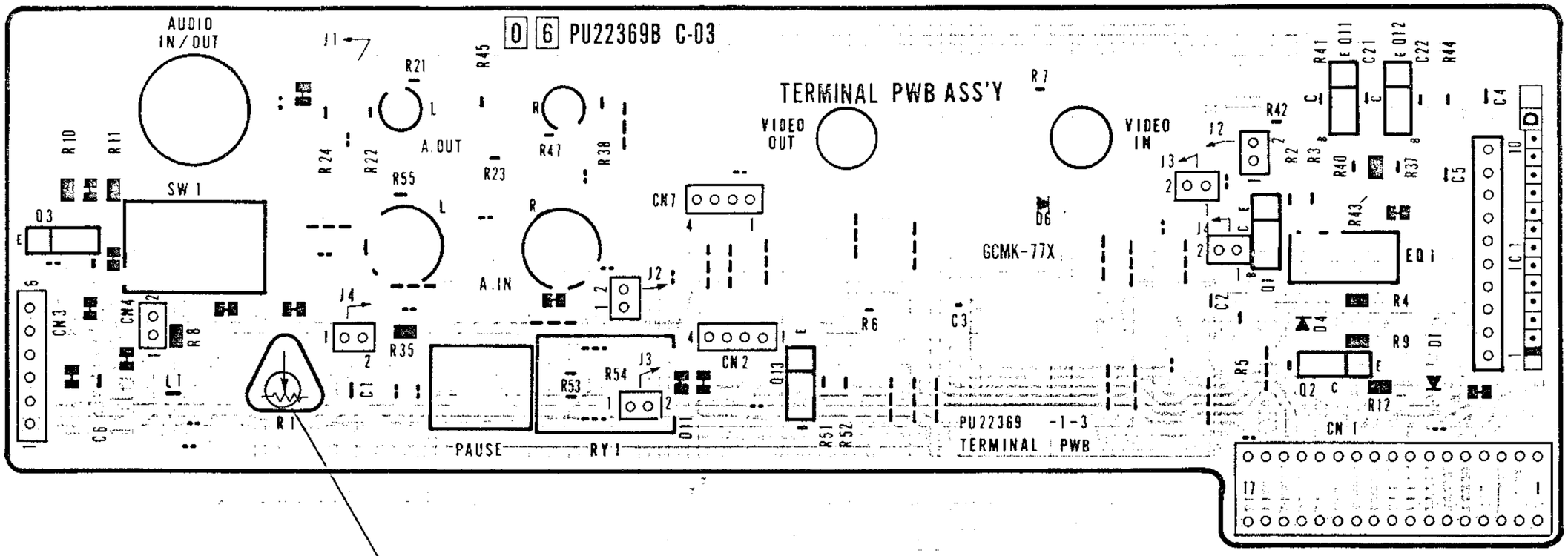


3.38 TERMINAL SCHEMATIC DIAGRAM
(HR-D180EK only)

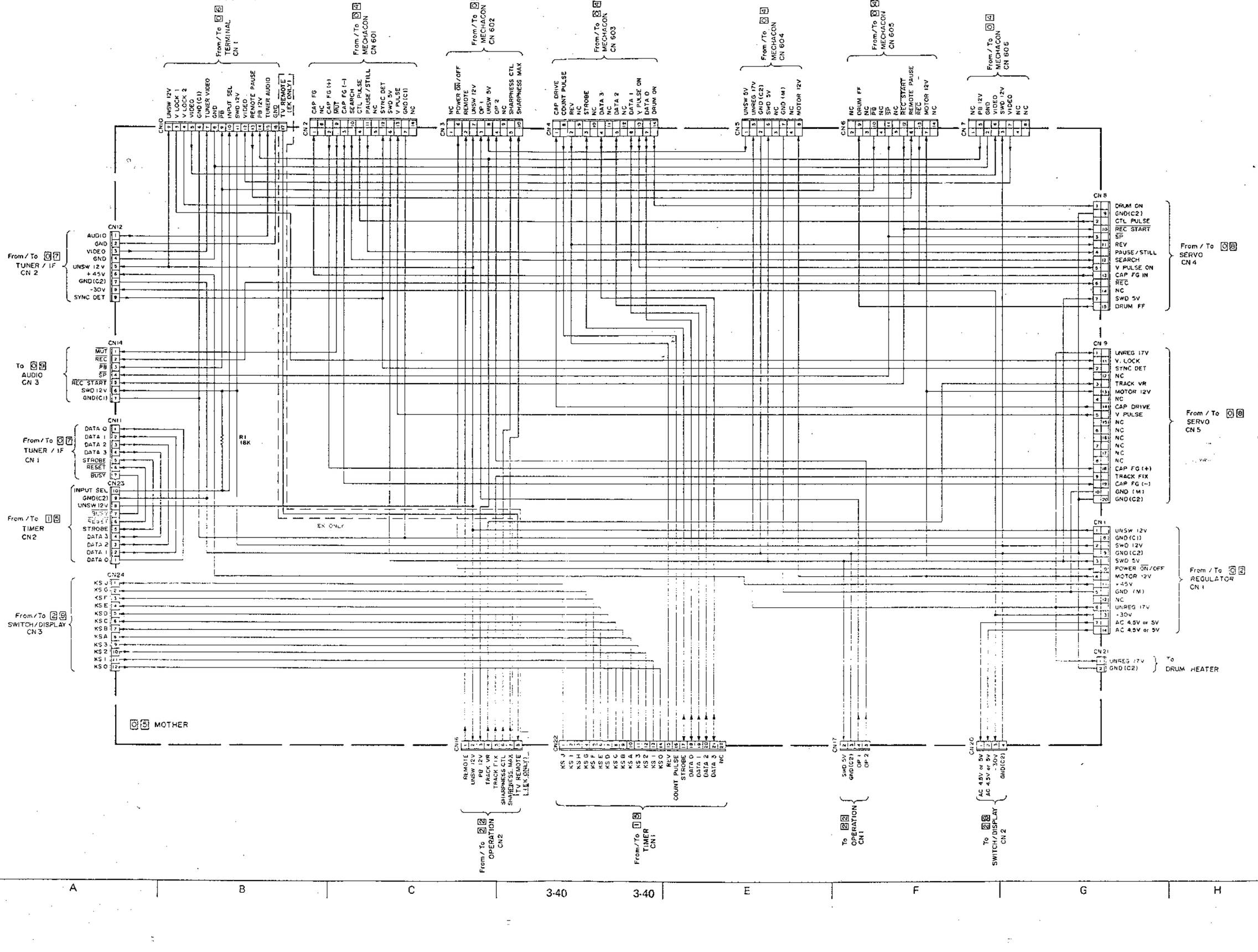


Note:
1. Voltages are DC-measured with a digital voltmeter during stop mode.

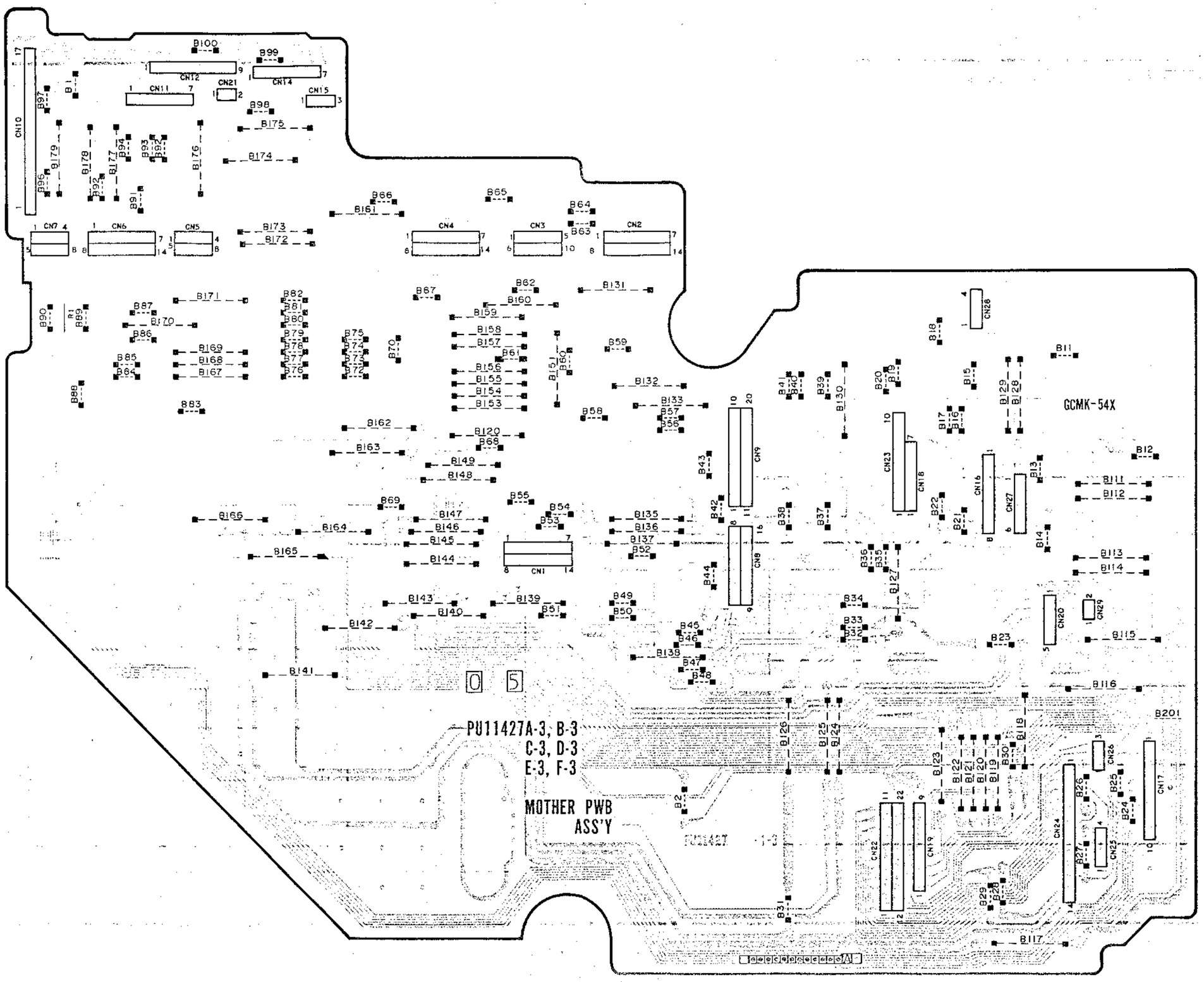
3.39 TERMINAL CIRCUIT BOARD
(HR-D180EK only)



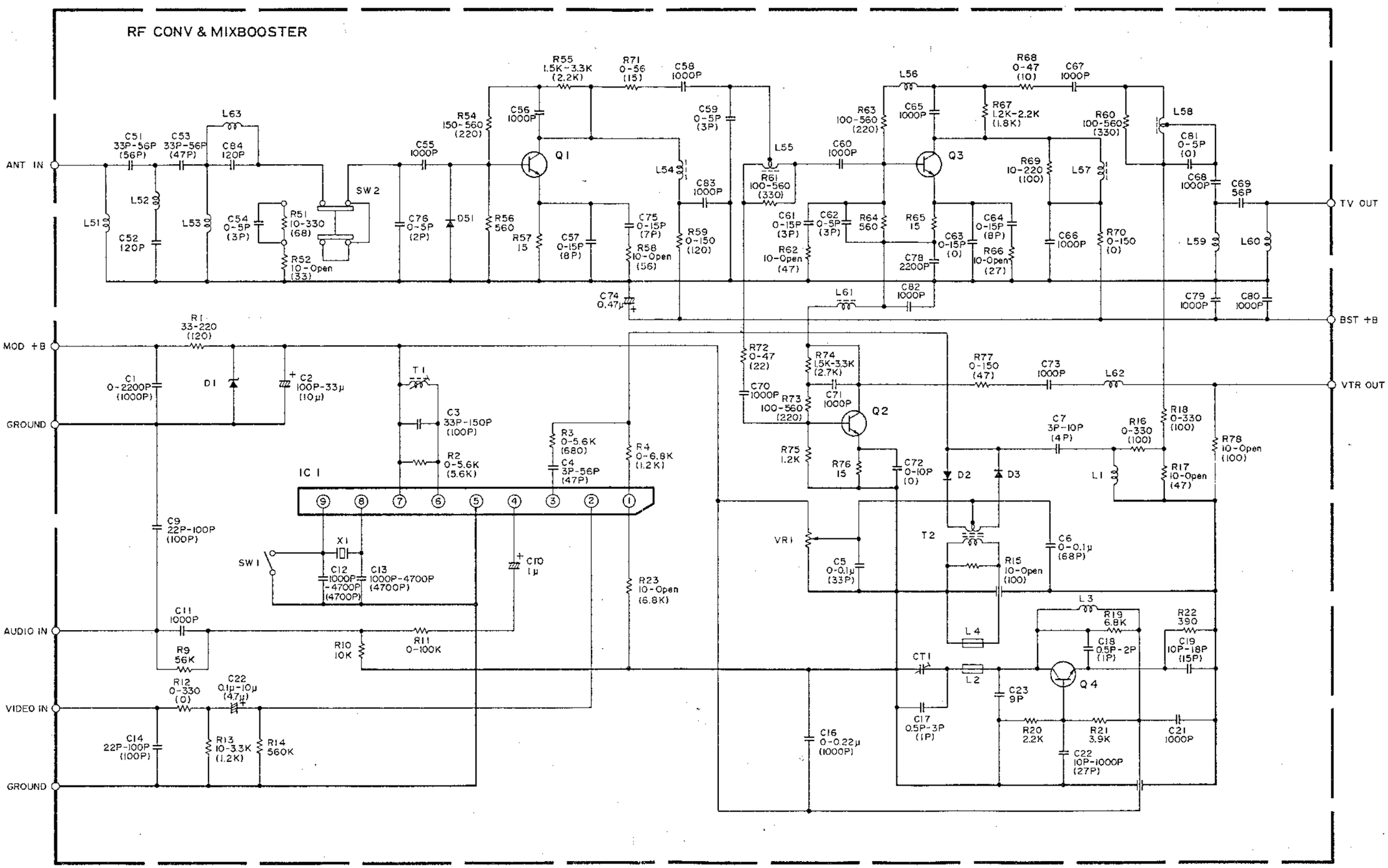
3.40 MOTHER SCHEMATIC DIAGRAM



3.41 MOTHER CIRCUIT BOARD



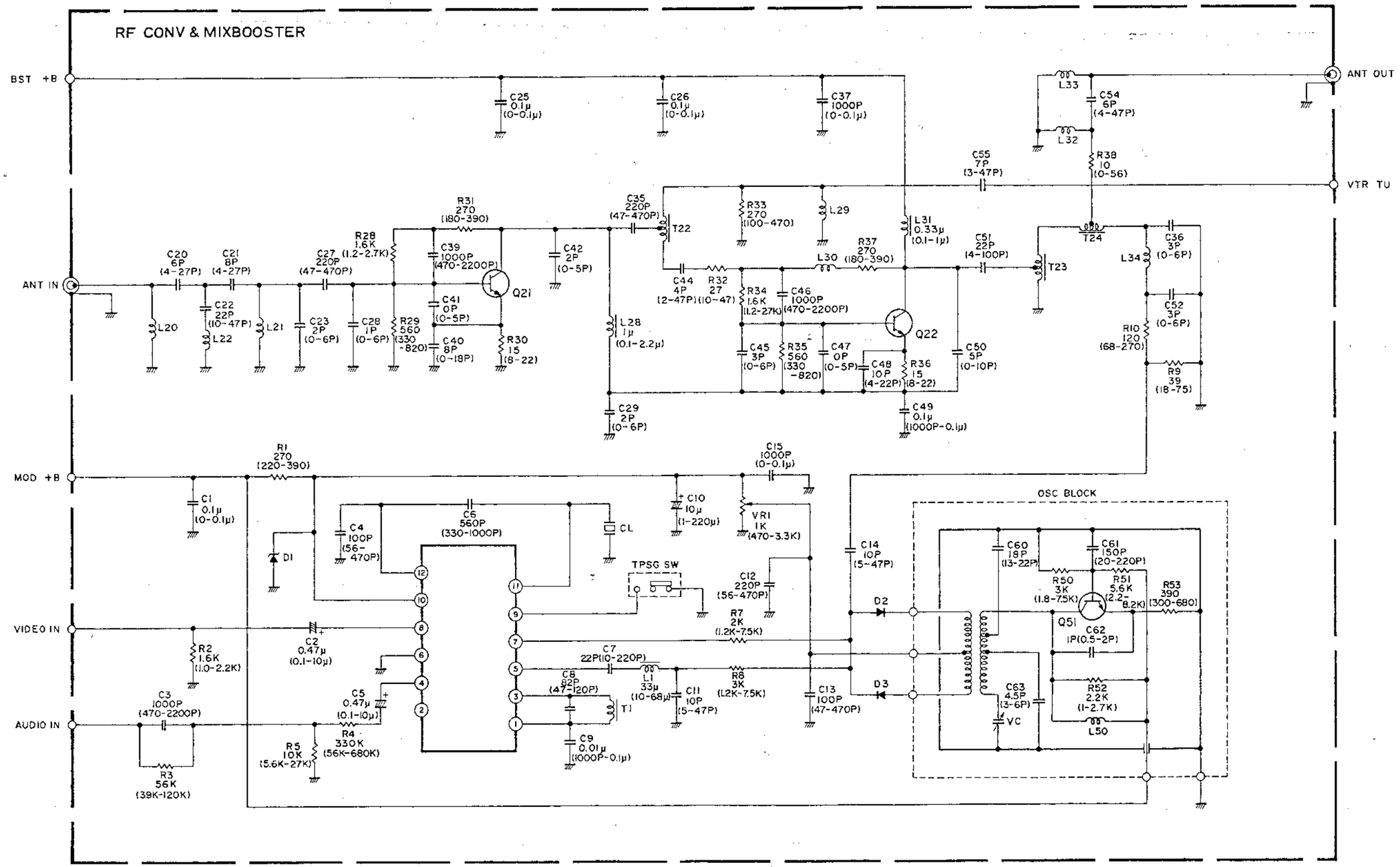
3.42 RF CONVERTER & MIX BOOSTER
(HR-D180E/EG only)



NOTE: This schematic parts are critical for safety.
Replace only with specified part numbers.

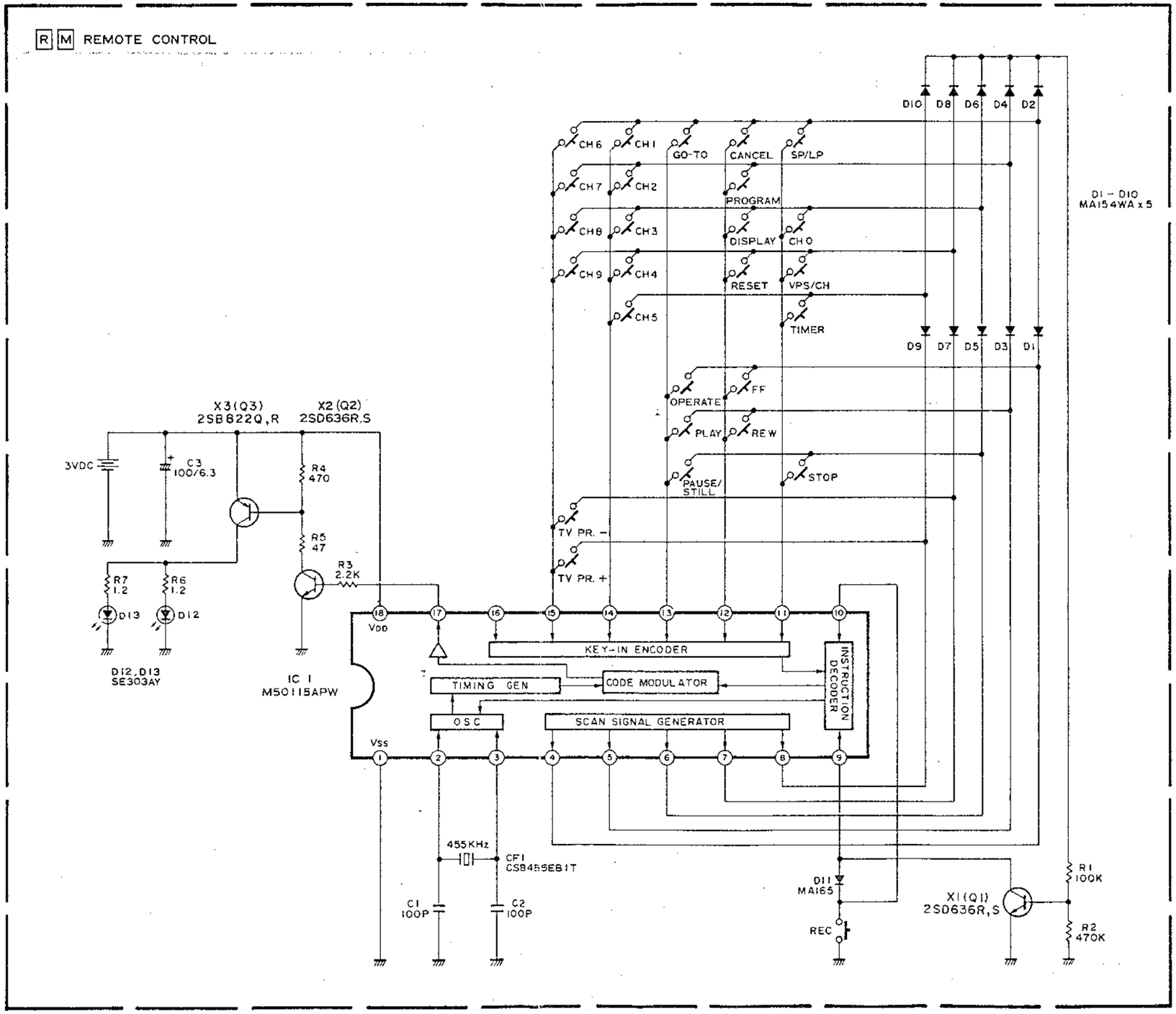
3-42

3.43 RF CONVERTER & MIXBOOSTER
(HR-D180EK only)



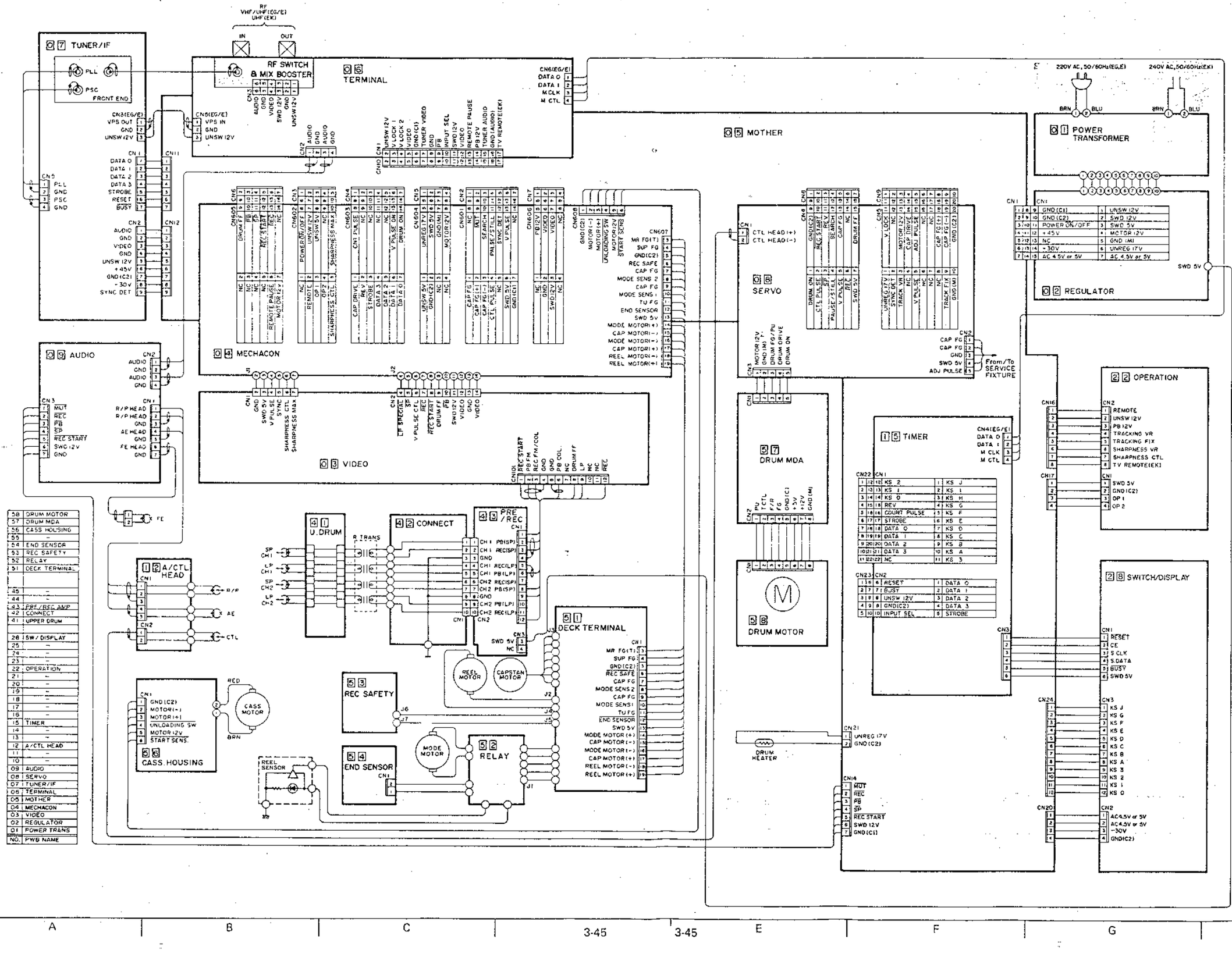
NOTE: This schematic parts are critical for safety.
Replace only with specified part numbers.

3.44 REMOTE CONTROL SCHEMATIC DIAGRAM



NOTE: This schematic parts are critical for safety.
Replace only with specified part numbers.

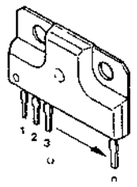
3.45 OVERALL WIRNG DIAGRAM



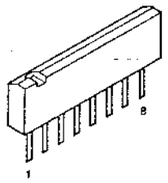
NO.	PWB NAME
58	DRUM MOTOR
57	DRUM MDA
56	CASS HOUSING
55	–
54	END SENSOR
53	REC SAFETY
52	RELAY
51	DECK TERMINAL
45	–
44	–
43	PRE/REC AMP
42	CONNECT
41	UPPER DRUM
28	SW/DISPLAY
25	–
24	–
23	–
22	OPERATION
21	–
20	–
19	–
18	–
17	–
16	–
15	TIMER
14	–
13	–
12	A/CTL HEAD
11	–
10	–
09	AUDIO
08	SERVO
07	TUNER/IF
06	TERMINAL
05	MOTHER
04	MECHACON
03	VIDEO
02	REGULATOR
01	POWER TRANS

3-45 3-45

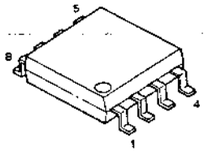
M54644BL
M54644AL



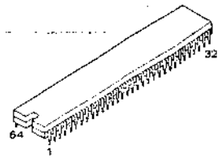
BA7007



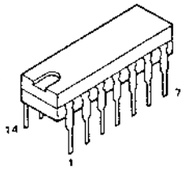
UPC339G2
UPC324G2
UPD4013BG



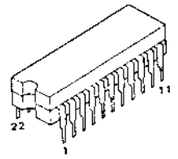
UPD75208CW-024
UPD75208CW-030
M50965-612SP



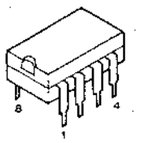
M51796P
M58655P
BU4066BP



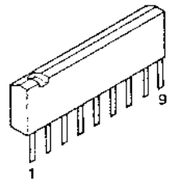
AN3592K



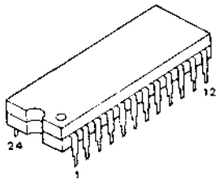
MSM6989RS



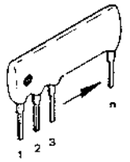
BA7021



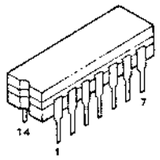
AN3994K
UPD82C43CY



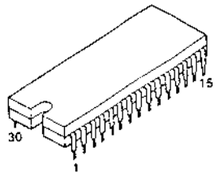
10VT27



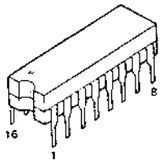
UPC324C



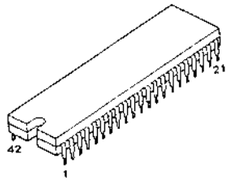
M50440-391SP
M51365SP
HA11870NT



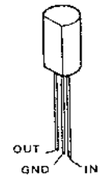
TA8400P



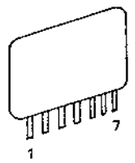
UPD7538ACU-201
VC2023A



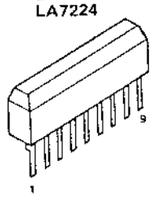
S-8053HLB
M5278L56



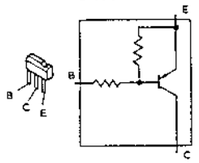
7VT12



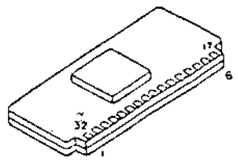
LA7225
LA7224



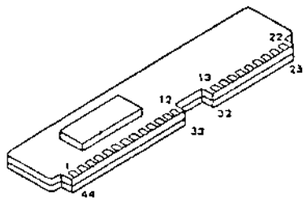
DTA114
DTA124
DTA144



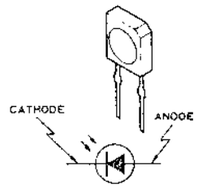
PU22046A



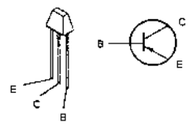
PU22282A



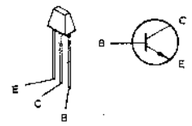
PD49PI



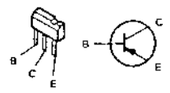
2SA933
2SB1030
2SA1309



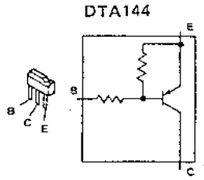
2SD1449
2SC1740
2SC3311
1SC3354



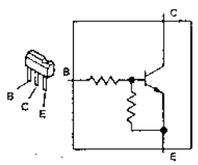
2SB641
2SB643



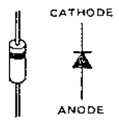
DTA124
DTA144



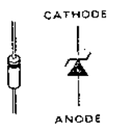
DTC144
DTC124



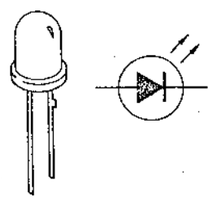
S5688G-TPA3
MA150
11E2
1SS132
MA27WA
10E2
1SS133
MA165
OA90



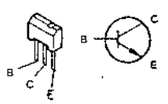
HZ30-2
HZS4.7EB2
HZS7.5EB2
HZS9.1EB1
HZS6.8EB2
HZS5.6EB1
HZ7B
MTZ10B
MTZ7.5B
MTZ12B
MTZ5.1B
RD9.1ES-T1B2
RD8.2EB2
RD5.1ES-T1B1



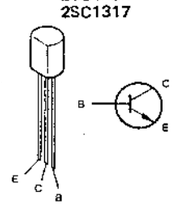
SLR-34VC3F



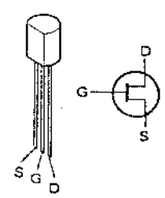
2SD636
2SC2021



2SC2655
2SC1685
2SC1317



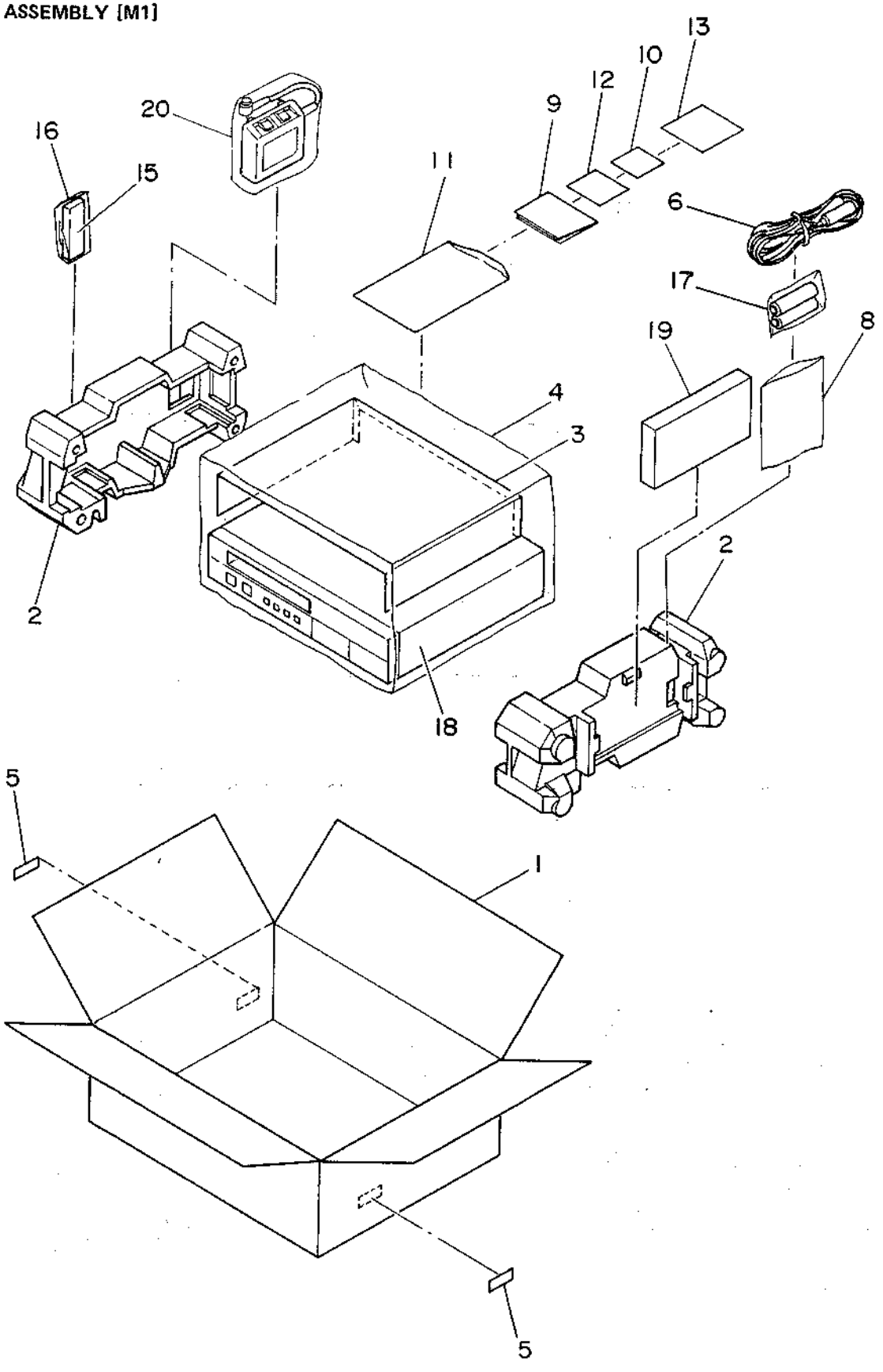
2SK656
2SK381



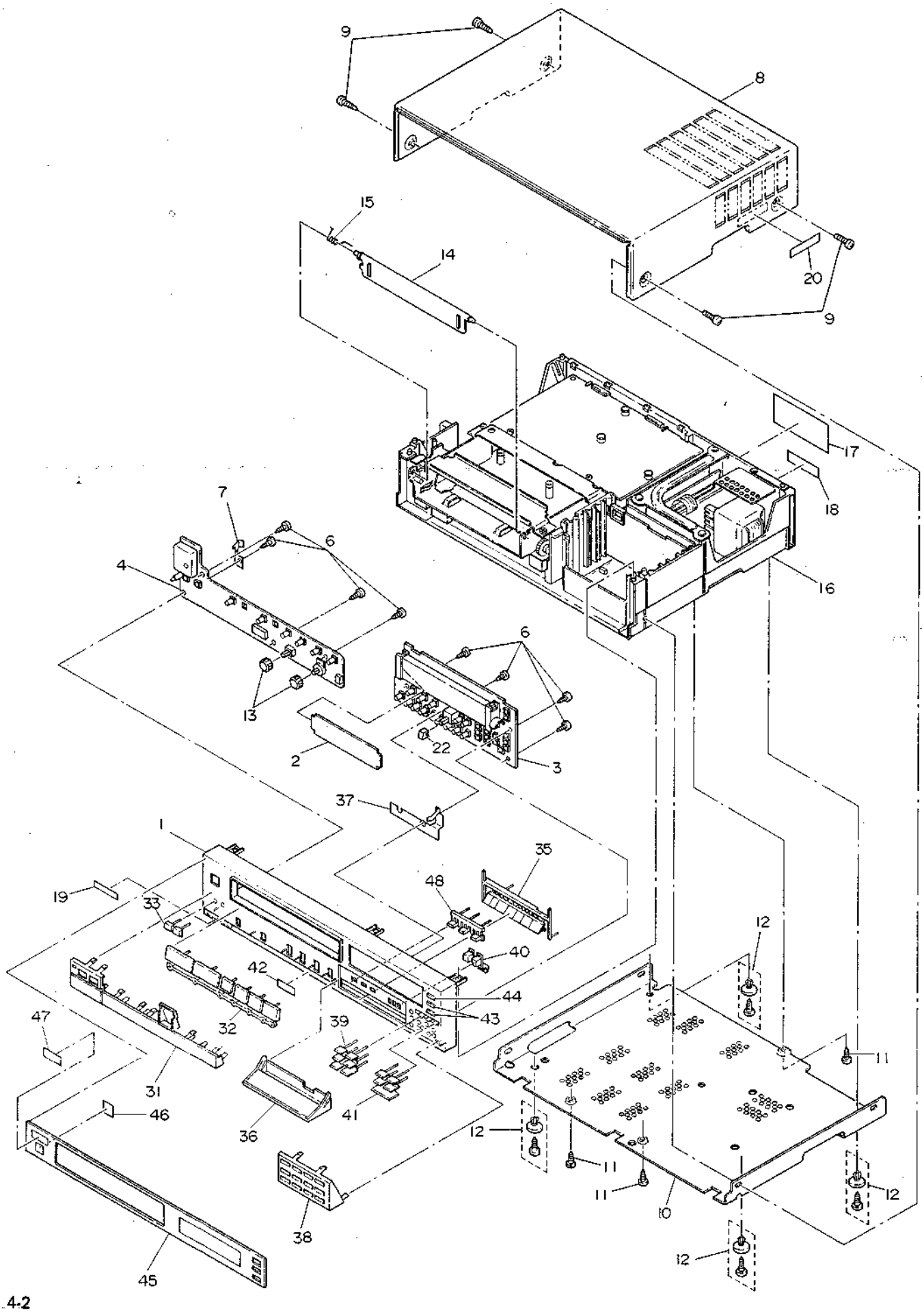
3-46

SECTION 4
EXPLODED VIEWS

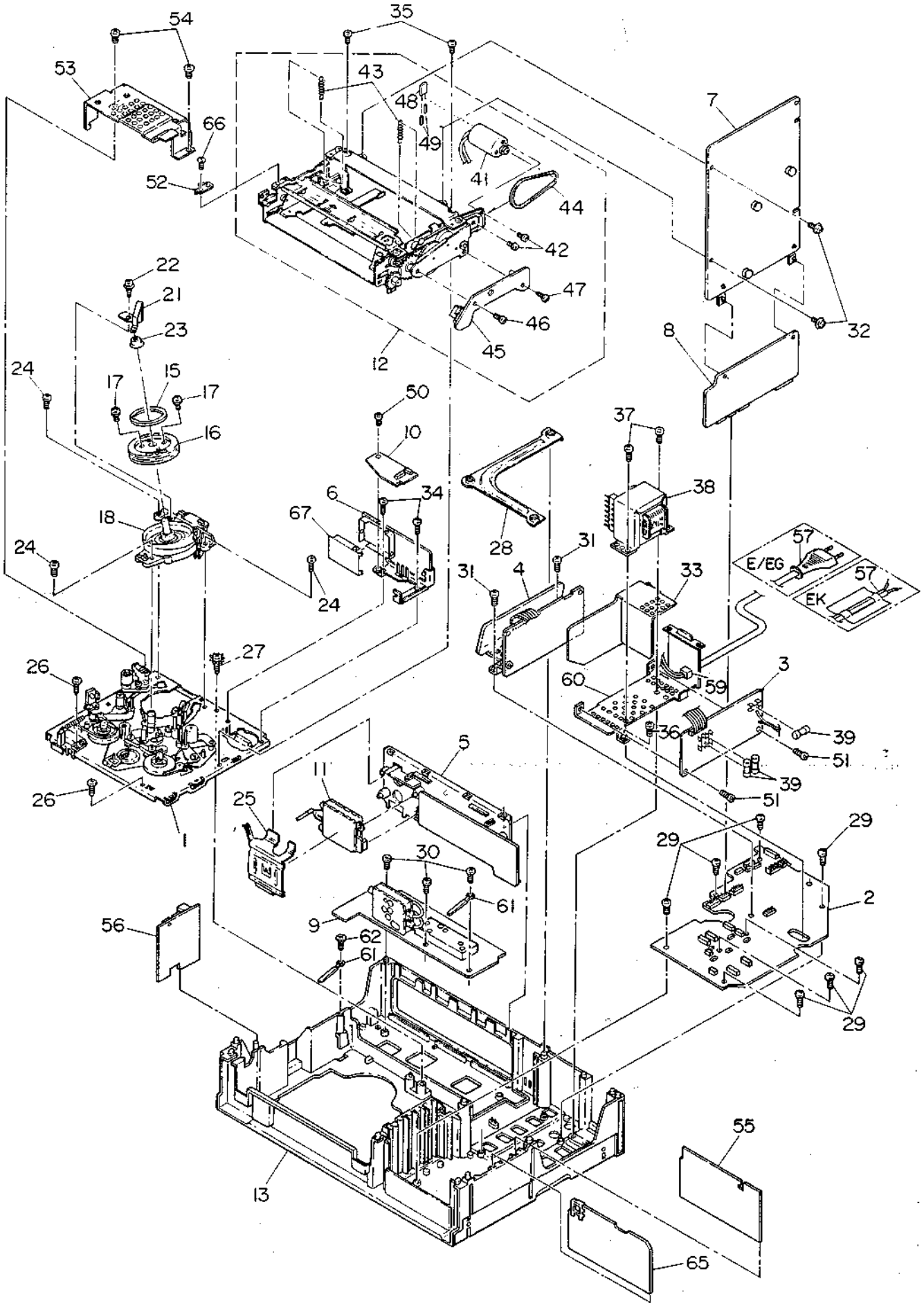
4.1 PACKING ASSEMBLY [M1]



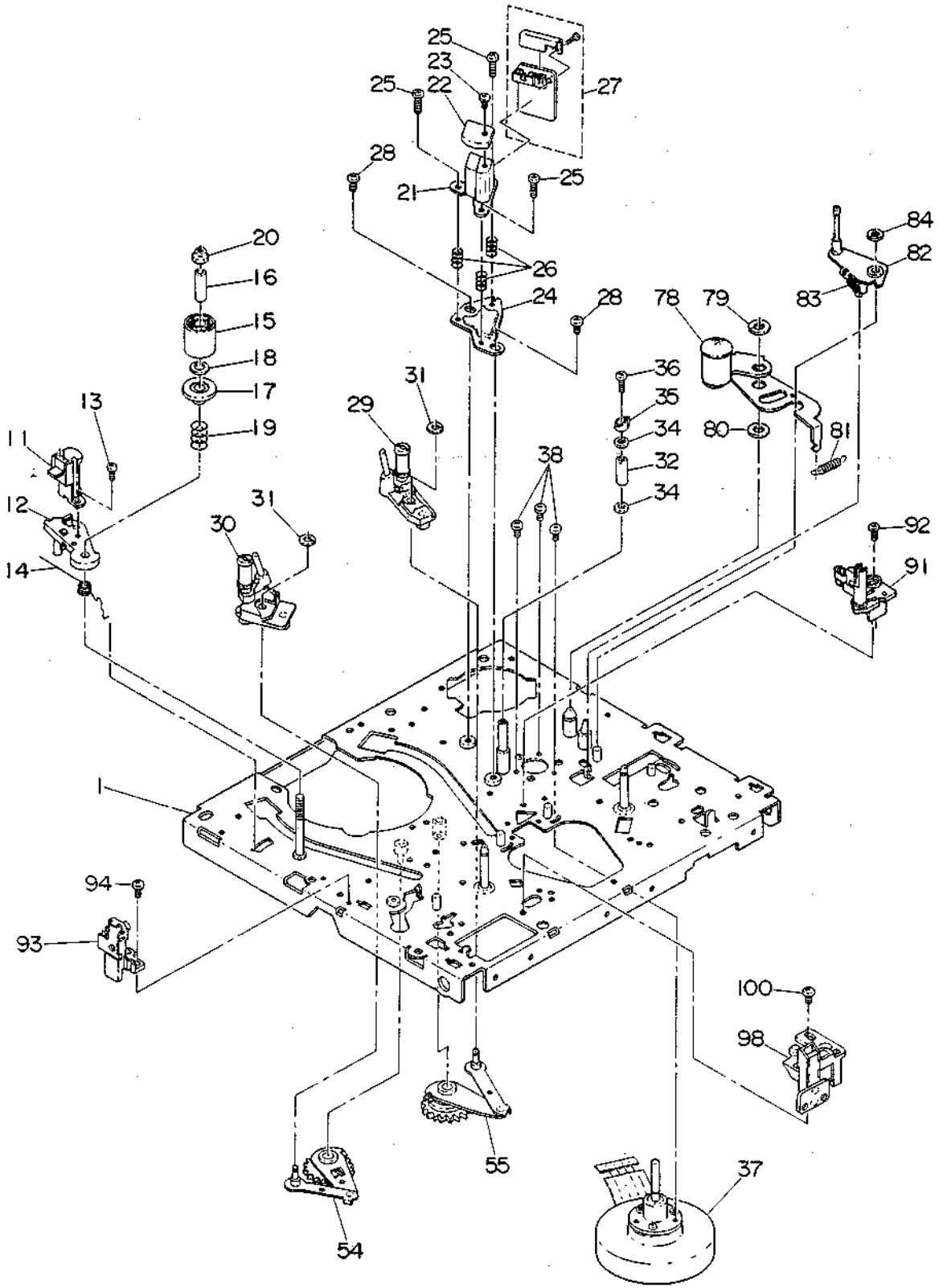
4.2 CABINET ASSEMBLY [M2]



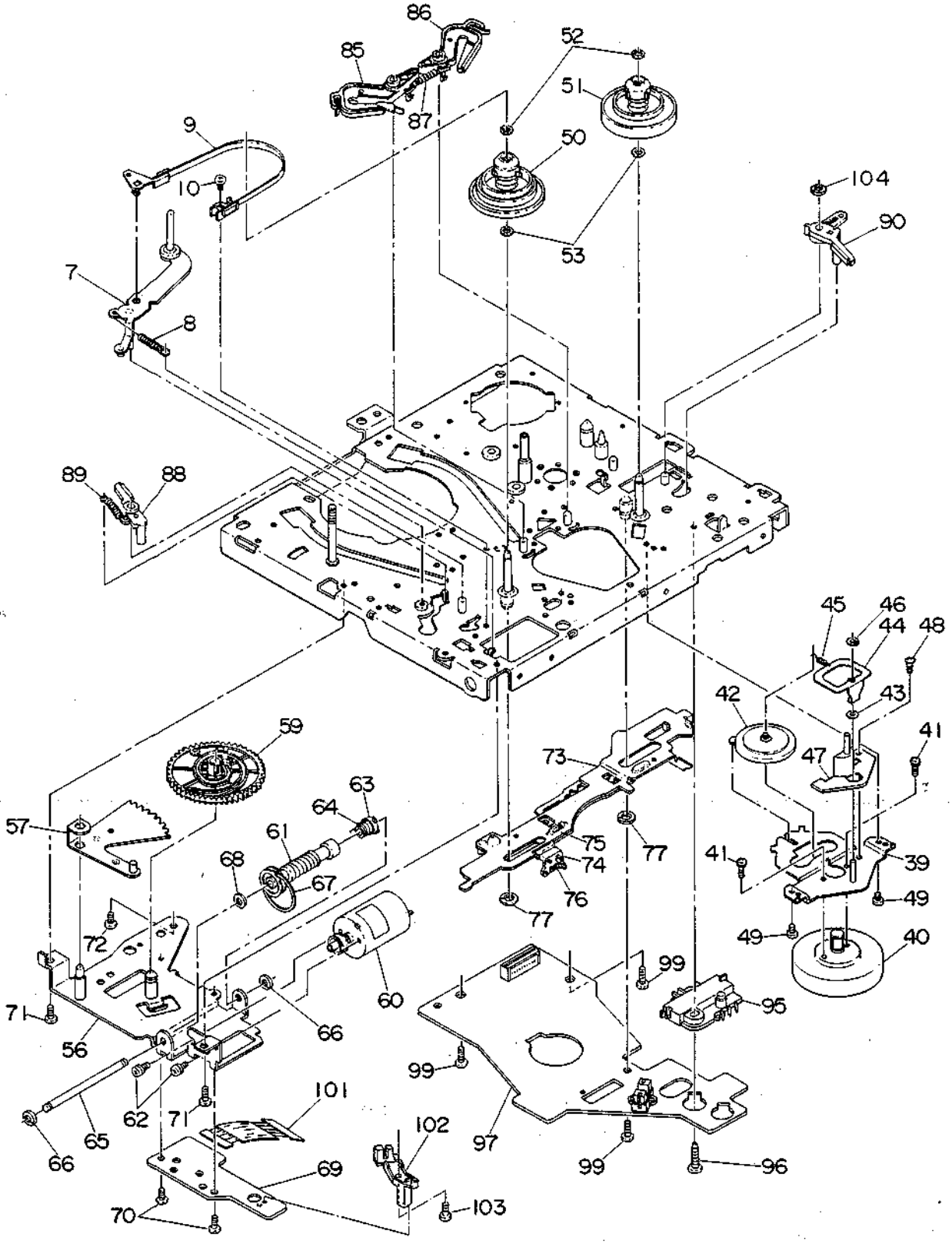
4.3 CHASSIS ASSEMBLY [M3]



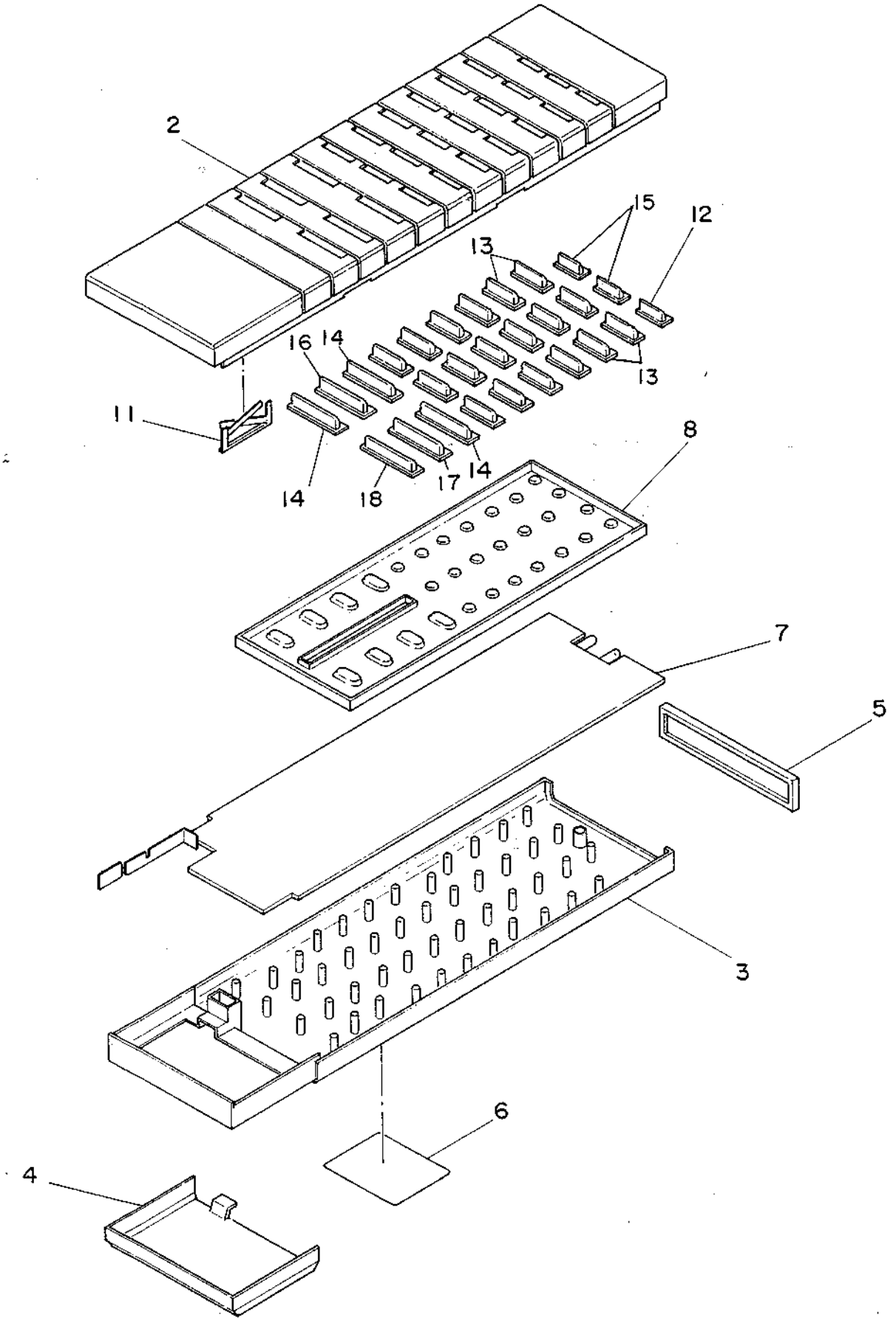
4.4 MECHANISM ASSEMBLY [M4] -1



MECHANISM ASSEMBLY [M4]-2



4.5 REMOTE CONTROL UNIT [M5]



SECTION 5
PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS– All resistance values are in ohms (Ω), unless otherwise indicated.

k	: 1,000 (Kilo)
M	: 1,000,000 (Mega)
Chip R	: Chip Resistor
Chip VR	: Chip Variable Resistor
Comp. R	: Composition Resistor
CR	: Carbon Film Resistor
FR	: Fusible Resistor
MFR	: Metal Film Resistor
MPR	: Metal Plate Resistor
OMR	: Oxide Metal Film Resistor
PMR	: Precision Metal Film Resistor
UFR	: Unflammable Resistor
VR	: Variable Resistor (Potentiometer)
WR	: Wire Wound Resistor

CAPACITORS–All capacitance values are in μF, unless otherwise indicated.

pF	: μμF (Pico farad)
C Cap	: Caramic Capacitor
Chip Cap	: Chip Capacitor
Chip T Cap	: Chip Tantalum Capacitor
E Cap	: Electrolytic Capacitor
FM Cap	: Film Mica Capacitor
LL Cap	: Low Leak Current Electrolytic Capacitor
MM Cap	: Metalized Mylar Capacitor
MP Cap	: Metalized Paper Capacitor
MY Cap	: Mylar Capacitor
NP Cap	: Non-polar Capacitor
PC Cap	: Polycarbonate Capacitor
PP Cap	: Polypropylene Capacitor
PS Cap	: Polystyrol Capacitor
T Cap	: Tantalum Capacitor
TF Cap	: Thin Film Capacitor
TR Cap	: Trimmer Capacitor

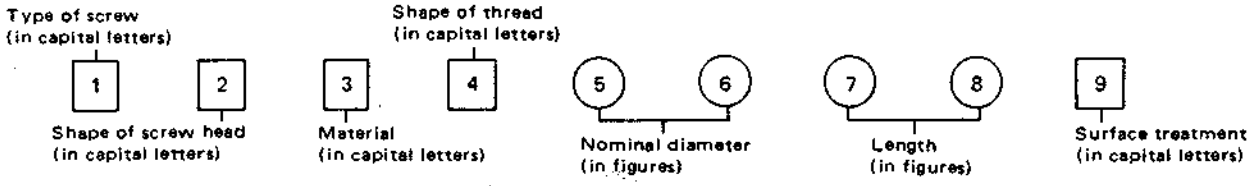
NOTES:

- [M] indicates mechanical symbol number.
- [2 digits] indicates circuit board symbol number.
- "X " indicates quantity per set.

5.1 STANDARD PART NUMBER CODING

5.1.1 Screw coding

Standard screw part numbers are as follows.

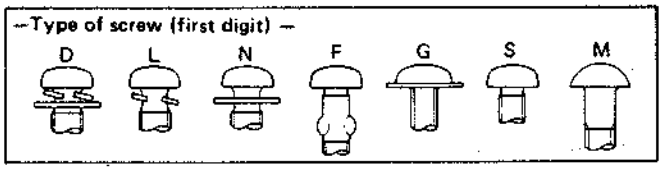


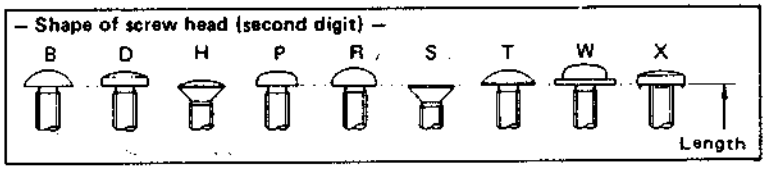
Type of screw (first digit)

- S Normal screws
- D Assembled machine screws (with plain and spring washers)
- L " (with spring washer)
- N " (with plain washer)
- F Feather screws
- G Washer head tapping screws
- M Wood screws

Shape of screw head (second digit)

- B Brazier head
- D Binding head
- H Oval countersunk head
- P Pan head
- R Round head
- S Flat head
- T Truss head
- W Washer head (machine screws)
- X Toothed head



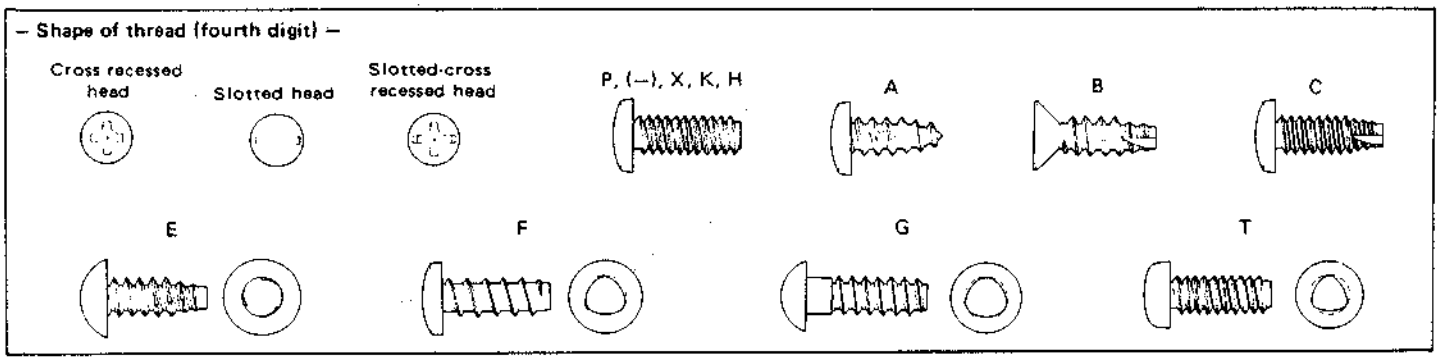


Material (third digit)

- S Steel
- E Stainless steel
- C Cast iron
- U Copper
- B Brass
- P Phosphor bronze
- N Nickel silver
- Y Cast brass
- A Aluminum
- Z Zinc alloy
- K Polycarbonate

Shape of thread (fourth digit)

- P Cross recessed head screws
- (–) Slotted head machine screws
- X Slotted-cross recessed head machine screws
- K Cross recessed head machine screws for precision equipment (type 1)
- H " (type 3)
- A Cross recessed head tapping screws (type 1)
- B " (type 2)
- C " (type 3)
- E Cross recessed head special tapping screws (brand : evertight)
- F " (brand : P-tight)
- T " (brand : taptight)
- G "



Nominal diameter (fifth and sixth digits)

The fifth and sixth digits indicate a nominal diameter or dimension. If the dimension exceeds 10 mm, three digits are used. The number indicates a nominal diameter or dimension, given in millimeters, multiplied by ten.

Length (seventh and eighth digits)

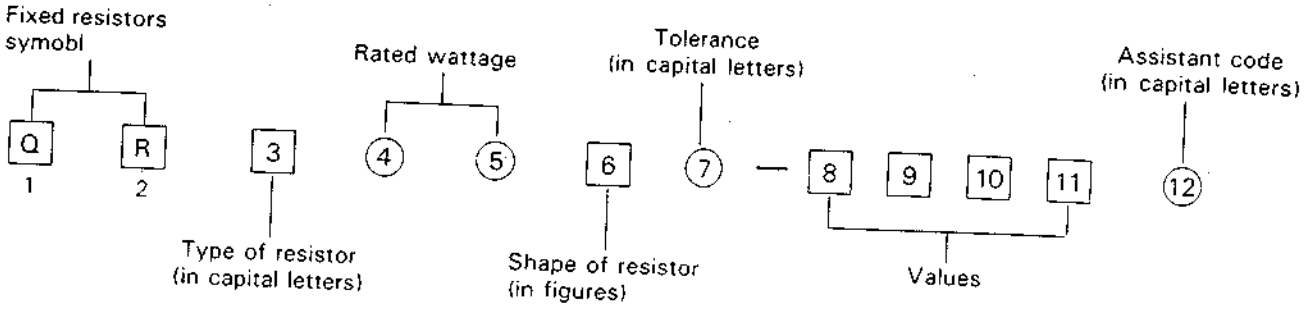
The seventh and eighth digits indicate length in millimeters. The preceding figure is zero when the dimension is smaller than 10 mm. For machine screws used in precision equipment whose length is given in units of 0.1 mm, the number indicates ten times the size of their length.

Surface treatment (ninth digit)

- Z Dichromate treatment after galvanizing (MFZn II-C)
- N Nickel plating (MFNi II, MFNi I)
- R Chromium plating (MBCr II, MBCr I)
- G Silver plating (SP4)
- B Black coating after plating
- F Blackening of iron (FB)
- M Blackening after galvanizing
- K Pickling of brass (PF2)
- P Phosphate treatment
- W Uni-chrome plating
- L Coated with transparent paint
- A Colored red after galvanizing (MFZn II-C)
- C Colored blue after galvanizing (MFZn II-C)
- T Colored green after galvanizing (MFZn II-C)
- V Colored purple after galvanizing (MFZn II-C)

5.1.2 Fixed resistor coding

Fixed resistor part numbers are as follows.



Type of resistor (third digit)

C	Composition resistors
D	Carbon film resistors
F	Unflammable resistors
G	Oxide metal film resistors
H	Fusible resistors
M	Metal plate resistors
S	Metal glazed resistors
V	Precision metal film resistors
W	Wire wound resistors
X	Metal film resistors
Z	Special resistors

Rated wattage (fourth and fifth digits)

A0	1/10 W
18	1/8 W
16	1/6 W
14	1/4 W
12	1/2 W
01	1 W
02	2 W
03	3 W
04	4 W
05	5 W
06	6 W
07	7 W
75	7.5 W
08	8 W
10	10 W
15	15 W
A6	16 W
20	20 W
30	30 W

Tolerance (seventh digit)

F	± 1 %
G	± 2 %
J	± 5 %
K	± 10 %
M	± 20 %

Assistant code (twelfth digit)

A	Small type
B	Small type
S	Small type
Y	Lead taping
Z	Lead taping

Values (eighth – tenth or eleventh digits)

examples:

R47		0.47 Ω
4R7		4.7 Ω
470	47×10^0	47 Ω
471	47×10^1	470 Ω
472	47×10^2	4.7 kΩ
473	47×10^3	47 kΩ
474	47×10^4	470 kΩ
475	47×10^5	4.7 MΩ

QRV resistance shown by four digits:

4640	464×10^0	464 Ω
4641	464×10^1	4.64 kΩ
4642	464×10^2	46.4 kΩ

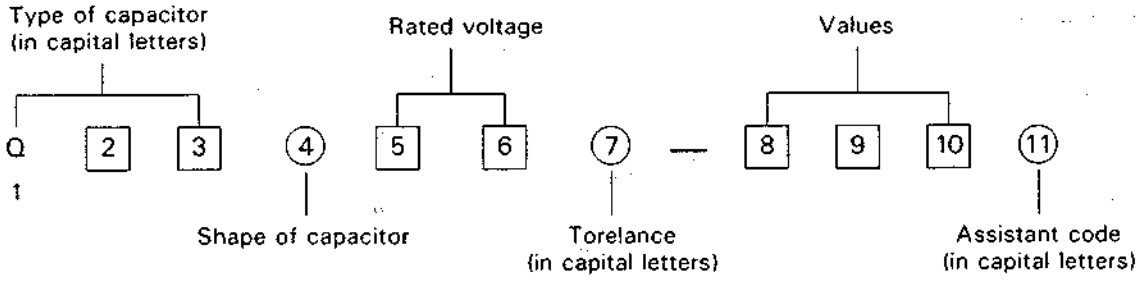
Shape of resistor (sixth digit)

Note: ■ indicates flame retardant resistor.

Shape of resistor \ Type of resistor	C	D	F	G	H	M	S	V	W	X
1										
2										
3										
4										
5									(L) type	
6										
7			Lug (B) type							
8			Lug (A) type				Chip			
9			Lug (C) type							

5.1.3 Fixed capacitor coding

Fixed capacitor part numbers are as follows.



Ceramic capacitors

Type of capacitor (first – third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Mono-direction	Kink lead	Axial lead	Axial forming lead	Chip
QCC	Ceramic	1		4	5	
QCD	High capacitance					A
QCF	High capacitance	1,4	3			8,A
QCS	Temperature compensation	1	3	4	5	8,A
QCT	Temperature compensation	Special coding				8,A
QCV	Ceramic			1	3	
QCX	Ceramic			1	3	
QCY	High capacitance	1,4	3	6	7	8,A
QCZ	Special type	Special coding				
QCB	Ceramic			B	C	

Electrolytic capacitors

Type of capacitor (first-third digits)		Shape of capacitor (fourth digit)				
Symbol	Characteristics	Tubular	Mono-direction	Anti-stress	Forming	Snap-in
QEB	Low leakage		4	5	6	
QEC	Low leakage		4,8,A	9,B	6,C	
QEE	Tantalum (normal)		4	5	6	
	Tantalum (small)		8			
QEF	Chip tantalum	8 (chip type)				
QEG	Low impedance		4			
QEK	Miniature type		4	5	6	
QEL	Small type		4	5	6	7
QEM	Small type		4,A	5	6	
QEN	Non-polar	2	4	5	6	
QEP	Non-polar (small)		4,A	5,B	6,C	
QER	Miniature type		4	5	6	
QET	Small type	2	4,A	5,B	6,C	7
QEU	Small type		4	5	6	
QEV	Small type		4		6	7
QEW	Normal	2	4	5	6	7

Paper film capacitors

Type of capacitor (first – third digits)		Shape of capacitor (fourth digit)				
		Tubular	Normal		Flame retardant	
Symbol	Characteristics		Mono-direction	Kink lead	Mono-direction	Kink lead
QFA	Metalized polypropylene				7	
QFE	Metalized mylar				5	
QFF	Film mica		4			
QFG	Polypropylene film		4	8		
QFH	Metalized mylar	2	4	3	5,7	6
QFJ	Mylar (special)		4			
QFK	Metalized mylar (small)				5	
QFM	Mylar	2	4	3,7	5	6
QFN	Mylar (small)		4	3		
QFP	Polypropylene		4	3,8		
QFS	Polystyrole	2	4	3		
QFV	Thin film		4	8		
QFZ	Special type	Special coding				

Rated voltage (fifth and sixth digits)

Fifth digit \ Sixth digit	A	B	C	D	E	F	G	H	J	K	V	W	X
0						3.15	4.0		6.3				
1	10		16	20	25		40	50	63	80	35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000				5000					

Tolerance (seventh digit)

A	$^{+100}_{-10}$ %	M	±20 %
F	±1 %	N	±30 %
G	±2 %	P	$^{+100}_{-0}$ %
H	$^{+50}_{-10}$ %	R	$^{+30}_{-10}$ %
J	±5 %	X	$^{+40}_{-20}$ %
K	±10 %	Z	$^{+80}_{-20}$ %

Values (eighth – tenth digits)

Example : Values are in picofarads

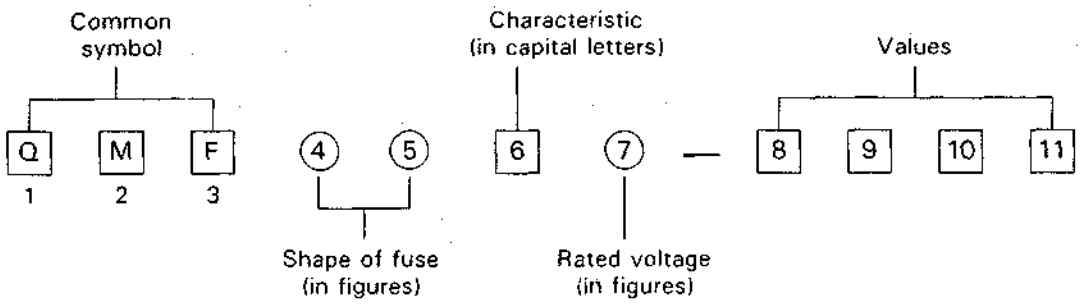
101	10×10^1 pF	100 pF
102	10×10^2 pF	1,000 pF (0.001 μF)
103	10×10^3 pF	10,000 pF (0.01 μF)
104	10×10^4 pF	100,000 pF (0.1 μF)
105	10×10^5 pF	1 μF
5R0		5.0 pF

Assistant code (eleventh digit)

G Small size
Z Lead taping
Y Lead taping

5.1.4 Fuse coding

Standard fuse part numbers are as follows.



Shape of fuse
(fourth and fifth digits)

51	ϕ5.2 × 20 mm
60	ϕ6.4 × 30 mm
61	ϕ6.35 × 31.8 mm
63	ϕ6.4 × 30 mm with lead wires
66	ϕ6.35 × 31.8 mm with lead wires
00	Special type

Rated voltage
(seventh digit)

1	AC125 V
2	AC250 V
3	0.1 – 1 A : AC250 V 1.25 – 6.3 A : AC125 V

Values
(eighth-tenth or eleventh digits)
example:

R63	0.63 A
1R0	1.0 A
2R5	2.5 A
100	10 A
R315	0.315 A
1R25	1.25 A

Characteristics (sixth digit)

Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 – 2 sec.	
	400 %	0.01 – 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type (for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 – 10 sec.	
	400 %	0.15 – 3 sec.	
	1000 %	0.02 – 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type (for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
S	160 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
	700 % – 2000 %	Within 0.01 sec.	
U	135 %	Within 1 hr.	Anti-rush type (for UL)
	200 %	Within 2 min.	
	800 % – 2000 %	Within 0.01 sec.	

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
			PACKING ASSEMBLY [M1]
	1	PQ31473-9-1	PACKING CASE, E
		PQ31473-1-1	PACKING CASE, EG
		PQ31473-10-1	PACKING CASE, EK
	2	PQ31467B	CUSHION ASSEMBLY
	3	PQ41026-8	PROTECT SHEET
	4	PQM30021-59-11	POLY BAG, E/EG
		PUP30320-26-12	POLY BAG, EK
	5	PUP40329	SERIAL NO. STICKER, X 2
⚠	6	PU59167-3	CABLE ASSEMBLY
	7	–	–
	8	QPGA020-02003	POLY BAG, E/EG, FOR JAPAN MADE SET
#		QPGA020-02005	POLY BAG, E/EG, FOR W. GERMANY MADE SET
		PQM30023-8	POLY BAG, EK
⚠	9	PU30425-855	INSTRUCTION BOOK, E
⚠		PU30425-853	INSTRUCTION BOOK, EG
⚠		PU30425-857	INSTRUCTION BOOK, EK
	10	BT-20069A	WARRANTY CARD, EG
		BT-20060	GUARANTY CARD
	11	QPGA025-03505	POLY BAG, E/EG
		PQM30023-5	POLY BAG, EK
⚠	12	PU36158	DBP INF SHEET, EG ONLY
⚠	13	BT-20066	E. DISTRI LIST, EK ONLY
	14	–	–
⚠	15	PQ10342H	REMOCON UNIT, E, INCL. 16, REFER TO [M5]
⚠		PQ10342D	REMOCON UNIT, EG, INCL. 16, REFER TO [M5]
⚠		PQ10342N	REMOCON UNIT, EK, INCL. 16, REFER TO [M5]
	16	PQ10342-009	POLY BAG
	17	UM-4NJ2P	BATTERY, 2 CELLS
	18	–	CABINET ASSEMBLY, REFER TO [M2]
	19	PTE-30-101	CASSETTE TAPE, E
		PTE-30	CASSETTE TAPE, EG
	20	–	VPS UNIT, EG ONLY, VU-V90E, REFER TO SERVICE MANUAL NO. 8457(2/2)

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
			CABINET ASSEMBLY [M2]
⚠	1	PQ10332E-6	FRONT PANEL ASS'Y, E, INCL. 31–45
⚠		PQ10332B-6	FRONT PANEL ASS'Y, EG, INCL. 31–45
⚠		PQ10332F-6	FRONT PANEL ASS'Y, EK, INCL. 31–45
	2	PQ31335-4	FDP FILTER
	3	–	SW/DISP. BOARD ASS'Y, REFER TO [28]
	4	–	OPE. BOARD ASS'Y, REFER TO [22]
	5	–	–
	6	SDSF2608Z	TAP. SCREW, X8, T/DISP AND OPE. BOARDS
	7	PQ42636-1-1	EARTH BRACKET
⚠	8	PQ10328-2-3	TOP COVER
	9	SDSA4014M	TAP. SCREW, X 4, TOP COVER
⚠	10	PQ10330-1-2	BOTTOM COVER
	11	SDSF3010Z	TAP. SCREW, X 3, BOTTOM COVER
	12	PU57662-1-1	FOOT, X 4
	13	PQ31214-1-1	VOLUME KNOB, X 2
	14	PQ31267-33	C. HOUSING DOOR, E
		PQ31267-9-14	C. HOUSING DOOR, EG
		PQ31267-24-14	C. HOUSING DOOR, EK
	15	PQ42410-1-1	TORSION SPRING
	16	–	CHASSIS ASSEMBLY, REFER TO [M3]
	17	–	RATING LABEL
	18	–	RATING LABEL 2, E/EG
⚠	19	PQ41700	LABEL, EK ONLY, FOR JAPAN MADE SET
# ⚠		PQ41700-2	LABEL, EK ONLY, FOR U. K. MADE SET
⚠	20	PU58020-3	CAUTION LABEL, EK ONLY, FOR JAPAN MADE SET
# ⚠		PU58020-4	CAUTION LABEL, EK ONLY, FOR U. K. MADE SET
	21	–	–
	22	PQ42353	MEMORY BUTTON
	23	–	–
	24	–	–
	25	–	–
	26	–	–
	27	–	–
	28	–	–
	29	–	–
	30	–	–
	31	PQ20332-2	BUTTON COVER (L), E/EK
		PQ20332	BUTTON COVER (L), EG
	32	PQ20294	OPE. BUTTON
	33	PQ31204	POWER BUTTON, POWER, EJECT
	34	–	–
	35	PQ31384	PROGRAM BUTTON
	36	PQ31228E	DOOR ASSEMBLY, E
		PQ31228B	DOOR ASSEMBLY, EG
		PQ31228F	DOOR ASSEMBLY, EK
	37	PQ31466-1-2	EARTH BRACKET
	38	PQ31212-4	BUTTON COVER (R), E/EK
		PQ31212-2	BUTTON COVER (R), EG
	39	PQ31213	TEN KEY BUTTON
	40	PQ31206	COUNTER BUTTON
	41	PQ31213-2	TEN KEY BUTTON
	42	PQ42474-2	PLATE, E/EK
		PQ42474-3	PLATE, EG
	43	PQ42351	CHANNEL BUTTON, X 2
	44	PQ42350	INSTANT REC BUTTON
	45	PQ20287-4	DISPLAY WINDOW, E/EK
		PQ20287-2	DISPLAY WINDOW, EG
	46	PQ41808	IFR FILTER
	47	PQ42473	MARK
	48	PQ31417	PUSH BUTTON

REF. NO.	PART NO.	PART NAME, DESCRIPTION
		CHASSIS ASSEMBLY [M3]
1	–	MECHANISM ASS'Y, REFER TO [M4]
2	–	MOTHER BOARD ASS'Y, REFER TO [05]
3	–	P. TRANS BOARD ASS'Y, REFER TO [01]
4	–	REGULATOR BOARD ASS'Y, REFER TO [02]
5	–	TERMINAL BOARD ASS'Y, REFER TO [06]
6	–	PRE/REC AMP BOARD ASS'Y, REFER TO [43]
7	–	VIDEO BOARD ASS'Y, REFER TO [03]
8	–	MECHACON BOARD ASS'Y, REFER TO [04]
9	–	TUNER/IF BOARD ASS'Y, REFER TO [07]
10	–	DRUM MDA BOARD ASS'Y, REFER TO [57]
11	–	RF CONV. & MIX BOOSTER, REFER TO [07]

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	12	PUS28277C	CASS. HOUSING ASS'Y, INCL. 41–49
	13	–	CHASSIS
	14	–	–
	15	–	UPPER DRUM BOARD, REFER TO [41]
	16	PDM2004B	UPPER DRUM ASS'Y
	17	PDM4001A	DRUM SCREW ASS'Y (SDBP3008N + SPACER), X 2
	18	PDM2024F	LOWER DRUM MOTOR ASS'Y
	19	–	–
	20	–	–
	21	PDM4015A-4	BRUSH ASS'Y
	22	DPSP2606Z	ASS'Y SCREW
	23	PU49483-3	COMMUTATOR
	OR	PQ41596A	COMMUTATOR ASS'Y
	24	LPSP2608Z	ASS'Y SCREW, X 3
	25	PQ31242	EARTH SPRING
	26	SDSA4014Z	TAP. SCREW, X 2
	27	PQ41396	SPECIAL SCREW (SDSA4012Z + WASHER)
	28	PQ31176	SUPPORT BRACKET
	29	SDSF3010Z	TAP. SCREW, X 7, MOTHER BOARD
	30	SDSF3010Z	TAP. SCREW, X 3, TUNER/IF BOARD
	31	SDSF3012Z	TAP. SCREW, X 2, HEAT SINK
	32	GPST2606Z	TAP. SCREW, X 2, VIDEO BOARD
⚠	33	PQ31241-1-1	AC COVER
	34	SDST2606Z	TAP. SCREW, X 2, PRE/REC AMP BOARD
	35	SDST2605Z	TAP. SCREW, X 2, CASS. HOUSING
	36	SDST3006C	TAP. SCREW, TRANS BRACKET
⚠	37	SDSA4014Z	TAP. SCREW, X 2, TRANS
⚠	38	PU59212	POWER TRANSFORMER, E/EG
⚠		PU59383	POWER TRANSFORMER, EK
	39	–	FUSE, X 3, F1–F3, REFER TO [01]
	40	–	–
⚠	41	PQ42385A	MOTOR ASS'Y
⚠	OR	PQ42385B	MOTOR ASS'Y
	42	SPSP2603Z	SCREW, X 2
	43	PQM30001-209	TENSION SPRING, X 2
	44	PQM30003-18	BELT
	45	–	CASS. HOUSING BOARD, REFER TO [56]
	46	SPSP2604Z	SCREW
	47	SPST2605Z	TH TAP. SCREW
	48	QFN41HK-104	MY CAP
	OR	QFN41HJ-104	MY CAP
	OR	QFV41HJ-104	MY CAP
	49	QXT3100-010	VINYL TUBE, X2
	50	SDSP2606Z	SCREW, DRUM MDA BOARD
⚠	51	SDST3006Z	TAP. SCREW, X 2, P. TRANS. BOARD
	52	PQ42631-1-2	SUPPORT BRACKET
	53	PQ31171-2	DRUM SHIELD
	54	SDST2605Z	TAP. SCREW, X 2, DRUM SHIELD
	55	–	SERVO BOARD ASS'Y, REFER TO [08]
	56	–	AUDIO BOARD ASS'Y, REFER TO [09]
⚠	57	QMP3980-200	POWER CORD, E/EG
⚠		QMP5140-200	POWER CORD, EK
	58	–	–
⚠	59	QHS3771-108	STRAIN RELIEF
⚠	60	PQ31201	TRANS BRACKET
	61	PU49485-4	WIRE CLAMP, X 2
	62	SDSF3010Z	TAP. SCREW, WIRE CLAMP
	63	–	–
	64	–	–
	65	–	TIMER BOARD ASS'Y, REFER TO [15]
	66	SDST2605Z	TAP. SCREW, SUPPORT BRACKET
	67	PU59082	PRE SHIELD (3)

MECHANISM ASSEMBLY [M4]

	1	–	MAIN DECK ASS'Y
	2	–	–
	3	–	–
	4	–	–
	5	–	–
	6	–	–
	7	PQ41944A-7	TENSION ARM ASS'Y INCL. 8
	8	PQ41952-3	SPRING
	9	PQ41948A	TENSION BAND ASS'Y
	10	SDST2606N	TAP. SCREW, TENSION BAND ASS'Y
	11	PU57641	FULL ERASE HEAD
	12	PQ31036	FE HEAD BASE
	13	SPSG2606Z	TAP. SCREW, FE HEAD
	14	PQ41954-1-1	TORSION SPRING
	15	PQ41955	IMPEDANCE ROLLER
	16	PQ41956	COLLAR
	17	PQ41957	LOWER FLANGE
	18	PQM30018-39	SPACER
	19	PQM30002-124	COMP. SPRING
	20	PQ40353	NYLON NUT
	21	PU59253	A/CTL HEAD
	22	PU55535	SHIELD CAP
	23	HPSP2015N	SCREW, SHIELD CAP
	24	PQ42208	HEAD BASE
	25	SPSP2608Z	SCREW, X 3, A/CTL HEAD
	26	PU30080-49	SPRING, X 3
	27	–	A/CTL HEAD BOARD, REFER TO [12]
	28	SDSP2606Z	SCREW, X2, HEAD BASE
	29	PQ41963A-1	P. BASE ASS'Y (T)
	30	PQ41969A	P. BASE ASS'Y (S)
	31	PQM30017-5	SLIT WASHER, X 2
	32	PU53629-2	TAPE GUIDE
	33	–	–
	34	PQ40268-2	GUIDE FLANGE, X 2
	35	PQ41346	GUIDE POLE CAP
	36	SDSP2006Z	SCREW, TAPE GUIDE
⚠	37	PU58635V	CAPSTAN MOTOR
	38	SPSP2605N	SCREW, X3, CAPSTAN MOTOR
	39	PQ41974A	R M BRACKET ASS'Y
⚠	40	PU58636W	REEL MOTOR
	41	LPSP2604Z	SCREW, X2, REEL MOTOR
	42	PU58645-1-1	IDLER ARM
	43	Q03093-834	WASHER
	44	PQ41976A	SPRING ARM ASS'Y, INCL. 45
	45	PQ42212	TENSION SPRING
	46	PQM30017-22	SLIT WASHER
	47	PQ41978	HOLDER
	48	SPST2606Z	TAP. SCREW

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	49	SPST2606Z	TAP. SCREW, X 2
	50	PU59250	REEL DISK (S)
	51	PU58638-1-2	REEL DISK (T)
	52	PQM30017-5	SLIT WASHER, X 2
	53	Q03093-828	WASHER, X 2
	54	PQ41979A-4	L ARM ASS'Y (S)
	55	PQ41985A-2	L ARM ASS'Y (T)
	56	PQ41992A-1	CAM BRACKET ASS'Y
	57	PQ41994A-1	ARM GEAR ASS'Y
	58	–	–
	59	PQ20250-1-1	CONTROL CAM
⚠	60	PQ41996A	MODE MOTOR ASS'Y
	61	PQ41998A	WORM ASS'Y
	62	LPSP2604Z	SCREW, X2, MODE MOTOR
	63	PQ42001	WINDMILL
	64	PQ42002	CLUTCH SPRING
	65	PQ42003	WORM SHAFT
	66	PQM30017-5	SLIP WASHER, X 2
	67	PQM30003-17	BELT
	68	PQM30018-22	SPACER
	69	–	RELAY BOARD, REFER TO [52]
	70	SPST2606Z	TAP. SCREW, X 2, RELAY BOARD
	71	SPST2606Z	TAP. SCREW, X 2, CAM BRACKET ASS'Y
	72	SPSP2603Z	SCREW, CAM BRACKET ASS'Y
	73	PQ42038A-3	PLATE ASS'Y INCL. 74–76
	74	PQ31044-1-2	LOCK LEVER
	75	PQM30001-191	TENSION SPRING
	76	PQM30001-211	TENSION SPRING
	77	PQM30017-28	SLIT WASHER, X 2
	78	PQ42006B	P R ARM ASS'Y
	79	PQM30017-28	SLIT WASHER
	80	Q03093-833	WASHER
	81	PQM30001-193	TENSION SPRING
	82	PQ42013B-4	GUIDE ARM ASS'Y INCL. 83
	83	PQ42029	SPRING
	84	PQM30017-6	SLIT WASHER
	85	PQ42019A-3	M. BRAKE ASS'Y (S)
	86	PQ42020A-2	M. BRAKE ASS'Y (T)
	87	PQM30001-216	CLUTCH SPRING
	88	PQ42021A-1	SUB BRAKE ASS'Y (S) INCL. 89
	89	PQ42023-1-2	TENSION SPRING
	90	PQ42037A-2	SUB BRAKE ASS'Y (T)
	91	PU59452	LED HOLDER
	OR	PU58640	LED HOLDER
	92	SPST2606Z	TAP. SCREW, LED HOLDER
	93	–	END SENSOR BOARD ASS'Y, REFER TO [54]
	94	SPST2606Z	TAP. SCREW, END SENSOR BOARD
	95	PU58642	SLIDE ENCODER
	96	SDSP2610Z	SCREW, SLIDE ENCODER
	97	–	DECK TERMINAL BOARD ASS'Y, REFER TO [51]
	98	–	REC SAFETY BOARD ASS'Y, REFER TO [53]
	99	SDSP2606Z	SCREW, X 3, DECK TERMINAL BOARD
	100	SDST2606Z	TAP. SCREW, REC SAFETY BOARD
	101	PW30110-26DD885	PARALLEL WIRE
	102	PU59251	REEL SENSOR (S)
	103	SPSP2603Z	SCREW, REEL SENSOR (S)
	104	PQM30017-6	SLIT WASHER

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
			REMOTE CONTROL UNIT (M5)
	1	–	REMOTE CONTROL UNIT, REFER TO (M1), INCL. 2–18
	2	PU36137-9	TOP CASE, E
		PU36137-4	TOP CASE, EG
		PU36137-10	TOP CASE, EK
	3	PQ31360	BOTTOM CASE
	4	PQ31361	BATTERY CAP
	5	PU36138-2	WINDOW
	6	PU36139-12	REMOCON LABEL, E
		PU36139-4	REMOCON LABEL, EG
		PU36139-13	REMOCON LABEL, EK
	7	–	REMOTE CONTROL BOARD ASS'Y, REFER TO (RM)
	8	PQ10342-002	RUBBER SHEET
	9	–	–
	10	–	–
	11	PQ10342-005	BATTERY TERMINAL
	12	PQ10342-015	BUTTON
	13	PQ10342-016	BUTTON, X 18
	14	PQ10342-017	BUTTON, X 3
	15	PQ10342-018	BUTTON, X 2
	16	PQ10342-019	BUTTON
	17	PQ10342-020	BUTTON
	18	PQ10342-021	BUTTON

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
⚠		PU22336D-01 (E/EK)	POWER SUPPLY BOARD ASS'Y [01], [02]
⚠		PU22336C-01 (EG)	POWER SUPPLY BOARD ASS'Y [01], [02]
	WR1	PU59295-101	WIRE ASSEMBLY
⚠	TAB	A74316	TAB, x 2
		PU22336D1 (E/EK)	POWER TRANS. BOARD ASS'Y [01]
		PU22336C1 (EG)	POWER TRANS. BOARD ASS'Y [01]
⚠	C101	OFZ9022-472	C CAP
⚠	HD1	PU57505	FUSE HOLDER, F1--F3
	D1	10E2	DIODE
	D2	10E2	DIODE
	D3	–	–
	D4	ERA15-02	DIODE
	OR	S5688G-TPA3	DIODE
	OR	1SR35-200AT-82	DIODE
	OR	11E2	DIODE
	D5	ERA15-02	DIODE
	OR	S5688G-TPA3	DIODE
	OR	1SR35-200AT-82	DIODE
	OR	11E2	DIODE
	DS1	S4VB10	DIODE STACK
⚠	LF1	PU59581	LINE FILTER, EG ONLY
⚠	LF2	PU59586	LINE FILTER, EG ONLY
	R1	–	–
⚠	R2	QRZ0052-100	FR
	C1	QFK52AK-473	M CAP
	C2	QETB1EM-228	E CAP
	C3	QETB1EM-478	E CAP
	C4	QETB1CM-478	E CAP
	C5	QETB1JM-476	E CAP
	C6	–	–
	C7	QETC1JM-107	E CAP
	OR	QET81JM-107	E CAP

THE FOLLOWING FUSE ARE NOT INCLUDED IN PU22336D1/PU22336C1

⚠	F1	QMF51E2-R315	FUSE
⚠	F2	QMF51E2-2R0	FUSE
⚠	F3	QMF51E2-1R0	FUSE
		PU22336D2 (E/EK)	REGULATOR BOARD ASS'Y [02]
		PU22336C2 (EG)	REGULATOR BOARD ASS'Y [02]
	SCR1	SDST3014Z	TAP. SCREW, IC1, X 2
	SCR2	SDST3006Z	TAP. SCREW, HEAT SINK, X 2

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	IC1	STK5481	INTERGRATED CIRCUIT
	Q1	2SA720Q,R,S	TRANSISTOR
	Q2	2SA720Q,R,S	TRANSISTOR
	D6	HZ30-2	ZENER DIODE
	D11	MA165	DIODE
	OR	1SS133	DIODE
	D12	1SS133	DIODE
	OR	MA165	DIODE
	D13	MA161	DIODE
	R1	–	–
	R2	–	–
	R3	QRD181J-822	CR
⚠	R4	QRZ0052-221	FR
	R5	QRD181J-222	CR
	R6	QRD181J-272	CR
	R7	QRD181J-682	CR
	R8	QRD181J-223	CR
	R9	–	–
	R10	QRD181J-102	CR
	OR	QRD182J-102	CR
	R11	QRD181J-104	CR
	OR	QRD182J-104	CR
	C1	–	–
	C2	–	–
	C3	–	–
	C4	–	–
	C5	–	–
	C6	QETC1HM-106	E CAP
	OR	QET61HM-106	E CAP
	C7	–	–
	C8	–	–
	C9	QETC1HM-106	E CAP
	OR	QET61HM-106	E CAP
	C10	QETC1CM-476	E CAP
	C11	QETC1EM-106	E CAP
	OR	QET61EM-106	E CAP
	C12	QETC1CM-107	E CAP
	C13	QETC1CM-476	E CAP
	C14	QETC1CM-107	E CAP
	CN1	PU58931-14	CAP. HOUSING
	TAB	A74017	TAB
	TP	PU55774	TEST PIN, TP1, 2, GND
⚠	CP1	ICP-F10	CIRCUIT PROTECTOR
⚠	CP2	ICP-F15	CIRCUIT PROTECTOR
⚠	CP3	ICP-F15	CIRCUIT PROTECTOR
⚠	CP4	ICP-F20	CIRCUIT PROTECTOR
⚠	HTS1	PQ31187	HEAT SINK

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU11430D1-01(E/EG) VIDEO BOARD ASS'Y [03]	
		PU11430E1-01 (EK) VIDEO BOARD ASS'Y [03]	
		— LUMINANCE SECTION —	
	IC101	PU22282A	Y. MODULE (JA016)
	IC102	7VT12	INTEGRATED CIRCUIT
	IC201	TA7374P	INTEGRATED CIRCUIT
	IC202	MSM6989RS	INTEGRATED CIRCUIT
	IC203	BA7021	INTEGRATED CIRCUIT
	Q101	2SC1740S(QRS)	TRANSISTOR
	Q102	2SC1740S(QRS)	TRANSISTOR
	Q103	—	—
	Q104	2SC1740S(QRS)	TRANSISTOR
	Q105	2SC1740S(QRS)	TRANSISTOR
	Q106	2SC1740S(QRS)	TRANSISTOR
	Q107	—	—
	Q108	—	—
	Q109	—	—
	Q110	—	—
	Q111	2SC1740S(QRS)	TRANSISTOR
	Q112	2SA1309R,S	TRANSISTOR
	OR	2SA933S(RS)	TRANSISTOR
	Q113	2SA1309R,S	TRANSISTOR
	OR	2SA933S(RS)	TRANSISTOR
	Q201	DTC124ES	D. TRANSISTOR
	Q202	DTC124ES	D. TRANSISTOR
	Q203	DTC124ES	D. TRANSISTOR
	Q204	DTC124ES	D. TRANSISTOR
	Q205	—	—
	Q206	—	—
	Q207	—	—
	Q208	2SC1740S(QRS)	TRANSISTOR
	Q209	2SC1740S(QRS)	TRANSISTOR
	Q210	2SC1740S(QRS)	TRANSISTOR
	Q211	2SA1309R,S	TRANSISTOR
	Q212	2SC1740S(QRS)	TRANSISTOR
	Q213	2SC1740S(QRS)	TRANSISTOR
	Q214	DTC124ES	D. TRANSISTOR
	Q215	2SC1740S(QRS)	TRANSISTOR
	Q216	DTC124ES	D. TRANSISTOR
	D101	MA165	DIODE
	OR	1SS133	DIODE
	D102	MA165	DIODE
	OR	1SS133	DIODE
	D103	OA90	DIODE
	D104	OA90	DIODE
	D105	MA165	DIODE
	OR	1SS133	DIODE
	D106	MA165	DIODE
	OR	1SS133	DIODE
	D201	—	—
	D202	MA165	DIODE
	OR	1SS133	DIODE
	D203	HZS9.1EB1	ZENER DIODE
	D204	—	—
	D205	—	—
	D206	MA165	DIODE
	OR	1SS133	DIODE
	D207	MA165	DIODE
	OR	1SS133	DIODE
	D208	MA165	DIODE
	OR	1SS133	DIODE
	D209	MA165	DIODE
	OR	1SS133	DIODE
	D210	MA165	DIODE
	OR	1SS133	DIODE
	R101	QRD161J-332	CR
	R102	QRD161J-152	CR
	R103	QRD161J-102	CR
	R104	QRD161J-122	CR
	R105	QRD161J-821	CR
	R106	QRD161J-681	CR
	R107	QRD161J-102	CR
	R108	QRD161J-152	CR
	R109	QRD161J-101	CR
	R110	QVZ3518-222	VR, SP RF EQ
	R111	—	—
	R112	QRD161J-561	CR
	R113	QRD161J-222	CR
	R114	QRD161J-222	CR
	R115	QRD161J-391	CR
	R116	QRD161J-333	CR
	R117	QRD161J-333	CR
	R118	QRD161J-331	CR
	R119	QVZ3518-681	VR, REC FM LEV.
	R120	QRD161J-102	CR
	R121	QRD161J-392	CR
	R122	QRD161J-103	CR
	R123	QRD161J-562	CR
	R124	QRD161J-225	CR
	R125	QRD161J-475	CR
	R126	QRD161J-335	CR
	R127	QRD161J-102	CR
	R128	QRD161J-152	CR
	R129	QRD161J-153	CR
	R130	QRD161J-684	CR
	R131	QRD161J-824	CR
	R132	QRD161J-562	CR
	R133	QRD161J-152	CR
	R134	—	—
	R135	—	—
	R136	QRD161J-102	CR
	R137	ERT-D2FGL101S	THERMISTOR
	R138	—	—
	R139	—	—
	R140	—	—
	R141	QRD161J-102	CR
	R142	QRD161J-272	CR
	R143	QRD161J-181	CR
	R144	QRD161J-821	CR
	R145	QRD161J-181	CR
	R146	QRD121J-391	CR
	R201	—	—
	R202	QVZ3518-102	VR, LP RF EQ

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R203	QRD161J-471	CR
	R204	QRD161J-471	CR
	R205	–	–
	R206	–	–
	R207	–	–
	R208	–	–
	R209	–	–
	R210	–	–
	R211	QRD161J-562	CR
	R212	QRD161J-681	CR
	R213	–	–
	R214	QRD161J-391	CR
	R215	QRD161J-122	CR
	R216	QRD161J-681	CR
	R217	QRD121J-560	CR
	R218	QRD161J-103	CR
	R219	QRD161J-222	CR
	R220	QRD161J-393	CR
	R221	QRD161J-473	CR
	R222	QRD161J-332	CR
	R223	QVZ3518-682	VR, 0.5 H D. VIDEO LEVEL
	R224	QRD161J-102	CR
	R225	QRD161J-122	CR
	R226	QRD161J-153	CR
	R227	QRD161J-223	CR
	R228	QRD161J-561	CR
	R229	QRD161J-681	CR
	R230	QRD161J-681	CR
	R231	QRD161J-681	CR
	R232	QRD161J-471	CR
	R233	QRD161J-222	CR
	R234	QRD161J-102	CR
	R235	QRD161J-222	CR
	R236	QRD161J-183	CR
	R237	–	–
	R238	QRD161J-822	CR
	R239	QRD161J-122	CR
	R240	QRD161J-563	CR
	R241	QRD161J-822	CR
	R242	QRD161J-223	CR
	R243	QRD161J-103	CR
	R244	QRD161J-103	CR
	R245	QRD161J-103	CR
	R246	QRD161J-333	CR
	C101	QCVB1CN-103	C CAP
	C102	QCSB1HJ-560	C CAP
	C103	QCSB1HJ-470	C CAP
	C104	QET60JM-476	E CAP
	C105	QCVB1CN-103	C CAP
	C106	QCSB1HJ-470	C CAP
	C107	QCVB1CN-103	C CAP
	C108	QCVB1CN-103	C CAP
	C109	–	–
	C110	QCVB1CN-103	C CAP
	C111	QCVB1CN-103	C CAP
	C112	QCVB1CN-103	C CAP
	C113	QCVB1CN-103	C CAP
	C114	QCBB1HJ-121	C CAP
	C115	QCBB1HJ-121	C CAP

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C116	QCSB1HJ-270	C CAP
	C117	QET60JM-476	E CAP
	C118	QCVB1CN-103	C CAP
	C119	–	–
	C120	–	–
	C121	QCBB1HJ-151	C CAP
	C122	QCSB1HJ-330	C CAP
	C123	QET61HM-105	E CAP
	C124	QET51HM-105	E CAP
	C125	QCBB1HJ-151	C CAP
	C126	QCBB1HJ-151	C CAP
	C127	QET61HM-225	E CAP
	C128	QER60JM-107	E CAP
	C129	QER60JM-107	E CAP
	C130	QET61EM-335	E CAP
	C131	QER41HM-105	E CAP
	C132	QER41HM-225	E CAP
	C133	QER41HM-335	E CAP
	C134	QER41HM-225	E CAP
	C135	QER41EM-475	E CAP
	C136	QEN41EM-335	NP E CAP
	C137	QEM51AK-107	E CAP
	C138	QCVB1CN-103	C CAP
	C139	QCBB1HJ-181	C CAP
	C140	QCBB1HJ-121	C CAP
	C141	QCSB1HJ-560	C CAP
	C142	QCSB1HJ-220	C CAP
	C143	–	–
	C144	QCBB1HJ-121	C CAP
	C145	QCBB1HJ-151	C CAP
	C146	QET61EM-475	E CAP
	C147	QET61CM-476	E CAP
	C148	QCVB1CN-103	C CAP
	C201	QCSB1HJ-120	C CAP
	C202	QFN31HJ-223	MY CAP
	C203	–	–
	C204	–	–
	C205	–	–
	C206	–	–
	C207	–	–
	C208	–	–
	C209	–	–
	C210	–	–
	C211	QCVB1CN-103	C CAP
	C212	QCSB1HJ-100	C CAP
	C213	QCVB1CN-103	C CAP
	C214	QET60JM-476	E CAP
	C215	–	–
	C216	QCSB1HJ-390	C CAP
	C217	QFN31HJ-102	MY CAP
	C218	QET61EM-475	E CAP
	C219	QCBB1HJ-102	C CAP
	C220	QFN31HJ-473	MY CAP
	C221	QET61AM-107	E CAP
	C222	QCVB1CN-103	C CAP
	C223	–	–
	C224	QEK61HM-104	E CAP
	C225	QET61EM-475	E CAP
	C226	QCVB1CN-103	C CAP

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C227	QCVB1CN-103	C CAP
	C228	–	–
	C229	QET60JM-476	E CAP
	C230	QCVB1CN-103	C CAP
	C231	–	–
	C232	–	–
	C233	QER41CM-106	E CAP
	C234	QER41CM-476	E CAP
	C235	QCVB1CN-103	C CAP
	C236	QCSB1HJ-330	C CAP
	C237	QCVB1CN-270	C CAP
	C238	QER41AM-476	E CAP
	C239	QCSB1HJ-200	C CAP
	C240	–	–
	C241	QCVB1CN-103	C CAP
	C242	QCVB1CN-103	C CAP
	C243	QCBB1HJ-121	C CAP
	C244	QER60JM-107	E CAP
	C245	QCVB1CN-103	C CAP
	C246	QEK61HM-104	E CAP
	C247	QEK61HM-105	E CAP
	C248	QET61AM-476	E CAP
	L101	PU48530-101K	PEAKING COIL
	L102	PU59152-560J	PEAKING COIL
	L103	PU59152-270J	PEAKING COIL
	L104	PU59152-180J	PEAKING COIL
	L105	–	–
	L106	PU59152-221J	PEAKING COIL
	L107	PU59152-680J	PEAKING COIL
	L108	PU59152-270J	PEAKING COIL
	L109	PU48530-101K	PEAKING COIL
	L110	–	–
	L111	PU59152-121J	PEAKING COIL
	L112	PU59152-180J	PEAKING COIL
	L113	PU59152-180J	PEAKING COIL
	L114	PU48530-471J	PEAKING COIL
	L115	PU59152-121J	PEAKING COIL
	L116	PU48530-101K	PEAKING COIL
	L117	PU59152-560J	PEAKING COIL
	L118	PU59152-680J	PEAKING COIL
	L119	PU48530-681J	PEAKING COIL
	L120	–	–
	L121	PU48530-101K	PEAKING COIL
	L201	PU48530-101K	PEAKING COIL
	L202	PU48530-101K	PEAKING COIL
	L203	PU48530-101K	PEAKING COIL
	L204	PU59152-560J	PEAKING COIL
	L205	PU59152-390J	PEAKING COIL
	L206	PU48530-101K	PEAKING COIL
	L207	PU48530-101K	PEAKING COIL
	EQ201	PU58315	EQUALIZER
	LPF101	PU58021-2	LOW PASS FILTER
	DL101	PU59173	1H DELAY LINE
	CN101	PU58844-12	CAP, HOUSING

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	TP	PU57545	TEST PIN, TP106, 110, 121, 221, 222, GND 1, GND 2
	– COLOUR SECTION –		
⚠	IC301	PU22046A	COLOUR MODULE, JA005
	IC351	BA7007	INTEGRATED CIRCUIT
	IC401	AN3592K	INTEGRATED CIRCUIT
	Q301	2SC1740S(QRS)	TRANSISTOR
	Q302	2SC1740S(QRS)	TRANSISTOR
	Q303	–	–
	Q304	–	–
	Q305	–	–
	Q306	–	–
	Q307	–	–
	Q308	–	–
	Q309	–	–
	Q310	–	–
	Q311	DTC144ES	D. TRANSISTOR
	Q312	DTC124ES	D. TRANSISTOR
	Q313	DTC144ES	D. TRANSISTOR
	Q314	DTC144ES	D. TRANSISTOR
	Q315	DTC144WS	D. TRANSISTOR
	Q316	DTC144ES	D. TRANSISTOR
	Q317	2SC1740S(QRS)	TRANSISTOR
	Q318	2SC1740S(QRS)	TRANSISTOR
	Q319	2SC1740S(QRS)	TRANSISTOR
	Q320	DTC144ES	D. TRANSISTOR
	Q351	2SC1740S(QRS)	TRANSISTOR, E/EG
	Q352	2SC1740S(QRS)	TRANSISTOR, E/EG
	Q401	2SC1740S(QRS)	TRANSISTOR
	Q402	2SC1740S(QRS)	TRANSISTOR
	Q403	2SC1740S(QRS)	TRANSISTOR
	Q404	2SC1740S(QRS)	TRANSISTOR
	Q405	2SC1740S(QRS)	TRANSISTOR
	Q406	2SC1740S(QRS)	TRANSISTOR
	Q407	2SC1740S(QRS)	TRANSISTOR
	Q408	–	–
	Q409	–	–
	Q410	–	–
	Q411	2SC2021Q,R,S	TRANSISTOR
	Q412	DTC124ES	D. TRANSISTOR, E/EG
	Q413	DTC124ES	D. TRANSISTOR
	Q414	2SC1740S(QRS)	TRANSISTOR
	Q415	DTC124ES	D. TRANSISTOR
	Q416	DTC124ES	D. TRANSISTOR
	Q417	DTC124ES	D. TRANSISTOR
	Q501	2SA933(S)	TRANSISTOR
	OR	2SA933S(S)	TRANSISTOR
	Q502	2SB643R,S	TRANSISTOR
	Q503	DTC144WS	D. TRANSISTOR
	Q504	2SB643R,S	TRANSISTOR
	Q505	2SB643R,S	TRANSISTOR
	Q506	DTC124ES	D. TRANSISTOR

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	Q507	DTC124ES	D. TRANSISTOR
	D301	MA165	DIODE
	OR	1SS133	DIODE
	D302	MA165	DIODE
	OR	1SS133	DIODE
	D303	MA165	DIODE
	OR	1SS133	DIODE
	D304	–	–
	D305	MA165	DIODE
	OR	1SS133	DIODE
	D306	MA165	DIODE
	OR	1SS133	DIODE
	D307	MA165	DIODE
	OR	1SS133	DIODE
	D308	MA165	DIODE
	OR	1SS133	DIODE
	D351	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D352	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D353	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D354	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D355	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D356	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D357	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D358	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D401	–	–
	D402	MA165	DIODE
	OR	1SS133	DIODE
	D403	MA165	DIODE
	OR	1SS133	DIODE
	D404	–	–
	D405	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	D406	MA165	DIODE
	OR	1SS133	DIODE
	D501	MA165	DIODE
	OR	1SS133	DIODE
	D502	MA165	DIODE
	OR	1SS133	DIODE
	D503	MA165	DIODE
	OR	1SS133	DIODE
	D504	MA165	DIODE
	OR	1SS133	DIODE
	D505	MA165	DIODE
	OR	1SS133	DIODE
	D506	–	–
	D507	MA165	DIODE
	OR	1SS133	DIODE
	R301	QRD161J-102	CR
	R302	QRD161J-102	CR
	R303	QRD161J-473	CR
	R304	QRD161J-272	CR
	R306	QRD161J-681	CR

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R306	QRD161J-102	CR
	R307	QRD161J-102	CR
	R308	–	–
	R309	–	–
	R310	–	–
	R311	QRD161J-562	CR
	R312	QRD161J-561	CR
	R313	QRD161J-561	CR
	R314	–	–
	R315	–	–
	R316	QRD161J-221	CR
	R317	QRD161J-391	CR
	R318	QRD161J-122	CR
	R319	QRD161J-393	CR
	R320	QRD161J-103	CR
	R321	QRD161J-103	CR
	R322	QVZ3518-101	VR, SP REC COL. LEV.
	R323	QRD161J-681	CR
	R324	–	–
	R325	QRD161J-102	CR
	R326	QRD161J-472	CR
	R327	QRD161J-274	CR
	R328	QVZ3518-223	VR, VXO
	R329	QRD161J-103	CR
	R330	QRD161J-122	CR
	R331	QRD161J-222	CR
	R332	QRD161J-103	CR
	R333	QRD161J-103	CR
	R334	QRD161J-102	CR
	R335	QRD161J-122	CR
	R336	QRD161J-471	CR
	R337	QRD161J-152	CR
	R338	QRD161J-223	CR
	R339	QRD161J-682	CR
	R340	QRD161J-102	CR
	R341	QRD161J-181	CR
	R342	QRD161J-391	CR
	R343	QRD161J-331	CR
	R344	QRD161J-223	CR
	R345	QRD161J-153	CR
	R346	QRD161J-222	CR
	R347	QRD161J-153	CR
	R348	QRD161J-103	CR
	R349	QRD161J-271	CR
	R350	–	–
	R351	QRD161J-332	CR, E/EG
	R352	QRD161J-154	CR, E/EG
	R353	QRD161J-563	CR, E/EG
	R354	QRD161J-182	CR, E/EG
	R355	QVZ3518-472	VR, SECAM DET, E/EG
	R356	QRD161J-103	CR, E/EG
	R357	QRD161J-562	CR, E/EG
	R358	QRD161J-333	CR, E/EG
	R359	QRD161J-393	CR, E/EG
	R360	QRD161J-102	CR, E/EG
	R361	QRD161J-393	CR, E/EG
	R362	QRD161J-393	CR, E/EG
	R363	QRD161J-822	CR, E/EG
	R364	QRD161J-223	CR, E/EG

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R365	QRD161J-333	CR, E/EG
	R401	QVZ3518-222	VR, INVERTED COLOUR LEVEL
	R402	QRD161J-222	CR
	R403	QRD161J-272	CR
	R404	QRD161J-821	CR
	R405	QRD161J-222	CR
	R406	QRD161J-473	CR
	R407	QRD161J-104	CR
	R408	QRD161J-391	CR
	R409	QRD161J-123	CR
	R410	QRD161J-332	CR
	R411	–	–
	R412	–	–
	R413	QRD161J-223	CR
	R414	QRD161J-103	CR
	R415	QRD161J-154	CR
	R416	QRD161J-221	CR
	R417	QRD161J-393	CR
	R418	QVZ3518-473	VR, 0.5 H D. J. DET
	R419	QRD161J-473	CR
	R420	QRD161J-122	CR
	R421	QRD161J-101	CR
	R422	QRD161J-152	CR
	R423	QRD161J-222	CR
	R424	QRD161J-561	CR
	R425	QRD161J-561	CR
	R426	QRD161J-393	CR
	R427	QRD161J-223	CR
	R428	QRD161J-471	CR
	R429	QRD161J-473	CR
	R430	–	–
	R431	QRD161J-682	CR
	R432	QRD161J-104	CR
	R433	QRD161J-473	CR
	R434	QRD161J-472	CR
	R435	QRD161J-682	CR, E/EG
	R436	QRD161J-103	CR
	R437	QRD161J-153	CR
	R438	QVZ3518-101	VR, LP REC COL. LEV.
	R439	QRD161J-822	CR, E/EG
	R440	QRD161J-102	CR
	R441	QRD161J-272	CR
	R442	QRD161J-333	CR
	R443	QRD161J-333	CR
	R444	QRD161J-103	CR
	R445	QRD161J-0R0Y	CR
	R501	QRD161J-393	CR
	R502	QRD161J-682	CR
	R503	QRD161J-393	CR
	R504	QRD161J-821	CR
	R505	QRD161J-103	CR
	R506	QRD161J-393	CR
	R507	QRD161J-821	CR
	R508	QRD161J-393	CR
	R509	QRD161J-821	CR
	R510	QRD161J-103	CR
	R511	QRD161J-103	CR
	R512	QRD161J-103	CR

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C301	–	–
	C302	QCBB1HJ-820	C CAP
	C303	QCBB1HJ-102	C CAP
	C304	QCVB1CN-103	C CAP
	C305	QFN31HJ-473	MY CAP
	C306	QCSB1HJ-470	C CAP
	C307	–	–
	C308	–	–
	C309	–	–
	C310	–	–
	C311	QET61CM-106	E CAP
	C312	QFN31HJ-224	MY CAP
	C313	QFN31HJ-563	MY CAP
	C314	QET61CM-106	E CAP
	C315	QET61HM-225	E CAP
	C316	QET61EM-335	E CAP
	C317	QFN31HJ-473	MY CAP
	C318	QCVB1CN-103	C CAP
	C319	QET61EM-475	E CAP
	C320	QEM51AK-107	E CAP
	C321	QCVB1CN-103	C CAP
	C322	QET61HM-105	E CAP
	C323	QET61HM-475	E CAP
	C324	QET61HM-475	E CAP
	C325	QCVB1CN-103	C CAP
	C326	QCVB1CN-103	C CAP
	C327	QET61HM-105	E CAP
	C328	QFN31HJ-223	MY CAP
	C329	QCT25CH-220	C CAP
	C330	QCVB1CN-103	C CAP
	C331	QET61CM-106	E CAP
	C332	QCBB1HJ-101	C CAP
	C333	QCVB1CN-103	C CAP
	C334	QCBB1HJ-102	C CAP
	C335	QET61AM-476	E CAP
	C336	QCVB1CN-103	C CAP
	C337	QCSB1HK-5R6	C CAP
	C338	–	–
	C339	QCC11EJ-104	C CAP
	C340	QCC11EK-273	C CAP
	OR	QFN31HJ-273	MY CAP
	C341	–	–
	C342	–	–
	C343	–	–
	C344	–	–
	C345	–	–
	C346	–	–
	C347	–	–
	C348	–	–
	C349	–	–
	C350	–	–
	C351	QET61CM-476	E CAP, E/EG
	C352	QCVB1CN-103	C CAP, E/EG
	C353	QET61AM-336	E CAP, E/EG
	C354	QFN31HJ-182	MY CAP, E/EG
	C355	QFN31HJ-272	MY CAP, E/EG
	C356	QFN31HJ-223	MY CAP, E/EG
	C357	QET61CM-106	E CAP, E/EG
	C358	QCVB1CN-103	C CAP, E/EG
	C359	QCBB1HJ-102	C CAP, E/EG

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C401	QCVB1CN-103	C CAP
	C402	QCSB1HJ-220	C CAP
	C403	QCSB1HJ-220	C CAP
	C404	QCVB1CN-103	C CAP
	C405	QCVB1CN-103	C CAP
	C406	QET61HM-105	E CAP
	C407	QET61HM-105	E CAP
	C408	QET61EM-475	E CAP
	C409	QET61HM-105	E CAP
	C410	QFN31HJ-152J	MY CAP
	C411	QFN31HJ-332	MY CAP
	C412	QCVB1CN-103	C CAP
	C413	QCVB1CN-103	C CAP
	C414	QET60JM-107	E CAP
	C415	QCVB1CN-103	C CAP
	C416	QFN31HJ-222	MY CAP
	C417	QFN31HJ-103	MY CAP
	C418	QFN31HJ-273	MY CAP
	C419	QFN31HJ-222	MY CAP
	C420	QET61HM-105	E CAP
	C421	QCVB1CN-103	C CAP
	C422	QCVB1CN-103	C CAP
	C423	QCSB1HJ-680	C CAP
	C424	QCVB1CN-103	C CAP
	C425	QCVB1CN-103	C CAP
	C426	QCVB1CN-103	C CAP
	C427	QCVB1CN-103	C CAP
	C428	–	–
	C429	–	–
	C430	–	–
	C431	QET61HM-225	E CAP
	C432	QFN31HJ-103	MY CAP
	C433	QFN31HJ-104	MY CAP
	C434	–	–
	C435	QFN31HJ-683	MY CAP
	C436	QET51AM-226	E CAP
	L301	–	–
	L302	PU48530-222J	PEAKING COIL
	L303	PU54223-271JG	PEAKING COIL
	L304	–	–
	L305	–	–
	L306	–	–
	L307	–	–
	L308	–	–
	L309	–	–
	L310	–	–
	L311	PU47051-822	PEAKING COIL
	L312	PU48530-101K	PEAKING COIL
	L313	PU48530-101K	PEAKING COIL
	L314	PU59152-150J	PEAKING COIL
	L315	PU59152-820J	PEAKING COIL
	L316	PU48530-101K	PEAKING COIL
	L351	PU49057	TRAP COIL, E/EG
	L352	PU48530-101K	PEAKING COIL, E/EG
	L353	PU47051-562	CHOKE COIL, E/EG
	L401	PU49057	TRAP COIL
	L402	PU57139	LC BLOCK
	L403	PU59152-330J	PEAKING COIL

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	L404	PU48530-101K	PEAKING COIL
	L405	PU59152-100J	PEAKING COIL
	EQ301	PU53501-7	EQUALIZER
	LPF301	PU58022	LOW PASS FILTER
	LPF302	PU54988	LOW PASS FILTER
	BPF301	PU54410-2	BAND PASS FILTER
	BPF302	PU57072	BAND PASS FILTER
	DL301	PU58971-2	2H DELAY LINE
	OR	PU59413	2H DELAY LINE
⚠	X301	PU59335	CRYSTAL
	OR	PU31449-4K	CRYSTAL
⚠	XB301	PU58023	CRYSTAL BLOCK
⚠	CF351	PU56983	CERAMIC FILTER, E/EG
	TP	PU57545	TEST PIN, TP304–306, 310, 405, 431–435, SWD 5V
	TP	PU57545	TEST PIN, TP310, E/EG
	SLD401	PU59170	CCD SHIELD (1)
	SLD402	PU59171	CCD SHIELD (2)
	SLD403	PU59172	CCD SHIELD (3)
		PU11430D2-01	MECHACON BOARD ASS'Y (04)
	IC601	M50965-612SP	INTEGRATED CIRCUIT
	IC602	TA8400P	INTEGRATED CIRCUIT
	IC603	M54644AL	INTEGRATED CIRCUIT
	OR	M54644BL	INTEGRATED CIRCUIT
	IC604	M54644BL	INTEGRATED CIRCUIT
	Q601	2SC1317R,S	TRANSISTOR
	Q602	2SA1309R,S	TRANSISTOR
	OR	2SA933S(RS)	TRANSISTOR
	Q603	2SC2655O,YTPE6	TRANSISTOR
	OR	2SD1292T103Q,R	TRANSISTOR
	Q604	2SA1309R,S	TRANSISTOR
	OR	2SA933S(RS)	TRANSISTOR
	Q605	2SC2655O,YTPE6	TRANSISTOR
	OR	2SD1292T103Q,R	TRANSISTOR
	Q606	2SK656	D. MOS FET
	Q607	DTC124EF	D. TRANSISTOR
	Q608	2SB641R,S	TRANSISTOR
	D601	–	–
	D602	MA165	DIODE
	OR	1SS133	DIODE
	D603	MA165	DIODE
	OR	1SS133	DIODE
	D604	HZS7.5EB2	ZENER DIODE
	OR	RD7.5ES-T1B2	ZENER DIODE
	OR	MTZ7.5B	ZENER DIODE

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	D605	HZS4.7EB2	ZENER DIODE
	D606	S5688G-TPA3	DIODE
	D607	MA165	DIODE
	OR	1SS133	DIODE
	D608	HZS5.6EB1	ZENER DIODE
	OR	MTZ5.6A	ZENER DIODE
	D609	MA27WA	DIODE
	D610	MA165	DIODE
	OR	1SS133	DIODE
	D611	HZS6.8EB2	ZENER DIODE
	OR	RD6.8ES-T1B2	ZENER DIODE
	D612	HZS6.8EB2	ZENER DIODE
	OR	RD6.8ES-T1B2	ZENER DIODE
	D613	–	–
	D614	1SS133	DIODE
	OR	MA165	DIODE
	R601	QRX029J-4R7A	MFR
	R602	QRD161J-332	CR
	R603	QRD161J-223	CR
	R604	QRD161J-682	CR
	R605	QRD161J-223	CR
	R606	QRD161J-222	CR
	R607	–	–
	R608	QRD161J-103	CR
	R609	QRD161J-103	CR
	R610	QRD161J-153	CR
	R611	QRD161J-472	CR
	R612	QRD161J-103	CR
	R613	–	–
	R614	QRD161J-152	CR
	R615	QRD161J-472	CR
	R616	QRD161J-472	CR
	R617	QRD161J-472	CR
	R618	QRD161J-472	CR
	R619	QRD161J-472	CR
	R620	QRD161J-472	CR
	R621	QRD161J-124	CR
	R622	QRD161J-472	CR
	R623	QRD161J-124	CR
	R624	QRD161J-472	CR
	R625	QRD161J-472	CR
	R626	QRD161J-472	CR
	R627	QRD161J-472	CR
	R628	QRD161J-333	CR
	R629	QRD161J-472	CR
	R630	QRD161J-472	CR
	R631	QRD162J-333	CR
	R632	QRD161J-562	CR
	R633	QRD161J-102	CR
	R634	QRD161J-102	CR
	R635	QRD161J-103	CR
	R636	QRD161J-103	CR
	R637	QRD161J-102	CR
	R638	–	–
	R639	QRD161J-105	CR
	R640	–	–
	R641	–	–
	R642	QRD161J-472	CR
	R643	QRD161J-272	CR
	R644	QRD161J-393	CR
	R645	QRD161J-472	CR

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R646	–	–
	R647	–	–
	R648	–	–
	R649	QRD161J-472	CR
	C601	QFV71HJ-104	MY CAP
	C602	QFV71HJ-104	MY CAP
	C603	QCF31HP-223	C CAP
	C604	QCF31HP-223	C CAP
	C605	QCSB1HJ-330	C CAP
	C606	QCSB1HJ-330	C CAP
	C607	QCB81HJ-102	C CAP
	C608	QETA1EM-107	E CAP
	C609	QET61EM-335	E CAP
	C610	QET61CM-336	E CAP
	C611	QET61EM-475	E CAP
	C612	–	–
	C613	–	–
	C614	QEK41EM-106	C CAP
	C615	QEN41EM-475	NP E CAP
	C616	QCF11HP-223	C CAP
	C617	QFN31HJ-683	MY CAP
	C618	QFN41HJ-102	MY CAP
⚠	CF601	PU55812	CERAMIC FILTER
	L601	PU59425	CHOKE COIL
	RA601	QRB057J-333	RESISTOR ARRAY
	RA602	QRB047J-103	RESISTOR ARRAY
	CN601	PU58931-14	CAP. HOUSING
	CN602	PU58931-10	CAP. HOUSING
	CN603	PU58931-14	CAP. HOUSING
	CN604	PU58931-8	CAP. HOUSING
	CN605	PU58931-12	CAP. HOUSING, 2–7, 9–14
	CN606	PU58931-8	CAP. HOUSING
	CN607	PU58798-17	CAP. HOUSING, 3–19
	CN608	PU58844-6	CAP. HOUSING
	FW1	PU58865-3	FLAT WIRE, FOR CN607
	J1	PW30109-50AAZZ6	PARALLEL WIRE, 2–7
	J2	PW30109-50AAZZB	PARALLEL WIRE, 4–14
	H1	PU57951	TU BOARD HINGE, x 2
	PR1	PU52105	PLASTIC RIVET
	SPC1	PQ41028-2	SPACER
		PU11427C-3 (E/EG)	MOTHER BOARD ASS'Y (05)
		PU11427D-3 (EK)	MOTHER BOARD ASS'Y (05)
	R1	QRD182J-183	CR
	CN1	PU58930-14	CAP. HOUSING
	CN2	PU58930-14	CAP. HOUSING
	CN3	PU58930-10	CAP. HOUSING
	CN4	PU58930-14	CAP. HOUSING
	CN5	PU58930-8	CAP. HOUSING
	CN6	PU58930-12	CAP. HOUSING, 2–7, 9–14
	CN7	PU58930-8	CAP. HOUSING
	CN8	PU58930-14	CAP. HOUSING, 1–7, 9–15
	CN9	PU58930-20	CAP. HOUSING

#	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	CN10	PU58928-15	CAP. HOUSING, 2–16, E/EG
		PU58928-16	CAP. HOUSING, 2–17, EK
	CN11	PU58844-7R	CAP. HOUSING
	CN12	PU58844-9	CAP. HOUSING
	CN13	–	–
	CN14	PU58844-7	CAP. HOUSING
	CN15	–	–
	CN16	PU58844-7	CAP. HOUSING, 1–7, E/EG
		PU58844-8	CAP. HOUSING, EK
	CN17	PU58844-4	CAP. HOUSING, 2–6
	CN18	–	–
	CN19	–	–
	CN20	PU58844-4R	CAP. HOUSING, 1–4
	CN21	PU58844-2	CAP. HOUSING
	CN22	PU58930-22	CAP. HOUSING
	CN23	PU58928-10	CAP. HOUSING
	CN24	PU58844-12	CAP. HOUSING, 1–12
		PU22307L-03 (E)	TERMINAL BOARD ASS'Y [06]
		PU22307H-03 (EG)	TERMINAL BOARD ASS'Y [06]
		PU22369B-03 (EK)	TERMINAL BOARD ASS'Y [06]
	IC1	10VT27	INTEGRATED CIRCUIT
	Q1	2SC1740S(QRS)	TRANSISTOR
	Q2	–	–
	Q3	DTA124ES	D. TRANSISTOR, EK ONLY
	Q11	2SC1740S(QRS)	TRANSISTOR
	Q12	2SC1740S(QRS)	TRANSISTOR
	D1	MA165	DIODE
	OR	1SS133	DIODE
	D5	MA165	DIODE, E/EG
	OR	1SS133	DIODE, E/EG
	R1	QVZ3518-474	VR, V. LOCK
	R2	QRD161J-102	CR
	R3	QRD161J-102	CR
	R4	QRD161J-102	CR
	R5	QRD161J-221	CR
	R6	QRD161J-750	CR
	R7	QRD161J-750	CR
	R8	–	–
	R9	–	–
	R10	QRD161J-103	CR, EK ONLY
	R11	QRD161J-682	CR, EK ONLY
	R12	–	–
	R13	–	–
	R14	–	–
	R15	–	–
	R16	–	–
	R17	–	–
	R18	–	–
	R19	–	–
	R20	–	–

#	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R21	QRD161J-182	CR
	R22	QRD161J-122	CR
	R23	–	–
	R24	–	–
	R25	QRD161J-152	CR, E/EG
	R26	QRD161J-152	CR, E/EG
	R27	–	–
	R28	–	–
	R29	QRD161J-272	CR, E/EG
	R30	QRD161J-822	CR, E/EG
	R31	QRD161J-104	CR, E/EG
	R32	–	–
	R33	–	–
	R34	–	–
	R35	QRD161J-223	CR, E/EG
	R36	QRD161J-273	CR, EK ONLY
	R37	QRD161J-682	CR
	R38	QRD161J-681	CR
	R39	–	–
	R40	QRD161J-183	CR
	R41	–	–
	R42	QRD161J-102	CR
	R43	QRD161J-103	CR
	R44	QRD161J-682	CR
	R45	–	–
	R46	–	–
	R47	–	–
	R48	–	–
	R49	–	–
	R50	–	–
	R51	–	–
	R52	–	–
	R53	–	–
	R54	–	–
	R55	QRD161J-332	CR
	C1	QEK61CM-476	E CAP
	C2	QEK61CM-476	E CAP
	C3	QETC0JM-477	E CAP
	C4	QET61CM-476	E CAP
	C5	QET61CM-476	E CAP
	C6	QEK61CM-476	E CAP
	C21	QCBB1HJ-102	C CAP
	C22	QCBB1HJ-102	C CAP
	L1	PU48530-101K	PEAKING COIL, 100 μH
	EQ1	PU54838	EQUALIZER
	CN1	PU58929-15	CAP. HOUSING, 2–16, E/EG
		PU58929-16	CAP. HOUSING, 2–17, EK
	CN2	–	–
	CN3	PU58962-6	CAP. HOUSING
⚠	TML1	PU59260-2	TERMINAL BOARD, EG
⚠	TML1	PU59260-11	TERMINAL BOARD, E
⚠	TML1	PU59260-12	TERMINAL BOARD, EK

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22276AB-2(E/EG)	TUNER/IF BOARD ASS'Y [07]
		PU22276C-2 (EK)	TUNER/IF BOARD ASS'Y [07]
⚠	IC1	M51365SP	INTEGRATED CIRCUIT
	IC2	M50440-391SP	INTEGRATED CIRCUIT
	IC3	M58655P	INTEGRATED CIRCUIT
	Q1	2SC3354S,T	TRANSISTOR
	Q2	2SD1468S(RS)	TRANSISTOR
	OR	2SD1450S,T	TRANSISTOR
	Q3	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTRO, EK ONLY
	Q4	2SC1740S(RS)	TRANSISTOR, E/EG
	Q5	2SA933S(RS)	TRANSISTOR
	OR	2SA1309R,S	TRANSISTOR
	Q6	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR
	Q7	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR
	Q8	–	–
	Q9	2SB808(FG)	TRANSISTOR, E/EG
	Q10	2SB808(FG)	TRANSISTOR, E/EG
	Q11	2SB808(FG)	TRANSISTOR, E/EG
	Q12	2SB808(FG)	TRANSISTOR, E/EG
	Q13	2SK381	FET
	Q14	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR, EK ONLY
	Q15	2SD1292T103Q,R	TRANSISTOR
	OR	2SC2655O, YTPE6	TRANSISTOR
	Q16	2SD1292T103Q,R	TRANSISTOR
	OR	2SC2655O, YTPE6	TRANSISTOR
	Q17	2SB1010(QR)	TRANSISTOR, E/EG
		2SB810H,J	TRANSISTOR, EK
	Q18	DTA124ES	D. TRANSISTOR
	Q19	–	–
	Q20	–	–
	Q21	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR
	Q22	2SA933S(RS)	TRANSISTOR
	OR	2SA1309R,S	TRANSISTOR, EK ONLY
	Q23	2SC1740S(RS)	TRANSISTOR
	OR	2SC3311AR,S	TRANSISTOR, EK ONLY
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	1SS133	DIODE
	D5	1SS133	DIODE
	D6	HZ30-2	ZENER DIODE
	D7	MTZ10B	ZENER DIODE
	OR	RD10ES-T182	ZENER DIODE
	D8	1SS133	DIODE
	D9	MTZ7.5B	ZENER DIODE
	OR	RD7.5ES-T182	ZENER DIODE
	D10	E-452-2	C.R. DIODE
	D11	RD6.2ES-T1B1	ZENER DIODE
	OR	HZS6.2EB1	ZENER DIODE, E/EG
	D12	1SS133	DIODE, E/EG
	R1	QRD161J-151	CR, E/EG
		QRD161J-750	CR, EK

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R2	QRD161J-103	CR, E/EG
		QRD161J-472	CR, EK
	R3	QRD161J-152	CR
	R4	QRD161J-470	CR
	R5	QRD161J-331	CR
	R6	QRD161J-681	CR
	R7	QRD161J-101	CR
	R8	QRD161J-100	CR, E/EG
		QRD161J-470	CR, EK
	R9	QRD161J-332	CR, EK ONLY
	R10	QRD161J-824	CR
	R11	QVZ3518-472	VR, AGC
	R12	QRD161J-222	CR
	R13	QRD161J-562	CR
	R14	QRD161J-332	CR
	R15	QRD161J-331	CR, E/EG
	R16	QVZ3518-103	VR, Y. LEVEL, E/EG
		QRD161J-222	CR, EK
	R17	QRD161J-331	CR
	R18	QRD161J-561	CR
	R19	QRD161J-470	CR
	R20	QRD161J-561	CR
	R21	–	–
	R22	–	–
	R23	QRD161J-473	CR, E/EG
	R24	–	–
	R25	QRD161J-471	CR
	R26	QRD161J-681	CR
	R27	QRD161J-681	CR
	R28	QRD161J-331	CR, E/EG
		QRD161J-391	CR, EK
	R29	QRD161J-332	CR
	R30	QRD161J-103	CR
	R31	QRD161J-222	
	R32	–	–
	R33	QRD162J-472	CR
	R34	QRD161J-103	CR
	R35	–	–
	R36	–	–
	R37	–	–
	R38	–	–
	R39	–	–
	R40	QRD161J-182	CR
	R41	QRD161J-272	CR
	R42	QVZ3518-103	VR, COLOUR LEVEL
	R43	QRD161J-123	CR
	R44	QRD161J-123	CR
	R45	QRD161J-331	CR
	R46	QRD161J-222	CR
	R47	–	–
	R48	–	–
	R49	–	–
	R50	QRD161J-680	CR, E/EG
	R51	QRD161J-222	CR, E/EG
	R52	QRD161J-471	CR
	R53	QRD162J-103	CR
	R54	QRD161J-332	CR
	R55	QRD161J-680	CR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R56	QRD161J-223	CR
	R57	QRD161J-471	CR
	R58	QRD161J-102	CR
	R59	QRD161J-223	CR
	R60	QRD161J-103	CR
	R61	QRD161J-334	CR
	R62	QRD161J-103	CR
	R63	QRD161J-331	CR
	R64	–	–
	R65	–	–
	R66	–	–
	R67	–	–
	R68	–	–
	R69	–	–
	R70	–	–
	R71	–	–
	R72	–	–
	R73	–	–
	R74	–	–
	R75	QRD161J-472	CR, E/EG
	R76	QRD161J-103	CR, E/EG
	R77	QRD161J-153	CR, E/EG
	R78	QRD161J-472	CR, E/EG
	R79	QRD161J-103	CR, E/EG
	R80	QRD161J-153	CR, E/EG
	R81	QRD161J-472	CR, E/EG
	R82	QRD161J-103	CR, E/EG
	R83	QRD161J-153	CR, E/EG
	R84	QRD161J-472	CR, E/EG
	R85	QRD161J-103	CR, E/EG
	R86	QRD161J-153	CR, E/EG
	R87	QRD161J-104	CR
	R88	QRD161J-153	CR
	R89	–	–
	R90	–	–
	R91	QRD161J-472	CR
	R92	QRD161J-562	CR
	R93	QRD161J-152	CR
	R94	QRD161J-472	CR
	R95	QRD161J-121	CR
	R96	QRD161J-103	CR
	R97	QRD161J-103	CR
	R98	QRD161J-153	CR
	R99	–	–
	R100	QRD161J-101	CR
	R101	QRD161J-222	CR
	R102	QRD161J-222	CR
	R103	QRD161J-222	CR
	R104	QRD161J-222	CR
	R105	QRD161J-222	CR
	R106	QRD161J-102	CR
	R107	QRD161J-222	CR
	R108	QRD161J-103	CR, E/EG
	R109	–	–
	R110	QRD161J-104	CR
	R111	–	–
	R112	QRD161J-222	CR
	R113	–	–
	R114	–	–

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R115	–	–
	R116	–	–
	R117	–	–
	R118	–	–
	R119	–	–
	R120	–	–
	R121	–	–
	R122	QRD161J-103	CR
	R123	QRD161J-103	CR
	R124	QRD161J-103	CR
	R125	QRD161J-103	CR
	R126	QRD161J-103	CR
	R127	QRD161J-473	CR
	R128	QRD161J-473	CR
	R129	–	–
	R130	QRD161J-471	CR
	R131	QRD161J-102	CR
	R132	–	–
	R133	QRD161J-103	CR
	R134	QRD161J-102	CR, E/EG
		QRD161J-182	CR, EK
	C1	QCSB1HJ-100	C CAP, E/EG
	C2	QC8B1HK-102	C CAP
	C3	QCXB1CK-222	C CAP
	C4	QC8B1HK-102	C CAP
	C5	QCBB1HK-102	C CAP
	C6	–	–
	C7	PU57601-474ME	OS CAP
	C8	QET61CM-336	E CAP
	C9	QCX81CK-222	C CAP
	C10	QCSB1HJ-330	C CAP, EK ONLY
	C11	QET61HM-474	E CAP
	C12	QCT25PH-270	C CAP, E/EG
		QCT25RH-220	C CAP, EK
	C13	QCXB1CK-222	C CAP
	C14	QET61CM-336	E CAP
	C15	–	–
	C16	–	–
	C17	–	–
	C18	–	–
	C19	QET61CM-336	E CAP
	C20	QCXB1CK-222	C CAP
	C21	QCF31HP-223	C CAP
	C22	QCSB1HJ-100	C CAP
	C23	QET61HM-105	E CAP
	C24	QCC11EK-223	C CAP
	C25	QET61HM-105	E CAP
	C26	–	–
	C27	QEK61HM-474	E CAP
	C28	–	–
	C29	–	–
	C30	QET61CM-336	E CAP
	C31	QCSB1HJ-470	C CAP
	C32	–	–
	C33	–	–
	C34	QET61CM-336	E CAP, E/EG
	C35	QET61CM-106	E CAP

#	⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		C36	QCC11EK-223	C CAP
		C37	QET61HM-474	E CAP
		C38	–	–
		C39	QCC11EK-104	C CAP
		C40	QET61CM-106	E CAP, E/EG
		C41	QET61CM-106	E CAP, E/EG
		C42	QET61CM-106	E CAP, E/EG
		C43	QET61CM-106	E CAP, E/EG
		C44	QET61HM-225	E CAP
		C45	–	–
		C46	QFV81HJ-474	MY CAP
		OR	QFZ9011-474	MP CAP
		C47	QFN31HJ-223	MY CAP
		C48	QCBB1HK-102	C CAP, E/EG
		C49	QCBB1HK-102	C CAP
		C50	–	–
		C51	QCT25CH-220	C CAP
		C52	QCT25CH-270	C CAP
		C53	QCVB1CM-103	C CAP
		C54	PU57601-335MC	OS CAP
		C55	QET61CM-106	E CAP
		C56	QET61CM-336	E CAP
		C57	QET61CM-107	E CAP
		C58	QCBB1HK-102	C CAP
		C59	QET61AM-336	E CAP
		C60	QET61AM-107	E CAP
		C61	QET61AM-106	E CAP
		C62	–	–
		C63	QET61HM-106	E CAP
		C64	–	–
		C65	QET61CM-336	E CAP
		L1	–	–
		L2	PU57717-1R0J	PEAKING COIL, E/EG
			PU57717-1R2	PEAKING COIL, EK
		L3	PU57717-1R5J	PEAKING COIL, E/EG
			PU57717-1R5	PEAKING COIL, EK
		L4	PU59152-6R8K	PEAKING COIL
		L5	PU59152-120J	PEAKING COIL, E/EG
			PU59152-150J	PEAKING COIL, EK
		L6	PU59152-6R8K	PEAKING COIL
		L7	PU59152-6R8K	PEAKING COIL
		L8	PU59152-220J	PEAKING COIL
		L9	–	–
		L10	PU59152-100J	PEAKING COIL
		L11	PU59152-R22J	PEAKING COIL, E/EG
		OR	PU49994-R22	PEAKING COIL, E/EG
		L12	–	–
		L13	PU53223-101J	PEAKING COIL, E/EG
		T1	PU59402	TRAP COIL, FTZ, E/EG
		T2	PU59308	COIL, VCO
		T5	PU55184	I.F.T., SYNC DET.
	⚠	TNR1	PU36155-1-2	U/V TUNER, E
	⚠	TNR1	PU36155-1-1	U/V TUNER, EG
	⚠	TNR1	PU36180	UHF TUNER, EK
	⚠	X1	PU58554-2	CRYSTAL
		SAW1	PU35557-4	SAW FILTER, E/EG
		SAW1	PU32987-4	SAW FILTER, EK

#	⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	⚠	CF1	PU57707-2	CERAMIC FILTER, S5.5, E/EG
	⚠		PU57707	CERAMIC FILTER, S6.0, EK
	⚠	CF2	PU59242-2	CERAMIC FILTER, 5.5 MC29, E/EG
	⚠		PU59242-3	CERAMIC FILTER, 6.0 MC29, EK
	⚠	CF3	PU32990-2	CERAMIC FILTER, T5.5, E/EG
	⚠		PU32990-3	CERAMIC FILTER, T6.0, EK
		RA1	QRB047J-104	RESISTOR ARRAY
		SLD1	PQ31327	SHIELD CASE
		SLD2	PQ31328	SHIELD COVER, E/EG
		SLD3	PQ42506	SHIELD PLATE, E/EG
	⚠	RF1	PU59241M-2	RF CONV. & MIX BOOSTER, E/EG
	⚠	RF1	PU59262S	RF CONV. & MIX BOOSTER, EK
		CN3	PU58844-3	CAP. HOUSING, E/EG
			PU22283B-1	SERVO BOARD ASS'Y (08)
		IC1	M51796P	INTEGRATED CIRCUIT
		IC2	VC2023A	INTEGRATED CIRCUIT
		IC3	UPC324C	INTEGRATED CIRCUIT
		OR	IR3702	INTEGRATED CIRCUIT
		Q1	2SD636R,S	TRANSISTOR
		OR	2SC1740S(QRS)	TRANSISTOR
		Q2	2SB641R,S	TRANSISTOR
		OR	2SA933S	TRANSISTOR
		Q3	2SD636R,S	TRANSISTOR
		OR	2SC1740S(QRS)	TRANSISTOR
		Q4	2SB641R,S	TRANSISTOR
		OR	2SA933S	TRANSISTOR
		Q5	DTC144ES	D. TRANSISTOR
		Q6	DTC144WS	D. TRANSISTOR
		D1	1SS133	DIODE
		D2	1SS133	DIODE
		D3	1SS133	DIODE
		D4	–	–
		D5	–	–
		D6	–	–
		D7	1SS133	DIODE
		D8	1SS133	DIODE
		D9	–	–
		D10	MTZ12B	ZENER DIODE
		D11	–	–
		D12	1SS133	DIODE
		D13	MTZ5.1B	ZENER DIODE
		D14	–	–
		D15	1SS133	DIODE
		D16	1SS133	DIODE
		R1	QRD161J-681	CR
		R2	QRD161J-102	CR
		R3	QRD161J-331	CR
		R4	QRD161J-684	CR
		R5	QRD161J-102	CR
		R6	QRD161J-103	CR

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R7	QRD161J-564	CR
	R8	QRD161J-103	CR
	R9	QRD161J-105	CR
	R10	QRD161J-103	CR
	R11	QRD161J-681	CR
	R12	QRD161J-103	CR
	R13	QRD161J-103	CR
	R14	–	–
	R15	QRD161J-101	CR
	R16	QRD161J-473	CR
	R17	QRD161J-473	CR
	R18	QRD161J-473	CR
	R19	QRD161J-473	CR
	R20	QRD161J-473	CR
	R21	QRD161J-473	CR
	R22	QRD161J-105	CR
	R23	QRD161J-473	CR
	R24	QRD161J-473	CR
	R25	QRD161J-564	CR
	R26	QRD161J-683	CR
	R27	QRD161J-105	CR
	R28	QRD161J-105	CR
	R29	QRD161J-273	CR
	R30	QRD161J-102	CR
	R31	QRD161J-103	CR
	R32	QRD161J-103	CR
	R33	–	–
	R34	QRD161J-333	CR
	R35	QVZ3521-474	VR, PB SW POINT
	R36	QRD161J-103	CR
	R37	–	–
	R38	–	–
	R39	QRD161J-393	CR
	R40	–	–
	R41	–	–
	R42	–	–
	R43	–	–
	R44	–	–
	R45	QRD161J-103	CR
	R46	QVZ3521-474	VR, CTL HEAD POSITION
	R47	QRD161J-103	CR
	R48	–	–
	R49	–	–
	R50	–	–
	R51	–	–
	R52	–	–
	R53	–	–
	R54	–	–
	R55	QRD161J-472	CR
	R56	QRD161J-103	CR
	R57	QRD161J-822	CR
	R58	QRD161J-562	CR
	R59	QRD161J-104	CR
	R60	QRD161J-104	CR
	R61	QRD161J-153	CR
	R62	QRD161J-102	CR
	R63	QRD161J-105	CR
	R64	QRD161J-333	CR
	R65	QRD161J-101	CR

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R66	QRD161J-222	CR
	R67	QRD161J-332	CR
	R68	QRD161J-105	CR
	R69	QRD161J-223	CR
	R70	QRD161J-104	CR
	R71	–	–
	R72	–	–
	R73	QRD161J-103	CR
	R74	QRD161J-472	CR
	R75	QRD161J-103	CR
	R76	–	–
	R77	–	–
	R78	QRD161J-185	CR
	C1	QCBB1HJ-102	C CAP
	C2	QET61AM-476	E CAP
	C3	QET61CM-106	E CAP
	C4	QET61CM-106	E CAP
	C5	QET61AM-476	E CAP
	C6	QFV71HJ-104	MY CAP
	C7	QCBB1HJ-102	C CAP
	C8	QET61HM-475	E CAP
	C9	QCBB1HJ-101	C CAP
	C10	QCBB1HJ-102	C CAP
	C11	QET61CM-106	E CAP
	C12	QCSB1HJ-330	C CAP
	C13	QCSB1HJ-330	C CAP
	C14	QCVB1CN-103	C CAP
	C15	QFV71HJ-223	MY CAP
	C16	QCXB1CN-472	C CAP
	C17	QCXB1CN-472	C CAP
	C18	–	–
	C19	QFV71HJ-473	MY CAP
	C20	QFV71HJ-473	MY CAP
	C21	QFV71HJ-473	MY CAP
	C22	QFV71HJ-473	MY CAP
	C23	QCXB1CN-472	C CAP
	C24	QCXB1CN-472	C CAP
	C25	QET61EM-475	E CAP
	C26	QET61EM-475	E CAP
	C27	QET61CM-106	E CAP
	C28	QET61CM-106	E CAP
	C29	QFN31HJ-682	MY CAP
	C30	QFN31HJ-102	MY CAP
	C31	QFV71HJ-104	MY CAP
	C32	–	–
	C33	QFV71HJ-154	MY CAP
	C34	–	–
	C35	QFV71HJ-154	MY CAP
	C36	QCXB1CN-472	C CAP
	C37	QET61CM-106	E CAP
	C38	QCVB1CN-103	C CAP
	C39	QEN61HM-105	NP E CAP
	C40	QCBB1HJ-102	C CAP
	C41	QET61HM-225	E CAP
	C42	QCBB1HJ-102	C CAP
	C43	QEN61HM-105	NP E CAP
	C44	QET61HM-225	E CAP
	C45	QCBB1HJ-102	C CAP
⚠	X1	PU59335	CRYSTAL

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	CN1	PU58844-2	CAP. HOUSING
	CN2	PU43351-105	CAP. HOUSING
	CN3	PU58844-5	CAP. HOUSING
	CN4	PU58931-14	CAP. HOUSING
	CN5	PU58931-20	CAP. HOUSING
	TP	PU55774	TEST PIN, TP1, 11, 25, GND
	CL1	PU56729-2	WIRE CLAMP

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# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU36160B-2	AUDIO BOARD ASS'Y [09]
	IC1	AN3994K	INTEGRATED CIRCUIT
	Q1	2SD1449S,T	TRANSISTOR
	Q2	2SD1449S,T	TRANSISTOR
	Q3	2SC3311R,S	TRANSISTOR
	Q4	2SB1030R,S	TRANSISTOR
	Q5	DTA144ES	D. TRANSISTOR
	Q6	DTC124ES	D. TRANSISTOR
	D1	MA165	DIODE
	OR	1SS133	DIODE
	D2	MA165	DIODE
	OR	1SS133	DIODE
	D3	MA165	DIODE
	OR	1SS133	DIODE
	D4	MA165	DIODE
	OR	1SS133	DIODE
	D5	MA165	DIODE
	OR	1SS133	DIODE
	D6	MA165	DIODE
	OR	1SS133	DIODE
	R1	QRD161J-103	CR
	R2	QRD161J-124	CR
	R3	QRD161J-223	CR
	R4	QRD161J-331	CR
	R5	QVZ3518-102	VR, PB LEVEL
	R6	QRD161J-100	CR
	R7	QRD161J-471	CR
	R8	QRD161J-303	CR
	R9	QRD161J-470	CR
	R10	–	–
	R11	QRD161J-563	CR
	R12	QRD161J-271	CR
	R13	QRD161J-153	CR
	R14	QRD161J-153	CR
	R15	QRD161J-103	CR
	R16	QRD161J-103	CR
	R17	QRD161J-103	CR
	R18	QRD161J-331	CR
	R19	QRD161J-103	CR
	R20	QVZ3518-473	VR, BIAS LEVEL
	R21	QRD161J-8R2	CR
	R22	QRD161J-333	CR
	R23	QRD161J-4R7	CR
	R24	QRD161J-223	CR
	R25	–	–
	R26	–	–
	R27	–	–
	R28	–	–
	R29	–	–
	R30	–	–
⚠	R31	PU58802-4R7	POSISTOR
	OR	PU52108-4R7	POSISTOR
	R32	QRD161J-0R0	CR
	C1	QER61EM-475G	E CAP
	C2	QER61HM-474G	E CAP
	C3	QFV71HJ-224	MY CAP
	C4	QFN31HJ-123	MY CAP
	C5	QEK41HM-105	E CAP
	C6	QCB81HJ-102	C CAP
	C7	QFN31HJ-152	MY CAP
	C8	QER61CM-226	E CAP
	C9	QER61EM-335G	E CAP
	C10	QER61CM-476	E CAP
	C11	QER61CM-106G	E CAP
	C12	QCB81HJ-331	C CAP
	C13	QFN31HJ-683	MY CAP
	C14	QFN31HJ-683	MY CAP
	C15	QER61HM-225G	E CAP
	C16	QCB81HJ-102	C CAP
	C17	QER60JM-476	E CAP
	C18	QER61AM-476	E CAP
	C19	QCB81HJ-331	C CAP
	C20	QFP32AJ-683	PP CAP
	C21	QER61CM-106G	E CAP
	C22	QFN31HJ-332	MY CAP
	C23	QFN31HJ-223	MY CAP
	C24	QCVB1CN-103	C CAP
	C25	QER61HM-104G	E CAP
	C26	QER61CM-106G	E CAP
	L1	PU58308-272J	PEAKING COIL
⚠	T1	PU59307	OSC. TRANS.
	TP	PU55774	TEST PIN, TP31, 32
	CN1	PU58844-7	CAP. HOUSING
	CN2	PU58844-4	CAP. HOUSING
	CN3	PU58844-7	CAP. HOUSING

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# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
			A/CTL HEAD BOARD [12]
		PU58016	A/CTL HEAD BOARD
	CN1	PU54537-5	CAP. HOUSING
	CN2	PU54537-2	CAP. HOUSING
	BKT1	PQ42518	BRACKET
	SCR1	SPSH1740	SCREW

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU22357A-02 (E/EG)	TIMER BOARD ASS'Y [15]
		PU22357B-02 (EK)	TIMER BOARD ASS'Y [15]
	IC1	M5278L56	INTEGRATED CIRCUIT
	IC2	S-8053HLB	INTEGRATED CIRCUIT
	IC101	UPD75208CW-030	INTEGRATED CIRCUIT
		UPD75208CW-024	INTEGRATED CIRCUIT, EK ONLY
	IC102	UPD82C43CY	INTEGRATED CIRCUIT
	Q1	–	–
	Q2	2SC1685R,S	TRANSISTOR
	Q3	2SC1685R,S	TRANSISTOR
	Q105	DTC124ES	D. TRANSISTOR
	Q106	–	–
	Q107	DTC124ES	D. TRANSISTOR
	D1	–	–
	D2	–	–
	D3	1SS133	DIODE
	D4	–	–
	D5	RD9.1ES-T1B2	ZENER DIODE
	D6	1SS133	DIODE
⚠	D10	HZ7B	ZENER DIODE
	D103	1SS133	DIODE
	R1	–	–
	R2	QRD161J-103	CR
	R3	QRD161J-682	CR
	R4	QRD161J-471	CR
	R5	QRD161J-104	CR
	R6	QRD161J-684	CR
	R7	QRD161J-102	CR
	R8	QRD161J-474	CR
	R9	–	–
	R10	–	–
	R11	QRD161J-104	CR
	R12	–	–
	R13	–	–
	R14	QRD161J-151	CR
	R15	–	–
	R16	–	–
	R17	–	–
	R18	QRD161J-472	CR
	R101	QRD161J-472	CR
	R102	QRD161J-472	CR
	R103	QRD161J-472	CR
	R104	QRD161J-472	CR
	R105	QRD161J-103	CR
	R106	QRD161J-103	CR
	R107	QRD161J-103	CR
	R108	QRD161J-103	CR
	R109	QRD161J-102	CR
	R110	QRD161J-472	CR
	R111	QRD161J-472	CR
	R112	–	–
	R113	QRD161J-472	CR
	R114	QRD161J-472	CR
	R115	QRD161J-472	CR
	R116	QRD161J-472	CR

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R117	QRD161J-472	CR
	R118	QRD161J-472	CR
	R119	QRD161J-472	CR
	R120	QRD161J-472	CR
	R121	QRD161J-472	CR
	R122	QRD161J-472	CR
	R123	QRD161J-103	CR
	R124	–	–
	R125	QRD161J-472	CR
	R126	–	–
	R127	–	–
	R128	–	–
	R129	–	–
	R130	QRD161J-472	CR
	R131	QRD161J-472	CR
	R132	QRD161J-472	CR
	R133	QRD161J-472	CR
	R134	QRD161J-472	CR
	R135	QRD161J-472	CR
	R136	QRD161J-472	CR
	R137	QRD161J-472	CR
	R138	QRD161J-472	CR
	R139	QRD161J-472	CR
	R140	QRD161J-472	CR
	R141	QRD161J-472	CR
	R142	QRD161J-472	CR
	R143	QRD161J-472	CR
	R144	QRD161J-472	CR
	R145	QRD161J-472	CR, E/EG
	R146	QRD161J-472	CR, E/EG
	R147	QRD161J-472	CR, E/EG
	R148	QRD161J-472	CR, E/EG
	R149	QRD161J-472	CR
	R150	QRD161J-472	CR
	R151	–	–
	R152	–	–
	R153	–	–
	R154	QRD161J-472	CR
	R155	QRD161J-334	CR
	R156	QRD161J-222	CR
	R157	–	–
	R158	QRD161J-333	CR
	C1	QETC1EM-107	E CAP
	C2	QCVB1CM-103	C CAP
	C3	QETC1CM-107	E CAP
	C4	QETC1CM-336	E CAP
	C5	QCBB1HJ-102	C CAP
	C6	QCVB1CM-103	C CAP
	C7	QETC1CM-106	E CAP
	C8	PU59421-104	E CAP, BACK UP
	C101	–	–
	C102	PU57672-500	TR CAP, TIMER CLOCK
	C103	QCSB1HJ-270	C CAP
	C104	QCVB1CM-103	C CAP
	C105	QCVB1CM-103	C CAP
	C106	QCC11EK-682	C CAP
	RA101	RNBH7A104	RESISTOR NETWORK
	RA102	–	–
	RA103	RNBH5A333	RESISTOR NETWORK
	RA104	RNBH8A224	RESISTOR NETWORK

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	RA105	RNBH7A104	RESISTOR NETWORK
	RA106	RNBH5A224	RESISTOR NETWORK
	L1	PU48530-101	PEAKING COIL
⚠	X101	PU58394	CRYSTAL
⚠	CF101	PU58428	CERAMIC FILTER
⚠	OR	PU59576	CERAMIC FILTER
	CN1	PU58931-22	CAP. HOUSING
	CN2	PU58929-10	CAP. HOUSING
	CN3	PU58844-106	CAP. HOUSING
	CN4	PU43351-104	CAP. HOUSING, E/EG
	CL101	PU59154	WIRE CLAMP
	TP	PU56008	TEST PIN, TP1–3

PU11406C-4 (E/EG)	OPERATION BOARD ASS'Y [22]	
PU11406D-4 (EK)	OPERATION BOARD ASS'Y [22]	
D201	SLR-34VC3F	LED, POWER
R201	QRD161J-102	CR
R202	QRD161J-104	CR
R203	QRD161J-223	CR
R204	–	–
R205	QRD161J-120	CR
R206	–	–
R207	QRD161J-152	CR
R208	QRD161J-222	CR
R209	QRD161J-222	CR
R210	–	–
R211	–	–
R212	–	–
R213	QRD161J-331	CR
R214	–	–
R215	QRD161J-222	CR
R216	QRD161J-222	CR
R217	QRD161J-332	CR
R218	QRD161J-472	CR
R219	QRD161J-103	CR
R401	PU57925	VR, TRACKING
R402	PU59166	VR, P. SHARPNESS
C201	QCBB1HJ-471	C CAP
C202	QFN41HJ-273	MY CAP
C203	QEK61EM-475G	E CAP
C204	QEK61HM-225G	E CAP
C205	–	–
C206	QEK61AM-476	E CAP
S201	PU57550	TACT SW, POWER
S202	PU57550	TACT SW, EJECT
S203	–	–
S204	PU57551	TACT SW, STOP
S205	PU57551	TACT SW, PAUSE
S206	PU57551	TACT SW, PLAY
S207	PU57551	TACT SW, REW
S208	PU57551	TACT SW, FF
S209	PU57551	TACT SW, RECORD
HD201	PQM30038	LED HOLDER, D201

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
		PU58006B (E/EG)	IFR BOARD ASS'Y
		PU58006E (EK)	IFR BOARD ASS'Y
	IC1	LA7224	INTEGRATED CIRCUIT, E/EG
		LA7225	INTEGRATED CIRCUIT, EK
	D4	PD49PI	PIN PHOTO DIODE
	R7	QRD161J-104	CR
	R9	QRD161J-102	CR
	C5	QEK60JM-476	E CAP
	L1	PU59060	TRAP COIL
	CN1	PU58844-104	CAP. HOUSING, 2–5
	CN2	PU58844-107	CAP. HOUSING, E/EG
		PU58844-108	CAP. HOUSING, EK
	SLD1	PQ30658	SHIELD CASE
	SLD2	PQ30645	SHIELD PLATE
	CL1	PU56729-2	WIRE CLAMP, x 2

PU22339B (E/EK)	SWITCH/DISPLAY BOARD ASS'Y [28]	
PU22339A (EG)	SWITCH/DISPALY BOARD ASS'Y [28]	
IC1	UPD7538ACU-201	INTEGRATED CIRCUIT
D1	RD8.2EB2	ZENER DIODE
D2	1SS132	DIODE
D3	1SS132	DIODE
D4	1SS132	DIODE
D5	1SS132	DIODE
D402	1SS132	DIODE
R1	QRD161J-103	CR
R2	QRD161J-102	CR
R3	QRD161J-102	CR
R4	QRD161J-102	CR
R5	QRD161J-103	CR
R6	QRD161J-472	CR
R7	QRD161J-273	CR
R8	QRD161J-104	CR
R9	QRD161J-102	CR
R10	QRD161J-102	CR
C1	QCBB1HJ-101	C CAP
C2	QCBB1HJ-101	C CAP
C3	QER61HM-106	E CAP
C4	QCVB1CN-103	C CAP
C5	QER61HM-106	E CAP
C6	QCF11HP-103	C CAP
C7	QCBB1HJ-102	C CAP
RA1	RNBHGA104	RESISTOR NETWORK
RA2	RNBH8A104	RESISTOR NETWORK
⚠ CF1	PU59109	CERAMIC FILTER

#	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	S1	PU53598	TACT SWITCH, 1/SUN
	S2	PU53598	TACT SWITCH, 2/MON
	S3	PU53598	TACT SWITCH, 3/TUE
	S4	PU53598	TACT SWITCH, 4/WED
	S5	PU53598	TACT SWITCH, 5/THU
	S6	PU53598	TACT SWITCH, 6/FRI
	S7	PU53598	TACT SWITCH, 7/SAT
	S8	PU53598	TACT SWITCH, 8/DAILY
	S9	PU53598	TACT SWITCH, 9/REPEAT
	S10	PU53598	TACT SWITCH, 0/AUX
	S11	PU53598	TACT SWITCH, GO TO
	S12	–	–
	S13	PU53598-2	TACT SWITCH, RESET
	S14	PU53598-2	TACT SWITCH, CNT/REMAIN
	S15	PU53598	TACT SWITCH, INSTANT REC
	S16	PU53598-2	TACT SWITCH, TIMER
	S17	PU53598	TACT SWITCH, CH UP
	S18	PU53598	TACT SWITCH, CH DOWN
	S19	PU53598-2	TACT SWITCH, SEARCH
	S20	PU53598-2	TACT SIWTCH, VPS/CH
	S21	PU53598-2	TACT SWITCH, CANC/SKIP
	S22	PU53598-2	TACT SWITCH, STORE
	S23	PU53598-2	TACT SWITCH, FINE +
	S24	PU53598-2	TACT SWITCH, FINE –
	S25	PU53598-2	TACT SWITCH, CLOCK/ADJ
	S26	PU53598-2	TACT SIWTCH, PROGRAM
	S27	PU53598-2	TACT SWITCH, SP/LP
	S28	–	–
	S29	PU53598-2	TACT SWITCH, CUR +
	S30	PU53598-2	TACT SWITCH, CUR –
	S402	PU52621	PUSH SWITCH, MEMORY
	TP	PU56008	TEST PIN, TP1
	FDP1	PU58960-3	FDP, E/EK
		PU58960-4	FDP, EG
	HD1	PQ31355	FDP HOLDER, R
	HD2	PQ31356	FDP HOLDER, L
			UPPER DRUM BOARD [41]
		PDM3018	UPPER DRUM BOARD
		PU36147B-02	PRE/REC AMP BOARD ASS'Y [43]
	IC1	HA11870NT	INTEGRATED CIRCUIT
	Q1	DTC144WS	D. TRANSISTOR
	Q2	DTC144WS	D. TRANSISTOR
	Q3	2SA1309R,S	TRANSISTOR
	Q4	DTC144WS	D. TRANSISTOR
	Q5	DTC144WS	D. TRANSISTOR
	Q6	2SC1740S(QRS)	TRANSISTOR

#	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	D1	MA150	DIODE
	OR	1SS133	DIODE
	D2	MA150	DIODE
	OR	1SS133	DIODE
	D3	MA150	DIODE
	OR	1SS133	DIODE
	D4	MA150	DIODE
	OR	1SS133	DIODE
	D5	MA150	DIODE
	OR	1SS133	DIODE
	R1	QVZ3518-221	VR, SP CH-2 Q
	R2	PU57457-221	VR, SP CH-1 Q
	R3	QVZ3518-221	VR, LP CH-1 Q
	R4	PU57457-221	VR, LP CH-2 Q
	R5	QRD161J-184	CR
	R6	–	–
	R7	–	–
	R8	QRD161J-393	CR
	R9	QRD161J-103	CR
	R10	QRD161J-153	CR
	R11	QRD161J-103	CR
	R12	QRD161J-103	CR
	R13	QRD161J-103	CR
	R14	QRD161J-223	CR
	R15	QRD161J-103	CR
	R16	–	–
	R17	QRD161J-152	CR
	R18	QRD161J-332	CR
	R19	QRD161J-561	CR
	R20	QRD161J-561	CR
	R21	QRD161J-561	CR
	R22	QRD161J-474	CR
	R23	QRD161J-223	CR
	R24	QRD161J-223	CR
	C1	QCVB1CN-103	C CAP
	C2	QFZ0096-224	MP CAP
	C3	QFZ0096-224	MP CAP
	C4	QCSB1HJ-220	C CAP
	C5	PU57672-500	TR CAP, SP CH-2 FO
	C6	QCSB1HJ-390	C CAP
	C7	PU57672-500	TR CAP, SP CH-1 FO
	C8	QCVB1CN-103	C CAP
	C9	QCVB1CN-103	C CAP
	C10	QFZ0096-224	MP CAP
	C11	QFZ0096-224	MP CAP
	C12	QCSB1HJ-330	C CAP
	C13	PU57672-500	TR CAP, LP CH-1 FO
	C14	QCSB1HJ-390	C CAP
	C15	PU57672-500	TR CAP, LP CH-2 FO
	C16	QCVB1CN-103	C CAP
	C17	QER60JM-476	E CAP
	C18	QCF31HP-223	C CAP
	C19	–	–
	C20	QCBB1HJ-681	C CAP
	C21	QCVB1CN-103	C CAP
	C22	QCVB1CN-103	C CAP
	C23	QEK61HM-104	E CAP
	C24	QCVB1CN-103	C CAP
	C25	QCBB1HJ-820	C CAP

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	C26	QCF31HP-223	C CAP
	C27	QET60JM-476	E CAP
	C28	–	–
	C29	QCVB1CN-103	C CAP
	C30	–	–
	C31	QCSB1HJ-330	C CAP
	C32	QCVB1CN-103	C CAP
	C33	QCF31HP-223	C CAP
	C34	QET60JM-476	E CAP
	L1	PU54223-101KG	PEAKING COIL
	L2	–	–
	L3	–	–
	L4	PU54223-560JG	PEAKING COIL
	L5	PU54223-101KG	PEAKING COIL
	L6	PU54223-101KG	PEAKING COIL
	CN1	PU58844-12	CAP. HOUSING
	CN2	PU56258-10	CAP. HOUSING
	CN3	PU58844-2	CAP. HOUSING
	TP	PU57545	TEST PIN, TP1–6
	SLD1	PU59080	PRE SHIELD (1)
	SLD2	PU59081-1-3	PRE SHIELD (2)
	BKT1	PQ42558	BOARD BRACKET
	LUG1	PQ40433-2	EARTH LUG
	SCR1	DPSP2606Z	ASS'Y SCREW
	SCR2	DPSP2606Z	ASS'Y SCREW, × 2
		PU22329B1	DECK TERMINAL BOARD ASS'Y [51]
	R1	QRD181J-151	CR
	R2	–	–
	R3	QRD181J-331	CR
	PS1	GP3A21	PHOTO INTERRUPTER
	CN1	PU58798-17	CAP. HOUSING, 3–19
		PU22329A2	RELAY BOARD ASS'Y [52]
		PU22329A3	REC SAFETY BOARD ASS'Y [53]
	S1	PU58844-1-3	REC SAFETY SWITCH
		PU22329A4	END SENSOR BOARD ASS'Y [54]
	HD1	PQ31047	E.S. HOLDER
	Q1	PN268R-NC	PHOTO TRANSISTOR
	CN1	PU49215-102	CAP. HOUSING

#⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
			CASSETTE HOUSING BOARD [56]
		PU36044-1-2	CASSETTE HOUSING BOARD
	PS1	PU58879	PHOTO INTERRUPTER
	Q1	PN268R-NC	PHOTO TRANSISTOR
	R1	QRD161J-471	CR
	CN1	PU58844-106	CAP. HOUSING
		PU22344A-1	DRUM MDA BOARD ASS'Y [57]
	IC1	UPC339G2	FLAT IC
	IC2	UPC324G2	FLAT IC
	IC3	UPD4013BG	FLAT IC
	OR	BU4013BF	FLAT IC
	Q1	2SD601Q,R	CHIP TRANSISTOR
	OR	2SC2412KT-96Q,R	CHIP TRANSISTOR
	Q2	2SD601Q,R	CHIP TRANSISTOR
	OR	2SC2412KT-96Q,R	CHIP TRANSISTOR
	Q3	2SD601Q,R	CHIP TRANSISTOR
	OR	2SC2412KT-96Q,R	CHIP TRANSISTOR
	Q4	2SD1292T103Q,R	TRANSISTOR
	D1	MA151WK	CHIP DIODE
	OR	DAN202K	CHIP DIODE
	D2	MA151WK	CHIP DIODE
	OR	DAN202KT	CHIP DIODE
	D3	MA151WK	CHIP DIODE
	OR	DAN202KT	CHIP DIODE
	D4	MA165	DIODE
	OR	1SS133	DIODE
	D5	RD5.1ES-T1B1	ZENER DIODE
	OR	HZS5.1EB2	ZENER DIODE
	OR	MTZ5.1B	ZENER DIODE
	R1	QRS188J-103YN	CHIP R
	R2	QRS188J-332YN	CHIP R
	R3	QRS188J-332YN	CHIP R
	R4	QRS188J-104YN	CHIP R
	R5	QRS188J-222YN	CHIP R
	R6	QRS188J-184YN	CHIP R
	R7	QRS188J-103YN	CHIP R
	R8	QRS188J-274YN	CHIP R
	R9	QRS188J-474YN	CHIP R
	R10	QRS188J-103YN	CHIP R
	R11	QRS188J-332YN	CHIP R
	R12	QRS188J-103YN	CHIP R
	R13	QRS188J-104YN	CHIP R
	R14	QRS188J-104YN	CHIP R
	R15	QRS188J-332YN	CHIP R
	R16	QRS188J-153YN	CHIP R
	R17	QRS188J-103YN	CHIP R
	R18	QRS188J-391YN	CHIP R
	R19	QRS188J-102YN	CHIP R
	R20	QRS188J-103YN	CHIP R

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	R21	QRS188J-103YN	CHIP R
	R22	QRS188J-103YN	CHIP R
	R23	QRS188J-104YN	CHIP R
	R24	QRS188F-102YN	CHIP R
	R25	QRS188F-472YN	CHIP R
	R26	QRS188J-223YN	CHIP R
	R27	QRS188F-103YN	CHIP R
	R28	QRS188J-222YN	CHIP R
	R29	QRD161J-102	CR
	R30	QRS188J-103YN	CHIP R
	R31	QRS188J-103YN	CHIP R
	R32	QRS188J-0R0Y	CHIP R
	R33	QRS188J-105YN	CHIP R
	R34	QRS188J-105YN	CHIP R
	R35	QRS188J-222YN	CHIP R
	C1	QFV71HJ-104	MY CAP
	C2	QFV71HJ-473	MY CAP
	C3	QCY81HK-102	CHIP CAP
	C4	QER61CM-106G	E CAP
	C5	QCBB1HJ-331	C CAP
⚠	CP1	ICP-F15	CIRCUIT PROTECTOR
	CN1	PU58844-5	CAP. HOUSING
	CN2	PU58844-8	CAP. HOUSING
	B1	QRS188J-0R0Y	CHIP R
	B2	QRS188J-0R0Y	CHIP R
	B3	QRS188J-0R0Y	CHIP R
	B4	QRS188J-0R0Y	CHIP R
	B5	QRS188J-0R0Y	CHIP R
	B6	QRS188J-0R0Y	CHIP R
	B7	QRS188J-0R0Y	CHIP R
	B8	QRS188J-0R0Y	CHIP R
	B9	QRS188J-0R0Y	CHIP R
	B10	QRS188J-0R0Y	CHIP R

⚠		PQ10342-014	REMOTE CONTROL BOARD ASS'Y [RM]
	IC1	M50115APW	INTEGRATED CIRCUIT
	X1 (Q1)	2SD636R,S	TRANSISTOR
	OR	2SD637R,S	TRANSISTOR
	X2 (Q2)	2SD636R,S	TRANSISTOR
	OR	2SD637R,S	TRANSISTOR
	X3 (Q3)	2SB822Q,R	TRANSISTOR
	OR	2SA1430A,B	TRANSISTOR
	D1, D2	MA154WA	DIODE
	OR	DAP201	DIODE
	D3, D4	MA154WA	DIODE
	OR	DAP201	DIODE
	D5, D6	MA154WA	DIODE
	OR	DAP201	DIODE
	D7, D8	MA154WA	DIODE
	OR	DAP201	LED

# ⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
	D9, D10	MA154WA	LED
	OR	DAP201	LED
	D11	MA165	DIODE
	D12	SE303AY	LED
	OR	LN66S	LED
	D13	SE303AY	LED
	OR	LN66S	LED
	R1	QRD181J-104	CR
	R2	QRD181J-474	CR
	R3	QRD181J-222	CR
	R4	QRD181J-471	CR
	R5	QRD181J-470	CR
	R6	QRD181J-1R2	CR
	R7	QRD181J-1R2	CR
	C1	QCF11HP-101	C CAP
	C2	QCF11HP-101	C CAP
	C3	QET40JM-107	E CAP
	CF1	CSB455EB1T	CERAMIC FILTER
	TER1	PQ10342-003	BATTERY TERMINAL(1) (+) SIDE
	TER2	PQ10342-004	BATTERY TERMINAL(2) (–) SIDE

INSTRUCTIONS

Thank you for purchasing the JVC HR-D180EG Video Cassette Recorder. Before use, read this instruction booklet carefully for obtaining the best results from your new unit.

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SPECIFICATIONS

The rating plate and the safety caution are on the rear of the unit.

WARNING – DANGEROUS VOLTAGE INSIDE
WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

IMPORTANT (In the United Kingdom)
Mains Supply (240 V~, 50 Hz only)

IMPORTANT

Do not make any connection to the Larger Terminal coded E or Green. The wires in the mains lead are coloured in accordance with following code:

If these colours do not correspond with the terminal identifications of your plug, connect as follows:
Blue wire to terminal coded N (Neutral) or coloured Black.
Brown wire to terminal coded L (Live) or coloured Red.
If in doubt – consult a competent electrician.
Note
We recommend that you should disconnect the AC cord from the outlet.

FOR YOUR SAFETY (in Australia)
Install any external aerial to AS 1417.1

Omkopplaren BETRIEB på denna apparat är sekundärt kopplad och skiljer inte apparaten från nätet i läge BETRIEB OFF.

The BETRIEB button does not completely shut off mains power from the unit, but switches operating current on and off.

BEMAERK: I stilling OFF er apparatet stadig forbundet med lysnettet Hvis det ønskes fuldstændig afbrudt skal netledningen trækkes ud.

This unit is produced to comply with Directive 82/499/EEC.

CAUTION

- Disconnect the mains plug from the supply socket when not in use.
- When you are not using the HR-D180EG for a long period of time, it is recommended that you disconnect the power cord from the AC outlet.
- Dangerous voltage inside. Refer internal servicing to qualified service personnel. To prevent electric shock or fire hazard, remove the power cord from the AC outlet prior to connecting or disconnecting any signal lead or aerial.

VHS PAL HQ High Quality

- Only cassettes marked "VHS" can be used with this video cassette recorder.
- HQ VHS is compatible with existing VHS equipment.

Printed in Japan

FEATURES

High-quality pictures

- **HQ (High Quality) System technologies** for superlative VHS pictures with a Detail Enhancer and a higher white clip level.
- **4-Head system** for quality recordings in both SP (Standard Play) and LP (Long Play) modes: LP allows up to 8 hours of continuous recording with a single cassette.

Tuner features

- **PLL frequency synthesized wide-band cable tuner** with 32-channel storage capacity.
- **Pretuned to European television broadcast frequencies:** VHF, UHF and cable channels including those of hyper band.
- **10-Key random-access channel selection** and up/down scan tuning.
- **Compatible with VPS (Video Programme System)** through use of the provided VPS adapter.

Automatic functions

- **Counter go-to function** for direct access to any specified point on the tape.
- **Fully automated playback procedure:** insert a cassette (with safety tab removed), and playback will start automatically.
- **Memory play function** for automatic start of playback after rewind to the beginning of the tape or the counter reading of "0000".
- Automatic backspace editing.
- Auto-power-on convenience.
- Automatic power on/off for cassette ejection.
- Automatic rewind at the end of tape.
- Motorized front-loading cassette system.

Other value features

- **Newly-designed chassis** with super-quiet running and durability for a long life of trouble-free operation.
- **Slim, super-low-profile design** – 95 mm in height.
- **1-Year/8-Event programmable timer with 10-key programming.**
- **Multi-function infrared remote control:** timer programming, direct counter go-to function, 10-key random-access channel selection, and more.
- **60-Minute memory backup** for clock and timer settings.
- Instant recording function with auto shut-off.
- Shuttle Search at 9 times normal speed in SP and LP modes.
- Still and frame advance in SP and LP modes.
- Picture sharpness control.
- Counter search function.
- Comprehensive fluorescent display with symbolic mode indicators.
- Remaining tape time indicator.

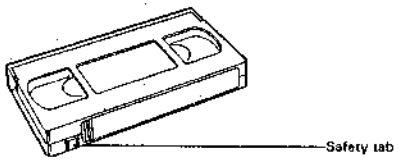
PRECAUTIONS

Handling and storage

- Avoid using the recorder under the following conditions:
  - extremely hot, cold or humid places,
  - dusty places,
  - near appliances generating strong magnetic fields,
  - places subject to vibrations, and
  - poorly ventilated places.
- Be careful of moisture condensation.
  Avoid using the recorder immediately after moving from a cold place to a warm place or soon after heating a room which was cold. The watervapour in warm air will condense on the still-cold video head drum and tape guides and may cause damage to the tape and the recorder.
- Handle the recorder carefully.
  - Do not block the ventilation openings.
  - Do not place anything heavy on the recorder.
  - Do not place anything which might spill and cause trouble on the top cover of the recorder.
  - Use in horizontal (flat) position only.
- In case of transportation,
  - Avoid violent shocks to the recorder during packing and transportation.
  - Before packing, be sure to remove the cassette from the recorder.

Video cassettes

- This recorder employs VHS-type cassettes only.
  E-240 for 4 or 8 hours, E-180 for 3 or 6 hours, E-120 for 2 or 4 hours, E-90 for 1 hour and 30 minutes or 3 hours, E-60 for 1 or 2 hours and E-30 for 30 minutes or 1 hour of recording.
- Video cassettes are equipped with a safety tab to prevent accidental erasure. When the tab is removed, recording cannot be performed. If you wish to record on a cassette whose tab has already been removed, use adhesive tape to block the hole.



- Avoid exposing the cassettes to direct sunlight. Keep them away from heaters.
- Avoid extreme humidity, violent vibrations or shocks, strong magnetic fields (near a motor, transformer or magnet) and dusty places.
- Place the cassettes in cassette cases and position vertically.

Moisture condensation

- If you pour a cold liquid into a glass, water vapour in the air will condense on the surface of the glass. This is called moisture condensation.
- Moisture condensation on the head drum, one of the most crucial parts of the video recorder, will cause damage to the tape.
- Moisture in the air will condense on the recorder when you move it from a cold place to a warm place, after heating a cold room or under extremely humid conditions.
- This recorder is equipped with a moisture condensation prevention circuit which automatically heats the head drum according to the ambient temperature. This circuit operates when the unit is plugged into an AC outlet.
- The moisture condensation prevention circuit consumes only a slight amount of power. However, if for some reason you are not using the recorder for a long period of time, it is advisable to remove the power cord from the AC outlet.
- Since the moisture condensation prevention circuit cannot evaporate existing moisture condensation immediately after the power cord has been plugged into the AC outlet, you must allow for a few hours if the recorder is to be used in such areas as would occasion moisture condensation.

Operation

- When a cassette is loaded, the power is switched on automatically.
- The cassette can be unloaded even when the power is off. Pressing the KASSETTE button turns the power on and, after ejection of the cassette, shuts it off automatically in this case.
- As long as the SCHALTUHR button is engaged with the TIMER indicator lit, the BETRIEB and KASSETTE buttons have no effect and unloading of a cassette is not possible. If a cassette has not yet been inserted, simply insert a cassette; the power will be switched on to load the cassette properly and, after completion of automatic loading, the Timer Recording Standby mode will be engaged with power off.

Remote control unit

- Avoid violent shocks, especially take care not to drop the unit.
- Take care not to allow liquid to spill into the unit.
- Do not place heavy objects on the unit.
- Avoid leaving the unit in places subject to direct sunlight or extremely high temperatures.

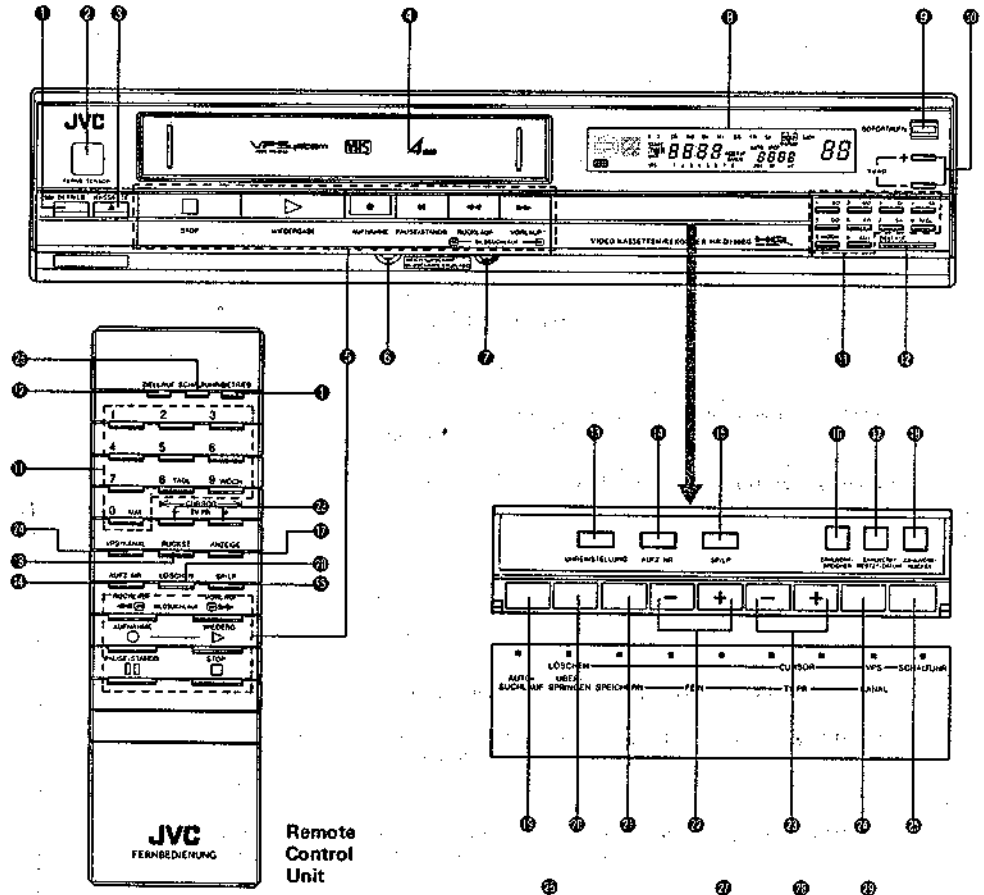
WARNING

1. This recorder can also receive colour television signals in East Germany (DDR) for recording and playback.
2. Recordings made of DDR television signals produce monochrome pictures if played back on another video recorder of PAL or SECAM standard.
3. SECAM prerecorded cassettes or recordings made with a SECAM video recorder produce monochrome pictures when played back with this recorder.
4. This recorder cannot be used in France. Use a SECAM recorder to record French SECAM signals.

CONTROLS, INDICATORS AND CONNECTORS

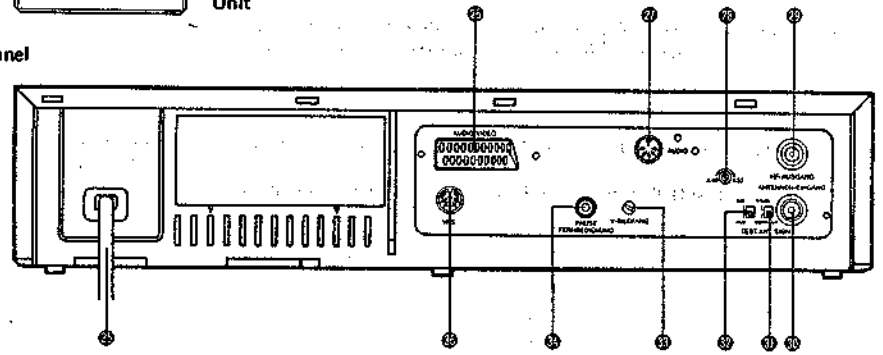
Keep this page opened so that you can refer to it at any time when you are reading this booklet.

Front Panel



Remote Control Unit

Rear Panel



Front Panel

❶ **Power button with LED indicator (BETRIEB)**
Press to apply power to the HR-D180EG for recording or playback. The indicator will light. Loading a cassette also turns the power on.

❷ **Infrared beam receiving window (FERNB. SENSOR)**

❸ **Cassette eject button (KASSETTE)**

❹ **Cassette loading slot**
Insert a VHS video cassette. The door will close and the indicator showing that a cassette is inside will appear on the FDP (fluorescent display panel).

❺ **Tape control buttons**

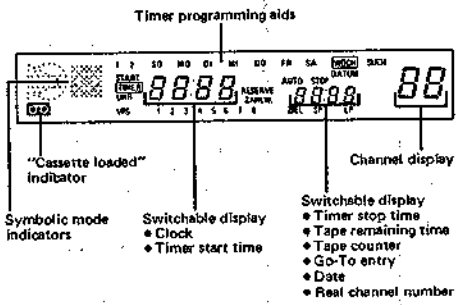
- **STOP button**
  To stop the tape.
- **Play button (WIEDERGABE)**
  Press to play back the tape or cancel the Pause/Still mode. Also press this button together with the AUFNAHME button for recording.
- **Record button (AUFNAHME)**
  Press together with the WIEDERGABE button for video and audio recording.
- **Pause/Still button (PAUSE/STANDB.)**
  Press to stop the tape temporarily to avoid recording of unwanted material or to view a still picture. The still picture can be advanced each time this button is pressed. Keeping this button pressed continuously advances the picture to give a slow-motion effect.
- **Rewind/Shuttle search button (RÜCKLAUF/BILDSUCHLAUF)**
  To rewind the tape, press this button while in the Stop mode. To view the speeded-up picture in the reverse direction for programme search, hold this button pressed while in the Play mode. For the memory play function, refer to page 39.
- **Fast Forward/Shuttle search button (VORLAUF/BILDSUCHLAUF)**
  To fast forward the tape, press this button while in the Stop mode. To view the speeded-up picture in the forward direction for programme search, hold this button pressed while in the Play mode. For the memory play function, refer to page 39.
  The engaged operating mode is indicated by the symbolic mode indicators on the FDP.

PLAY:	▷	FAST FORWARD:	▷▷
STILL:	▯▯	REVERSE SHUTTLE SEARCH:	◁▷
RECORD:	○	FORWARD SHUTTLE SEARCH:	▷▷
RECORD PAUSE:	○▯▯	GO-TO PLAY:	— —
REWIND:	◁◁	MEMORY PLAY:	— —

❻ **Picture sharpness control (BILDSCHÄRFE)**
Turn this knob clockwise to make the picture sharper. Turn counterclockwise to give the picture a softer tone. Effective only for playback pictures. (No effect for recording.)

❼ **Tracking control (SPURLAGE)**
Turn to minimise noise bars, if observed, during playback.

❽ **Comprehensive fluorescent display panel**
Fully explained in relevant sections.



❾ **Instant record button (SOFORTAUFN.)**
Use this button to start recording instantly and stop automatically after a specific time. (See page 34.)

❿ **Channel +/- buttons (TV PR.)**
Press either button to scan to a desired channel.

⓫ **Multi-purpose numeric keys**
Clock setting: See page 28.
Channel selection: See page 29.
Timer programming: See pages 35 and 36.
Counter Go-To: See page 38.
The "0" key also functions as the AUX mode select button. To record from a source connected to the rear panel AUDIO/VIDEO socket or AUDIO DIN socket, obtain "0" in the channel display by pressing the "0" key.

⓬ **GO TO button (ZIELLAUF)**
Press to engage the counter Go-To mode. See page 38.

⓭ **Clock adjust button (UHREINSTELLUNG)**
To set or adjust the clock time, press this button and use the numeric keys. After time setting, press this button again to start timekeeping.

⓮ **Programme button (AUFZ. NR.)**
Press this button when you want to preset the timer for unattended recording. See page 35.

⓯ **SP/LP recording mode select button**
Press to obtain the SP mode when you wish recordings to be made in the SP (Standard Play) mode. When you wish to record longer TV shows or for unattended and prolonged recording of a number of TV shows with a combined time of up to 8 hours (with an E-240 cassette), press this button to obtain the LP (Long Play) mode. The selected mode is indicated by "SP" or "LP" on the FDP.

⓰ **Counter memory button (ZÄHLWERK-SPEICHER)**
When this button is pressed to engage, the tape will stop automatically at the counter reading of about "0000" in the Rewind or Fast Forward mode.

⓱ **Counter/Remain/Date button (ZÄHLWERK/RESTZT./DATUM)**
Press to change the display from the Timer Set mode to the Clock mode. Usually use this button to switch the middle 4-digit display to tape counter (ZÄHLW.), remaining tape time (RESERVE) and date (DATUM). The ANZEIGE button on the remote control unit functions in the same way.

⓲ **Counter reset button (ZÄHLWERK-RÜCKST.)**
Press to reset the tape counter reading to "0000".

⓳ **Search button (AUTO SUCHLAUF)**
Press this button to initiate automatic scan tuning in the Real-channel mode. (See pages 29 and 30.)

⓴ **Cancel/Skip button (LÖSCHEN/ÜBERSPRINGEN)**
A dual-purpose switch. Use to clear the programmed data in the Timer Set mode or skip unnecessary channels in the Channel Set mode. The LÖSCHEN button on the remote control unit only functions in the Timer Set mode. (See pages 30 and 36.)

㉑ **Store button (SPEICHERN)**
Press to store necessary channels. (See page 30.)

㉒ **Fine tuning buttons (FEIN -/+)**
To fine-tune in to a certain station by shifting the frequency in both directions. (See page 30.)

㉓ **Cursor/Channel button (CURSOR/TV PR. -/+)**
Press either button to scan to a desired channel. These buttons can also be used as cursor keys for 10-key programming.

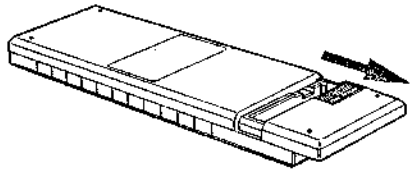
㉔ **VPS/Real channel button (VPS/KANAL)**
Allows for VPS programming when pressed in the Timer Set mode. In all other modes, this button functions to engage the tuner in the Real-channel mode. (See page 30.)

㉕ **Timer button (SCHALTUHR)**
Press after you have preset the timer for unattended recording.

Infrared Remote Control Unit

The infrared remote control unit gives you full operation control from your viewing position. All control buttons have the same function as the corresponding buttons on the recorder. The maximum operating distance is about 8 m.

Installing the batteries
1. Slide the battery compartment cover on the rear of the unit in the direction of the arrow (►).



2. Insert 2 "R03"-size batteries (provided) in the correct directions into the battery compartment.
3. Replace the cover.

Rear Panel

㉖ **AUDIO/VIDEO socket**
A 21-pin standardised audio/video input/output socket for the connection to a TV equipped with the same type of socket. The input from this socket can be recorded in the AUX mode with "0" in the channel display.

㉗ **AUDIO input/output DIN socket**
Connect a tape recorder or other audio sources or connect the audio output of other video sources for recording. The input from this socket can be recorded in the AUX mode with "0" in the channel display. Also, audio signals being recorded or played back are available from the output terminals of this DIN socket.

㉘ **RF converter frequency adjustment screw**
See page 27.

㉙ **RF output connector (HF-AUSGANG)**
Connect to the aerial connector of a TV receiver through the aerial cable (provided).

㉚ **Aerial input connector (ANTENNEN-EINGANG)**
Connect an aerial to this connector.

㉛ **Attenuator switch (ANT. SIGN.)**
Set to SCHWACH to receive broadcasts from distant stations. Set to STARK to receive broadcasts of high field strength. Use a screwdriver for setting this switch.

㉜ **TEST signal switch**
Set to EIN when tuning your TV receiver for the VIDEO CHANNEL. A test signal in the form of two vertical white bars will be available.

㉝ **V-lock adjustment screw (V-BILDFANG)**
When operating in the Still mode, adjust this screw to eliminate any vertical vibration of the picture. (For any inquiry about this adjustment, contact a JVC dealer.)

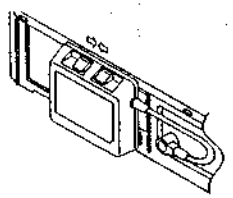
㉞ **Pause remote control terminal (PAUSE FERNBEDIENUNG)**
When using a JVC video camera, connect the remote control cable of the camera adapter to this terminal for the purpose of controlling the starting and stopping of the tape with the camera's start/stop switch.

㉟ **Power cord**

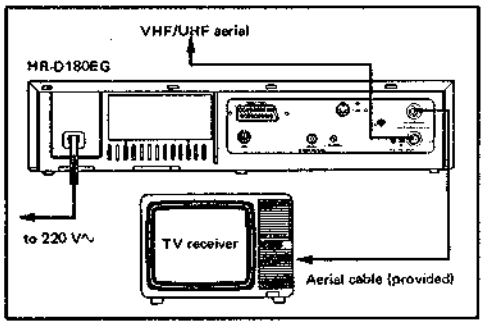
㊱ **VPS connector**
Connect the provided VPS unit to decode VPS broadcasts. For more details of the VPS system, refer to page 37.

How to attach the VPS unit
1. Insert the two lower hooks on the unit into the two ventilation holes indicated by the ▼ marks.
2. Insert the two upper latches into the slits near the top of the VCR body.
3. Insert the unit's plug into the VPS terminal on the rear panel.

How to detach the VPS unit
1. Pull out the plug from the VPS terminal.
2. Slide together the two knobs on top of the unit as shown by the arrows.
3. Keeping them pressed together, swing the unit down and lift its hooks out of the ventilation holes.



CONNECTIONS



Procedure

- Remove the aerial cable from the TV receiver and reconnect to the HR-D180EG as illustrated. The HR-D180EG is then ready to record off-air programmes.
- Connect the HR-D180EG to the TV receiver using the aerial cable (provided) as illustrated. The TV receiver is then ready to receive TV broadcast programmes as well as accommodate video cassette playback.

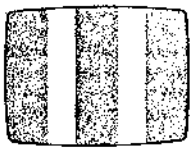
VIDEO CHANNEL SETTING

The built-in RF converter permits playback of video and audio recordings through a TV receiver. The signals from the RF converter are viewed through a vacant channel not used for broadcasting in your viewing area.

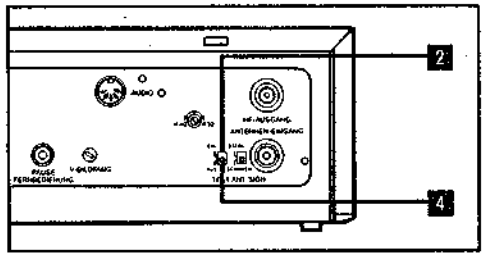
The converter channel of all units is set to UHF channel 36 prior to shipment. Setting your TV receiver to UHF channel 36 may provide video playback. However, to obtain the best possible reproduction on your TV receiver, accurate adjustment to the RF converter output is required.

Procedure

1. Press the front panel BETRIEB button to turn the indicator on. Turn on the TV receiver.
2. Set the TEST switch, located on the rear panel, to EIN.
3. Adjust your TV receiver in the vicinity of UHF channel 36 until you bring in the two white signal bars on the screen as illustrated. This setting is now the VIDEO CHANNEL of the TV receiver to which the HR-D180EG is connected.

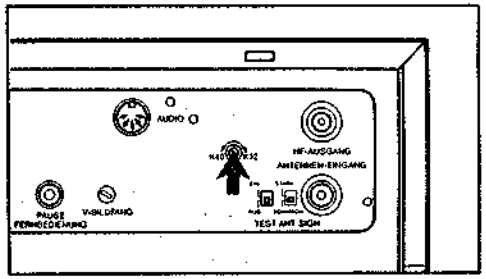


4. Reset the TEST switch to AUS.



Notes:

- When you adjust your TV receiver to channel 36 for video playback, if some interference noise is seen on the screen because of broadcasts on neighbouring channels or if your preset broadcasts should be affected in picture quality, it is necessary to shift the RF converter output frequency from that of channel 36.



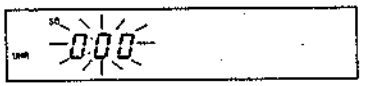
For this purpose, insert a screwdriver into a hole provided on the rear of the set and re-adjust the RF converter frequency adjustment screw in minute steps. Then tune the TV receiver once again until a clear picture is obtained. This adjustment requires extreme precision and must be done with the utmost care. We recommend that you consult your JVC dealer for making this adjustment.

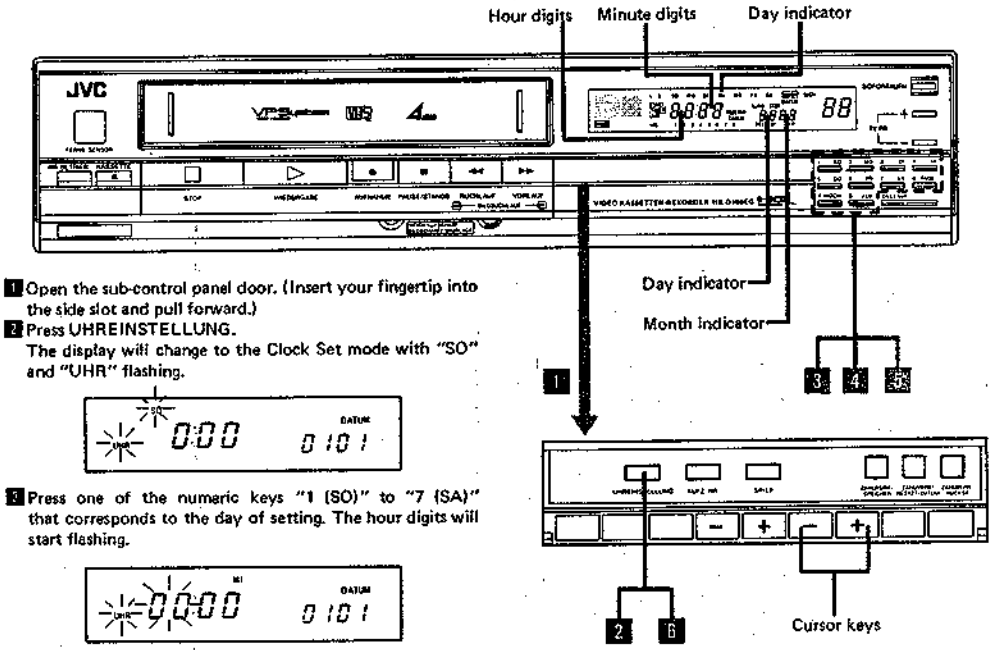
- Be sure to set the TEST switch to AUS after VIDEO CHANNEL tuning has been completed.
- No signal is available from the AUDIO/VIDEO socket while the test signal is being used.
- If a prerecorded VHS cassette is available, TV adjustment for VIDEO CHANNEL setting is also possible using it to obtain a playback picture. Insert the cassette and operate the HR-D180EG for playing back the cassette. Then tune the TV receiver to obtain clear pictures and sound while monitoring the playback picture on the TV screen.
- If your TV receiver is not provided with an AFC circuit, perform fine tuning of the TV receiver when you are actually viewing video cassettes.

CLOCK SETTING

Plug the HR-D180EG into an AC outlet. The display shows a flashing 0:00 with SO and UHR illuminated. This initial display also functions as a power failure indicator.

Power failure indicator





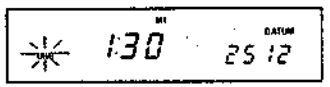
1. Open the sub-control panel door. (Insert your fingertip into the side slot and pull forward.)
2. Press UHREINSTELLUNG.
   The display will change to the Clock Set mode with "SO" and "UHR" flashing.

3. Press one of the numeric keys "1 (SO)" to "7 (SA)" that corresponds to the day of setting. The hour digits will start flashing.

4. Set the hour and minute in that order.

- The flashing position is ready for entry.
- To set a one-digit number, first press "0", then press the numeric key for 1 to 9.
- Zero will not be displayed in the tens place of the hour indication unless the cursor is moved back to the hour digits.
- For a two-digit number, simply press the corresponding numeric keys in the right order.
- In hour setting, numbers larger than 23 will be rejected.
- In minute setting, numbers larger than 59 will be rejected.

5. Set the day and month in that order.
   - The flashing position is ready for entry.
   - The setting method is the same as for time setting.
   - In day setting, invalid numbers such as 32 of January or 30 of February will be rejected.
   - In month setting, numbers larger than 12 will be rejected.



6. Press UHREINSTELLUNG.
   - Press it at the exact instant of the time signal, and the clock will be set accurately to the present time.

Notes:

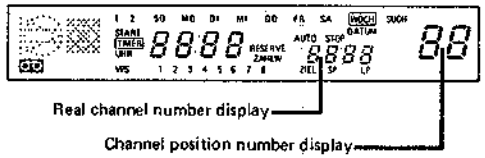
- If you press a wrong numeric key, you can return to the previous position using the CURSOR "–" key.
- Once all necessary data have been entered, you can reach any position for correction using the CURSOR "–" and "+" keys.
- Clock setting is not possible if the SCHALTUHR button is engaged with the TIMER indicator lit. First check to see that the TIMER indicator is off.
- Readjust the date in leap years.

Clock/timer memory backup

- The built-in memory backup battery allows for correct time-keeping for about 60 minutes after the recorder is unplugged from the AC outlet. During this period of power outage, the preprogrammed timer data are also maintained, although the display blacks out.
- When the backup time is expired, the power failure indicator shown above will appear when power is reapplied.

OPERATING THE BUILT-IN-TUNER

The HR-D180EG incorporates an advanced frequency synthesizer tuner which is pretuned to 112 channels to cover VHF, UHF and CATV broadcasts. Channel indication is given in two different ways: real channel numbers and channel position numbers. Real channel number indication is available by pressing the VPS/KANAL button, while channel position number indication is always available in the channel display.



Correspondence between 112 pretuned TV stations and the HR-D180EG's real channel indications

DISPLAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
Ch	–	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	A	B	C	D	E	F	G
CC	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19
DISPLAY	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Ch	H	E21	E22	E23	E24	E25	E26	E27	E28	E29	E30	E31	E32	E33	E34	E35	E36	E37	E38
CC	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30	S31	S32	S33	S34	S35	S36	S37	S38
DISPLAY	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
Ch	E39	E40	E41	E42	E43	E44	E45	E46	E47	E48	E49	E50	E51	E52	E53	E54	E55	E56	E57
CC	S39	S40	S41	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
DISPLAY	58	59	60	61	62	63	64	65	66	67	68	69			75	76	77		
Ch	E58	E59	E60	E61	E62	E63	E64	E65	E66	E67	E68	E69			–	–	–		
CC	–	–	–	–	–	–	–	–	–	–	–	–			X	Y	Z		

Stored channels

A total of 112 channels are receivable. Of them, up to 32 can be stored for easy channel selection. Prior to shipment, some channels are stored.

It is possible to store more channels or skip some channels if there are no broadcasts on those channels in your area. It is possible to change the stored channels to correspond to your preferred channel allocation. Skipped channels can be restored whenever necessary.

- Channel memories are permanent; the programmed channel allocation will not be erased even if the recorder is unplugged from the AC outlet.

Channel selection

To select a channel for recording, normally use the TV PR. –/+ buttons or 10 numeric keys. You can choose any channel from among the stored ones by calling up the corresponding channel position number.

- Use the TV PR. "–" button to scan to a channel in the direction of decreasing numbers; the TV PR. "+" button, in the direction of increasing numbers.
- When using the 10 numeric keys, pay attention to the following: When 1, 2 or 3 is entered, it blinks for about 2 seconds. To set channel 1, 2 or 3, leave it blinking until it remains lit. To key in a two-digit number, enter the 2nd number while 1, 2 or 3 is blinking. The number entered first will be shifted to the tens place and channels 10 to 32 can be set. If you enter an invalid number (larger than 32), the channel display will return to the previous figure after 2 seconds.

If you want to select a channel other than those stored, engage the Real Channel mode and call up a channel, while referring to the real channel number display.

With recorder's controls:

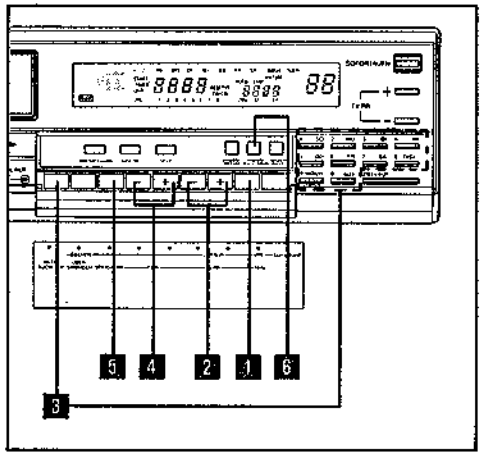
Press the VPS/KANAL button to engage the Real Channel mode and call up a channel by either pressing the AUTO SUCHLAUF button or using the 10 numeric keys.

With remote control:

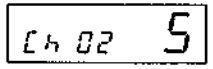
Press the VPS/KANAL button to engage the Real Channel mode and call up a channel by using the 10 numeric keys.

Changing the stored channels

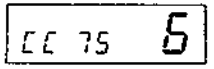
Turn the TV receiver to ON and adjust it to your video channel.



1 Press the VPS/KANAL button.
The middle 4-digit display will change to the Real Channel mode and show the band and real channel number of a station stored for that position.



VHF channel 2 is stored for channel position 6.



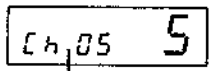
Cable channel 75 is stored for channel position 6.

2 Call up the channel position number for which you wish to change the stored TV station.

- For this purpose, press either the TV PR. "–" or "+" button. Channel positions from 0 to 32 appear successively. "0" indicates that the unit is in the external input mode usually referred to as AUX.

3 Select a TV station which you wish to store into that position.

- Pressing the VPS/KANAL button changes the band and alternates the band indication between "Ch" (for VHF and UHF) and "CC" (for Cable). Select the appropriate indication.
- You can scan to the real channel number corresponding to the desired station by pressing the AUTO SUCHLAUF button. Pressing the AUTO SUCHLAUF button initiates automatic scanning from real channel number Ch 02 to 69, CC 01 to 41, 75, 76, 77, then back to Ch 02. When a broadcast is detected, scanning stops automatically. To advance to the next station, press the AUTO SUCHLAUF button.

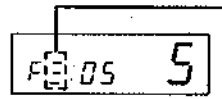


"Colon" will appear to indicate that this real channel is not stored for the indicated channel position.

- You can key in that real channel number using 10 numeric keys. 70, 71, 72, 73, 74 and numbers larger than 77 are invalid numbers. If an invalid number is keyed in, the previously selected channel will be received.

4 If the picture quality is unsatisfactory due to ghosts or other noise, perform fine tuning.

- For this purpose, press either the FEIN "–" or "+" button. The Fine Tuning mode will be engaged.



Upper or lower "–" sign indicates the operating tuning frequency is above or below the standard broadcast frequency. Centre "–" sign will appear when it corresponds to the standard.

Then press either the FEIN "–" or "+" button, depending on the direction of fine adjustment, so that the picture clears up. Each time the button is pressed, the picture condition changes in a single increment. Continuous changing is also possible by keeping the button pressed. If the tuning frequency falls on the next station, the channel number advances as well. If no command is given for 2 seconds after either FEIN button has been pressed, the Fine Tuning mode will be automatically cancelled. To cancel the Fine Tuning mode instantly, press the VPS/KANAL button.

- If the picture is not clear after all procedures, perform fine tuning on your television.
- Distorted pictures or sound will be recorded if fine tuning has not been properly performed. Exercise care with this adjustment since the recorded picture and sound cannot be adjusted later.

5 After confirming both the real channel number and channel position number, press the SPEICHERN button. "Colon" will disappear.

- The selected station will be stored in memory.

6 Press the ZÄHLWERK/RESTZT./DATUM button to disengage the Real Channel mode.

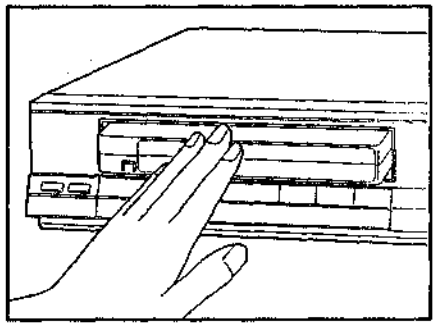
Skipping the stored channels

1. Call up the channel position number that you wish to skip by using the TV PR. button or 10 numeric keys.
2. Press the VPS/KANAL button.
3. Press the ÜBERSPRINGEN button.
   "Colon" will appear to indicate that the displayed real channel is not stored.
4. Press the ZÄHLWERK/RESTZT./DATUM button to disengage the Real Channel mode.
   - The skipped channel number will not appear on the channel display during up/down scan tuning.

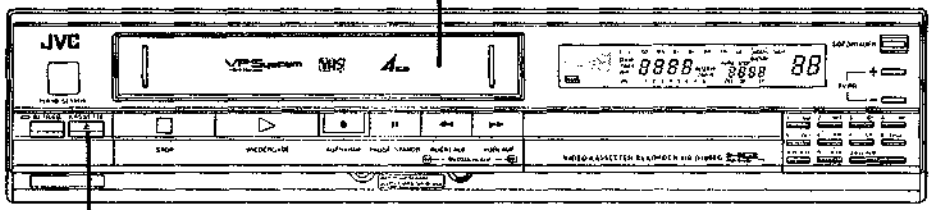
Restoring the skipped channels

1. Press the VPS/KANAL button to engage the Real Channel mode.
   - In this mode, all channel position numbers 1 through 32 are available in the channel display.
2. Select the channel position number that you wish to restore by using the TV PR. "–" or "+" button.
3. Select a real channel that you wish to restore in that channel position by using the AUTO SUCHLAUF button or 10 numeric keys.
4. After confirming both the real channel number and channel position number, press the SPEICHERN button.
5. Press the ZÄHLWERK/RESTZT./DATUM button to disengage the Real Channel mode.

LOADING AND UNLOADING A CASSETTE



Loading
Insert a cassette as illustrated with its labelled side facing you.
- With a cassette inserted, the ⊙⊙ mark to indicate "cassette inserted" appears on the display panel.



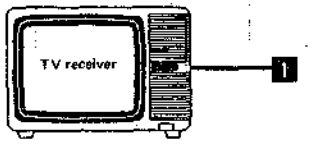
Unloading
Press the KASSETTE button.
The cassette will be ejected.

Auto power-on and auto-play functions
- The cassette can be loaded even when the power has not been turned on. Inserting a cassette into the loading slot turns the power on automatically.
- Inserting a cassette, with its safety tab removed, turns the recorder on and playback of the cassette begins automatically.
- The cassette can be unloaded even when the power has been turned off. If a cassette is inside, pressing the KASSETTE button turns the power on automatically and, after ejection of the cassette, shuts it off automatically.

Notes:
- Be sure to insert the cassette firmly into the slot; otherwise, it will be automatically ejected.
- The automatic loading mechanism will operate only when the cassette is inserted correctly.
- A cassette inverted cannot be inserted.

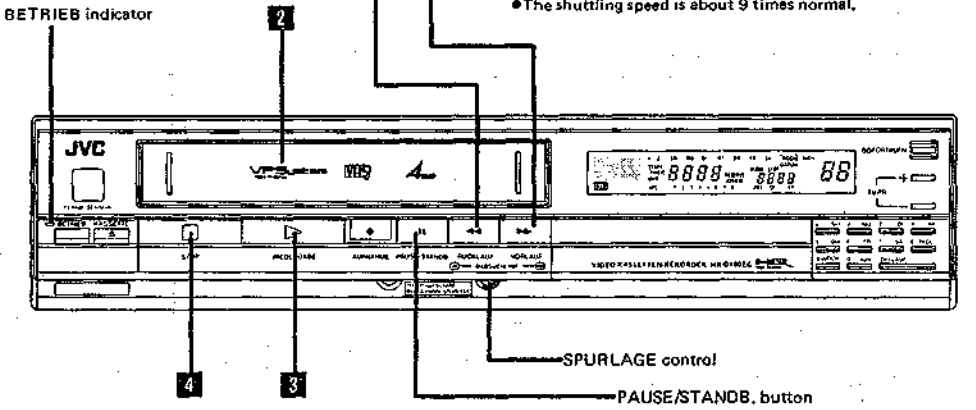
Caution
- If unloading of a cassette is not possible, check to see whether the TIMER indicator is lit. If so, press the SCHALTUHR button so the TIMER indicator extinguishes.
- Do not attempt to pull out the cassette once automatic loading has started.
- Do not insert fingers or any foreign object beyond the door flaps of the cassette loading slot, as this could lead to injury or damage to the mechanism. Show special caution with children.

PLAYING BACK A VIDEO CASSETTE



RÜCKLAUF/BILDSUCHLAUF button
- To rewind the tape, press this button in the Stop mode.
- To shuttle search the tape in the reverse direction, hold this button pressed in the Play mode.
- The shuttling speed is about 9 times normal.

VORLAUF/BILDSUCHLAUF button
- To fast forward the tape, press this button in the Stop mode.
- To shuttle search the tape in the forward direction, hold this button pressed in the Play mode.
- The shuttling speed is about 9 times normal.



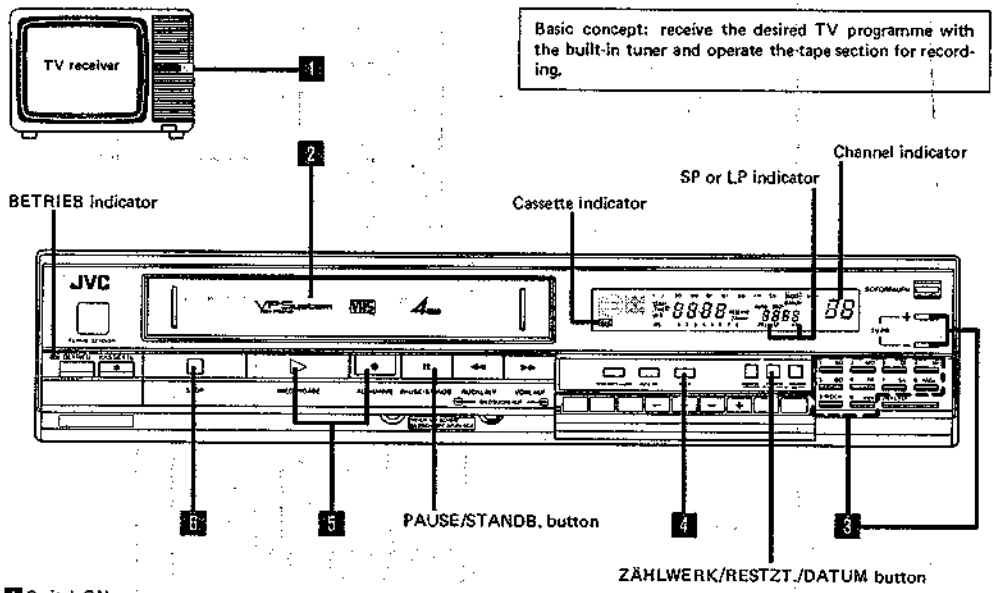
1 Switch ON.
Adjust the TV receiver's channel to the video channel.
2 Load a pre-recorded cassette. Power will be switched on automatically. When the cassette loaded has no safety tab, playback starts automatically.
3 Press WIEDERGABE.
4 Press STOP at the end of the programme.

Memory play function
- If you want to watch the same tape again from the beginning, press the WIEDERGABE button within 2 seconds after you have pressed the RÜCKLAUF button. Playback will start automatically after the tape has been rewound to the beginning. In this case, while the tape is being rewound, the symbolic mode indicator for the Play mode will be blinking.
- When used in conjunction with the counter memory function, this memory play is also available at the counter reading of "0000" after either rewind or fast forward. (For more details of the counter memory function, refer to page 39.)

Notes:
- The SP/LP button may be in either position. The SP or LP mode recording is automatically detected and played back at a correct speed respectively with the corresponding indicator lit on the FDP.
- The tape-end auto rewind mechanism functions in both the Play and Fast forward modes.
- Noise bars may appear on the screen if you play back a tape which was recorded using another recorder. In such cases, adjust the SPURLAGE control. Turn it in either direction to adjust the picture. After playing a particular tape, return the control knob to the centre position.
- When the PAUSE/STANDB. button is pressed during playback, a still picture will appear. The still picture can be advanced in a frame-by-frame manner each time this button is pressed. Keeping this button pressed continuously advances the picture to give a slow-motion effect.
- When the Still mode continues for longer than about 5 minutes, the Stop mode will be entered automatically.
- With some televisions, the still picture may be unstable. This is not due to any defect of the unit.

RECORDING TV PROGRAMMES

Basic concept: receive the desired TV programme with the built-in tuner and operate the tape section for recording.



1 Switch ON.
- Adjust the TV receiver to your video channel.

2 Load a cassette. Power will be switched on automatically.
3 Select the channel you wish to record.
4 Select the recording speed (SP or LP).
SP: 4 hours with an E-240 cassette.
LP: 8 hours with an E-240 cassette.
5 Press AUFNAHME and WIEDERGABE simultaneously to start recording.
6 Press STOP at the end of the programme.

Notes:
- If there is part of the programme you don't want to record, press the PAUSE/STANDB. button. To release the Pause mode, press the WIEDERGABE button.
- When recording is restarted from the Pause mode, assemble recording is performed so that the playback picture will not distort at the edit point. A few frames recorded before the pause are erased due to overlap of the new recording. This is not due to any defect of the unit.
- When the Pause mode continues for longer than about 5 minutes, the Stop mode will be entered automatically.
- If the AUFNAHME button cannot be engaged, check to see if the cassette safety tab has been removed. (See page 23.)
- When the end of the tape is reached during recording, the tape is automatically rewound to the beginning and stops.
- Press the ZÄHLWERK/RESTZT./DATUM button to use the tape counter. (For more details refer to page 39.)
- Press the ZÄHLWERK/RESTZT./DATUM button once again to check how much recording time is left.
- The built-in tuner's automatic channel lock mechanism prevents the selected channel from being altered during recording. Therefore, if you wish to change the channel during recording, first engage the Pause mode and then select a different channel.

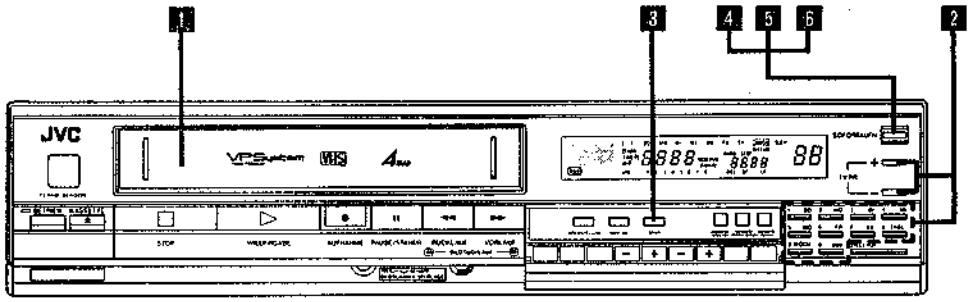
RECORDING ONE PROGRAMME WHILE WATCHING ANOTHER

A programme not being viewed can be recorded while you enjoy viewing another programme.
This permits the recorded programme to be played back later at your convenience.

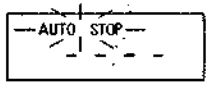
The key points to be remembered are:
- Select the channel you wish to record with the recorder's channel select buttons.
- Select the channel you wish to view with the TV receiver's channel selector.

INSTANT RECORDING

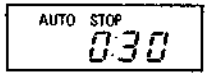
Besides starting and stopping a recording as usual, the HR-D180EG offers a more convenient possibility: starting by the push of a single button, and recording will stop automatically after a certain period of time. Use this facility for starting a recording before you go to bed or leave home.



1 Load a cassette.
2 Select the channel you want to record.
3 Select the recording speed.
4 Press SOFORTAUFN.
- The following indication will appear on the display, to show that the recorder is ready to start recording.
- The AUTO STOP indicator on the display will flash.



5 Press SOFORTAUFN. once again.
- Recording will begin immediately and the following indication will appear on the display, showing that recording will automatically stop and power will switch off after 30 minutes.
- The AUTO STOP indicator remains lit.



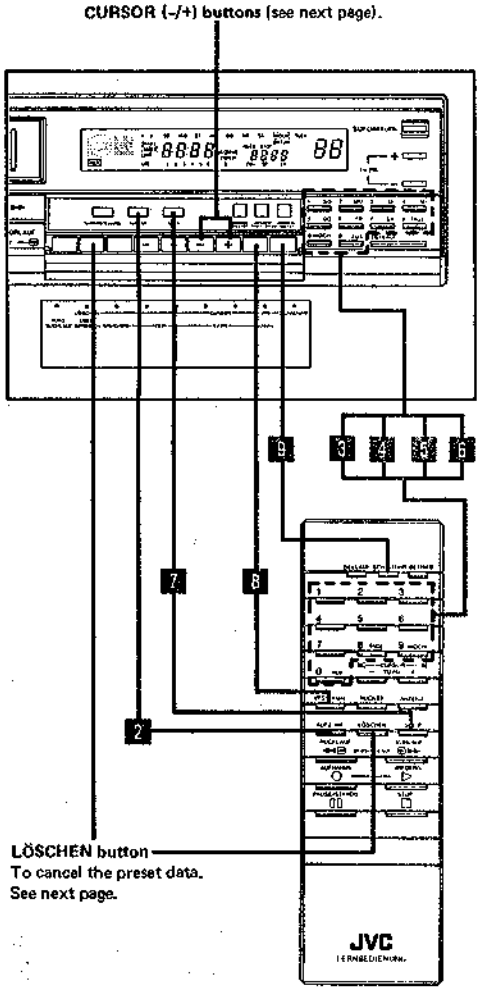
6 Each time the SOFORTAUFN. button is pressed, recording time increases by 30 minutes up to 4 hours.
- For a more precise time setting, use the numeric keys after recording has started. To change both hour and minute digits, simply key in the corresponding numbers. For this purpose, after "0:30" has appeared, specify the time using the numeric keys and press the SOFORTAUFN. button immediately. (Always key in a full number including hours and minutes. For "0:35", key in zero first.)

Notes:
- If the SOFORTAUFN. button is not pressed a second time within about 10 seconds after it has been pressed once, the Instant Record mode will be cancelled and the display will change back to the previous display mode.
- If you want to change the time setting again after the SOFORTAUFN. button has been pressed for memorisation of new data, simply press SOFORTAUFN. and redo the programming.
- While recording is in progress, the displayed time counts down; when 0:00 is reached, the Record mode is released after 10 seconds and the power is switched off.
- If you want to stop recording after having started recording in the Instant Record mode, press the STOP button.
- The instant recording function can also be used as a sleep timer. If you press the SOFORTAUFN. button during normal recording, the AUTO STOP indicator will light on the display and the indication "0:30" will be obtained, showing that recording will stop automatically after 30 minutes. The time span can be adjusted in the same way as for instant recording up to 9 hours, 59 minutes.
- Instant recording has priority over all other modes including VPS recording. If a preset VPS programme starts during instant recording, recording of that VPS programme will begin only after the Instant Record mode has ended.
- If the SOFORTAUFN. button is pressed with a non-recordable cassette loaded (one with its safety tab removed), the cassette will be automatically ejected.
- If you want to perform instant recording after you have set the timer and engaged the SCHALTUHR button, press the SOFORTAUFN. button as usual. Power will be turned on and instant recording will start. After instant recording has been performed, the Timer mode is automatically re-entered and power is turned off. The preset time for instant recording has priority over the timer preset time.
- If the preset START time for a timer recording should come after the STOP time of the instant recording, this timer recording will still be made automatically.
- If you want to check the remaining tape time or Counter reading while performing instant recording, press the ZÄHLWERK/RESTZT./DATUM button to obtain the desired indication (the AUTO STOP indication disappears). To return to the AUTO STOP indication, press the SOFORTAUFN. button once, or wait for about one minute and the remaining time indication will reappear automatically.

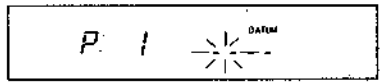
AUTOMATIC VPS OR TIMER RECORDING

The built-in 8-event/1-year calendar timer permits recording of selected channels on preset days from preset start times to preset stop times.

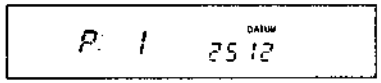
1 **First of all, load a cassette (with safety tab in place); power will be switched on automatically.** Programme the timer using the recorder's controls or remote control unit.



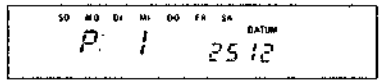
2 Press AUFZ. NR.
The display will change to the Timer Set mode with P: 1 illuminating and the date display section flashing. You are ready to enter the data into No. 1 programme memory. To advance to programme numbers 2 – 8, press again. After programme 8, the Clock mode will be engaged.



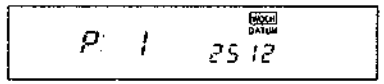
3 Enter the date using numeric keys.



- Invalid numbers will be rejected.
- To record a daily serial starting on the day of setting, move the cursor with the CURSOR "+" button to the START time setting without entering any date figure.
- To record a daily serial starting on a certain day, press [6] (TÄGL.) and enter the date.

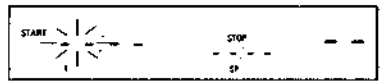


- The "daily" entry can be cancelled by pressing [8] again.
- To record a weekly serial, press [9] (WÖCH.) and enter the date.

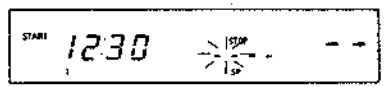


- The "weekly" entry can be cancelled by pressing [9] again.
- Both "daily" and "weekly" information can be entered or cancelled also in the time setting stage.
- When both day and month data have been entered, the display will change to the time setting mode and the programme number will be displayed at the bottom of the FDP panel.

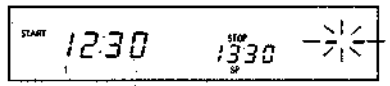
4 Key in the start time.



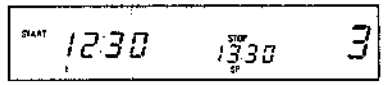
- To key in a one-digit number of hours or minutes, first press [0]. Then press the relevant numeric key.
- The minute digits will start flashing after keying in the hour.
- The hour digits of the "STOP" time will start flashing after keying in the start time.



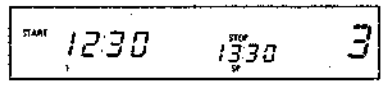
5 Key in the stop time in the same manner as the start time.
- The digits of the channel display will start flashing after keying in the stop time.



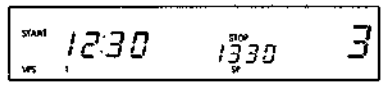
6 Enter the channel. Refer to page 29.



7 Press SP/LP to obtain the desired recording mode indication on the display.
- The SP or LP entry can be made anytime while in the Timer Set mode.

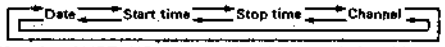


8 For VPS recording (refer to page 37), press the VPS/KANAL button.
- VPS will be displayed.
- The VPS entry can be made or cancelled anytime in the Timer Set mode.



9 Press SCHALTUHR button.
- The TIMER indicator will light.
- The display will return to the Clock mode, also showing the programme numbers for which recording data has been programmed.

How to use the CURSOR keys (–/+ on the remote control)
- If you press a wrong key and the flashing position has advanced, press "–" to return to the previous position for correction.
- Once all data have been programmed, you can reach any position for correction using "–" or "+". The flashing position is ready for re-entry.
- The cursor (flashing position) advances or returns in the following order.



(Pressing AUFZ. NR. engages the check mode in which no position flashes and data correction is not possible. To correct the data, press either CURSOR key; "+" to move to "Date" or "–" to move to "Channel".

IMPORTANT INFORMATION ON VPS AND TIMER RECORDING

Setting the DATE, START and STOP times
- It is not possible to set the DATE, START and STOP times unless the date and the clock time have previously been set.
- Enter the data while the digit positions are flashing.
- Unless the START time has been properly set, STOP time setting is not possible.
- The STOP time can be set within 24 hours from the START time. If the hour setting for the STOP time runs into the following day, there is no need to set the day. Recording will stop at the preset time on the following day.
- Non-applicable numbers (such as January 32, February 30 for dates, 24 or larger for hours, 60 or larger for minutes and 33 or larger for channels) will be rejected when keyed in.

Last-channel memory
- The currently tuned channel locks in the Timer Set mode and, when the display returns to the Clock mode, the locked channel is displayed.

Cancelling the preset data
- The preset programmes can be cancelled by pressing the LÖSCHEN button. For this purpose, first engage the Timer Set mode for the number you wish to cancel and then press the LÖSCHEN button.
- Unless the VPS mode is engaged, an executed programme is automatically cleared.

Checking the programmed data
- Checking and re-programming can be performed anytime, even when the SCHALTUHR button has already been engaged.
- While recording is actually taking place in the regular Timer mode, the STOP time can be changed. For this purpose, engage the Timer Set mode and move the cursor; only "STOP" time will flash. This means you can re-programme the stop time.
- While recording is actually taking place according to one preset programme, all other preset programmes can be checked or re-programmed.
- To disengage the Timer Set mode, press the ZÄHLWERK/RESTZT./DATUM button (on the recorder) or the ANZEIGE button (on the remote control).

TIMER indicator (Error indication)

- When the SCHALTUHR button is pressed with a cassette loaded and the timer correctly programmed, the TIMER indicator on the display will light with the corresponding programme number(s) also lighting and the power is turned off.
- When you have preset several programmes at a time, confirm that all the preset programme numbers light together with the TIMER indicator when the SCHALTUHR button is pressed. The programme whose number does not light has not been correctly preset. Recheck the programmed data.
- Programming errors include cases where either "START" or "STOP" time has not been preset, or both these preset times are the same. A "no-channel-programmed" situation is not interpreted as an error, and recording will be made of the currently tuned channel.
- If all programmes have been wrongly preset, the TIMER indicator will flash for about 10 seconds when the SCHALTUHR button is pressed, and remain lit with no programme number lit.
- If the SCHALTUHR button is pressed when a cassette is not loaded, the TIMER indicator will continue blinking.
- If a cassette with its safety tab removed has been loaded, it will be ejected automatically when the SCHALTUHR button is pressed. The TIMER indicator will continue blinking. Also, a programmed timer recording will not be executed after the start time has passed, even if you insert a cassette.
- As long as the SCHALTUHR button is engaged, unloading of a cassette is not possible.

VPS operation

- When a VPS code corresponding to the intended TV programme is detected, recording will start with "VPS" blinking. When the VPS code changes to another, recording will stop.
- If no VPS code is detected during the VPS standby mode (for example, the tuned-in station does not transmit VPS codes), ordinary timer recording will be engaged; recording will start at the preset time and stop at the preset time.
- When an interruption code is detected during VPS recording, the recorder enters the VPS standby mode and restarts recording when the regular VPS code is restored.
- When the VPS code stops for some reason during VPS recording, recording will stop at the preset stop time.
- If a system status code which cancels VPS recording is detected during the VPS standby mode, ordinary timer recording will be engaged.
- During VPS recording, the number of the programme that is presently operating and the indication "VPS" will be blinking.
- After VPS recording, the power is switched off and the auto rewind mechanism does not function. If the end of the tape is reached during VPS recording, the cassette is automatically ejected and then the power is switched off.

Regular timer operation

- If the VPS mode is not engaged, tape loading starts 20 seconds before the preset START time and the recording start signal is triggered 2 seconds before the preset time so that recording starts exactly at the preset time.
- During timer recording, the number of the programme that is presently operating will be flashing.
- Operation at the end of recording is the same as with VPS operation.

VPS recording

VPS stands for the Video Programme System which adds flexibility to timer recording with a video cassette recorder. In this system, TV stations transmit special VPS codes using a multiplex system while certain programmes are being broadcast; the codes are different for different programmes. These VPS codes control the starting and stopping of the video recorder and have precedence over times preset in the timer. Using the VPS function, if a programme starts earlier or later than scheduled or overruns its scheduled time, it will be recorded from start to finish. When the VPS unit (provided) is plugged in the rear panel VPS connector, the HR-D180EG detects the VPS codes and controls power on/off and tape start/stop. First programme the timer, then, if you switch on the VPS function, all timer data – date, start time, stop time and channel – are converted to VPS codes and stored in memory. When the VPS function is not engaged, the timer starts and stops recording in the usual way.
If the VPS function is engaged, the HR-D180EG will enter the VPS standby mode at 20:00 on the day previous to the preset day and remain engaged until 3:59 on the following day, if the intended programme has not been broadcast. This means that if the required programme starts within this 32-hour period it will be recorded correctly.

One-year calendar timer

"One-year" presetting capacity means that you can "reserve" a recording on any day, even one year in advance. One extreme case: If the date entry corresponds to the current day and the START time is set to a time before the current time, recording will start on the same day next year.

8-Programme timer

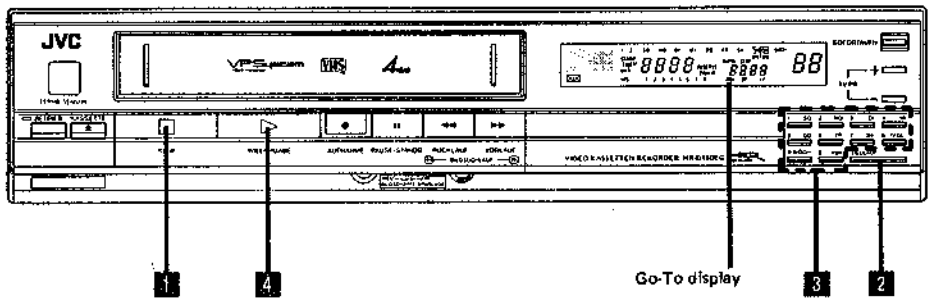
"8-Programme" presetting capacity means that you have 8 separate timers which contain different programming data. Because of this capacity, you can even "reserve" 8 different TV programmes, either on the same day or on different days.
Each programme (No. 1 through No. 8) contains information on "date" (or "daily" or "weekly"), "start time", "stop time", "TV channel number, "SP or LP" and "VPS or regular".

Example of the contents of one programme entry:

Programme number	TV channel number	Date	Start time	Stop time	Recording mode	VPS
2	12	05.12	10:30	11:30	LP	VPS

COUNTER GO-TO FUNCTION

The counter go-to function gives you direct access to any point on the tape by simply specifying a desired counter reading. Depending on your command, the tape will either stop at that point or playback will start automatically from there.

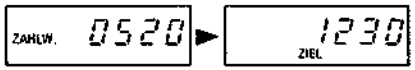


1 Engage the Stop mode.
- If the tape counter mode is not engaged, press the ZÄHLWERK/RESTZT./DATUM button to check the current count.

2 Press the ZIELLAUF button.
- The counter will change to the go-to mode.

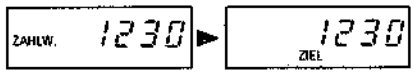
There are three possible cases:

(1) Counter reading changes from one number to another.



Relative count — Absolute count

(2) Counter reading remains unchanged.

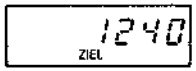


Absolute count — Absolute count

(3) "----" appears instead of a number.

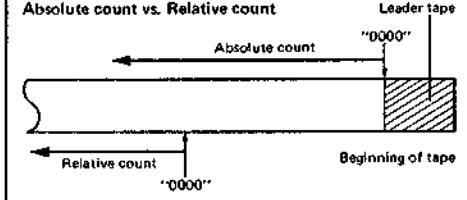
- The recorder did not detect the leader tape when the cassette was loaded and, therefore, cannot determine the tape's present position in relation to its beginning.

3 Specify the point you want to locate by using 10 numeric keys.



4 Press the WIEDERGABE button if you want playback to start there or the STOP button if you want the tape to stop there.
- In cases (1) and (2), the tape will either fast forward or rewind to the specified point.
- In the case of (3), the tape is first rewound to the beginning of the tape (where the counter is automatically reset to "0000") and then is fast forwarded to the specified point.
- Once the beginning of the tape is detected in this way, the tape counter always reads the position in relation to the beginning until the ZÄHLWERK-RÜCKST. button is pressed at a different position.
- If the specified number exceeds the tape length, the tape is first fast forwarded to its end, then rewound to its beginning and stops.
- Use of the go-to function cancels the previous relative count.
- Press the WIEDERGABE or STOP button for cancelling the Go-To function, and the recorder will enter the Play or Stop mode.

Absolute count vs. Relative count



- The absolute "0000" count is automatically set when the leader tape is detected at the time of cassette loading.
- The relative "0000" count is set when the ZÄHLWERK-RÜCKST. button is pressed and does not apply to the counter Go-To procedure.

INSTRUCTIONS:
VIDEO CASSETTE RECORDER

For refernce, the text of the Instruction booklet for this model is reproduced in the following pages.

Numbering of the pages also corresponds with that of the booklet.

The Instructions shown pertain specifically to the Model HR-D180E. For detailed descriptions, be sure to consult the Instruction booklets of the other models.

Main differing points with respect to other models in this series (with suffixes E and EG) are aslo included.

The following table lists the principal differing points among the models (suffixes E, EG and EK) in this series.

Item \ Model		E	EG	EK
Power requirement		220 V ∿, 50/60 Hz	←	240 V ∿, 50/60 Hz
Channels coverage	VHF channels IV/V	47 – 89 MHz	←	No
	VHF channels IV/V	104 – 470 MHz	←	No
	UHF channels IV/V	470 – 862 MHz	←	21 – 69
Aerial output	UHF channels	32 – 40 (Adjustable)	←	←
AUDIO	AUDIO connector	5-Pin DIN – 20 dB	←	Mic – 67 dB
"	AUDIO/VIDEO socket	21-Pin Peri connector	←	No
Accessories	Video cassette tape	Yes	←	No

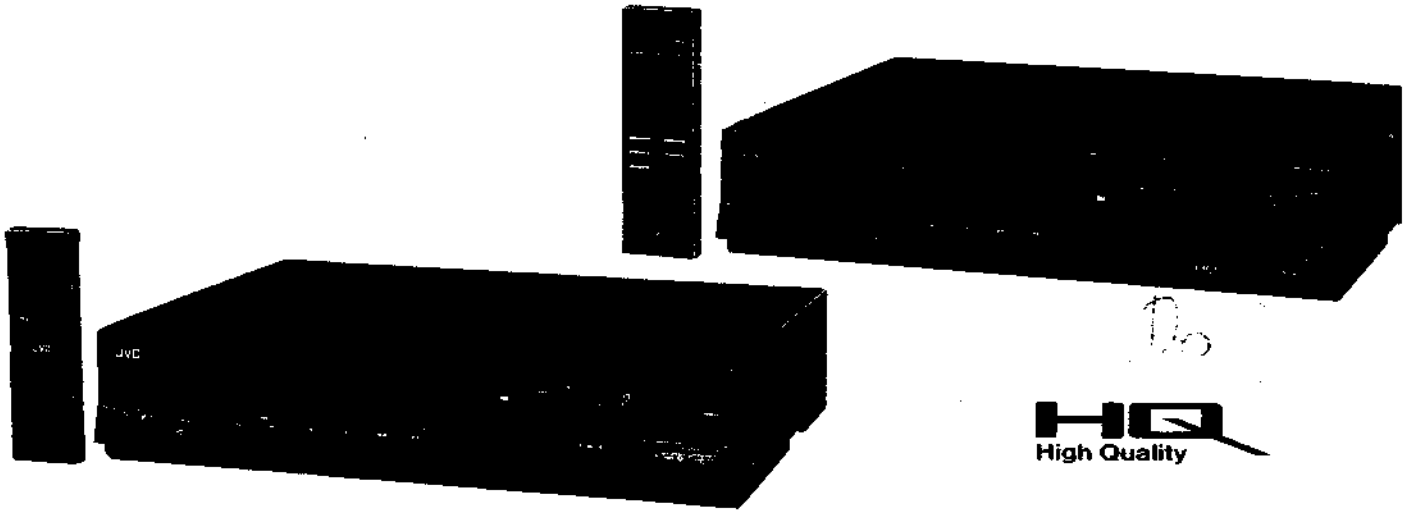
NOTE: ← Same as model at left.

JVC

SERVICE MANUAL

VIDEO-KASSETTEN-RECORDER VHS

HR-D170EG/HR-D180EG EINSTELLANWEISUNG



HQ
High Quality

VPS-Adapter (Modell VU-V90E) kann an HR-D170EG/HR-D180EG angeschlossen werden.

TECHNISCHE DATEN

Format	: VHS PAL
Aufnahmesystem	: Rotierendes Zweikopfsystem, Schrägspurabtastung mit im Winkel versetzten Köpfen (HR-D180EG: mit zwei Videokopfpaaren, je 1 Paar für SP und LP-Betrieb)
Videosignalsystem	: PAL-Farb- und CCIR-Monochromsignale, 625 Linien
Bandbreite	: 12,65 mm
Spielzeit	: 240 Min. mit E-240 Videokassette
	: 480 Min. mit E-240 Videokassette (nur HR-D180EG im LP-Betrieb)
Temperatur	
Betrieb	: 5°C bis 40°C
Lagerung	: -20°C bis 60°C
Frequenzbänder	: VHF 47 – 89 MHz 104 – 300 MHz UHF 470 – 862 MHz
Antennenausgang	: UHF-Kanäle 32 – 40 (einstellbar)
Leistungsaufnahme	
HR-D170EG	: 30 Watt
HR-D180EG	: 33 Watt
Spannungsversorgung	: 220 V~, 50/60 Hz
Video	
Eingang	: 0,5 bis 2,0 Vss, 75 Ohm, unsymmetrisch
Ausgang	: 1,0 Vss, 75 Ohm, unsymmetrisch
Störspannungsabstand	: 43 dB (Rohde & Schwarz Störspannungsmesser) bei Mittenposition des Bildschärfe-Reglers
Horizontale Auflösung	: 250 Linien bei Mittenposition des Bildschärfe-Reglers
Audio	
Eingang	: AUDIO-Buchse (5 pol. DIN): -20 dBs, me als 50 kOhm, unsymmetrisch AUDIO/VIDEO-Buchse (21 pol. Peri-Buchse): -3,8 dBs (CENELEC-Norm), mel als 10 kOhm, unsymmetrisch
Ausgangspegel	: AUDIO-Buchse (5 pol. DIN): -6 dBs, hohe Impedanz AUDIO/VIDEO-Buchse (21 pol. Peri-Buchse): -3,8 dBs (CENELEC-Norm), hoh Impedanz
Ausgangsimpedanz	: Weniger als 1 kOhm, unsymmetrisch
Störspannungsabstand	: Mehr als 40 dB
Frequenzbereich	: 70 bis 10.000 Hz
Schaltuhr	
HR-D170EG	: 14 Tage/4 Programme
HR-D180EG	: 1 Jahr/8 Programme
Abmessungen	: 435(B) x 95(H) x 341(T) mm
Gewicht	: 7,1 kg
Mitgeliefertes Zubehör	: Antennenkabel, Infrarot-Fernbedienung, Batterie x 2, VPS-Adapter (nur HR-D180E

Technische Änderungen vorbehalten!

No. 8451VD/84
August

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3.2 TIMER-SCHALTUNG (1 5 TIMER-Platine)

Hinweis: Wenn nicht anders angeben, befinden sich die Testpunkte und Einstellwiderstände auf der TIMER-Platine.

Nr.	Position	Testpunkt	Abgleich-punkt	Signal & Betriebsart	Beschreibung
1	Timer-Uhr	TP2	C102	• E-E	1) An TP2 und GND einen Frequenzzähler anschließen. 2) TP1 (TEST) und GND kurzschließen. Zur Rückstellung von IC1 dann beide Leitungen von Elektrolyt-Kondensator C7 einmal kurzschließen. 3) C102 auf 2048,010 Hz ±1,0 Hz einstellen.

3.3 SERVO-SCHALTUNG (0 8 SERVO-Platine)

Hinweis: Wenn nicht anders angegeben, befinden sich die Testpunkte und Einstellwiderstände auf der SERVO-Platine.
Vor Schritt 1 und 2 muß die Steuerkopfphase eingestellt werden. Siehe Abschnitt 1.6.3.

1	Wiedergabe-Umschaltpunkt	VIDEO OUT oder Pin 12 von CN2 (0 3 VIDEO-Platine)	R35 (CH-1) PB SW POINT	• MH-2 Grautreppe • Negative Flanke des Triggersignals • Wiedergabe • SP-Betriebsart	1) An VIDEO OUT oder Pin 12 von CN2 an der VIDEO-Platine ein Oszilloskop anschließen. 2) Abgleichband MH-2 (Grautreppe) abspielen. 3) Das Oszilloskop extern mit der negativen Flanke des Signals von TP11 (DRUM FF) triggern. 4) Mit R35 den Triggerpunkt 6,5 ±0,5 H vor V. Synchronimpuls einstellen.
2	Steuerkopf-position	VIDEO OUT oder Pin 12 von CN2 (0 3 VIDEO-Platine)	R46 Steuer-kopf-position	• Wiedergabe • Farbbalken	1) An VIDEO OUT oder Pin 12 Von CN2 auf der VIDEO-Platine ein Oszilloskop anschließen. 2) Abschnitt Farbbalken von Abgleichcassette MH-2 abspielen. 3) R46 auf maximalen Ausgangspegel einstellen.
3	Vertikalpuls-position	MONITOR	R1 (0 6 TERMINAL-Platine)	• Farbbalken • Standbild • Aufnahme, dann Wiederg. • SP-Betriebsart	1) Einen Farbbalken aufnehmen und wiedergeben. 2) Auf Standbild schalten, bei Monitorüberwachung R1 auf minimales vertikales Zittern einstellen.

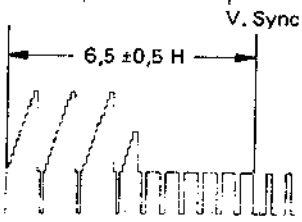


Abb. 3-3-1

3. 4 VIDEO-SCHALTUNG (0 3 MAIN-Platine)

Hinweis: Wenn nicht anders angegeben, befinden sich die Testpunkte und Einstellwiderstände auf der MAIN-Platine.

Nr.	Position	Testpunkt	Abgleich-punkt	Signal & Betriebsart	Beschreibung
1	Vidoe-kopfresonanz und Güte (4 3 PRE/REC-Verstärker-Platine)	TP2 (CH1 SP REC FM) TP5 (PB FM) TP1 (CH2 SP REC FM) TP3 (CH1 LP REC FM) TP4 (CH1 LP REC FM)	C7 (SP CH1 fo) R2 (SP CH1 Q) C5 (SP CH2 fo) R1 (SP CH2 fo) C13 (LP CH1 fo) R3 (LP CH1 Q) C15 (LP CH2 fo) R4 (LP CH2 Q)	• HF-Wobbel-signal • Wiedergabe • SP-Betriebsart • HF-Wobbel-signal • Wiedergabe • LP-Betriebsart	1) Ohne eingelegte Cassette auf Wiedergabe schalten. (Siehe Mechanische Einstellung 1.1.1). 2) An TP2 (CH1) und TP1 (CH2) einen Wobbel-signalgenerator anschließen. 3) Bei TP5 C7 (CH1) und C5 (CH2) auf maximalen Pegel bei der 5-MHz-Position einstellen und R2 (CH1) sowie R1 (CH2) so einstellen, daß das Verhältnis 1-MHz-Pegel zu 5-MHz-Pegel bei 1:2 liegt,wie in Abb. 3-4-1 gezeigt. 4) Die Einstellung wie für SP CH1 und CH2 vornehmen. Den Wobbelsignalgenerator an TP3 (CH1) sowie R4 (CH2) anschließen. 5) Bei TP5 C13 (CH1) und C15 (CH2) auf maximalen Pegel bei der 5-MHz-Position einstellen und R3 (CH1) sowie R4 (CH2) so einstellen, daß das Verhältnis 1-MHz-Pegel zu 5-MHz-Pegel bei 1:2 liegt, wie in Abb. 2-4-1 gezeigt.
2	VXO	TP306 FSC	R328 VXO	• MH-2 Farbbalken • Wiedergabe • SP-Betriebsart	1) An TP306 einen Frequenzzähler anschließen. 2) Abschnitt Farbbalken von Abgleichcassette MH-2 abspielen. 3) R328 auf 4,433619 MHz ±50 kHz einstellen.
3	Aufnahme-FM-Pegel	TP2 (SP) (CH1 SP REC FM (4 3 PRE/REC Verstärker-Platine) TP3 (LP) (CH1 LP REC FM (4 3 PRE/REC Verstärker-Platine)	R119 (REC FM FM ADJ)	• Farbbalken • Aufnahme • LP-Betriebsart • Farbbalken • Aufnahme • SP-Betriebsart	1) Ein Farbbalken-Eingangssignal anlegen. 2) An TP3 der PRE/REC-Verstärker-Platine ein Oszilloskop anschließen. 3) Bei LP-Betriebsart R119 so einstellen, daß der Austastpegel der vertikalen Austastung bei 1 Vss liegt. 4) Bei SP-Betriebsart sicherstellen, daß der Austastpegel der vertikalen Austastung bei 1,3 Vss liegt.

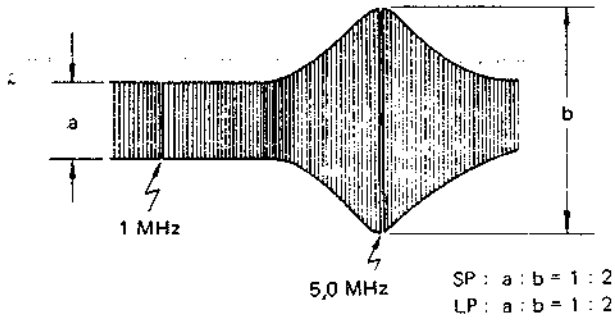


Abb. 3-4-1

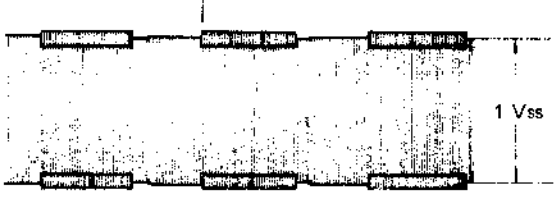
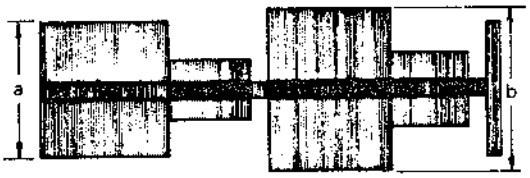
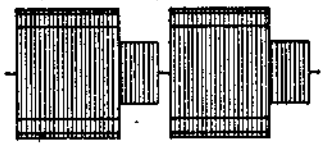
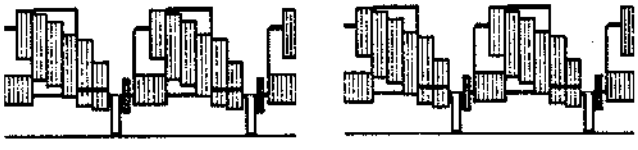
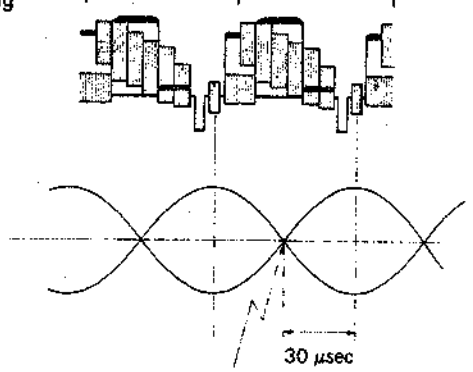
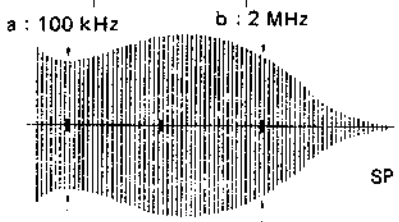
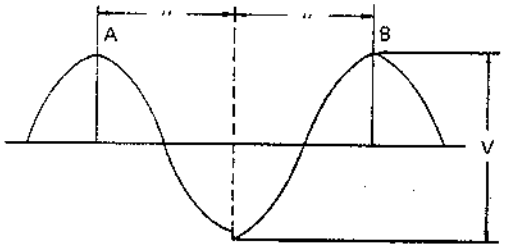


Abb. 3-4-2

1 Vss : LP-Betriebsart
1,3 Vss : SP-Betriebsart

Nr.	Position	Testpunkt	Abgleich-punkt	Signal & Betriebsart	Beschreibung
4	SP-Aufnahme-Farbpegel	TP304	R322	• Farbbalken • Wiedergabe • Aufnahme, dann Wiedergabe • SP-Betriebsart	1) An TP304 ein Oszilloskop anschließen, dann Abschnitt Farbbalken von Abgleichcassette MH-2 abspielen und den Farbsignalpegel beobachten. 2) Den Spurlageregler (R401) der OPERATE-Platine so einstellen, daß der Farbsignalpegel als Maximum vorliegt. Den höheren Pegel merken. 3) Den Spurlageregler (R401) der OPERATE-Platine auf seine einrastbare Mittenposition einstellen. 4) Das Farbbalkensignal aufnehmen, dann wiedergeben. Vor der Aufnahme R322 so einstellen, daß der Kanal mit dem höheren Pegel bei 95 bis 105 % des vorher gemerkten Pegels liegt, wenn wiedergegeben wird. Sicherstellen, daß hierbei die Abweichung zwischen den Kanälen innerhalb 3 dB liegt.
	 Abb. 3-4-3				
5	LP-Aufnahme-Farbpegel	TP304	R438	• Farbbalken • Wiedergabe • Aufnahme, dann Wiedergabe • LP-Betriebsart	1) An TP304 ein Oszilloskop anschließen, dann Abschnitt Farbbalken von Abgleichcassette MH-2 abspielen und den Farbsignalpegel beobachten. 2) Den Spurlageregler (R401) der OPERATE-Platine so einstellen, daß der Farbsginalpegel als Maximum vorliegt. Den höheren Pegel merken. 3) Den Spurlageregler (R401) der OPERATE-Platine auf seine einrastbare Mittenposition einstellen. 4) Das Farbbalkensignal aufnehmen, dann wiedergeben. Vor der Aufnahme R438 so einstellen, daß der Kanal mit dem höheren Pegel bei 75 bis 85 % des vorher gemerkten Pegels liegt, wenn wiedergegeben wird. Sicherstellen, daß hierbei die Abweichung zwischen den Kanälen innerhalb 3 dB liegt.
6	Umkehrfarb-pegel	TP405 (PB COLOUR 4,43 MHz)	R401 (INVERTED COLOUR LEVEL)	• MH-2 Farbbalken • Wiedergabe	1) An TP405 ein Oszilloskop anschließen und den Signalpegel beobachten. 2) TP434, TP435 und GND über Überbrückungskabel miteinander verbinden. Nochmals den Pegel bei TP405 überprüfen. 3) R401 so einstellen, daß für beide Fälle der gleiche Pegel vorliegt, wie in Abb. 3-4-4 gezeigt.
	 Abb. 3-4-4				
7	Verzögerter Videopegel (0,5 H)	TP222 (ORIGINAL VIDEO IN) TP221 (0,5 H DELAYED VIDEO)	R223 (0,5 H DELAYED VIDEO)	• MH-2 Farbbalken • Wiedergabe • LP-Betriebsart	**Hinweis:** Den verzögerten Videopegel nach Einstellung des Umkehrfarbpegels einstellen. 1) Je einen Kanal eines Zweistrahloszilloskops an TP222 und an TP221 anschließen. 2) R223 so einstellen, daß für beide Messungen der gleiche Pegel vorliegt, wie in Abb. 3-4-5 gezeigt.
	 TP222 TP221 Abb. 3-4-5				

Nr.	Position	Testpunkt	Abgleich-punkt	Signal & Betriebsart	Beschreibung
8	Fehlerphase der automatischen Phasenregelung	TP405 (PB Colour) TP433 (7,8 kHz)	L401 (7,8 kHz TUNING)	• MH-2 Farbbalken	1) Je einen Kanal eines Zweistrahloszilloskops an TP405 und TP433 anschließen und die Signalform beobachten. 2) L401 so einstellen, daß der Nulldurchgang 30 µsec ±3 µsec vom Zentrum des Burstsignals liegt, wie in Abb. 3-4-6 gezeigt.
					 Abb. 3-4-6
9	Verzögerter Zeilensprung (0,5 H) DET	TP432 (VCO OUTPUT)	R418 (0,5 DELAYED Jump DET)	• Kein Signal (AUX) • E-E	1) TP431 und TPSWD 5 V mit Überbrückungskabel miteinander verbinden. 2) An TP432 einen Frequenzzähler anschließen. 3) R418 auf 30 ±0,2 kHz einstellen.
10	SP-Wiedergabe-Frequenzgang	TP110 (VIDEO OUT)	R110 (RF EQ)	• Wobbelsignal • Aufnahme, dann Wiedergabe • SP-Betriebsart	1) An TP 110 ein Oszilloskop anschließen. 2) Den Bildschärferegler (R402) der OPERATION-Platine auf seine einrastbare Mittenposition einstellen. 3) Ein Video-Wobbelsignal (mit Sync) aufnehmen und wiedergeben. 4) R110 so einstellen, daß der 2-MHz-Pegel bei 0 ±1 dB (79 – 96 %) in Bezug zu 100 MHz liegt.
					 $SP : \frac{b}{a} = 0 \pm 1$ dB $LP : \frac{b}{a} = -4 \pm 1$ dB Abb. 3-4-7
11	LP-Wiedergabe-Frequenzgang	TP110 (VIDEO OUT)	R202 (LP RF EQ)	• Wobbelsignal • Aufnahme, dann Wiedergabe • LP-Betriebsart	1) An TP 110 ein Oszilloskop anschließen. 2) Den Bildschärferegler auf seine einrastbare Mittenposition einstellen. 3) Ein Video-Wobbelsignal (mit Sync) aufnehmen und wiedergeben. 4) R202 so einstellen, daß der 2-MHz-Pegel bei 4±1 dB in Bezug zu 100 MHz liegt wie in Abb. 3-4-7 gezeigt.
12	SECAM DET	TP310 (S DET ADJ)	L351 (1/2 fH TUNING) R355 (S DET ADJ)	• SECAM-Farbbalken • E-E	1) An TP310 ein Oszilloskop anschließen. 2) L351 so einstellen, daß die Übergangsstufe im Zentrum zwischen A und B liegt, wie in Abb. 3-4-8 gezeigt.
		Diesen Punkt zentral zwischen Punkt A und B legen. V = mehr als 5,5 Vss bei Aufnahme V = 6,5 ±0,5 Vss bei Wiedergabe			 Abb. 3-4-8
				• Aufnahme, dann Wiedergabe	3) Aufnehmen, dann wiedergeben. 4) R355 auf 6,5 ±0,5 Vss einstellen.

3.5 AUDIO- & STEUERSCHALTUNG ([0][9] AUDIO & CUE-Platine)

Hinweis: Wenn nicht anders angegeben, befinden sich die Testpunkte und Einstellwiderstände an der AUDIO & CUE-Platine.

Nr.	Position	Testpunkt	Abgleich-punkt	Signal & Betriebsart	Beschreibung
1	Vormagneti-sierungspegel	TP31 (BIAS LEVEL)	R20 (BIAS LEVEL)	• Aufnahme • SP-Betriebsart	1) Zwischen TP31 und TP32 ein Digital-Voltmeter anschließen. 2) Ohne Signal auf Aufnahme schalten. 3) R20 auf 12,5 V ±0,2 mVrms einstellen.
2	Audio-Wieder-gabepegel	AUDIO OUT	R5 (PB LEVEL)	• Aufnahme • SP- oder LP-Betriebsart	1) An AUDIO OUT ein Oszilloskop anschließen. 2) An AUDIO IN ein Audiosignal (-8 dBs/1 kHz) legen und zusammen mit einem Videosignal aufnehmen, dann wiedergeben 3) R5 so einstellen, daß der Wiedergabe-Ausgangspegel des Audiosignals bei -6 ±2 dBs.

3.6 TUNER/ZF-SCHALTUNG ([0][7] TU/IF-Platine)

Hinweis: Wenn nicht anders angegeben, befinden sich alle Test- und Einstellpunkte an der TUNER/IF-Platine.

Erforderliche Geräte:
1. Oszilloskop
2. ZF-Wobbelsignalgenerator mit Markengeber (Bild – Ton ZF
3. Gleichspannungsversorgung – Für Betriebsspanung (12,0 V)
   – Für ZF AGC-Vorspannung (ca. 5 V variabel)
4. Anschlußkabel (Wobbelsignal-Kabel) wie unten gezeigt.

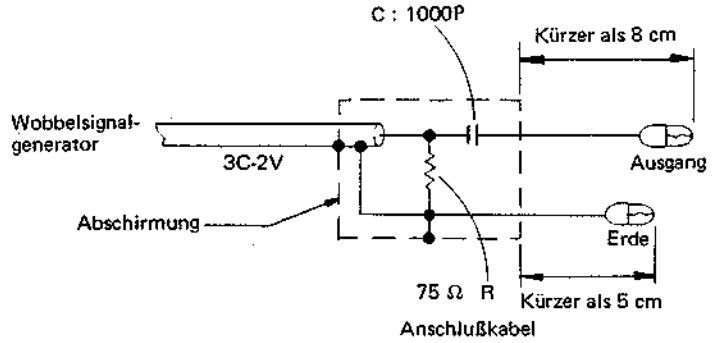
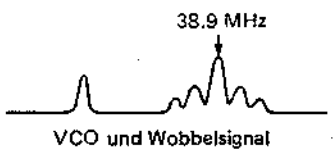


Abb. 3-6-1

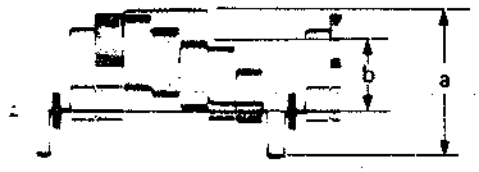
1	VCO 38,9 MHz	Pin 28 von IC1	T2	• Wobbelsignal • Generator	1) Das in der Abb. gezeigte Anschlußkabel (zur ZF-Einstellung) verwenden und ein ZF-Wobbelsignal an den SAW 1-Eingang legen. 2) An Pin 6 von IC1 (IF AGC) 4,5 V Gleichspannung legen. An Pin 28 (VIDEO DET OUT) ein Oszilloskop anschließen und mit T2 die Signalform an die links gezeigte Marke anpassen. **Hinweis:** Der Wobbelsignalgenerator-Ausgangspegel liegt bei 70 dB µ/75 Ω.
2	Eingangs-ZF	UHF/ VHF-Tuner	ZF-Spule	• Wobbelsignal • Generator	1) Das Anschlußkabel für die ZF-Einstellung verwenden und ein ZF-Wobbelsignal an den Eingangs-Testpunkt (U/V TUNER) (TP) legen. 2) Mit dem Anschlußkabel für die ZF-Einstellung SAW 1-Eingang mit dem ZF-Meßgerät verbinden. 3) Die Eingangs-ZF-Spule auf Maximalfrequenz einstellen.



VCO und Wobbelsignal

Abb. 3-6-2

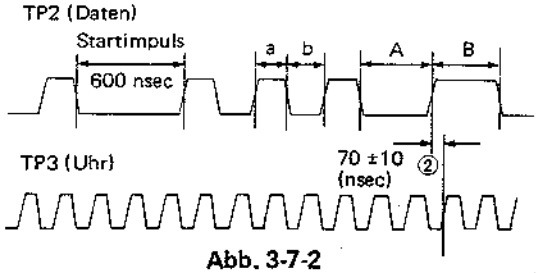
Nr.	Position	Testpunkt	Abgleich-punkt	Signal & Betriebsart	Beschreibung
3	Tonfalle	UHF/ VHF-Tuner (Im Tuner-teil)	T1	• Farbbalken	1) An den U/V-Tuner-Testpunkt ein 32,4 MHz-Signal mit 400 Hz Amplitudenmodulation legen. 2) Ein Oszilloskop an Pin 28 von IC1 anschließen und die Spule der Ausgangsseite von T1 auf Minimalpegel einstellen.
4	HF AGC	UHF/ VHF-Tuner (Im Tunerteil)	R11	• Farbbalken	1) Ein Farbbalkensignal anlegen und ein Oszilloskop an den ZF-Eingang anschließen. 2) R11 auf Maximalpegel einstellen. Dann mit R11 den Pegel um 10 dB absenken.
5	VPS Y-Pegel	CN3-Pin 1 (VIDEO OUT)	R16	• Moduliertes Signal	1) Ein Signal mit 87,5 % Modulation anlegen. R16 so einstellen, daß bei Pin 1 (VPS OUT) von CN3 ein maximaler Y-Pegel (inkl. Sync) von 2,0 Vss vorliegt.
6	Farbpegel	CN2-Pin 3 (VIDEO OUT)	R42	• Farbbalken	1) Ein Farbbalkensignal anlegen. Unter Annahme des Y-Pegels als 100 % R42 so einstellen, daß für Pin 3 (VIDEO OUT) von CN2 der Magentapegel bei 48 % liegt.



b : Magenta
a : b = 1 : 0.48

Abb. 3-6-3

3. 7 VPS-ADAPTER-SCHALTUNG (A f -Platine)

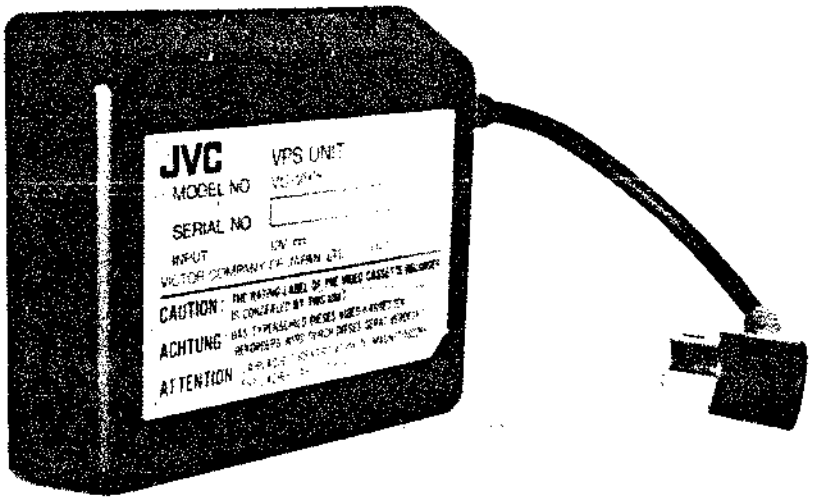
1	Oszillator-Einstellung	TP6	T1	–	1) TP5 and VDD (+5 V) anschließen, TP4 an Erde legen. 2) Die TP6-Signalform im Oszilloskop beobachten. 3) Spule T1 so einstellen, daß das Maximum wie in der Abbildung durch (1) angezeigt vorliegt.  Abb. 3-7-1
2	Funktions-überprüfung	TP2 und TP3		–	1) Unter Bezugnahme auf das Diagramm überprüfen, ob folgende Vorgaben eingehalten werden: a:b = 200 ±10 (nsec) : 200 ±10 (nsec) A:B = 400±20 (nsec):400±20 (nsec) Der Startimpuls liegt vor dem Datencode und beträgt hier 600 nsec.  Abb. 3-7-2 2) Zeitsteuerung T1 so einstellen, daß die Zeitdifferenz swischen positiver Daten- und Uhrensignalflanke (als 2 in der Abb. bezeichnet) bei ±10 nsec liegt.

JVC

SERVICE MANUAL

VIDEO PROGRAMING SYSTEM UNIT

VU-V90E



NOTE: This VPS Unit is separately sold.

No. 8457 (2/2)
June 1986

Anbringen der VPS-Einheit

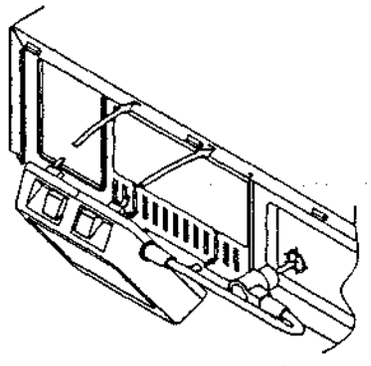
1 : Die beiden unteren Haken der Einheit in die mit den Pfeilmarkierungen gekennzeichneten Ventilationsschlitze einsetzen.
2 : Dann die Einheit wie gezeigt nach oben klappen, und die beiden oberen Riegel in die flachen Öffnungen unterhalb der Rekorderoberseite einführen.
3 : Das Kabel der Einheit an die VPS-Buchse des Rekorders anschließen.

How to attach the VPS unit

1 : Insert the two lower hooks on the unit into the two ventilation holes indicated by ▽ marks.
2 : Inserting the two upper latches into the slits near the top of the VCR body.
3 : Insert the unit's plug into the VPS terminal on *rear* panel.

Fixation du boîtier VPS

1 : Introduire les deux crochets inférieurs du boîtier dans les deux trous de ventilation indiqués par les repères ▽.
2 : Faire basculer ver le haut le boîtier en introduisant les deux verrous supérieurs dans les fentes près du haut du corps du magnétoscope.
3 : Brancher la fiche du boîtier dans la prise VPS du panneau arriere.



Abnehmen der VPS-Einheit

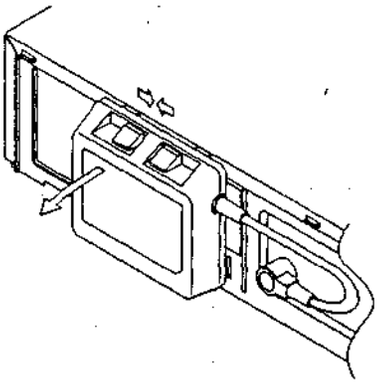
1 : Das Kabel von der VPS-Buchse abziehen.
Die beiden Tasten an der Oberseite der Einheit wie gezeigt in Pfeilrichtung drücken.
3 : Die Tasten so gedrückt halten, und die Einheit nach unten abklappen. Nun die Haken aus den Ventilationsschlitzen ziehen.

How to detach the VPS unit

1 : Pull out the plug from the VPS terminal.
2 : Slide together the two knobs on the top of the unit as shown by the arrows.
3 : Keeping them pressed together, swing the unit down and lift it's hooks out of the ventilation holes.

Démontage du boîtier VPS

1 : Débrancher la fiche de la prise VPS.
2 : Glisser ensemble les deux boutons sur le dessus de l'appareil comme montré par les flèches.
3 : En les maintenant pressés ensemble, basculer le boîtier vers le bas et retirer ses crochets inférieurs des trous de ventilation.



1. ELECTRICAL ADJUSTMENT

1. Oscillator adjustment (TP6 waveform)

   1) Connect TP5 to VDD (+5 V) and TP4 to ground.
   2) Observe the TP6 waveform on an oscilloscope.
   3) Adjust the inner core of coil T1 so that maximum (peak) apperas as shown by (1) in the figure.

Fig. 1-1

2. Duty check (TP2 and TP3 waveforms)

   Refer to the figure and checkthat
   a : b = 200 ± 10 (nsec) : 200 ± 10 (nsec)
   A : B = 400 ± 20 (nsec) : 400 ± 20 (nsec)

   The start pulse is positioned ahead of the data and is 600 ns only at this point.

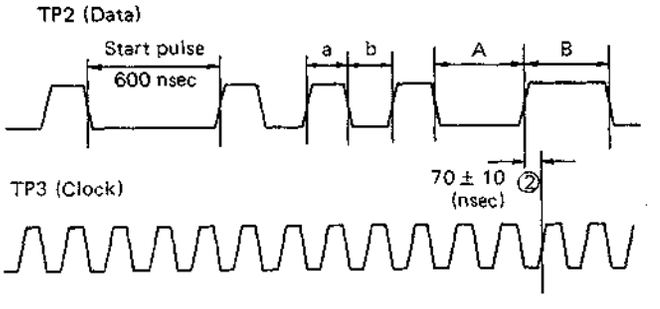


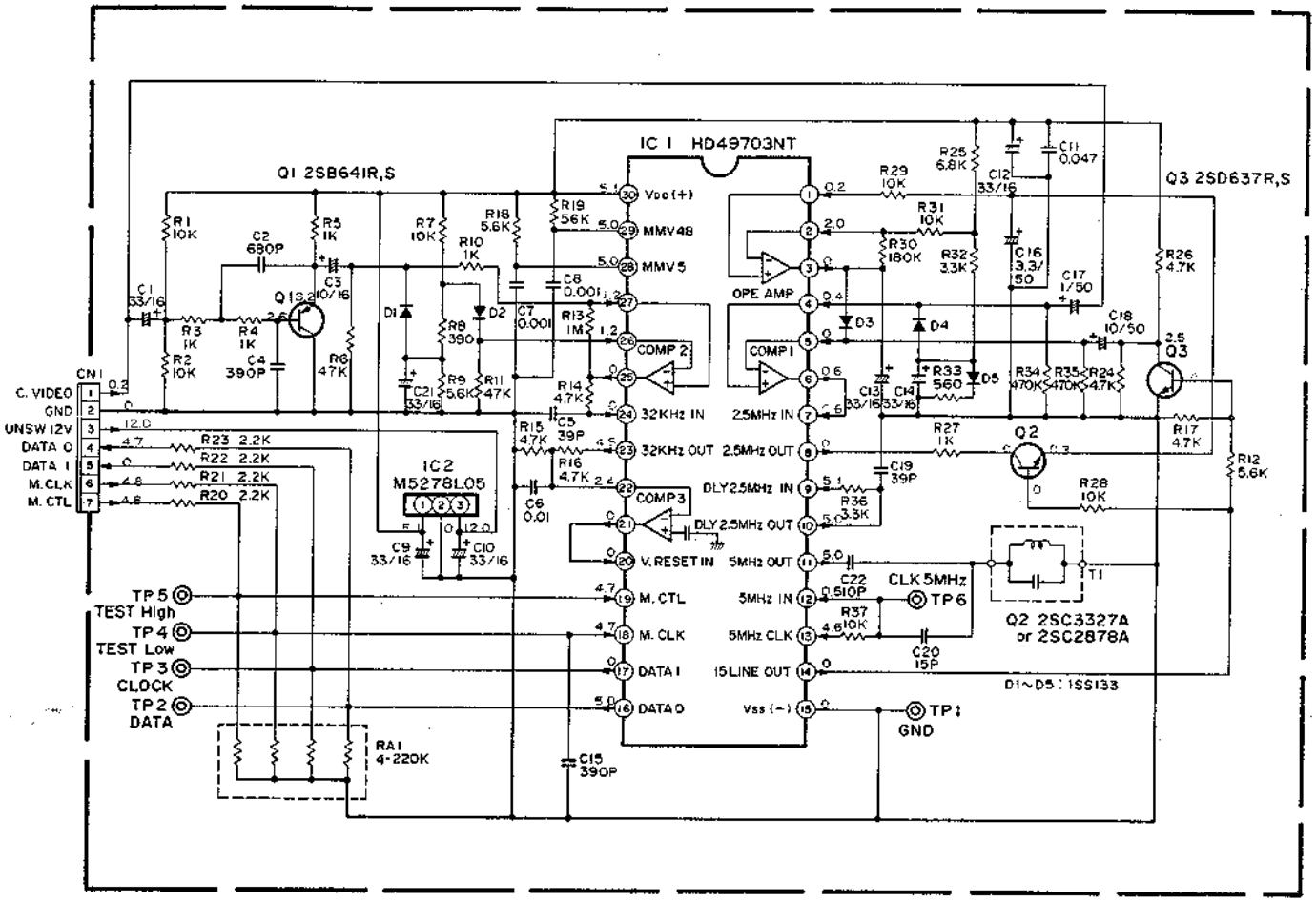
Fig. 1-2

3 Timing

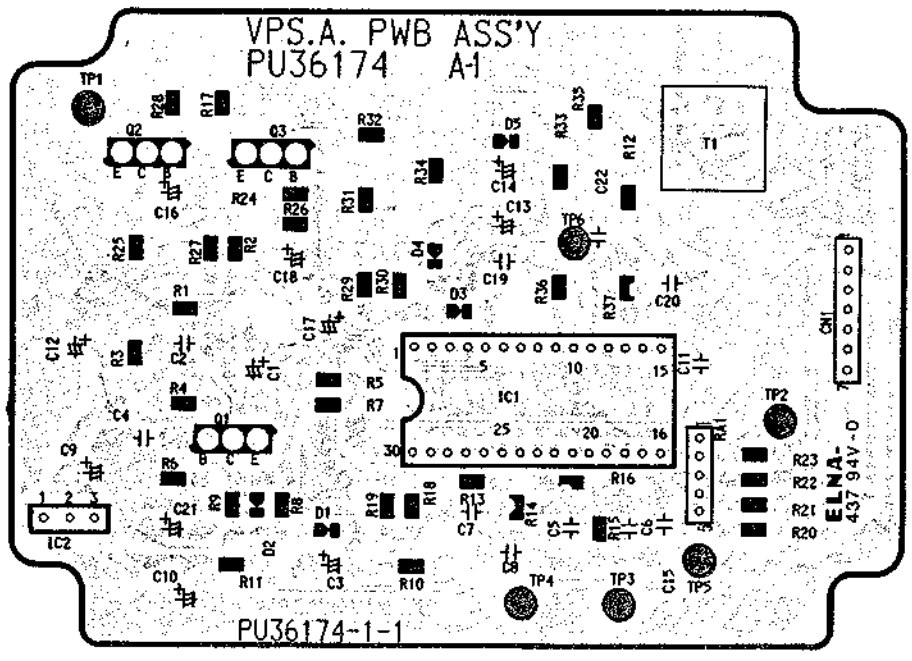
Adjust T1 so that time between data rise and clock rise (2 in figure) is 70 ± 10 ns.

2. SCHEMATIC AND CIRCUIT BOARD

2.1 SCHEMATIC DIAGRAM

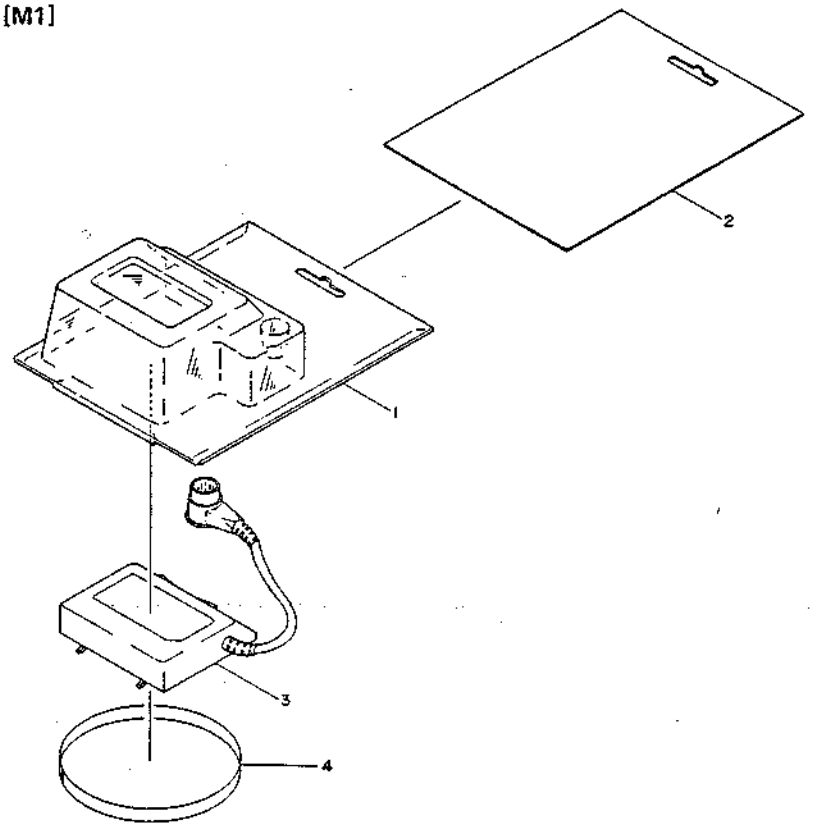


2.2 CIRCUIT BOARD

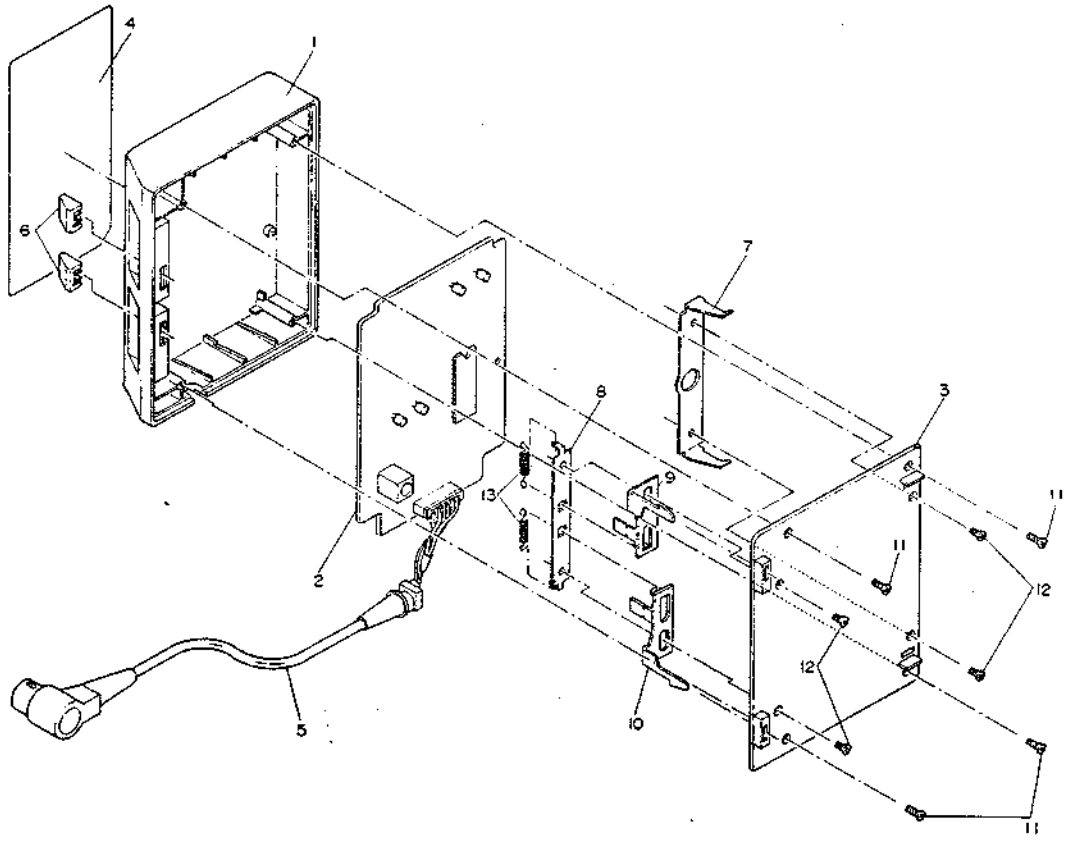


3. EXPLODED VIEWS

3.1 PACKING ASSEMBLY [M1]



3.2 VPS UNIT ASSEMBLY [M2]



4. PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS– All resistance values are in ohms (Ω), unless otherwise indicated.

k	: 1,000 (Kilo)
M	: 1,000,000 (Mega)
Chip R	: Chip Resistor
Chip VR	: Chip Variable Resistor
Comp. R	: Composition Resistor
CR	: Carbon Film Resistor
FR	: Fusible Resistor
MFR	: Metal Film Resistor
MPR	: Metal Plate Resistor
OMR	: Oxide Metal Film Resistor
PMR	: Precistion Metal Film Resistor
UFR	: Unflammable Resistor
VR	: Variable Resistor (Potentiometer)
WR	: Wire Wound Resistor

CAPACITORS–All capacitance values are in μF, unless otherwise indicated.

pF	: μμF (Pico farad)
C Cap	: Caramic Capacitor
Chip Cap	: Chip Capacitor
Chip T Cap	: Chip Tantalum Capacitor
E Cap	: Electrolytic Capacitor
FM Cap	: Film Mica Capacitor
LL Cap	: Low Leak Current Electrolytic Capacitor
MM Cap	: Metalized Mylar Capacitor
MP Cap	: Metalized Paper Capacitor
MY Cap	: Mylar Capacitor
NP Cap	: Non-polar Capacitor
PC Cap	: Polycarbonate Capacitor
PP Cap	: Polypropylene Capacitor
PS Cap	: Polystyrol Capacitor
T Cap	: Tantalum Capacitor
TF Cap	: Thin Film Capacitor
TR Cap	: Trimmer Capacitor

NOTES:

- [M] indicates mechanical symbol number.
- [2 digits] indicates circuit board symbol number.
- "X " indicates quantities for use.

#	⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
				PACKING ASSEMBLY [M1]
		1	PQ10405	COVER
		2	PQ20364	PACKING SHEET
		3	–	VPS UNIT ASSEMBLY, REFER TO [M2]
		4	PQ42679	SPACER
				VPS UNIT ASSEMBLY [M2]
		1	PQ20362	UPPER CASE
		2	–	VPS BOARD ASSEMBLY, REFER TO [01]
		3	PQ20363	LOWER CASE
		4	–	RATING LABEL
		5	–	CORD ASSEMBLY, REFER TO [01]
		6	PU36199	RELEASE KNOB, X2
		7	PQ42627	LOCK ARM
		8	PQ42611	LOCK PLATE
		9	PQ42628	SLIDE PLATE (R)
		10	PQ42612	SLIDE PLATE (L)
		11	SSSF2608M	TAP. SCREW, X4
		12	SSSP2605M	SCREW, X4
		13	PQM30001-214	TENSION SPRING, X2

#	⚠	REF. NO.	PART NO.	PART NAME, DESCRIPTION
			PU36174A-1	VPS BOARD ASSEMBLY [01]
		IC1	HD49703NT	INTEGRATED CIRCUIT
		IC2	M5278L05	INTEGRATED CIRCUIT
		Q1	2SB641R,S	TRANSISTOR
		Q2	2SC3327A	TRANSISTOR
		OR	2SC2878A	TRANSISTOR
		Q3	2SD637R,S	TRANSISTOR
		D1	1SS133	DIODE
		D2	1SS133	DIODE
		D3	1SS133	DIODE
		D4	1SS133	DIODE
		D6	1SS133	DIODE
		R1	QRD161J-103	CR
		R2	QRD161J-103	CR
		R3	QRD161J-102	CR
		R4	QRD161J-102	CR
		R5	QRD161J-102	CR
		R6	QRD161J-473	CR
		R7	QRD161J-103	CR
		R8	QRD161J-391	CR
		R9	QRD161J-562	CR
		R10	QRD161J-102	CR
		R11	QRD161J-473	CR
		R12	QRD161J-562	CR
		R13	QRD161J-105	CR
		R14	QRD161J-472	CR
		R15	QRD161J-472	CR
		R16	QRD161J-472	CR
		R17	QRD161J-472	CR
		R18	QRD161J-562	CR
		R19	QRD161J-563	CR
		R20	QRD161J-222	CR
		R21	QRD161J-222	CR
		R22	QRD161J-222	CR
		R23	QRD161J-222	CR
		R24	QRD161J-472	CR
		R25	QRD161J-682	CR
		R26	QRD161J-472	CR
		R27	QRD161J-102	CR
		R28	QRD161J-103	CR
		R29	QRD161J-103	CR
		R30	QRD161J-184	CR
		R31	QRD161J-103	CR
		R32	QRD161J-332	CR
		R33	QRD161J-561	CR
		R34	QRD161J-474	CR
		R35	QRD161J-474	CR
		R36	QRD161J-332	CR
		R37	QRD161J-103	CR
		RA1	RN8H5A224	R. NETWORK
		C1	QETC1CM-336	E CAP
		C2	QCS31HJ-681	C CAP
		C3	QETC1CM-106	E CAP
		C4	QCS31HJ-391	C CAP
		C5	QCT25CH-390	C CAP
		C6	QFN31HJ-103	M CAP
		C7	QFN31HJ-102	M CAP
		C8	QFN31HJ-102	M CAP
		C9	QETC1CM-336	E CAP
		C10	QETC1CM-336	E CAP
		C11	QCF31HP-473	C CAP
		C12	QETC1CM-336	E CAP
		C13	QETC1CM-336	E CAP
		C14	QETC1CM-336	E CAP
		C15	QCS31HJ-391	C CAP
		C16	QETC1HM-335	E CAP
		C17	QETC1HM-105	E CAP
		C18	QETC1HM-106	E CAP
		C19	QCT25CH-390	C CAP
		C20	QCT25CH-150	C CAP
		C21	QETC1CM-336	E CAP
		C22	QCT25CH-100	C CAP
		T1	PU58484	COIL
		CN1	PU58844-7	CAP HOUSING
			PU59233	CORD ASS'Y
		TP	PU56008	TEST PIN, TP1–6

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