

Service Manual

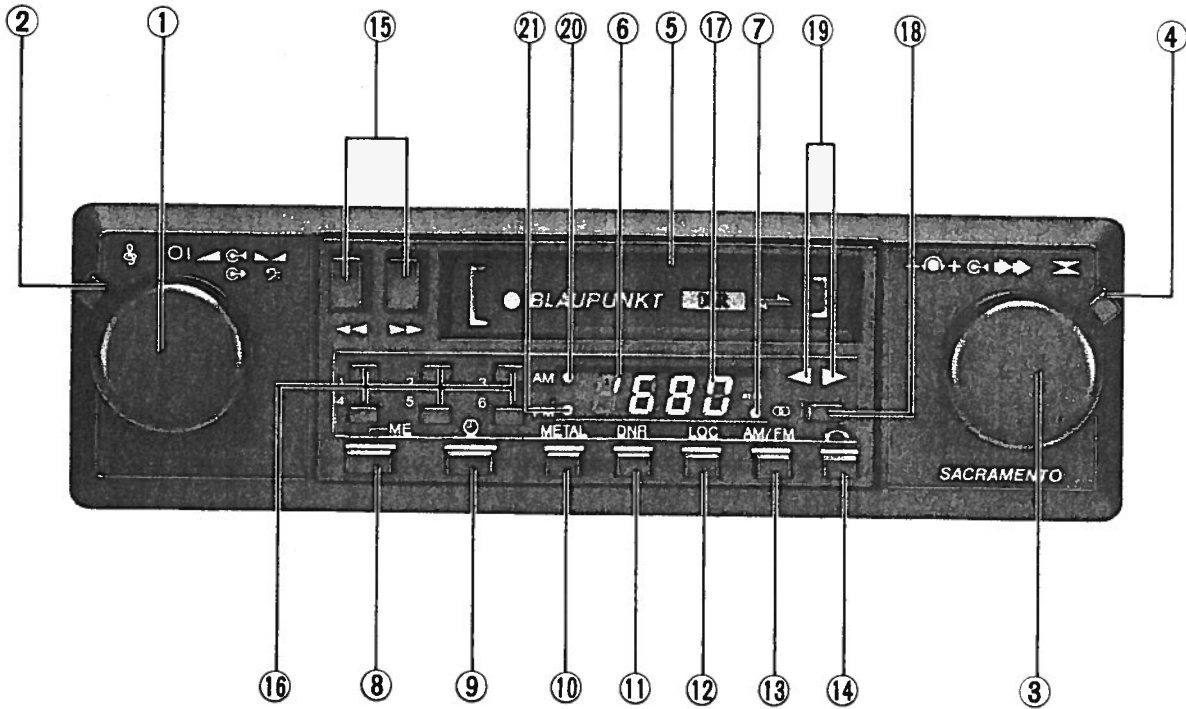
IN-DASH AUTOREVERSE CASSETTE
PLAYER WITH AM/FM STEREO PLL
RADIO, CONNECTION FOR ARI® A-
DAPTER, FADER CONTROL AND DNR

SACRAMENTO

● **BLAUPUNKT**



Dimensions: 160(W) x 50(H) x 125(D)mm



OPERATION OF CONTROLS

The symbols screened onto the front panel above the operating controls on the SACRAMENTO, are international function symbols to indicate the various unit functions those controls operate. An explanation of these symbols follows:

- ⏻ = On/Off
- ◀ = Volume Control
- 🎵 = Bass Tone Control
- 🎵 = Treble Tone Control
- ↔ = Left/Right Balance Control (Push and Turn)
- 🔍 = Signal Search Tuning
- 🔍 = Manual Tuning
- ME = Preset Memory Entry
- 🕒 = Time Check
- 🗑️ = Tape Ejection
- ⏪ = Program (Tape Direction)
- 🔊 = FM Stereo
- ⏩ = Tape Fast Forward
- ⏮ = Tape Fast Rewind
- DNR = Dynamic Noise Reduction
- ⏸ = Fader Control
- METAL = Metal Tape
- LOC = Local

UNIT FEATURES

- ① Power On/Off & Volume Control (Turn)
Balance Control, left-right (Push & Turn)
Bass Tone Control (Pull & Turn)
- ② Treble Tone Control
- ③ Signal Searching (Push)
Manual Tuning (Turn)
- ④ Fader Control, front-rear
- ⑤ Cassette Insertion Slot
- ⑥ Memory Entry Indicator
- ⑦ Stereo Indicator
- ⑧ Memory Entry Button
- ⑨ Time Check Button
- ⑩ Tape Equalization Button
- ⑪ DNR On/Off Switch
- ⑫ Local/DX Button
- ⑬ AM/FM Waveband Selector
- ⑭ Eject Button
- ⑮ Locking Fast Forward & Rewind Buttons
- ⑯ Preset Station Selectors (6 AM & 6 FM)
- ⑰ Digital Frequency/Clock Display
- ⑱ Program Change Button
- ⑲ Tape Program Indicators
- ⑳ AM Indicator
- ㉑ FM Indicator

GENERAL INFORMATION

SEMICONDUCTORS: 12 ICs, 3 FET's, 35 Transistors, 44 Diodes, 4 Hybrid ICs, 2 LEDs, 1 LED Display
 RADIO SECTION: 3 ICs, 2FET's, 13 Transistors, 12 Diodes, 3 Hybrid ICs

AM RADIO SECTION:

1. AM IC.	IC601	LA1130.	CR 0 312 146 0
2. RF AMP FET.	Q601	2SK161 or equivalent.	CR 0 302 012 2
3. AGC Transistor.	[Q602 Q603 Q604]	2SC3312 or equivalent.	CR 0 304 100 0
4. Buffer AMP FET.	Q605	2SK161 or equivalent.	CR 0 302 012 2
5. Buffer AMP Transistor.	[Q606 Q608]	2SC3312 or equivalent.	CR 0 304 100 0
6. Search Stop Transistor.	Q607	2SC3312 or equivalent.	CR 0 304 100 0
7. Varactor Diode.	[D601-1 D601-2 D601-3]	KV1235Z.	CR 0 306 010 0
8. Switching Diode.	[D602 D603 D604 D605 D606]	1S1588 or equivalent.	CR 0 305 039 0
9. Loc/Dx Transistor.	Q801	2SC3312 or equivalent.	CR 0 304 100 0

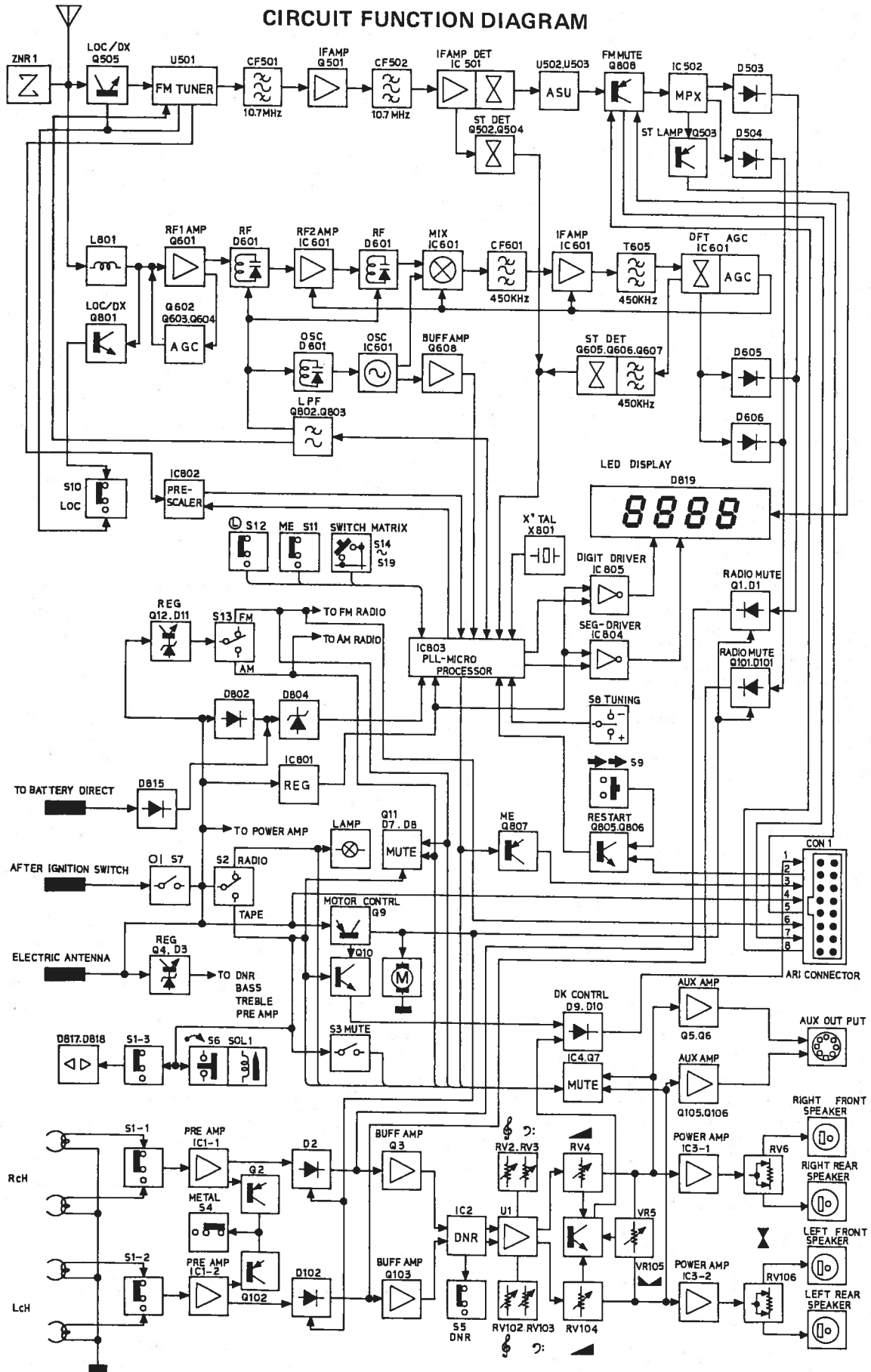
FM RADIO SECTION

1. FM Tuner Hybrid I.C.	U501	FM Tuner.	CR 2 462 002 0
2. ASU Hybrid I.C.	U502	FM ASU I.	CR 0 314 002 0
3. ASU Hybrid I.C.	U503	FM ASU II.	CR 0 314 003 0
4. FM IF I.C.	IC501	LA1140.	CR 0 312 131 0
5. MPX I.C.	IC502	LA3370 or equivalent.	CR 0 312 135 0
6. IF AMP Transistor.	Q501	2SC2668 or equivalent.	CR 0 304 064 0
7. Search Stop Transistor.	[Q502 Q504]	2SC3312 or equivalent.	CR 0 304 100 0
8. Stereo Indicator Transistor.	Q503	2SA1310 or equivalent.	CR 0 304 036 0
9. Loc/Dx Transistor.	Q505	2SC3327 or equivalent.	CR 0 304 103 0
10. Buffer AMP Transistor.	Q808	2SA1310 or equivalent.	CR 0 304 036 0
11. Switching Diode.	[D501 D502 D503 D504]	1S1588 or equivalent.	CR 0 305 039 0

CONTROLLER AND DISPLAY SECTION: 5 ICs, 1 FET, 5 Transistors, 17 Diodes

1. Prescaler I.C.	IC802	μPB553AC.	CR 0 312 137 0
2. PLL Controller I.C.	IC803	μPD1701C-013.	CR 0 312 142 0
3. Segment Driver I.C.	IC804	TD62506P.	CR 0 312 143 0
4. Digit Driver I.C.	IC805	TD62301P.	CR 0 312 144 0
5. Voltage Regulator I.C.	IC801	AN78M05 or NIQ78M05.	CR 0 312 145 0
6. Low Pass Filter Transistor.	Q802	2SC3312 or equivalent.	CR 0 304 100 0
7. Low Pass Filter FET.	Q803	2SK118 or equivalent.	CR 0 302 032 0
8. Display Control Transistor.	Q804	2SC3312 or equivalent.	CR 0 304 100 0
9. Search Start Transistor.	Q805	2SA1310 or equivalent.	CR 0 304 036 0
10. Search Start Transistor.	Q806	2SC3312 or equivalent.	CR 0 304 100 0
11. ME Output Transistor.	Q807	2SA1310 or equivalent.	CR 0 304 036 0
12. Zener Diode.	D814	05Z5.1X or equivalent.	CR 0 307 029 0
13. Zener Diode.	D801	05Z10Y or equivalent.	CR 0 307 030 0
	[D802 D803 D804 D805 D806 D807 D808]		

CIRCUIT FUNCTION DIAGRAM



SERVICE ALIGNMENT PROCEDURES

RADIO SECTION

Test equipment required:

1. AC/DC V.T.V.M. (input impedance > 1 megohm)
2. A well regulated power supply (15V @5A)
3. Non-metallic alignment tools
4. AM/FM sweep generator
5. AM/FM signal generator
6. Oscilloscope
7. Frequency counter
8. FM Stereo generator

1. AM SECTION

A. Alignment of Control Block AM Oscillator Frequency

1. Connect the frequency counter to T601 and ground. (See Figure 1)
2. Turn on the radio, and tune the radio to 1000 kHz.
3. Read the frequency counter display, and adjust CT801 to obtain a reading of 1450 kHz \pm 3 Hz. (See Figure 2 for location of CT801)

B. AM IF ALIGNMENT

1. Connect the AM sweep generator's output to the antenna receptacle (no antenna pad is necessary), and the oscilloscope's vertical axis to TP602 (R617 test point). (See Figure 1 and Figure 3)
2. Set the sweep generator to 450 kHz and turn on the radio.
3. Adjust the sweep generator and oscilloscope's Controls to obtain a display similar to that shown in Figure 4, keep the generator's output as low as possible to avoid clipping and saturation.
4. Align T604 and T605 to obtain a maximum and symmetrical curve. (See Figure 1 for locations of T604 and T605.)

C. AM RF Alignment

1. Turn on the radio and tune to 530 kHz.
2. Connect a DC voltmeter across TP603 (R612 test point) and ground. (See Figure 1)
3. Adjust T603 until the DC control voltage is 1.25V.
4. Now tune the radio to 1620 kHz.
5. With the DC voltmeter still connected to TP603 (R612 test point) and ground, adjust TC601 until the DC control voltage is 8.5V.
6. Repeat steps 1-5 until no change in the DC Control voltages occurs.
7. Connect the output of the AM signal generator to the antenna input of the radio through a matching pad. (See Figure 5).
8. Connect a 4 Ω load to each speaker output. Connect an AC V.T.V.M. and oscilloscope across one of the outputs.
9. Set the volume control to maximum, the bass/treble and balance controls to their center position, and all audio compensation circuits to the off position.
10. Adjust the signal generator's frequency and the radio to 600 kHz. Adjust the signal generator's output until the output voltage reads 2V across the 4 Ω load (1W).

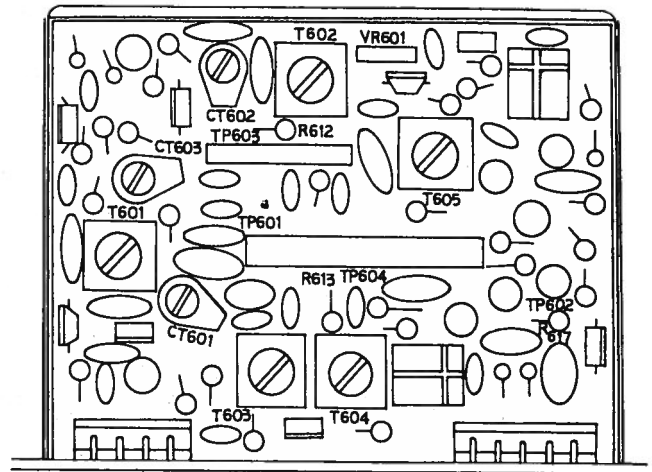


Figure 1

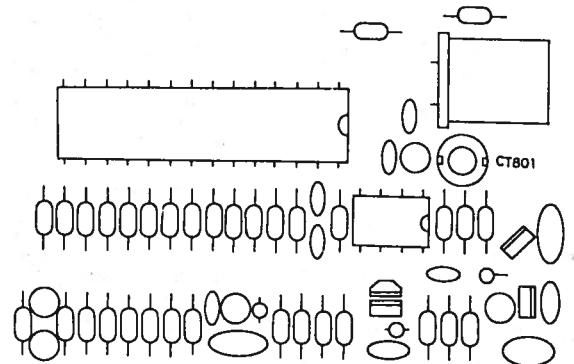


Figure 2

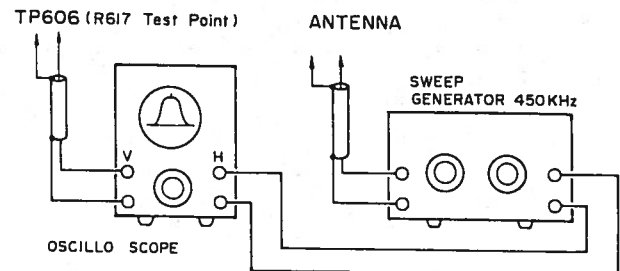


Figure 3

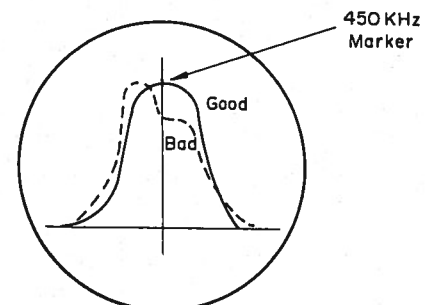


Figure 4

AUDIO SECTION

Equipment Required.

1. Stabilized power supply (DC 14V)
2. DC Voltmeter (Input impedance: More than 1M ohm)
3. Audio frequency generator
4. AC V.T.V.M.

PILOT FILTER ADJUSTMENT

- (1) Set the audio frequency generator to 19 kHz \pm 2 Hz.
- (2) Adjust output voltage to obtain 100mV.
- (3) Connect the DC volt meter to test point (TP1) and rotate L1 to read minimum voltage on the meter. (See Figure 11)

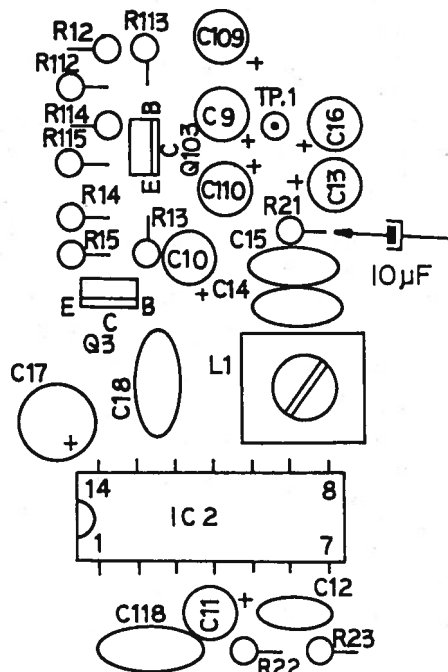
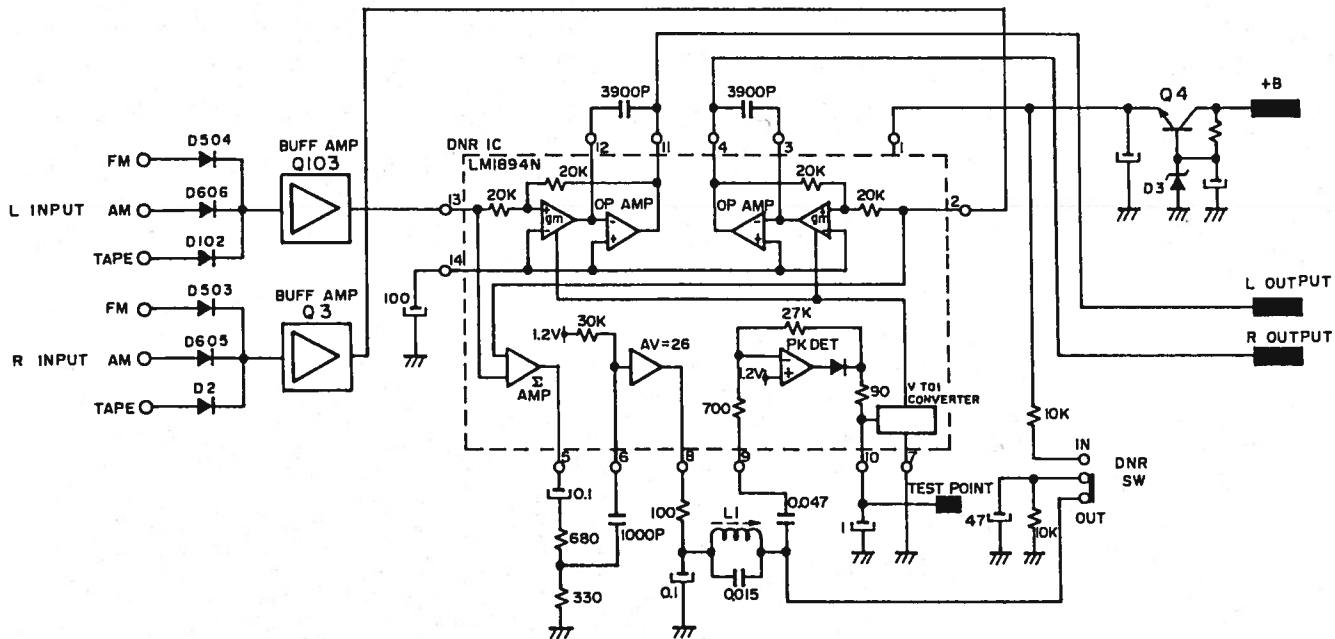


Figure 11

DNR CIRCUIT



DNR™ – DYNAMIC NOISE REDUCTION

1. DNR FUNDAMENTAL THEORY:

The SACRAMENTO incorporates one of the latest noise reduction systems, DNR (Dynamic Noise Reduction). Unlike other noise reduction systems which only prevents more noise from being added to the recorded program, DNR acts to remove noise already present in the recorded program. Since DNR requires no special processing during recording, it is effective on all types of cassette tapes as well as AM and FM.

The basic design principles of DNR are, "Noise is proportional to the system bandwidth" and "The ability to hear noise is proportional to the sound level". Since the majority of the noise's frequency components are in the high frequency spectrum, reducing the frequency bandwidth from 30 kHz down to 1 kHz approximately 14 dB of noise attenuation can be achieved.

Control of the bandwidth is achieved by audio level circuitry. At low sound levels noise can be heard much easier than at high sound levels. So at low sound levels the audio level circuitry acts to reduce the system bandwidth. As the sound level increases the sound begins to "mask" the noise, and the audio level circuitry acts to widen the system bandwidth. As a result, significant improvement in noise reduction can be realized using DNR.

2. CIRCUIT OPERATION:

In its most basic form the DNR circuitry is composed of a variable low pass filter section and control section. As the signal enters the DNR I.C. it is routed to each of these sections.

The variable low pass filter section is composed of a variable transconductance block (gm) that drives an OP amp integrator. This configuration produces a low pass filter of -6 dB/octave whose corner frequency is variable by the current flowing into the variable transconductance block. Corner frequencies of 800 Hz – 30 kHz can be achieved with the DNR low pass filter section.

The control section's purpose is to determine the audio signal's spectrum components and level and producing a current to feed the variable (gm) block. Right and left audio signals are summed in a summing (Σ) amplifier and fed to a high gain amplifier. The total gain of the two amplifiers is 60. High gain is necessary to sense low noise conditions.

Since the higher audio frequencies seem to mask noise better than the low audio frequencies, the signal goes through a high pass weighting filter. The detector (audio level detector) will look and respond only to those frequencies that are capable of masking the noise. A 19 kHz notch filter is also included to reject the FM pilot signal. The 19 kHz signal could falsely activate the DNR circuitry.

The weighted signal drives a peak level detector which drives a voltage to current inverter. It is this control current that will vary the bandwidth.

The detector's attack and decay time has been selected for optimum performance against transient response.

3. ACTIVATION OF DNR:

Activation of DNR is achieved by depressing the DNR button located on the front of the radio. Activating DNR allows the peak detector to dynamically change with the program content. De-activation of DNR disables the operation of the peak detector and opens the bandwidth to the full extent.

PRINCIPLE FUNCTION OF PHASE-LOCKED-LOOP

- (1) Although there are two major kinds of PLL which are Analogue PLL and Digital PLL, the Frequency Synthesizer Radio SACRAMENTO uses the Digital PLL.

Basic circuit of PLL is consisted of Phase detector, Low-pass filter and Voltage controlled oscillator as shown in Fig. 12.

The phase detector detects either advance or delayed difference of phase of the feed-back signal against the fundamental signal, and converts it to the differential voltage. This differential voltage is, after its RF components is attenuated by the low-pass filter which determines the response speed of the loop, applied to the VCO. VCO is an oscillator of which frequency is determined according to the applied voltage.

When each of the frequency or phase between the fundamental signal and VCO oscillated signal is different, PLL adjusts the radio circuit to the fundamental signal with maintaining $\theta_{ref}(t) = \theta_o(5)$.

Fig. 13 shows actual diagram of the PLL circuit for explaining the function of each circuit block.

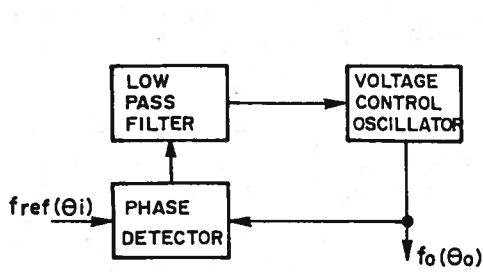


Figure 12

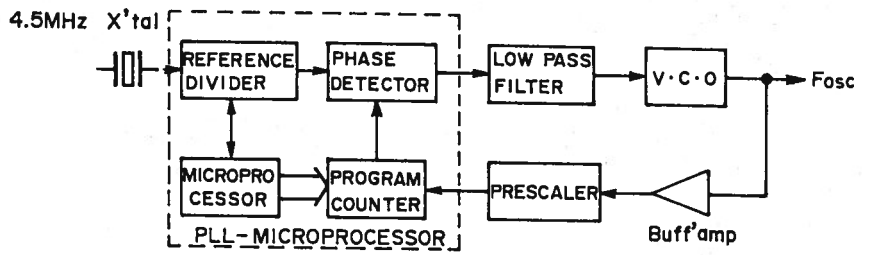


Figure 13

(2) Reference divider:

Reference divider divides frequency of $X'tal$ oscillator (by dividing ratio "A") to produce a reference frequency (AM = 10 kHz, FM = 6.25 kHz) for the phase detector.

$$A_{AM} = \frac{4500 \text{ kHz}}{\text{AM reference frequency } 10 \text{ kHz}} = 450$$

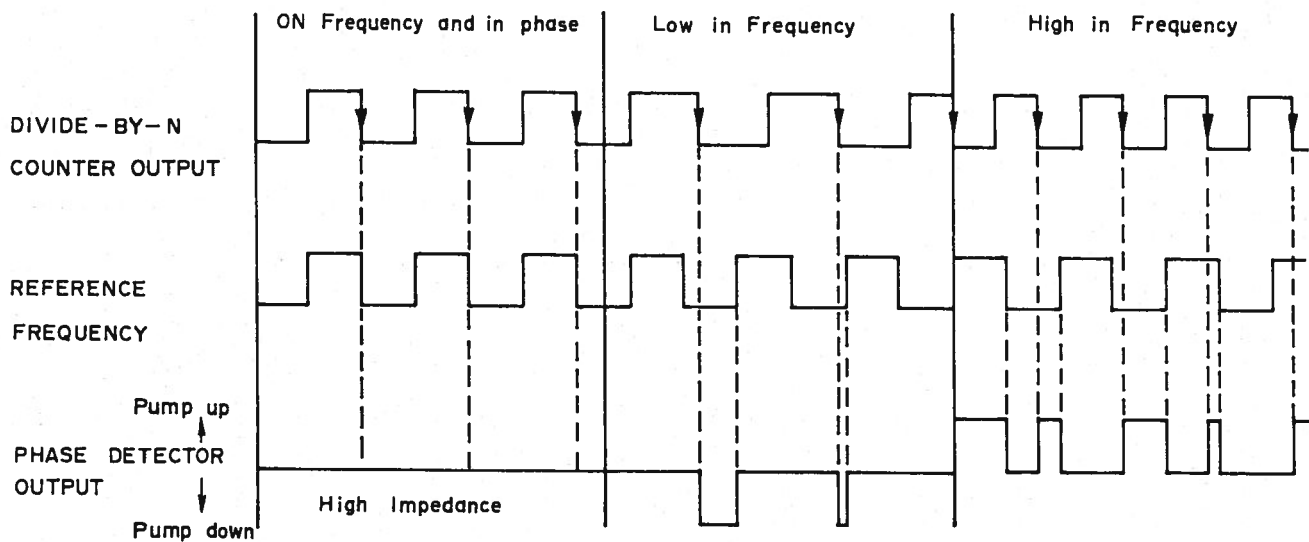
$$A_{FM} = \frac{4500 \text{ kHz}}{\text{FM reference frequency } 6.25 \text{ kHz}} = 720$$

(3) Phase detector:

Phase detector produces the output according to the difference between the reference frequency and "N"-divided frequency of the VCO, Figure 14 shows the detail of the function.

When rise-up of both of the reference frequency and the comparing frequency are equal with both of its frequency and phase, the output of the detector is high impedance, and the PLL locks. If the comparing frequency is lower than the reference frequency, or the phase delays, output of detector becomes low impedance, and the oscillating frequency of VCO after low-pass filter is driven for higher frequency, or Vice Versa.

Digital phase detector operates regardless with the duty cycle of input signal, but operates only by the sequential modes of fall-down of the two input signals. Therefore, the lock-range of PLL with digital phase detector covers all range that VCO can oscillate.



Output Wave Forme. From Frequency / Phase Detector.

Figure 14

(4) Low-pass filter (LPF):

LPF is an active low-pass filter as shown in Figure 15. The voltage which has been charged in "C" discharges while output of the phase detector is kept low, and it increases output voltage of the LPF. And when the PLL comes to lock, output of the phase detector changes to high to hold the voltage of "C" constant.

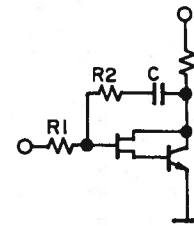


Figure 15

Vice Versa, "C" is charged up while output of the phase detector is high for resulting decreasing of LPF output voltage.

(5) Voltage controlled oscillator (VCO).

The VCO is consisted basically of a varactor diode and an inductance resonance circuit. Figure 16 shows its output voltage vs output frequency characteristic.

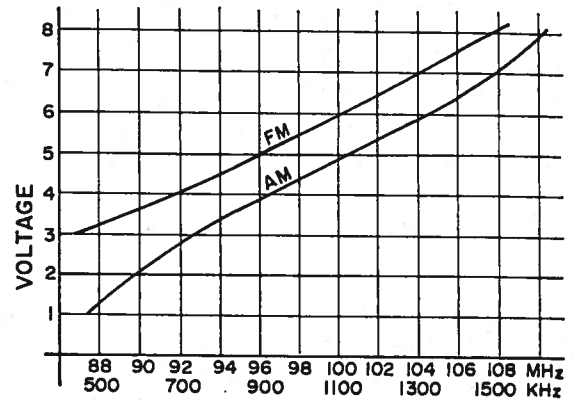


Figure 16

(6) Prescaler and Program counter:

The dividing ratio of prescaler changes to 16 or 17. It divides input pulse by 17 when one (single) pulse is added from swallow counter, and otherwise it divides by 16.

The total dividing ratio together with the prescaler and program counter is;

FM	Receiving frequency	IF frequency	Reference frequency	
LOW-END	(87.9	+ 10.7) MHz	÷ 6.25 kHz	= 15776
HIGH-END	(107.9	+ 10.7) MHz	÷ 6.25 kHz	= 18976

Because channel spacing is 200 kHz, the dividing ratio is changed every 8 steps between 3944 and 4744.

AM	Receiving frequency	IF frequency	Reference frequency	
LOW-END	(530	+ 450) kHz	÷ 10 kHz	= 98
HIGH-END	(1620	+ 450) kHz	÷ 10 kHz	= 207

Prescaler is not needed for AM.

CHART-1 shows dividing ratios by prescaler and program counter for FM.

CHART - 1

Receiving frequency	VCO frequency	Prescaler output frequency	Program counter divide ratio
87.9 MHz	98.6 MHz	6.1625 MHz	986
88.1	98.8	6.1750	988
88.3	99.0	6.1875	990
.	.	.	.
.	.	.	.
98.1	108.8	6.8000	1088
.	.	.	.
.	.	.	.
107.7	118.4	7.4000	1184
107.9	118.6	7.4125	1186

(7) Principle function of pulse swallow counting:

To give an example, a single output pulse of prescaler is likened to a piece of brick, and a single output pulse of program counter is likened to a wall. For building walls of various length from 3944 to 4744 inches each different by 8 inches however without resizing any of those bricks, the usual way is to use 8 inch bricks. But, if it is allowed to use two different kinds of longer bricks in proper combination, it would be also possible to build those various length of walls without resizing any of those. As an example, Figure 17 shows how to build a wall of 4008 inches with 16 inch and 17 inch bricks.

As the above example, by properly switching the dividing ratio to $1/P$ or $1/P + 1$, it is possible to minimize the dividing ratio of prescaler as well as required number of the programs, and furthermore possible to use a higher reference frequency. This switching of prescaler to either $1/P$ or $1/P + 1$ is made by a separate counter (beside of the program counter) and a swallow counter.

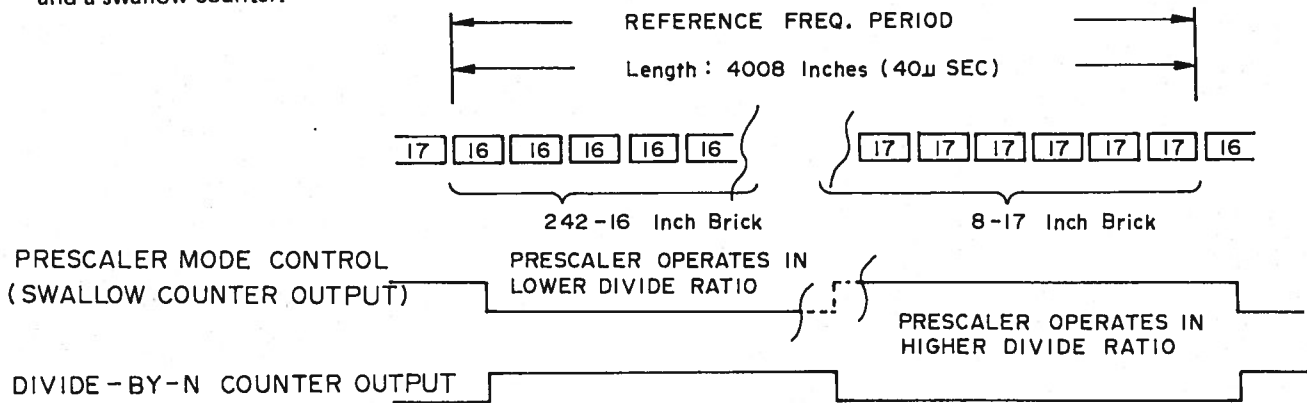


Figure 17

PRINCIPLE FUNCTION OF SEARCH STOP

During the radio's "SEARCH" mode, a means must be present to detect a station and automatically stop the radio from further searching. The SACRAMENTO uses AM and FM I.F. level detection to tell the controller IC to stop searching. I.F. levels can be detected from pin 15 of IC501 for FM and pin 9 of IC601 for AM.

AM SEARCH STOP CIRCUIT:

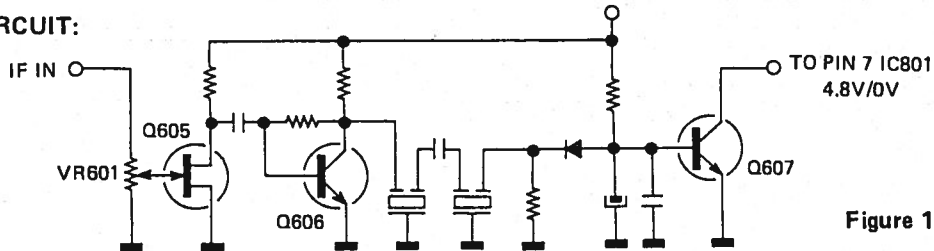


Figure 18

When no signal is present, there is no I.F. signal at pin 14 of IC601. Therefore, biasing of Q605 is such, that the transistor is on, and the voltage at the controller IC is low. A low voltage at pin 7 of the controller IC (IC801) keeps the radio in the search mode.

When a signal is present, an I.F. signal is present at pin 14. Only a frequency of 450 kHz passes through the ceramic filter (CF602). The diode (D603) is forward biased on the negative transitions resulting in Q605 being shut off and a high voltage at the controller IC. A high voltage at the controller IC stops the search function and the radio locks onto the tuned station.

FM SEARCH STOP CIRCUIT:

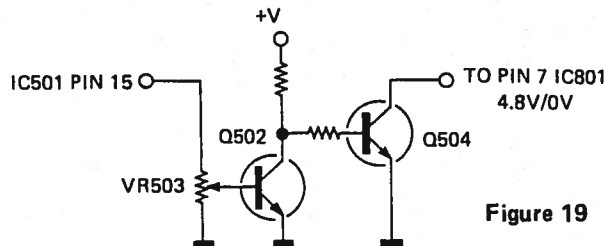


Figure 19

When no signal is present the voltage at pin 14 of IC501 goes high and the collector voltage of Q502 goes low. A low voltage at pin 7 of the controller IC keeps the radio in the search mode.

When a signal is present, the voltage at pin 14 of IC501 goes low and the collector voltage of Q502 goes high. A high voltage at pin 7 stops the search function and locks onto the tuned station.

OPERATING INSTRUCTIONS

ARI (Automatic Radio Information) INTERFACE CIRCUIT

Functions

1. FM mute when ARI adaptor is connected.
2. WARNING TONE function when ARI adaptor is connected.
3. VOLUME UP when ARI adaptor is connected.
4. MOTOR STOP when ARI adaptor is connected.
5. CHANGEOVER from TAPE to RADIO when ARI adaptor is connected.

The above mentioned functions will work if adaptor is connected, where the functions of items 3, 4 and 5 will work only when the announcement of ARI broadcasting commenced.

1. FM MUTE

Transistor Q808 is an A-class amplifier and is in active state due to the bias voltage developed by R847 and R848 if no ARI adaptor is connected. With the Q808 set in the active state, FM signals are being input to the MPX IC502 through the Q808 amplifier. However, when no ARI broadcasting is received with the ARI adaptor connected and the ARI switch closed, ARI mute voltage (8V) is output from pin 8 of the ARI connector. The ARI mute voltage is applied to the Q808 base in passing through R849 and makes Q808 turn off, thus muting the FM signals.

2. WARNING TONE

Under the state of ARI mute as mentioned in section 1, if no input is given from ARI broadcasting for more than 35 seconds after station seeking is commenced, ARI adaptor outputs a warning tone signal to pin No. 5 of ARI connector. The warning tone signal is then sent to MPX IC502 and warning tone can be in turn heard from the speaker.

3. VOLUME UP

Resistors VR4 and VR104 for volume control are commonly grounded and connected to Q8 and VR1. Ordinarily a 0.7V of bias voltage is applied to the base of Q8. At the state of Q8 being "ON" VR1 is short and volumes of VR4 and VR104 can be full-scaled.

If announcement is commenced the voltage of pin No. 1 of ARI connector becomes 0V, the base voltage of Q8 also becomes 0V.

Thus Q8 changes to "cut OFF" state.

Then VR1 is inserted into the place between VR4, VR104 and GND and volume is boosted.

The operating of "VOLUME UP" works only when ARI announcement is mod. The degree of volume up is determined by setting the semi-fixed volume VR1.

4. MOTOR STOP

Transistor Q10 is biased by R44 and R45 and is normally turned on. Transistor Q9 is also turned on at the same time. When the voltage at pin 1 of ARI connector falls to 0V, Q10 and Q9 are cut off, and makes the motor stop.

5. TAPE PLAY TO RADIO SWITCHING

The radio section is being operated during tape playing operation, but the audio output is muted out by transistors Q1 and Q101.

As previously stated, when the voltage at pin 1 of ARI connector becomes to 0V, the motor stops and bias current for diodes D2 and D102 decreases to 0A and the tape signal is cut.

At the same time, bias voltage for Q1 and Q101 go 0V and Q1 and Q101 are turned off, thus releasing the radio mute.

TROUBLE SHOOTING

RADIO SECTION

SYMPTOM	DEFECTIVE CIRCUIT		DEFECTIVE POINT AND CAUSE
NO SOUND	AM/FM SECTION	Mute circuit	* Mute circuit defective. Check IC4, IC805, Q1, Q7, Q101, D1 and D101
		Power supply circuit	* Power supply circuit defective. Check R51, Q12 and D11.
	AM SECTION	Diode switching circuit	* Diode switching circuit defective. Check Q605, 606.
		Detection circuit	* Detection circuit defective. Check pin voltage of IC601.
		IF circuit	* IF circuit defective. Check pin voltage of IC601. Check T604, T605 and CF601.
	FM SECTION	Diode Switching circuit	* Diode switching circuit defective. Check D503 and D504.
		MPX circuit	* MPX circuit defective. Check pin voltage of IC502.
		Detection circuit	* Detection circuit defective. Check T501.
		IF circuit	* IF circuit defective. Check pin voltage of IC501 and Q808.
	ASU SECTION	ASU circuit	* ASU circuit defective. Check pin voltage of U502 and 503.
INSUFFICIENT SOUND	AM SECTION	DX/LOC circuit	* DX/LOC circuit defective. Check Q801.
		RF circuit	* RF circuit defective. FET Q601 defective. Check pin voltage of IC601. T601, T602, D601-2 and D602-3 defective.
		RF AGC circuit	* RF AGC circuit defective. Q603 and Q604 defective.
		IF circuit	* IF circuit defective. T604, T605 and CF601 defective. Check pin voltage of IC601.
INSUFFICIENT SOUND	FM SECTION	FM TUNER circuit	* Poor FM TUNER defective. Check pin voltage of U501.
		DX/LOC circuit	* DX/LOC circuit defective. Check Q505.

TROUBLE SHOOTING

SYMPTOM	DEFECTIVE CIRCUIT		DEFECTIVE POINT AND CAUSE
	FM SECTION	IF circuit	* IF circuit defective. CF501, CF502 defective. Check pin voltage IC501 and Q808.
		Detection circuit	* Poor adjustment of detection coil T501.
		MPX circuit	* MPX circuit defective. Check pin voltage IC502.
		ASU circuit	* ASU circuit defective. Check pin voltage U502, 503.
DISTORTED SOUND	AM SECTION	RF AGC circuit	* RF AGC circuit defective. Check Q602, Q603, Q604, D602, D603.
		IF AGC circuit	* IF AGC circuit defective. Check voltages at pins "15" and "16" of IC601.
	FM SECTION	Detection circuit	* Poor adjustment of detection coil T501.
		MPX circuit	* MPX circuit defective. Check pin voltage of IC502.
		ASU circuit	* ASU circuit defective. Check pin voltage U502, 503.
	OSCILLATION	AM/FM SECTION	Power supply circuit
FM SECTION		FM IF circuit	* Poor soldering of FM shielded board.
AM SECTION		AM circuit	* Poor soldering of shielded board.
POOR STEREO EFFECT		MPX circuit	* VR504 misalignment. * VR505 misalignment. * MPX IC defective. Check pin voltage of IC502.
INDICATOR DOES NOT LIGHT		Stereo indicator	* Display board connection defective. * LED display D819 defective. * Stereo indicator circuit defective. Check for voltage Q503.
NO FUNCTION OF DX AND LOC	AM/FM SECTION	Power circuit supply	* R803 defective.
	AM SECTION	LOC circuit	* LOC circuit defective. Q801 defective.
	FM SECTION	LOC circuit	* LOC circuit defective. Q505 defective.

TROUBLE SHOOTING

SYMPTOM	DEFECTIVE CIRCUIT		DEFECTIVE POINT AND CAUSE
ENGINE NOISE IS EXTREME	MOTOR COMPARTMENT		<ul style="list-style-type: none"> * Missing or poor connection of resistor wire on high tension coil of car. Insert noise preventing resistor between ignition coil and distributor of car. * Missing or poor connection of noise silencer by alternator of car. Install specified noise silencer on the alternator. * Missing or poor connection of grounding wire between engine chassis and engine, transmission and engine chassis of car.
	ANTENNA GROUND CIRCUIT		<ul style="list-style-type: none"> * Missing or poor connection of grounding wire for antenna to grounding point of the car chassis.
LESS SENSITIVITY DRIFT OCCURS WHEN AIR CONDITIONER IS ON			<ul style="list-style-type: none"> * If the set was installed near the blower of the air conditioner, the sensitivity drift will be created by the temperature (Hot or Cold). Avoid installing the set near air conditioner is unavoidable, isolate the set by isolating material from the air conditioner.

CONTROL CIRCUIT

If something goes wrong with the Phase Locked Loop and the loop becomes unlocked, the following phenomena will be observed.

- (1) The output of the phase detector will be High or Low, the tuning voltage will change to either 0V or about 9V.
- (2) In the above case, if there is an auto search present, IC803 actuates to step 10 kHz up in AM and 200 kHz in FM. Then, the manual tuning function and all switches will be inoperable with the exception of the power and AM/FM switches. During the repairing of this control circuit, there is a possibility that the loop may be placed into a unlocked condition, operation of station selection will be done by MU (manual up) or MD (manual down).
For all inputs of the PLL micro processor, the segment output and the dynamic signal is used. Therefore, if something is wrong with that output, it will interfere with all functions as well as the LED display. The wave forms of all parts of IC803 are shown in Figure .

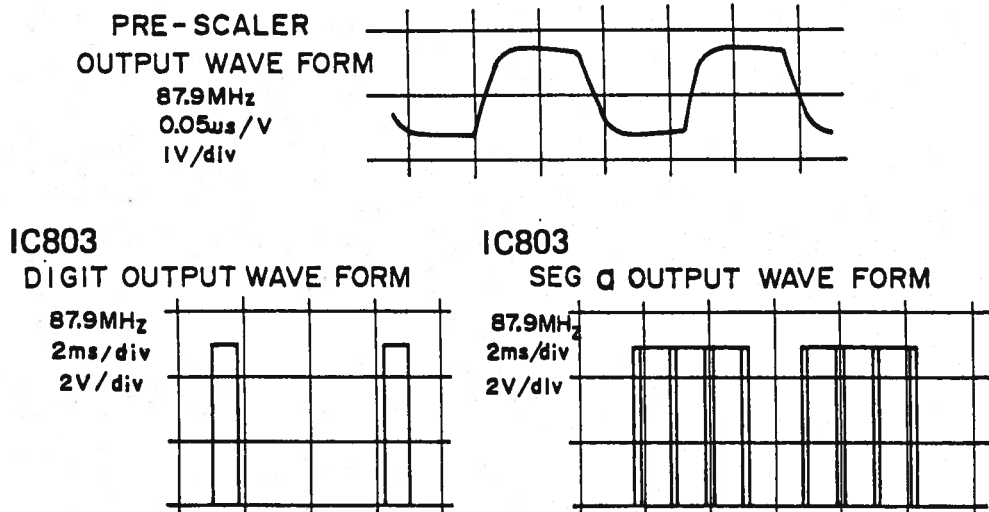


Figure 20

TROUBLE SHOOTING

SYMPTOM	DEFECTIVE CIRCUIT		DEFECTIVE POINT AND CAUSE
DISPLAY DOES NOT INDICATE		Power supply circuit	<ul style="list-style-type: none"> * Power supply circuit defective. Check voltage at IC803 pin "14" and IC801 pin "1". Diode D802 defective. Diode D814 defective. IC801 defective.
		Indication circuit	<ul style="list-style-type: none"> * Indication circuit defective. Controller IC (IC803) defective. * Digit/segment driver IC804, IC805 defective. * Crystal OSC, X801 defective. * Display board connection defective.
A DIGIT OR SEGMENT DOES NOT DISPLAY OR FAIL		Digit/segment drive circuit	<ul style="list-style-type: none"> * IC804 or IC805 defective. * D819 defective.
NO GOOD INDICATION FOR SWITCHOVER OR OPERATION		No changeover from AM to FM	<ul style="list-style-type: none"> * Diode D812 defective. * Transistor Q804 defective.
		No changeover to clock	* Diode D804 and D811 defective.
		No ME indication	* Diode D805, D808 defective.
		No changeover between memory 1 to 6	* Diode D809, D810, D804, D805, D806 and D807 defective.
		No operation of manual up & down.	* Diodes D806, D807 and D808 defective.

TROUBLE SHOOTING

SYMPTOM	DEFECTIVE CIRCUIT		DEFECTIVE POINT AND CAUSE
NO SEARCH (See paragraphs of "Function Principle of Phase-Locked-Loop" and "Function Principle of Search Stop" in the manual for further informations)	AM/FM SECTION	Power supply circuit of filter	* Power circuit of filter defective. Check voltage of D801. Diode D801 defective.
		CPU command circuit	* CPU command circuit defective. D810 or D806 defective. * CPU IC803 defective.
		Filter circuit	* Filter circuit defective. FET Q803 defective. Transistor Q802 defective.
	AM SECTION	OSC circuit	* OSC circuit defective. Diode D601-1 defective. OSC coil T603 defective. TC601 misalignment.
		Buffer circuit	* Buffer circuit defective. Transistor Q608 defective.
		Stop circuit	* Stop circuit defective. Diode D604 defective. Transistor Q605, Q606 and Q607.
	FM SECTION	OSC circuit	* OSC circuit defective. FM tuner defective.
		Stop circuit	* Stop circuit defective. Transistor Q502, 504 defective.
	THE UNIT SEARCH SCANNES BUT DOES NOT STOP (See paragraph of "Function Principle of Search-Stop" in this manual for further informations)	AM/FM SECTION	Stop circuit
AM SECTION		Stop circuit	* Stop circuit defective. Diode D604 defective. Transistor Q605, 606 and Q607. * FM stop circuit defective. Transistor Q504 defective.
FM SECTION		Stop circuit	* Stop circuit defective. Transistor Q502, Q504 defective. * AM stop circuit defective. Transistor Q607 defective.

TROUBLE SHOOTING

TAPE SECTION

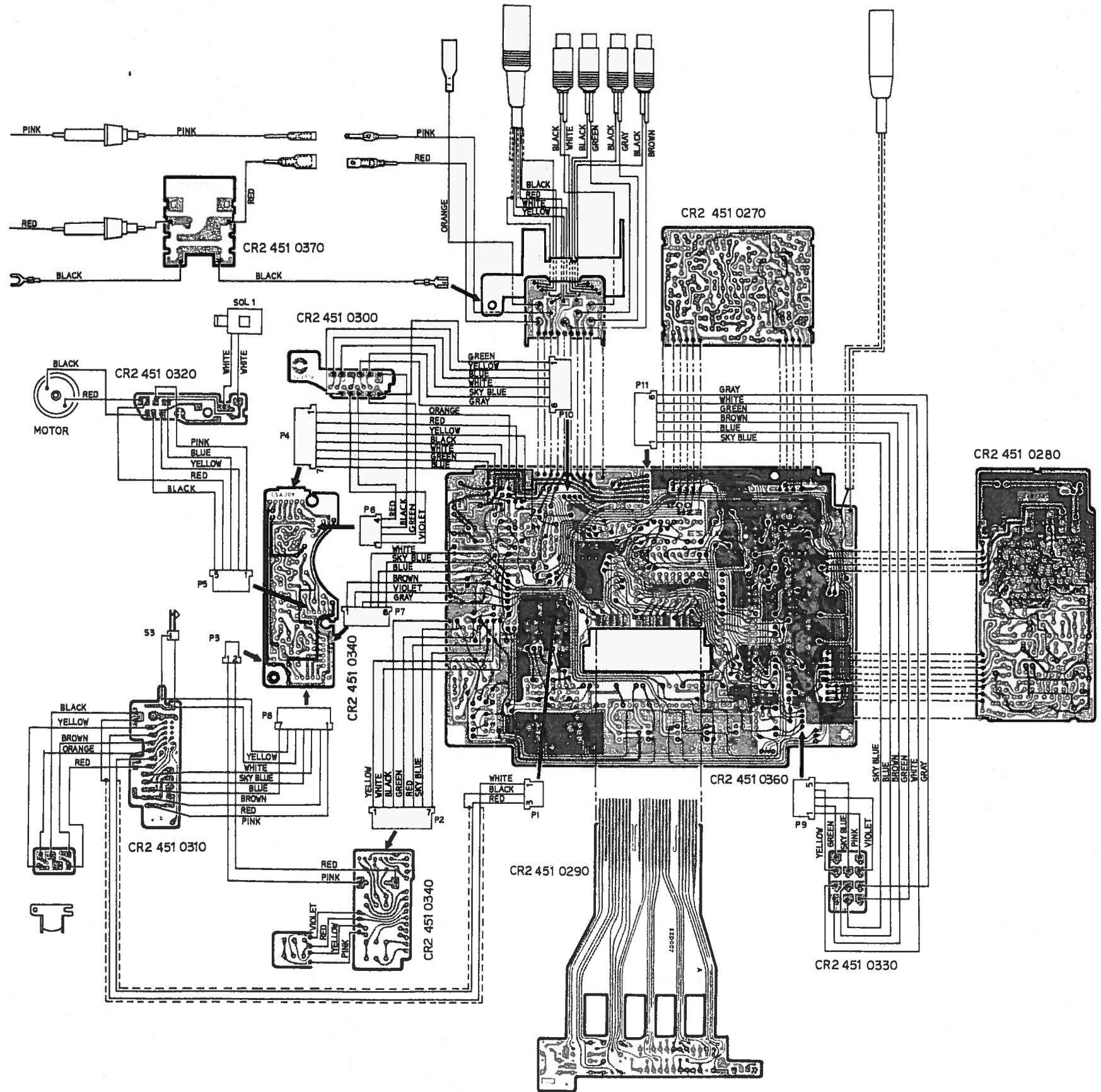
SYMPTOM	DEFECTIVE CIRCUIT	DEFECTIVE POINT AND CAUSE
NO SOUND	Power supply circuit	* Switch S2 defective.
	Mechanism or motor	* Motor does not run. Motor defective. Transistor Q9, Q10 defective. Resistor R50 defective. * Mechanism defective. Check for running of tape. * Cassette does not lock in operating position. Solenoid SOL1 open. Switch S6 defective.
	Switch circuit	* Faulty contact of slide switch S1.
	Pre-amplifier circuit	* Pre-amplifier defective. Check each pin voltage of pre-amplifier IC1. * Leakage of large amount of DC current into capacitor C4 or C104. * Head lead wire open.
DISTORTED SOUND OR INSUFFICIENT SOUND	Pre-amplifier circuit	* Pre-amplifier circuit defective. Check each pin voltage of pre-amplifier IC1.
	Head	* Head surface dirty. * Head azimuth angle misalignment.
OSCILLATION	Pre-amplifier circuit	* C1 or C101 capacity insufficient or open.
POOR METAL SWITCH EFFECT	METAL switch circuit	* METAL ON/OFF switch S4 defective. * Transistor Q2, Q102 defective. * Resistor R5, R105 defective.
ABNORMAL TAPE SPEED	Mechanism or motor	* Mechanism defective. * Motor defective.
WOW AND FLUTTER	Flywheel drive section	* Flywheel, capstan or intermediate gear defective. * Reel table defective. * Belt, pinchroller, idler, flywheel or pully defective. * Motor defective.
DOES NOT REVERSE (EITHER AUTO OR MANUAL)	Mechanism or motor	* Mechanism defective. * Motor defective.

TROUBLE SHOOTING

AUX OUTPUT SECTION

SYMPTOM	DEFECTIVE CIRCUIT	DEFECTIVE POINT AND CAUSE
NO SOUND	Power supply circuit	* Ripple filter defective. Zener Diode D4 defective. Diode D5 open.
	Buffer amplifier circuit	* Buffer amplifier defective. Check voltage of transistor Q5, Q6, Q105 and Q106.
	Mute circuit	* Mute circuit defective. Check IC4.
OSCILLATION	Power supply circuit	* Ripple filter defective. Zener Diode D4 defective. C22 capacity insufficient or open.
	Buffer amplifier circuit	* C24, C124 capacity insufficient or open.

WIRING LAYOUT

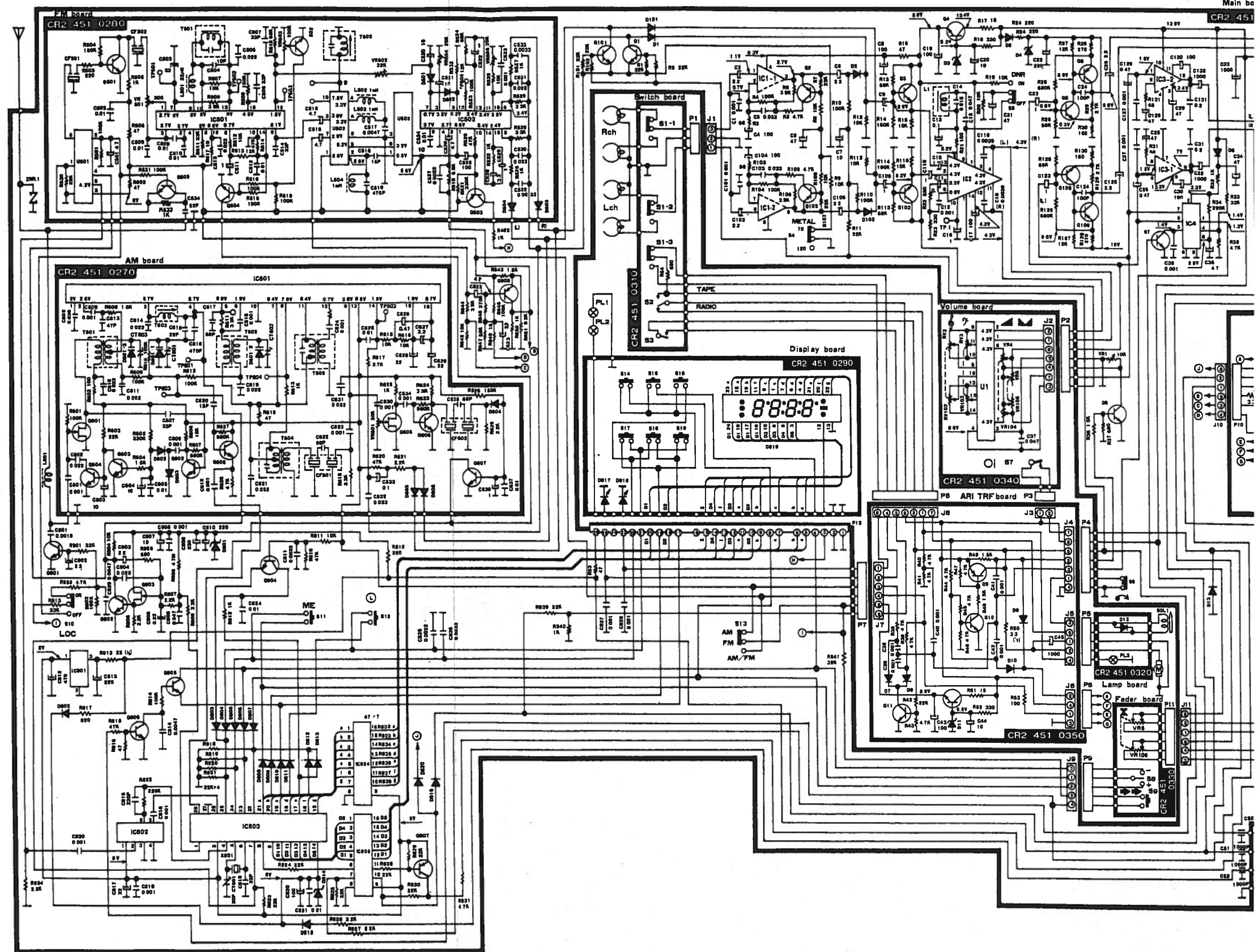


TROUBLE SHOOTING

RADIO AND TAPE SECTION

SYMPTOM	DEFECTIVE CIRCUIT	DEFECTIVE POINT AND CAUSE
NO SOUND	Power supply circuit	<ul style="list-style-type: none"> * Fuse open * Diode D13 short. * Power switch S7 defective. * Faulty connection to the battery. * Lead wire cold soldered.
	Tone control circuit	<ul style="list-style-type: none"> * Voltage regulator defective. Transistor Q4 open. Diode D3 short. * Hybrid IC defective. Check each pin voltage of U1.
	DNR circuit	<ul style="list-style-type: none"> * Voltage regulator defective. Transistor Q4 open. Diode D3 short. DNR IC2 defective. Check each pin voltage of DNR IC2.
	Power output circuit	<ul style="list-style-type: none"> * Power amplifier defective. Check each pin voltage of power amplifier IC3.
	Mute circuit	<ul style="list-style-type: none"> * Muting IC defective. Check each pin voltage of Mute IC4.
DISTORTED SOUND OR INSUFFICIENT SOUND	DNR circuit	<ul style="list-style-type: none"> * C17 capacity insufficient or open.
	Tone control circuit	<ul style="list-style-type: none"> * Variable resistor VR2, VR102, VR3, VR103 defective. * Lead wire open.
	Power supply circuit	<ul style="list-style-type: none"> * Variable resistor VR4, VR104, VR5, VR105, VR6 and VR106. * Capacitor C28, C128, C30, C130 defective.
OSCILLATION	Power supply circuit	<ul style="list-style-type: none"> * C33, C53, C54 capacity insufficient or open.
	Tone control circuit	<ul style="list-style-type: none"> * Voltage regulator defective. Transistor Q4 short. Diode D3 open. C19, C20, C37 capacity insufficient or open.
	DNR circuit	<ul style="list-style-type: none"> * Voltage regulator defective. Transistor Q4 short. Diode D3 open. C19, C20 capacity insufficient or open. * C17, C18, C118 capacity insufficient or open.
	Power output circuit	<ul style="list-style-type: none"> * C33, C37, C127 capacity insufficient or open. * C29, C129 capacity insufficient or open.
ENGINE NOISE IS EXTERM	Power supply circuit	<ul style="list-style-type: none"> * Missing or poor connection of grounding wire. * C53, C54 capacity insufficient or open.
	DNR and tone control circuit	<ul style="list-style-type: none"> * Voltage regulator defective. Transistor Q4 short. C19, C20 capacity insufficient or open.

SCHEMATIC DIAGRAM



Main bo

CR2 451

CR2 451 0290

CR2 451 0340

CR2 451 0320

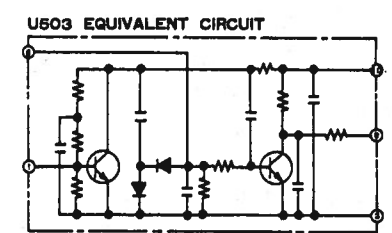
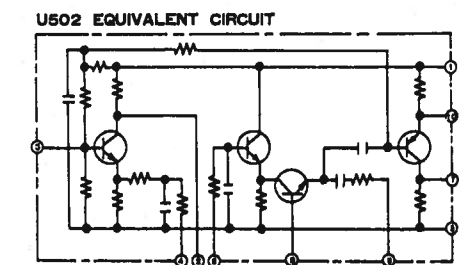
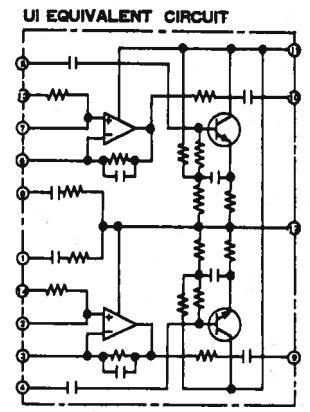
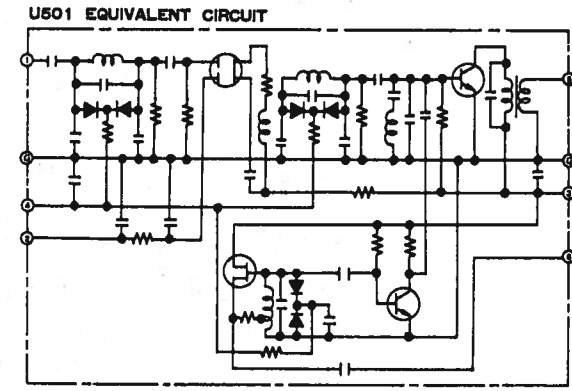
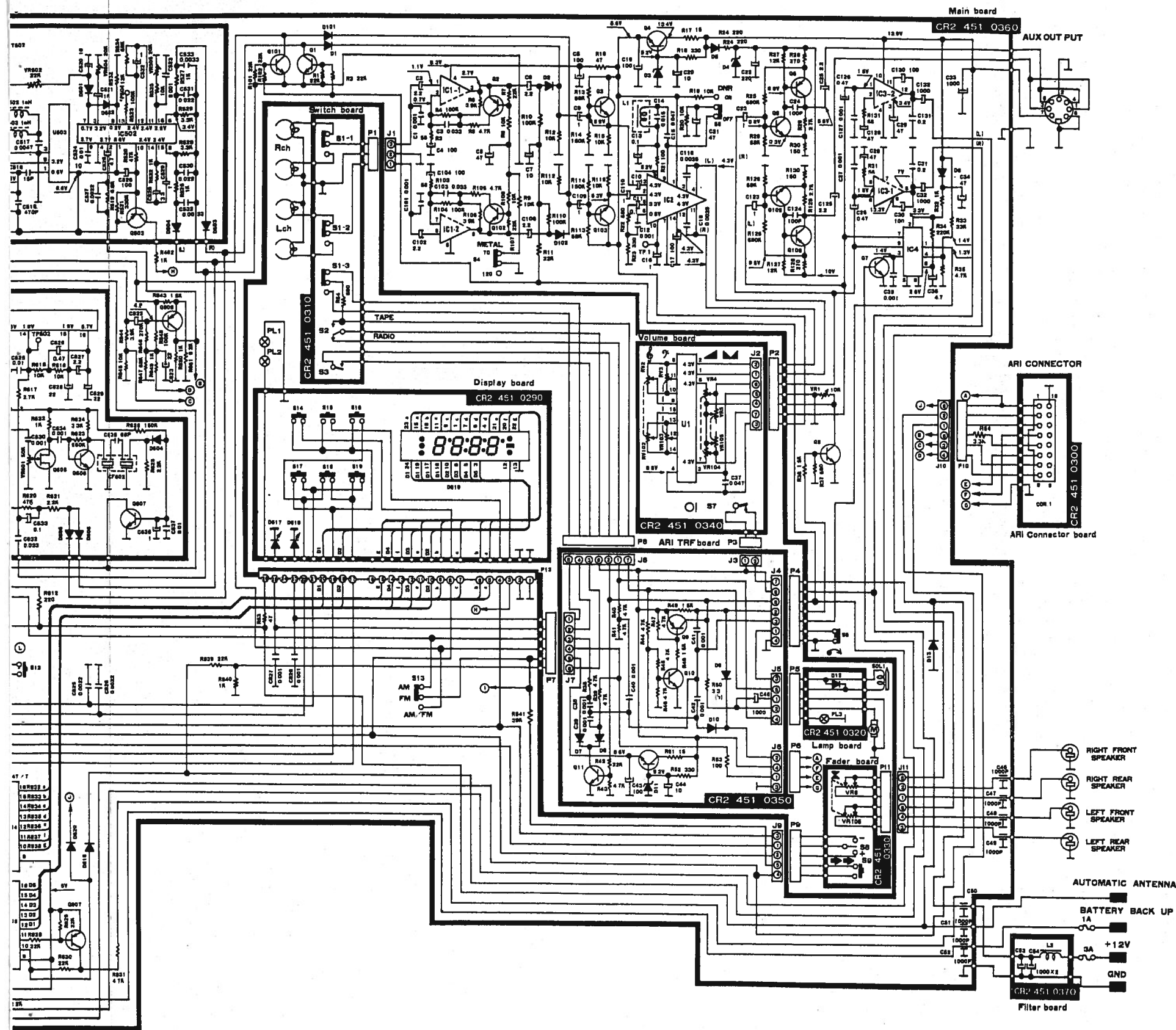
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CR2 451 0270

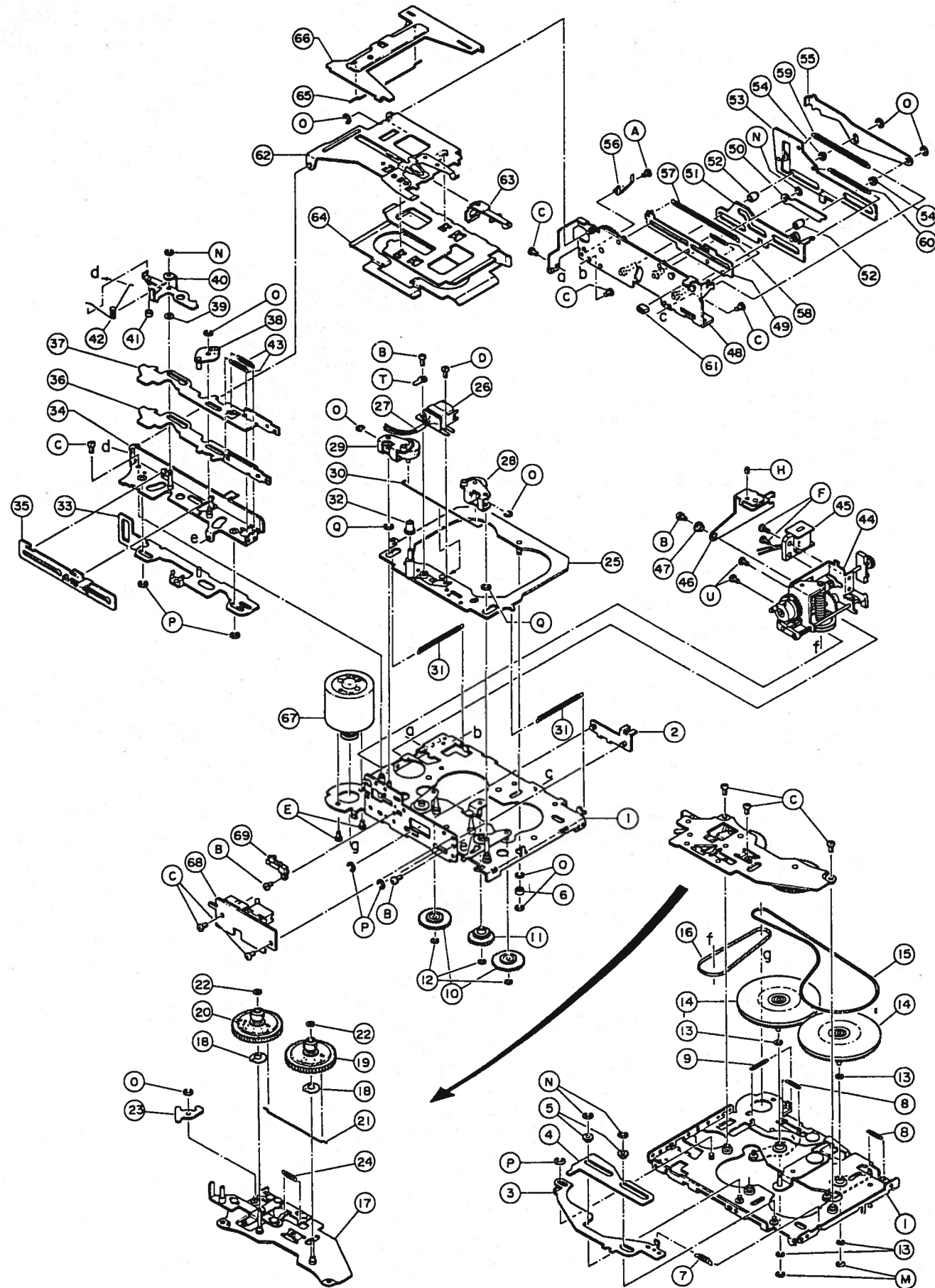
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SCHEMATIC DIAGRAM



- | | | | |
|---------------------------------|-------|--------------|--------------------|
| D1, D2, D101, D102 | IC1 | LA3181 | Q1, Q101, Q3, Q103 |
| D9, D10, D601 ~ D604 | IC2 | LM1894N | Q5, Q105, Q7, Q10 |
| D802 ~ D806, D815 | IC3 | TA7240P | Q11, Q502, Q504 |
| D802 ~ D813, D816, D820, D815B8 | IC4 | TA7324P | Q602, Q603, Q604 |
| D5, D6, D12 | IC501 | LA1140 | Q606, Q607, Q608 |
| D3, D11 | IC502 | LA3370 | Q801, Q802, Q804 |
| D4, D601 | IC801 | LA1130 | Q806 |
| D815 | IC801 | AN78M05 | Q7, Q102, Q6, Q108 |
| D801 | IC802 | #PB53AC | Q503, Q805, Q807 |
| D817, D818 | IC803 | #PD1701C-013 | Q808 |
| D819 | IC804 | TD62508P | Q4 |
| D7, D8 | IC805 | LC-204-GL | Q8 |
| | | Q80 | Q9 |
| | | Q80 | Q12 |
| | | Q80 | Q501 |
| | | Q80 | Q601, Q605 |
| | | Q80 | Q803 |
| | | Q80 | Q505 |
| | | Q80 | 25C3312 |
| | | Q80 | 25A1310 |
| | | Q80 | 25D592NC |
| | | Q80 | 25D1302 |
| | | Q80 | 25A986 |
| | | Q80 | 25D986 |
| | | Q80 | 25C2688 |
| | | Q80 | 25K181 |
| | | Q80 | 25K118 |
| | | Q80 | 25C3327 |

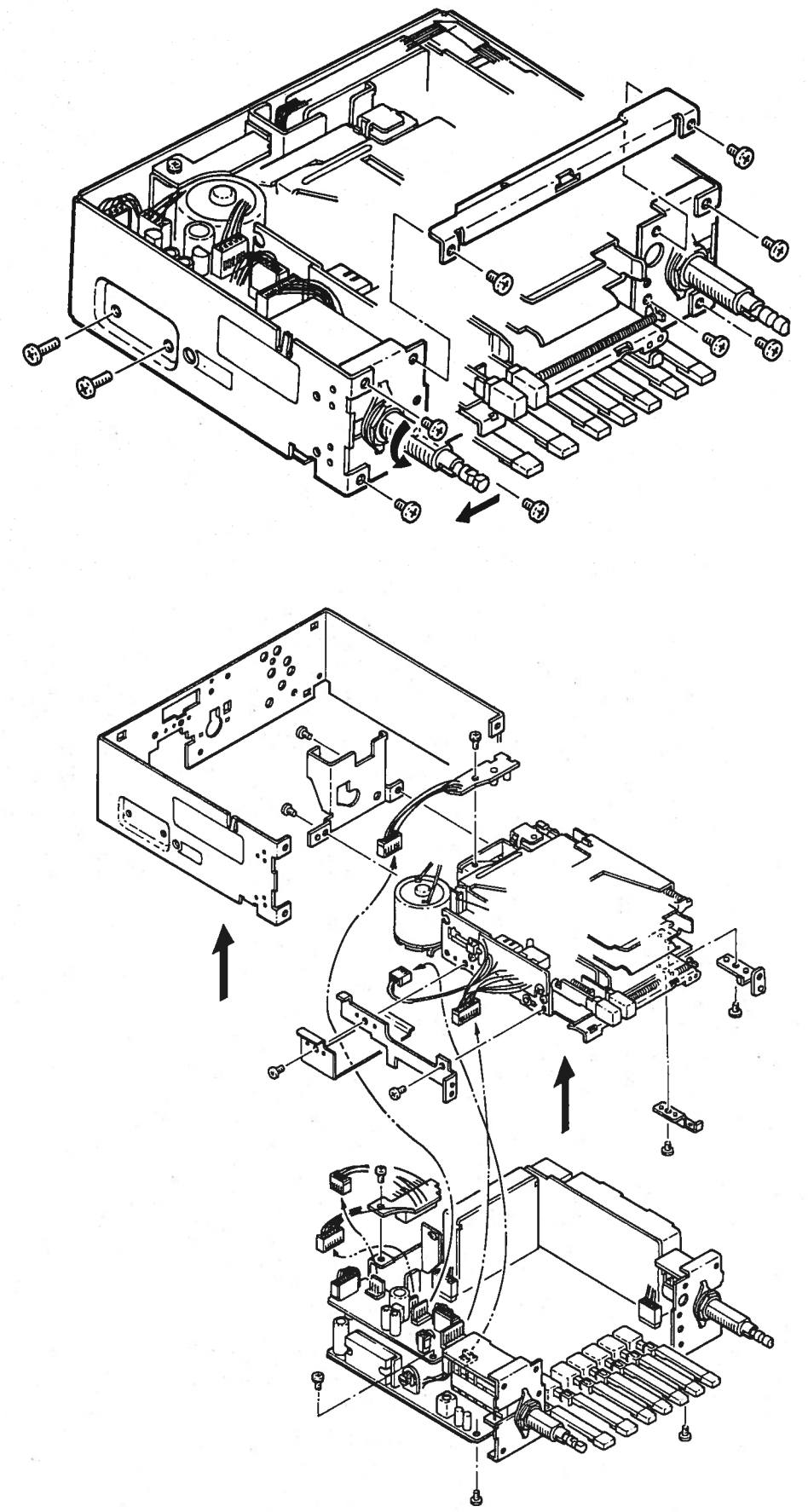
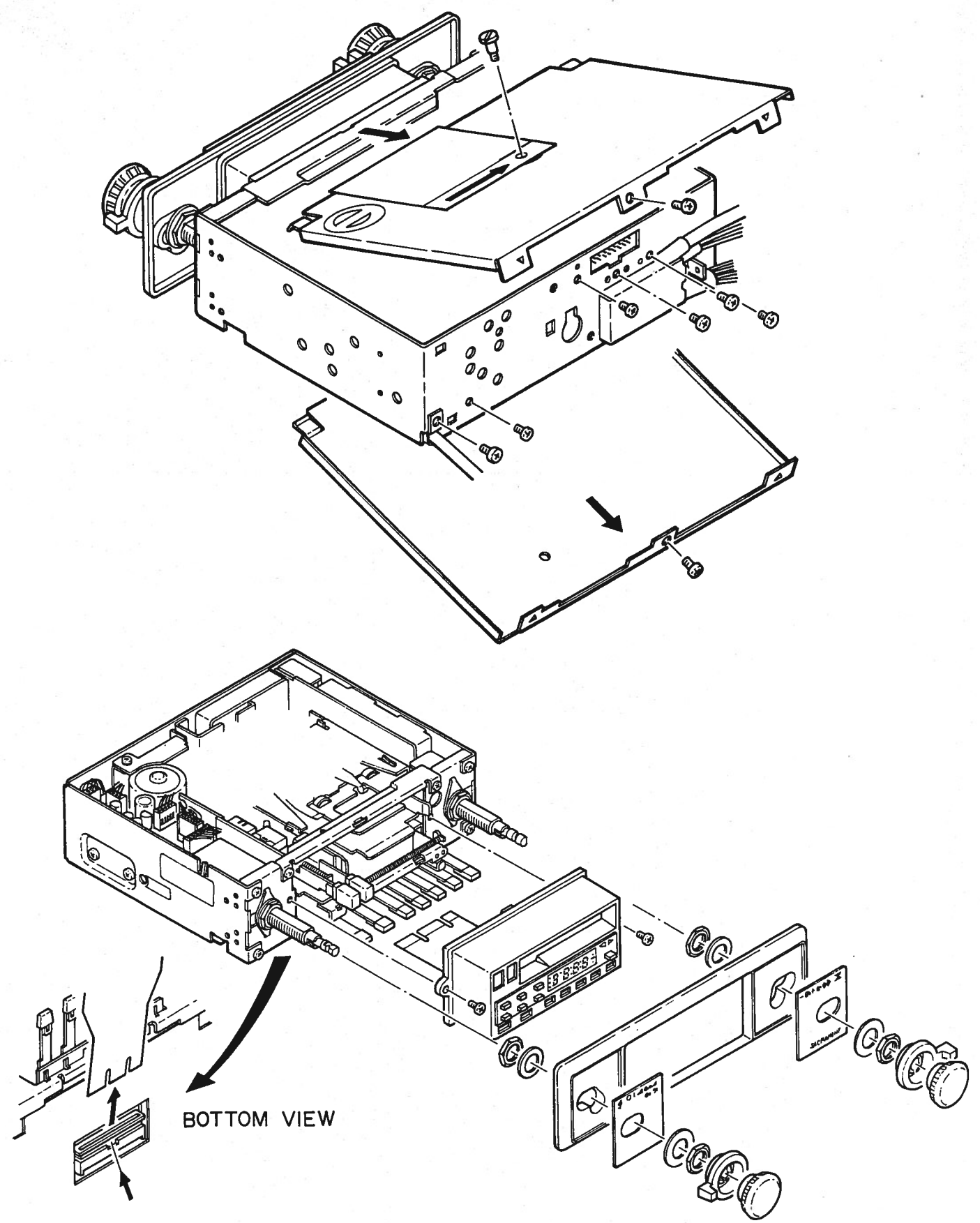
EXPLODED VIEW - MECHANISM



MECHANISM PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	Q'TY	REF. NO.	PART NO.	DESCRIPTION	Q'TY
1	CR 2 681 601 0	Main Chassis ass'y	1	60	CR 2 722 613 0	Eject lever (B) spring	1
2	CR 2 681 602 0	FF lever connect plate ass'y	1	61	CR 2 714 605 0	Cushion rubber	1
3	CR 2 682 631 0	Direction lever	1	62	CR 2 681 625 0	Cassette tray tilter ass'y	1
4	CR 2 682 604 0	Head chassis push up lever	1	63	CR 2 662 606 0	Cassette draw prong	1
5	CR 2 692 601 0	Push up lever roller	2	64	CR 2 682 627 0	Cassette tray	1
6	CR 2 692 602 0	Head chassis roller	1	65	CR 2 726 614 0	Slide plate spring	1
7	CR 2 722 601 0	Direction lever spring	1	66	CR 2 682 628 0	Slide plate	1
8	CR 2 722 602 0	Intermediate gear spring	2	67	CR 2 431 601 0	Motor ass'y EMD034	1
9	CR 2 722 603 0	FF gear lock spring	1	67-01	CR 2 692 608 0	Motor pulley	(1)
10	CR 2 662 601 0	Intermediate gear	2	67-02	CR 2 714 606 0	Motor rubber	(1)
11	CR 2 662 602 0	FF/REW gear	1	68	CR 2 451 031 0	Switch board ass'y	1
12	CR 2 597 601 0	Polyslider washer 1.5φ x 4φ x 0.25	3	68-01	CR 2 373 003 0	Slide switch ESS027	(1)
13	CR 2 597 602 0	Polyslider washer 2.1φ x 3.4φ x 0.25	4	68-02	CR 2 377 004 0	Micro switch ESM014	(1)
14	CR 2 711 607 0	Fly wheel	2	69	CR 2 372 006 0	Leaf switch ESL014	1
15	CR 2 714 601 0	Drive belt (A)	1	A	CR 0 552 302 5	Pan head screw M2 x 2	1
16	CR 2 714 602 0	Drive belt (B)	1	B	CR 0 551 305 1	Sems screw M2 x 5	5
17	CR 2 681 606 0	Sub chassis ass'y	1	C	CR 0 553 303 1	Bind head screw M2 x 3	11
18	CR 2 682 607 0	Back tension spring	2	D	CR 0 553 305 1	Bind head screw M2 x 5	1
19	CR 2 661 603 0	Take-up reel table ass'y (L)	1	E	CR 0 553 602 1	Bind head screw M2.6 x 4	2
20	CR 2 661 604 0	Take-up reel table ass'y (R)	1	F	CR 0 553 605 1	Bind head screw M2.6 x 5	2
21	CR 2 726 604 0	Reel connect arm	1	G	CR 0 566 331 6	Slotted set screw M2 x 2	1
22	CR 2 597 603 0	Polyslider washer 1.2φ x 3φ x 0.25	2	M	CR 0 587 300 5	E-ring φ1.5 x 3.5 x 0.3	2
23	CR 2 682 608 0	Direction changing arm	1	N	CR 0 587 300 6	E-ring φ1.5 x 0.4	4
24	CR 2 722 605 0	Sub chassis spring	1	O	CR 0 587 400 6	E-ring φ2 x 0.4	9
25	CR 2 681 609 0	Head chassis ass'y	1	P	CR 0 587 500 6	E-ring φ2.5 x 0.4	5
26	CR 2 447 601 0	Autoreverse head EAH028	1	Q	CR 0 587 600 6	E-ring φ3 x 0.6	2
27	CR 2 503 601 0	Head wire ass'y	1	T	CR 0 595 604 2	Lug washer	1
28	CR 2 711 603 0	Pinchroller ass'y (L)	1	H	CR 0 566 331 6	Slotted Set screw 2 x 2	1
29	CR 2 711 604 0	Pinchroller ass'y (R)	1				
30	CR 2 726 606 0	Pinchroller spring	1				
31	CR 2 722 607 0	Head chassis spring	2				
32	CR 2 692 603 0	Head chassis release roller	1				
33	CR 2 681 610 0	Function plate ass'y	1				
34	CR 2 681 611 0	Side plate ass'y	1				
35	CR 2 682 612 0	Sub slide plate (A)	1				
36	CR 2 682 613 0	FF lever (A)	1				
37	CR 2 682 614 0	FF lever (B)	1				
38	CR 2 681 615 0	FF/REW changing plate ass'y	1				
39	CR 2 597 605 0	Polyslider washer 2.1φ x 5.5φ x 0.25	1				
40	CR 2 681 606 0	FF lock plate ass'y	1				
41	CR 2 692 604 0	FF lock plate roller	1				
42	CR 2 723 608 0	FF lock plate spring	1				
43	CR 2 722 609 0	FF lever spring	2				
44	CR 2 661 605 0	Gear wheel ass'y	1				
45	CR 2 437 602 0	Solenoid for eject ELX027	1				
46	CR 2 681 617 1	Sub lock lever ass'y	1				
47	CR 2 692 605 0	Sub lock lever coller	1				
48	CR 2 681 618 0	Eject chassis ass'y	1				
49	CR 2 681 619 0	Sub slide plate (B) ass'y	1				
50	CR 2 682 620 0	Eject lever lock plate	1				
51	CR 2 681 621 0	Eject lever (B) ass'y	1				
52	CR 2 692 606 0	Eject lever roller	2				
53	CR 2 681 622 0	Eject lever (A) ass'y	1				
54	CR 2 692 607 0	Lock lever roller	2				
55	CR 2 682 623 0	Lock lever	1				
56	CR 2 682 624 0	Push spring	1				
57	CR 2 722 610 0	Eject spring	1				
58	CR 2 722 611 0	Gear turn spring	1				
59	CR 2 722 612 0	Eject lever (A) spring	1				

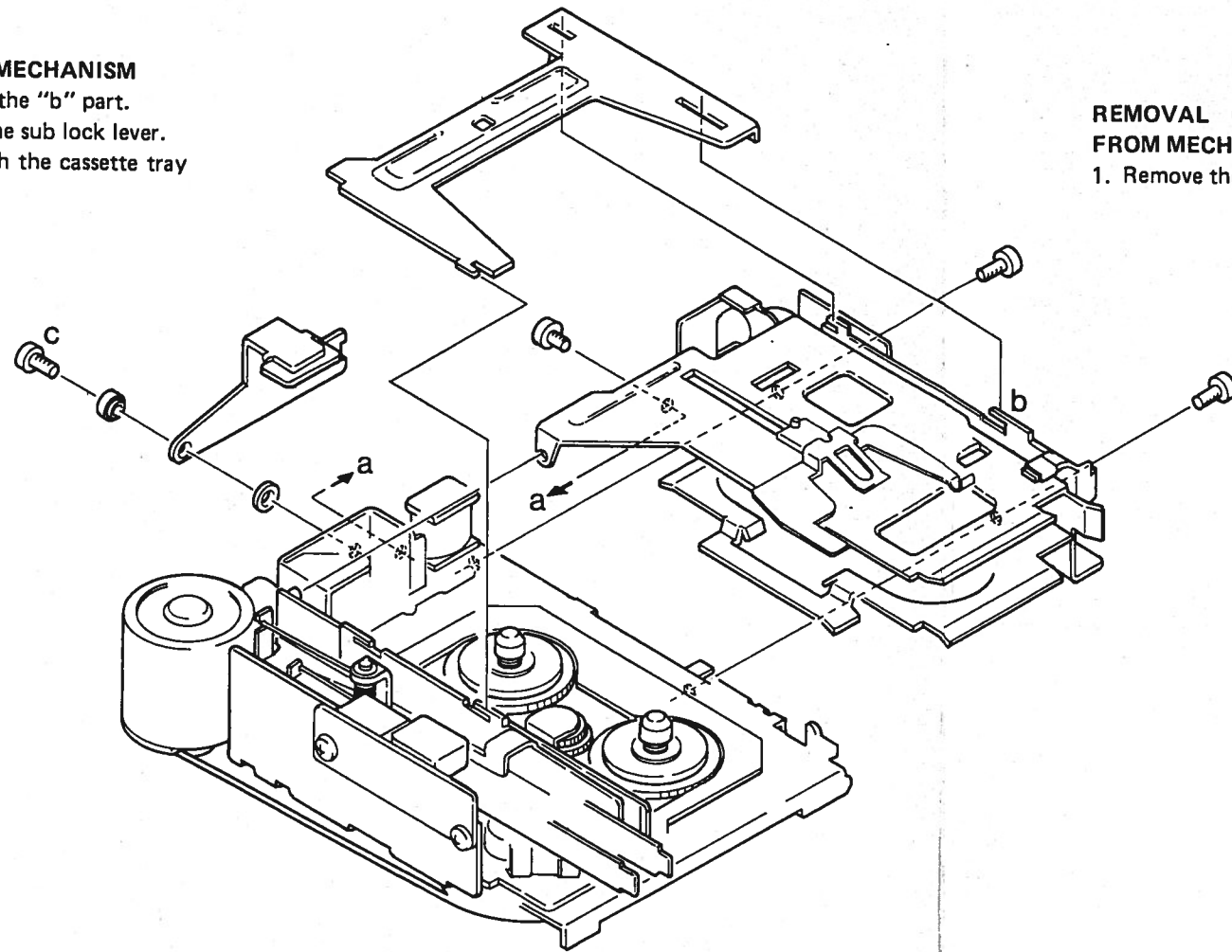
TO REMOVE THE COMPLETE CASSETTE MECHANISM



TO DETACH FLYWHEELS AND REEL TABLE FROM THE MECHANISM

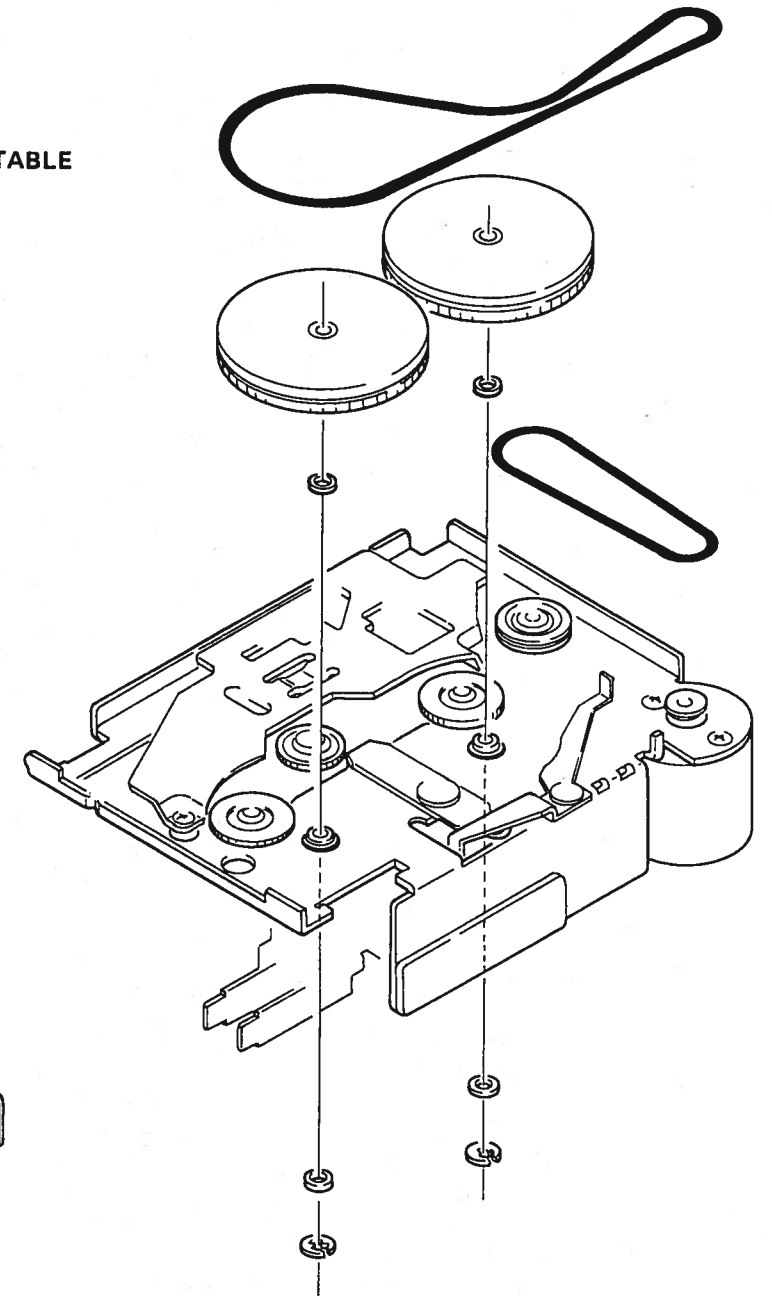
REMOVAL OF TAPE HEAD FROM MECHANISM

1. Remove the slide plate by bending the "b" part.
2. Remove the "C" screw to detach the sub lock lever.
3. Remove the three screws to detach the cassette tray assembly.

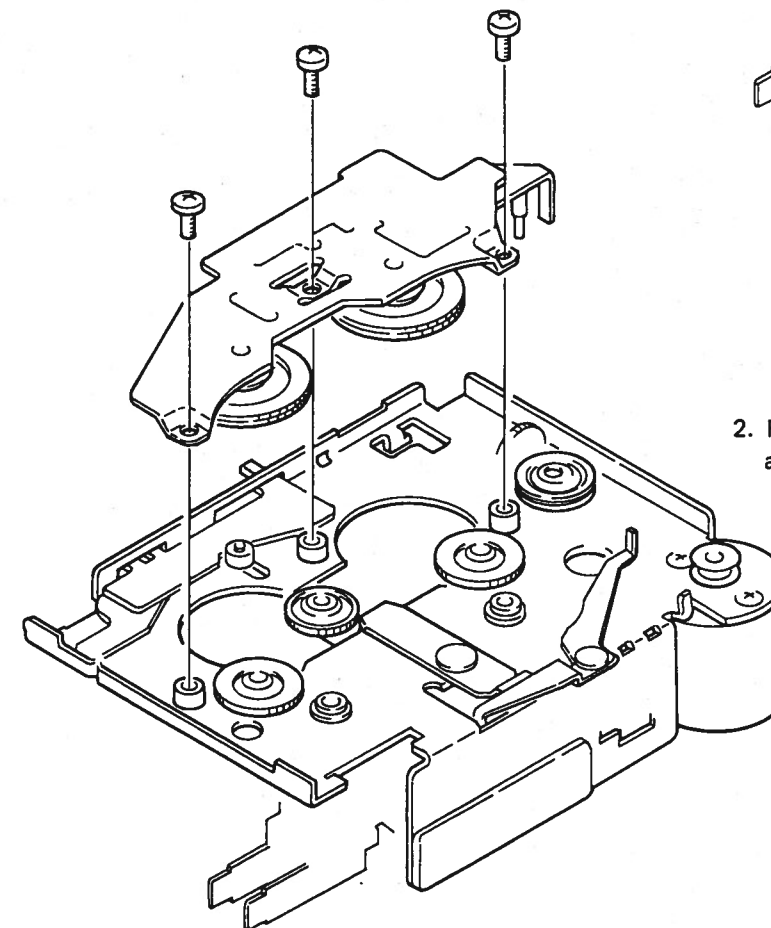
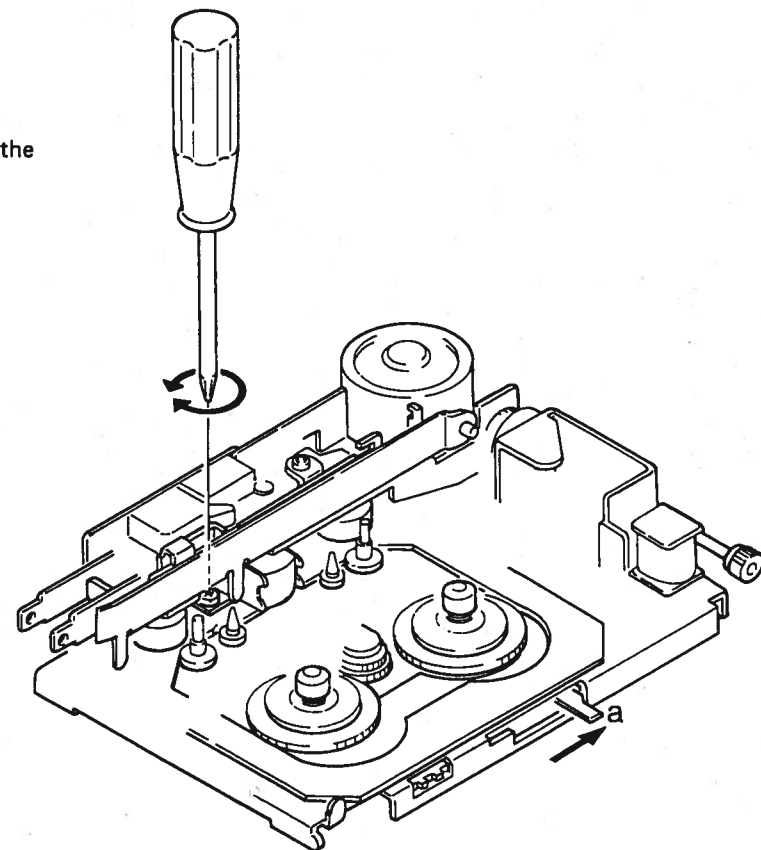


REMOVAL OF FLYWHEEL AND REEL TABLE FROM MECHANISM

1. Remove the "E" rings to pull the flywheel out.



4. Push the "a" lever in the arrow direction and set the mechanism to "Play" mode.
5. Remove the two set screw to detach the tape head.



2. Remove the three screws to detach the reel table assembly.

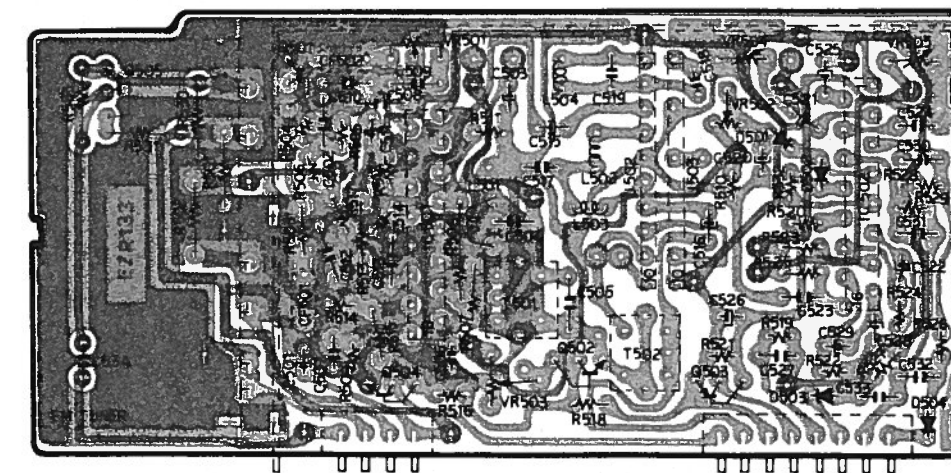
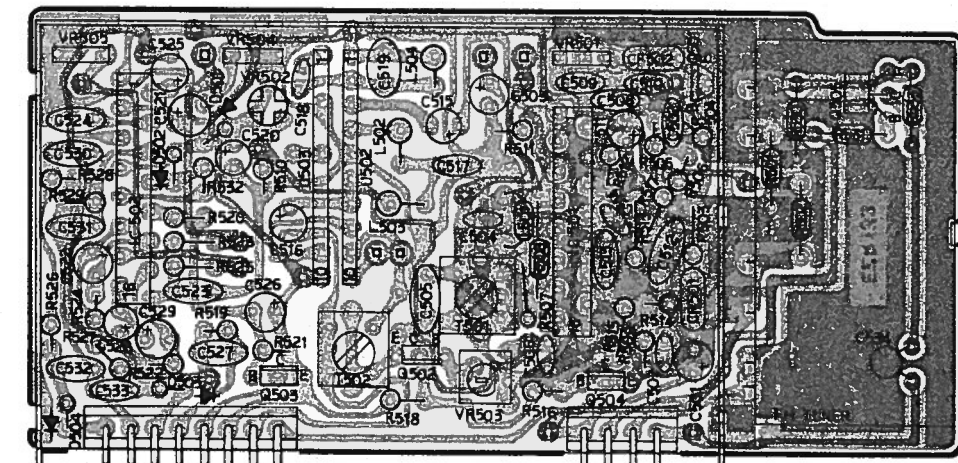
CR 2 451 028 0 FM BOARD ASSEMBLY PARTS LIST (1)

REF. NO.	PART NO.	DESCRIPTION	QTY
	CR 2 452 041 0	FM printed circuit board	1
IC501	CR 0 312 131 0	IC LA1140 (FM IF)	1
IC502	CR 0 312 135 0	IC LA3370 (MPX)	1
Q501	CR 0 304 064 0	Transistor 2SC2668Y	1
Q502, 504	CR 0 304 100 0	Transistor 2SC3312	2
Q503	CR 0 303 036 0	Transistor 2SA1310	1
Q505	CR 0 304 103 0	Transistor 2SC3327	1
D501, 502, 503, 504	CR 0 305 048 0	Diode 1S1588	4
U501	CR 9 314 002 0	Hybrid IC FM ASU I	1
U503	CR 9 314 003 0	Hybrid IC FM ASU II	1
U501	CR 2 462 002 0	FM tuner	1
C528	CR 0 332 096 2	Electrolytic capacitor 3.3 μ F 50V	1
C516, 525	CR 0 332 104 2	Electrolytic capacitor 4.7 μ F 25V	2
C520	CR 0 332 123 2	Electrolytic capacitor 10 μ F 16V	1
C511, 522, 529	CR 0 332 076 2	Electrolytic capacitor 1 μ F 50V	3
C503	CR 0 332 096 2	Electrolytic capacitor 3.3 μ F 50V	1
C501, 515	CR 0 332 104 2	Electrolytic capacitor 4.7 μ F 25V	2
C521	CR 0 332 123 2	Electrolytic capacitor 10 μ F 16V	1
C526	CR 0 332 162 2	Electrolytic capacitor 100 μ F 10V	1
C523	CR 2 339 130 2	Polypropylen capacitor 1000 pF 100V \pm 10%	1
C519	CR 0 335 302 2	Polyester film capacitor 470 pF 50V \pm 10%	1
C527	CR 0 335 382 2	Polyester film capacitor 0.0022 μ F 50V \pm 10%	1
C532, 533	CR 0 335 412 2	Polyester film capacitor 0.0033 μ F 50V \pm 10%	2
C517	CR 0 335 432 2	Polyester film capacitor 0.0047 μ F 50V \pm 10%	1
C524	CR 0 335 472 2	Polyester film capacitor 0.01 μ F 50V \pm 10%	1
C530, 531	CR 0 335 502 2	Polyester film capacitor 0.022 μ F 50V \pm 10%	2
C534	CR 0 334 122 1	Ceramic capacitor 22 pF 50V SL	1
C504	CR 0 334 082 5	Ceramic capacitor 10 pF 50V SH	1
C518	CR 0 334 102 3	Ceramic capacitor 15 pF 50V CH	1
C506, 507, 514	CR 0 334 152 1	Ceramic capacitor 33 pF 50V SL	3
C502, 508, 509, 510, 512	CR 0 333 472 5	Ceramic capacitor 0.01 μ F 50V F	5
C505, 513	CR 0 333 502 5	Ceramic capacitor 0.022 μ F 50V F	2
R508	CR 0 322 598 4	Carbon film resistor 3.9K ohm 1/6W \pm 5%	1
R507	CR 0 322 648 0	Carbon film resistor 10K ohm 1/6W \pm 5%	1
R502	CR 0 322 358 4	Carbon film resistor 47 ohm 1/6W \pm 5%	1
R501, 531	CR 0 322 768 4	Carbon film resistor 100K ohm 1/6W \pm 5%	2
R530	CR 0 322 688 4	Carbon film resistor 22K ohm 1/6W \pm 5%	1
R512	CR 0 322 643 4	Carbon film resistor 10K ohm 1/4W \pm 5%	1
R510	CR 0 322 743 4	Carbon film resistor 68K ohm 1/4W \pm 5%	1
R517	CR 0 322 273 4	Carbon film resistor 10 ohm 1/4W \pm 5%	1
R506	CR 0 322 353 4	Carbon film resistor 47 ohm 1/4W \pm 5%	1
R503	CR 0 322 433 4	Carbon film resistor 220 ohm 1/4W \pm 5%	1
R505, 522, 526, 527	CR 0 322 513 4	Carbon film resistor 1K ohm 1/4W \pm 5%	4
R528, 529	CR 0 322 583 4	Carbon film resistor 3.3K ohm 1/4W \pm 5%	2
R519	CR 0 322 623 4	Carbon film resistor 68K ohm 1/4W \pm 5%	1
R525	CR 0 322 643 4	Carbon film resistor 10K ohm 1/4W \pm 5%	1
R513, 532	CR 0 322 653 4	Carbon film resistor 12K ohm 1/4W \pm 5%	2
R511	CR 0 322 703 4	Carbon film resistor 33K ohm 1/4W \pm 5%	1
R514, 520	CR 0 322 723 4	Carbon film resistor 47K ohm 1/4W \pm 5%	2
R524	CR 0 322 743 4	Carbon film resistor 68K ohm 1/4W \pm 5%	1
R515, 516, 518, 523	CR 0 322 763 4	Carbon film resistor 100K ohm 1/4W \pm 5%	4
R504, 509	CR 0 322 783 4	Carbon film resistor 150K ohm 1/4W \pm 5%	2
R521	CR 0 322 823 4	Carbon film resistor 330K ohm 1/4W \pm 5%	1
T501	CR 2 354 022 0	DET coil	1
T502	CR 2 354 023 0	19 kHz coil	1

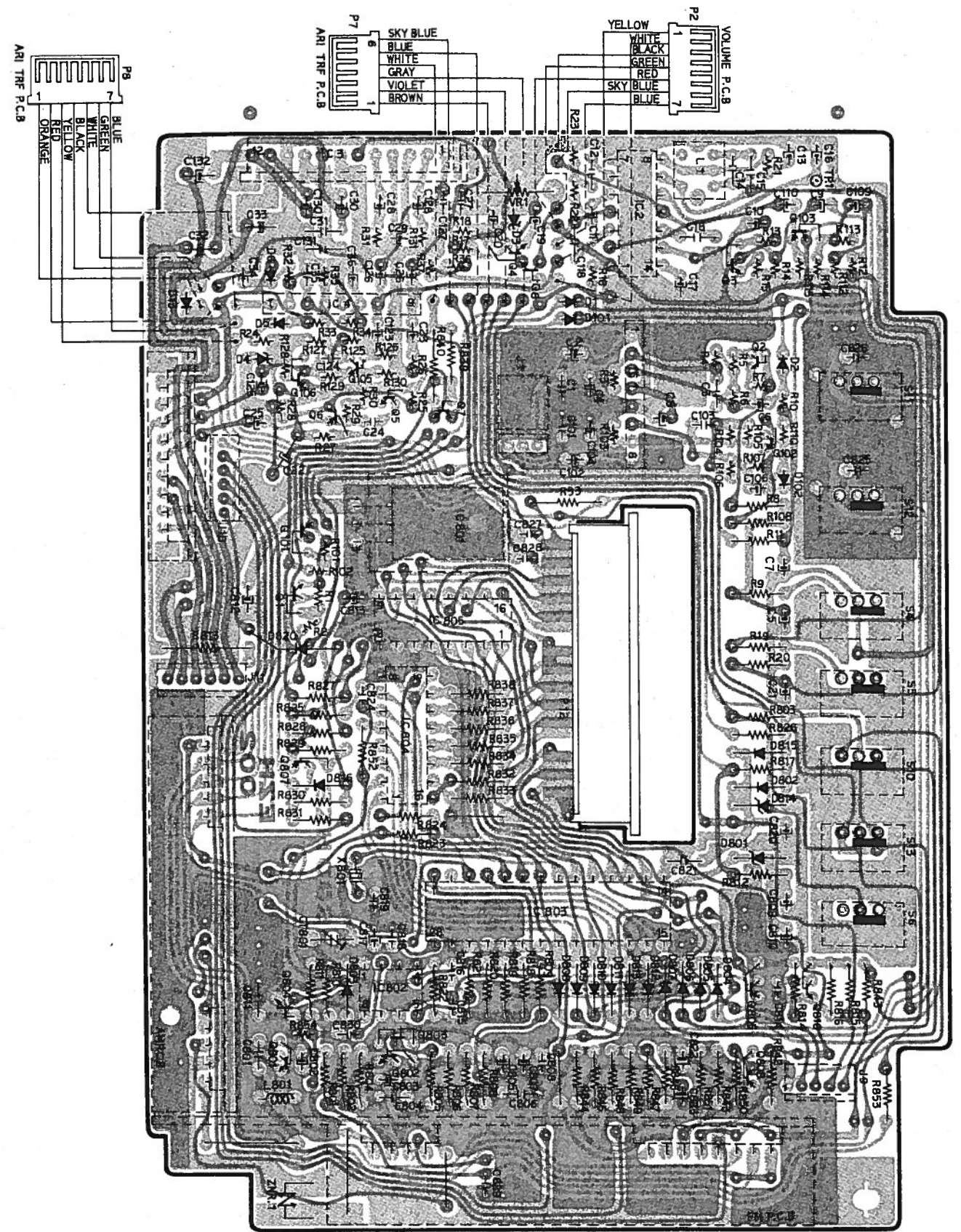
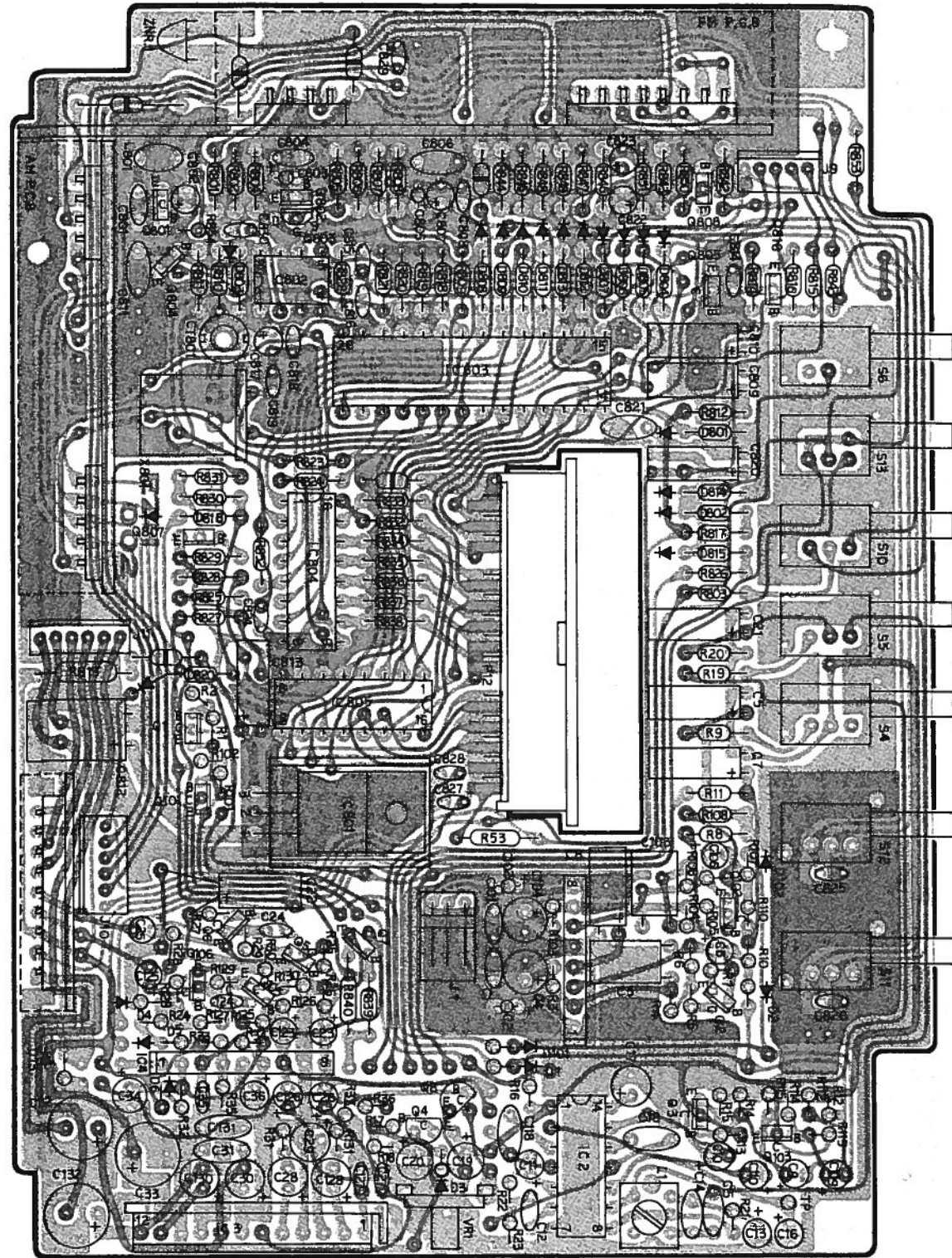
CR 2 451 028 0 FM BOARD ASSEMBLY PARTS LIST (2)

REF. NO.	PART NO.	DESCRIPTION	QTY
L501	CR 2 355 004 0	Choke coil 22 μ H ELR046	1
L502, 503, 504	CR 2 355 024 0	Choke coil 1 mH	3
CF501, 502	CR 2 364 006 0	Ceramic filter	2
VR501	CR 2 328 006 0	Variable resistor 300 ohm	1
VR504, 505	CR 2 328 007 0	Variable resistor 20K ohm	2
VR503	CR 2 328 015 0	Variable resistor 100K ohm	1
VR502	CR 2 328 016 0	Variable resistor 22K ohm	1
	CR 2 396 003 0	4 Pin angle plug	1
	CR 2 396 018 0	8 Pin angle plug	1
	CR 2 682 037 0	P.C.B. bracket (B)	1

FM BOARD ASSEMBLY LOCATION GUIDE (CR 2 451 028 0)



MAIN BOARD ASSEMBLY LOCATION GUIDE (CR 2 451 036 0)



CR 2 451 036 0 MAIN BOARD ASSEMBLY PARTS LIST (1)

REF. NO.	PART NO.	DESCRIPTION	QTY
	CR 2 452 038 0	Main printed circuit board	1
IC1	CR 2 312 125 0	Pre amplifier IC LA3161	1
IC2	CR 0 312 140 0	DNR IC LM1894N (DNR)	1
IC3	CR 0 312 157 0	IC TA7240P (Power amplifier)	1
IC4	CR 0 312 158 0	IC TA7324P (Mute)	1
IC801	CR 0 312 145 0	IC 78M05 (Voltage regulator)	1
IC802	CR 0 312 137 0	IC μ PB553AC (Pre-Scaler)	1
IC803	CR 0 312 142 0	PLL IC μ PD1701C-013 (PLL)	1
IC804	CR 0 312 143 0	IC TD62506P (Transistor arrey)	1
IC805	CR 0 312 144 0	IC TD62301P (Transistor arrey)	1
Q1, 3, 5, 7, 101, 103, 105, 801, 802, 804, 806	CR 0 304 100 0	Transistor 2SC3312	11
Q2, 6, 102, 106, Q805, 806, 808	CR 0 303 036 0	Transistor 2SA1310	7
Q4	CR 0 304 093 0	Transistor 2SD592NC	1
Q8	CR 0 304 101 0	Transistor 2SD1302	1
Q803	CR 0 302 032 0	FET 2SK118 (R)	1
D1, 2, 5, 101, 102, 820	CR 0 305 048 0	Diode 1S1588	6
D6, 13	CR 0 305 002 0	Diode 1N4003	2
D3	CR 0 307 028 0	Zener diode 05Z9.1Y	1
D4	CR 0 307 030 0	Zener diode 05Z10Y	1
C1, C2, 101	CR 0 335 342 2	Polyester film capacitor 0.001 μ F 50V \pm 10%	3
C801	CR 0 335 372 2	Polyester film capacitor 1800 pF 50V \pm 10%	1
C14	CR 0 335 492 2	Polyester film capacitor 0.015 μ F 50V \pm 10%	1
C804	CR 0 335 502 2	Polyester film capacitor 0.022 μ F 50V \pm 10%	1
C3, 103	CR 0 335 512 2	Polyester film capacitor 0.033 μ F 50V \pm 10%	1
C806	CR 0 335 522 2	Polyester film capacitor 0.047 μ F 50V \pm 10%	1
C15	CR 0 333 521 6	Ceramic capacitor 0.047 μ F 25V SR	1
C31, 131	CR 0 333 695 6	Ceramic capacitor 0.2 μ F 12V S	2
C814, 829	CR 0 333 431 6	Ceramic capacitor 4700 pF 25V SR	2
C18, 118	CR 0 333 422 1	Ceramic capacitor 3900 pF 50V B	2
C24, 124	CR 0 333 212 1	Ceramic capacitor 100 pF 50V B	2
C27, 127, 35, 808, 816, 818, 827, 828, 830	CR 0 333 342 1	Ceramic capacitor 0.001 μ F 50V	9
C815	CR 0 333 262 1	Ceramic capacitor 220 pF 50V B	1
C811	CR 0 333 382 1	Ceramic capacitor 0.0022 pF 50V B	1
C821	CR 0 333 472 5	Ceramic capacitor 0.01 μ F 50V F	1
C825, 826	CR 0 333 381 6	Ceramic capacitor 2200 pF 25V SR	2
C819	CR 0 334 122 3	Ceramic capacitor 220 pF 50V CH	1
C824	CR 0 333 471 6	Ceramic capacitor 0.01 μ F 25V SR	1
C4, 17, 104	CR 0 332 161 2	Electrolytic capacitor 100 μ F 6.3V	3
C6, 106, 802, 823	CR 0 332 086 2	Electrolytic capacitor 2.2 μ F 50V	4
C10, 23, 123, 822	CR 0 332 076 2	Electrolytic capacitor 1 μ F 50V	4
C807	CR 0 332 123 2	Electrolytic capacitor 10 μ F 16V	1
C817	CR 0 332 131 2	Electrolytic capacitor 22 μ F 6.3V	1
C28, 128	CR 0 332 151 2	Electrolytic capacitor 47 μ F 6.3V	2
C9, 109, 16, 110	CR 0 332 076 2	Electrolytic capacitor 1 μ F 50V	4
C11, 13	CR 0 332 016 2	Electrolytic capacitor 0.1 μ F 50V	2
C26, 106	CR 0 332 056 2	Electrolytic capacitor 0.47 μ F 50V	2
C36	CR 0 332 104 2	Electrolytic capacitor 4.7 μ F 25V	1
C25, 125	CR 0 332 086 2	Electrolytic capacitor 2.2 μ F 50V	2
C5, 21, 29, 34	CR 0 332 153 2	Electrolytic capacitor 47 μ F 16V	4
C7, 20	CR 0 332 123 2	Electrolytic capacitor 10 μ F 16V	2
C8, 19, 30, 130, 820	CR 0 332 162 2	Electrolytic capacitor 100 μ F 10V	5

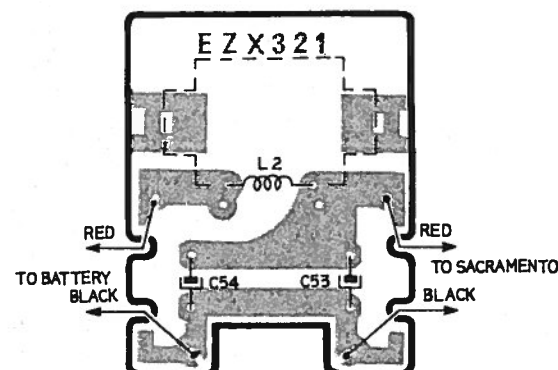
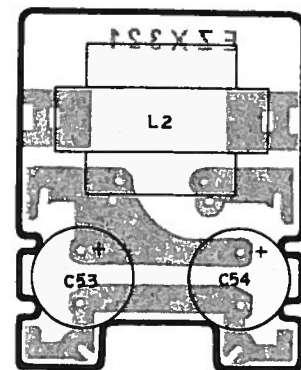
CR 2 451 036 0 MAIN BOARD ASSEMBLY PARTS LIST (2)

REF. NO.	PART NO.	DESCRIPTION	QTY
C33	CR 0 332 203 2	Electrolytic capacitor 1000 μ F 16V	1
C32, 132	CR 0 332 202 2	Electrolytic capacitor 1000 μ F 10V	2
C812	CR 0 332 192 2	Electrolytic capacitor 470 μ F 10V	1
C22, 813	CR 0 332 173 2	Electrolytic capacitor 220 μ F 16V	2
C809, 810	CR 0 332 172 2	Electrolytic capacitor 220 μ F 10V	2
C2, 102, 803	CR 0 337 082 0	Tantalum electrolytic capacitor 2.2 μ F 10V	3
C805	CR 0 337 033 2	Tantalum electrolytic capacitor 0.22 μ F 16V	1
CT801	CR 2 344 003 0	Trimmer capacitor 20 pF	1
X801	CR 2 362 001 0	Crystal 4.5 MHz EP0005	1
L1	CR 2 354 016 0	DNR coil 4.7 mH	1
L801	CR 2 356 002 0	Choke coil 4.7 μ H ELR047R7	1
VR1	CR 2 328 009 0	Variable resistor 10K ohm	1
ZNR1	CR 2 541 001 0	ZNR	1
TP	CR 2 413 001 0	Test point	1
S6, 11	CR 2 375 007 0	Push Unlock Switch	3
S4, 5	CR 2 375 008 0	Push Lock Switch	2
S10, 13	CR 2 375 009 0	Push Lock Switch	2
J1	CR 2 396 011 0	3 Pin angle plug	1
J9	CR 2 396 012 0	5 Pin Stright Plug	1
J10, 11	CR 2 396 013 0	6 Pin Stright Plug	2
P12	CR 2 396 002 0	26 Pin connector	1
P4	CR 2 408 023 0	7 Pin connector assembly (B)	1
P7	CR 2 408 024 0	6 Pin connector assembly (A)	1
P2	CR 2 408 025 0	7 Pin connector assembly (A)	1
R17	CR 0 322 293 4	Carbon film resistor 15 ohm $\frac{1}{4}$ W \pm 5%	1
R16	CR 0 322 353 4	Carbon film resistor 47 ohm $\frac{1}{4}$ W \pm 5%	1
R31, 131	CR 0 322 363 4	Carbon film resistor 56 ohm $\frac{1}{4}$ W \pm 5%	2
R21	CR 0 322 393 4	Carbon film resistor 100 ohm $\frac{1}{4}$ W \pm 5%	1
R24	CR 0 322 433 4	Carbon film resistor 220 ohm $\frac{1}{4}$ W \pm 5%	1
R18, 23	CR 0 322 453 4	Carbon film resistor 330 ohm $\frac{1}{4}$ W \pm 5%	2
R22, 37	CR 0 322 493 4	Carbon film resistor 680 ohm $\frac{1}{4}$ W \pm 5%	2
R32	CR 0 322 513 4	Carbon film resistor 1K ohm $\frac{1}{4}$ W \pm 5%	1
R36	CR 0 322 533 4	Carbon film resistor 1.5K ohm $\frac{1}{4}$ W \pm 5%	1
R35	CR 0 322 723 4	Carbon film resistor 47K ohm $\frac{1}{4}$ W \pm 5%	1
R53	CR 0 322 353 4	Carbon film resistor 47 ohm $\frac{1}{4}$ W \pm 5%	1
R840	CR 0 322 513 4	Carbon film resistor 1K ohm $\frac{1}{4}$ W \pm 5%	1
R813	CR 0 322 314 4	Carbon film resistor 22 ohm $\frac{1}{4}$ W \pm 5%	1
R3, 103	CR 0 322 368 4	Carbon film resistor 56 ohm $\frac{1}{6}$ W \pm 5%	2
R30, 130	CR 0 322 418 4	Carbon film resistor 150 ohm $\frac{1}{6}$ W \pm 5%	2
R28, 128	CR 0 322 448 4	Carbon film resistor 270 ohm $\frac{1}{6}$ W \pm 5%	2
R29, 129	CR 0 322 578 4	Carbon film resistor 2.7K ohm $\frac{1}{6}$ W \pm 5%	2
R6, 106	CR 0 322 598 4	Carbon film resistor 3.9K ohm $\frac{1}{6}$ W \pm 5%	2
R5, 105	CR 0 322 608 4	Carbon film resistor 4.7K ohm $\frac{1}{6}$ W \pm 5%	2
R12, 15, 112, 115	CR 0 322 648 4	Carbon film resistor 10K ohm $\frac{1}{6}$ W \pm 5%	4
R27, 127	CR 0 322 658 4	Carbon film resistor 12K ohm $\frac{1}{6}$ W \pm 5%	2
R1, 2, 7, 101, 102, 107	CR 0 322 688 4	Carbon film resistor 22K ohm $\frac{1}{6}$ W \pm 5%	6
R33	CR 0 322 708 4	Carbon film resistor 33K ohm $\frac{1}{6}$ W \pm 5%	1
R13, 26, 113, 126	CR 0 322 748 4	Carbon film resistor 68K ohm $\frac{1}{6}$ W \pm 5%	4
R4, 10, 104, 110	CR 0 322 768 4	Carbon film resistor 100K ohm $\frac{1}{6}$ W \pm 5%	4
R14, 114	CR 0 322 788 4	Carbon film resistor 150K ohm $\frac{1}{6}$ W \pm 5%	2
R34	CR 0 322 808 4	Carbon film resistor 220K ohm $\frac{1}{6}$ W \pm 5%	1
R25, 125	CR 0 322 878 4	Carbon film resistor 680K ohm $\frac{1}{6}$ W \pm 5%	2
R854	CR 0 322 568 4	Carbon film resistor 2.2K ohm $\frac{1}{6}$ W \pm 5%	1
R832, 833, 834, 835, R836, 837, 838	CR 0 322 358 4	Carbon film resistor 47 ohm $\frac{1}{6}$ W \pm 5%	7
R812	CR 0 322 438 4	Carbon film resistor 220 ohm $\frac{1}{6}$ W \pm 5%	1
R805	CR 0 322 498 4	Carbon film resistor 680 ohm $\frac{1}{6}$ W \pm 5%	1

CR 2 451 036 0 MAIN BOARD ASSEMBLY PARTS LIST (3)

REF. NO.	PART NO.	DESCRIPTION	QTY
R817	CR 0 322 508 4	Carbon film resistor 820 ohm 1/6W ± 5%	1
R842, 849, 850, 852	CR 0 322 518 4	Carbon film resistor 1K ohm 1/6W ± 5%	4
R843	CR 0 322 538 4	Carbon film resistor 1.5K ohm 1/6W ± 5%	1
R806, 807, 809, 826	CR 0 322 568 4	Carbon film resistor 2.2K ohm 1/6W ± 5%	4
R844	CR 0 322 598 4	Carbon film resistor 3.9K ohm 1/6W ± 5%	1
R831	CR 0 322 608 4	Carbon film resistor 4.7K ohm 1/6W ± 5%	2
R851	CR 0 322 638 4	Carbon film resistor 8.2K ohm 1/6W ± 5%	1
R8, 9, 19, 20, 108, 804, R811, 845	CR 0 322 648 4	Carbon film resistor 10K ohm 1/6W ± 5%	8
R11, 818, 819, 820, 821, R823, 824, 826, 827, R828, 829, 830, 839	CR 0 322 688 4	Carbon film resistor 22K ohm 1/6W ± 5%	13
R801, 803	CR 0 322 708 4	Carbon film resistor 33K ohm 1/6W ± 5%	2
R841	CR 0 322 718 4	Carbon film resistor 39K ohm 1/6W ± 5%	1
R810, 815, 816	CR 0 322 728 4	Carbon film resistor 47K ohm 1/6W ± 5%	3
R847	CR 0 322 748 4	Carbon film resistor 68K ohm 1/6W ± 5%	1
R802, 814, 848	CR 0 322 768 4	Carbon film resistor 100K ohm 1/6W ± 5%	3
R822	CR 0 322 808 4	Carbon film resistor 220K ohm 1/6W ± 5%	1
R846	CR 0 322 818 4	Carbon film resistor 270K ohm 1/6W ± 5%	1
R808	CR 0 322 018 4	Carbon film resistor 4.7M ohm 1/6W ± 5%	1
	CR 2 329 010 0	Zero ohm resistor	6
D802 ~ 813, 815, 816	CR 0 305 039 0	Diode 1S1588	14
D814	CR 0 307 029 0	Zener diode 05Z5.1X	1
D801	CR 0 307 030 0	Zener diode 05Z10Y	1
	CR 2 682 048 0	IC barcket	1
	CR 2 682 049 0	Heat sink	1
	CR 2 683 050 0	Insulation paper (B)	1

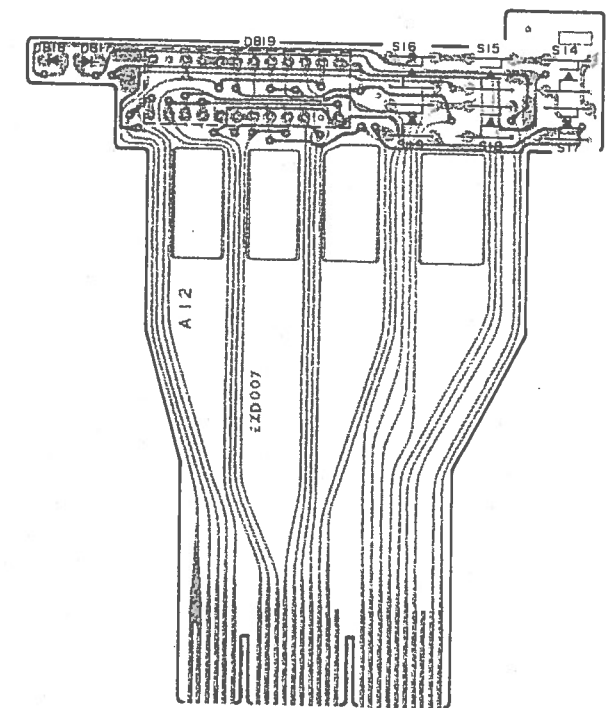
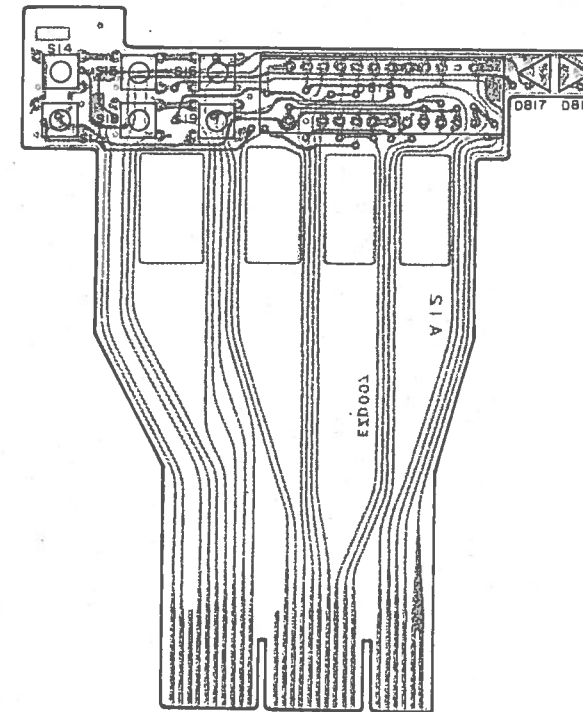
FILTER BOARD ASSEMBLY LOCATION GUIDE (CR 2 451 037 0)



CR 2 451 037 0 FILTER BOARD ASSEMBLY PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	QTY
C53, 54	CR 2 452 048 0	Filter printed circuit board	1
L2	CR 0 332 203 2	Electrolytic capacitor 1000 μF 16V	2
	CR 2 355 003 0	Choke transformer ELX004	1
	CR 2 683 023 0	Cushion	1
	CR 2 652 025 0	Filter box	1

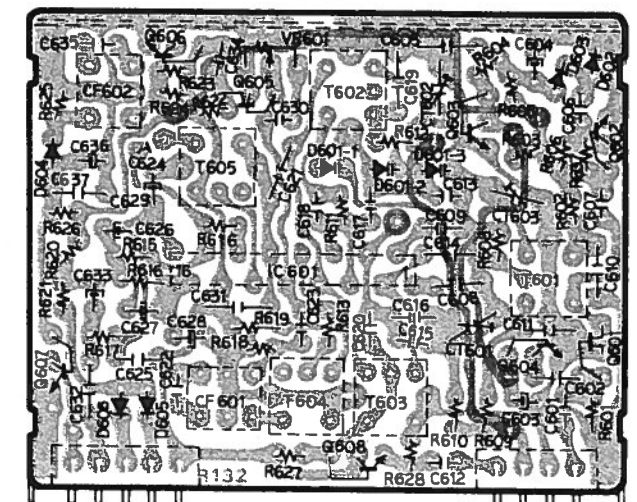
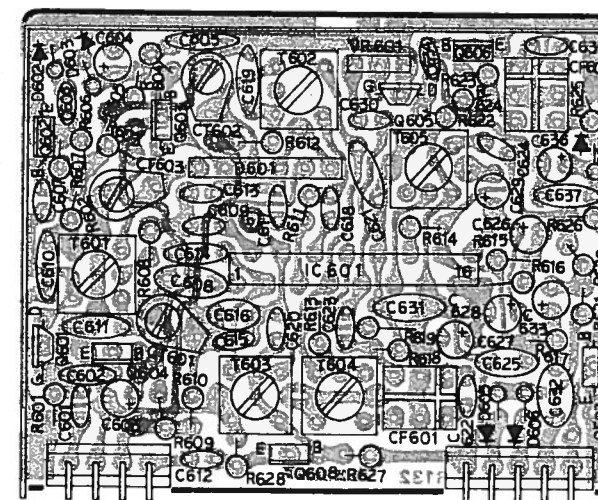
DISPLAY BOARD ASSEMBLY LOCATION GUIDE (CR 2 451 029 0)



CR 2 451 029 0 DISPLAY BOARD ASSEMBLY PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	QTY
D819	CR 2 453 014 0	Display printed circuit board	1
C817, 818	CR 2 423 008 0	Display LC-204-MLA	1
S14, 15	CR 0 423 011 0	LED LN312GP	2
	CR 2 379 005 0	Switch ESP-056	6

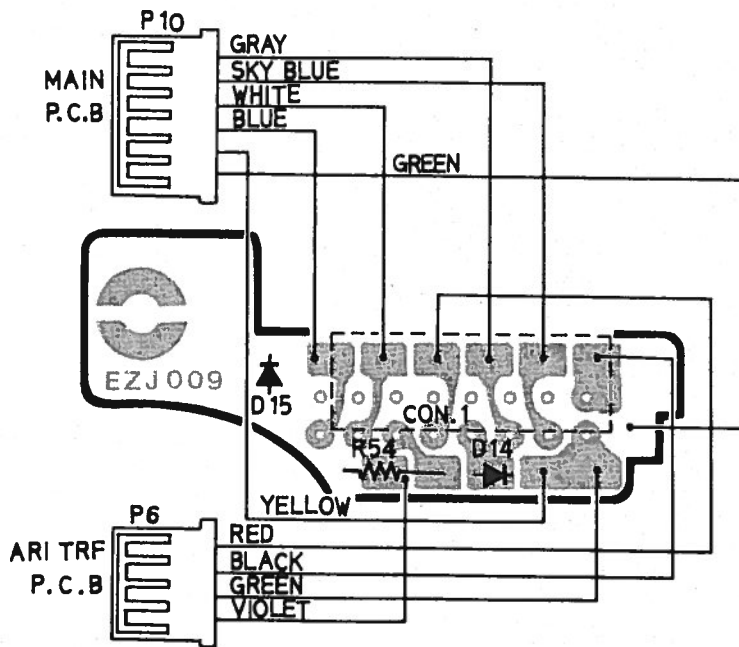
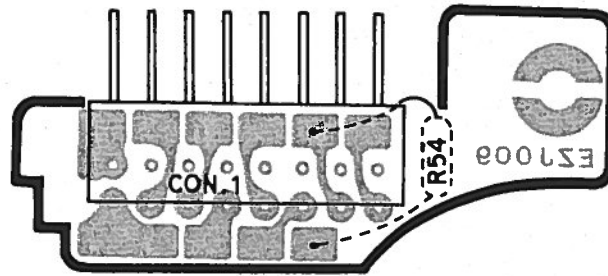
AM BOARD ASSEMBLY LOCATION GUIDE (CR 2 451 027 0)



CR 2 451 027 0 AM BOARD ASSEMBLY PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	QTY
	CR 2 452 040 0	AM printed circuit board	1
IC601	CR 0 312 146 0	IC LA1130	1
Q602	CR 0 304 100 0	Transistor 2SC3312	6
Q601	CR 0 302 012 2	FET 2SK161(Y)	2
D601-1, -2, -3	CR 0 306 010 0	Variable diode KV1235Z3	1
D602, 603, 604, 605, 606	CR 0 305 039 0	Diode 1S1588	5
C633	CR 0 332 016 2	Electrolytic capacitor 0.1 μ F 50V	1
C626	CR 0 332 056 2	Electrolytic capacitor 0.47 μ F 50V	1
C636	CR 0 332 076 2	Electrolytic capacitor 1 μ F 50V	1
C627	CR 0 332 086 2	Electrolytic capacitor 2.2 μ F 50V	1
C603, 604	CR 0 332 123 2	Electrolytic capacitor 10 μ F 16V	2
C628, 629	CR 0 332 131 2	Electrolytic capacitor 22 μ F 6.3V	2
C616	CR 0 339 110 4	Polypropylene capacitor 470 pF 100V \pm 5%	1
C625	CR 0 335 472 2	Polyester film capacitor 0.01 μ F 50V \pm 10%	1
C632	CR 0 335 512 2	Polyester film capacitor 0.033 μ F 50V \pm 10%	1
C608	CR 0 335 612 2	Polyester film capacitor 0.039 μ F 50V \pm 10%	1
C602, 610, 611, 614, C619, 621, 631	CR 0 333 502 5	Ceramic capacitor 0.022 μ F 50V F	7
C605, 637	CR 0 333 472 5	Ceramic capacitor 0.01 μ F 50V F	2
C601, 606, 609, 612, 618, C623, 624, 630, 634	CR 0 333 342 1	Ceramic capacitor 0.001 μ F 50V	9
C617, 622, 635	CR 0 333 192 1	Ceramic capacitor 68 pF 50V SL	3
C613	CR 0 333 172 1	Ceramic capacitor 47 pF 50V SL	1
C607	CR 0 333 152 1	Ceramic capacitor 33 pF 50V SL	1
C615	CR 0 333 122 3	Ceramic capacitor 22 pF 50V CH	1
C620	CR 0 333 102 1	Ceramic capacitor 15 pF 50V SL	1
VR601	CR 2 328 014 0	Variable resistor 50K ohm	1
CT601, 602, 603	CR 2 344 002 0	Trimmer capacitor 20 pF ECT035	3
CF601	CR 2 364 005 0	Ceramic filter 450F3L	1
CF602	CR 2 364 004 0	Ceramic filter 450C EPF013	1
T603	CR 2 353 017 0	OSC coil	1
T601	CR 2 353 018 0	RE1 coil	1
T602	CR 2 353 019 0	RF2 coil	1
T604	CR 2 353 020 0	IF1 coil	1
T605	CR 2 353 021 0	IF2 coil	1
R613	CR 0 322 513 4	Carbon film resistor 1K ohm $\frac{1}{4}$ W \pm 5%	1
R617	CR 0 322 573 4	Carbon film resistor 2.7K ohm $\frac{1}{4}$ W \pm 5%	1
R611	CR 0 322 583 4	Carbon film resistor 3.3K ohm $\frac{1}{4}$ W \pm 5%	1
R612	CR 0 322 763 4	Carbon film resistor 100K ohm $\frac{1}{4}$ W \pm 5%	1
R619	CR 0 322 353 4	Carbon film resistor 47 ohm $\frac{1}{4}$ W \pm 5%	1
R602	CR 0 322 393 4	Carbon film resistor 100 ohm $\frac{1}{4}$ W \pm 5%	1
R614	CR 0 322 433 4	Carbon film resistor 220 ohm $\frac{1}{4}$ W \pm 5%	1
R622	CR 0 322 513 4	Carbon film resistor 1K ohm $\frac{1}{4}$ W \pm 5%	1
R604, 608	CR 0 322 533 4	Carbon film resistor 1.5K ohm $\frac{1}{4}$ W \pm 5%	2
R621, 625	CR 0 322 563 4	Carbon film resistor 2.2K ohm $\frac{1}{4}$ W \pm 5%	2
R618, 624	CR 0 322 583 4	Carbon film resistor 3.3K ohm $\frac{1}{4}$ W \pm 5%	2
R628	CR 0 322 603 4	Carbon film resistor 4.7K ohm $\frac{1}{4}$ W \pm 5%	1
R615, 616	CR 0 322 643 4	Carbon film resistor 10K ohm $\frac{1}{4}$ W \pm 5%	2
R606	CR 0 322 663 4	Carbon film resistor 15K ohm $\frac{1}{4}$ W \pm 5%	1
R603	CR 0 322 683 4	Carbon film resistor 22K ohm $\frac{1}{4}$ W \pm 5%	1
R620	CR 0 322 723 4	Carbon film resistor 47K ohm $\frac{1}{4}$ W \pm 5%	1
R601, 609, 610	CR 0 322 763 4	Carbon film resistor 100K ohm $\frac{1}{4}$ W \pm 5%	3
R626	CR 0 322 783 4	Carbon film resistor 150K ohm $\frac{1}{4}$ W \pm 5%	1
R605	CR 0 322 823 4	Carbon film resistor 330K ohm $\frac{1}{4}$ W \pm 5%	1
R607, 623, 627	CR 0 322 863 4	Carbon film resistor 560K ohm $\frac{1}{4}$ W \pm 5%	3
	CR 2 396 003 0	4 Pin angle plug EJJ046-04	1
	CR 2 396 004 0	5 Pin angle plug EJJ046-05	1
	CR 2 682 036 0	P.C.B. bracket (A)	1

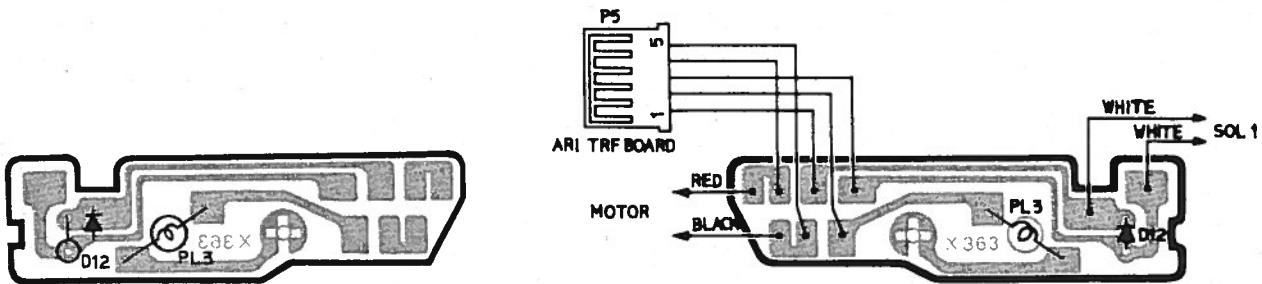
ARI CONNECTOR BOARD ASSEMBLY LOCATION GUIDE (CR 2 451 030 0)



CR 2 451 030 0 ARI CONNECTOR BOARD ASSEMBLY PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	QTY
CON1	CR 2 452 046 0	ARI CON printed circuit board	1
	CR 2 396 017 0	Multi connector	1
P6	CR 2 408 026 0	4 Pin connector assembly	1
P10	CR 2 408 027 0	6 Pin connector assembly (C)	1

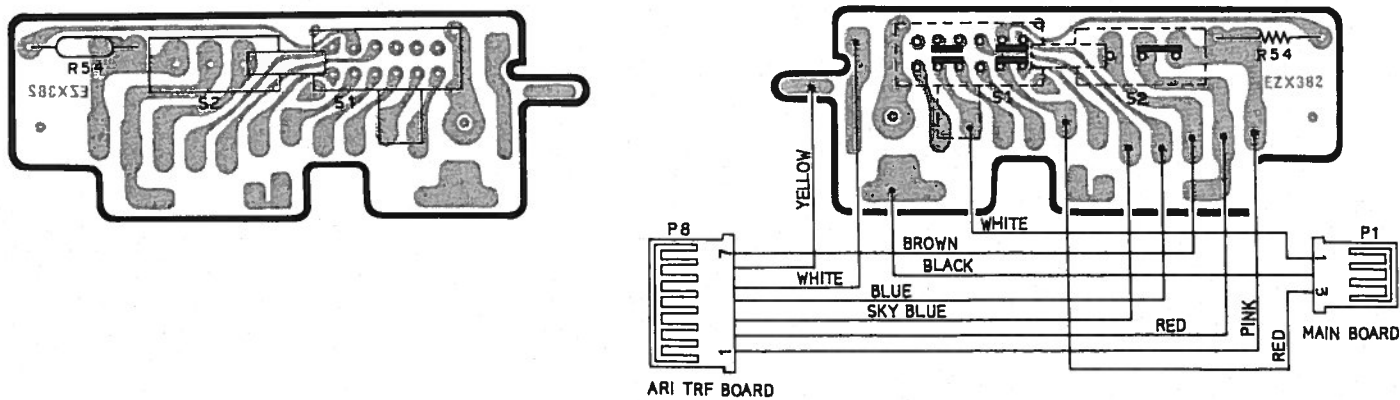
LAMP BOARD ASSEMBLY LOCATION GUIDE (CR 2 451 032 0)



CR 2 451 032 0 LAMP BOARD ASSEMBLY PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	QTY
D12 PL3 P5	CR 2 452 039 0	Lamp printed circuit board	1
	CR 0 305 002 0	Diode 1N4003	1
	CR 2 422 007 0	Incandescent lamp	1
	CR 2 408 032 0	5 Pin connector assembly (C)	1

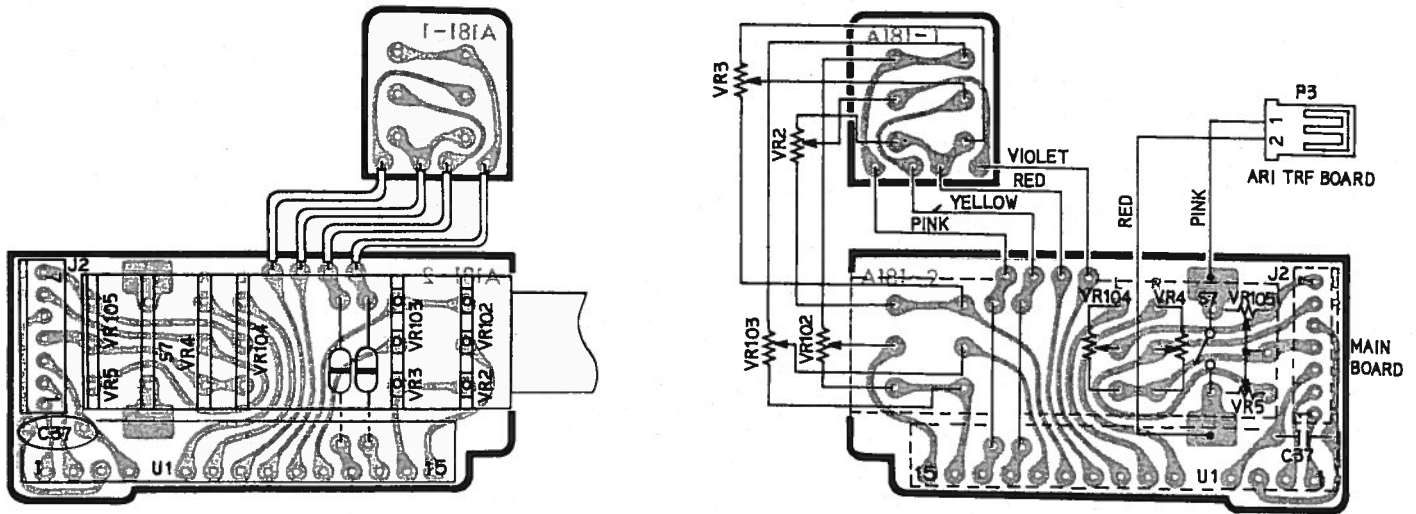
SWITCH PRINTED CIRCUIT BOARD LOCATION GUIDE (CR 2 452 047 0)



CR 2 452 047 0 SWITCH PRINTED CIRCUIT BOARD PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	QTY
R54 S1 S2 P1 P8	CR 2 452 047 0	Switch printed circuit board	1
	CR 0 322 493 4	Carbon film resistor 680 ohm 1/4W ± 5%	1
	CR 2 373 003 0	Slide switch	1
	CR 2 377 004 0	Micro switch	1
	CR 2 408 033 0	3 Pin connector assembly	1
	CR 2 408 034 0	7 Pin connector assembly (C)	1

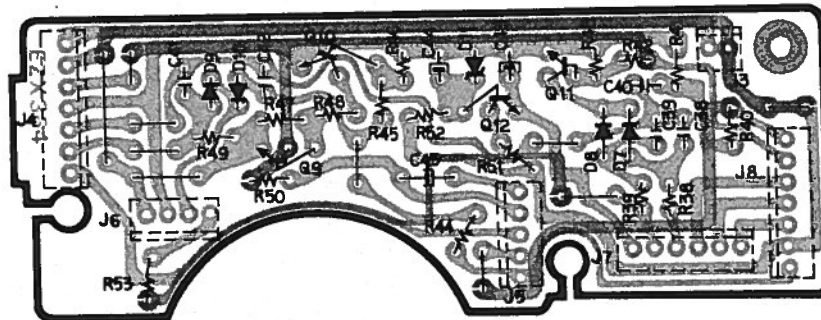
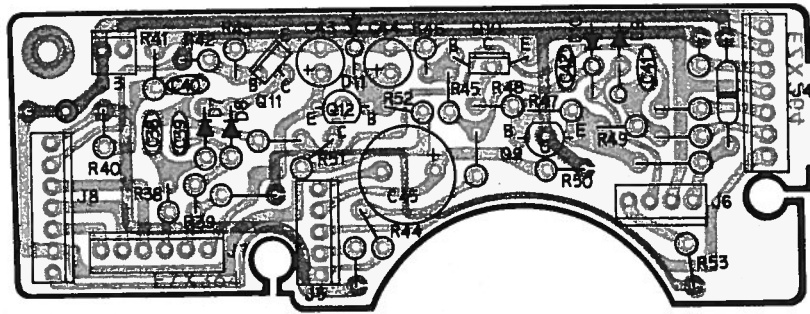
VOLUME BOARD ASSEMBLY LOCATION GUIDE (CR 2 451 034 0)



CR 2 451 034 0 VOLUME BOARD ASSEMBLY PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	QTY	
U1 VR2, 3, 4, 5, 57, 102, VR103, 104, 105 C37 J2 P3	CR 2 452 042 0	Volume printed circuit board (1)	1	
	CR 2 452 043 0	Volume printed circuit board (2)	1	
	CR 2 313 003 0	EEH001 Hybrid IC	1	
	CR 2 328 012 0	Variable resistor with switch	1	
	CR 0 333 521 6	Ceramic capacitor	0.047 μ F 25V SR	1
	CR 2 396 014 0	7 Pin stright plug		1
	CR 2 329 010 0	Zero ohm resistor		2
	CR 2 408 028 0	2 pin connector assembly		1
	CR 2 503 004 0	Insulated wire (red)		1
	CR 2 503 005 0	Insulated wire (yellow)		1
	CR 2 503 006 0	Insulated wire (violet)		1
	CR 2 503 007 0	Insulated wire (pink)		1

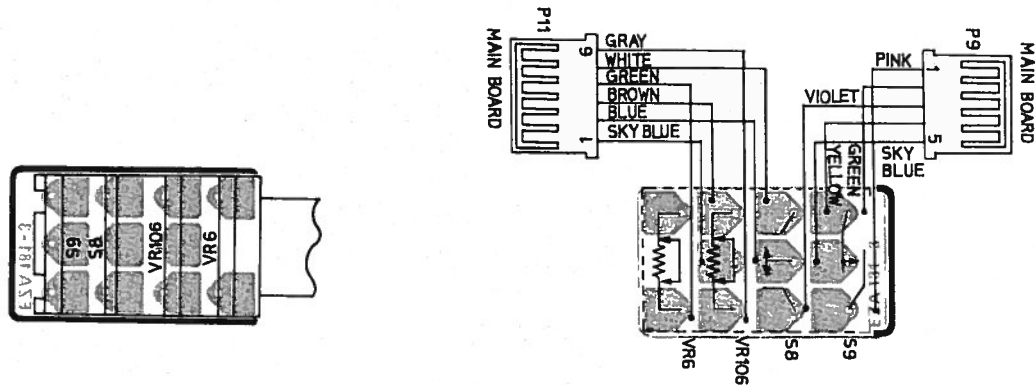
ARI TRANSFER BOARD LOCATION GUIDE (CR 2 451 035 0)



CR 2 451 035 0 ARI TRANSFER BOARD ASSEMBLY PART LIST

REF. NO.	PART NO.	DESCRIPTION	QTY
	CR 2 452 045 0	ARI IRF printed circuit board	1
Q9	CR 0 303 037 0	Transistor 2SA966	1
Q10, 11	CR 0 304 100 0	Transistor 2SC3312	2
Q12	CR 0 304 102 0	Transistor 2SD966	1
D7, 8	CR 0 305 047 0	Diode 0A90	2
D9, 10	CR 0 305 048 0	Diode 1S1588	2
D11	CR 0 307 028 0	Zener diode 05Z9.1Y	1
C38, 39, 40, 41, 42	CR 0 333 342 1	Ceramic capacitor 0.001 μ F 50V YB \pm 10	5
C44	CR 0 332 123 2	Electrolytic capacitor 10 μ F 16V	1
C43	CR 0 332 162 2	Electrolytic capacitor 100 μ F 10V	1
C45	CR 0 332 203 2	Electrolytic capacitor 1000 μ F 16V	1
J4, 8	CR 2 396 014 0	7 Pin stright plug	2
J3	CR 2 396 015 0	2 Pin stright plug	1
J5	CR 2 396 012 0	5 Pin stright plug	1
J6	CR 2 396 016 0	4 Pin stright plug	1
J7	CR 2 396 013 0	6 Pin stright plug	1
R51	CR 0 322 293 4	Carbon film resistor 15 ohm $\frac{1}{4}$ W \pm 5%	1
R53	CR 0 322 393 4	Carbon film resistor 100 ohm $\frac{1}{4}$ W \pm 5%	1
R52	CR 0 322 453 4	Carbon film resistor 330 ohm $\frac{1}{4}$ W \pm 5%	1
R48, 49	CR 0 322 533 4	Carbon film resistor 1.5K ohm $\frac{1}{4}$ W \pm 5%	2
R38, 39, 40, 41, 43, 44, R45, 46, 47	CR 0 322 603 4	Carbon film resistor 4.7K ohm $\frac{1}{4}$ W \pm 5%	9
R42	CR 0 322 683 4	Carbon film resistor 22K ohm $\frac{1}{4}$ W \pm 5%	1
R50	CR 0 322 204 4	Carbon film resistor 3.3 ohm $\frac{1}{2}$ W \pm 5%	1
	CR 2 329 001 0	Zero ohm resistor EX029	10

FADER VOLUME BOARD ASSEMBLY LOCATION GUIDE (CR 2 451 033 0)



CR 2 451 033 0 FADER VOLUME BOARD ASSEMBLY PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	Q'TY
VR6, 106 P11 P9	CR 2 452 044 0	Volume Printed Circuit board	1
	CR 2 328 013 0	Variable resistor with switch	1
	CR 2 408 029 0	6 Pin connector assembly (B)	1
	CR 2 408 030 0	5 Pin connector assembly (B)	1

OTHER PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	Q'TY
	CR 1 736 473 0	ARI label (S)	1
	CR 2 736 019 0	ARI adjusting label	1
	CR 2 736 020 0	Transit screw label	1
	CR 2 736 022 0	Warranty No. seal (A)	1
	CR 2 736 010 0	Warranty No. seal (B)	1
	CR 2 736 021 0	Warranty No. label	2
	CR 9 737 001 0	Caution tag	1
	CR 2 559 001 0	Transit screw	1
	CR 9 682 001 0	Supporting Strap	1
	CR 2 732 014 0	Trimplate inlay (L) 124mm	1
	CR 2 732 015 0	Trimplate inlay (R) 124mm	1
	CR 2 782 002 0	Screw kit	1
	CR 1 736 472 0	ARI label (L)	1
	CR 1 902 095 0	ARI instruction manual	1
	CR 2 908 006 0	Circuit diagram	1
	CR 2 904 005 0	Warranty card	1
	CR 2 902 007 0	Instruction book	1
	CR 1 402 034 0	2P DIN speaker wire	4
	CR 2 407 002 0	Power/Ground Cable with choke (3A fuse)	1
	CR 2 923 004 0	Polyethylene bag for main unit	1
	CR 2 925 008 0	Styrofoam cushion	2
	CR 2 922 007 0	Gift box	1

NOVEMBER 29, 1984

WE HAVE FOUND SEVERAL MISPRINTS IN THE SACRAMENTO SERVICE MANUAL.

THE CORRECTIONS FOLLOW:

<u>REF.</u>	<u>ERROR</u>	<u>CORRECT</u>
67	CR2 431 601 0 MOTOR ASS'Y	CR2 431 602 0 MOTOR ASS'Y
67-02	CR2 714 606 0 MOTOR RUBBER	CR2 598 600 0 MOTOR SPACER
Q503 Q808 Q805 Q807 Q2 Q6 Q9 Q102 Q106	CR0 304 036 0	CR0 303 036 0

PLEASE NOTE THE CHANGES IN YOUR SACRAMENTO SERVICE MANUAL.

BEST REGARDS,



KEN J. MASLOWSKI
NATIONAL SERVICE TRAINING MANAGER

RECEIVED DEC 10 1984

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404668

AUTOMATIC
RADIO
INFORMATION

ARI

SACRAMENTO
SERVICE MANUAL
CORRECTION

SACRAMENTO

1. Page 2A

REF. Q503,808,805,807

2. Page 3A

REF. Q2,102,6,106

PART NUMBER-----CR0 304 036 0

CHANGE TO

PART NUMBER-----CR0 303 036 0

3. Page 3a

REF. Q9

PART NUMBER-----CR0 304 037 0

CHANGE TO

PART NUMBER-----CR0 303 037 0

4. Page 25a - MECHANICAL PARTS LIST

a. REF 164

PART NUMBER-----CR2 652 023 0

CHANGE TO

PART NUMBER-----CR2 651 023 0

b. REF. 165

PART NUMBER-----CR2 652 024 0

CHANGE TO

PART NUMBER-----CR2 651 024 0