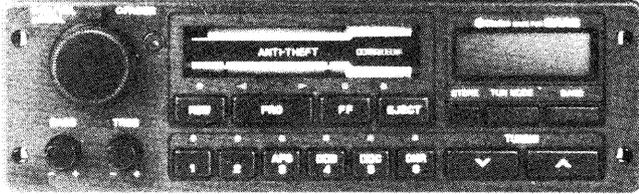


clarion Service Manual

Published by Service Administration Section



SAAB Automobile Genuine AM Stereo, FM Stereo Cassette Tuner

Model PU-9206A

■ SPECIFICATIONS:

(The specifications for this product were determined and are presented in accordance with specification standards established by the Ad Hoc Committee of Car Stereo Manufacturers.)

General

Power supply voltage: DC 14.4V
 (10.8 to 15.6V allowable)
 Current consumption: Less than 3A
 Weight: 1.6kg
 Dimensions: Width 189mm
 Height 59mm
 Depth 150mm

FM Section

Frequency range: 87.9MHz to 107.9MHz
 Usable sensitivity: 13dBf (1.1μV./75 ohms)
 50dB Quieting sensitivity:
 18dBf (2.0μV./75 ohms)
 Alternate channel selectivity:
 60dB
 Frequency response: 30Hz to 15,000Hz, ±3dB

AM Section

Frequency range: 530kHz to 1,620kHz
 Usable sensitivity. (20dB S/N): 28μV

Tape Section

Tape speed: 4.75cm/s. (1-7/8 ips)
 Wow & Flutter: 0.13% (W.R.M.S.)
 Signal/Noise ratio: 120μs(normal)/Dolby B/
 Dolby C
 53dB/61dB/69dB
 Frequency response: 120μs(normal)
 50Hz to 14,000Hz(±3dB)

Audio Section

Line output voltage: 150mV into 10k ohms
 (adjustable)

- Dolby Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation.
- Dolby and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

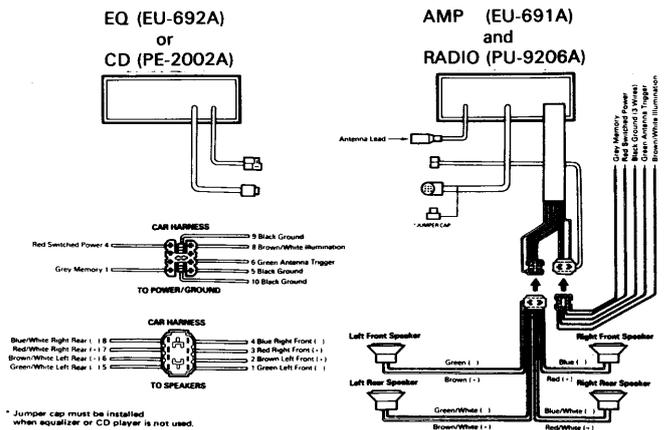
■ FEATURES:

- Full logic tape transport.
- AM stereo.
- Auto reverse with dual direction automatic azimuth adjustment.
- Motorized load/eject.
- Dolby B/C noise reduction.
- Unit removable from dash.
- Anti-Theft System.
- APS (Automatic Program System).
- Eject capability with key off (Key off pinch roller release).
- Automatic 70μs tape equalization selector.
- Automatic Antenna Circuit.

■ COMPONENTS:

| | | |
|----------------|-------------|---|
| • PU-9206A-A | | |
| Main unit | | 1 |
| Parts bag | 921-8430-00 | 1 |
| { Removal Tool | 341-1363-00 | 1 |
| { Vinyl Holder | 348-0151-00 | 1 |

■ WIRING DIAGRAM:

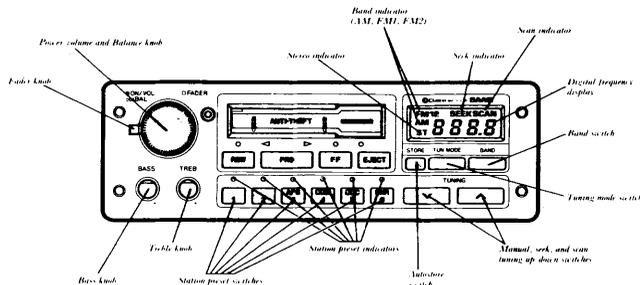


■ OPERATION:

N.B.

When using the seven-band graphic equalizer, the bass and treble settings should be left in the center click stop position.

■ TUNER OPERATION



Tuning

Use the Tuning Mode switch to select manual, seek, or scan tuning. The frequency display will indicate both seek and scan modes. A blank display indicates manual mode.

Manual tuning is accomplished by pressing the ∇ or \blacktriangle switches. The ∇ switch lowers the frequency. The \blacktriangle switch raises the frequency.

In the Seek Tuning mode, the radio automatically seeks out the next clear station when the ∇ or \blacktriangle switch is depressed. Use the ∇ switch to seek the next clear lower frequency station, the \blacktriangle switch to seek the next clear higher station.

Scan Tuning is started by pressing either the ∇ or \blacktriangle switches. The radio will automatically scan for the next medium to strong frequency and play for a few seconds before continuing on to the next. Scanning can be stopped at any desired station simply by pressing the same switch again during the pause.

Station Presets

You can preset up to 18 stations—six on each of the three indicated bands. Once you know which stations you'll enjoy listening to regularly, you can use the preset function to summon them instantly.

First, use the BAND switch to select the AM, FM1 or FM2 band. Note that FM1 and FM2 both represent the regular FM band. The duplicate listing merely allows you to store six FM stations on one band, and six different FM stations on the other.

Using the manual mode, select the first station to be preset. Generally, this will either be the station you listen to most often or the first station on the dial that you listen to frequently. Use whatever sequence is easy for you to remember. To enter this station in memory, depress and hold the No. 1 memory preset switch. An indicator will illuminate above the switch you have pre-

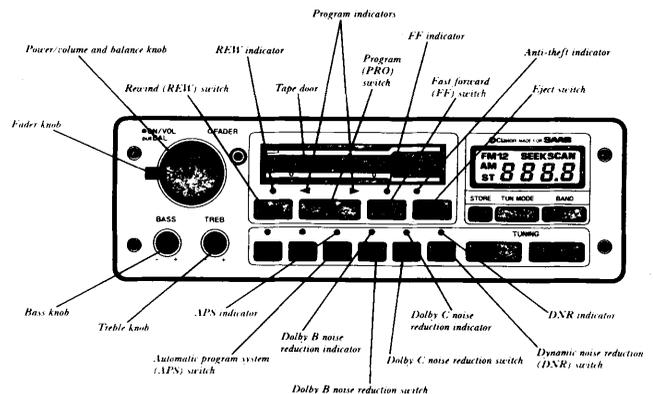
set. While this switch is held, you will hear the volume decrease and then return to its original level. When it returns to its original level, release the switch and that station is memorized. Turn to the next station you want memorized and repeat the procedure on the next preset switch. To call up a memorized station, simply tap the appropriately numbered memory preset.

Auto Store

If you are driving in an unfamiliar area—and thereby lose the stations you generally listen to—you can use the auto store function to find and memorize the strongest stations in the area which you're driving. To activate the auto store function, depress the Auto Store (STORE) switch for two seconds. In this mode the radio will automatically scan the entire frequency band (AM if on AM, FM if on FM). Six stations with strong signal strength will be stored in the radio's memory. If six strong stations cannot be found, weaker stations will be chosen. The auto store function will only store six stations at one time—six on AM or six on FM.

If you use the auto store function, you will lose the stations that had previously been programmed into memory. They can be reset when you are again driving in your local area.

■ CASSETTE TAPE OPERATION



Fast Forward or Rewind

Fast forward or rewind is accomplished by pressing the FF or REW switch. It is not necessary to hold the switch while the tape is fast forwarding or rewinding. The appropriate indicator will illuminate above the switch.

N.B.

—To release the cassette from fast forward, press the FF switch again. To stop the cassette from rewinding, press the REW switch again.

- If the tape is wound completely in the FF mode, it will stop automatically and play the opposite side. If the tape is wound completely in the REW mode, it will stop automatically and play the same side.
- If the tape is in the FF or REW mode and the Program switch is pressed, the tape will stop and begin to play in the opposite direction.

Automatic Program System (APS)

This feature provides still more flexibility. It allows you to repeat the selection you are currently listening to or jump ahead to the next selection before the current one is finished.

To repeat the selection that is currently playing, tap the APS switch (the APS indicator will light) and the cassette rewind (REW) switch.

To jump to the next selection, tap APS and the cassette fast-forward (FF) switch.

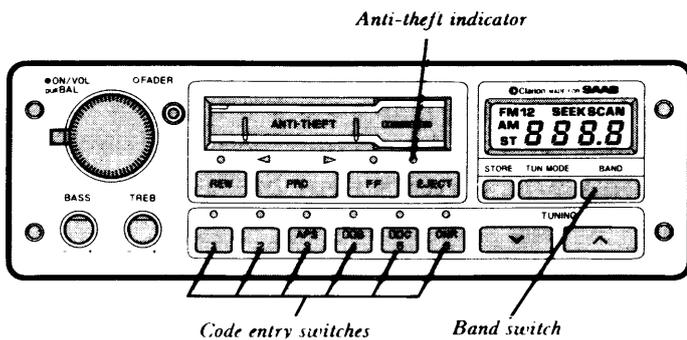
N.B. : The APS system may occasionally be "fooled" by the long low-level passages in classical music, since these resemble the silent gaps between selections.

Tape Equalization

There are several different types of tape currently in use, and Automatic Tape Equalization is provided to enable you to match their playback characteristics for the best sound. Most tapes have a normal equalization of 120µs (normal bias). Unless there is some indication to the contrary—such as the designations "metal," "chrome" or "70µs" (high bias)—you can assume that the tape requires normal equalization and the unit will select the normal mode. However, high-performance metal and chrome cassettes (as well as ferrichrome, an infrequently used tape type) require a different equalization. In this case the unit will select the high-bias position.

There is one important exception: Many prerecorded cassettes today use chrome tape for improved performance with normal bias (120µs) equalization. In this case the unit will not select high-bias.

ANTI-THEFT SYSTEM (ELECTRONIC LOCK-OUT SYSTEM)



The unit already has code numbers from the factory, and then ascertaining this code numbers, please submit next procedure.

1. Turn on the ignition.
2. Turn on the radio.
3. Key in your code numbers using the station preset keys (1-6). The unit will operate.

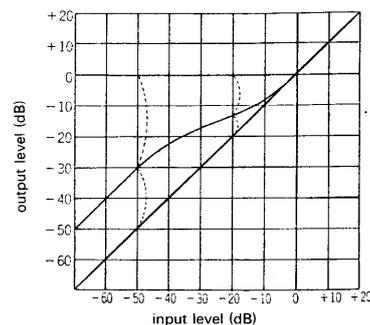
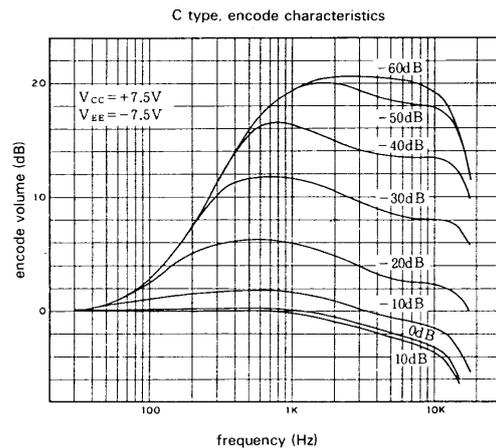
If you make a mistake while entering your code, finish entering all four digits. Press and hold the BAND switch until CODE reappears on the display. Then enter the correct code.

Your radio also has a built-in flashing light which indicates to outside viewers that it contains an electronic Anti-Theft System. When your ignition is turned off, this light will flash. It will not flash when the ignition is turned on. If you think it is necessary to turn off the flashing light, it can be done manually. Press and hold the BAND switch until the light goes out. This light will automatically be turned on again after the ignition has been turned on and off.

●Dolby C NR

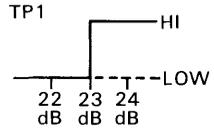
Dolby system is a device to decrease the noise generated by tapes (hiss noise). Conventional type "B" decreases the noise in high toned region by 10dB, but noise is decreased by -20dB at maximum in the medium and high toned region in "C". SN ratio is better than "B".

Dolby C works as a linear AMP for the input level over 0dB as well as "B", but for the smaller input level than 0dB, compression ratio changes according to the input level. When it is less than -50dB, noise is compressed by 20dB at maximum. In the low toned region (about less than 100Hz) noise is not compressed regardless of the input level. Compression ratio changes as the frequency gets high. This is to hold down the influence to the medium-low toned region by the saturation of high toned signals. At the low level of this band, noise is not obvious because hearing sensitivity is decreased.



ADJUSTMENT:

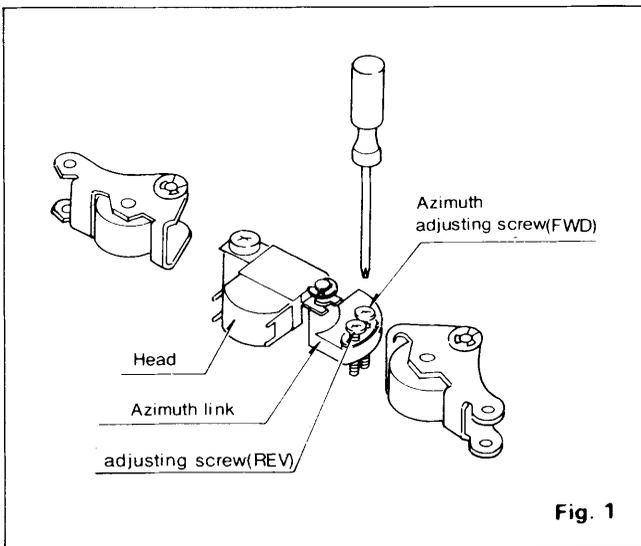
| Adjustment item | Adjustment point | Procedure |
|-----------------|------------------|---|
| OV | IFT2 | <ol style="list-style-type: none"> 1. Connect the digital voltmeter to TP2 and TP3. 2. Input the 98.1MHz/55dB signal and adjust the reading of digital voltmeter to $0 \pm 50\text{mV}$ by IFT2. |
| SD | VR1 | <ol style="list-style-type: none"> 1. Input the 98.1MHz/23dB signal. 2. Adjust VR1 so that the voltage of TP1 is in the range LOW to HI. |
| SASC | VR3 | <ol style="list-style-type: none"> 1. Input the 98.1MHz/65dB, 7kHz modulation frequency, 30% modulation degree SSG signal, and then turn on ST. SW. 2. Adjust the output level of the volume controller to 0dBm (0.775V). 3. Set the SSG output to 38dB and adjust VR3 so that the output level is -3dB. |
| Separation | VR1 (880-0304A) | <ol style="list-style-type: none"> 1. Input the 98.1MHz, connect the output of a stereo modulator to the external modulation terminal, and input a 65dB SSG signal. 2. Set the stereo modulator to the L or R ch and adjust VR1 so that the maximum separation is obtained. |
| Pilot canceller | VR2 (880-0304A) | <ol style="list-style-type: none"> 1. Input the 98.1MHz/65dB, modulation (PL 10%). 2. Adjust VR2 so that output of the set is minimum. |
| Dolby NR | VR301 and VR302 | Insert a Dolby level test tape (400Hz \sim 200nWb/m), connect the milli-volt meter to TP17 and TP44, and adjust VR301 and VR302 to obtain an output of 245mV. |



< TAPE MECHANISM >

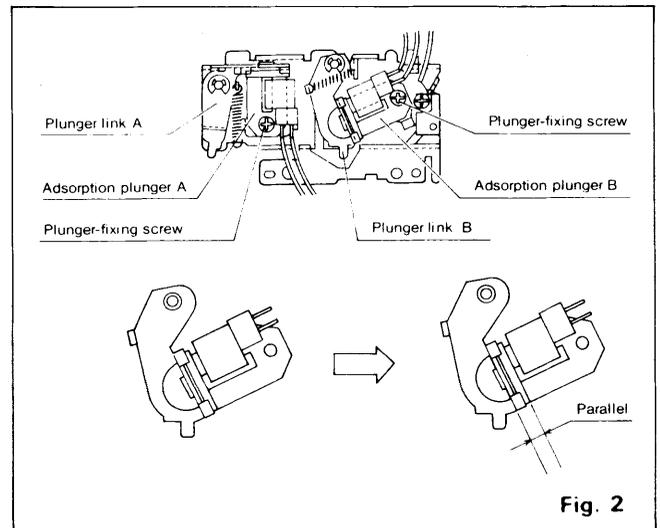
1. Head-azimuth Adjustment

Make playback for the azimuth-tape (8kHz, -10VU), and turn each azimuth-adjusting screw to make each FWD & REV maximum. After adjustment, make adhesion with bond.



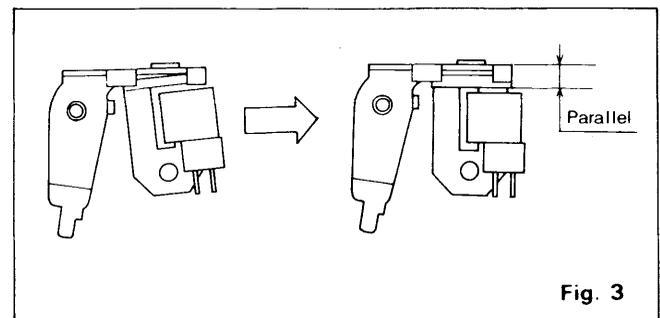
2. Adjustment of Adsorption Plunger B

Under FF-operation, when adsorption plunger is released, mount the plunger to make the adsorption-surface of adsorption plunger B in parallel to the bent surface of plunger link B, and make adhesion of the rear side of the screw with bond.



3. Adjustment of Adsorption Plunger A

Under REW-operation, when adsorption plunger is released, mount the plunger to make the adsorption-surface of adsorption plunger A in parallel to the bent surface of plunger link A, and make adhesion of the rear side of the screw with bond.



EXPLANATION OF IC's:

| | | | |
|--|-------------|-------------------------|-----|
| Refer to description in IC service manual vol 1. | | | |
| LA2110 | 051-0407-00 | FM Noise Canceller | P17 |
| LM1894N | 051-0485-00 | Dynamic Noise Reduction | P25 |

| | | | |
|--|-------------|-------------------------------|-----|
| Refer to description in IC service manual vol 2. | | | |
| LA3430 | 051-0733-01 | FM MPX | P9 |
| HA12438FP | 051-0730-00 | FM Frontend | P7 |
| TMP42C70N8005 | 051-0740-01 | Cassette Mechanism Controller | P83 |
| TA7411AP | 051-0798-20 | FM IF System | P8 |
| NJM4558M | 051-0350-55 | Dual OP. Amp | P39 |
| NJM2058M | 051-0556-01 | Quad OP. Amp | P41 |
| AN6263N | 051-0561-01 | Music Interval Detection | P42 |
| TA7705P | 051-0714-00 | Dual Preamp | P18 |
| CXA1097Q | 051-0830-00 | Stereo Dolby Noise Reduction | P20 |

MC13020P 051-0630-00 MOTOROLA CQUAM[®] AM STEREO MC13020P 051-0630-01 DECODER

NOTE : 051-0630-01 is useful instead of 051-0630-00.

This circuit is a complete one-chip full-feature AM stereo decoding and pilot detection system. It employs full-wave envelope signal detection at all times for the L + R signal, and decodes L - R signals only in the presence of valid stereo transmission.

- No Adjustments, No Coils
- Few Peripheral Components
- True Full-Wave Envelope Detection for L + R
- PLL Detection for L - R
- 25Hz Pilot Presences Required To Receive L - R
- Pilot Acquisition Time 300ms For Strong Signals, Time Extended For Noise Conditions To Prevent "Falsing"
- Internal Level Detector Can Be Used As AGC Source

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|----------------------------|---------------------|-------------|-------|
| Supply Voltage | V _{CC} | 14 | Vdc |
| Pilot Lamp Current, Pin 15 | | 50 | mA |
| Operating Temperature | T _A | -40 to +85 | °C |
| Storage Temperature | T _{STG} | -65 to +150 | °C |
| Junction Temperature | T _{J(max)} | 150 | °C |
| Power Dissipation | P _D | 1.25 | W |
| Derate above 25°C | | 10 | mW/°C |

ELECTRICAL CHARACTERISTICS

(V_{CC}=8.0Vdc, T_A=25°C, Input Signal=200mVRMS Unmodulated Carrier, Circuit Of Figure 1 Unless Otherwise Noted.)

| Characteristic | Min | Typ | Max | Unit |
|---|------------------|------------|-------|-------|
| Power Supply Operating Range | — | 6.0 ~ 12.0 | — | Vdc |
| Supply Line Current Drain, Pin 6 | 20 | 30 | 40 | mA |
| Input Signal Level, Unmodulated, Pin 3, for Full Operation | 100 | 200 | 357 | mVRMS |
| Audio Output Level, 50% Modulation, L only or R only | 160 | 220 | 280 | mVRMS |
| Audio Output Level, 50% Modulation, Monaural | 80 | 110 | 140 | mVRMS |
| Output THD, 50% Modulation | | 0.5 | ± 0.8 | % |
| Channel Separation, L only or R only, 50% Modulation | ± 22 | 30 | — | dB |
| Pilot Acquisition Time VCO locked, after release of forced monaural | — | 300 | — | ms |
| Input Impedance | R _{in} | 20 | 27 | kΩ |
| | C _{in} | — | 6.0 | pF |
| Output Impedance | — | 100 | 150 | Ω |
| Level Detector Filter Voltage, Pin 4 | 0 signal | 1.4 | 1.7 | Vdc |
| | 200 mVRMS Signal | — | 2.5 | — |
| Lock Detector Filter Voltage, Pin 10 | In Lock | — | 7.8 | Vdc |
| | Out of Lock | — | 0.8 | — |
| Force to Monaural, Pin 9, Pull Down for Monaural Mode | 2.0 | 2.5 | — | Vdc |
| | — | 0.15 | 1.0 | μA |
| Force to Monaural, Pin 9, Pull Up for Automatic Mode | — | 3.5 | 3.7 | Vdc |
| | — | < 0.001 | 1.0 | μA |

Fig. 1 - TYPICAL APPLICATION

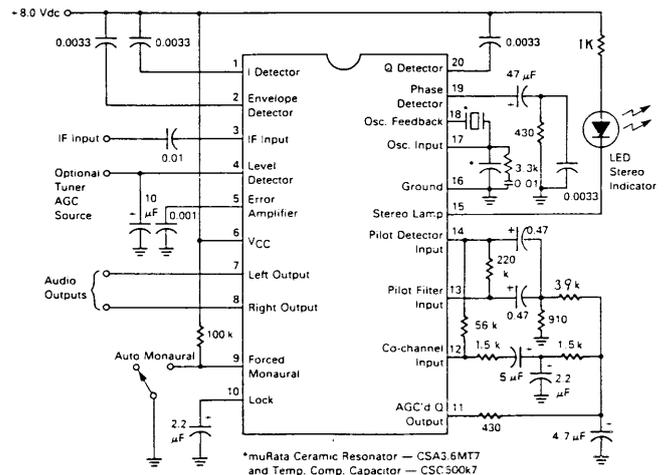


Fig. 2 - BASIC QUADRATURE AM (QUAM)

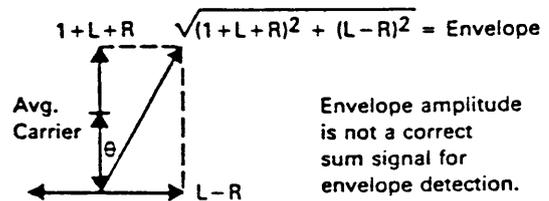


Fig. 3 - MOTOROLA CQUAM[®]

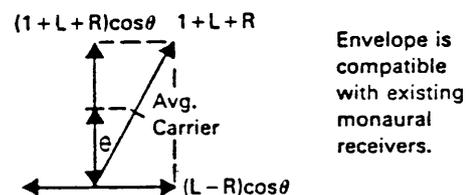
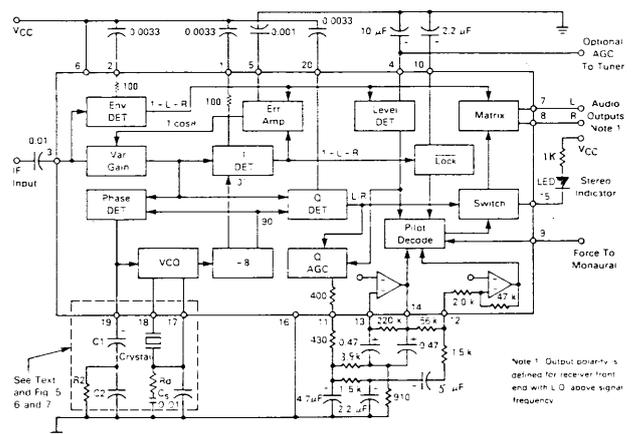


Fig. 4 - BLOCK DIAGRAM



MOTOROLA CQUAM[®] - COMPATIBLE QUADRATURE AM STEREO

INTRODUCTION

In CQUAM[®], conventional quadrature amplitude modulation has been modified by multiplying each axis by cosθ as shown in Figures 2 and 3. The resulting carrier envelope is 1 + L + R, i.e., a correct sum signal for monaural receivers and for stereo receivers operating in monaural mode. A 25Hz pilot signal is added to the L - R information at a 4% modulation level.

THE DECODER

The MC13020P takes the output of the AM IF amplifier and performs the complete CQUAM \bar{R} decoding function. In the absence of a good stereo signal, it produces an ungraded monaural output. Note in Figure 4 that the L+R information delivered to the output always comes from the envelope detector (Env DET).

The MC13020P decodes the stereo information by first converting the CQUAM \bar{R} signal to QUAM, and then detecting QUAM. The conversion is accomplished by comparing the output of the Env DET and the I DET in the Err AMP. This provides the $1/\cos\theta$ correction factor, which is then multiplied by the CQUAM \bar{R} incoming signal in the Var Gain block. Thus, the output of the Var Gain block is a QUAM signal, which can then be synchronously detected by conventional means. The I and Q detectors are held at 0° and 90° relative demodulation angles by reference signals from the phase-locked, divided-down VCO. The output of the I DET is 1-L+R, with the added benefit (over the Env DET) of being able to produce a negative output on strong co-channel or noise interference. This is used to tell the Lock circuit to go to monaural operation. The output of the Q DET is the L-R and pilot information.

THE VCO

The VCO operates at 8 times the IF input frequency, which ensures that it is out-of-band, even when a 260kHz IF frequency is used. Typically a 450kHz IF frequency is used with synthesized front ends. This places the VCO at 3.6MHz, which permits economic crystal and ceramic resonators. A crystal VCO is very stable, but cannot be pulled very far to follow front-end mistuning. Pull-in capability of ± 1 Hz at 450kHz is typical, and de-Q-ing with a resistor (see Figure 7) can increase the range only slightly. Therefore, the crystal approach can only be used with very accurate, stable front-ends. By comparison, ceramic and L-C VCO circuits offer pull-in range in the order of ± 2.5 kHz (at 450kHz). Ceramic devices accurate enough to avoid trimming adjustment can be obtained with a matched capacitor for Cs (see Figures 1 and 5).

In the PLL filter circuit on Pin 19, C1 is the primary factor in setting a loop corner frequency of 8-10Hz, in-lock. An internally controlled fast pull-in is provided. R2 is selected to slightly overdamp the control loop, and C2 prevents high frequency instability.

The Level DET block senses carrier level and provides an optional tuner AGC source. It also operates on the Q AGC block to provide a constant amplitude of 25Hz pilot at Pin 11, and it delivers information to the pilot decoder regarding signal strength.

PILOT AND CO-CHANNEL FILTERS

The Q AGC output drives a low pass filter, made up of 400 Ω internal, and 430 Ω and 4.7 μ F external. From this point, an active 25Hz band-pass filter is coupled to the Pilot Decoder, Pin 14, and another low-pass filter is connected to the Co-channel Input, Pin 12. A 2:1 reduction of 25Hz pilot level to the Pilot Decode circuit will cause the system to go monaural, with the components shown. Refer to Figure 8 for the formulas governing the active band-pass filter. The co-channel input signal contains any low frequency intercarrier beat notes, and, at the selected level, prevents the Pilot Decode circuit from going into stereo. The co-channel input, Pin 12, gain can be adjusted by changing the external 1.5k resistor. The values shown set the "trip" level at about 7% modulation. The 25Hz pilot signal at the output of the active filter is opposite in phase to the pilot signal coming from the second low-pass filter. The 56k resistor from Pin 14 to Pin 12 causes the pilot to be cancelled at the co-channel input. This allows a more sensitive setting of the co-channel trip level.

THE PILOT DECODER

The Pilot Decoder has two modes of operation. When signal conditions are good, the decoder will switch to stereo after 7 consecutive cycles of the 25Hz pilot tone. When signal conditions are bad, the detected interference changes the pilot counter so as to require 37 consecutive cycles of pilot to go to stereo. In a frequency synthesized radio, the logic that mutes the audio when tuning can be connected to Pin 9. When this pin is held low it holds the decoder in monaural mode and switches it to the short count. This pin should be held low until the synthesizer and decoder have both locked onto a new station. A 300ms delay should be sufficient. If the synthesizer logic does not provide sufficient delay, the circuit shown in Figure 9 may be added. Once Pin 9 goes high, the Pilot Decoder starts counting. If no pilot is detected for seven consecutive counts, it is assumed to be a good monaural station and the decoder is switched to the long count. This reduces the possibility of false stereo triggering due to signal level fluctuation or noise. If the PLL goes out of lock, or interference is detected by the co-channel protection circuit before seven cycles are counted, the decoder goes into the long count mode. Each disturbance will reset the counter to zero. The Level Detector will keep the decoder from going into stereo if the IF input level drops 10dB, but will not change the operation of the pilot counter.

Once the decoder has gone into the stereo mode, it will go instantly back to monaural if either the lock detector on Pin 10 goes low, or if the carrier level drops below the preset threshold. Seven consecutive counts of no pilot will also put the decoder in monaural. In stereo, the co-channel input is disabled, and co-channel or other noise is detected by negative excursions of the I DET, as mentioned earlier. When these excursions reach a level caused by approximately 20% modulation of co-channel, the lock detector puts the system in monaural, even though the PLL may still actually be locked. This higher level of co-channel tolerance provides the hysteresis to prevent chattering in and out of stereo on a marginal signal.

When all inputs to the Pilot Decode block are correct, and it has completed its count, it turns on the Switch, sending the L-R to the Matrix, and switches the pilot lamp pin to a low impedance to ground.

SUMMARY

It should be noted that in CQUAM \bar{R} , with both channels AM modulated, the noise increase in stereo is a maximum of 3.0dB, less on program material. Therefore, this is not the major concern in the choice of monaural to stereo switching point as it was in FM, and blend is not needed.

PIN DESCRIPTIONS

- Pin 1, 2 – Detector Filters, Rout = 4.3k, recommend 0.0033 μ F to Vcc to filter 450kHz components.
- Pin 3 – IF Signal Input.
- Pin 4 – Level Detector filter pin, Rout = 8.2k, 10 μ F to ground sets the AGC time constant. High impedance output, needs buffer.
- Pin 5 – Error Amp compensation to stabilize the Var Gain feedback loop.
- Pin 6 – Vcc 6-12Vdc, suitable for low Vbatt automotive operation, but must be protected from "high line" condition.
- Pin 7, 8 – Left and Right Outputs, NPN emitter followers.
- Pin 9 – Forced Monaural, MOS or TTL controllable.
- Pin 10 – Lock detector filter, Rout = 27k, recommend 2.2 μ F to ground.
- Pin 11 – AGC'd Q output, NPN emitter follower with 400 Ω from emitter to Pin 11.
- Pin 12 – Co-channel Input, 1.5k series in and 56k feedback.
- Pin 13 – Pilot Filter Input to op amp, see Figure 8.
- Pin 14 – Pilot Decode Input (op amp output) emitter follower, Rout = 100 Ω .
- Pin 15 – Stereo Lamp, open-collector of an NPN common emitter stage, can sink 50mA, Vsat = 0.3V at 5.0mA.
- Pin 16 – Ground.
- Pin 17 – Oscillator input, Rin = 10k, do not connect to Pin 18 or ground.
- Pin 18 – Oscillator feedback, NPN emitter, Rout = 100 Ω .
- Pin 19 – Phase Detector Output, current source to filter.
- Pin 20 – Detector Filter, Rout = 4.3k, recommend 0.0033 μ F to Vcc to filter 450kHz.

Fig. 5 – CERAMIC VCO

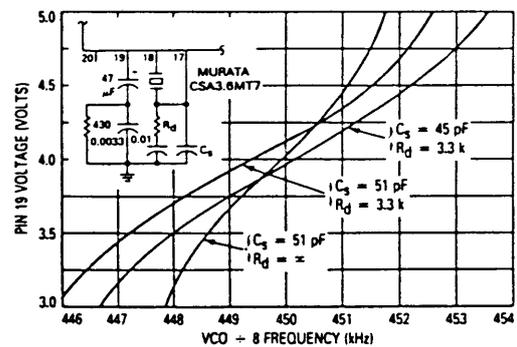


Fig. 6 – L-C VCO

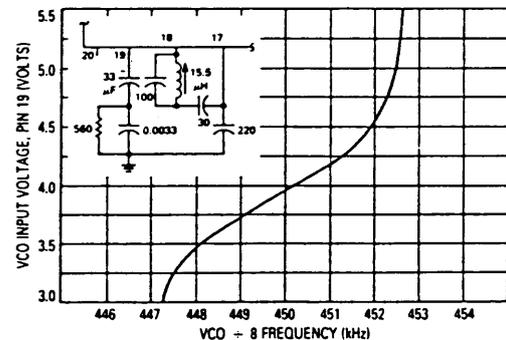


Fig. 7 – CRYSTAL VCO

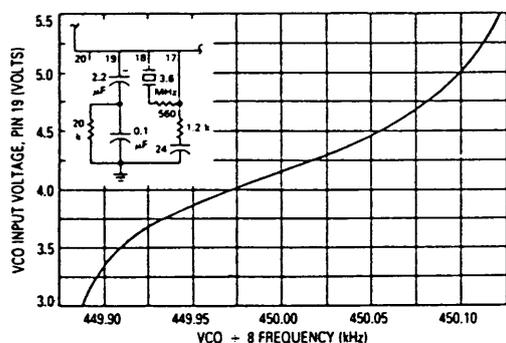
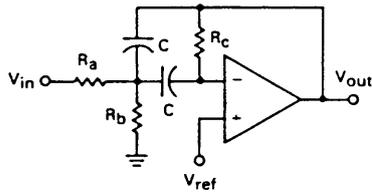


Fig. 8 – ACTIVE BAND-PASS FILTER



$$R_c = \frac{Q}{\pi f_0 C}$$

$$R_a = \frac{R_c}{2 A_0}$$

$$R_b = \frac{R_a R_c}{4Q^2 R_a - R_c}$$

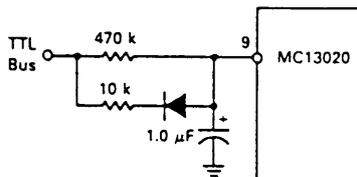
where, in this application
 f_0 = center frequency = 25Hz
 A_0 = gain at $f_0 \leq 35$
 $Q \leq 10$

Choose values for f_0 , A_0 , Q , and convenient C , solve for resistors

| C ± 5% | Ra ± 5% | Rb ± 1% | Rc ± 1% |
|--------|---------|---------|---------|
| 0.47μF | 3.9k | 910 | 220k |
| 0.33μF | 6.8k | 1.3k | 330k |

Note: Capacitor C should be a good grade, low ESR.

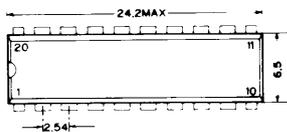
Fig. 9 – FORCED MONAURAL OPTIONAL DELAY CIRCUIT



LA1135 051-0634-00 AM Tuner
 LA1135B 051-0634-01

The part of electric specification is different between 051-0634-00 and 051-0634-01
 (Output level for signal meter output)

Outward Form



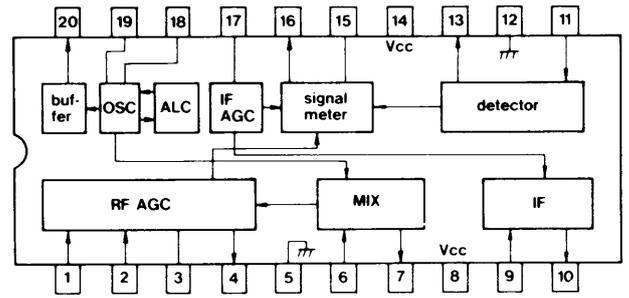
Performance

- MIX
- OSC (with ALC)
- IF amplification
- Detection
- AGC (Normal)
- RF wide bandwidth AGC
- Stop signal for auto search (Signal meter output)
- LO OSC buffer Output

Maximum Ratings

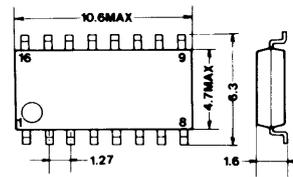
| Item | Symbol | Condition | Rating | Unit |
|-------------------|----------------|-----------------------|--------|------|
| Supply voltage | Vcc max | Pin No. 8, 14 | 16 | V |
| Output voltage | V _o | Pin No. 7, 10 | 24 | V |
| Input voltage | V _i | Pin No. 6 | 5.6 | V |
| Power dissipation | Vd max | T _a ≤ 50°C | 730 | mW |

Block Diagram



TD62305F 051-0829-04 Darlington Transistor Array

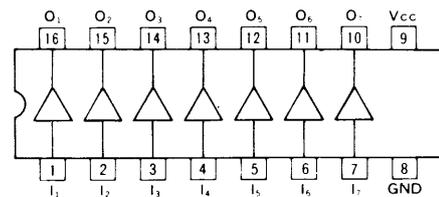
Outward Form



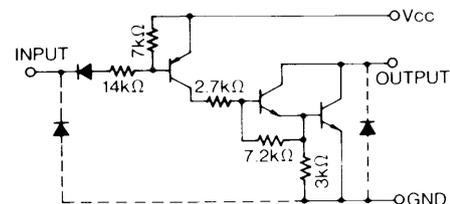
Absolute Maximum Ratings

| Item | Symbol | Rating | Unit |
|------------------------|--------|--------|------|
| Power voltage | Vcc | 7.0 | V |
| C-E Sustaining voltage | V | 35 | V |
| Output current | LOUT | 350 | mA |
| Input voltage | VIN | 7.0 | V |
| Input current | IIN | -10 | mA |
| GND terminal current | IGND | 2.3 | A |
| Power dissipation | Pd | 0.625 | W |

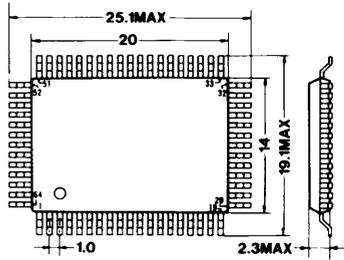
Block Diagram



Circuit Diagram



I. Outward Form



II. Outline

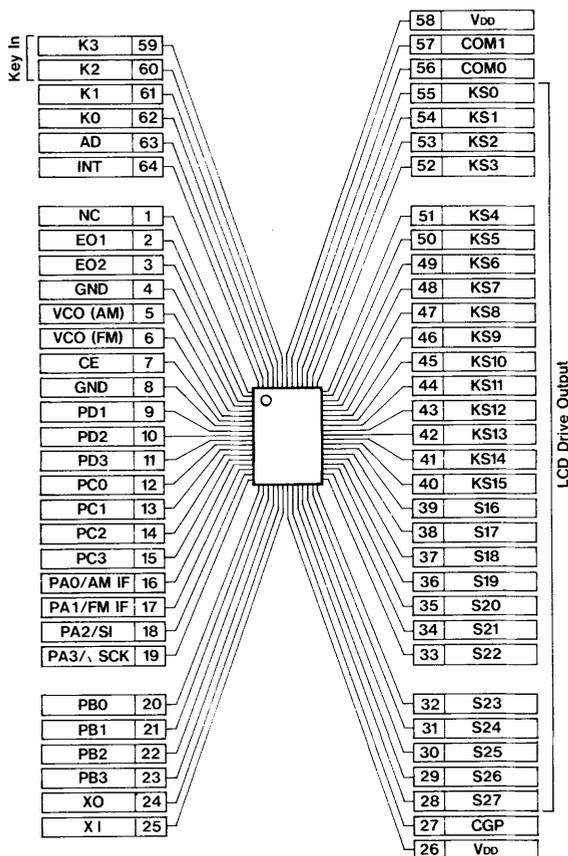
This IC, which can receive FM and MW is a complete 1-chip controller incorporating a prescaler, PLL frequency synthesizer and LCD driver.

- (1) Prescaler incorporate.
- (2) PLL frequency synthesizer incorporated.
- (3) 3 bands with FM1/FM2/MW.
- (4) UP/DOWN channel selectable by AUTO/MANUAL.
- (5) Preset and memory available for FM1/FM2/MW.

III. Receive Bands

| | | Receive Frequency | Channel Space | Comparative Frequency | Intermediate Frequency |
|-----------|----|-------------------|---------------|-----------------------|------------------------|
| U.S.A | MW | 530 - 1,620kHz | 10kHz | 10kHz | 450kHz |
| | FM | 87.9 - 107.9MHz | 200kHz | 25kHz | 10.7MHz |
| Australia | MW | 531 - 1,602kHz | 9kHz | 9kHz | 450kHz |
| | FM | 87.9 - 107.9MHz | 100kHz | 25kHz | 10.7MHz |
| Japan | MW | 522 - 1,629kHz | 9kHz | 9kHz | 450kHz |
| | FM | 76.0 - 90.0MHz | 100kHz | 25kHz | -10.7MHz |

IV. Terminal Connection



Pin 26 and 58 is Internally connected.

V. Terminal Description

| Pin No. | Symbol | I/O | Function |
|---------|-----------------|-----|---|
| 1 | NC | - | Not in use. |
| 2 | EO 1 | O | PLL error output terminals. When divided VCO output is higher than a reference frequency, "H" is output from these terminals, and when it is lower, "L" is output. When they coincide with each other, floating occurs. Use either EO1 or EO2 because same wave form is output from them. |
| 3 | EO 2 | | |
| 4 | GND | - | Ground. |
| 5 | VCO (AM) | I | Inputs VCO output of 0.6 to 15MHz (0.3 Vp-p MIN.). |
| 6 | VCO (FM) | I | Inputs VCO output of 15 to 150MHz (0.5 Vp-p MIN.). |
| 7 | CE | I | Select signal input terminal of a device. Set to "H" when you make the device function normally, and set to "L" when you do not use it. |
| 9 | DOLBY M4 | O | Tape mode Dolby control output. Active="High" Radio mode M4 channel indicator control output. Active="High" |
| 10 | M2 | O | M2 channel indicator control output. Active="High" |
| 11 | APC M3 | O | Tape mode APC control output. Active="High" Radio mode M3 channel indicator control output. Active="High" |
| 12 | T/R | I | Cassette pack-in detect input terminal. Pulls up through a transistor switch. Judges "L" as cassette pack-in. |
| 13 | RST | I | Becomes RESET at "H". |
| 14 | ST | I | ST station detect input terminal. Pulls up by being connected to the ST IND terminal. Judges "L" as the ST station. Displays by LCD only when executing in the ST ON mode. |
| 15 | SD | I | With input of high level to this terminal, it is judged that the broadcasting station could receiver. |
| 16 | CD IN | I | The control input terminal from external devices. At High input, it operates normally and at Low input, the radio and the tape functions are stopped. This disables the Keys and the output signals related to radio or tape. High is output to R/T port only. |
| 17 | M1 | O | M1 indicator output. Active="High" |
| 18 | T/R OUT | O | The output will be reversed at cassette pack in/out. At TAPE or if High is input to CD IN port, High will be output. It will be switched after 50m Sec of MUTE ON. This output is maintained at CE OFF. |
| 19 | F/R | I | Tape run direction detect input terminal. Valid when the pin 12(T/R) is "L" in the FOW mode, and "H" in the REV mode. |
| 20 | MUTE | O | Output terminal to eliminate a shock noise when the PLL unit is unlocked. Active "L". |
| 21 | LOUD | O | LOUDNESS ON/OFF selector output terminal. "H" in the LOUDNESS ON mode, and "L" in the LOUDNESS OFF mode. Corresponding to the LOUDNESS ON/OFF key, LOUDNESS is turned off("L") when V _{DD} is turned on. (See Momentary Sw. No. ⑦) |
| 22 | DNR M6 | O | Tape mode DNR control output. Active="High". Radio mode M6 indicator output. |
| 24 | XO | I | This is a connection terminal for a crystal oscillator. Connect a 4.5MHz crystal to it. Adjust the oscillation frequency while observing the XO terminal. |
| 25 | XI | | |
| 26 | V _{DD} | - | This is the power supply terminal of the device. When the device operates, a voltage of 5V ± 10% will be supplied. |
| 28 | DX/LO | O | Auto DX/LOCAL terminal in auto tuning such as SEEK, AUTO STORE, and so on. Valid in all bands of FM, and MW. "H" in the LOCAL mode, and "L" in the DX (normal reception) mode. |

| Pin No. | Symbol | I/O | Function | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------|--------------|-------|---|--|--------|-------|-----|---|---|----|---|---|--|----|-------|--------|--|---|---|---|----|---|---|---|-----|---|---|---|
| 29 | AM BW | O | AM Band width control output. The output will be reversed each time a key is pressed at AM with active High. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | BAND | O | Control output terminal for switching power supply of FM/MW. FM time-----High level MW-----Low level | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | NR M5 | O | The noise reduction control output terminal. At the tape mode, that depends on the initial setting A and B and the output is made in combination with the $\square\square$ terminal (9) and the DNR terminal (22). (I) A=0, B=1 or A=1, B=0 Only the DNR terminal have the output with active High while the $\square\square$ and the NR terminals are always kept at Low level. <table border="1" style="margin-left: 20px;"> <tr> <td></td> <td>DNR ON</td> <td>NR ON</td> </tr> <tr> <td>DNR</td> <td>1</td> <td>0</td> </tr> <tr> <td>NR</td> <td>0</td> <td>1</td> </tr> </table> (III) A=B=0 <table border="1" style="margin-left: 20px;"> <tr> <td></td> <td>ON</td> <td>NR ON</td> <td>DNR ON</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>NR</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>DNR</td> <td>0</td> <td>0</td> <td>1</td> </tr> </table> 1 : High, 0 : Low At the radio mode, when the diode SW, of PS-IND is on, the signal is active High at the indicator output terminal for M5. | | DNR ON | NR ON | DNR | 1 | 0 | NR | 0 | 1 | | ON | NR ON | DNR ON | | 1 | 0 | 0 | NR | 0 | 1 | 0 | DNR | 0 | 0 | 1 |
| | DNR ON | NR ON | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DNR | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NR | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ON | NR ON | DNR ON | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| NR | 0 | 1 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| DNR | 0 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 55 | S23 S0 | O | Terminal which outputs segment signal to the LCD panel and key matrix signal. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56 57 | COM0 COM1 | O | Common signal output terminal to the LCD panel. | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59 62 | K3 K0 | I | Key matrix signal input terminal. (See Key Matrix) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64 | INT | I | Not in use. | | | | | | | | | | | | | | | | | | | | | | | | | |

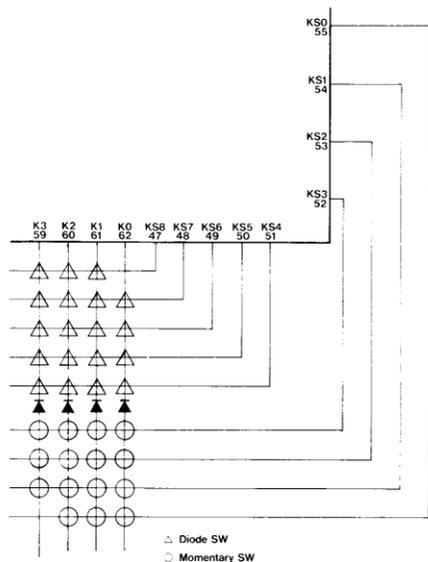
VI.

1. Key Matrix Connection Table

| | K3 (59) | K2 (60) | K1 (61) | K0 (62) |
|----------|----------|-----------|-----------|---------|
| KS0 (55) | --- | M3 | M2 | M1 |
| KS1 (54) | LOUD | M6 | M5 | M4 |
| KS2 (53) | M. DWN | T.M./M.UP | DWN | UP |
| KS3 (52) | AS | PS | BAND | AM-BW |
| KS5 (50) | T-MODE 1 | T-MODE 2 | | |
| KS7 (48) | A | B | FMST/AMST | |
| KS8 (47) | AREA 0 | AREA 1 | | PS-IND |

: Momentary SW : Diode SW

2. Key Matrix Connection and Switch Form



3. Diode SW

The initial setting diode matrix will be read when the power is applied at the beginning (V_{DD} : Low \rightarrow High) and when the CE terminal changes from the low to the high level. In the Table below "0" means the diode switch is OFF (Open) and "1" does the diode switch is ON (Short).

| Symbol | Function | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|--|---|---|------|----------|---|-------|---------|-------------|-------------------|---|----|----------------------------------|---|---|-----------------------------|--|-----------------------------------|--|---|---|-----------------------------------|--|---|---|
| AREA 0 AREA 1 | Use this switch when setting the destination. <table border="1" style="margin-left: 20px;"> <tr> <td>AREA 0</td> <td>AREA 1</td> <td>Area</td> </tr> <tr> <td>0</td> <td>0</td> <td>U.S.A</td> </tr> <tr> <td>0</td> <td>1</td> <td>Japan</td> </tr> <tr> <td>1</td> <td>0</td> <td>Australia</td> </tr> </table> | AREA 0 | AREA 1 | Area | 0 | 0 | U.S.A | 0 | 1 | Japan | 1 | 0 | Australia | | | | | | | | | | | | |
| AREA 0 | AREA 1 | Area | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | U.S.A | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 1 | Japan | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | Australia | | | | | | | | | | | | | | | | | | | | | | | |
| FMST/AMST | This switch is to select whether the ST display is effective only at FM or at FM+AM. 0 : Effective at FM+AM 1 : Effective at FM only | | | | | | | | | | | | | | | | | | | | | | | | |
| T-MODE | Select scan mode. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>T-MODE 1</th> <th>T-MODE 2</th> <th>KEY</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td rowspan="3">0</td> <td rowspan="3">0</td> <td>M. DOWN</td> <td>Manual down</td> </tr> <tr> <td>T.M./M.UP DOWN</td> <td>T.M Seek down, scan down or manual down</td> </tr> <tr> <td>UP</td> <td>Seek UP, Scan UP or Manual UP</td> </tr> <tr> <td rowspan="2">0</td> <td rowspan="2">1</td> <td>M. DOWN T.M./M.UP DWN</td> <td>Manual down Manual up Seek down Seek up</td> </tr> <tr> <td>M. DOWN T.M./M.UP DWN UP</td> <td>Manual down Manual up Scan down Scan up</td> </tr> <tr> <td rowspan="2">1</td> <td rowspan="2">0</td> <td>M. DOWN T.M./M.UP DWN UP</td> <td>Manual down Manual up Scan down Scan up</td> </tr> <tr> <td>M. DOWN T.M./M.UP DWN UP UP</td> <td>Manual down T.M Seek down or manual down Seek UP or Manual UP</td> </tr> </tbody> </table> | T-MODE 1 | T-MODE 2 | KEY | Function | 0 | 0 | M. DOWN | Manual down | T.M./M.UP DOWN | T.M Seek down, scan down or manual down | UP | Seek UP, Scan UP or Manual UP | 0 | 1 | M. DOWN T.M./M.UP DWN | Manual down Manual up Seek down Seek up | M. DOWN T.M./M.UP DWN UP | Manual down Manual up Scan down Scan up | 1 | 0 | M. DOWN T.M./M.UP DWN UP | Manual down Manual up Scan down Scan up | M. DOWN T.M./M.UP DWN UP UP | Manual down T.M Seek down or manual down Seek UP or Manual UP |
| T-MODE 1 | T-MODE 2 | KEY | Function | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | M. DOWN | Manual down | | | | | | | | | | | | | | | | | | | | | | |
| | | T.M./M.UP DOWN | T.M Seek down, scan down or manual down | | | | | | | | | | | | | | | | | | | | | | |
| | | UP | Seek UP, Scan UP or Manual UP | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 1 | M. DOWN T.M./M.UP DWN | Manual down Manual up Seek down Seek up | | | | | | | | | | | | | | | | | | | | | | |
| | | M. DOWN T.M./M.UP DWN UP | Manual down Manual up Scan down Scan up | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | M. DOWN T.M./M.UP DWN UP | Manual down Manual up Scan down Scan up | | | | | | | | | | | | | | | | | | | | | | |
| | | M. DOWN T.M./M.UP DWN UP UP | Manual down T.M Seek down or manual down Seek UP or Manual UP | | | | | | | | | | | | | | | | | | | | | | |

4. Momentary SW

| NO. | SW name | Function |
|-----|----------------------|---|
| 1 | M. UP M. DWN | Channel UP/DOWN key. Every time this key is pressed, a frequency is increased (M. UP) or decreased (M. DOWN) by 1 step. If this key is kept pressed for 0.5 second or more, fast forwarding will be performed at the following intervals until the key is released. FM mode : About 20mS MW mode : About 70mS If the M. UP key is pressed at an upper limit frequency, the frequency will jump to a lower limit one, and if the M. DOWN key is pressed at the lower limit frequency, the frequency will jump to the upper limit one. |
| 2 | M1 - M6 | Preset memory write/call key FM1, FM2 and MW can be independently memorized for one key. There are 18 stations in total; 6 channels for FM1, 6 for FM2, 6 and MW. Valid only in the RADIO mode. 1) When calling For example, if the M1 key is pressed and it is released within 2 seconds with the FM band selected, a frequency memorized there will be called upon its release. When the key is pressed during auto tuning, the frequency is called upon pressing, because a write action is disabled. 2) When writind For example, if the M3 key is kept pressed for 2 seconds or more with the MW band selected, a frequency being displayed will be written to M3. The SEEK mode and TAPE mode disable a write action. |
| 3 | SEEK UP SEEK DOWN | If SEEK UP/DOWN KEY is pressed, auto-tuning is performed by increasing or decreasing one channel. When SD signal "High" is input during auto-tuning the frequency at that time will be maintained. SD signal is tested after setting the waiting time to approx 20mS for FM and approx 40mS for AM preceded by PLL lock. If "High" is input at this time, auto-tuning will be released. At the band edge, just as the manual tuning, it becomes upper limit \leftrightarrow lower limit and SD is detected after waiting the frequency changed for 250mS. In auto-tuning, searching is performed by a DX mode. If the same key is pressed again, searching stops at the present frequency. More over, if the key for the opposite direction is pressed, the direction will be changed while searching is continued. If the power is turned off and the function becomes a tape mode during auto-tuning, the rewriting of the last channel will not be performed and the frequency with which the auto-tuning is started is held in the last-channel memory. Therefore, when the power is turned on or it becomes a radio mode next time, the frequency with which the previous auto-tuning is started will be regained. |

| NO. | SW name | Function |
|-----|-------------------------------|---|
| 4 | SCAN UP SCAN DOWN | If SCAN UP/DOWN KEY is pressed, auto-tuning will be started and if "High" is input to the SD Signal input during auto-tuning, the present station is held at the frequency for five seconds and the unit becomes the receiving state. Then, after five seconds, auto-tuning will be resumed. There after, SCAN operation is repeated SCAN operation will be released if either UP or Down key (A Key presently in effect) is pressed during auto-tuning or during half for five seconds. Then, the unit becomes the receiving state at the frequency. |
| 5 | AS | AUTO STORE Key. If pressed for 2 seconds or more, it starts seeking in the UP direction from the frequency currently received and sequentially stores channels (from CH1 to CH6) where SD exists and an IF frequency matches. Storing the channels in the LOCAL mode for the 1st time and in the DX mode for the 2nd time, CH1 is called after having stored up to CH6 or having made two rounds of them. |
| 6 | BAND | Use this switch when switching the band. Each time the key is pushed, switching will be make as FM, MW and so on, and will receive the last channel memory of a newly switched band. Also, "Low" at time of AM or "High" at time of FM will be output from the controlled signal output terminal for switching FM and MW. FM1 \rightarrow FM2 \rightarrow MW (U.S.A Type) FM \rightarrow MW (Japan, Australia Type) |
| 7 | PS | PRESET SCAN Key. Starting at the channel next to the one currently receiving a frequency, if the channel has SD and the IF frequency matches, it receives for 5 seconds and proceeds to the next channel. During P/S operation, if the CH Key is pressed or the P/S Key is pressed again, P/S operation is terminated. |
| 8 | CD IN | When High is input to CD IN terminal, the mute signal will be output as follows. (Transferring process to CD MODE) Td : First-out mute Approx 50mS Tm : Last-out mute Approx 50mS |
| 9 | LOUD | This key is a switch which controls the loudness function. Each time this key is pressed, ON and OFF alternate. When the key is ON, High is output from the output port at the same time as display. This key is acceptable in both the radio and tape (CD) mode. |
| 10 | DNR | This key is a switch which controls the DNR function. Each time this key is pressed, ON and OFF alternate. When the key is ON, High is output from the output port at the same time as display. This key is acceptable in both the radio and tape mode. |
| 11 | APC | Each time this key is pressed, ON and OFF alternate. When the key is ON, High is output from the output port at the same time as display. |
| 12 | $\square\square$ DNR NR | This Key is valid in the tape mode. Each time this Key is pressed, ON and OFF alternate. When the Key is ON, the output is made is combination with the $\square\square$ terminal (9). The VR terminal (31) and the DNR terminal at the same time as display. These Keys function as each alternating reset type (With preference of latter input). The initial setting is OFF. |

PARTS LIST:

⊙Electrical section

⊙MAIN P.W.B

NOTE : OM (Oxidized Metal) SS (Super Small)
 S (Small) TC (Temperature-Compensating)
 HD (Higher Dielectric) LL (Low Leak)
 SC (Semi-Conductor) USS (Ultra Super Small)

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|--|-------------|--------------------------|------|
| D202 | 001-0195-00 | Diode AW01 | 1 |
| 2~4 101~103 203~210 212,213,502 504~506 510~512 D515~523 537~539 600 603~608 611,612,615 618,621,626 627,630,631 | 001-0330-00 | Diode 1SS119 | 51 |
| D1 | 001-0366-90 | Diode LTZ-MR15T | 1 |
| D620 | 001-0377-14 | Diode MA4033M | 1 |
| D619 | 001-0377-32 | Diode MA4056M | 1 |
| D624 | 001-0377-35 | Diode MA4062M | 1 |
| D628 | 001-0377-41 | Diode MA4075M | 1 |
| 507~509 D524~528 601,629 | 001-0391-00 | Diode DCE015-AC | 10 |
| D614 | 001-0423-14 | Diode MA4036 | 1 |
| D503 | 001-0423-15 | Diode MA4039 | 1 |
| D536,633 | 001-0423-18 | Diode MA4051 | 2 |
| D501,623 | 001-0423-19 | Diode MA4056 | 2 |
| D613 | 001-0423-21 | Diode MA4068 | 1 |
| D609,622 | 001-0423-23 | Diode MA4082 | 2 |
| D201,616,617 | 001-0423-24 | Diode MA4091 | 3 |
| D538,634 | 001-0454-00 | Diode MA700 | 2 |
| D514,535 | 001-0464-00 | Diode 1GWJ42 | 2 |
| IFT1 | 005-0836-00 | IF-transformer | 1 |
| IFT2 | 005-0976-00 | IF-transformer | 1 |
| L 101 | 010-2003-03 | Coil | 1 |
| L 102 | 010-2046-32 | Coil | 1 |
| VR1,2 | 012-3808-06 | Variable resistor 10kΩ | 2 |
| VR3 | 012-4318-06 | Variable resistor 10kΩ | 1 |
| CCT501 | 050-0077-02 | Component circuit 10kΩx4 | 1 |
| CCT502 | 050-0086-00 | Component circuit 10kΩx8 | 1 |
| IC501,504 | 051-0390-05 | IC TD62104F | 2 |
| IC502 | 051-0740-01 | IC TMP42C70N | 1 |
| IC1 | 051-0798-20 | IC TA7411AP | 1 |
| IC503 | 051-0829-04 | IC TD62305F | 1 |
| IC504 | 051-0876-10 | IC μPD1714G635-12 | 1 |
| X101 | 060-0067-52 | Ceramic resonator | 1 |
| SUP1 | 060-0122-00 | Surge protector | 1 |
| X201 | 060-0129-00 | Buzzer | 1 |
| X301 | 061-1053-00 | Crystal | 1 |
| Q502 | 100-1015-00 | Transistor 2SA1015OYGR | 1 |

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|--|-------------|--------------------------------------|------|
| Q601,617 | 100-1048-00 | Transistor 2SA1048OYGR | 2 |
| Q500,620 | 100-1315-00 | Transistor 2SA1315OY | 2 |
| Q504~507 | 100-1346-00 | Transistor 2SA1346AC | 4 |
| 1,2,101,102 205 510~513 515,602,604 608,609,616 618,619,621 | 102-2458-00 | Transistor 2SC2458 | 18 |
| 202~204 503,508,509 Q516~518 603,605,622 623 | 102-3400-00 | Transistor 2SC3400AC | 13 |
| Q610 | 103-0947-00 | Transistor 2SD947 | 1 |
| 201,501,600 Q606,607,612 615 | 103-1225-00 | Transistor 2SD1225MPQR | 7 |
| Q613,614 | 103-1504-00 | Transistor 2SD1504 | 2 |
| Q514 | 108-0369-00 | FET 2SK369 | 1 |
| R202 | 114-1011-11 | Film resistor 1Ws100Ω OM | 1 |
| R614 | 114-3391-21 | Film resistor 2Ws3.3Ω OM | 1 |
| C509 | 042-0348-00 | Electrolytic capacitor 16V220μF | 1 |
| C6 | 043-0039-92 | Ceramic capacitor 16V0.1μF | 1 |
| C15 | 160-1822-05 | Ceramic capacitor 1800pF B HD | 1 |
| C14 | 160-3912-05 | Ceramic capacitor 390pF B HD | 1 |
| C3~5,8,13 | 171-1033-06 | Ceramic capacitor 0.01μF SR SC | 5 |
| C16,17 | 171-1533-06 | Ceramic capacitor 0.015μF SR SC | 2 |
| C103 | 171-2233-06 | Ceramic capacitor 0.022μF SR SC | 1 |
| C18,19 | 171-3323-06 | Ceramic capacitor 0.0033μF SR SC | 2 |
| C520 | 171-3333-06 | Ceramic capacitor 0.033μF SR SC | 1 |
| C108,109,611 | 171-3932-06 | Ceramic capacitor 0.0039μF SR SC | 3 |
| C102,104,110 111 | 171-4733-06 | Ceramic capacitor 0.047μF SR SC | 4 |
| C12 | 174-1000-13 | Ceramic capacitor 10pF CH TC | 1 |
| C504,505 | 174-1010-13 | Ceramic capacitor 100pF CH TC | 2 |
| C101,507,508 | 174-2200-13 | Ceramic capacitor 22pF CH TC | 3 |
| C106 | 179-2273-23 | Electrolytic capacitor 10V220μF S | 1 |
| C604,607 | 179-3373-33 | Electrolytic capacitor 16V330μF S | 2 |
| C7,9,105 | 183-1053-62 | Electrolytic capacitor 50V1μF USS | 3 |
| C10,201,502 603 | 183-1063-32 | Electrolytic capacitor 16V10μF USS | 4 |
| C11,506 | 183-2253-62 | Electrolytic capacitor 50V2.2μF USS | 2 |
| C503 | 183-2263-32 | Electrolytic capacitor 16V22μF USS | 1 |
| C1,2 | 183-3343-62 | Electrolytic capacitor 50V0.33μF USS | 2 |
| C609 | 183-3353-62 | Electrolytic capacitor 50V3.3μF USS | 1 |
| C205 | 183-4743-62 | Electrolytic capacitor 50V0.47μF USS | 1 |
| 601,602,608 610 | 183-4763-32 | Electrolytic capacitor 16V47μF USS | 4 |
| 202~204 501,605,606 | 183-6863-22 | Electrolytic capacitor 10V68μF USS | 6 |

⊙VOLUME P.W.B

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|-----------|-------------|-------------------|------|
| D211,400 | 001-0330-00 | Diode 1SS119 | 2 |
| D401,402 | 001-0423-19 | Diode MA4056 | 2 |
| D403 | 001-0423-23 | Diode MA4082 | 1 |
| VR401,402 | 012-4447-00 | Variable resistor | 2 |
| VR408 | 012-4663-00 | Variable resistor | 1 |

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|-----------|-------------|------------------------|------|
| CCT401 | 050-0104-00 | Component circuit | 1 |
| IC403 | 051-0350-55 | IC NJM4558M | 1 |
| IC402 | 051-0485-00 | IC LM1894N | 1 |
| IC404,405 | 051-0556-01 | IC NJM2058M | 2 |
| Q403 | 103-1225-00 | Transistor 2SD1225MPQR | 1 |

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|----------|-------------|-------------------------------------|------|
| Q401,402 | 103-1504-00 | Transistor 2SD1504-D,E | 2 |
| C435,436 | 043-0208-00 | Ceramic capacitor 16V0.15μF | 2 |
| C430 | 160-1022-05 | Ceramic capacitor 1000pF B HD | 1 |
| C425 | 171-3333-06 | Ceramic capacitor 0.033μF SR SC | 1 |
| C431,432 | 171-4723-06 | Ceramic capacitor 0.0047μF SR SC | 2 |
| C426 | 171-4733-06 | Ceramic capacitor 0.047μF SR SC | 1 |
| C447 | 182-1073-12 | Electrolytic capacitor 6.3V100μF SS | 1 |

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|--------------------------------|-------------|-------------------------------------|------|
| C429 | 183-1053-62 | Electrolytic capacitor 50V1μF USS | 1 |
| C439,440,452 454 | 183-1063-32 | Electrolytic capacitor 16V10μF USS | 4 |
| C433,434,442 C453,456 | 183-2253-62 | Electrolytic capacitor 50V2.2μF USS | 5 |
| 437,438,443 C444 448~451 | 183-4753-52 | Electrolytic capacitor 35V4.7μF USS | 8 |
| C428 | 183-4763-32 | Electrolytic capacitor 16V47μF USS | 1 |
| C427,441,445 C446 | 183-6863-22 | Electrolytic capacitor 10V68μF USS | 4 |

⊙DOLBY P.W.B

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|--------------|-------------|--------------------------------|------|
| D301,302 | 001-0330-00 | Diode 1SS119 | 2 |
| VR301,302 | 012-3939-05 | Variable resistor 10kΩ | 2 |
| IC302 | 051-0561-01 | IC AN6263N | 1 |
| IC301 | 051-0714-00 | IC TA7705P | 1 |
| IC401 | 051-0830-00 | IC CXA1097Q | 1 |
| L 401,402 | 060-0124-00 | Low Pass Filter | 2 |
| Q301,302 | 102-2458-00 | Transistor 2SC2458 | 2 |
| R307,313 | 116-1231-10 | Chip resistor 1/8Ws12kΩ | 2 |
| R310,315 | 116-1531-10 | Chip resistor 1/8Ws15kΩ | 2 |
| R305,311 | 116-1811-10 | Chip resistor 1/8Ws180Ω | 2 |
| R308,312 | 116-1831-10 | Chip resistor 1/8Ws18kΩ | 2 |
| R309,316 | 116-2221-10 | Chip resistor 1/8Ws2.2kΩ | 2 |
| R301~304 | 116-2231-10 | Chip resistor 1/8Ws22kΩ | 4 |
| R306,314 | 116-3341-10 | Chip resistor 1/8Ws330kΩ | 2 |
| C409,420 | 172-4732-20 | Polyester capacitor 0.047μF SS | 2 |
| C311,408,419 | 172-6831-20 | Polyester capacitor 0.068μF SS | 3 |

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|----------|-------------|--------------------------------------|------|
| C411,422 | 173-1032-10 | Polyester capacitor 0.01μF S | 2 |
| C406,417 | 173-1531-10 | Polyester capacitor 0.015μF S | 2 |
| C403,414 | 173-4721-10 | Polyester capacitor 4700pF S | 2 |
| C410,421 | 173-6821-10 | Polyester capacitor 6800pF S | 2 |
| C310 | 177-2232-05 | Ceramic chip capacitor 0.022μF HD | 1 |
| C301~304 | 177-6812-05 | Ceramic chip capacitor 680pF HD | 4 |
| C402,413 | 179-2273-23 | Electrolytic capacitor 10V220μF S | 2 |
| C309 | 182-1063-32 | Electrolytic capacitor 16V10μF SS | 1 |
| C307 | 182-3363-03 | Electrolytic capacitor 4V33μF SS | 1 |
| C305 | 182-3363-12 | Electrolytic capacitor 6.3V33μF SS | 1 |
| C423,424 | 183-1063-32 | Electrolytic capacitor 16V10μF USS | 2 |
| C405,416 | 183-1543-62 | Electrolytic capacitor 50V0.15μF USS | 2 |
| C407,418 | 183-2243-62 | Electrolytic capacitor 50V0.22μF USS | 2 |
| C401,412 | 183-2253-62 | Electrolytic capacitor 50V2.2μF USS | 2 |
| C404,415 | 183-4743-62 | Electrolytic capacitor 50V0.47μF USS | 2 |

⊙AM-ST TUNER 880-1507B

| REF.NO. | PART NO. (ORDER NO.) | DESCRIPTION | Q'TY |
|--------------|----------------------|-------------------------------|------|
| D1~3 | 001-0402-00 | Diode (1SV149AB) | 3 |
| D4 | 001-0453-00 | Diode (1SS237) | 1 |
| TH1 | 002-0204-00 | Thermistor (350Ω TD) | 1 |
| TC1,2,3 | 004-1567-00 | Trimmer (20pF) | 3 |
| IFT1 | 005-0951-01 | IF-transformer (IFT-1) | 1 |
| IFT2 | 005-0961-01 | IF-transformer (IFT-2) | 1 |
| IFT4 | 005-0962-00 | IF-transformer (10A) | 1 |
| IFT3 | 005-0963-01 | IF-transformer (BFU-450) | 1 |
| T2 | 005-0973-00 | IF-transformer (T-2 2ND) | 1 |
| T1 | 010-2112-00 | Coil (T-1 1ST) | 1 |
| L1 | 010-2113-00 | Coil (L-1 5μH) | 1 |
| T3 | 010-2114-00 | Coil (T-3 OSC) | 1 |
| VR1 | 012-3808-07 | Variable resistor (22kΩ) | 1 |
| IC2 | 051-0630-01 | IC (MC13020P) | 1 |
| IC1 | 051-0634-01 | IC (LA1135) | 1 |
| CF1 | 060-0112-00 | Ceramic resonator (CSA3-6M17) | 1 |
| Q1,3,4 | 102-2458-25 | Transistor (2SC2458Y) | 3 |
| Q5,9 | 102-2670-15 | Transistor (2SC2670O) | 2 |
| Q6,7 | 102-2715-15 | Transistor (2SC2715-O) | 2 |
| Q2 | 108-0435-51 | FET (2SK435-CD) | 1 |
| Q8 | 108-0494-50 | FET (2SK494B) | 1 |
| R28 | 117-1021-10 | Chip resistor (1/4W1kΩ) S | 1 |
| R14,15,18,20 | 117-1031-10 | Chip resistor (1/4W10kΩ) S | 4 |

| REF.NO. | PART NO. (ORDER NO.) | DESCRIPTION | Q'TY |
|---------|----------------------|--------------------------------|------|
| R36 | 117-1041-10 | Chip resistor (1/4W100kΩ) S | 1 |
| R11 | 117-1211-10 | Chip resistor (1/4W120Ω) S | 1 |
| R29,31 | 117-1521-10 | Chip resistor (1/4W1.5kΩ) S | 2 |
| R13 | 117-2201-10 | Chip resistor (1/4W22Ω) S | 1 |
| R22 | 117-2211-10 | Chip resistor (1/4W220Ω) S | 1 |
| R39 | 117-2221-10 | Chip resistor (1/4W2.2kΩ) S | 1 |
| R34 | 117-2741-10 | Chip resistor (1/4W270kΩ) S | 1 |
| R6 | 117-2711-10 | Chip resistor (1/4W270Ω) S | 1 |
| R12 | 117-3311-10 | Chip resistor (1/4W330Ω) S | 1 |
| R16,37 | 117-3321-10 | Chip resistor (1/4W3.3kΩ) S | 2 |
| R32 | 117-3921-10 | Chip resistor (1/4W3.9kΩ) S | 1 |
| R30 | 117-4311-10 | Chip resistor (1/4W430Ω) S | 1 |
| R3 | 117-4701-10 | Chip resistor (1/4W47Ω) S | 1 |
| R27,38 | 117-4711-10 | Chip resistor (1/4W470Ω) S | 2 |
| R17 | 117-4721-10 | Chip resistor (1/4W4.7kΩ) S | 1 |
| R35 | 117-5631-10 | Chip resistor (1/4W56kΩ) S | 1 |
| R25 | 117-6821-10 | Chip resistor (1/4W6.8kΩ) S | 1 |
| R9 | 117-7501-10 | Chip resistor (1/4W75Ω) S | 1 |
| R21 | 117-8201-10 | Chip resistor (1/4W82Ω) S | 1 |
| R33 | 117-8211-10 | Chip resistor (1/4W820Ω) S | 1 |
| C37 | 043-0204-00 | Ceramic capacitor (50p) | 1 |
| C2 | 171-1533-06 | Ceramic capacitor (0.015μF) SC | 1 |
| C43 | 173-3322-10 | Ceramic capacitor (0.0033μF) S | 1 |

| REF.NO. | PART NO. (ORDER NO.) | DESCRIPTION | Q'TY |
|--------------------------|----------------------|--|------|
| C12 | 174-1000-13 | Ceramic capacitor (10pF CH) TC | 1 |
| C13 | 176-4311-00 | Ceramic chip capacitor (430pF CH) TC,S | 1 |
| C11 | 177-4732-05 | Ceramic chip capacitor (0.047μF) HD | 1 |
| C5,30 | 178-1022-05 | Ceramic chip capacitor (1000pF) HD,S | 2 |
| C17,22,26,38 | 178-1032-05 | Ceramic chip capacitor (0.01μF) HD,S | 4 |
| C3 | 178-1045-06 | Ceramic chip capacitor (0.1μF) HD,S | 1 |
| C1,8,9,10,14,21,23,27,29 | 178-2232-05 | Ceramic chip capacitor (0.022μF) HD,S | 9 |
| C40,41,42 | 178-3322-05 | Ceramic chip capacitor (0.0033μF) HD,S | 3 |
| C6 | 178-4735-06 | Ceramic chip capacitor (0.047μF) HD,S | 1 |
| C25 | 042-0199-00 | Electrolytic capacitor (10V22μF TAN) | 1 |

| REF.NO. | PART NO. (ORDER NO.) | DESCRIPTION | Q'TY |
|-----------|----------------------|--|------|
| C20,39 | 042-0200-00 | Electrolytic capacitor (10V47μF TAN) | 2 |
| C35,36 | 042-0391-00 | Electrolytic capacitor (35V0.47μF TAN) | 2 |
| C16 | 042-0239-00 | Electrolytic capacitor (16V1μF TAN) | 1 |
| C15 | 042-0227-00 | Electrolytic capacitor (16V2.2μF TAN) | 1 |
| C19,28,34 | 182-1063-32 | Electrolytic capacitor (16V10μF) SS | 3 |
| C24 | 182-1073-22 | Electrolytic capacitor (10V100μF) SS | 1 |
| C31,33 | 182-2253-62 | Electrolytic capacitor (50V2.2μF) SS | 2 |
| C18 | 182-3353-62 | Electrolytic capacitor (50V3.3μF) SS | 1 |
| C4 | 182-4763-12 | Electrolytic capacitor (6.3V47μF) SS | 1 |
| C32 | 182-4753-52 | Electrolytic capacitor (35V4.7μF) SS | 1 |

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| Ref. No. | Part No. (Order No.) | Description | Q'ty |
|----------|----------------------|----------------------------|------|
| D1 | 001-0368-00 | Diode (1SV121) | 1 |
| D3 | 001-0423-13 | Diode (MA4033) | 1 |
| D2,4,5 | 001-0442-00 | Diode (1SV147) | 3 |
| VC1 | 004-1567-00 | Trimer (20P) | 1 |
| IFT1 | 005-0966-00 | IF-Transformer | 1 |
| IFT2,3 | 005-0967-00 | IF-Transformer (MS3LK) | 2 |
| L4 | 010-1570-01 | Coil (RF) | 1 |
| L1 | 010-2046-03 | Coil (0.039μH) | 1 |
| L2 | 010-2046-14 | Coil (3.3μH) | 1 |
| L6 | 010-2104-00 | Coil (OSC) | 1 |
| L3,5 | 010-2105-00 | Coil (L4.5T) | 2 |
| IC1 | 051-0730-00 | IC (HA12438AFP) | 1 |
| R14 | 117-1011-10 | Chip resistor (1/16W 100Ω) | 1 |
| R6,11,13 | 117-1021-10 | Chip resistor (1kΩ) | 3 |
| R12 | 117-1031-10 | Chip resistor (10kΩ) | 1 |
| R3,7 | 117-1041-10 | Chip resistor (100kΩ) | 2 |
| R5 | 117-2211-10 | Chip resistor (220Ω) | 1 |

| Ref. No. | Part No. (Order No.) | Description | Q'ty |
|--------------|----------------------|----------------------------------|------|
| R2,9,10 | 117-3331-10 | Chip resistor (33kΩ) | 3 |
| R8 | 117-4701-10 | Chip resistor (47Ω) | 1 |
| R4 | 117-6831-10 | Chip resistor (68Ω) | 1 |
| Q3 | 124-0114-15 | Transistor (3SK114) | 1 |
| Q1 | 125-0001-01 | Transistor (UN2111) | 1 |
| Q2 | 125-0006-00 | Transistor (UN2110) | 1 |
| C11 | 176-1007-00 | Ceramic chip capacitor (10pF) | 1 |
| C3,6,18 | 176-1501-00 | Ceramic chip capacitor (15pF) | 3 |
| C14,15,16 | 176-2201-00 | Ceramic chip capacitor (22pF) | 3 |
| C4 | 176-5601-00 | Ceramic chip capacitor (56pF) | 1 |
| C5,9,13 | 176-6097-00 | Ceramic chip capacitor (6pF) | 3 |
| C2 | 176-8097-00 | Ceramic chip capacitor (8pF) | 1 |
| C21 | 178-1022-05 | eramic chip capacitor (0.001μF) | 1 |
| C1,7,8,10,17 | 178-1032-05 | Ceramic chip capacitor (0.01μF) | 5 |
| C12,19 | 178-2232-05 | Ceramic chip capacitor (0.022μF) | 2 |
| C20 | 183-1053-62 | Electrolytic capacitor (50V 1μF) | 1 |

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| REF.NO. | PART NO. (ORDER NO.) | DESCRIPTION | Q'TY |
|----------|----------------------|----------------------|------|
| D501~604 | 001-0330-00 | Diode (1SS119) | 4 |
| Q605 | 100-1048-00 | Transistor (2SA1048) | 1 |
| Q601,602 | 100-1297-00 | Transistor (2SA1297) | 2 |

| REF.NO. | PART NO. (ORDER NO.) | DESCRIPTION | Q'TY |
|----------|----------------------|--------------------------------------|------|
| Q603,604 | 102-3267-00 | Transistor (2SC3267GR,BL) | 2 |
| R601 | 114-2291-11 | Film resistor (1W2.2Ω) OM | 1 |
| C601 | 182-1073-32 | Electrolytic capacitor (16V100μF) SS | 1 |

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| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|----------|-------------|------------------------------|------|
| VR1 | 012-3707-05 | Variable resistor (VR10kΩ) | 1 |
| VR2 | 012-3707-08 | Variable resistor (VR100kΩ) | 1 |
| CCT1 | 050-0099-50 | Component circuit | 1 |
| IC1 | 051-0407-00 | IC (LA2110) | 1 |
| IC2 | 051-0733-01 | IC (LA3430) | 1 |
| X1 | 060-0115-02 | Ceramic resonator | 1 |
| Q1 | 102-2458-49 | Transistor (2SC2458-YGR) | 1 |
| R2,12 | 117-1041-10 | Chip resistor (1/16W100kΩ) S | 2 |
| R8,9 | 117-2221-10 | Chip resistor (1/16W2.2kΩ) S | 2 |
| R14 | 117-2231-10 | Chip resistor (1/16W22kΩ) S | 1 |
| R6 | 117-3331-10 | Chip resistor (1/16W33kΩ) S | 1 |
| R10 | 117-3921-10 | Chip resistor (1/16W3.9kΩ) S | 1 |
| R1 | 117-4721-10 | Chip resistor (1/16W4.7kΩ) S | 1 |
| R4,11,13 | 117-5621-10 | Chip resistor (1/16W5.6kΩ) S | 3 |

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|---------|-------------|--|------|
| R5 | 117-6821-10 | Chip resistor (1/16W6.8kΩ) S | 1 |
| R3 | 117-8211-10 | Chip resistor (1/16W820Ω) S | 1 |
| C6 | 171-2223-06 | Ceramic capacitor (0.0022μF) SC | 1 |
| C16 | 171-3333-06 | Ceramic capacitor (0.033μF) SC | 1 |
| C7 | 171-4733-06 | Ceramic capacitor (0.047μF) SC | 1 |
| C2,3 | 178-1032-05 | Ceramic chip capacitor (0.01μF) HD,S | 2 |
| C10 | 178-2232-05 | Ceramic chip capacitor (0.022μF) HD,S | 1 |
| C9 | 178-4722-05 | Ceramic chip capacitor (0.0047μF) HD,S | 1 |
| C4,15 | 178-6822-05 | Ceramic chip capacitor (0.0068μF) HD,S | 2 |
| C11,12 | 182-1053-62 | Electrolytic capacitor (50V1μF) SS | 2 |
| C14 | 182-1063-32 | Electrolytic capacitor (16V10μF) SS | 1 |
| C13 | 182-2243-62 | Electrolytic capacitor (50V0.22μF) SS | 1 |
| C5 | 182-2263-32 | Electrolytic capacitor (16V22μF) SS | 1 |
| C1,8 | 182-4753-52 | Electrolytic capacitor (35V4.7μF) SS | 2 |

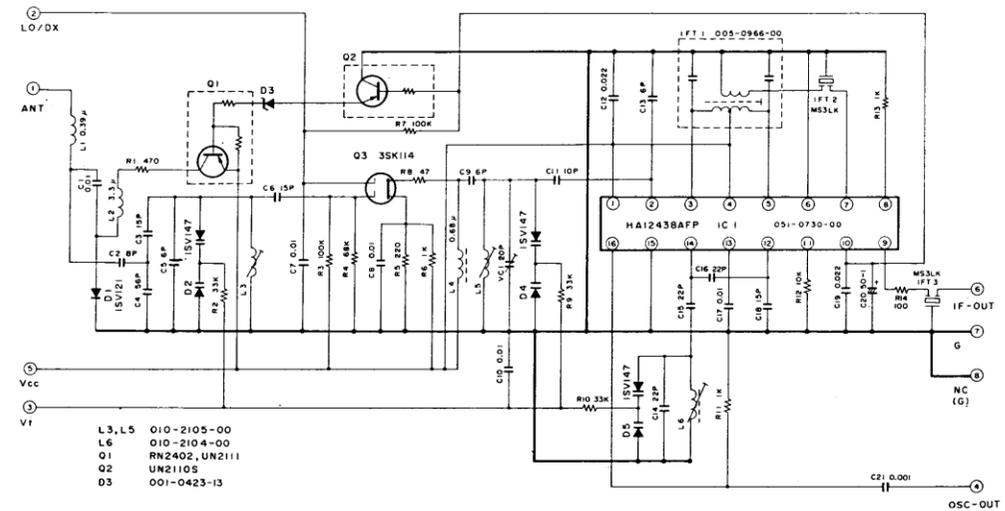
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| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|----------------------|-------------|------------------------|------|
| D513 | 001-0486-00 | Diode LT1D1118 (RED) | 1 |
| D529~534 D540~543 | 001-0486-01 | Diode LT1N1118 (GREEN) | 10 |

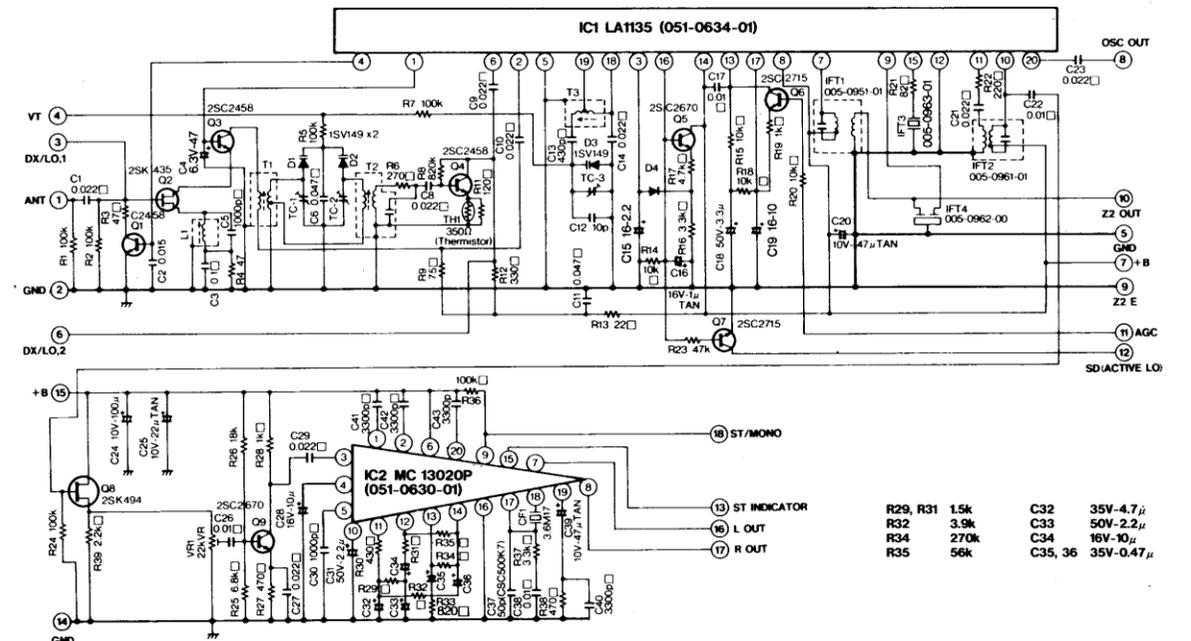
| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|---------|-------------|------------------|------|
| Q611 | 060-0150-00 | Photo transistor | 1 |

■BLOCK CIRCUIT DIAGRAM:

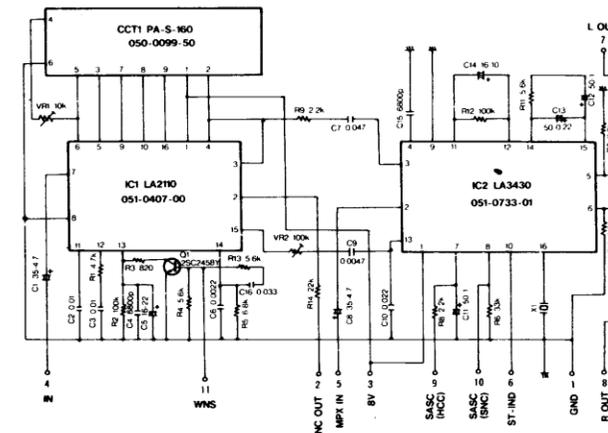
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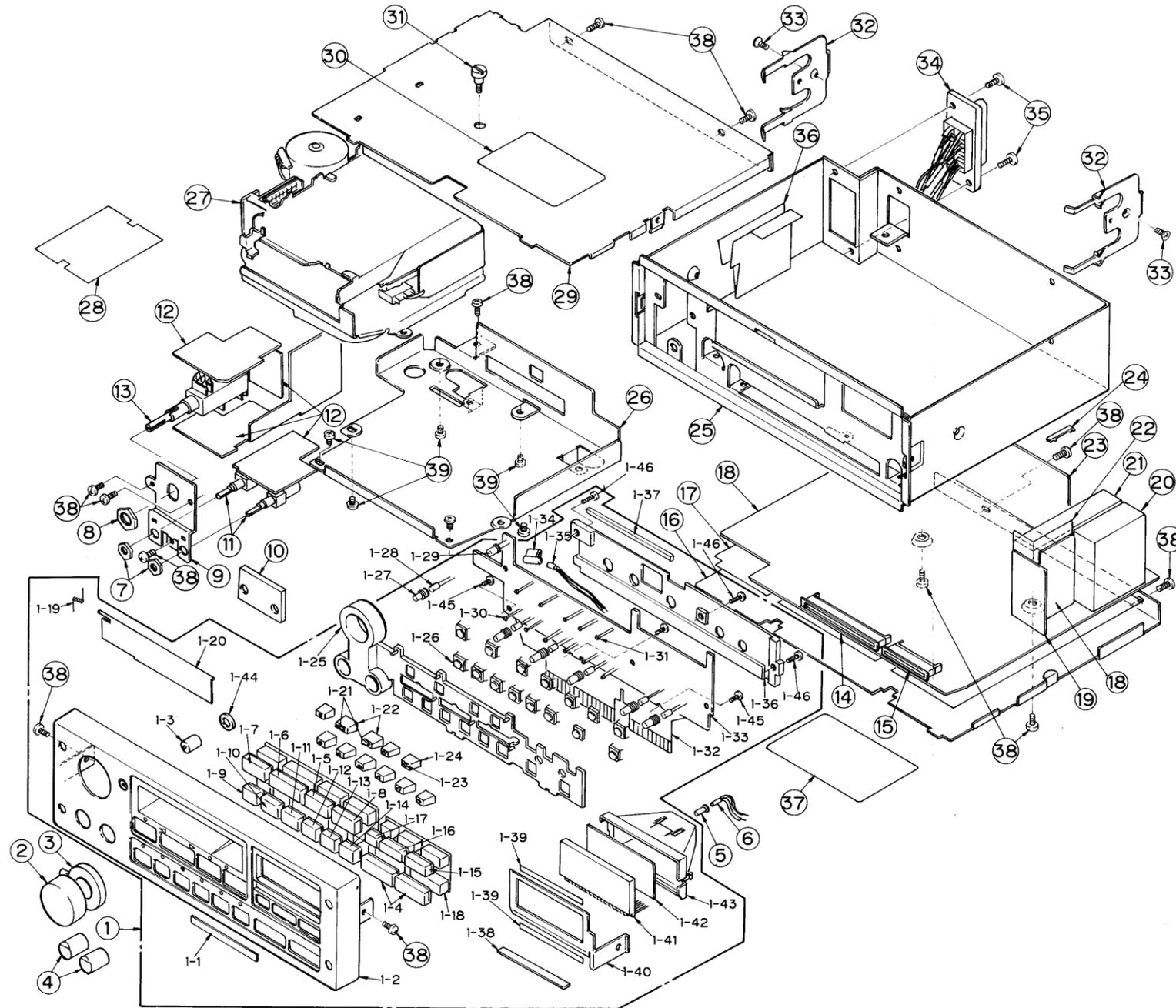


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EXPLODED VIEW • PARTS LIST:

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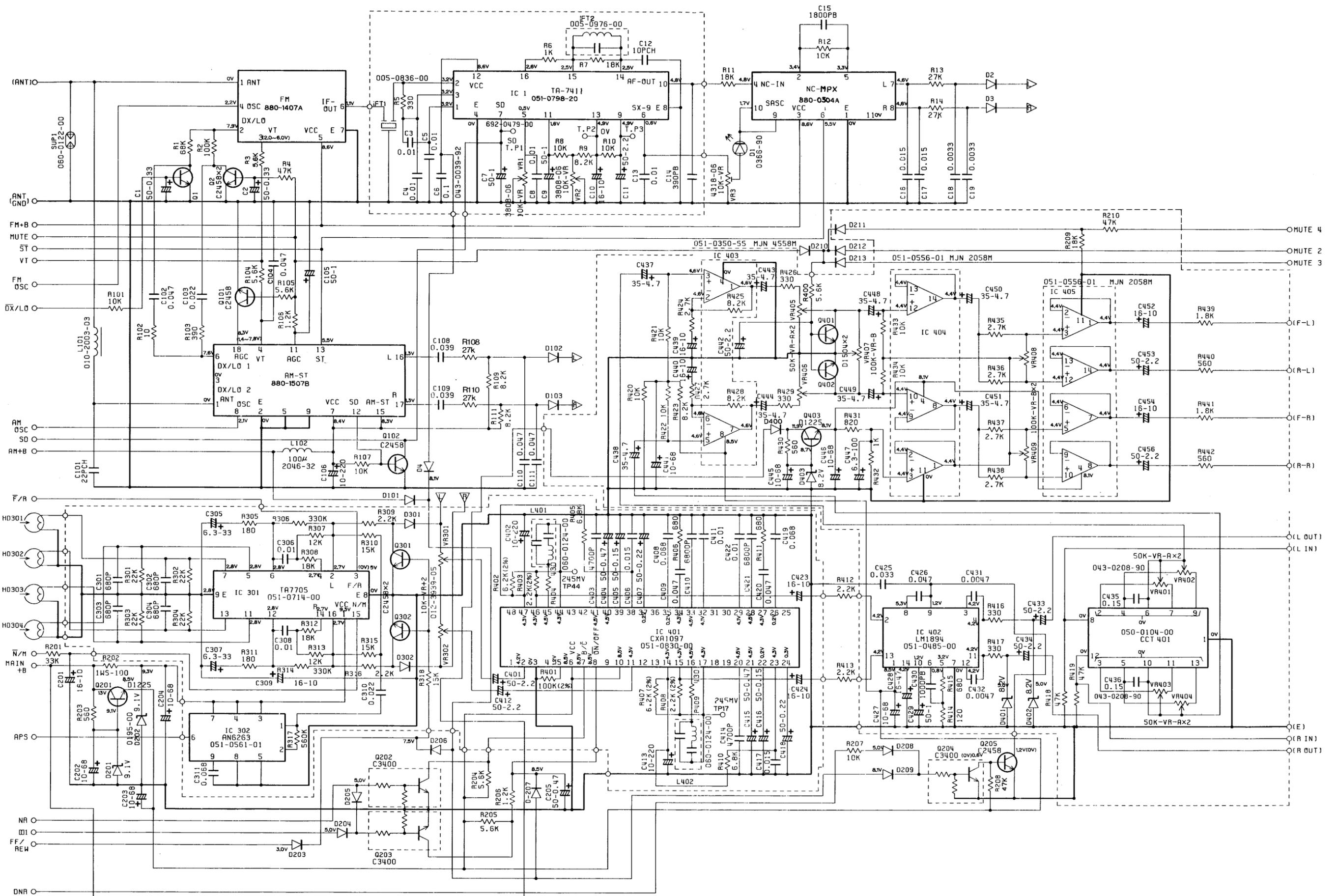
| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|---------|-------------|--------------------------------------|------|
| 1-33 | 099-8170-00 | P.W.B (SW) | 1 |
| 1-34 | 345-3316-02 | Lamp holder | 1 |
| 1-35 | 017-0345-01 | Pilot lamp | 1 |
| 1-36 | 374-0901-00 | Back plate | 1 |
| 1-37 | 345-4625-00 | Cushion rubber | 1 |
| 1-38 | 347-2481-00 | Insulator | 1 |
| 1-39 | 347-0644-00 | Insulator | 2 |
| 1-40 | 330-8666-00 | LCD cover | 1 |
| 1-41 | 379-0183-00 | LCD | 1 |
| 1-42 | 335-2726-00 | Color film | 1 |
| 1-43 | 335-2589-00 | LCD holder | 1 |
| 1-44 | 345-4638-00 | Seal rubber | 1 |
| 1-45 | 716-0778-00 | Wave screw (M2x6) | 3 |
| 1-46 | 716-0779-00 | Wave screw (M2x8) | 3 |
| 2 | 380-4898-00 | Knob (VR) | 1 |
| 3 | 380-4295-00 | Knob (FADER) | 1 |
| 4 | 380-4899-00 | Knob (BASS-TREB) | 2 |
| 5 | 345-4157-07 | Lamp holder | 1 |
| 6 | 017-0346-00 | Pilot lamp | 1 |
| 7 | 722-0332-00 | Special nut | 2 |
| 8 | 722-0231-00 | Special nut | 1 |
| 9 | 330-8658-00 | VR holder | 1 |
| 10 | 345-4630-00 | Seal rubber | 1 |
| 11 | 012-4447-00 | Variable resistor (BASS-TREB) | 2 |
| 12 | 099-8168-00 | P.W.B (VR) | 1 |
| 13 | 012-4663-00 | Variable resistor (SW-VOL-BAL-FADER) | 1 |
| 14 | 074-0731-36 | Outlet socket | 1 |
| 15 | 074-0731-18 | Outlet socket | 1 |
| 16 | 304-0397-00 | Lower cover | 1 |
| 17 | 347-2480-00 | Insulator | 1 |
| 18 | 099-8167-00 | P.W.B (Main) | 1 |
| 19 | 880-0304A | NC-MPX Ass'y | 1 |
| 20 | 880-1407A | FM TUNER Ass'y | 1 |
| 21 | 880-1507B | AM TUNER Ass'y | 1 |
| 22 | 347-2479-01 | Insulator | 1 |
| 23 | 099-8169-00 | P.W.B (Dolby) | 1 |
| 24 | 335-2469-00 | P.W.B holder | 1 |
| 25 | 312-0288-01 | Chassis | 1 |
| 26 | 330-8657-00 | Mechanism holder | 1 |
| 27 | 930-0530-10 | Tape mechanism | 1 |
| 28 | 347-2477-00 | Insulator | 1 |
| 29 | 303-0348-00 | Upper cover | 1 |
| 30 | 285-1000-00 | Guide label | 1 |
| 31 | 716-0706-00 | Lock screw | 1 |
| 32 | 750-2649-00 | Spring | 2 |
| 33 | 714-3006-41 | Machine screw (M3x6) | 2 |
| 34 | 854-0058-01 | Extension lead | 1 |
| 35 | 714-3008-81 | Machine screw (M3x8) | 2 |
| 36 | 347-2478-00 | Insulator | 1 |
| 37 | 286-6922-00 | Set plate | 1 |
| 38 | 714-3006-81 | Machine screw (M3x6) | 12 |
| 39 | 714-3003-81 | Machine screw (M3x3) | 6 |

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|---------|-------------|------------------|------|
| 1 | 940-0866A | Escutcheon ass'y | 1 |
| 1-1 | 371-3451-00 | Trim plate | 1 |
| 1-2 | 370-4045-01 | Escutcheon | 1 |
| 1-3 | 335-2650-01 | LED accessory | 1 |
| 1-4 | 382-1409-00 | Button (TUNING) | 2 |
| 1-5 | 382-1410-00 | Button (FF) | 1 |
| 1-6 | 382-1411-00 | Button (PRO) | 1 |
| 1-7 | 382-1410-01 | Button (REW) | 1 |
| 1-8 | 382-1412-00 | Button (EJECT) | 1 |
| 1-9 | 382-1408-00 | Button (1) | 1 |
| 1-10 | 382-1408-01 | Button (2) | 1 |

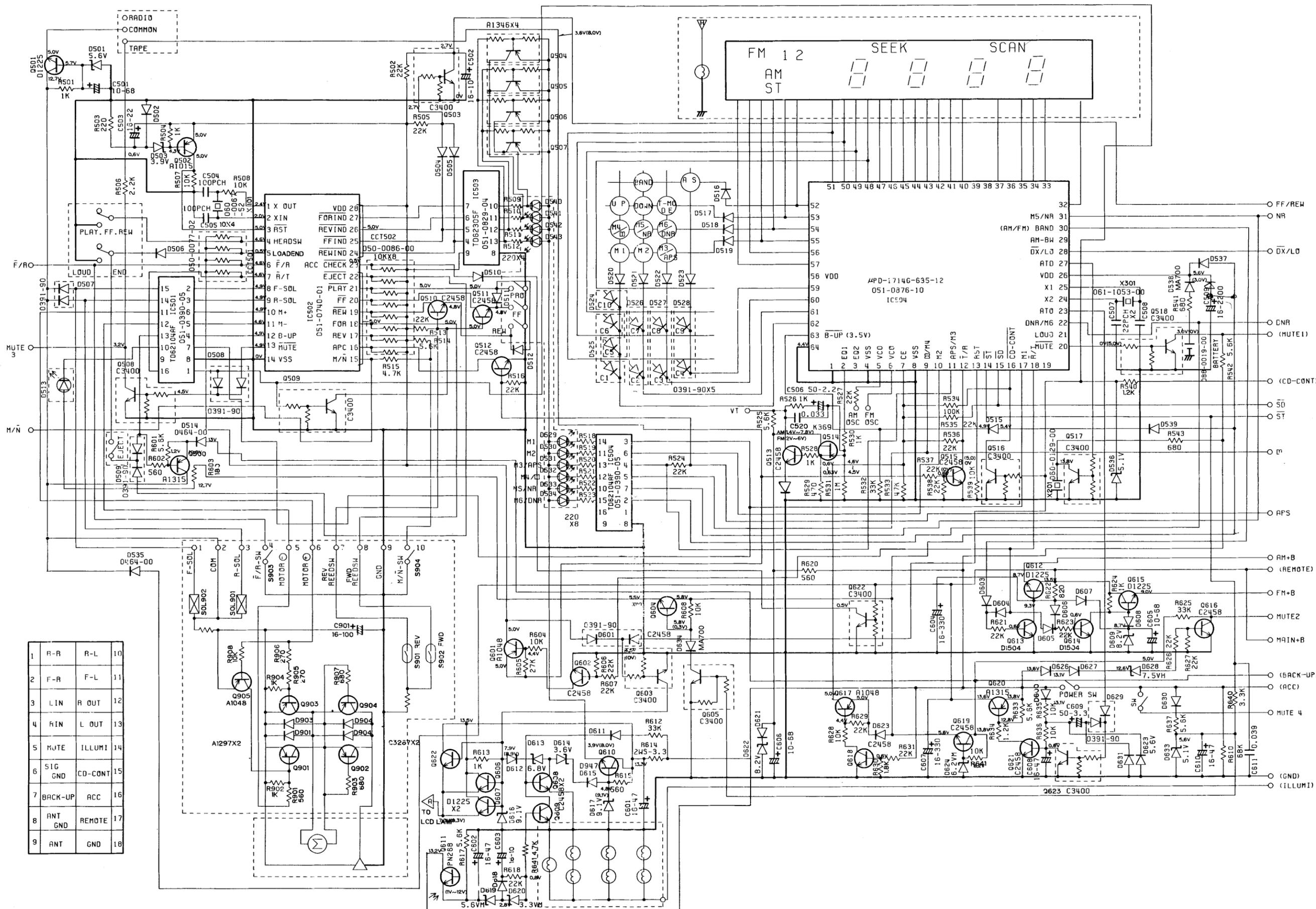
| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|---------|-------------|-------------------|------|
| 1-11 | 382-1408-02 | Button (3) | 1 |
| 1-12 | 382-1408-03 | Button (4) | 1 |
| 1-13 | 382-1408-04 | Button (5) | 1 |
| 1-14 | 382-1408-05 | Button (6) | 1 |
| 1-15 | 382-1414-01 | Button (BAND) | 1 |
| 1-16 | 382-1414-00 | Button (TUN MODE) | 1 |
| 1-17 | 382-1413-00 | Button (STORE) | 1 |
| 1-18 | 345-4533-00 | Cushion rubber | 1 |
| 1-19 | 750-2309-01 | Spring | 1 |
| 1-20 | 320-0391-04 | Dustproof cover | 1 |
| 1-21 | 335-2592-00 | LED accessory | 2 |

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|---------|-------------|------------------|------|
| 1-22 | 345-4532-00 | Seal rubber | 2 |
| 1-23 | 335-2591-00 | LED accessory | 9 |
| 1-24 | 345-4531-00 | Seal rubber | 9 |
| 1-25 | 335-2590-00 | Illumi plate | 1 |
| 1-26 | 013-3694-00 | Switch | 15 |
| 1-27 | 345-3814-10 | Lamp holder | 6 |
| 1-28 | 017-0338-06 | Pilot lamp | 6 |
| 1-29 | 060-0150-00 | Transistor | 1 |
| 1-30 | 001-0486-01 | LED (Green) | 10 |
| 1-31 | 001-0486-00 | LED (Red) | 1 |
| 1-32 | 099-8171-00 | P.W.B (Flexible) | 1 |

■CIRCUIT DIAGRAM:

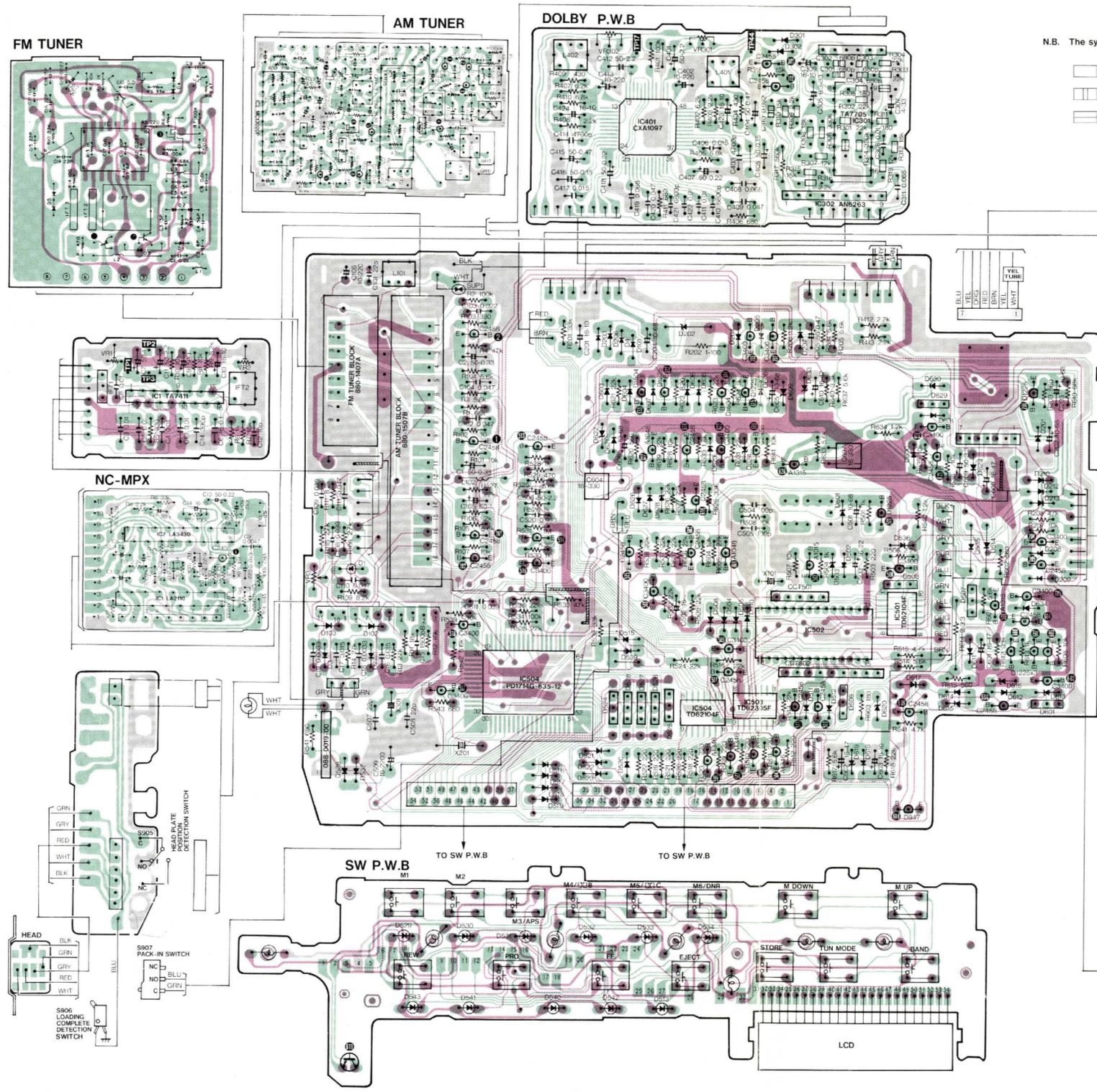


CIRCUIT DIAGRAM:



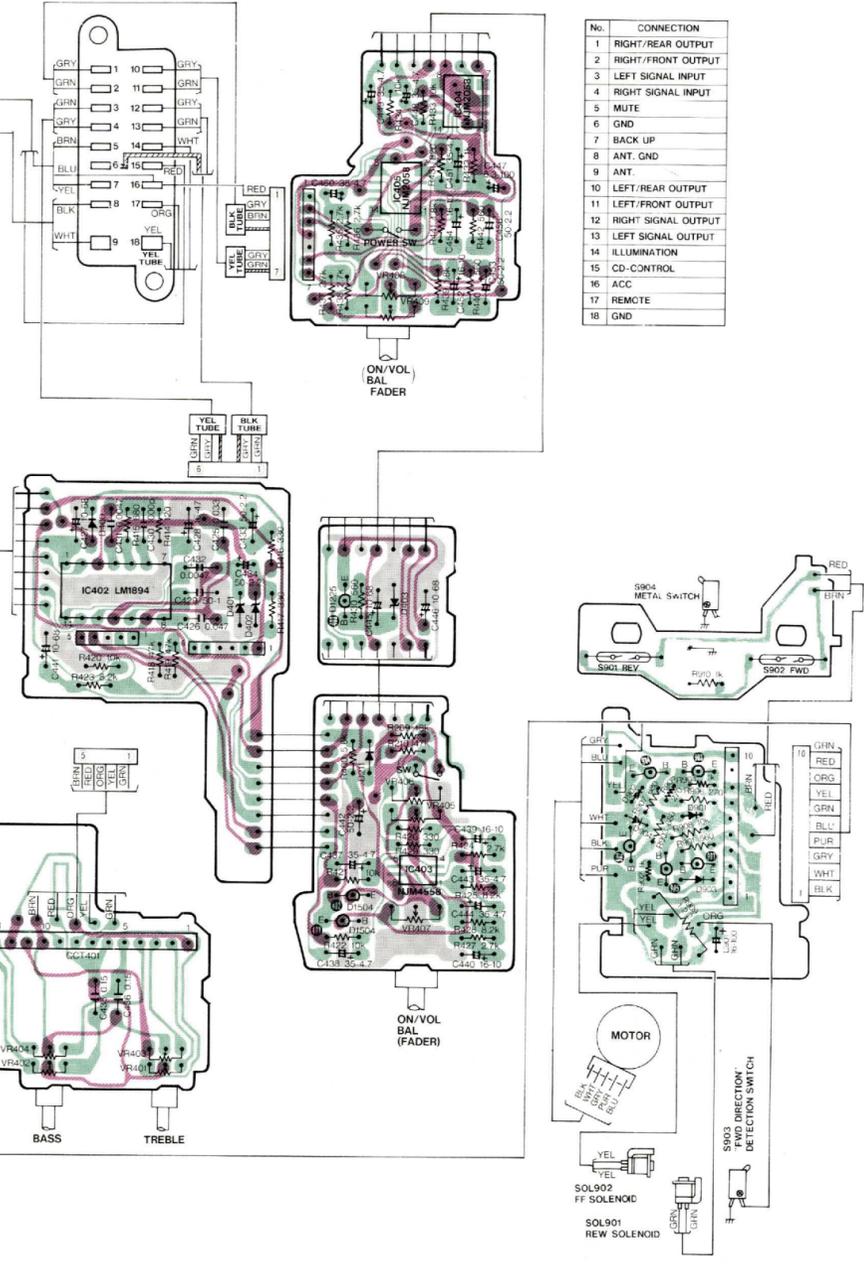
| | | | |
|---|---------|---------|----|
| 1 | R-R | R-L | 10 |
| 2 | F-R | F-L | 11 |
| 3 | LIN | R OUT | 12 |
| 4 | RIN | L OUT | 13 |
| 5 | MUTE | ILLUMI | 14 |
| 6 | SIG GND | CD-CONT | 15 |
| 7 | BACK-UP | ACC | 16 |
| 8 | ANT GND | REMOTE | 17 |
| 9 | ANT | GND | 18 |

■ PRINTED WIRING BOARD:



N.B. The symbol mark of chip parts is as follows.

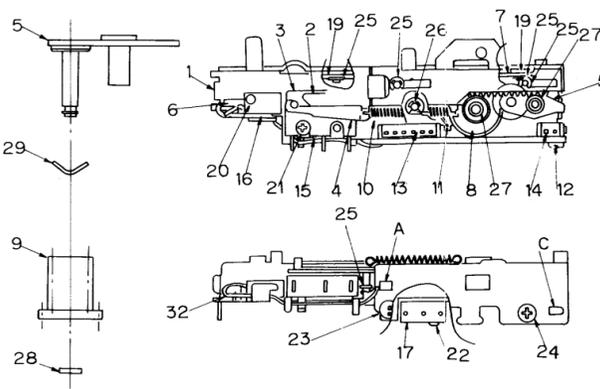
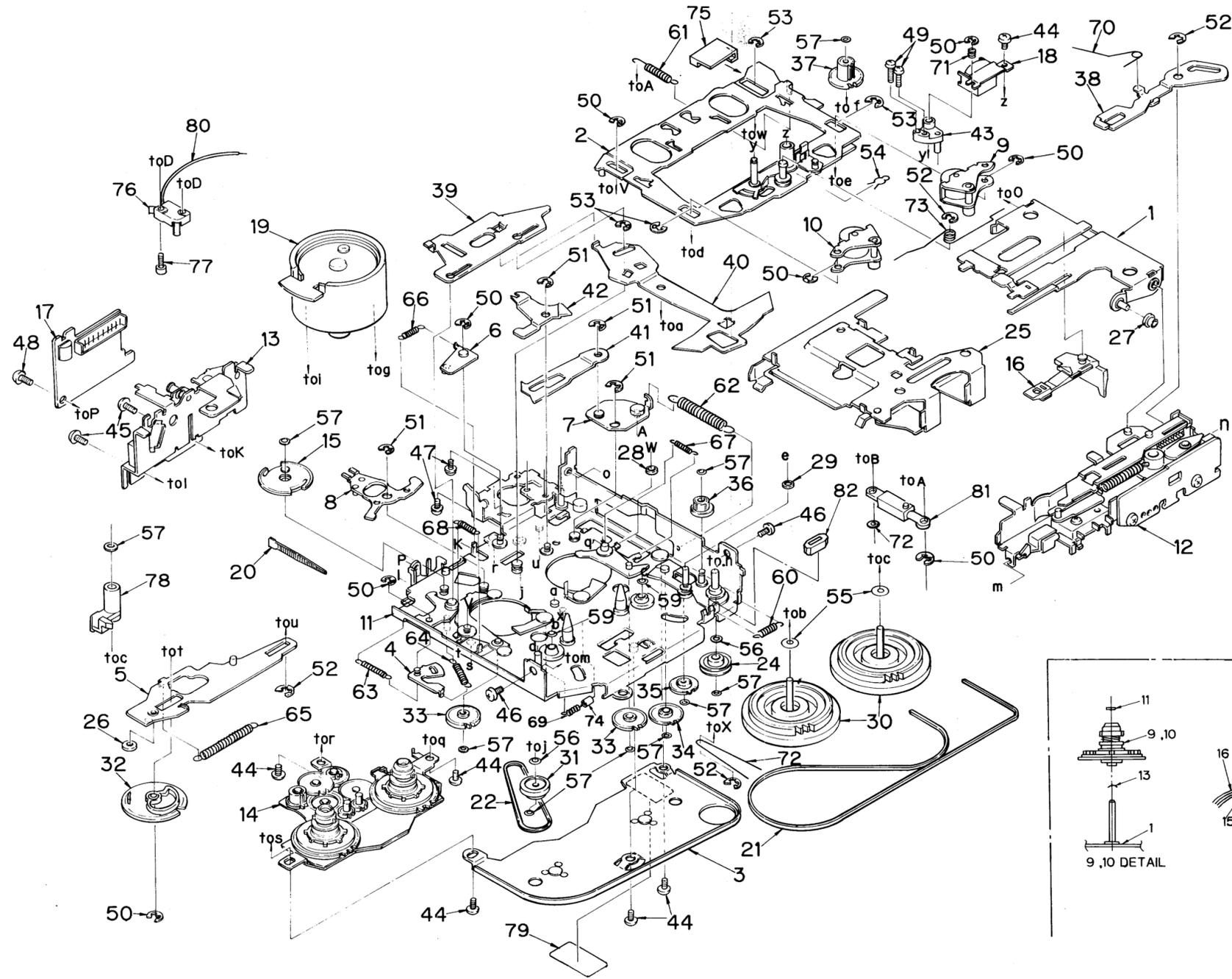
- means resistors.
- means capacitors.
- means jumper wires.



| No. | CONNECTION |
|-----|---------------------|
| 1 | RIGHT/REAR OUTPUT |
| 2 | RIGHT/FRONT OUTPUT |
| 3 | LEFT SIGNAL INPUT |
| 4 | RIGHT SIGNAL INPUT |
| 5 | MUTE |
| 6 | GND |
| 7 | BACK UP |
| 8 | ANT. GND |
| 9 | ANT. |
| 10 | LEFT/REAR OUTPUT |
| 11 | LEFT/FRONT OUTPUT |
| 12 | RIGHT SIGNAL OUTPUT |
| 13 | LEFT SIGNAL OUTPUT |
| 14 | ILLUMINATION OUTPUT |
| 15 | CD-CONTROL |
| 16 | ACC |
| 17 | REMOTE |
| 18 | GND |

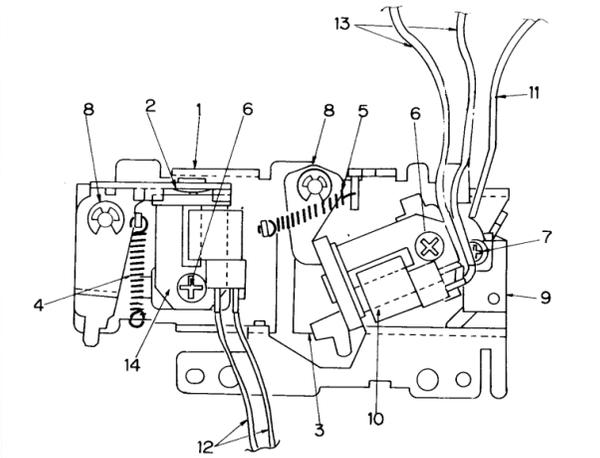
EXPLODED VIEW • PARTS LIST:

©Tape mechanism section



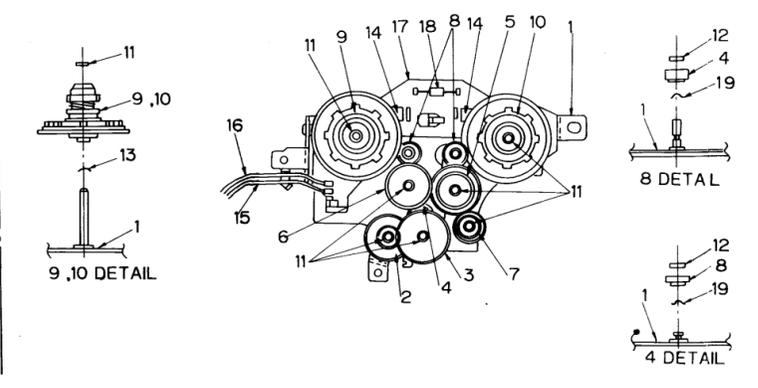
12 960-3639-06 Frame-sub ass'y

| NO | PART NO | DESCRIPTION | Q'TY |
|----|-------------|----------------------|------|
| 1 | 960-3611-04 | FRAME ASS'Y | 1 |
| 2 | 960-3618-03 | EJ ARM P ASS'Y | 1 |
| 3 | 630-1758-03 | EJ RACK PLATE | 1 |
| 4 | 960-3621-02 | SW LINK ASS'Y | 1 |
| 5 | 960-3620-05 | SWING P ASS'Y | 1 |
| 6 | 820-3005-02 | VINYL TUBE | 1 |
| 7 | 960-3618-03 | EJECT P ASS'Y | 1 |
| 8 | 613-0076-02 | EJECT GEAR | 1 |
| 9 | 613-0075-01 | SWING GEAR | 1 |
| 10 | 750-2404-00 | EJ RACK SPRING | 1 |
| 11 | 750-2413-01 | EJ GEAR SPRING | 1 |
| 12 | 099-7435-02 | P.W.B | 1 |
| 13 | 076-0277-06 | PLUG | 1 |
| 14 | 076-0277-02 | PLUG | 1 |
| 15 | 013-2690-05 | SWITCH | 1 |
| 16 | 013-3757-00 | SWITCH | 1 |
| 17 | 013-3780-00 | SWITCH | 1 |
| 18 | 806-0607-60 | VINYL COAT WIRE | 1 |
| 19 | 610-0268-00 | EJECT ROLLER | 2 |
| 20 | 716-0670-00 | SPECIAL SCREW | 1 |
| 21 | 714-2308-11 | MACHINE SCREW M2.3x8 | 1 |
| 22 | 716-0656-00 | SPECIAL SCREW | 1 |
| 23 | 716-0485-00 | SPECIAL SCREW | 1 |
| 24 | 714-2604-81 | MACHINE SCREW M2.6x4 | 1 |
| 25 | 743-1500-10 | E-RING | 1 |
| 26 | 743-2000-10 | E-RING | 1 |
| 27 | 746-0761-00 | SPECIAL WASHER | 2 |
| 28 | 746-0762-00 | SPECIAL WASHER | 1 |
| 29 | 745-0586-00 | SPECIAL WASHER | 1 |



13 960-3640-09 Side-P-sub ass'y

| NO | PART NO | DESCRIPTION | Q'TY |
|----|-------------|----------------------|------|
| 1 | 960-3610-06 | SIDE PANEL ASS'Y | 1 |
| 2 | 960-3623-05 | PL LINK A ASS'Y | 1 |
| 3 | 960-3624-06 | PL LINK B ASS'Y | 1 |
| 4 | 750-2408-00 | PL SPRING A | 1 |
| 5 | 750-2409-02 | PL SPRING B | 1 |
| 6 | 714-2606-11 | MACHINE SCREW M2.6x6 | 2 |
| 7 | 716-0670-00 | SCREW | 1 |
| 8 | 743-1500-10 | E-RING | 2 |
| 9 | 013-3757-00 | SWITCH | 1 |
| 10 | 015-0232-02 | PLUNGER | 1 |
| 11 | 803-0608-60 | VINYL COAT WIRE | 1 |
| 12 | 804-0606-60 | VINYL COAT WIRE | 2 |
| 13 | 805-0609-60 | VINYL COAT WIRE | 2 |
| 14 | 015-0238-00 | PLUNGER | 1 |



14 960-3641-07 Reel-B-sub ass'y

| NO | PART NO | DESCRIPTION | Q'TY |
|----|-------------|--------------------------|------|
| 1 | 960-3613-05 | REELBASE P ASS'Y | 1 |
| 2 | 613-0061-01 | POWER GEAR A | 1 |
| 3 | 613-0062-00 | POWER GEAR B | 1 |
| 4 | 613-0066-01 | P IDLER GEAR | 1 |
| 5 | 613-0063-00 | POWER GEAR C | 1 |
| 6 | 613-0064-01 | POWER GEAR D | 1 |
| 7 | 613-0065-00 | POWER GEAR E | 1 |
| 8 | 613-0069-00 | IDLER GEAR | 2 |
| 9 | 960-3634-02 | REELBASE F ASS'Y | 1 |
| 10 | 960-3635-02 | REELBASE R ASS'Y | 1 |
| 11 | 746-0761-00 | SPECIAL WASHER | 7 |
| 12 | 746-0762-00 | SPECIAL WASHER | 3 |
| 13 | 746-0712-01 | SPECIAL WASHER | 2 |
| 14 | 013-3707-00 | SWITCH | 2 |
| 15 | 802-0615-60 | VINYL COAT WIRE | 1 |
| 16 | 801-0615-60 | VINYL COAT WIRE | 1 |
| 17 | 099-7216-02 | P.W.B | 1 |
| 18 | 111-1021-91 | FILM RESISTOR(1/4W5%1KΩ) | 1 |
| 19 | 745-0678-01 | SPECIAL WASHER | 3 |

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|---------|-------------|------------------|------|
| 1 | 960-3609-05 | Guide arm ass'y | 1 |
| 2 | 960-3612-07 | Head plate ass'y | 1 |
| 3 | 960-3617-00 | Flywheel-P ass'y | 1 |
| 4 | 960-3626-02 | Timing-P ass'y | 1 |
| 5 | 960-3627-04 | Power-P ass'y | 1 |
| 6 | 960-3628-01 | P-lock-P ass'y | 1 |

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|---------|-------------|----------------------|------|
| 7 | 960-3631-06 | Power link ass'y | 1 |
| 8 | 960-3632-02 | REW-link ass'y | 1 |
| 9 | 960-3738-01 | Roller-F ass'y | 1 |
| 10 | 960-3739-01 | Roller-R ass'y | 1 |
| 11 | 960-3638-12 | Deck plate ass'y | 1 |
| 12 | 960-3639-06 | Frame-sub ass'y (12) | 1 |

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|---------|-------------|-----------------------|------|
| 13 | 960-3640-09 | Side-P-sub ass'y (13) | 1 |
| 14 | 960-3641-07 | Reel-B-sub ass'y (14) | 1 |
| 15 | 960-3642-03 | CH-gear ass'y | 1 |
| 16 | 960-3643-02 | Pack-ST ass'y | 1 |
| 17 | 099-7670-03 | P.W.B | 1 |
| 18 | 011-0304-00 | Head | 1 |

| REF.NO. | PART NO. | DESCRIPTION | Q'TY |
|---------|-------------|------------------------|------|
| 19 | SMA-105-100 | Motor ass'y | 1 |
| 20 | 335-0833-01 | Clamp | 1 |
| 21 | 602-0097-00 | Belt-A | 1 |
| 22 | 602-0098-02 | Belt-B | 1 |
| 23 | 750-2421-00 | Change-A spring | 1 |
| 24 | 604-0033-00 | Tension pulley | 1 |
| 25 | 606-0079-06 | Pack guide | 1 |
| 26 | 610-0266-00 | Cam roller | 1 |
| 27 | 610-0267-00 | Guide roller | 1 |
| 28 | 610-0281-00 | Head-P-roller | 1 |
| 29 | 610-0282-00 | H-P-roller B | 1 |
| 30 | 611-0072-02 | Flywheel | 2 |
| 31 | 613-0060-02 | Pulley gear | 1 |
| 32 | 613-0067-05 | Cam gear | 1 |
| 33 | 613-0070-00 | FF-gear | 2 |
| 34 | 613-0071-00 | Loading gear-A | 1 |
| 35 | 613-0072-00 | Loading gear-B | 1 |
| 36 | 613-0073-00 | Loading gear-C | 1 |
| 37 | 613-0074-00 | Loading gear-D | 1 |
| 38 | 630-1759-03 | Eject arm | 1 |
| 39 | 630-1760-02 | Change plate | 1 |
| 40 | 630-1761-00 | Change arm | 1 |
| 41 | 630-1762-02 | Head lock plate | 1 |
| 42 | 630-1763-01 | FF-link | 1 |
| 43 | 631-0461-01 | Azimuth link | 1 |
| 44 | 714-2003-81 | Machine screw (M2x3) | 6 |
| 45 | 714-2603-81 | Machine screw (M2.6x3) | 2 |
| 46 | 714-2604-81 | Machine screw (M2.6x4) | 2 |
| 47 | 716-0347-00 | Screw (MOTOR) | 2 |
| 48 | 716-0485-00 | Screw (P.W.B) | 1 |
| 49 | 716-0654-01 | Screw (AZIMUTH) | 2 |
| 50 | 743-1500-10 | E-ring (M1.5) | 8 |
| 51 | 743-2000-10 | E-ring (M2) | 4 |
| 52 | 743-2500-10 | E-ring (M2.5) | 4 |
| 53 | 744-0031-10 | E-ring | 4 |
| 54 | 744-0028-00 | Snap retainer | 1 |
| 55 | 745-0646-00 | Washer (FLYWHEEL) | 2 |
| 56 | 746-0624-00 | Washer | 2 |
| 57 | 746-0761-00 | Washer | 10 |
| 59 | 746-0747-00 | Washer (BEARING) | 2 |
| 60 | 750-2405-02 | Loading spring | 1 |
| 61 | 750-2406-03 | Head-P-spring | 1 |
| 62 | 750-2407-03 | P-link spring | 1 |
| 63 | 750-2410-00 | G-lock spring | 1 |
| 64 | 750-2411-00 | Timing spring | 1 |
| 65 | 750-2412-00 | Power-P-spring | 1 |
| 66 | 750-2413-00 | P-lock spring | 1 |
| 67 | 750-2414-02 | FF-spring | 1 |
| 68 | 750-2415-01 | REW-spring | 1 |
| 69 | 750-2416-01 | Brake spring | 1 |
| 70 | 750-2418-02 | EJ-arm spring-B | 1 |
| 71 | 750-2420-00 | Azimuth spring | 1 |
| 72 | 746-0762-00 | Washer | 1 |
| 73 | 750-2422-03 | Roller spring | 1 |
| 74 | 820-4006-02 | Vinyl tube | 1 |
| 75 | 631-0540-00 | Stopper B | 1 |
| 76 | 013-3757-00 | Switch | 1 |
| 77 | 716-0670-00 | Screw | 1 |
| 78 | 631-0528-01 | Sensor link | 1 |
| 79 | 290-4065-01 | Care label | 1 |
| 80 | 804-0608-60 | Vinyl coat | 1 |
| 81 | 960-3824-00 | Dumper ass'y | 1 |
| 82 | 631-0539-00 | Stopper A | 1 |