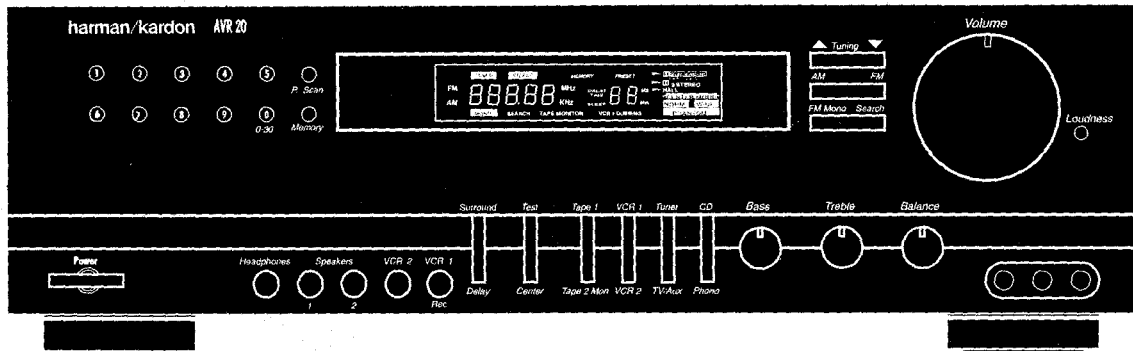


# The Harman Kardon Model AVR20

Manual 188A

## AUDIO AND VIDEO RECEIVER

# Technical Manual



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**harman/kardon**

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1112-0330A152 G9212 1500 Printed in Korea

**SPECIFICATIONS**

|   | Nominal     | Limit      | Nominal   | Limit    |
|---|-------------|------------|-----------|----------|
| <b>● FRONT AMP SECTION</b>                      |             |            |           |          |
| RMS Output Power                                |             |            |           |          |
| (Stereo Mode) Input: CD                         |             |            |           |          |
| THD ( 0.09%, 8 ohms)                            | ≥ 65 W      | ≥ 63 W     |           |          |
| Both Channel Driven (40 Hz-10 kHz)              |             |            |           |          |
| (Surround Mode)                                 | ≥ 55 W      | ≥ 50 W     |           |          |
| THD ( 0.09%, 8 ohms, 1 kHz)                     |             |            |           |          |
| Im Distortion Input : CD                        | ≤ 0.2%      | ≤ 0.3%     |           |          |
| At 63 W, 60:7000 Hz = 4:1                       |             |            |           |          |
| THD (40Hz-10KHz) at 8 ohms, 63 W Input: CD      |             |            |           |          |
| 40 Hz   | ≤ 0.06%     | ≤ 0.09%    |           |          |
| 1 kHz   | ≤ 0.06%     | ≤ 0.09%    |           |          |
| 10 kHz  | ≤ 0.06%     | ≤ 0.09%    |           |          |
| Input Sensitivity                               |             |            |           |          |
| Phono (MM)                                      | 2.5 mV      | ±0.4 mV    |           |          |
| CD, AUX, VCR                                    | 150 mV      | ±30 mV     |           |          |
| S/N (WTD IHF-A) Input Shorted at Volume Max     |             |            |           |          |
| Phono   | ≥ 74 dB     | ≥ 70 dB    |           |          |
| CD, Tape1, 2                                    | ≥ 92 dB     | ≥ 90 dB    |           |          |
| TV, VCR1, 2                                     | ≥ 82 dB     | ≥ 80 dB    |           |          |
| Phono Overload at 1 kHz, THD: 0.5%              |             |            |           |          |
| Phono Input → Take Output                       | ≥ 140 mV    | ≥ 130 mV   |           |          |
| Phono Equalization                              |             |            |           |          |
| RIAA 30 Hz-15 kHz, Tape Mon, Output             | RIAA dB     | ±1.5 dB    |           |          |
| Tone Control                                    |             |            |           |          |
| Bass, 100 Hz                                    | ± 10 dB     | ±2 dB      |           |          |
| Treble, 10 kHz                                  | ± 10 dB     | ±2 dB      |           |          |
| Loudness control at -40 dB                      |             |            |           |          |
| 100 Hz  | +6 dB       | ±2 dB      |           |          |
| 10 kHz  | +3 dB       | ±2 dB      |           |          |
| Frequency Response                              |             |            |           |          |
| CD/AUX  |             |            |           |          |
| 20 Hz, 20 kHz                                   | ±0.5 dB     | ±1 dB      |           |          |
| Channel Crosstalk Input Shorted                 |             |            |           |          |
| 1 kHz   | ≥ 60 dB     | ≥ 50 dB    |           |          |
| 10 kHz  | ≥ 50 dB     | ≥ 40 dB    |           |          |
| <b>● CENTER AMP SECTION</b>                     |             |            |           |          |
| RMS Output Power                                |             |            |           |          |
| THD < 0.3%, 8 ohms, 1 kHz                       | ≥ 55 W      | ≥ 50 W     |           |          |
| Only Center Channel Driven                      |             |            |           |          |
| S/N   |             |            |           |          |
| Input Shorted, IHF A WTD                        | ≥ 67 dB     | ≥ 65 dB    |           |          |
| Line Input : 350 mV                             |             |            |           |          |
| Frequency Response at -3dB                      |             |            |           |          |
| Normal  | 100-20 kHz  | 150-15 kHz |           |          |
| Wide  | 20-20 kHz   | 50-15 kHz  |           |          |
| <b>● REAR AMP SECTION</b>                       |             |            |           |          |
| RMS Output Power                                |             |            |           |          |
| (Both Rear Channels Connected)                  |             |            |           |          |
| THD < 0.7%, 16 ohms, 1 kHz                      | ≥ 27 W      | ≥ 25 W     |           |          |
| Only Rear Channel Driven                        |             |            |           |          |
| S/N   |             |            |           |          |
| Input Shorted, IHF A WTD,                       |             |            |           |          |
| Delay: 20 mS, Line Input :350 mV                |             |            |           |          |
| Dolby   | ≥ 60 dB     | ≥ 55 dB    |           |          |
| Hall  | ≥ 60 dB     | ≥ 55 dB    |           |          |
| Frequency Response at -3 dB 80-7 kHz            |             |            | 100-6 kHz |          |
| 8 ohms, Dolby Pro-Logic                         |             |            |           |          |
| <b>● VIDEO SECTION</b>                          |             |            |           |          |
| Input Sensitivity/Impedance                     |             |            |           |          |
| VCR1, VCR2, VDP                                 | 1Vp-p/75 Ω  | dB         |           | ±1 dB    |
| Output Level/Impedance                          |             |            |           |          |
| VCR1, REC out, TV Monitor Out                   | 1Vp-p/75 Ω  | dB         |           | ±1 dB    |
| Frequency Response -3dB                         | DC -10      | MHz        |           | 5-16 MHz |
| Crosstalk at 1.0 MHz                            | ≥ 45 dB     |            |           | ≥ 40 dB  |
| <b>● FM SECTION</b>                             |             |            |           |          |
| Tuning Cover Range 50 kHz Step                  |             |            |           |          |
| Low   |             |            | 87.5      | MHz      |
| High  |             |            | 108.0     | MHz      |
| Usable Sensitivity                              |             |            |           |          |
| S/N 30 dB (Europe: 26 dB)                       | ≥ 11.2 dBf  | ≥ 17.2 dBf |           |          |
| Image Rejection (at 106 MHz)                    | ≥ 45 dB     | ≥ 35 dB    |           |          |
| (Europe)  | ≥ 100 dB    | ≥ 90 dB    |           |          |
| IF Rejection (at 90 MHz)                        | ≥ 110 dB    | ≥ 100 dB   |           |          |
| Full Limiting (at -3 dB)                        | ≤ 12.2 dBf  | ≤ 15.2 dBf |           |          |
| 50 dB Quieting Sen. at 98 MHz, 75 k DIV         |             |            |           |          |
| IHF Band Pass Filter                            |             |            |           |          |
| Mono  | ≤ 17.2 dBf  | ≤ 23.2 dBf |           |          |
| Stereo  | ≤ 40.3 dBf  | ≤ 43.3 dBf |           |          |
| Distortion (1 kHz 100% MOD at 98 MHz)           |             |            |           |          |
| IHF Band Pass Filter                            |             |            |           |          |
| Mono  | ≤ 0.2%      | ≤ 0.5%     |           |          |
| Stereo  | ≤ 0.4%      | ≤ 0.7%     |           |          |
| Signal-to-Noise (1 mV Input 100% MOD, at 98MHz) |             |            |           |          |
| IHF Band Pass Filter                            |             |            |           |          |
| Mono  | ≥ 70 dB     | ≥ 65 dB    |           |          |
| Stereo  | ≥ 65 dB     | ≥ 60 dB    |           |          |
| Frequency Response: +1, -3dB                    |             |            |           |          |
| AM-Rejection Ratio                              | 20-15.5 kHz | 30-15 kHz  |           |          |
| (100 μV-20mV Input)                             | ≥ 60 dB     | ≥ 50 dB    |           |          |
| Search Level (at 98 MHz)                        | 29.2 dBf    | ± 5 dBf    |           |          |
| Automatic Stereo Threshold (at 98 MHz)          | 29.2 dBf    | ± 5 dBf    |           |          |

|   | Nominal              | Limit    |
|---|----------------------|----------|
| Muting Threshold (at 98 MHz)                          | 29.2 dBf             | ± 5 dBf  |
| Overload at 98 MHz<br>(100% MOD 100 mV RF Input)      | ≤ 0.2%               | ≤ 0.5%   |
| Suprious Response<br>(at 98 MHz Antenna Input 3 μV)   | ≥ 70 dB              | ≥ 60 dB  |
| Capture Ratio 40/60 dBf                               | ≤ 2 dB               | ≤ 2.5 dB |
| Alternative Channel Selectivity<br>(Input at 98 MHz)  | ≥ 65 dB<br>± 400 kHz | ≥ 55 dB  |
| Stereo Separation (100% MOD, 1 mV Input at 98 MHz)    |                      |          |
| IHF Band Pass Filter                                  |                      |          |
| 100 Hz  | ≥ 40 dB              | ≥ 35 dB  |
| 1 KHz   | ≥ 45 dB              | ≥ 40 dB  |
| 10 KHz  | ≥ 35 dB              | ≥ 30 dB  |
| Output Voltage (at 75 kHz DEV, 1 kHz MOD, 1 mV Input) |                      |          |
| Mono  | 500 mV               | ± 150 mV |
| Stereo  | 450 mV               | ± 150 mV |

● AM SECTION

|  |               |             |
|--|---------------|-------------|
| Tuning Cover Range 10 kHz/9 kHz Step                           |               |             |
| Low  | 520/522 kHz   |             |
| High   | 1710/1611 kHz |             |
| Usable Sensitivity<br>(400 Hz, 30% MOD, S/N 20 dB)             | ≤ 500 μV/m    | ≤ 1000 μV/m |
| Image Rejection (at 1400 kHz)                                  | ≥ 35 dB       | ≥ 30 dB     |
| IF Rejection (at 600 kHz)                                      | ≥ 60 dB       | ≥ 50 dB     |
| AGC Figure of Merit<br>(From 100 mV/m at 1000 kHz)             | ≥ 50 dB       | ≥ 45 dB     |
| Distortion<br>(400 Hz, 30% MOD, 5 mV/m Input)                  | ≤ 0.8%        | ≤ 1.5%      |
| IF Bandwidth<br>(6 dB Down, 350 μV/m)                          | 6 kHz         | 4-11 kHz    |
| Audio Response<br>(5 mV/m Input 1 kHz 0dB, 1000 kHz)           | 80 Hz         | 100 kHz     |
| -6 dB  | -2.3 kHz      | 2 kHz       |
| Selecticity 350 μV/m ± 10 kHz                                  | ≥ 35 dB       | ≥ 25 dB     |
| Signal to NOise Ratio<br>(1000 kHz, With Antenna Input 5 mV/m) | ≥ 45 dB       | ≥ 40 dB     |
| RF Overload 400 Hz   | ≤ 5%          | ≤ 10%       |
| 80% MOD, 100 mV/m Input  |               |             |
| Search Level (at 1000 kHz)                                     | 800 μV        | ± 6dB μV    |
| Output Voltage<br>(400 Hz 30% MOD 5 mV/m Input)                | 165 mV        | ± 40 mV     |
| Whistle  | ≤ 10 %        | ≤ 15 %      |

● GENERAL

|                               |   |
|-------------------------------|---|
| Speaker Load Impedance:       | 8Ω  |
| Power Consumption             |   |
| No Signal:                    | 45 Watts  |
| Full Signal at both Channels: | AC 120 V, 60 Hz, 180 Watts<br>AC 230 V, 50 Hz, 500 Watts                        |
| Dimensions:                   | (W) 17.5/16 x (H) 4 7/8 x (D) 14 15/16 Inches<br>(W) 440 x (H) 125 x (D) 380 mm |
| Weight:                       | 23.59 lbs (10.7 kg)   |

**Note :** Nominal specs represent the design specs. All units should be able to approximate these-some will exceed and some may drop slightly below these specs. Limit specs represent the absolute worst condition that still might be considered acceptable; in no case should a unit fail to meet limit specs. This manual is based on the American standard wiring diagram, and information on regional component variations through use of parts list. Design and specifications subject to change without notice for improvement.

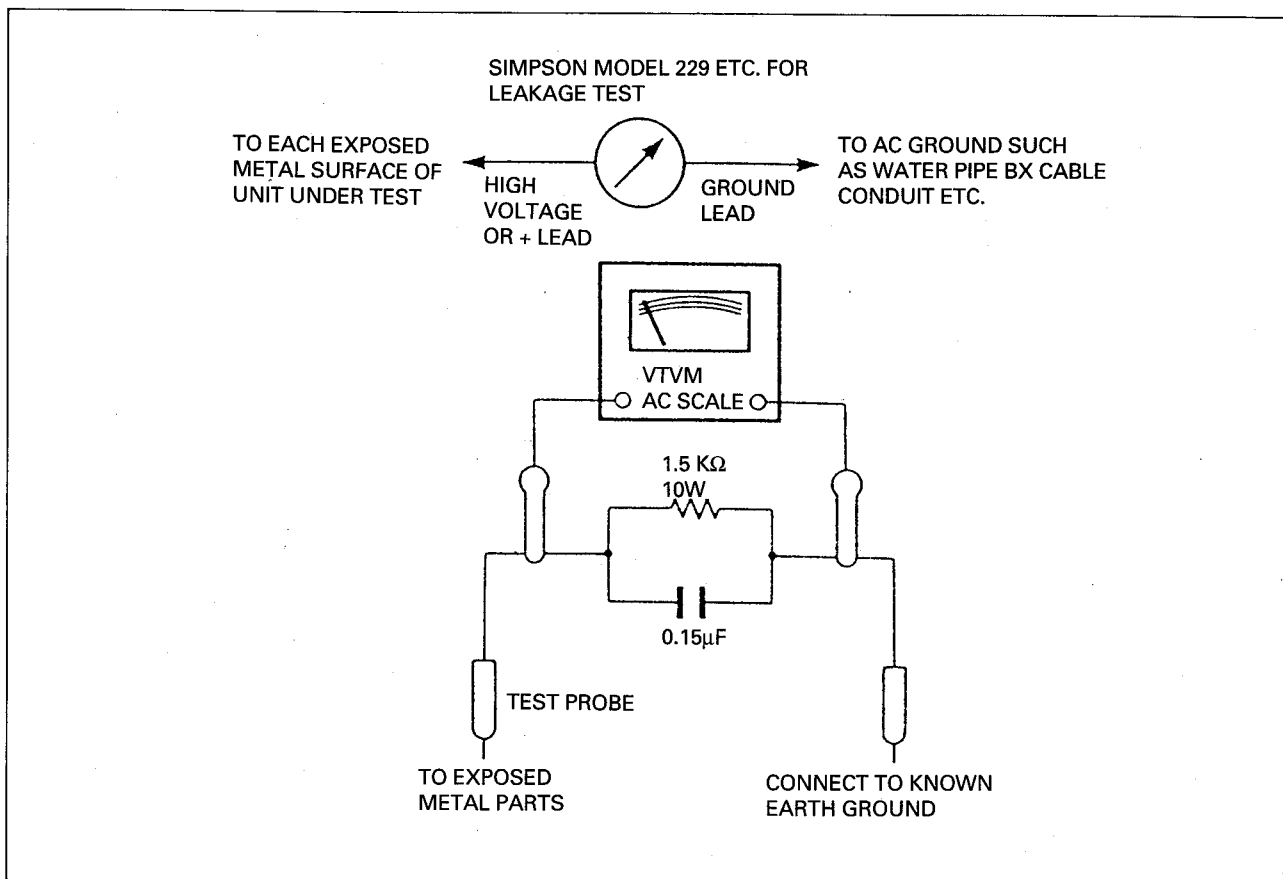
## LEAKAGE TEST

Before returning the unit to the user, perform the following safety checks:

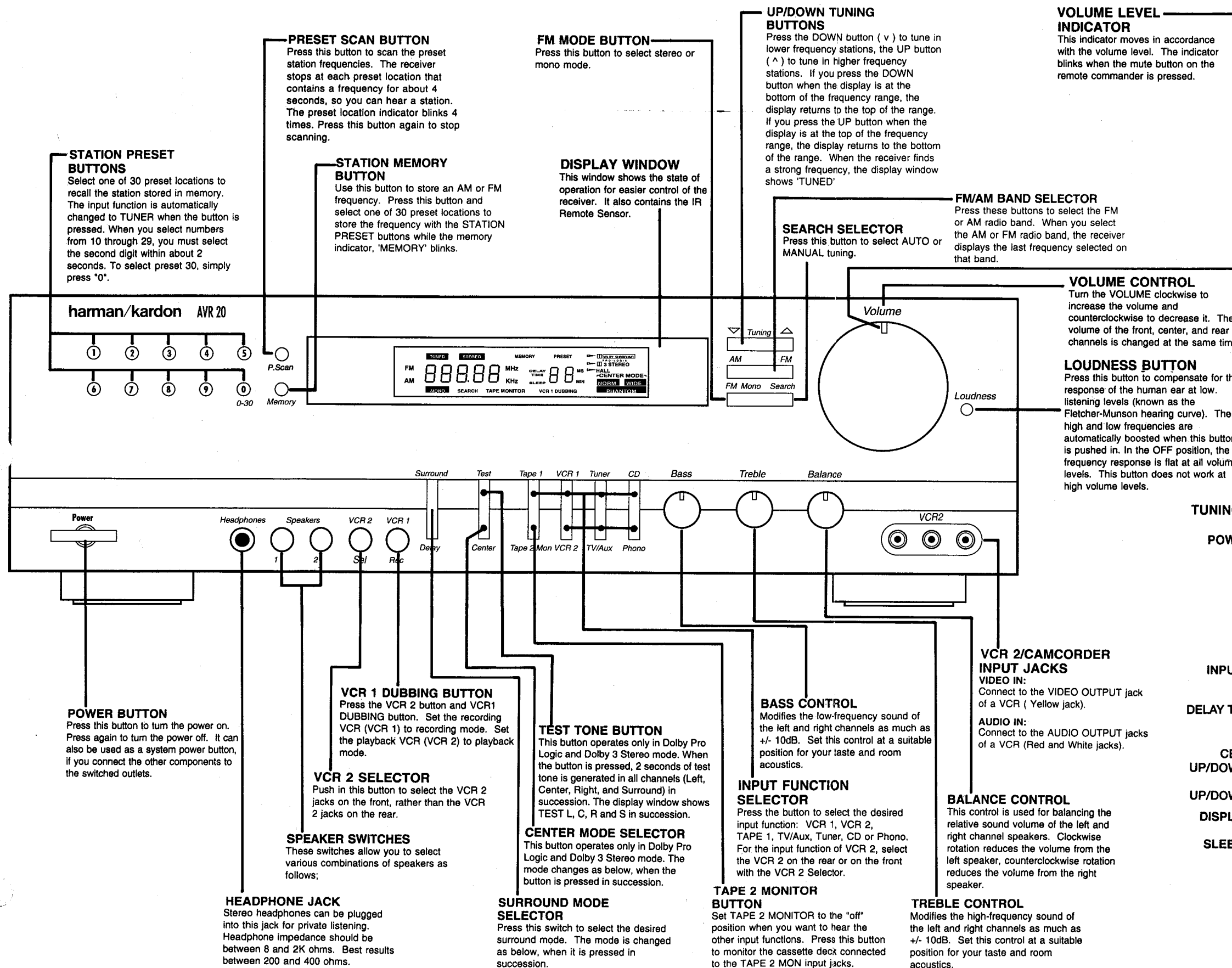
1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the unit.
2. Be sure that any protective devices such as nonmetallic control knobs, insulating fishpapers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc. Which were removed for servicing are properly reinstalled.
3. Be sure that no shock hazard exists; check for leakage current using Simpson Model 229 Leakage Tester, standard equipment item No. 21641, RCA Model WT540A or use alternate method as follows: Plug the power cord directly into a 120-volt AC receptacle (do not use an Isolation Transformer for this test).

Using two clip leads, connects a 1500 Ohm, 10-watt resistor paralleled by a  $0.15\mu\text{F}$  capacitor, in series with all exposed metal cabinet parts and a known earth ground, such as a water pipe or conduit. Use a VTVM or VOM with 1000 Ohms per volt, or higher sensitivity to measure the AC voltage drop across the resistor. (See Diagram.) Move the resistor connection to each exposed metal part having a return path to the chassis (antenna, metal cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor. (This test should be performed with the power switch in both the On and Off positions.)

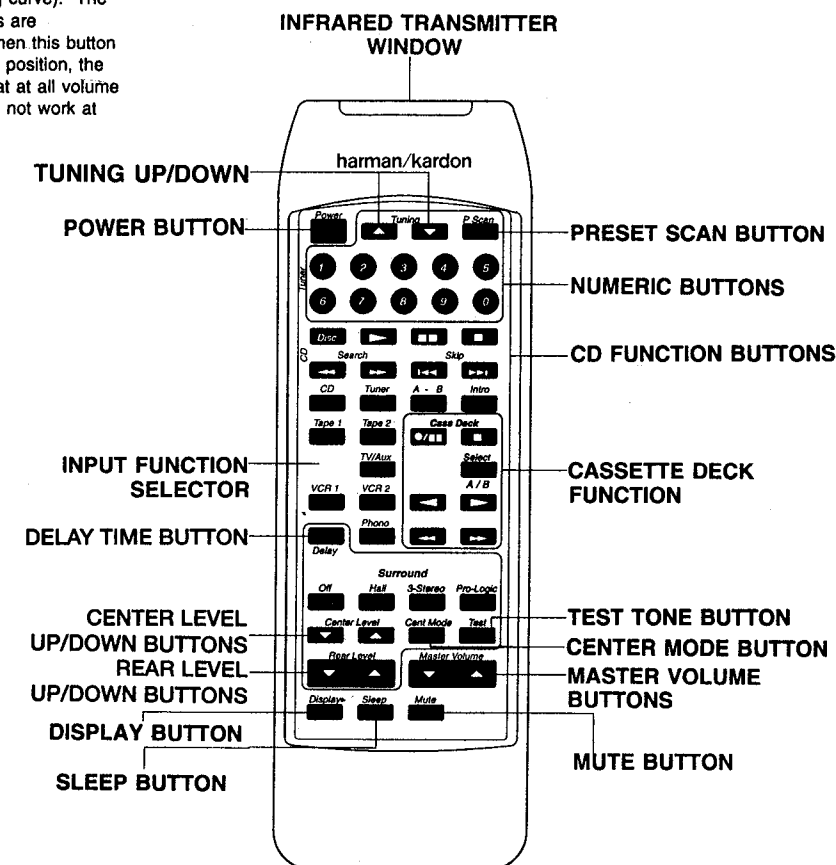
A reading of 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the unit to the owner.



CONTROL AND FUNCTIONS



REMOTE CONTROL



**CONTROL AND FUNCTIONS**

**STATION PRESET BUTTONS**

Select one of 30 preset locations to recall the station stored in memory. The input function is automatically changed to TUNER when the button is pressed. When you select numbers from 10 through 29, you must select the second digit within about 2 seconds. To select preset 30, simply press "0".

**PRESET SCAN BUTTON**

Press this button to scan the preset station frequencies. The receiver stops at each preset location that contains a frequency for about 4 seconds, so you can hear a station. The preset location indicator blinks 4 times. Press this button again to stop scanning.

**STATION MEMORY BUTTON**

Use this button to store an AM or FM frequency. Press this button and select one of 30 preset locations to store the frequency with the STATION PRESET buttons while the memory indicator, 'MEMORY' blinks.

**FM MODE BUTTON**

Press this button to select stereo or mono mode.

**DISPLAY WINDOW**

This window shows the state of operation for easier control of the receiver. It also contains the IR Remote Sensor.

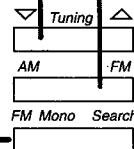
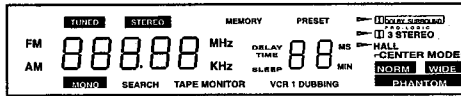
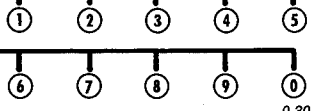
**UP/DOWN TUNING BUTTONS**

Press the DOWN (^) to tune in the lower frequency stations. If you press the UP (^) button when the frequency is at the bottom of the frequency range, the display returns to the top of the range. If you press the DOWN (^) button when the frequency is at the top of the range, the display returns to the bottom of the range. When a strong frequency is found, the display shows 'TUNED'.

**SEARCH BUTTON**

Press this button to search for a station manually.

harman/kardon AVR 20



**POWER BUTTON**

Press this button to turn the power on. Press again to turn the power off. It can also be used as a system power button, if you connect the other components to the switched outlets.

**VCR 1 DUBBING BUTTON**

Press the VCR 2 button and VCR1 DUBBING button. Set the recording VCR (VCR 1) to recording mode. Set the playback VCR (VCR 2) to playback mode.

**VCR 2 SELECTOR**

Push in this button to select the VCR 2 jacks on the front, rather than the VCR 2 jacks on the rear.

**SPEAKER SWITCHES**

These switches allow you to select various combinations of speakers as follows;

**HEADPHONE JACK**

Stereo headphones can be plugged into this jack for private listening. Headphone impedance should be between 8 and 2K ohms. Best results between 200 and 400 ohms.

**TEST TONE BUTTON**

This button operates only in Dolby Pro Logic and Dolby 3 Stereo mode. When the button is pressed, 2 seconds of test tone is generated in all channels (Left, Center, Right, and Surround) in succession. The display window shows TEST L, C, R and S in succession.

**CENTER MODE SELECTOR**

This button operates only in Dolby Pro Logic and Dolby 3 Stereo mode. The mode changes as below, when the button is pressed in succession.

**SURROUND MODE SELECTOR**

Press this switch to select the desired surround mode. The mode is changed as below, when it is pressed in succession.

**BASS CONTROL**

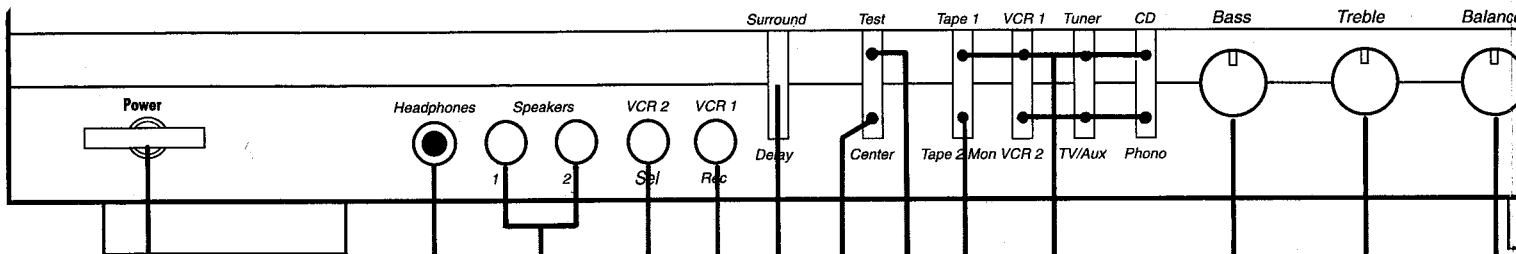
Modifies the low-frequency response of the left and right channels by +/- 10dB. Set the position for your room acoustics.

**INPUT FUNCTION SELECTOR**

Press the button to select the input function: VCR 1, TAPE 1, TV/Aux, Tuner. For the input function of the VCR 2 on the rear, press with the VCR 2 Selector.

**TAPE 2 MONITOR BUTTON**

Set TAPE 2 MONITOR to the position when you want to monitor the cassette deck to the TAPE 2 MON input jack.



**UP/DOWN TUNING BUTTONS**

Press the DOWN button (v) to tune in lower frequency stations, the UP button (^) to tune in higher frequency stations. If you press the DOWN button when the display is at the bottom of the frequency range, the display returns to the top of the range. If you press the UP button when the display is at the top of the frequency range, the display returns to the bottom of the range. When the receiver finds a strong frequency, the display window shows 'TUNED'.

**VOLUME LEVEL INDICATOR**

This indicator moves in accordance with the volume level. The indicator blinks when the mute button on the remote commander is pressed.

**FM/AM BAND SELECTOR**

Press these buttons to select the FM or AM radio band. When you select the AM or FM radio band, the receiver displays the last frequency selected on that band.

**SEARCH SELECTOR**

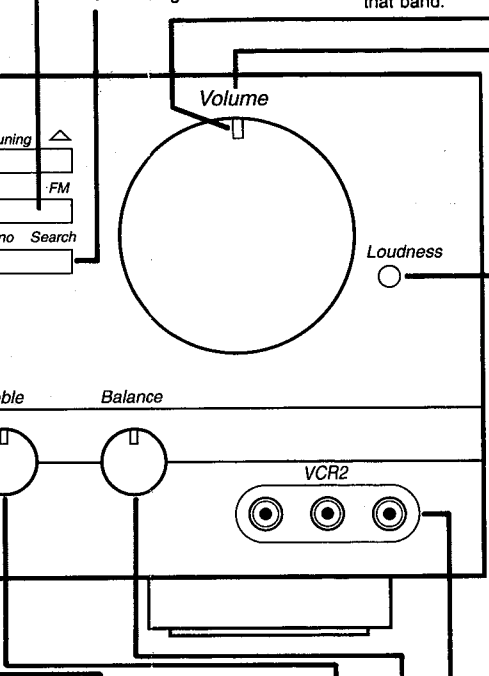
Press this button to select AUTO or MANUAL tuning.

**VOLUME CONTROL**

Turn the VOLUME clockwise to increase the volume and counterclockwise to decrease it. The volume of the front, center, and rear channels is changed at the same time.

**LOUDNESS BUTTON**

Press this button to compensate for the response of the human ear at low listening levels (known as the Fletcher-Munson hearing curve). The high and low frequencies are automatically boosted when this button is pushed in. In the OFF position, the frequency response is flat at all volume levels. This button does not work at high volume levels.



**BASS CONTROL**

Modifies the low-frequency sound of the left and right channels as much as +/- 10dB. Set this control at a suitable position for your taste and room acoustics.

**INPUT FUNCTION SELECTOR**

Press the button to select the desired input function: VCR 1, VCR 2, TPE 1, TV/Aux, Tuner, CD or Phono. For the input function of VCR 2, select VCR 2 on the rear or on the front in the VCR 2 Selector.

**2 MONITOR ON**

Set 2 MONITOR to the "off" position when you want to hear the output functions. Press this button on the cassette deck connected to TAPE 2 MON input jacks.

**VCR 2/CAMCORDER INPUT JACKS**

**VIDEO IN:** Connect to the VIDEO OUTPUT jack of a VCR (Yellow jack).

**AUDIO IN:** Connect to the AUDIO OUTPUT jacks of a VCR (Red and White jacks).

**BALANCE CONTROL**

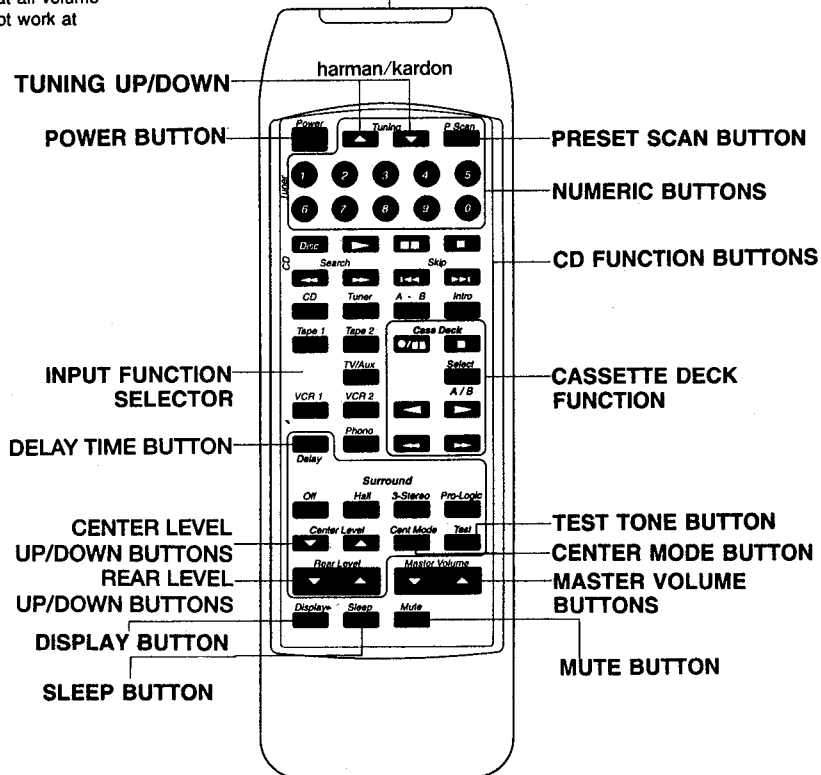
This control is used for balancing the relative sound volume of the left and right channel speakers. Clockwise rotation reduces the volume from the left speaker, counterclockwise rotation reduces the volume from the right speaker.

**TREBLE CONTROL**

Modifies the high-frequency sound of the left and right channels as much as +/- 10dB. Set this control at a suitable position for your taste and room acoustics.

**REMOTE CONTROL**

**INFRARED TRANSMITTER WINDOW**



## INSTRUMENT DISASSEMBLY

### MODEL NO. : AVR-20

NOTE: The item numbers given in the following procedures refer to the exploded view and parts list.

#### 1 Cover top removal

1. Remove 6 screws (S6) from the sides of chassis to release the cover top.
2. Remove 2 screws (S1) from the chassis back (item #34).
3. Carefully lift the cover top to remove.

#### 2 Cover bottom removal

1. Remove 10 screws (S7) from the chassis to release the cover bottom (item #29).
2. Carefully lift the cover bottom to remove.

#### 3 Panel Front Assembly removal

1. Remove the cover top.
2. Remove 4 screws (S4) from both side of panel front.
3. Remove 3 screws (S1) from the chassis front (item #50)
4. Disconnect CP102 from the volume PC Board.
5. Disconnect CNT602 from the surround PC Board.
6. Disconnect CP701 and CP702 from the input PC Board.
7. Disconnect CP703 from the video PC Board.
8. Remove 1 screw (S1) from the chassis right (item #31) for remove the lug wire.
9. Disconnect CP901, CP902 and CP402 from the main PC Board.
10. Remove the flat cable from the wafer (CP401) on input PC Board.

#### 4 Volume PC Board removal

1. Remove the panel front assembly.
2. Disconnect CP603 from Volume PC Board.
3. Pull the knob (main volume).
4. Remove the hex nut from the volume-motor (item #23) to release the volume PC Board.
5. Remove 2 screws (S1) from the panel front (item #1).
6. Pull the volume PC Board from the panel front assembly to remove.

#### 5 Speaker PC Board Removal

1. Remove the panel front assembly.
2. Remove 4 screws (S1) from the panel front (item #1) to release the headphone PC Board.

#### 6 Tone PC Board Removal

1. Remove the panel front assembly.
2. Pull out the knobs (bass, treble, balance) from

panel front assembly.

3. Remove the hex nut from the variable resistors (item #17 and 18).
4. Remove 4 screws (S4)
5. Remove the shield fence (item # 19).

#### 7 Front PC Board Removal

1. Remove the panel front assembly.
2. Remove 11 screws (S4) holding the front PC Board to release the panel front (item #1).

#### 8 Tuner PC Board Removal

1. Remove the cover top.
2. Remove 1 screw (S4) from the tuner PC Board fixed by bracket PCB (item #30)
3. Remove 2 screws (S8) holding the terminal antenna AM and FM (item # 33) to the chassis back (item # 34).

#### 9 Surround PC Board Removal

1. Remove 2 screws from the chassis back and chassis front (item # 50).
2. Disconnect CNT 602 from the surround PC Board.
3. Remove the surround PC Board.

#### 10 Video PC Board Removal

1. Remove the cover top.
2. Disconnect CP101, CP104 and CP703 from the video PC Board.
3. Disconnect CP301 from the main PC Board.
4. Remove 3 screws (S2).
5. Remove 2 screws (S8).

#### 11 Outlet PC Board Removal (Europe Only)

1. Remove the cover top.
2. Unsolder 2 leads of the AC-cord (item #53) from pin-L and pin-N on the outlet P.C. Board.
3. Remove 2 screws (S2) holding the PC Board.

#### 12 Chassis back Removal

1. Remove the cover top.
2. Do steps 8, 9 and 10.
3. Remove 6 screws (S2) holding the terminal speaker (item # 47) from the chassis back.
4. Remove 2 screws (S1) holding the bracket heatsink (item #42) from the chassis back.
5. Remove 4 screws (S1) from the chassis left (item # 49) and chassis right (item # 31).
6. Remove 1 (S1) screw from the chassis bottom.
7. Remove 1 (S1) screw from the chassis back..



### **13 Input PC Board Removal**

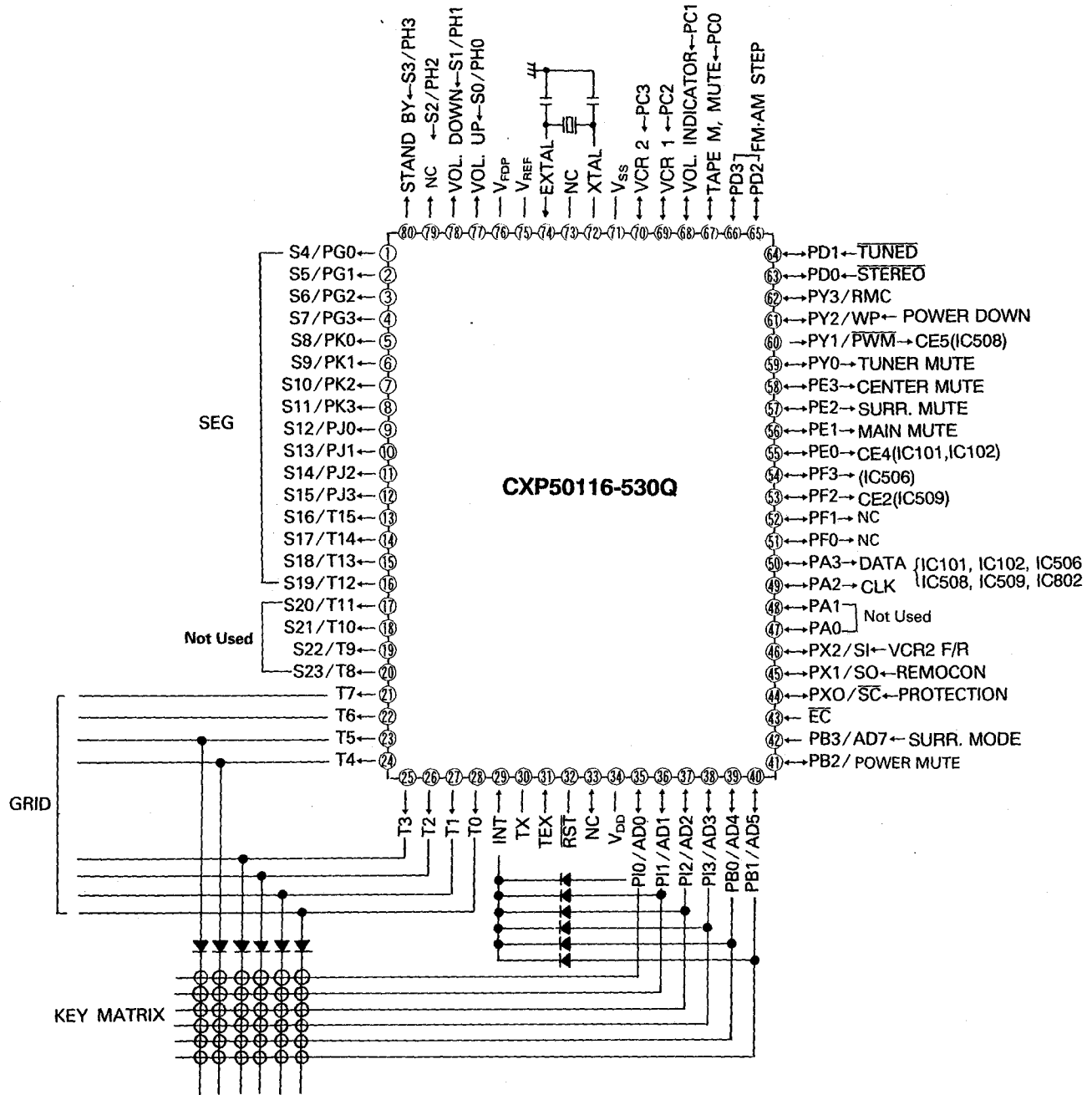
1. Remove the cover top.
2. Remove the panel front assembly.
3. Remove the chass back.
4. Unsolder all leads of Q116, Q112, Q115, Q123, Q126 and Q127 from copper track on the input PC Board.
5. Disconnect CP103, CP109 and CP206 (black) from main PC Board.
6. Disconnect CP110, CP204, CP207 from input PC Board.
7. Remove 2 screws (S1) from the chassis front.
8. Remove 2 screws (S4) from the chassis right.
9. Remove 1 screw (S1) for unjoin input PC Board and bracket heatsink.

### **14 Main PC Board Removal**

1. Remove the cover top.
2. Remove the panel front assembly
3. Remove the chass back.
4. Unsolder all leads of Q216L/R, Q217L/R and Q213L/R from copper track on the input P.C. Board.
5. Disconnect CP201, CP202, CP203, CP204, CP206 (yellow), CP207H and CP207T from main P.C. Board.
6. Remove 1 screw (S1) from the chassis front.
7. Remove 1 screw (S4) from the chassis left.
8. Remove 1 screw (S1) for unjoin main P C Board and bracket heatsink.

# CIRCUIT DESCRIPTION

CPU (4 bit CMOS MICROPROCESSOR : CXP50116-530Q)

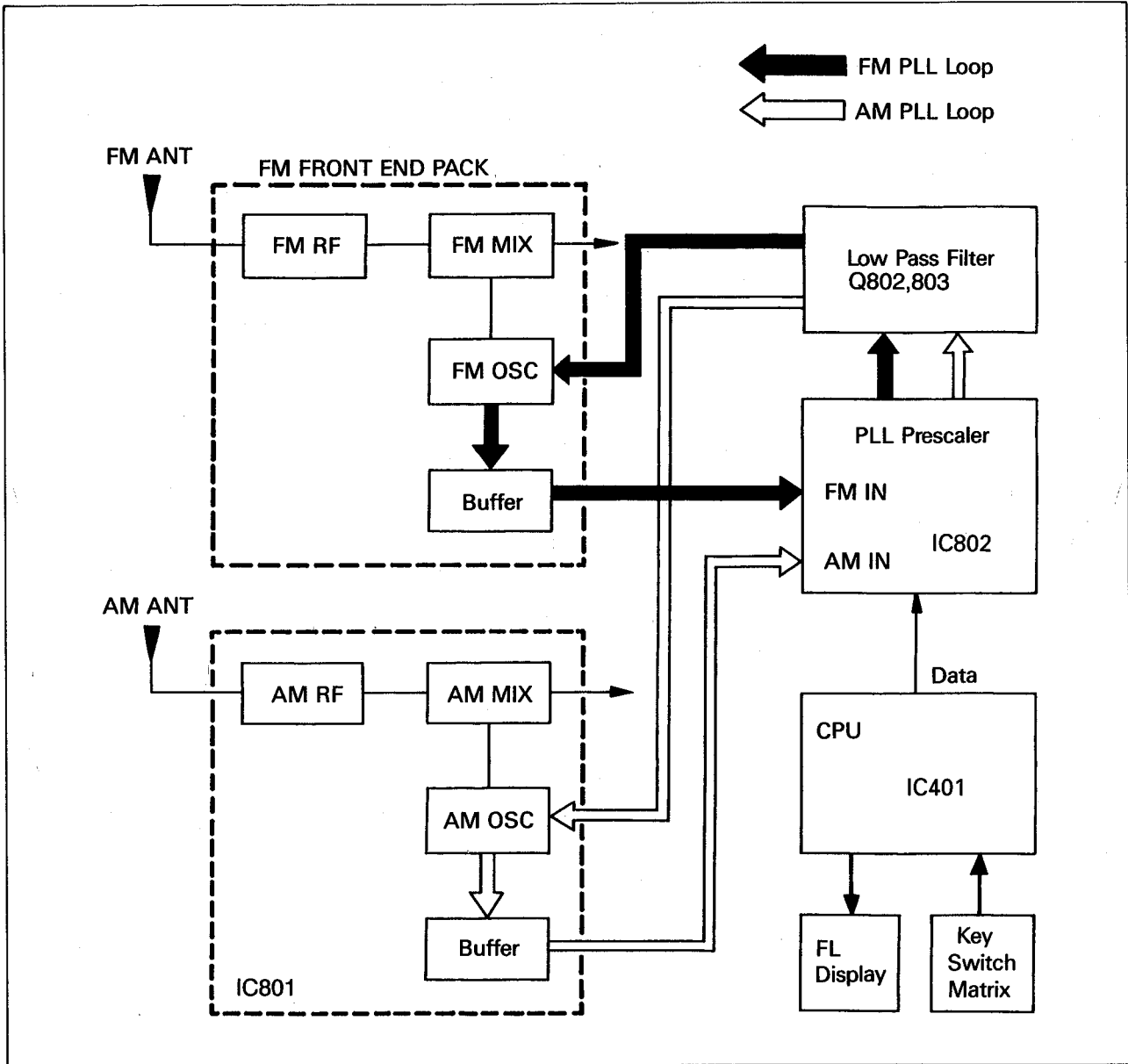


## INPUT AND OUTPUT TERMINAL FUNCTIONS

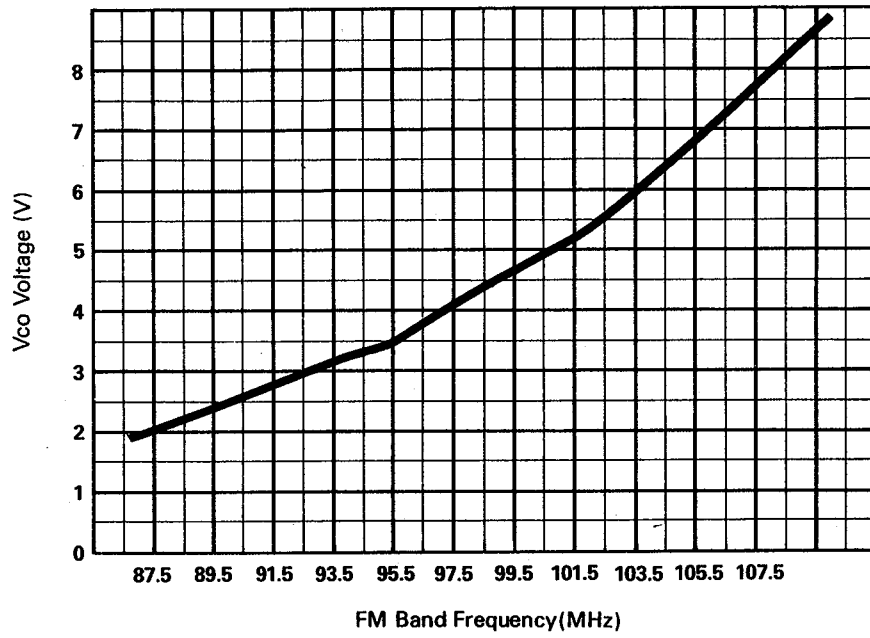
| Code             | Function   |
|------------------|--|
| S4/PG0-S19/T12   | These are segment signal output pins of FL controller/driver.  |
| S20/T1-S23/T8    | Not used   |
| T7-T 0           | These are timing signal output pins of FL controller/driver and key scan pins.                                 |
| INT              | This is external interrupt dedicated pin.  |
| TX, TEX          | Not used   |
| RST              | This is the system reset of the device.  |
| NC               | No connection  |
| V <sub>DD</sub>  | This is the power supply pin.  |
| PI0/AD0-PB1/AD5  | These are the key input pins.  |
| PB2/AD6          | This is the power mute output pin.   |
| PB3/AD7          | This is the channel mode control pin of surround mode.   |
| EC               | Not used.  |
| PX0              | This is the protection input pin.  |
| PX1              | This is the remote control input pin.  |
| PX2              | This is the VCR2 front and rar input control pin.  |
| PA0              | Not used.  |
| PA1              | Not used.  |
| PA2-PA3          | These are used to control the PLL IC, analog switching IC. Shift register IC, volume IC, delay IC. (CLK, DATA) |
| PF0              | This is the FM mode control pin.   |
| PF1              | This is used to control the PLL IC.  |
| PF2              | This is used to control the shift register IC.   |
| PF3              | This is used to control the volume IC.   |
| PE0              | This is used to control at analog switching IC.  |
| PE1              | This is the main mute output pin.  |
| PE2              | This is the surround mute output pin.  |
| PE3              | This is the center mute output pin.  |
| PY0              | This is the tuner mute output in.  |
| PY1              | This is used to control the delay IC.  |
| PY2              | This is the power down pin.  |
| PY3              | Not used.  |
| PD0              | This is the tuner stereo input pin.  |
| PD1              | This is the tuner tuned input pin.   |
| PD2-PD3          | These are used to control FM and AM step.  |
| PC0              | This is used to eliminate the noise of the PLL IC in the Tape 2 Monitor mode.                                  |
| PC1              | This is used to control volume indicator.  |
| PC2              | This is used to control VCR1   |
| PC3              | This is used to control VCR2   |
| V <sub>SS</sub>  | This pin provides the ground potential.  |
| XTAL, EXTAL      | These pin serve for connecting a clock oscillator crystal.   |
| NC               | No connection.   |
| V <sub>REF</sub> | Not used.  |
| V <sub>FDP</sub> | This is the power supply pin of the FL controller.   |
| PH0-PH1          | These are used to control the motor volume.  |
| PH2              | Not used.  |
| PH3              | This is used to control stand-by mode.   |

# DIGITAL TUNING SYSTEM DESCRIPTION

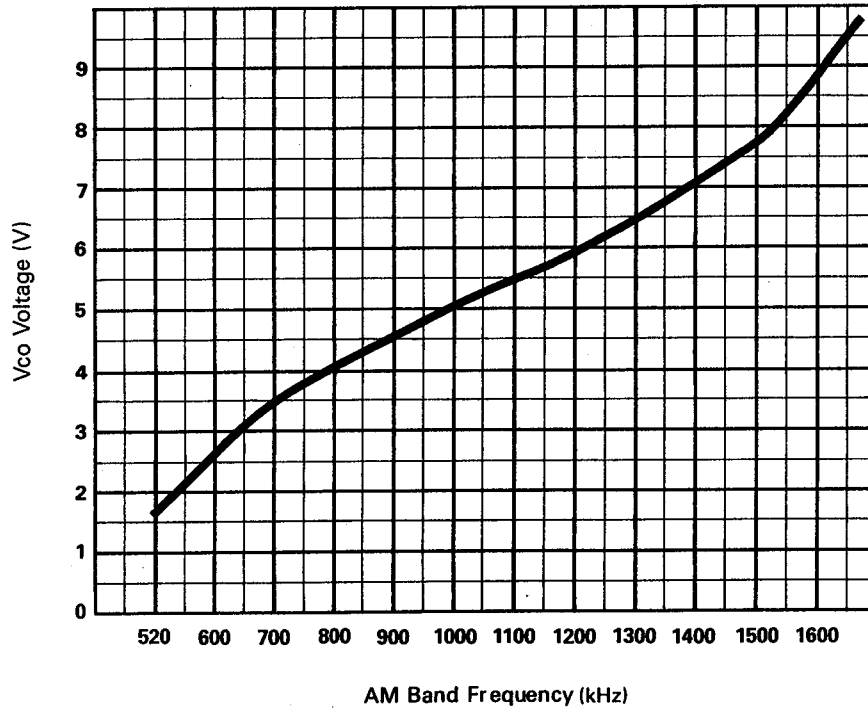
## DIGITAL TUNING SYSTEM



Vco vs. FM Band Frequency Curve



Vco vs. AM Band Frequency Curve



## CONTROL KEY AND MODE SWITCH MATRIX

### Searching for station

#### Automatic Tuning

Press the AUTO SEARCH key for automatic tuning.

Pressing the TUNE  $\Delta$  or TUNE  $\nabla$  key causes automatic up or down searching for a station until a station is received.

#### Manual Tuning

By pressing the TUNE  $\Delta$  or TUNE  $\nabla$  key, the frequency is changed by a step. If the key is kept pressing scanning is continued until the key is released.

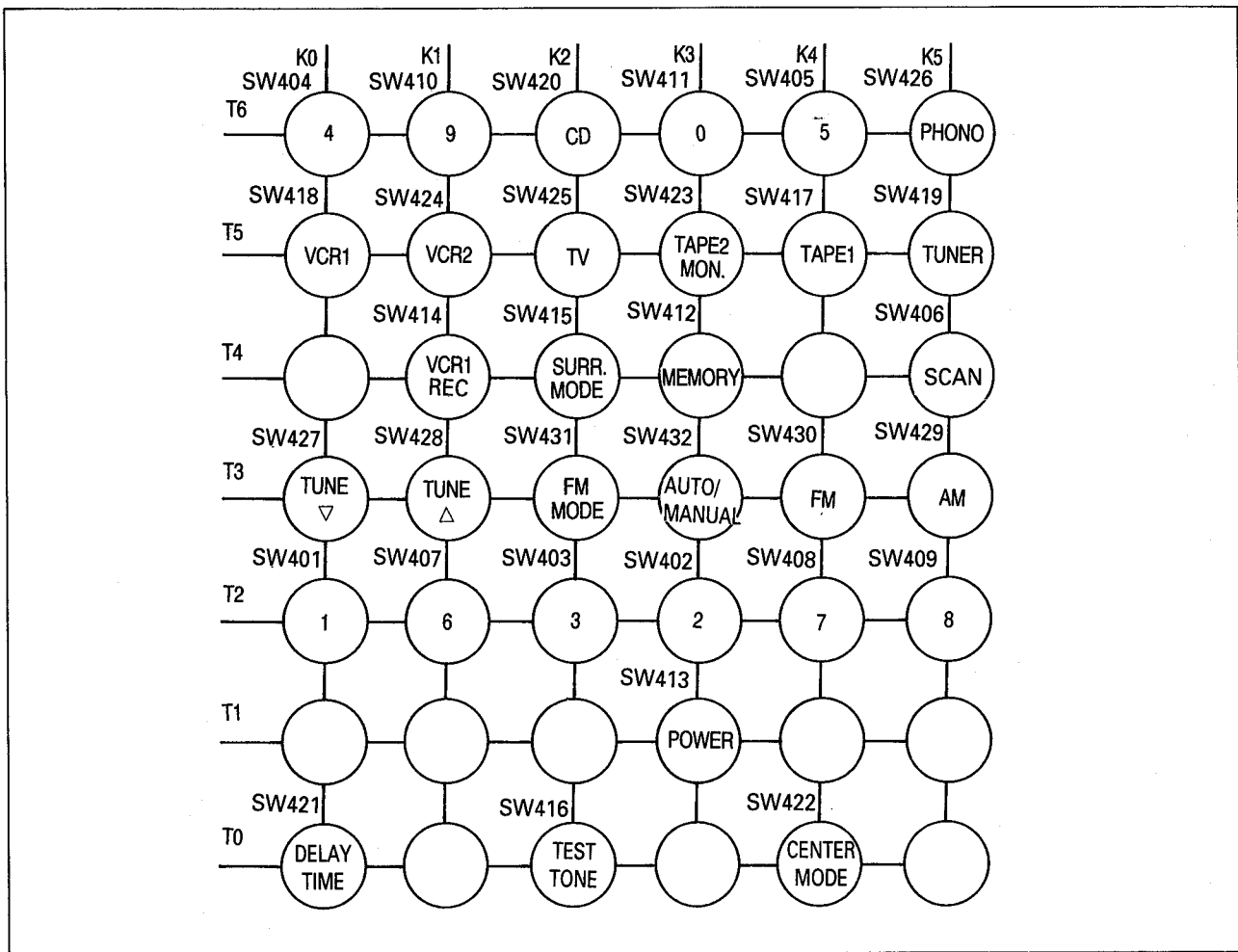
### Memory

The tuning information is stored into an internal RAM by pressing the MEMORY key and the pressing one of 30 preset locations while the memory indicator 'MEMORY' blinks.

If no key is pressed while the indicator blinks, the memory function is canceled.

### M1 to M10

Thirty AM and FM stations can be recalled from internal RAM. When it is switched from one band to the other band, the tuner tunes to the station last tuned on that band. Each time a station is changed, the controller provides a signal to mute the tuner.

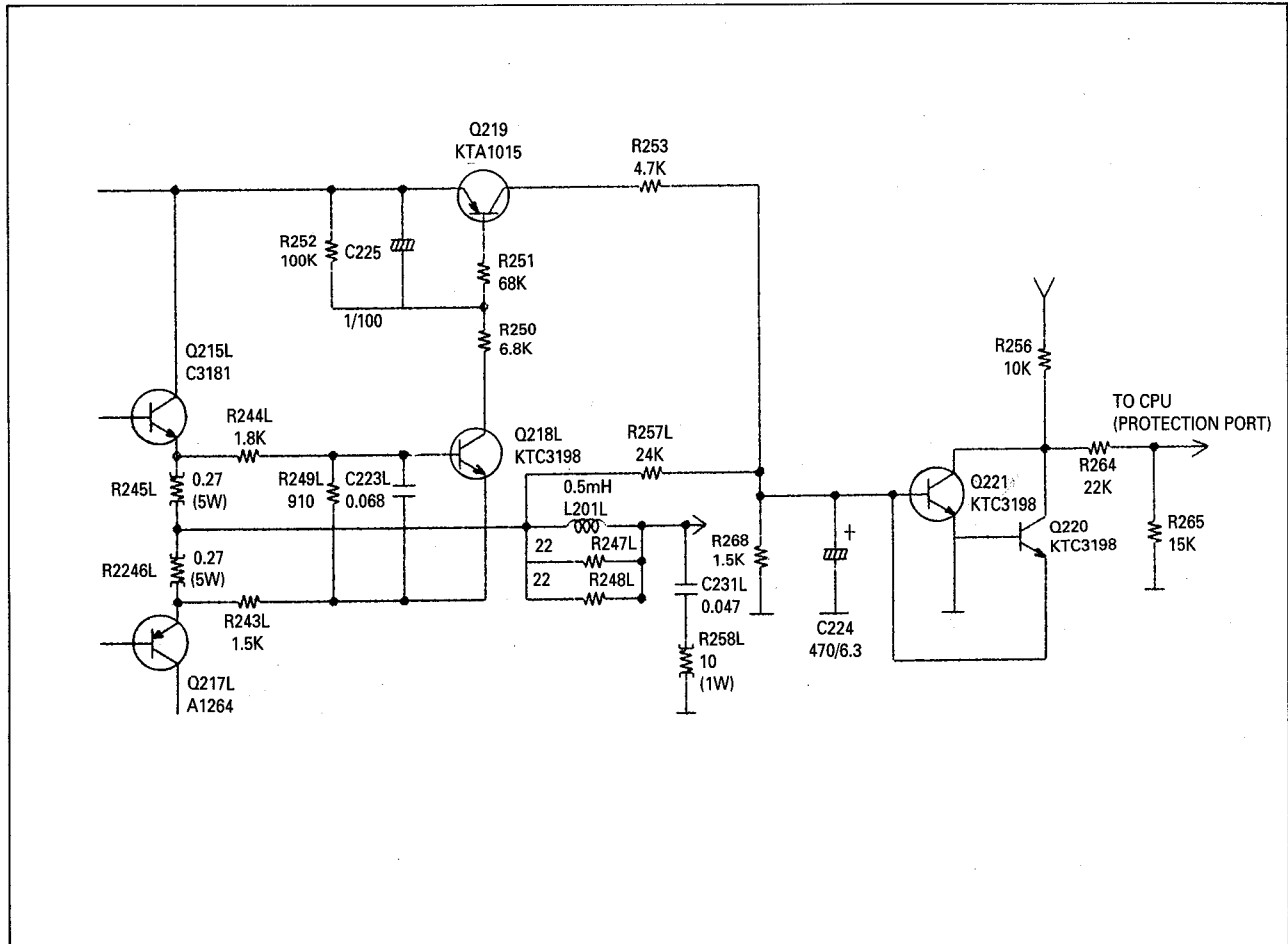


## PROTECTION CIRCUITS

### SPEAKER PROTECTION CIRCUIT

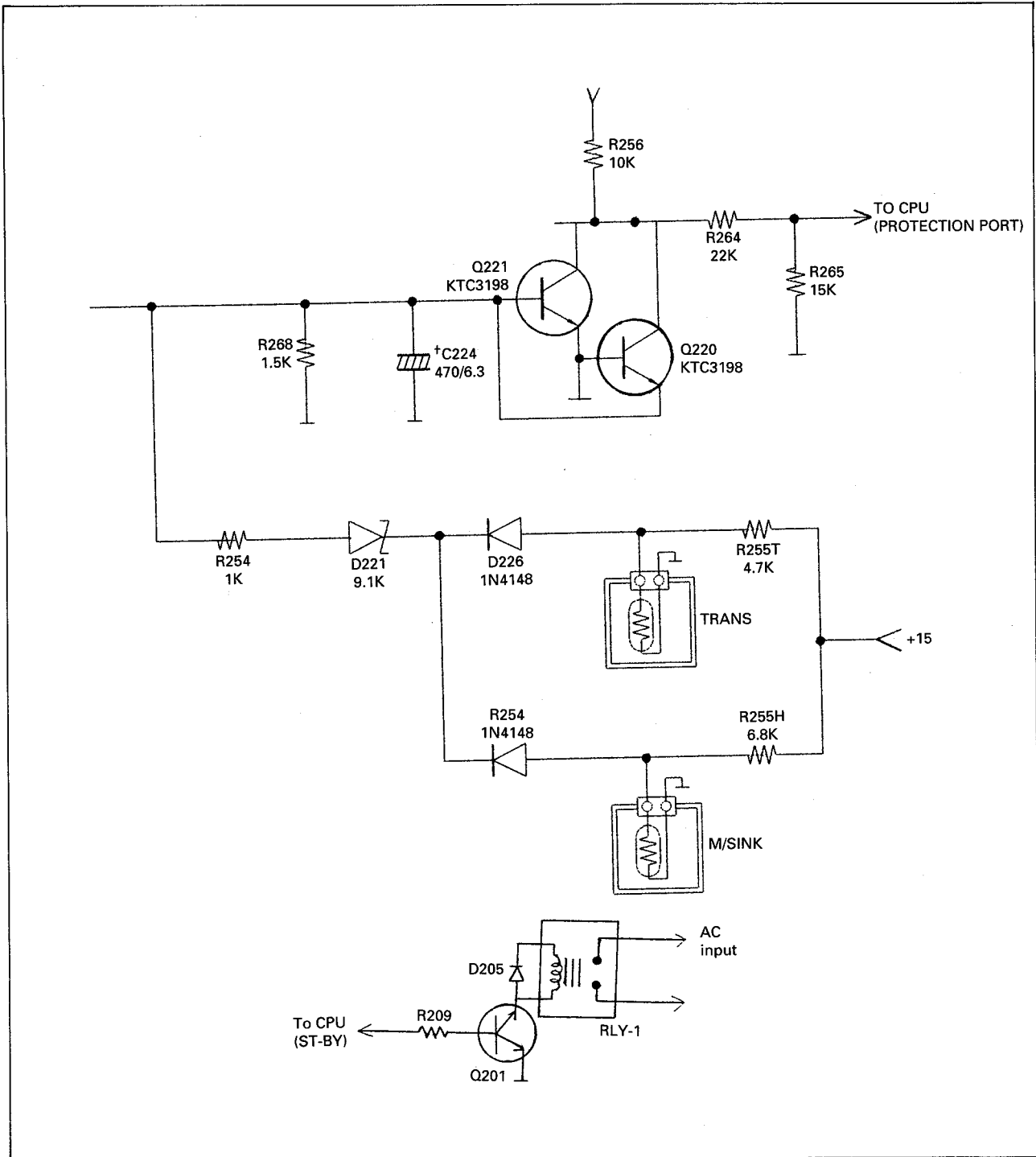
The CPU protects both this unit and the speakers when an abnormally high current flows in Q216 L/R and Q217 L/R due to excessive input drive, too low of a load impedance, or short of the speaker terminals. If current increase is excessive the voltage across R245 L/R or R246 L/R turns on Q218 L/R, then Q219 turns on Q221.

It makes the protection port of the CPU to low state, and the CPU turns off Q201 and RLY-1. Then the power is turned off.



**THERMAL PROTECTION CIRCUIT**

This receiver has a overload thermal protection circuits to guard against abnormal operation. When the temperature of TRANS POSISTOR installed with the main transformer or H/SINK POSISTOR rises abnormally, the resistance of the posistor becomes larger and Q221 is turned on. It makes the protection port of the CPU to Low state, and the CPU turns off Q201 and RLY-1. Then the power is turned off.





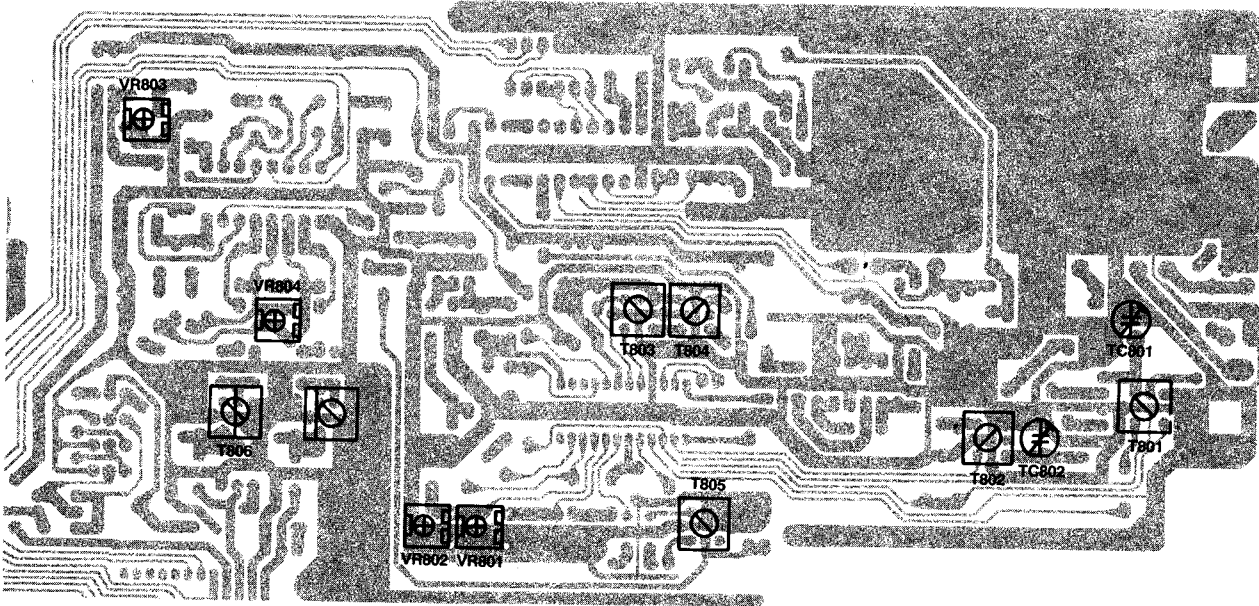
## ALIGNMENT PROCEDURES

### Equipment Required

- AM signal generator
- Oscilloscope
- AC voltmeter
- FM signal generator
- Stereo modulator
- Audio generator
- Distortion meter
- DC voltmeter
- Frequency counter

**Note:** Remove line cord antenna from FM external antenna terminal when aligning.

### Alignment and Test Points (Tuner P.C.Board)



### AM IF and RF Alignment

#### Preparation

1. Output of Signal Generator should not be higher than necessary to obtain an optimum output reading.
2. Signal Generator Modulation: 30%.
3. Switch: Press to AM.

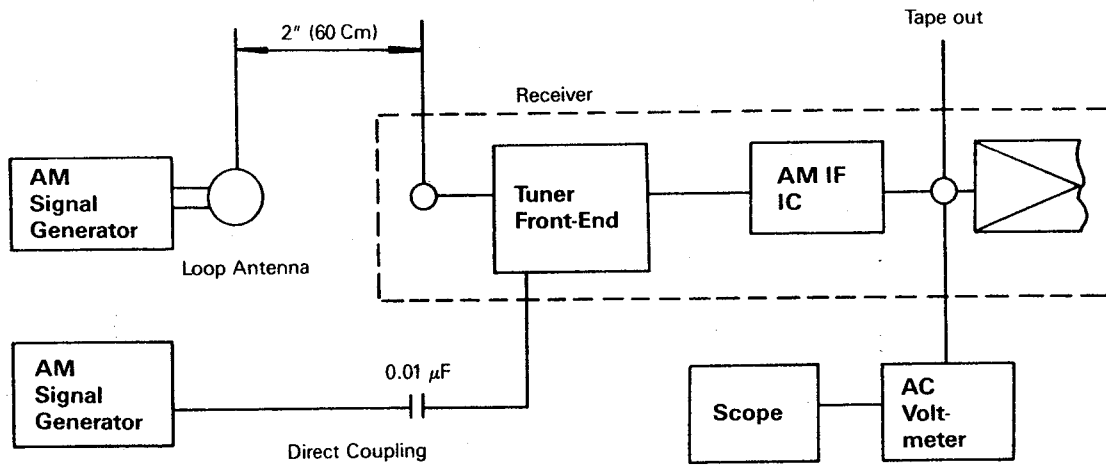
| Step | Signal Generator Frequency | Receiver Frequency on the Display               | Equipment Connection           | Adjustment Point       | Adjust for  |
|------|----------------------------|---|--------------------------------|------------------------|---|
| 1    | 450 kHz<br>(400 Hz, Mod.)  | Place at a non-interference spot around 600 kHz | AC voltmeter to TAPE OUT jack. | T805<br>(IFT)          | Maximum reading                                     |
| 2    | 600 kHz<br>(400 Hz, Mod.)  | 600 kHz   | Same as Step 1.                | T801<br>(ANT Coil)     | Same as Step 1                                      |
| 3    | 1400 kHz<br>(400 Hz, Mod.) | 1400 kHz  | Same as Step 1.                | TC801<br>(ANT Trimmer) | Same as Step 1                                      |
| 4    | 1000 kHz<br>(400 Hz, Mod.) | 1000 kHz  | FL display TUNED indicator     | VR802                  | Indication on receiver with output of 500 $\mu$ V/m |

## FM IF Alignment

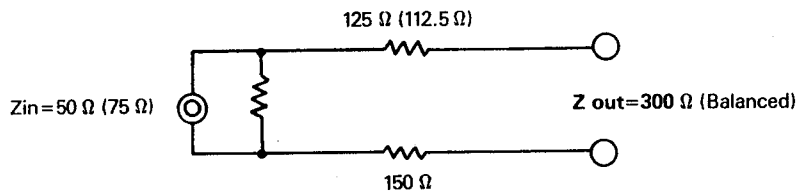
### Preparation

1. Signal Generator output should be no higher than necessary to obtain an optimum output reading.
2. Switch: Press to FM.
3. Signal generator deviation: 75 kHz.

| Step | Signal Generator Frequency | Receiver Frequency Display | Equipment Connection              | Adjustment Point | Adjust for  |
|------|----------------------------|----------------------------|-----------------------------------|------------------|---|
| 1    | 98.1 MHz<br>(1 kHz, Mod.)  | 98.1 MHz                   | Distortion meter to TAPE OUT jack | T804             | Minimum distortion  |
| 2    | 98.1 MHz<br>(1 kHz, Mod.)  | 98.1 MHz                   | Same as Step 1                    | VR801            | Zero reading on AC voltmeter with SSG output level of 6 $\mu$ V |



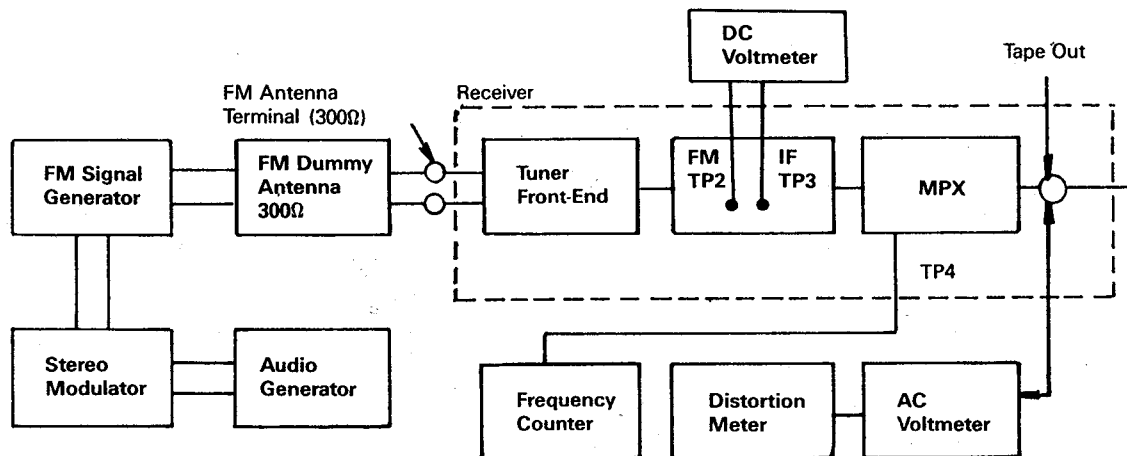
AM Alignment Connection



FM Dummy Antenna to 300  $\Omega$  Antenna terminal of receiver

FM Dummy Antenna

## MPX Alignment



FM RF/IF and MPX Alignment Connection

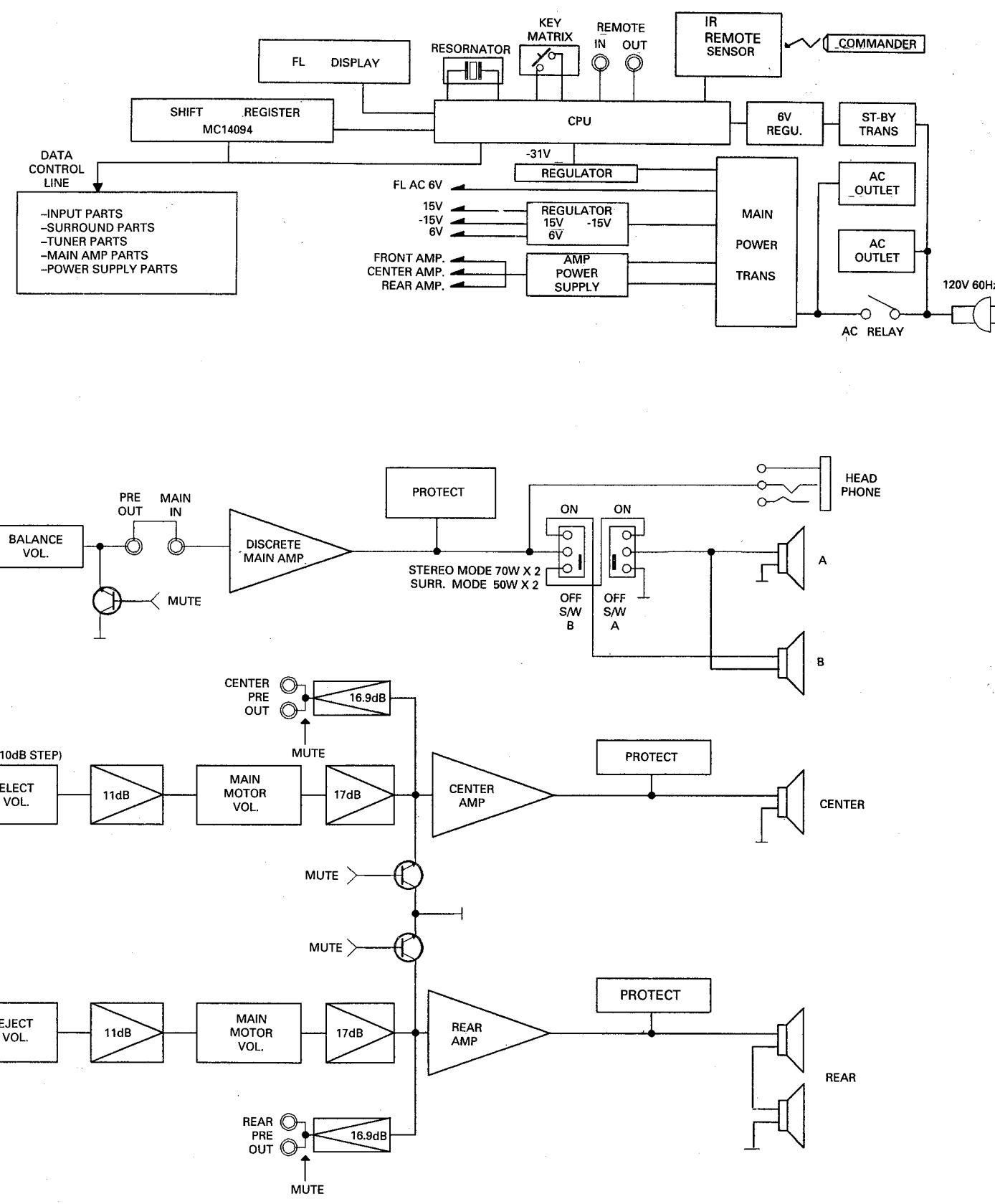
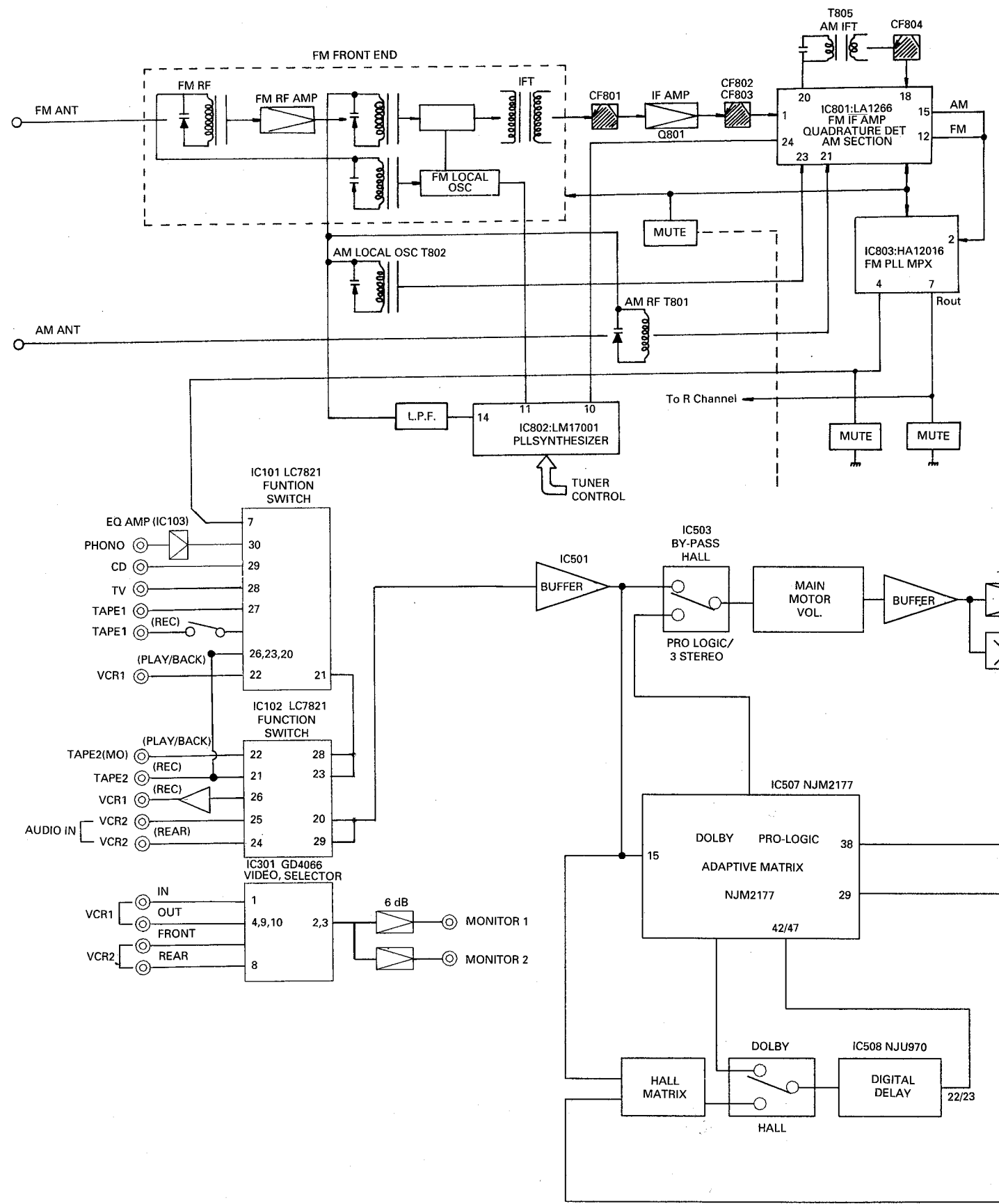
### Preparation

1. Switch: Press to FM.
2. Tune for 98 MHz on band.
3. Signal Generator output level: 1000  $\mu$ V.
4. Deviation: 75 kHz, at 100% modulation of composite signal.
5. Connect Signal Generator to FM antenna terminal through FM dummy antenna (300  $\Omega$ ).

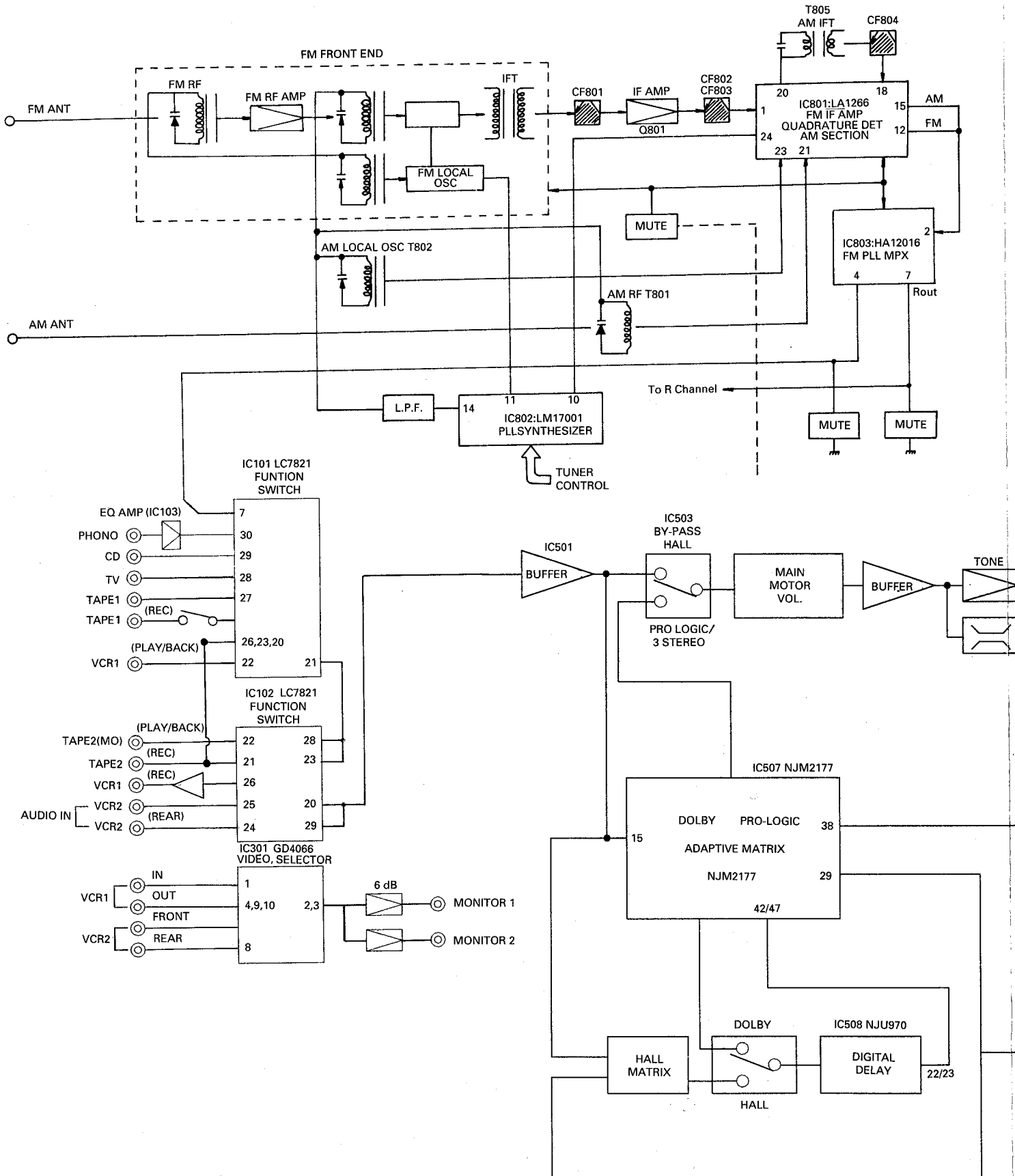
| Step | 19 kHz Modulation Level | Signal Generator Frequency Setting | Output Indicator Connection                              | Adjust | Adjust for  |
|------|-------------------------|------------------------------------|--|--------|---|
| 1    | Pilot off               | Carrier only                       | Frequency counter connect to TP4 (HOT) of PCB and ground | VR803  | 76kHz   |
| 2    | 8% mod.                 | Composite to channel 1kHz R        | AC voltmeter to TAPE OUT jack of R channel               | —      | Adjust for about 450mV of audio output              |
| 3    | 8% mod.                 | Composite to channel 1kHz L        | AC voltmeter to TAPE OUT jack of R channel               | VR804  | AC voltmeter reading should be at least 33dB below. |
| 4    | 8% mod.                 | Composite to channel 1kHz R        | AC voltmeter to TAPE OUT jack of L channel               | VR804  | Same as Step 3.                                     |

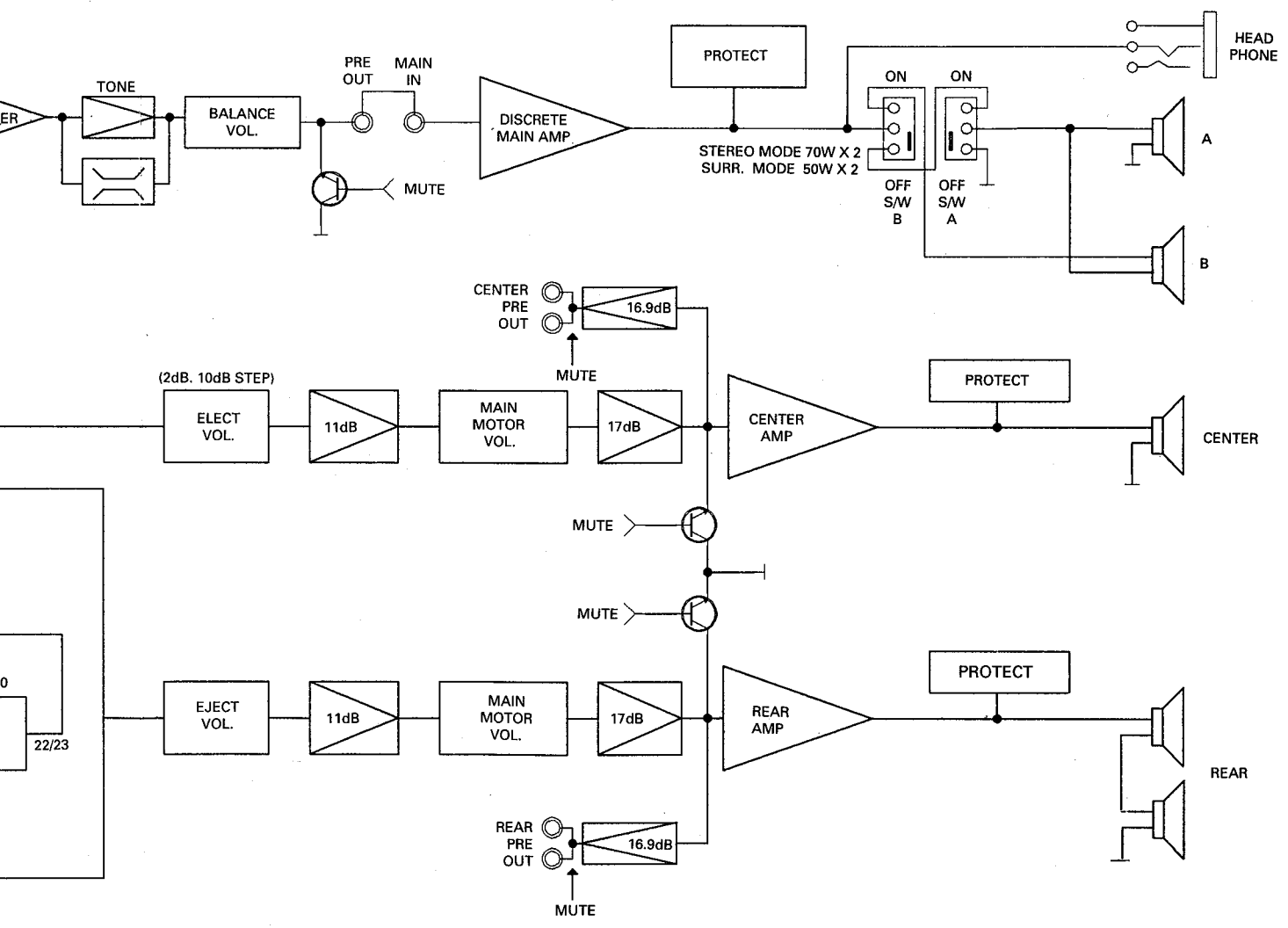
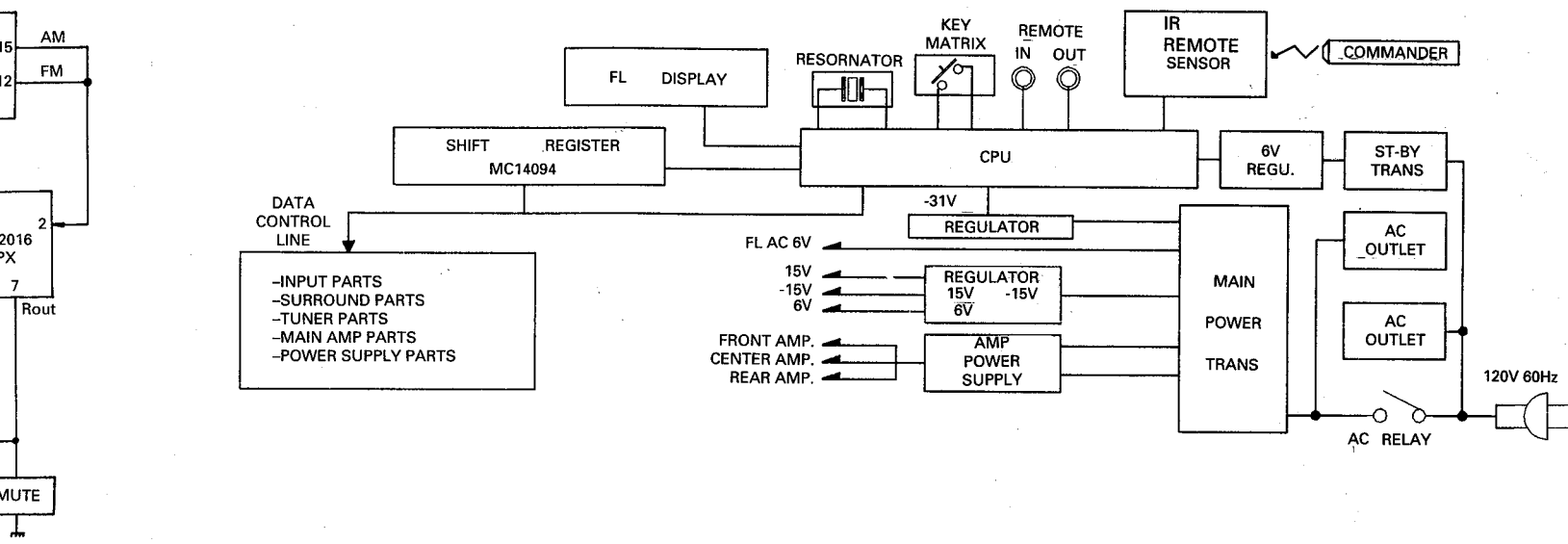
If you could not obtain -35 dB readings in Steps 3 and 4 (compared with Step 2), readjust VR804 until you obtain -33dB readings for both Steps 3 and 4. Nominal is -43dB.

BLOCK DIAGRAM

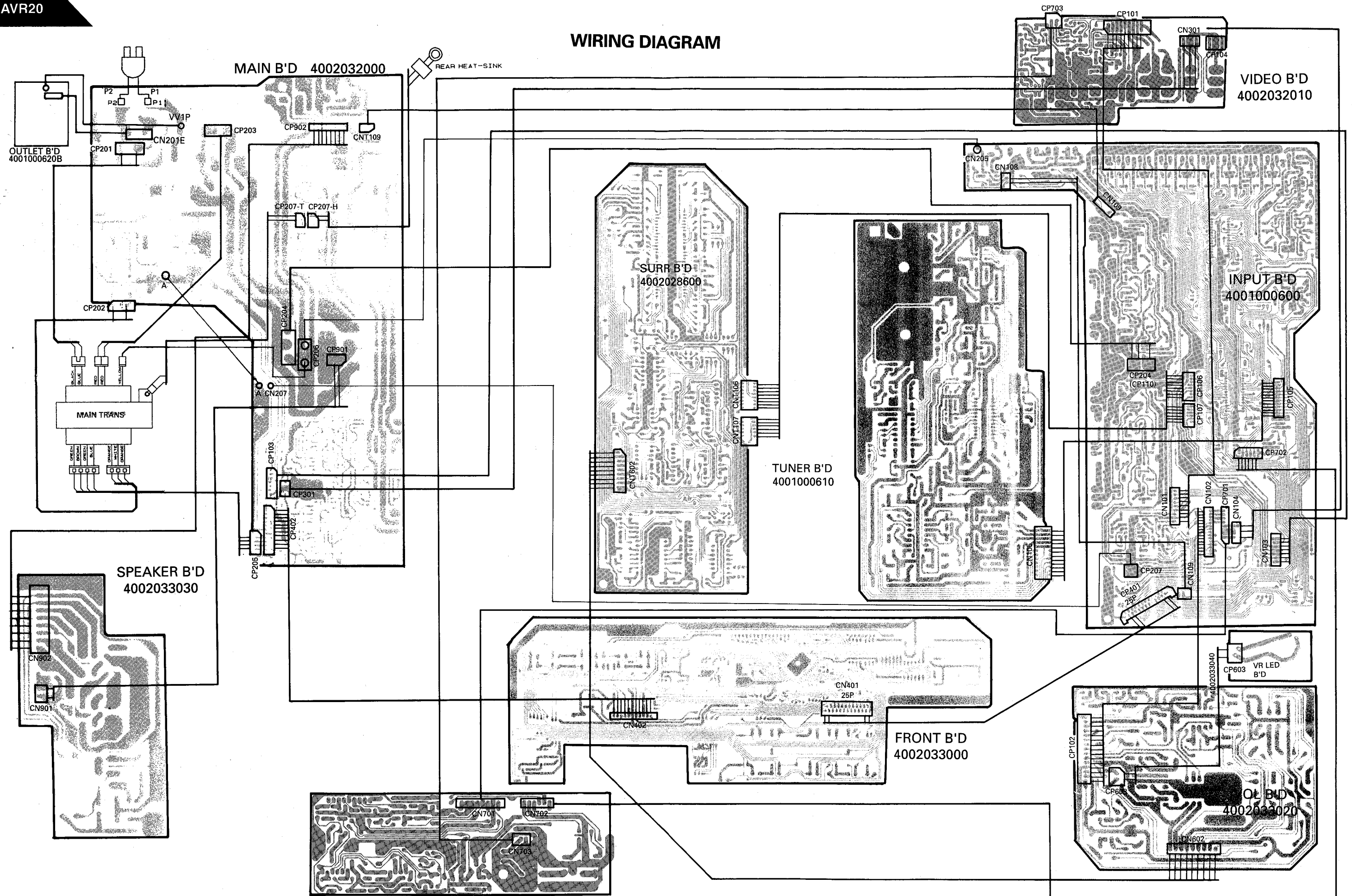


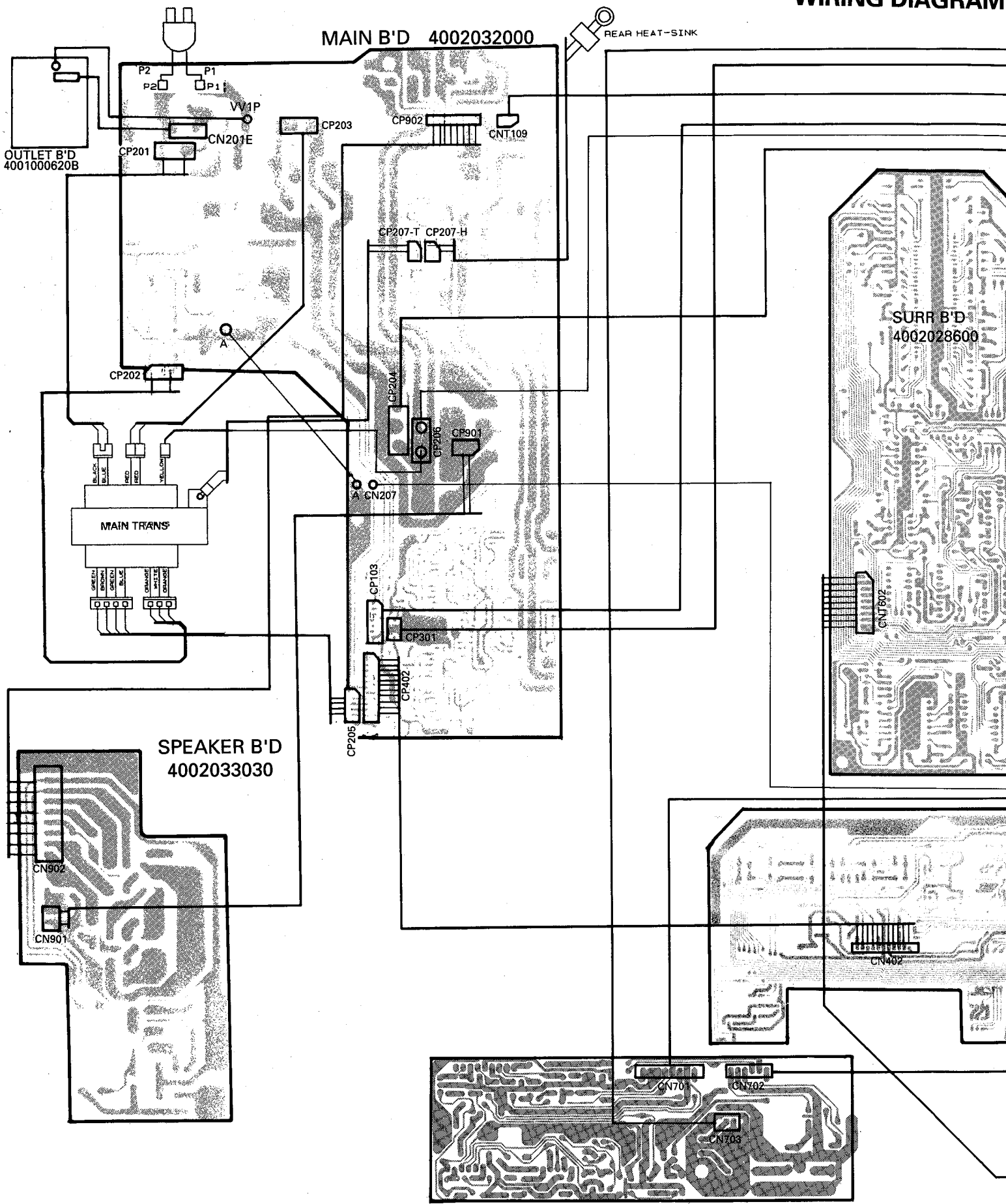
BLOCK DIAGRAM





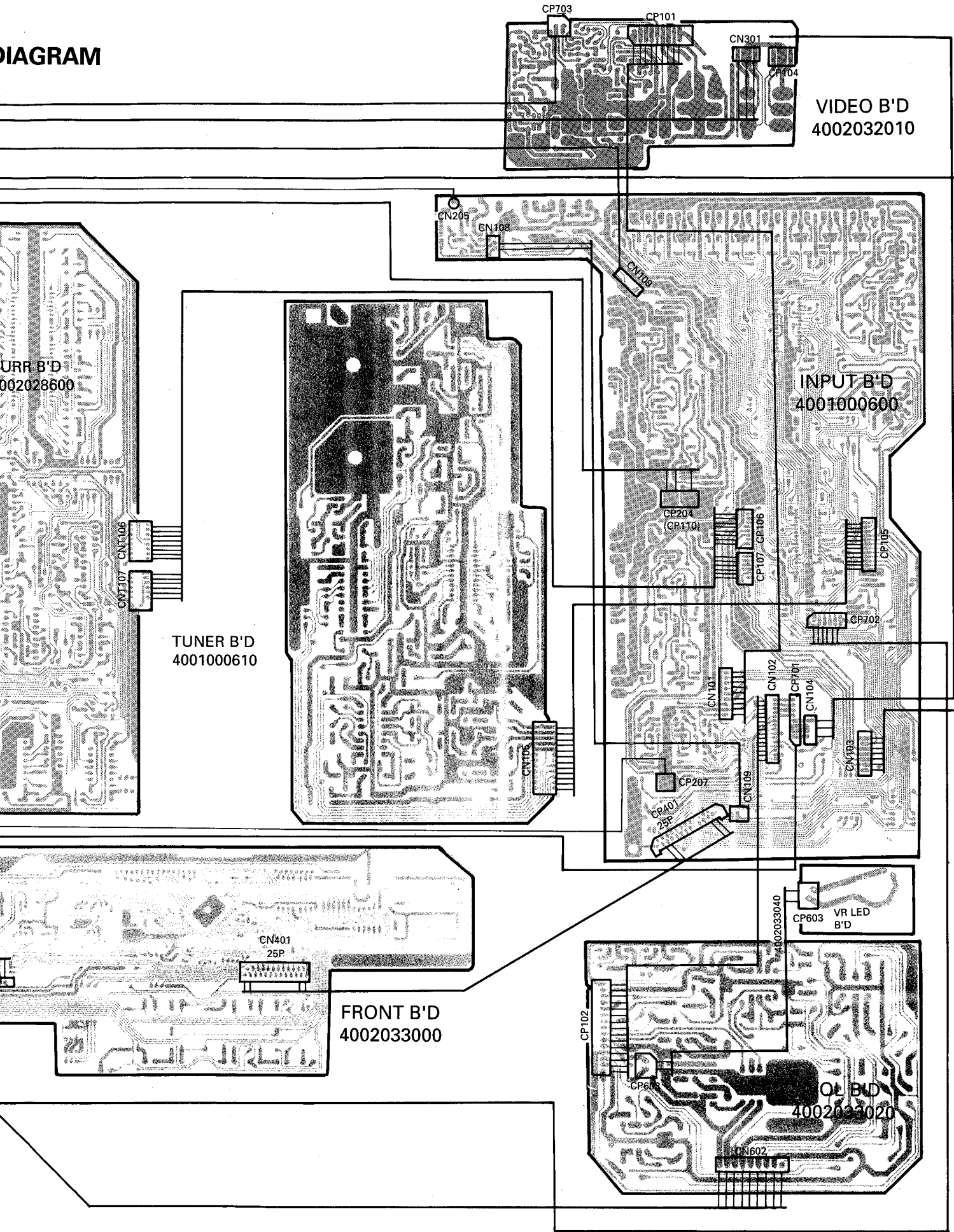
# WIRING DIAGRAM







DIAGRAM



## TROUBLESHOOTING

| Symptom   | Cause and Remedy  |
|---|---|
| Receiver inoperative<br>(FL indicator does not light)   | <p>A) Faulty AC power cord.<br/>Replace.</p> <p>B) Defect the power switch.<br/>Replace.</p> <p>C) Broken wire in the power transformer.<br/>Replace the power transformer.</p> <p>D) Blown fuse.<br/>Replace the fuse.</p>   |
| Fuse blows when power is turned on.   | <p>A) Defective power transformer.<br/>Replace.</p> <p>B) Short the primary or secondary of the transformer circuitry.<br/>Repair the short.</p> <p>C) Damaged rectifier (D208 to D211) or damaged transistor (Q216 to Q217). Replace the defective component(s).</p> <p>D) Short circuit in the amplifier circuit.<br/>Repair the short.</p> |
| Power indicator lights but no sound from both channels  | <p>A) Speaker switch 1 or 2 defective.<br/>Replace the defective switch (es)</p> <p>B) Defect in transistor Q216 L/R, Q217 L/R on the Main Amp Board.<br/>Replace the defective component(s).</p>   |
| Speaker A inoperative   | <p>A) Speaker switch A defective.<br/>Replace</p>   |
| Speaker B inoperative   | <p>A) Speaker switch B defective.<br/>Replace.</p>  |
| One channel does not work when Volume is at maximum with a test signal applied to the center terminal of Volume control VR5 of the dead channel | <p>A) Defect in transistor Q216 L/R, Q217 L/R on the Main Amp Board<br/>Locate and correct the defect.</p> <p>B) Break in copper foil of printed circuit board.<br/>Repair the short.</p> <p>C) Short in speaker output terminal.<br/>Repair or replace.</p>  |
| Speaker works normally but headphones inoperative   | <p>A) Headphone plug does not mate with jack.<br/>Replace the plug.</p> <p>B) Defective resistor R901, R902.<br/>Replace.</p>   |
| PHONO input inoperative   | <p>A) Poor contact in phono input jack.<br/>Repair or replace the jack.</p> <p>B) Defective phono switch or IC103.<br/>Replace.</p>   |
| LOUDNESS has no effect  | <p>A) Defective loudness switch.<br/>Replace.</p> <p>B) Defective resistor R601, R602, C601, C602.<br/>Replace the defective components(s).</p>   |
| FM inoperative  | <p>A) Defective front-end. (FTH3-505H)<br/>Replace.</p> <p>B) Defective FM switch.<br/>Replace the switch</p>   |

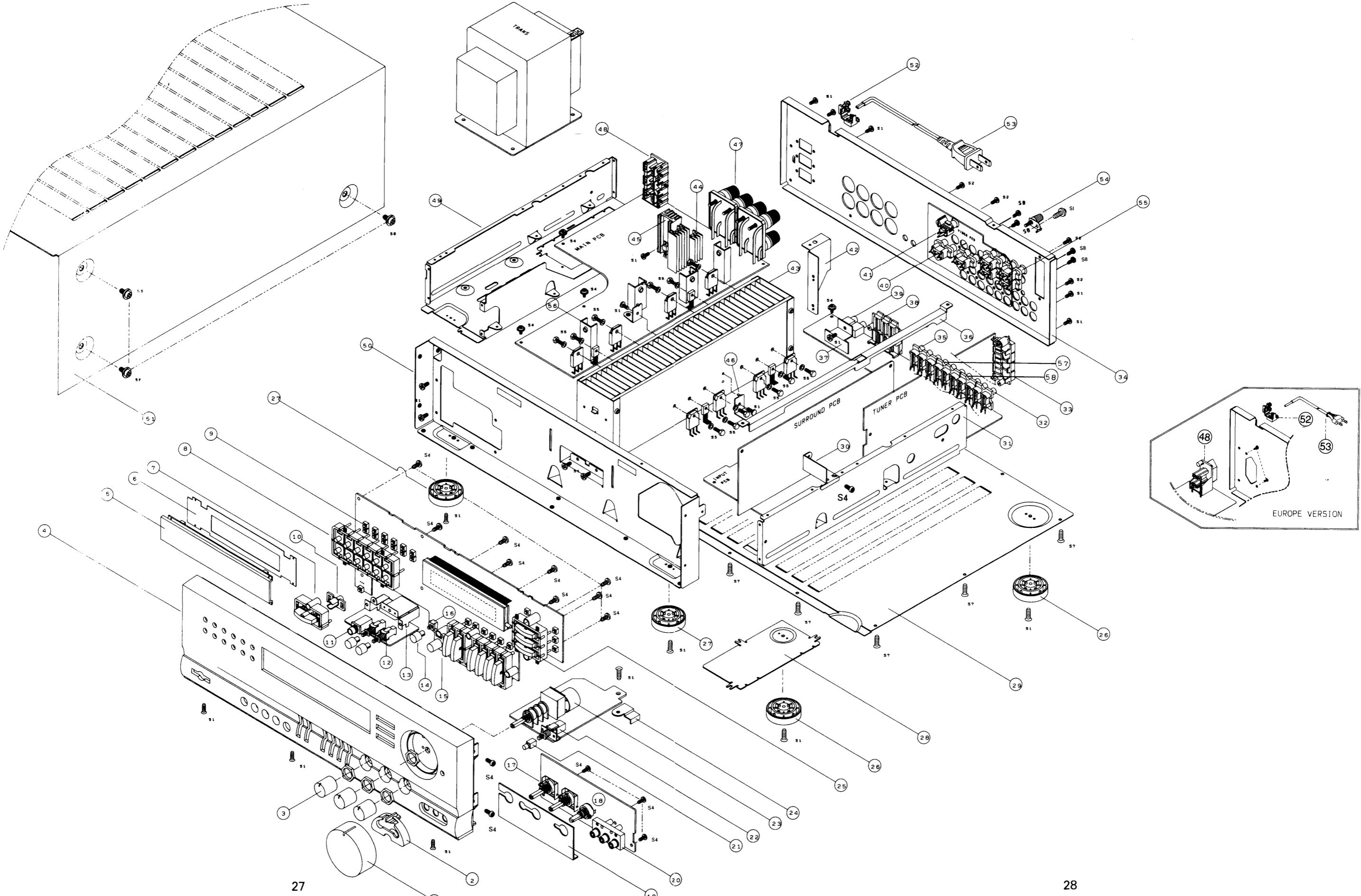
| Symptom                         | Cause and Remedy   |
|---------------------------------|--|
| FM inoperative                  | <p>C) Defective transistor Q801, Q805, Q806, IC801, IC803<br/>Replace the defective transistor(s) or IC(s).</p> <p>D) Defective coil T803 or T804<br/>Replace the coil(s).</p> <p>E) Defective lead-in.<br/>Repair or replace the lead-in.</p> <p>F) Ceramic filter CF801, CF802, CF803 defective.<br/>Replace the defective ceramic filter(s).</p> <p>G) Defective controller circuit component.<br/>Replace.</p>   |
| Poor multiplex separation       | <p>A) Improper adjustment.<br/>Readjust VR803 and VR804.<br/>(Refer to MPX Alignment.)</p> <p>B) IC803 defective.<br/>Replace.</p> <p>C) Variable resistor VR803 or VR804 defective.<br/>Replace the variable resistor(s).</p>   |
| STEREO indicator does not light | <p>A) Defective indicator in FL.<br/>Replace.</p> <p>B) Improper adjustment of VR803 of tuner board.<br/>Make readjustment.</p> <p>C) Defective IC803<br/>Replace the defective component.</p>   |
| FM volume not sufficient        | <p>A) If volume from both L and R channels is not loud enough :<br/>Front end Section defective.<br/>Faulty IC801, Coil T803,<br/>Defective C838 of tuner Board.<br/>If sound of one channel is not loud enough:<br/>Defective T806, T807</p>  |
| FM Mono has no effect           | <p>A) Defective FM MODE switch.<br/>Replace.</p>   |
| AM inoperative                  | <p>A) Damaged IC801 of tuner board.<br/>Replace.</p> <p>B) Defective T801, T802, T805 or CF804 of tuner board.<br/>Replace the defective component(s).</p> <p>C) Resistor R829, R817 defective.<br/>Replace the defective component(s).</p> <p>D) Capacitor C836, C818, C813 defective.<br/>Replace the defective capacitor(s).</p> <p>E) Defective AM switch<br/>Replace.</p> <p>F) Defective varicap diode VD1, VD2<br/>Replace varicap diode(s).</p> <p>G) Damaged AM loop antenna.<br/>Repair or replace.</p> <p>H) Defective controller circuit component.<br/>Replace.</p> |
| Bass control has no effect      | <p>A) Variable resistor BASE defective.<br/>Replace.</p> <p>B) Defective R709L/R, R710L/R, C702L/R, C708L/R<br/>Replace the defective component(s).</p>  |

| Symptom                                      | Cause and Remedy   |
|--|--|
| Treble control has no effect                 | A) Variable resistor TREBLE defective.<br>B) Defective R711 L/R, R712 L/R, C709 L/R, C710L/R<br>Replace the defective components(s).   |
| Auto tune inoperative (UP/DOWN)              | A) Poor contact in Up/Down key.<br>Repair replace.<br>B) Defective IC401<br>Replace.<br>C) Defective FL401.<br>Replace.<br>D) Defective tuner circuit component.<br>Replace.<br>E) In case of FM only, improper adjustment of FM front-end.<br>Readjust. |
| Manual tune inoperative (UP/DOWN) (AM or FM) | A) Poor contact in Up/Down key.<br>Replace.<br>B) Defective IC401.<br>Replace.   |
| Memory setting (keys 1-10) inoperative       | A) Poor contact in memory keys 1-10.<br>Replace.<br>B) Poor contact in memory set key.<br>Replace.<br>C) Defective IC401.<br>Replace the defective component.  |
| FL inoperative                               | A) FL defective.<br>Replace.<br>B) Defective IC401.<br>Replace<br>C) Defective X401.<br>Replace.   |
| Noise Volume control                         | A) Defective IC603.<br>Replace.<br>B) Defective capacitor C615 or C616.<br>Replace the defective capacitor(s).   |
| Remote Control Unit inoperative              | A) Weak Battery.<br>Replace.<br>B) Defective.<br>Replace.<br>C) Defective IC401(CPU Board) or IC01.<br>Replace.  |

## GENERAL UNIT PARTS LIST

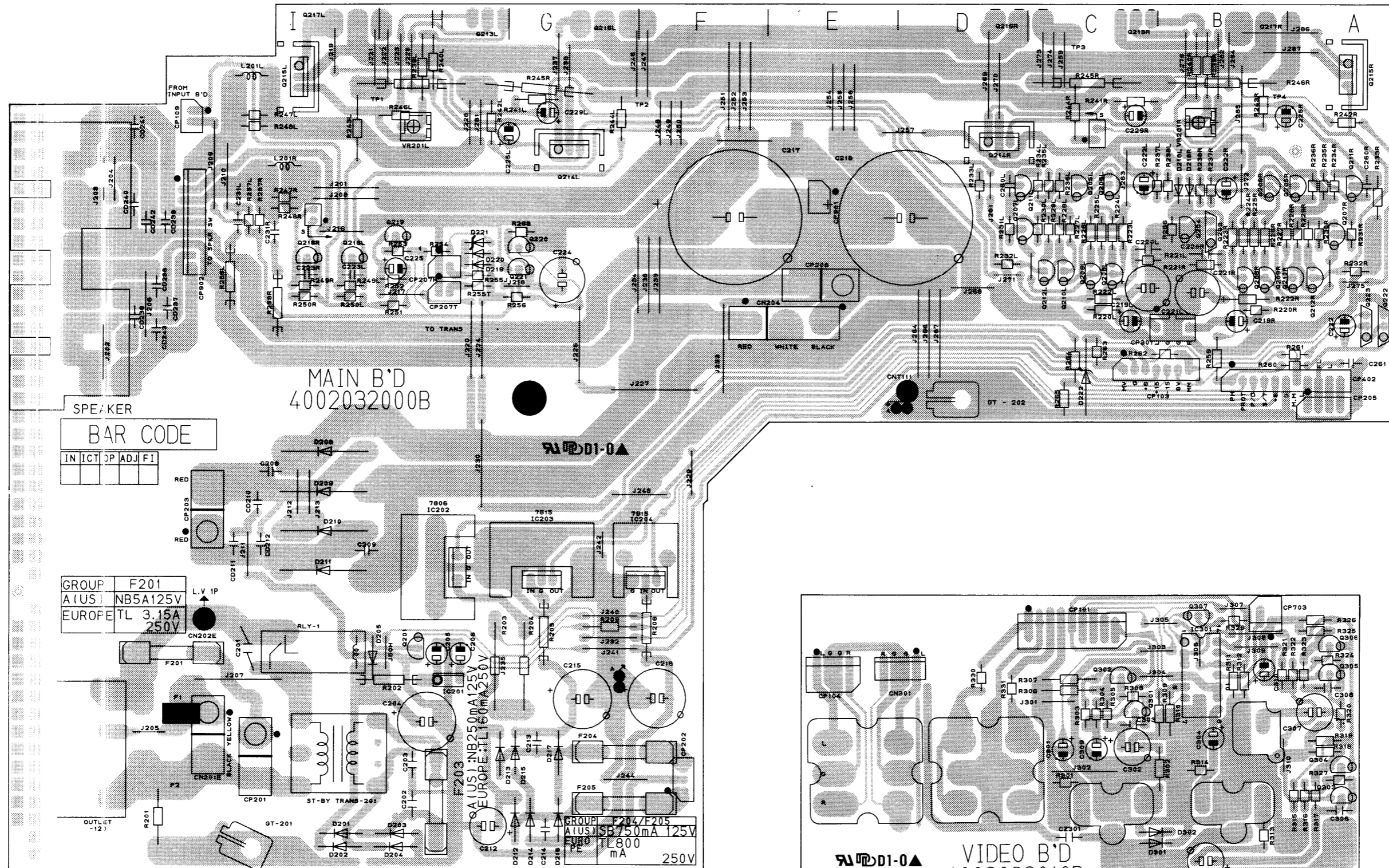
| Ref.No.       | Mfr. Part No. Description                 | Version | Ref.No. | Mfr. Part No. Description                 | Version   |
|---------------|---|---------|---------|---|-----------|
| 1             | 048543059811 Knob, VR, ABS Black          |         | 46      | 6505134910 Bracket, PCB                   |           |
| 2             | 8555048610 Indicator, Volume              |         | 47      | 4408105810 Terminal, Speaker 8P           |           |
| 3             | 048545124311 Knob, Rotary                 |         | 48      | 4448102910 Outlet, AC, CCT1306-0212       | USA/CA    |
| 4             | 048501033811 Panel, Front, ABS, Black     |         | 49      | 4448103610 Outlet, AC, YKE31-0090         | Eur. Only |
| 5             | 8553019710 Window, Display                |         | 50      | 6121608930 Frame (L)                      |           |
| 6             | 048555048511 Filter                       |         | 51      | 6122214510 Chassis, Front, SECC ZN        |           |
| 7             | 048545124011 Button, Power, ABS Black     |         | 52      | 046122022421 Cover, Top                   | USA/CA    |
| 8             | 048543059611 Button, Preset, ABS Black    |         |         | 6518002310 Stopper, Cord                  | Eur.      |
| 9 (SW401-432) | 4658003710 Switch, Tact                   |         | 53      | 6518002320 Stopper, Cord                  | USA/CA    |
| 10            | 8555048710 Indicator, Power               |         |         | 4408001410 Cord, AC Power                 | Eur.      |
| 11            | 4438005020 Jack, Phone                    |         | 54      | 4408000430 Cord, AC Power                 |           |
| 12            | 462804310 Switch, Push, ABS Black         |         | 55      | 4408103710 System GND                     |           |
| 13            | 6165147910 Shield, Fence                  |         | 56      | 4438103410 Jack, RCA, 4P, AP4-0096        |           |
| 14            | 048545124111 Button, Speaker, ABS Black   |         | 57      | 7505210010 Heatsink, REG. TR              |           |
| 15            | 048543059911 Button, Function, ABS Black  |         | 58      | 4438103110 Terminal, 4P                   |           |
| 16 (SW433)    | 4628054410 Switch, Push, 1 Key, ABS Black |         | P1      | 4438108010 Jack, RAC, 4P, with Ground     |           |
| 17            | 3208049510 VR Bass/Treble                 |         | P1-1    | 4002032000B P.C. B Main                   |           |
| 18            | 320805210 VR, Balance                     |         | P2      | 4002032010B P.C. B Video                  |           |
| 19            | 6165148410 Shield, Fence, knob            |         | P2-1    | 4002033000A P.C. B Front                  |           |
| 20            | 4438109710 Jack, RCA, 3P, VCR             |         | P2-2    | 4002033010A P.C. B Tone                   |           |
| 21            | 048545124211 Button Loud, ABS Black       |         | P2-3    | 4002033020A P.C. B Volume                 |           |
| 22            | 4628059610 Switch, Push, Loud             |         | P2-4    | 4002033030A P.C. B Speaker                |           |
| 23            | 3228019410 VR, Motor                      |         | P3      | 4002033040A P.C. B Volume/LED             |           |
| 24            | 6505138410 Bracket, VR                    |         | P4      | 4002028600 P.C. B Surround                |           |
| 25            | 048543059711 Button, Tuning, ABS Black    |         | P4-1    | 4001000600B P.C. B Input                  |           |
| 26            | 6033102510 Foot, ABS, Black               |         | P4-2    | 4001000610B P.C. B Tuner                  |           |
| 27            | 046033102511 Foot, Hot-stampinmg, Gold    |         | P5      | 4001000620B P.C. B Outlet                 |           |
| 28            | 6123205210 Frame, Cover                   |         | S1      | 4008500200 P.C. B Commander               |           |
| 29            | 6122418120 Cover Bottom, SECC             |         | S2      | 8109230083 Screw #2BTC 3 x 8 (B)          |           |
| 30            | 6506111710 Bracket, PCB                   |         | S3      | 8119130103 Screw #1PTC 3 x 10 (B)         |           |
| 31            | 6122636410 Frame (R)                      |         | S4      | 8109230081 Screw #2BTC 3 x 8 (Y)          |           |
| 32            | 4438108110 Jack, RAC, 4P                  |         | S5      | 8159230081 Screw #2WPTC 3 x 8 (Y)         |           |
| 33            | 4408108310 Terminal, Antenna              | USA/CA  | S6      | 8099130121 Screw #HEX MSPW 3 x 12         |           |
|               | 4408108210 Terminal, Antenna              | Eur.    | S7      | 8159440083 Screw WSAM 4 x 8 (B)           |           |
| 34            | 046102040611 Chassis, Back, SECC          | USA/CA  | S8      | 8109230063 Screw #2BTC 3 x 8 (B)          |           |
|               | 046102040611 Chassis, Back, SECC          | Eur.    |         | 8155000710 Screw Ground                   |           |
| 35            | 4438103210 Jack, RCA, 6P                  |         |         | 2828009981 Power Transformer, 120V, 60 Hz | USA/CA    |
| 36            | 6123205110 Frame, Center                  |         |         | 2828009991 Power Transformer, 230V, 60 Hz | Eur.      |
| 37            | 6505138510 Bracket, Jack                  |         |         |   |           |
| 38            | 4408107410 Terminal, Speaker, 6P          |         |         |   |           |
| 39            | 4438006510 Jack, Multi                    |         |         |   |           |
| 40            | 4438109310 Jack, RCA, 2P with Ground      |         |         |   |           |
| 41            | 4438113810 Jack RCA, 1P, Yello            |         |         |   |           |
| 42            | 6506135010 Bracket, Heatsink              |         |         |   |           |
| 43            | 7502008510 Heatsink, Power                |         |         |   |           |
| 44            | 7505206220 Heatsink, REG. TR              |         |         |   |           |
| 45            | 7505206120 Heatsink, REG. TR              |         |         |   |           |

EXPLODED VIEW

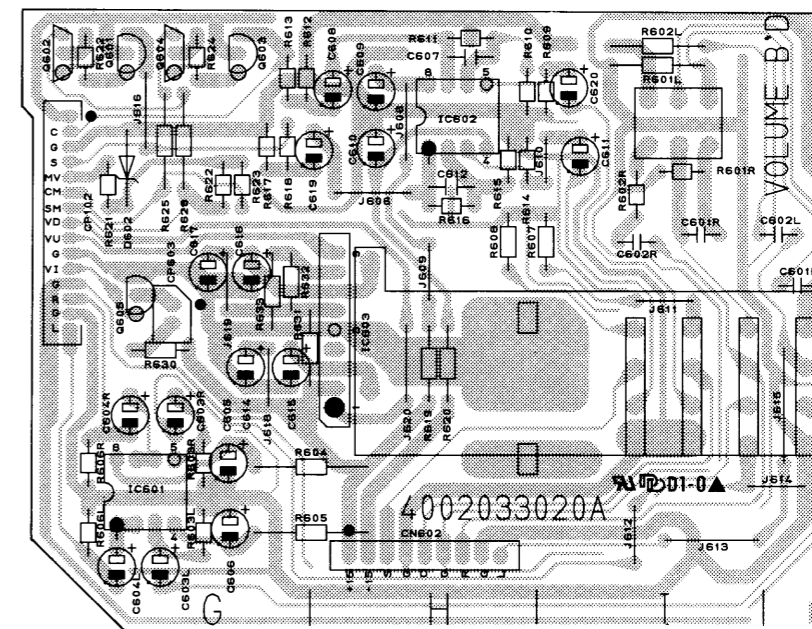
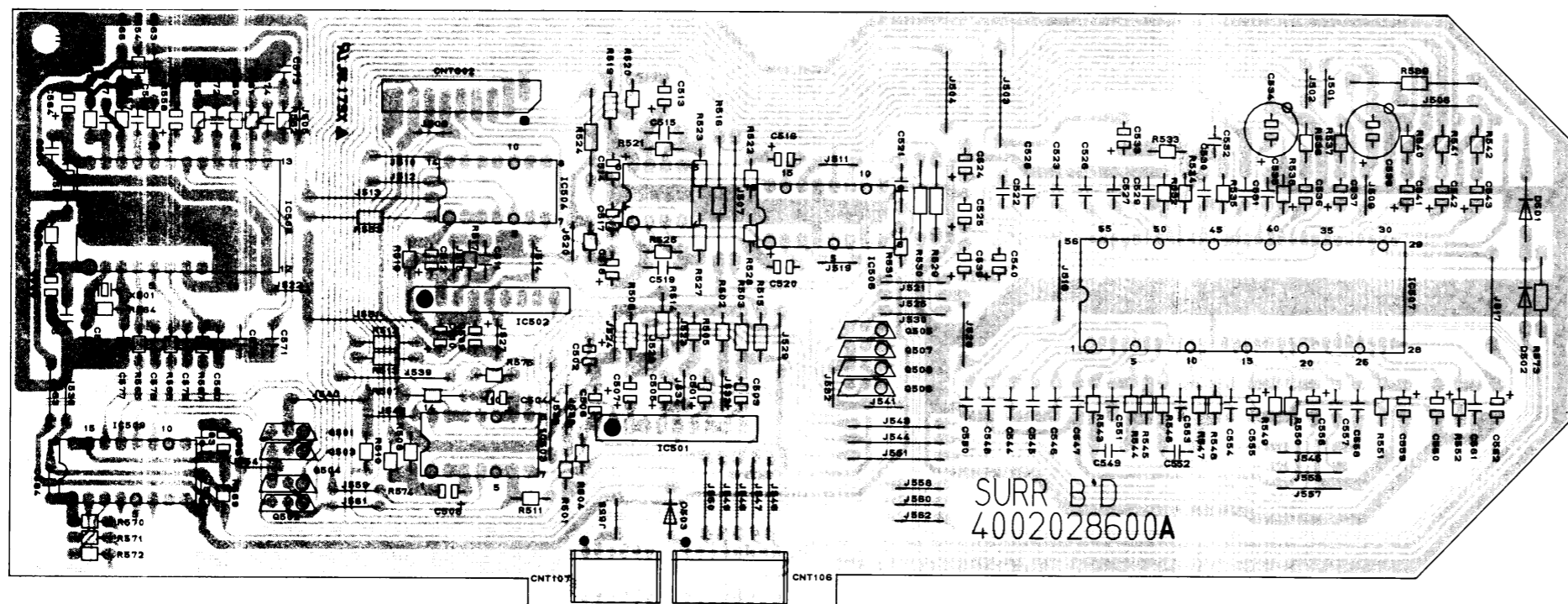
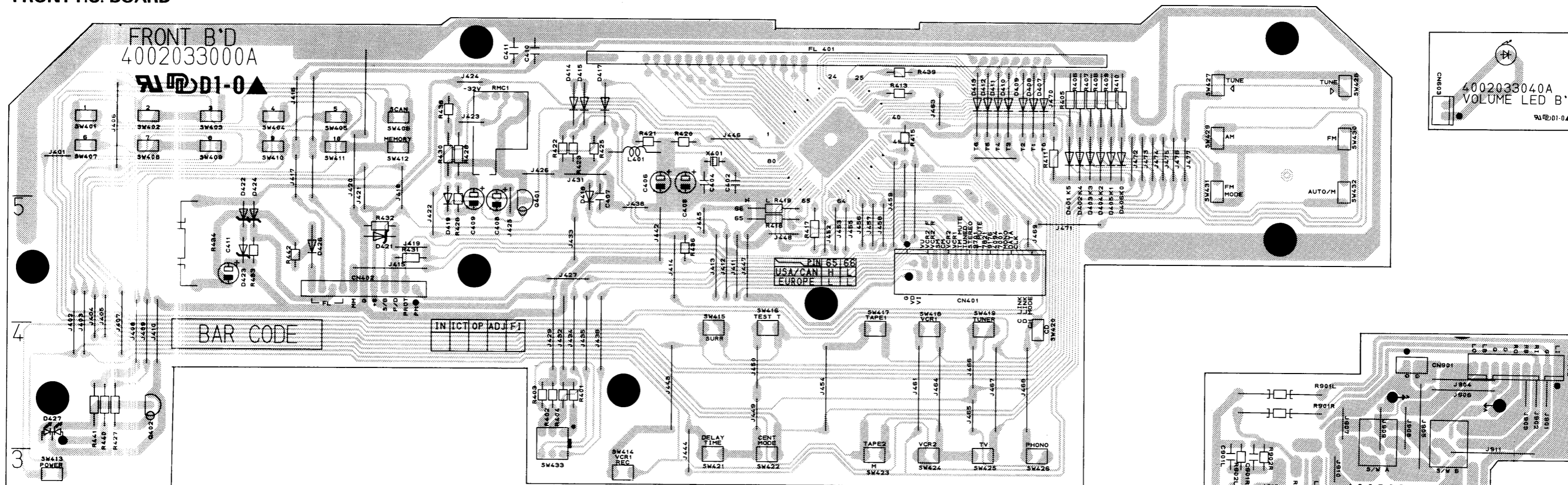


# PRINTED CIRCUIT BOARDS

## MAIN P.C. BOARD

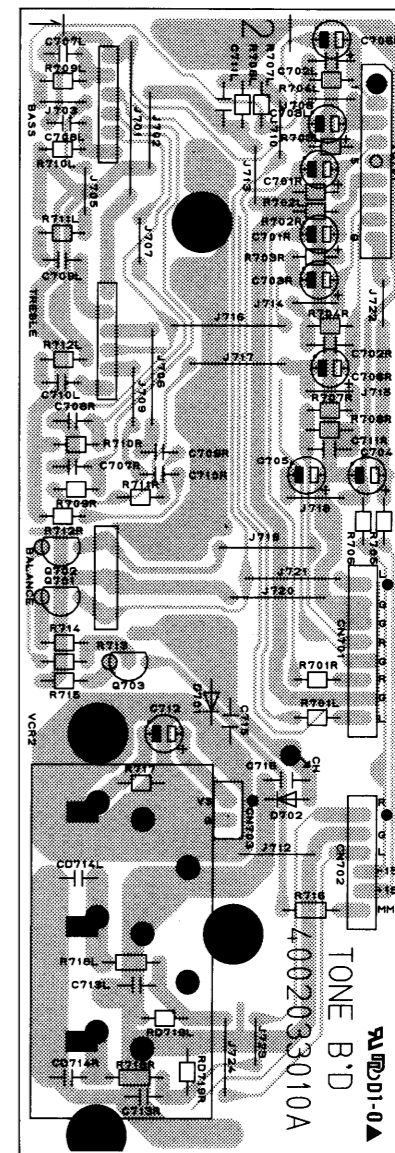
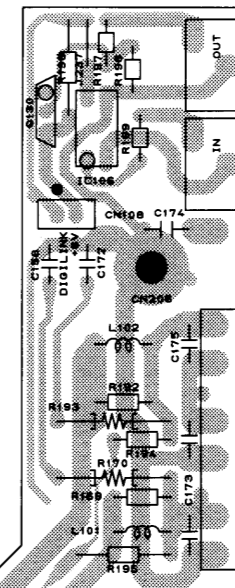
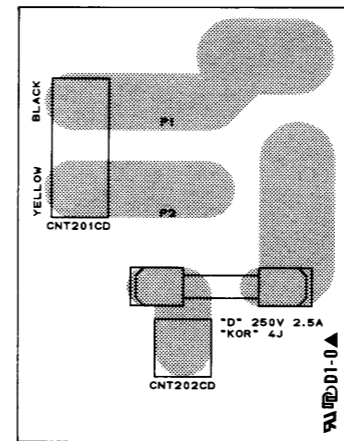
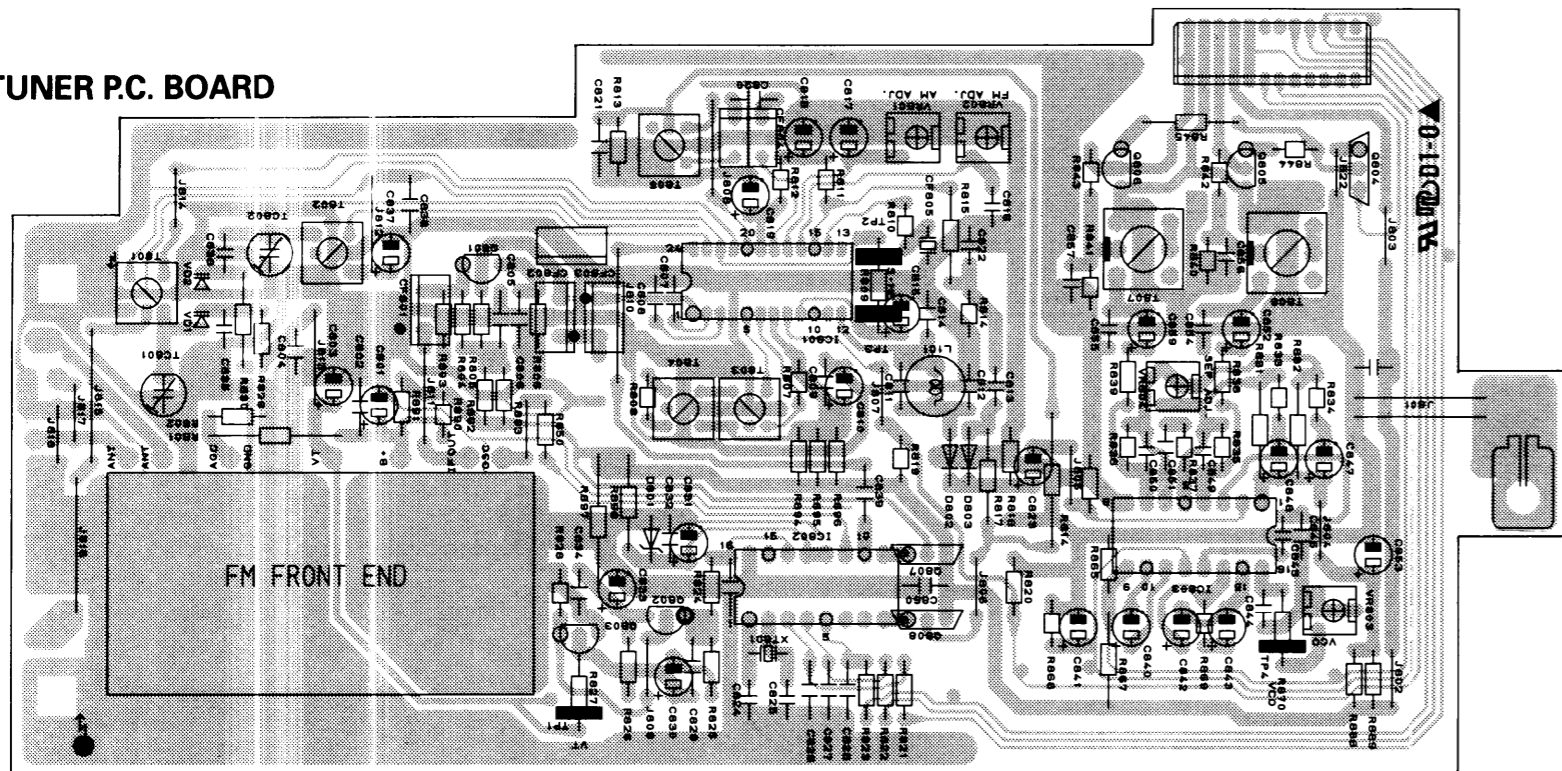


FRONT P.C. BOARD

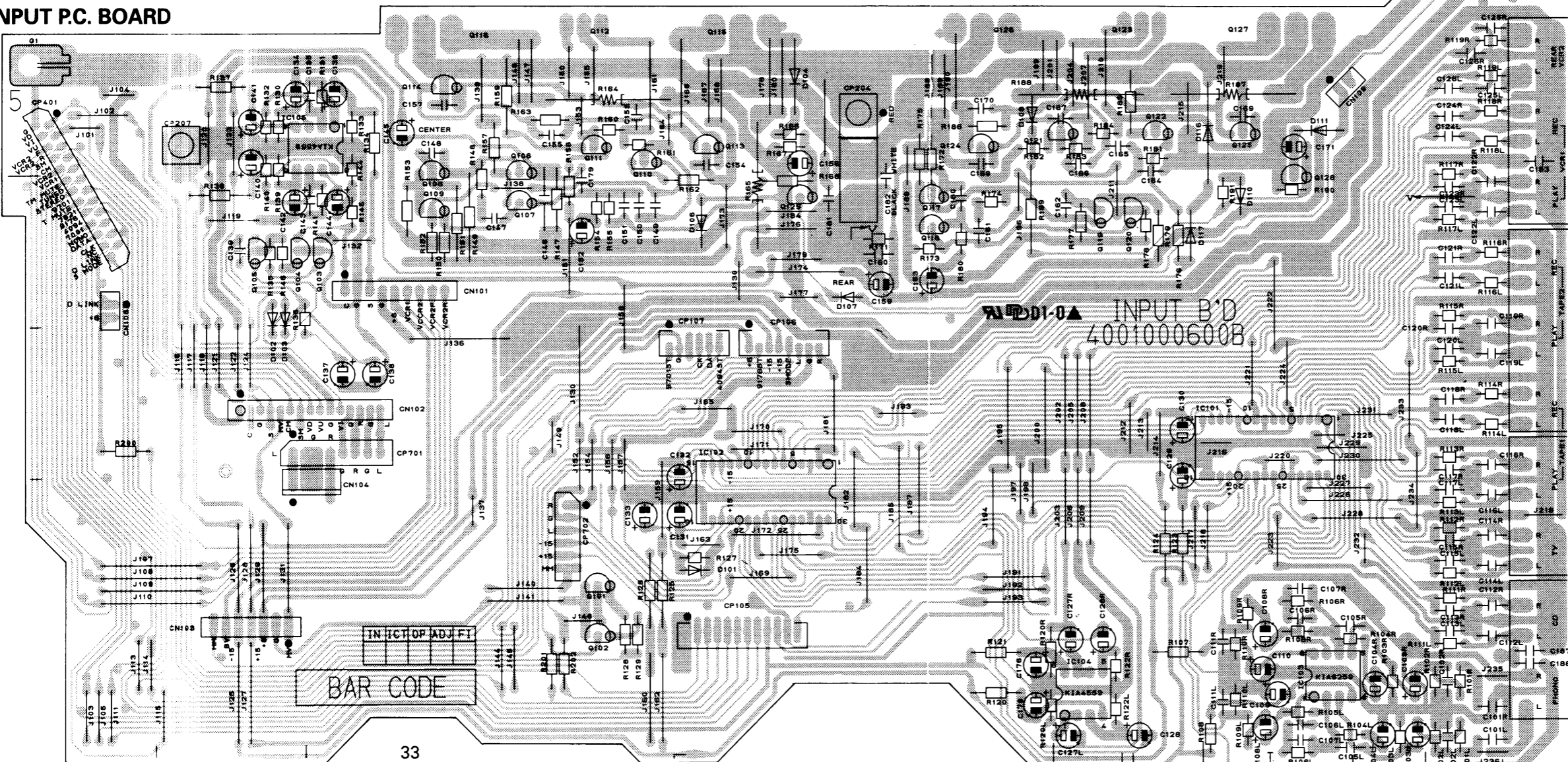




TUNER P.C. BOARD



INPUT P.C. BOARD



## ELECTRICAL PARTS LIST

| Ref. No.  | Mfr. Part No.       | Description                        | Version               | Ref. No.  | Mfr. Part No. | Description             | Version         |
|-----------|---------------------|------------------------------------|-----------------------|-----------|---------------|-------------------------|-----------------|
|           | <b>057502000149</b> | <b>ASSEMBLY HEATSINK</b>           |                       | D222      | 2258599102    | Zener, UZ 4.3 B5B       |                 |
| 42        | 6505135010          | Bracket, Heatsink                  |                       |           |               | <b>ICs</b>              |                 |
| 43        | 7502008510          | Heatsink, Power                    |                       | IC201/202 | 2168601110    | GL7806                  |                 |
| 46        | 6505134910          | Bracket, PCB                       |                       | IC203     | 2168601110    | GL7815                  |                 |
| Q112      | 2008622110          | 2SC4137, Bias NPN                  |                       | IC204     | 2168601111    | GL7915                  |                 |
| Q115      | 2028407109          | 2SD7180/KTD718, NPN                |                       |           |               | <b>TRANSISTORS</b>      |                 |
| Q116      | 2028107106          | 2SB688/KTB688, PNP                 |                       | Q201      | 2208606104    | KTC1815Y/BKTC3198Y, NPN |                 |
| Q123      | 2008622110          | 2SC4137, Bias NPN                  |                       | Q203      | 2208622106    | DTC114YS, NPN           |                 |
| Q126      | 2028407109          | 2SD7180/KTD718, NPN                |                       | Q204L/R   | 2208206105    | KTA1015Y/BKTA1266Y, PNP |                 |
| Q127      | 2028107106          | 2SB688/KTB688, PNP                 |                       | Q205L/R   | 2208206104    | KTA970/KTA1268          |                 |
| Q213L/R   | 2008622110          | 2SC4137, Bias NPN                  |                       | Q207L/R   | 2208606108    | KTC2240/BKTC3200, NPN   |                 |
| Q216L/R   | 2028307100          | 2SC3181N-O                         |                       | Q208L/R   | 2208206104    | KTA970/KTA1268          |                 |
| Q217L/R   | 2028007100          | 2SA1264N-O                         |                       | Q209L/R   | 2208206104    | KTA970/KTA1268          |                 |
| S1        | 8109230083          | Screw #2BTC 3X8 (B)                |                       | Q210L/R   | 2208606108    | KTC2240/BKTC3200, NPN   |                 |
| S5        | 8099130121          | Screw #HEX MSPW 3X12               |                       | Q211L/R   | 2208206102    | BKTA949/KTA1024, PNP    |                 |
|           |                     | <b>END OF ASSEMBLY HEATSINK</b>    |                       | Q212L/R   | 2208606107    | KTC2229/KTC3206, NPN    |                 |
|           |                     |                                    |                       | Q214L/R   | 2008602102    | KSC2690A-Y, NPN         |                 |
| <b>P1</b> | <b>054002007504</b> | <b>ASS'Y P.C.B MAIN FOR USA/CA</b> |                       | Q215L/R   | 2008202101    | KSA1220A-Y, PNP         |                 |
| <b>P1</b> | <b>054002007951</b> | <b>ASS'Y P.C.B MAIN FOR EUROPE</b> |                       | Q218L/R   | 2208606104    | KTC1815Y/BKTC3198Y, NPN |                 |
|           |                     | <b>CAPACITORS</b>                  |                       | Q219      | 2208206105    | KTA1015Y/BKTA1266Y, PNP |                 |
| C201      | 3549472407          | Ceramic Tubular                    | 0.0047 uF 400 V K     | Q220/221  | 2208606104    | KTC1815Y/BKTC3198Y, NPN |                 |
| C202/203  | 3679473120          | Mylar                              | 0.047 uF 100 V J      | Q222/223  | 2208622106    | DTC114YS, NPN           |                 |
| C204      | 3409347149          | Electric SG                        | 470 uF 25 V M         |           |               | <b>RESISTORS</b>        |                 |
| C206      | 3479222071          | Electrolytic SA                    | 22 uF 50 V M          | R201      | 3009335373    | Carbon Film             | 3.3 Mohm 1/2W J |
| C208/209  | 3679104257          | Mylar                              | 0.1 uF 250 V J        | R202      | 3029479472    | Metal Film              | 4.7 ohm 1 W J   |
| C212      | 3479310161          | Electric SG                        | 100 uF 35 V M         | R203/204  | 3029220572    | Metal Film              | 22 ohm 2 W J    |
| C213/214  | 3679473120          | Mylar                              | 0.047 uF 100 V J      | R205      | 3029100472    | Metal Film              | 10 ohm 1 W J    |
| C215/216  | 3409310269          | Electric SG                        | 1000 uF 35 V M        | R206      | 3029479472    | Metal Film              | 4.7 ohm 1 W J   |
| C217/218  | 3419582235          | Electrolytic HM                    | 8200 uF 63 V M        | R209      | 3069332970    | Carbon Film             | 3.3 kohm 1/5W J |
| C219L/R   | 3479347031          | Electrolytic SA                    | 47 uF 16 V M          | R220L/R   | 3069331970    | Carbon Film             | 330 ohm 1/5W J  |
| C220L/R   | 3479210171          | Electrolytic SA                    | 100 uF 50 V J         | R221L/R   | 3069333970    | Carbon Film             | 33 kohm 1/5W J  |
| C221L/R   | 3479347111          | Electric SG                        | 470 uF 6.3 V M        | R222L/R   | 3069102970    | Carbon Film             | 1 kohm 1/5W J   |
| C222      | 3479210071          | Electrolytic SA                    | 10 uF 50 V M          | R223L/R   | 3069152970    | Carbon Film             | 1.5 kohm 1/5W J |
| C222L/R   | 3479210971          | Electrolytic SA                    | 1 uF 50 V M           | R224L/R   | 3069391970    | Carbon Film             | 390 ohm 1/5W J  |
| C223L/R   | 3679683120          | Mylar                              | 0.068 uF 100 V J      | R225L/R   | 3069152970    | Carbon Film             | 1.5 kohm 1/5W J |
| C224      | 3479347111          | Electric SG                        | 470 uF 6.3 V M        | R226L/R   | 3069391970    | Carbon Film             | 390 ohm 1/5W J  |
| C225      | 3479210071          | Electrolytic SA                    | 10 uF 50 V M          | R227L/R   | 3069561970    | Carbon Film             | 560 ohm 1/5W J  |
| C225L/R   | 3479210071          | Electrolytic SA                    | 10 uF 50 V M          | R228L/R   | 3069561970    | Carbon Film             | 560 ohm 1/5W J  |
| C229L/R   | 3479247971          | Electrolytic SA                    | 4.7 uF 50 V M         | R229L/R   | 3069820970    | Carbon Film             | 82 ohm 1/5W J   |
| C231L/R   | 3679473120          | Mylar                              | 0.047 uF 100 V J      | R230L/R   | 3069561970    | Carbon Film             | 560 ohm 1/5W J  |
| C260L/R   | 3579309030          | Ceramic Disc                       | 5 pF 50 V K           | R231L/R   | 3069561970    | Carbon Film             | 560 ohm 1/5W J  |
| CD237-239 | 3519222935          | Ceramic Tubular                    | 0.0022 uF 50 V K Eur. | R232L/R   | 3069223970    | Carbon Film             | 22 kohm 1/5W J  |
| CD242     | 3519222935          | Ceramic Tubular                    | 0.0022 uF 50 V K Eur. | R233L/R   | 3069223970    | Carbon Film             | 22 kohm 1/5W J  |
|           |                     | <b>CONNECTORS</b>                  |                       | R234L/R   | 3069820970    | Carbon Film             | 82 ohm 1/5W J   |
| CN204     | 4358800353          | Lead Ass'y 3P 530mm                |                       | R235L/R   | 3069561970    | Carbon Film             | 560 ohm 1/5W J  |
| CN301     | 436204608331        | Lead Ass'y 4P, Shield, 600 mm      |                       | R236L/R   | 3069271970    | Carbon Film             | 270 ohm 1/5W J  |
| CP103     | 4428505410          | Wafer 7P                           |                       | R237L/R   | 3069103970    | Carbon Film             | 10 kohm 1/5W J  |
| CP104     | 4428513440          | Wafer 4P, Angle                    |                       | R238L/R   | 3069333970    | Carbon Film             | 33 kohm 1/5W J  |
| CP109     | 4428508210          | Wafer 2P                           |                       | R239L/R   | 3069360970    | Carbon Film             | 360 ohm 1/5W J  |
| CP201     | 4428525780          | Wafer 2P, AC                       |                       | R240L/R   | 3069122970    | Carbon Film             | 1.2 kohm 1/5W J |
| CP202     | 4428505710          | Wafer 3P                           |                       | R241L/R   | 3069820970    | Carbon Film             | 82 ohm 1/5W J   |
| CP203     | 4428525780          | Wafer 2P, AC                       |                       | R242L/R   | 3069333970    | Carbon Film             | 33 kohm 1/5W J  |
| CP205     | 4428505610          | Wafer 4P                           |                       | R243L/R   | 3069152970    | Carbon Film             | 1.5 kohm 1/5W J |
| CP206     | 4428525780          | Wafer 2P, AC                       |                       | R244L/R   | 3069182970    | Carbon Film             | 1.8 kohm 1/5W J |
| CP207H    | 4428508210          | Wafer 2P                           |                       | R245L/R   | 3059278782    | Cement                  | 0.27 ohm 5 W K  |
| CP207T    | 4428508210          | Wafer 2P                           |                       | R246L/R   | 3059278782    | Cement                  | 0.27 ohm 5 W K  |
| CP301     | 4428517710          | Wafer 4P                           |                       | R247L/R   | 3069220970    | Carbon Film             | 22 ohm 1/5W J   |
| CP402     | 4428510710          | Wafer 11P                          |                       | R248L/R   | 3069220970    | Carbon Film             | 22 ohm 1/5W J   |
| CP901     | 4428508210          | Wafer 2P                           |                       | R249L/R   | 3069911970    | Carbon Film             | 910 ohm 1/5W J  |
| CP902     | 4428518210          | Wafer 9P                           |                       | R250L/R   | 3069682970    | Carbon Film             | 6.8 kohm 1/5W J |
|           |                     | <b>DIODES</b>                      |                       | R251L/R   | 3069683970    | Carbon Film             | 68 kohm 1/5W J  |
| D201-205  | 2258100135          | 1N4002, Rectifier                  |                       | R252L/R   | 3069104970    | Carbon Film             | 100 kohm 1/5W J |
| D207      | 2258100135          | 1N4002, Rectifier                  |                       | R253L/R   | 3069332970    | Carbon Film             | 3.3 kohm 1/5W J |
| D208-211  | 2058100138          | PX6A03, Rectifier                  |                       | R254L/R   | 3069102970    | Carbon Film             | 1 kohm 1/5W J   |
| D212-217  | 2258100135          | 1N4002, Rectifier                  |                       | R255T     | 3069682970    | Carbon Film             | 6.8 kohm 1/5W J |
| D218L/R   | 2058322101          | 1N4148M                            |                       | R256      | 3069103970    | Carbon Film             | 10 kohm 1/5W J  |
| D219/220  | 2058322101          | 1N4148M                            |                       | R257L/R   | 3069243970    | Carbon Film             | 24 kohm 1/5W J  |
| D221      | 2258599107          | Zener, UZ 9.1 B5C                  |                       | R258L/R   | 3029100472    | Metal Film              | 10 ohm 1 W J    |

| Ref. No.                                   | Mfr. Part No. | Description                   | Version         | Ref. No.                                 | Mfr. Part No. | Description               | Version          |
|--|---------------|-------------------------------|-----------------|--|---------------|---------------------------|------------------|
| R259                                       | 3069103970    | Carbon Film                   | 10 kohm 1/5W J  | R306                                     | 3069151970    | Carbon Film               | 150 ohm 1/5W J   |
| R260                                       | 3069103970    | Carbon Film                   | 10 kohm 1/5W J  | R307                                     | 3069822970    | Carbon Film               | 8.2 kohm 1/5W J  |
| R261                                       | 3069103970    | Carbon Film                   | 10 kohm 1/5W J  | R308                                     | 3069122970    | Carbon Film               | 1.2 kohm 1/5W J  |
| R262                                       | 3069102970    | Carbon Film                   | 1 kohm 1/5W J   | R309-312                                 | 3069104970    | Carbon Film               | 100 kohm 1/5W J  |
| R263                                       | 3069242970    | Carbon Film                   | 2.4 kohm 1/5W J | R313/314                                 | 3069750970    | Carbon Film               | 75 ohm 1/5W J    |
| R264                                       | 3069223970    | Carbon Film                   | 22 kohm 1/5W J  | R315                                     | 3069123970    | Carbon Film               | 12 kohm 1/5W J   |
| R265                                       | 3069153970    | Carbon Film                   | 15 kohm 1/5W J  | R316                                     | 3069122970    | Carbon Film               | 1.2 kohm 1/5W J  |
| R266                                       | 3069154970    | Carbon Film                   | 150 kohm 1/5W J | R317                                     | 3069181970    | Carbon Film               | 180 ohm 1/5W J   |
| <b>MISCELLANEOUS</b>                       |               |                               |                 | R318                                     | 3069151970    | Carbon Film               | 150 ohm 1/5W J   |
| 44   | 7505206220    | Heatsink, REG. TR             |                 | R319                                     | 3069822970    | Carbon Film               | 8.2 kohm 1/5W J  |
| 45   | 7505206120    | Heatsink, REG. TR             |                 | R320                                     | 3069750970    | Carbon Film               | 75 ohm 1/5W J    |
| 47   | 4408105810    | Terminal, Speaker 8P          |                 | R321                                     | 3069123970    | Carbon Film               | 12 kohm 1/5W J   |
| 48   | 4448102910    | Oulet, AC, CCT1306-0212       | USA/CA          | R322                                     | 3069122970    | Carbon Film               | 1.2 kohm 1/5W J  |
| 56   | 7505210010    | Heatsink, REG. TR             |                 | R323                                     | 3069181970    | Carbon Film               | 180 ohm 1/5W J   |
| J235/236                                   | 2648601470    | Coil, 50 uH                   | Eur.            | R324                                     | 3069122970    | Carbon Film               | 1.2 kohm 1/5W J  |
| L201/LR                                    | 2648001010    | Inductor 0.5 uH               |                 | R325                                     | 3069151970    | Carbon Film               | 150 ohm 1/5W J   |
| F201                                       | 5508203021    | Fuse, NB 125V 5A              | USA/CA          | R326                                     | 3069822970    | Carbon Film               | 8.2 kohm 1/5W J  |
| F201                                       | 5508302735    | Fuse, 5T 3.15 A, 250 V, SEMKO | Eur.            | R327                                     | 3069122970    | Carbon Film               | 1.2 kohm 1/5W J  |
| F203                                       | 5508201221    | Fuse, NB 125V 250mA           | USA/CA          | R329                                     | 3069105970    | Carbon Film               | 1 Mohm 1/5W J    |
| F203                                       | 5508301034    | Fuse, TL 160 mA, 250 V, SEMKO | Eur.            | R330/331                                 | 3069471970    | Carbon Film               | 470 ohm 1/5W J   |
| F204/205                                   | 5508101821    | Fuse, NB 125V 750mA           | USA/CA          | <b>MISCELLANEOUS</b>                     |               |                           |                  |
| F204/205                                   | 5508301934    | Fuse, TL 800 mA, 250 V, SEMKO | Eur.            | 40                                       | 4438109310    | Jack, RCA, 2P with Ground |                  |
| GT201/202                                  | 4235007310    | Ground Plate                  |                 | 41                                       | 4438113810    | Jack RCA, 1P, Yellow      |                  |
| RLY-1                                      | 5528001620    | OEG OST-S-112DM, Relay        |                 | 55                                       | 4438103410    | Jack, RCA, 4P, AP4-0096   |                  |
| S3   | 8109230081    | Screw #2BTC 3X8 (Y)           |                 | <b>END OF ASS'Y P.C.B VIDEO</b>          |               |                           |                  |
| TRANS201                                   | 2828096001    | Transformer, Standby          |                 | <b>P2 054002007510 ASS'Y P.C.B FRONT</b> |               |                           |                  |
| VR201                                      | 3248322120    | Semi, 220(B)                  |                 | <b>CAPACITORS</b>                        |               |                           |                  |
| <b>END OF ASS'Y P.C.B MAIN</b>             |               |                               |                 | C402                                     | 3528560210    | Ceramic CH                | 56 pF 50 V K     |
| <b>P1-1 054002007506 ASS'Y P.C.B VIDEO</b> |               |                               |                 | C404                                     | 3528560210    | Ceramic CH                | 56 pF 50 V K     |
| <b>CAPACITORS</b>                          |               |                               |                 | C405                                     | 3409247022    | Electric SS               | 47 uF 10 V M     |
| C301                                       | 3479233041    | Electric SG                   | 33 uF 25 V M    | C406                                     | 3449347314    | Electrolytic, Backup      | 0.047 uF 5.5 V K |
| C302                                       | 3479347121    | Electric SG                   | 470 uF 10 V M   | C407                                     | 3679104120    | Mylar                     | 0.1 uF 100 V J   |
| C303                                       | 3579471130    | Ceramic Disc                  | 470 pF 50 V K   | C408                                     | 3479210971    | Electrolytic SA           | 1 uF 50 V M      |
| C304                                       | 3479233041    | Electric SG                   | 33 uF 25 V M    | C409                                     | 3479210071    | Electrolytic SA           | 10 uF 50 V M     |
| C305                                       | 3479347121    | Electric SG                   | 470 uF 10 V M   | C410                                     | 3679473120    | Mylar                     | 0.047 uF 100 V J |
| C306                                       | 3519010935    | Ceramic Tubular               | 1 pF 50 V K     | C411                                     | 3479310171    | Electric SG               | 100 uF 50 V M    |
| C307                                       | 3479347121    | Electric SG                   | 470 uF 10 V M   | C411                                     | 3679473120    | Mylar                     | 0.047 uF 100 V J |
| C308                                       | 3519010935    | Ceramic Tubular               | 1 pF 50 V K     | <b>CONNECTORS</b>                        |               |                           |                  |
| C309                                       | 3479310121    | Electric SG                   | 100 uF 10 V M   | CN401                                    | 4428525826    | Wafer 25P, 52575-2530     |                  |
| C311                                       | 3519104935    | Ceramic Tubular               | 0.1 uF 50 V K   | CN402                                    | 436111203331  | Lead Ass'y 11P, 200 mm    |                  |
| CZ301                                      | 3519104935    | Ceramic Tubular               | 0.1 uF 50 V K   | <b>DIODES</b>                            |               |                           |                  |
| <b>CONNECTORS</b>                          |               |                               |                 | D401-415                                 | 2058322101    | 1N4148M                   |                  |
| CN301                                      | 436204608331  | Lead Ass'y 4P                 |                 | D417-419                                 | 2058322101    | 1N4148M                   |                  |
| CP101                                      | 4428513490    | Wafer 9P, Angle               |                 | D421                                     | 2258599102    | Zener, UZ 4.3 BSB         |                  |
| CP104                                      | 4428513440    | Wafer 4P, Angle               |                 | D422/423                                 | 2258599117    | Zener, UZ 16.0 BSD        |                  |
| CP703                                      | 4428513420    | Wafer 2P, Angle               |                 | D424                                     | 2258599107    | Zener, UZ 9.1 BSC         |                  |
| <b>DIODES</b>                              |               |                               |                 | D426                                     | 2258100135    | 1N4002, Rectifier         |                  |
| D301/302                                   | 2058322101    | 1N4148M                       |                 | D427                                     | 2308222302    | LED, SPR54MWW3, RED/GREEN |                  |
| <b>IC</b>                                  |               |                               |                 | <b>IC</b>                                |               |                           |                  |
| IC301                                      | 2138001101    | GD4066, Switching             |                 | IC401                                    | 2138322181    | CPU, CXP50116-568Q        |                  |
| <b>TRANSISTORS</b>                         |               |                               |                 | <b>TRANSISTORS</b>                       |               |                           |                  |
| Q301                                       | 2208206105    | KTA1015Y/BKTA1266Y, PNP       |                 | Q401/402                                 | 2208606104    | KTC1815Y/BKTC3198Y,NPN    |                  |
| Q302                                       | 2208606104    | KTC1815Y/BKTC3198Y,NPN        |                 | <b>RESISTORS</b>                         |               |                           |                  |
| Q303                                       | 2208206105    | KTA1015Y/BKTA1266Y, PNP       |                 | R401-403                                 | 3069103970    | Carbon Film               | 10 kohm 1/5W J   |
| Q304                                       | 2208606104    | KTC1815Y/BKTC3198Y,NPN        |                 | R404                                     | 3069223970    | Carbon Film               | 22 kohm 1/5W J   |
| Q305                                       | 2208206105    | KTA1015Y/BKTA1266Y, PNP       |                 | R405-410                                 | 3069473970    | Carbon Film               | 47 kohm 1/5W J   |
| Q306                                       | 2208606104    | KTC1815Y/BKTC3198Y,NPN        |                 | R411                                     | 3069224970    | Carbon Film               | 220 kohm 1/5W J  |
| Q307                                       | 2218207106    | FET, 2SK117Y                  |                 | R413                                     | 3069334970    | Carbon Film               | 330 kohm 1/5W J  |
| <b>RESISTORS</b>                           |               |                               |                 | R415                                     | 3069103970    | Carbon Film               | 10 kohm 1/5W J   |
| R301/302                                   | 3069750970    | Carbon Film                   | 75 ohm 1/5W J   | R417-420                                 | 3069103970    | Carbon Film               | 10 kohm 1/5W J   |
| R303                                       | 3069123970    | Carbon Film                   | 12 kohm 1/5W J  | R421                                     | 3069104970    | Carbon Film               | 100 kohm 1/5W J  |
| R304                                       | 3069122970    | Carbon Film                   | 1.2 kohm 1/5W J | R422/423                                 | 3069473970    | Carbon Film               | 47 kohm 1/5W J   |
| R305                                       | 3069181970    | Carbon Film                   | 180 ohm 1/5W J  |  |               |                           |                  |

| Ref. No.                                  | Mfr. Part No. | Description                      | Version   | Ref. No.             | Mfr. Part No. | Description | Version |
|---|---------------|----------------------------------|-----------|----------------------|---------------|-------------|---------|
| R425                                      | 3069473970    | Carbon Film                      | 47 kohm   | 1/5W                 | J             |             |         |
| R426                                      | 3069103970    | Carbon Film                      | 10 kohm   | 1/5W                 | J             |             |         |
| R427                                      | 3069102970    | Carbon Film                      | 1 kohm    | 1/5W                 | J             |             |         |
| R428                                      | 3069331970    | Carbon Film                      | 330 ohm   | 1/5W                 | J             |             |         |
| R430                                      | 3069473970    | Carbon Film                      | 47 kohm   | 1/5W                 | J             |             |         |
| R431/432                                  | 3069472970    | Carbon Film                      | 4.7 kohm  | 1/5W                 | J             |             |         |
| R433                                      | 3069153970    | Carbon Film                      | 15 kohm   | 1/5W                 | J             |             |         |
| R434                                      | 3029391472    | Metal Film                       | 390 ohm   | 1 W                  | J             |             |         |
| R436                                      | 3069331970    | Carbon Film                      | 330 ohm   | 1/5W                 | J             |             |         |
| R438                                      | 3069332970    | Carbon Film                      | 3.3 kohm  | 1/5W                 | J             |             |         |
| R439                                      | 3069221970    | Carbon Film                      | 220 ohm   | 1/5W                 | J             |             |         |
| R440                                      | 3069271970    | Carbon Film                      | 270 ohm   | 1/5W                 | J             |             |         |
| R441                                      | 3069221970    | Carbon Film                      | 220 ohm   | 1/5W                 | J             |             |         |
| R442                                      | 3069101970    | Carbon Film                      | 100 ohm   | 1/5W                 | J             |             |         |
| <b>MISCELLANEOUS</b>                      |               |                                  |           |                      |               |             |         |
| SW433                                     | 4628054410    | Switch, Push, 1 Key, ABS Black   |           |                      |               |             |         |
| SW401-432                                 | 4658003710    | Switch, Tact                     |           |                      |               |             |         |
| FL401                                     | 2328130925    | FIP 11CM9, FL Display            |           |                      |               |             |         |
| L401                                      | 2648610182    | Inductor 100 uH                  |           |                      |               |             |         |
| RMC1                                      | 2408005001    | TFMT5380, 38 kHz, Remocon sensor |           |                      |               |             |         |
| X401                                      | 3938131460    | Resonator, 4.19MHz               |           |                      |               |             |         |
|   | 6715020730    | Sponge, Rubber                   |           |                      |               |             |         |
| <b>END OF ASS'Y P.C.B FRONT</b>           |               |                                  |           |                      |               |             |         |
| <b>P2-1 054002007512 ASS'Y P.C.B TONE</b> |               |                                  |           | <b>MISCELLANEOUS</b> |               |             |         |
| <b>CAPACITORS</b>                         |               |                                  |           |                      |               |             |         |
| C701L/R                                   | 3479210071    | Electrolytic SA                  | 10 uF     | 50 V                 | M             |             |         |
| C702L/R                                   | 3519470935    | Ceramic Tubular                  | 47 pF     | 50 V                 | K             |             |         |
| C703L/R                                   | 3479247971    | Electrolytic SA                  | 4.7 uF    | 50 V                 | M             |             |         |
| C704/705                                  | 3479347041    | Electric SG                      | 47 uF     | 25 V                 | M             |             |         |
| C706L/R                                   | 3479210071    | Electrolytic SA                  | 10 uF     | 50 V                 | M             |             |         |
| C707L/R                                   | 3679183120    | Mylar                            | 0.018 uF  | 100 V                | J             |             |         |
| C708L/R                                   | 3679823120    | Mylar                            | 0.082 uF  | 100 V                | J             |             |         |
| C709L/R                                   | 3679392120    | Mylar                            | 0.0039 uF | 100 V                | J             |             |         |
| C710L/R                                   | 3679183120    | Mylar                            | 0.018 uF  | 100 V                | J             |             |         |
| C711L/R                                   | 3529561935    | Ceramic Tubular                  | 560 pF    | 50 V                 | K             |             |         |
| C712                                      | 3479333041    | Electric SG                      | 33 uF     | 25 V                 | M             |             |         |
| C713L/R                                   | 3519101935    | Ceramic Tubular                  | 100 pF    | 50 V                 | K             |             |         |
| C715/716                                  | 3479210871    | Electrolytic SA                  | 0.1 uF    | 50 V                 | M             |             |         |
| <b>CONNECTORS</b>                         |               |                                  |           |                      |               |             |         |
| CN701                                     | 436108203331  | Lead Ass'y 200mm 8P              |           |                      |               |             |         |
| CN702                                     | 436106223331  | Lead Ass'y 220mm 6P              |           |                      |               |             |         |
| CN703                                     | 436102483331  | Lead Ass'y 2P, 480 mm            |           |                      |               |             |         |
| <b>IC</b>                                 |               |                                  |           |                      |               |             |         |
| IC701                                     | 2168206103    | KIA7559S/KIA4559S                |           |                      |               |             |         |
| <b>TRANSISTOR</b>                         |               |                                  |           |                      |               |             |         |
| Q701/702                                  | 2208606112    | KTD1302, NPN                     |           |                      |               |             |         |
| Q703                                      | 2208206105    | KTA1015Y/BKTA1266Y, PNP          |           |                      |               |             |         |
| <b>RESISTORS</b>                          |               |                                  |           |                      |               |             |         |
| R701L/R                                   | 3069102970    | Carbon Film                      | 1 kohm    | 1/5W                 | J             |             |         |
| R702L/R                                   | 3069104970    | Carbon Film                      | 100 kohm  | 1/5W                 | J             |             |         |
| R703L/R                                   | 3069224970    | Carbon Film                      | 220 kohm  | 1/5W                 | J             |             |         |
| R704L/R                                   | 3069105970    | Carbon Film                      | 1 Mohm    | 1/5W                 | J             |             |         |
| R705/706                                  | 3069470970    | Carbon Film                      | 47 ohm    | 1/5W                 | J             |             |         |
| R707L/R                                   | 3069102970    | Carbon Film                      | 1 kohm    | 1/5W                 | J             |             |         |
| R708L/R                                   | 3069104970    | Carbon Film                      | 100 kohm  | 1/5W                 | J             |             |         |
| R709L/R                                   | 3069183970    | Carbon Film                      | 18 kohm   | 1/5W                 | J             |             |         |
| R710L/R                                   | 3069392970    | Carbon Film                      | 3.9 kohm  | 1/5W                 | J             |             |         |
| R711L/R                                   | 3069272970    | Carbon Film                      | 2.7 kohm  | 1/5W                 | J             |             |         |
| R712L/R                                   | 3069751970    | Carbon Film                      | 750 ohm   | 1/5W                 | J             |             |         |
| R713/714                                  | 3069102970    | Carbon Film                      | 1 kohm    | 1/5W                 | J             |             |         |
| R715                                      | 3069103970    | Carbon Film                      | 10 kohm   | 1/5W                 | J             |             |         |
| R716                                      | 3069471970    | Carbon Film                      | 470 ohm   | 1/5W                 | J             |             |         |
| R717                                      | 3069750970    | Carbon Film                      | 75 ohm    | 1/5W                 | J             |             |         |
| R718L/R                                   | 3069102970    | Carbon Film                      | 1 kohm    | 1/5W                 | J             |             |         |
| <b>CONNECTORS</b>                         |               |                                  |           |                      |               |             |         |
| CNT102                                    | 4428517410    | Wafer 15P                        |           |                      |               |             |         |
| CNT602                                    | 436109183331  | Lead Ass'y 180mm 9P              |           |                      |               |             |         |
| CNT603                                    | 4428508210    | Wafer 2P                         |           |                      |               |             |         |
| <b>DIODES</b>                             |               |                                  |           |                      |               |             |         |
| D602                                      | 2258599102    | Zener, UZ 4.3 BSB                |           |                      |               |             |         |
| D701                                      | 2058322101    | 1N4148M                          |           |                      |               |             |         |
| D702                                      | 2058322101    | 1N4148M                          |           |                      |               |             |         |
| <b>ICs</b>                                |               |                                  |           |                      |               |             |         |
| IC601/602                                 | 2168206104    | KIA7559P/KIA4559P                |           |                      |               |             |         |
| IC603                                     | 2168007204    | TA7291S                          |           |                      |               |             |         |
| <b>TRANSISTORS</b>                        |               |                                  |           |                      |               |             |         |
| Q601                                      | 2208606112    | KTD1302, NPN                     |           |                      |               |             |         |
| Q602                                      | 2208222105    | KTA114Y, PNP                     |           |                      |               |             |         |
| Q603                                      | 2208606112    | KTD1302, NPN                     |           |                      |               |             |         |
| Q604                                      | 2208222105    | KTA114Y, PNP                     |           |                      |               |             |         |
| Q605                                      | 2208622108    | DTC114TS, NPN                    |           |                      |               |             |         |
| <b>RESISTORS</b>                          |               |                                  |           |                      |               |             |         |
| R601L/R                                   | 3069512970    | Carbon Film                      | 5.1 kohm  | 1/5W                 | J             |             |         |
| R602L/R                                   | 3069183970    | Carbon Film                      | 18 kohm   | 1/5W                 | J             |             |         |
| R603L/R                                   | 3069104970    | Carbon Film                      | 100 kohm  | 1/5W                 | J             |             |         |
| R604/605                                  | 3069101970    | Carbon Film                      | 100 ohm   | 1/5W                 | J             |             |         |
| R606L/R                                   | 3069104970    | Carbon Film                      | 100 kohm  | 1/5W                 | J             |             |         |
| R607/608                                  | 3069512970    | Carbon Film                      | 5.1 kohm  | 1/5W                 | J             |             |         |
| R609                                      | 3069473970    | Carbon Film                      | 47 kohm   | 1/5W                 | J             |             |         |
| R610                                      | 3069102970    | Carbon Film                      | 1 kohm    | 1/5W                 | J             |             |         |
| R611                                      | 3069622970    | Carbon Film                      | 6.2 kohm  | 1/5W                 | J             |             |         |
| R612                                      | 3069104970    | Carbon Film                      | 100 kohm  | 1/5W                 | J             |             |         |
| R613                                      | 3069471970    | Carbon Film                      | 470 ohm   | 1/5W                 | J             |             |         |
| R614                                      | 3069473970    | Carbon Film                      | 47 kohm   | 1/5W                 | J             |             |         |
| R615                                      | 3069102970    | Carbon Film                      | 1 kohm    | 1/5W                 | J             |             |         |
| R616                                      | 3069622970    | Carbon Film                      | 6.2 kohm  | 1/5W                 | J             |             |         |
| R617                                      | 3069104970    | Carbon Film                      | 100 kohm  | 1/5W                 | J             |             |         |
| R618                                      | 3069471970    | Carbon Film                      | 470 ohm   | 1/5W                 | J             |             |         |
| R619/620                                  | 3069101970    | Carbon Film                      | 100 ohm   | 1/5W                 | J             |             |         |
| R621                                      | 3069332970    | Carbon Film                      | 3.3 kohm  | 1/5W                 | J             |             |         |
| R622-624                                  | 3069102970    | Carbon Film                      | 1 kohm    | 1/5W                 | J             |             |         |
| R625-628                                  | 3069471970    | Carbon Film                      | 470 ohm   | 1/5W                 | J             |             |         |
| R630                                      | 3069561970    | Carbon Film                      | 560 ohm   | 1/5W                 | J             |             |         |
| R631                                      | 3069479970    | Carbon Film                      | 4.7 ohm   | 1/5W                 | J             |             |         |
| R632                                      | 3069103970    | Carbon Film                      | 10 kohm   | 1/5W                 | J             |             |         |

| Ref. No.    | Mfr. Part No.       | Description                          | Version   | Ref. No. | Mfr. Part No. | Description | Version |
|-------------|---------------------|--------------------------------------|-----------|----------|---------------|-------------|---------|
| R633        | 3069302970          | Carbon Film                          | 3 kohm    | 1/5W     | J             |             |         |
|             |                     | <b>MISCELLANEOUS</b>                 |           |          |               |             |         |
| 22          | 4628059610          | Switch, Push, Loud                   |           |          |               |             |         |
| 23          | 3228019410          | VR, Motor                            |           |          |               |             |         |
|             |                     | <b>END OF ASS'Y P.C.B VOLUME</b>     |           |          |               |             |         |
| <b>P2-3</b> | <b>054002007522</b> | <b>ASS'Y P.C.B SPEAKER</b>           |           |          |               |             |         |
|             |                     | <b>CONNECTORS</b>                    |           |          |               |             |         |
| CN901       | 436102283321        | Lead Ass'y, 2P, 280mm                |           |          |               |             |         |
| CN902       | 435209403401        | Lead Ass'y, 9P, 400mm                |           |          |               |             |         |
|             |                     | <b>RESISTORS</b>                     |           |          |               |             |         |
| R901/LR     | 3029271572          | Metal Film                           | 270 ohm   | 2 W      | J             |             |         |
|             |                     | <b>MISCELLANEOUS</b>                 |           |          |               |             |         |
|             | 152622100607        | LUG, HI-W AWG #22BK60                |           |          |               |             |         |
| 11          | 4438005020          | Jack, Phone                          |           |          |               |             |         |
| 12          | 4628043810          | Switch, Push, ABS Black              |           |          |               |             |         |
| 13          | 6165147910          | Shield, Fence                        |           |          |               |             |         |
|             |                     | <b>END OF ASS'Y P.C.B SPEAKER</b>    |           |          |               |             |         |
| <b>P2-4</b> | <b>054002007514</b> | <b>ASS'Y P.C.B VOLUME LED</b>        |           |          |               |             |         |
| CNT603      | 435102183181        | Lead Ass'y 180mm 2P                  |           |          |               |             |         |
| D601        | 2308220324          | LED, SLC-22VR5                       |           |          |               |             |         |
|             |                     | <b>END OF ASS'Y P.C.B VOLUME LED</b> |           |          |               |             |         |
| <b>P4</b>   | <b>054002007516</b> | <b>ASS'Y P.C.B INPUT FOR USA/CA</b>  |           |          |               |             |         |
| <b>P4</b>   | <b>054002007965</b> | <b>ASS'Y P.C.B INPUT FOR EUROPE</b>  |           |          |               |             |         |
|             |                     | <b>CAPACITORS</b>                    |           |          |               |             |         |
| C101/LR     | 3519101935          | Ceramic Tubular                      | 100 pF    | 50 V     | K             |             |         |
| C102/LR     | 3529101935          | Ceramic Tubular                      | 100 pF    | 50V      | K Eur.        |             |         |
| C103/LR     | 3479210971          | Electrolytic SA                      | 1 uF      | 50 V     | M             |             |         |
| C104/LR     | 3479332041          | Electric SG                          | 33 uF     | 25 V     | M             |             |         |
| C105/LR     | 3519223935          | Ceramic Tubular                      | 0.022 uF  | 50 V     | K             |             |         |
| C106/LR     | 3679562120          | Mylar                                | 0.0056 uF | 100 V    | J             |             |         |
| C107/LR     | 3679182120          | Mylar                                | 0.0018 uF | 100 V    | J             |             |         |
| C108/LR     | 3479210971          | Electrolytic SA                      | 1 uF      | 50 V     | M             |             |         |
| C109/110    | 3479347041          | Electric SG                          | 47 uF     | 25 V     | M             |             |         |
| C111/LR     | 3679182120          | Mylar                                | 0.0018 uF | 100 V    | J             |             |         |
| C112/LR     | 3519101935          | Ceramic Tubular                      | 100 pF    | 50 V     | K             |             |         |
| C113/LR     | 3529101935          | Ceramic Tubular                      | 100 pF    | 50V      | K Eur.        |             |         |
| C114/LR     | 3519101935          | Ceramic Tubular                      | 100 pF    | 50 V     | K             |             |         |
| C115/LR     | 3529101935          | Ceramic Tubular                      | 100 pF    | 50V      | K Eur.        |             |         |
| C116/LR     | 3519101935          | Ceramic Tubular                      | 100 pF    | 50 V     | K             |             |         |
| C117/LR     | 3529101935          | Ceramic Tubular                      | 100 pF    | 50V      | K Eur.        |             |         |
| C118/LR     | 3519101935          | Ceramic Tubular                      | 100 pF    | 50 V     | K             |             |         |
| C119/LR     | 3519101935          | Ceramic Tubular                      | 100 pF    | 50 V     | K             |             |         |
| C120/LR     | 3529101935          | Ceramic Tubular                      | 100 pF    | 50V      | K Eur.        |             |         |
| C121/LR     | 3519101935          | Ceramic Tubular                      | 100 pF    | 50 V     | K             |             |         |
| C122/LR     | 3519101935          | Ceramic Tubular                      | 100 pF    | 50 V     | K             |             |         |
| C123/LR     | 3529101935          | Ceramic Tubular                      | 100 pF    | 50V      | K Eur.        |             |         |
| C124/LR     | 3519101935          | Ceramic Tubular                      | 100 pF    | 50 V     | K             |             |         |
| C125/LR     | 3519101935          | Ceramic Tubular                      | 100 pF    | 50 V     | K             |             |         |
| C126/LR     | 3529101935          | Ceramic Tubular                      | 100 pF    | 50V      | K Eur.        |             |         |
| C127/LR     | 3479247971          | Electrolytic SA                      | 4.7 uF    | 50 V     | M             |             |         |
| C128/LR     | 3479247971          | Electrolytic SA                      | 4.7 uF    | 50 V     | M             |             |         |
| C129-132    | 3479347041          | Electric SG                          | 47 uF     | 25 V     | M             |             |         |
| C133/134    | 3479210971          | Electrolytic SA                      | 1 uF      | 50 V     | M             |             |         |
| C135        | 3519102935          | Ceramic Tubular                      | 1000 pF   | 50 V     | K             |             |         |
| C136        | 3479210971          | Electrolytic SA                      | 1 uF      | 50 V     | M             |             |         |
| C137        | 3479347041          | Electric SG                          | 47 uF     | 25 V     | M             |             |         |
| C138        | 3479222041          | Electrolytic SA                      | 22 uF     | 25 V     | M             |             |         |
| C139        | 3679223120          | Mylar                                | 0.022 uF  | 100 V    | J             |             |         |
| C140/141    | 3479347041          | Electric SG                          | 47 uF     | 25 V     | M             |             |         |
| C142        | 3479210971          | Electrolytic SA                      | 1 uF      | 50 V     | M             |             |         |
| C143        | 3519102935          | Ceramic Tubular                      | 1000 pF   | 50 V     | K             |             |         |
| C144/145    | 3479210971          | Electrolytic SA                      | 1 uF      | 50 V     | M             |             |         |
| C146        | 3579681130          | Ceramic Disc                         | 680 pF    | 50 V     | K             |             |         |
| C147        | 3579471130          | Ceramic Disc                         | 470 pF    | 50 V     | K             |             |         |
| C148        | 3579270130          | Ceramic Disc                         | 27 pF     | 50 V     | K             |             |         |
| C149        | 3579150130          | Ceramic Disc                         | 15 pF     | 50 V     | K             |             |         |
| C151        | 3579809030          | Ceramic Disc                         | 8 pF      | 50 V     | K             |             |         |
| C152        | 3479332041          | Electric SG                          | 33 uF     | 25 V     | M             |             |         |
| C153        | 3579102130          | Ceramic Disc                         | 1000 pF   | 50 V     | K             |             |         |
| C154        | 3579221130          | Ceramic Disc                         | 220 pF    | 50 V     | K             |             |         |
| C155        | 3679473120          | Mylar                                | 0.047 uF  | 100 V    | J             |             |         |
| C156        | 3479210971          | Electrolytic SA                      | 1 uF      | 50 V     | M             |             |         |
| C157        | 3579221130          | Ceramic Disc                         | 220 pF    | 50 V     | K             |             |         |
| C158        | 3679473120          | Mylar                                | 0.047 uF  | 100 V    | J             |             |         |
| C159        | 3479247871          | Electrolytic SA                      | 0.47 uF   | 50 V     | M             |             |         |
| C160        | 3579681130          | Ceramic Disc                         | 680 pF    | 50 V     | K             |             |         |
| C161        | 3579471130          | Ceramic Disc                         | 470 pF    | 50 V     | K             |             |         |
| C162        | 3579270130          | Ceramic Disc                         | 27 pF     | 50 V     | K             |             |         |
| C163        | 3479332041          | Electric SG                          | 33 uF     | 25 V     | M             |             |         |
| C164        | 3579809130          | Ceramic Disc                         | 8 pF      | 50 V     | K             |             |         |
| C166        | 3579150130          | Ceramic Disc                         | 15 pF     | 50 V     | K             |             |         |
| C167        | 3579102130          | Ceramic Disc                         | 1000 pF   | 50 V     | K             |             |         |
| C168/169    | 3579221130          | Ceramic Disc                         | 220 pF    | 50 V     | K             |             |         |
| C170        | 3679473120          | Mylar                                | 0.047 uF  | 100 V    | J             |             |         |
| C171        | 3479210971          | Electrolytic SA                      | 1 uF      | 50 V     | M             |             |         |
| C172        | 3679473120          | Mylar                                | 0.047 uF  | 100 V    | J             |             |         |
| C173-175    | 3579472530          | Ceramic Tubular                      | 0.0047 uF | 50 V     | K             |             |         |
| C176        | 3479347041          | Electric SG                          | 47 uF     | 25 V     | M             |             |         |
| C178        | 3479347041          | Electric SG                          | 47 uF     | 25 V     | M             |             |         |
| C187        | 3579104530          | Ceramic Disc                         | 0.1 uF    | 50 V     | K             |             |         |
| C188        | 3579473530          | Ceramic Disc                         | 0.047 uF  | 50 V     | K             |             |         |
|             |                     | <b>CONNECTORS</b>                    |           |          |               |             |         |
| CN101       | 436109303331        | Lead Ass'y 300mm 9P                  |           |          |               |             |         |
| CN102       | 436215163332        | Lead Ass'y 160mm 15P                 |           |          |               |             |         |
| CN103       | 436107463331        | Lead Ass'y 460mm 7P                  |           |          |               |             |         |
| CN104       | 436104308331        | Lead Ass'y 300mm 4P                  |           |          |               |             |         |
| CN108       | 436402443331        | Lead Ass'y 440mm 2P                  |           |          |               |             |         |
| CN109       | 436102223331        | Lead Ass'y 220mm 2P                  |           |          |               |             |         |
| CP105       | 4428550120          | Wafer 12P GD                         |           |          |               |             |         |
| CP106       | 4428550080          | Wafer 8P GD                          |           |          |               |             |         |
| CP107       | 4428550060          | Wafer 6P GD                          |           |          |               |             |         |
| CP110 (CP2) | 4428525790          | Wafer 3P AC                          |           |          |               |             |         |
| CP207       | 4428525860          | Wafer 1P AC                          |           |          |               |             |         |
| CP401       | 4428526370          | Wafer, FPC, 25P                      |           |          |               |             |         |
| CP701       | 4428505510          | Wafer 8P                             |           |          |               |             |         |
| CP702       | 4428505810          | Wafer 6P                             |           |          |               |             |         |
|             |                     | <b>DIODES</b>                        |           |          |               |             |         |
| D101-104    | 2058322101          | 1N4148M                              |           |          |               |             |         |
| D106-108    | 2058322101          | 1N4148M                              |           |          |               |             |         |
| D110/111    | 2058322101          | 1N4148M                              |           |          |               |             |         |
| D116/117    | 2058322101          | 1N4148M                              |           |          |               |             |         |
|             |                     | <b>ICs</b>                           |           |          |               |             |         |
| IC101/102   | 2168017132          | LC7821                               |           |          |               |             |         |
| IC103       | 2168206107          | KIA6259P                             |           |          |               |             |         |
| IC104/105   | 2168206104          | KIA7559P/KIA4559P                    |           |          |               |             |         |
| IC106       | 2408000136          | LTV817, Photo-Coupler                |           |          |               |             |         |
|             |                     | <b>TRANSISTORS</b>                   |           |          |               |             |         |
| Q101-104    | 2208606104          | KTC1815Y/BKTC3198Y,NPN               |           |          |               |             |         |
| Q105        | 2208222105          | DTA114YS, PNP                        |           |          |               |             |         |
| Q106/107    | 2208606108          | KTC2240/BKTC3200, NPN                |           |          |               |             |         |
| Q108/109    | 2208606104          | KTC1815Y/BKTC3198Y,NPN               |           |          |               |             |         |
| Q110        | 2208206107          | BKTA949/KTA1024, PNP                 |           |          |               |             |         |
| Q111        | 2208606102          | KTC2229/KTC3206, NPN                 |           |          |               |             |         |
| Q113        | 2228406120          | BKTC2235/KTC1027, NPN                |           |          |               |             |         |
| Q114        | 2228106107          | BKTA965/KTA1023, PNP                 |           |          |               |             |         |
| Q117/118    | 2208606108          | KTC2240/BKTC3200, NPN                |           |          |               |             |         |
| Q119/120    | 2208606104          | KTC1815Y/BKTC3198Y,NPN               |           |          |               |             |         |
| Q121        | 2208206102          | BKTA949/KTA1024, PNP                 |           |          |               |             |         |
| Q122        | 2208606107          | KTC2229/KTC3206, NPN                 |           |          |               |             |         |
| Q124        | 2228406120          | BKTC2235/KTC1027, NPN                |           |          |               |             |         |
| Q125        | 2228106107          | BKTA965/KTA1023, PNP                 |           |          |               |             |         |
| Q128/129    | 2208606104          | KTC1815Y/BKTC3198Y,NPN               |           |          |               |             |         |

| Ref. No. | Mfr. Part No. | Description      | Version         | Ref. No.    | Mfr. Part No.       | Description                         | Version              |
|----------|---------------|------------------|-----------------|-------------|---------------------|-------------------------------------|----------------------|
| Q130     | 2208222105    | DTA114YS, PNP    |                 | R183        | 3069272970          | Carbon Film                         | 2.7 kohm 1/5W J      |
|          |               | <b>RESISTORS</b> |                 | R184        | 3069102970          | Carbon Film                         | 1 kohm 1/5W J        |
| R101L/R  | 3069102970    | Carbon Film      | 1 kohm 1/5W J   | R185        | 3069121970          | Carbon Film                         | 120 ohm 1/5W J       |
| R102L/R  | 3069913970    | Carbon Film      | 91 kohm 1/5W J  | R186        | 3069221970          | Carbon Film                         | 220 ohm 1/5W J       |
| R103L/R  | 3069913970    | Carbon Film      | 91 kohm 1/5W J  | R187/188    | 3059278682          | Cement                              | 0.27 ohm 3 W K       |
| R104L/R  | 3069821970    | Carbon Film      | 820 ohm 1/5W J  | R189        | 3069271970          | Carbon Film                         | 270 ohm 1/5W J       |
| R105L/R  | 3069564970    | Carbon Film      | 560 kohm 1/5W J | R190        | 3069472970          | Carbon Film                         | 4.7 kohm 1/5W J      |
| R106L/R  | 3069433970    | Carbon Film      | 43 kohm 1/5W J  | R191        | 3069153970          | Carbon Film                         | 15 kohm 1/5W J       |
| R107/108 | 3069470970    | Carbon Film      | 47 ohm 1/5W J   | R192        | 3069100270          | Carbon Film                         | 10 ohm 1/4W J        |
| R109L/R  | 3069471970    | Carbon Film      | 470 ohm 1/5W J  | R193        | 3069100270          | Carbon Film                         | 10 ohm 1/4W J        |
| R110L/R  | 3069104970    | Carbon Film      | 100 kohm 1/5W J | R194/195    | 3069243970          | Carbon Film                         | 24 kohm 1/5W J       |
| R111L/R  | 3069102970    | Carbon Film      | 1 kohm 1/5W J   | R196        | 3069392970          | Carbon Film                         | 3.9 kohm 1/5W J      |
| R112L/R  | 3069102970    | Carbon Film      | 1 kohm 1/5W J   | R197        | 3069470970          | Carbon Film                         | 47 ohm 1/5W J        |
| R113L/R  | 3069102970    | Carbon Film      | 1 kohm 1/5W J   | R198        | 3069473970          | Carbon Film                         | 47 kohm 1/5W J       |
| R114L/R  | 3069102970    | Carbon Film      | 1 kohm 1/5W J   | R199        | 3069271970          | Carbon Film                         | 270 ohm 1/5W J       |
| R115L/R  | 3069102970    | Carbon Film      | 1 kohm 1/5W J   | R200        | 3069101970          | Carbon Film                         | 100 ohm 1/5W J       |
| R116L/R  | 3069102970    | Carbon Film      | 1 kohm 1/5W J   | R201        | 3069102970          | Carbon Film                         | 1 kohm 1/5W J        |
| R117L/R  | 3069102970    | Carbon Film      | 1 kohm 1/5W J   | R202        | 3069102970          | Carbon Film                         | 1 kohm 1/5W J        |
| R118L/R  | 3069102970    | Carbon Film      | 1 kohm 1/5W J   |             |                     | <b>MISCELLANEOUS</b>                |                      |
| R119L/R  | 3069102970    | Carbon Film      | 1 kohm 1/5W J   | 32          | 4438108110          | Jack, RAC, 4P                       |                      |
| R120L/R  | 3069473970    | Carbon Film      | 47 kohm 1/5W J  | 35          | 4438103210          | Jack, RCA, 6P                       |                      |
| R121     | 3069471970    | Carbon Film      | 470 ohm 1/5W J  | 38          | 4408107410          | Terminal, Speaker, 6P               |                      |
| R122L/R  | 3069104970    | Carbon Film      | 100 kohm 1/5W J | 39          | 4438006510          | Jack, Multi                         |                      |
| R123-126 | 3069471970    | Carbon Film      | 470 ohm 1/5W J  | G1          | 4235007310          | Ground Plate                        |                      |
| R127     | 3069104970    | Carbon Film      | 100 kohm 1/5W J | 57          | 4438103110          | Terminal, 4P                        |                      |
| R128/129 | 3069102970    | Carbon Film      | 1 kohm 1/5W J   | 58          | 4438108010          | Jack, RAC, 4P, with Ground          |                      |
| R130     | 3069104970    | Carbon Film      | 100 kohm 1/5W J |             | 152624101043        | LUG, HI-WP #24BK FF 100             |                      |
| R131     | 3069123970    | Carbon Film      | 12 kohm 1/5W J  |             | 152624101843        | LUG, HI-WP #24BK FF 180             |                      |
| R132     | 3069202970    | Carbon Film      | 2 kohm 1/5W J   |             |                     | <b>END OF ASS'Y P.C.B INPUT</b>     |                      |
| R133     | 3069104970    | Carbon Film      | 100 kohm 1/5W J | <b>P4-1</b> | <b>054002007518</b> | <b>ASS'Y P.C.B TUNER FOR USA/CA</b> |                      |
| R134     | 3069471970    | Carbon Film      | 470 ohm 1/5W J  | <b>P4-1</b> | <b>054002007967</b> | <b>ASS'Y P.C.B TUNER FOR EUROPE</b> |                      |
| R135     | 3069332970    | Carbon Film      | 3.3 kohm 1/5W J |             |                     | <b>CAPACITORS</b>                   |                      |
| R136     | 3069222970    | Carbon Film      | 2.2 kohm 1/5W J | C801        | 3479310141          | Electric SG                         | 100 uF 25 V M        |
| R137/138 | 3069471970    | Carbon Film      | 470 ohm 1/5W J  | C802        | 3519223935          | Ceramic Tubular                     | 0.022 uF 50 V K      |
| R139     | 3069104970    | Carbon Film      | 100 kohm 1/5W J | C804-809    | 3519223935          | Ceramic Tubular                     | 0.022 uF 50 V K      |
| R140     | 3069202970    | Carbon Film      | 2 kohm 1/5W J   | C810        | 3479347041          | Electric SG                         | 47 uF 25 V M         |
| R141     | 3069123970    | Carbon Film      | 12 kohm 1/5W J  | C811        | 3519820935          | Ceramic Tubular                     | 82 pF 50 V K Eur.    |
| R144     | 3069104970    | Carbon Film      | 100 kohm 1/5W J | C812        | 3519101935          | Ceramic Tubular                     | 100 pF 50V K Eur.    |
| R145     | 3069471970    | Carbon Film      | 470 ohm 1/5W J  | C813        | 3679333120          | Mylar                               | 0.033 uF 100 V J     |
| R146     | 3069332970    | Carbon Film      | 3.3 kohm 1/5W J | C814        | 3519331935          | Ceramic Tubular                     | 330 pF 50 V K USA/CA |
| R147     | 3069393970    | Carbon Film      | 39 kohm 1/5W J  | C814        | 3519101935          | Ceramic Tubular                     | 100 pF 50V K Eur.    |
| R148     | 3069681970    | Carbon Film      | 680 ohm 1/5W J  | C815        | 3479247871          | Electrolytic SA                     | 0.47 uF 50 V M       |
| R149/150 | 3069103970    | Carbon Film      | 10 kohm 1/5W J  | C816        | 3519223935          | Ceramic Tubular                     | 0.022 uF 50 V K      |
| R151/152 | 3069433970    | Carbon Film      | 43 kohm 1/5W J  | C817        | 3479247971          | Electrolytic SA                     | 4.7 uF 50 V M        |
| R153     | 3069433970    | Carbon Film      | 43 kohm 1/5W J  | C818        | 3479233971          | Electrolytic SA                     | 3.3 uF 50 V M        |
| R154     | 3069182970    | Carbon Film      | 1.8 kohm 1/5W J | C819        | 3479247971          | Electrolytic SA                     | 4.7 uF 50 V M        |
| R155     | 3069393970    | Carbon Film      | 39 kohm 1/5W J  | C820        | 3519470935          | Ceramic Tubular                     | 47 pF 50 V K         |
| R156     | 3069332970    | Carbon Film      | 3.3 kohm 1/5W J | C821        | 3519223935          | Ceramic Tubular                     | 0.022 uF 50 V K      |
| R157     | 3069104970    | Carbon Film      | 100 kohm 1/5W J | C822        | 3679332120          | Mylar                               | 0.0033 uF 100 V J    |
| R159     | 3069121970    | Carbon Film      | 120 ohm 1/5W J  | C823        | 3479222971          | Electrolytic SA                     | 2.2 uF 50 V M        |
| R160     | 3069102970    | Carbon Film      | 1 kohm 1/5W J   | C824/825    | 3528330210          | Ceramic Disc CH                     | 33 pF 50 V K         |
| R161     | 3069272970    | Carbon Film      | 2.7 kohm 1/5W J | C826-828    | 3519101935          | Ceramic Tubular                     | 100 pF 50 V K        |
| R162     | 3069121970    | Carbon Film      | 120 ohm 1/5W J  | C829        | 3519103935          | Ceramic Tubular                     | 0.01 uF 50 V K       |
| R163     | 3069221970    | Carbon Film      | 220 ohm 1/5W J  | C830        | 3479210971          | Electrolytic SA                     | 1 uF 50 V M          |
| R164/165 | 3059278682    | Cement           | 0.27 ohm 3 W K  | C831        | 3479347041          | Electric SG                         | 47 uF 25 V M         |
| R166     | 3069471970    | Carbon Film      | 470 ohm 1/5W J  | C832        | 3519223935          | Ceramic Tubular                     | 0.022 uF 50 V K      |
| R167     | 3069472970    | Carbon Film      | 4.7 kohm 1/5W J | C833        | 3479347041          | Electric SG                         | 47 uF 25 V M         |
| R168     | 3069153970    | Carbon Film      | 15 kohm 1/5W J  | C834        | 3519223935          | Ceramic Tubular                     | 0.022 uF 50 V K      |
| R169     | 3069100270    | Carbon Film      | 10 ohm 1/4W J   | C835        | 3679473120          | Mylar                               | 0.047 uF 100 V J     |
| R170     | 3069100270    | Carbon Film      | 10 ohm 1/4W J   | C836        | 3619471110          | Poly                                | 470 pF 50 V J        |
| R171     | 3069393970    | Carbon Film      | 39 kohm 1/5W J  | C837        | 3479210071          | Electrolytic SA                     | 10 uF 50 V M         |
| R172/173 | 3069103970    | Carbon Film      | 10 kohm 1/5W J  | C838        | 3519223935          | Ceramic Tubular                     | 0.022 uF 50 V K      |
| R174     | 3069681970    | Carbon Film      | 680 ohm 1/5W J  | C839        | 3519103935          | Ceramic Tubular                     | 0.01 uF 50 V K       |
| R175     | 3069104970    | Carbon Film      | 100 kohm 1/5W J | C840        | 3479233971          | Electrolytic SA                     | 3.3 uF 50 V M        |
| R176     | 3069332970    | Carbon Film      | 3.3 kohm 1/5W J | C841/842    | 3479210971          | Electrolytic SA                     | 1 uF 50 V M          |
| R177/178 | 3069432970    | Carbon Film      | 4.3 kohm 1/5W J | C843        | 3479233971          | Electrolytic SA                     | 3.3 uF 50 V M        |
| R179     | 3069433970    | Carbon Film      | 43 kohm 1/5W J  | C844        | 3619102110          | Poly                                | 1000 pF 50 V J       |
| R180     | 3069182970    | Carbon Film      | 1.8 kohm 1/5W J | C845        | 3679473120          | Mylar                               | 0.047 uF 100 V J     |
| R181     | 3069393970    | Carbon Film      | 39 kohm 1/5W J  | C846        | 3519681935          | Ceramic Tubular                     | 680 pF 50 V K        |
| R182     | 3069121970    | Carbon Film      | 120 ohm 1/5W J  |             |                     |                                     |                      |

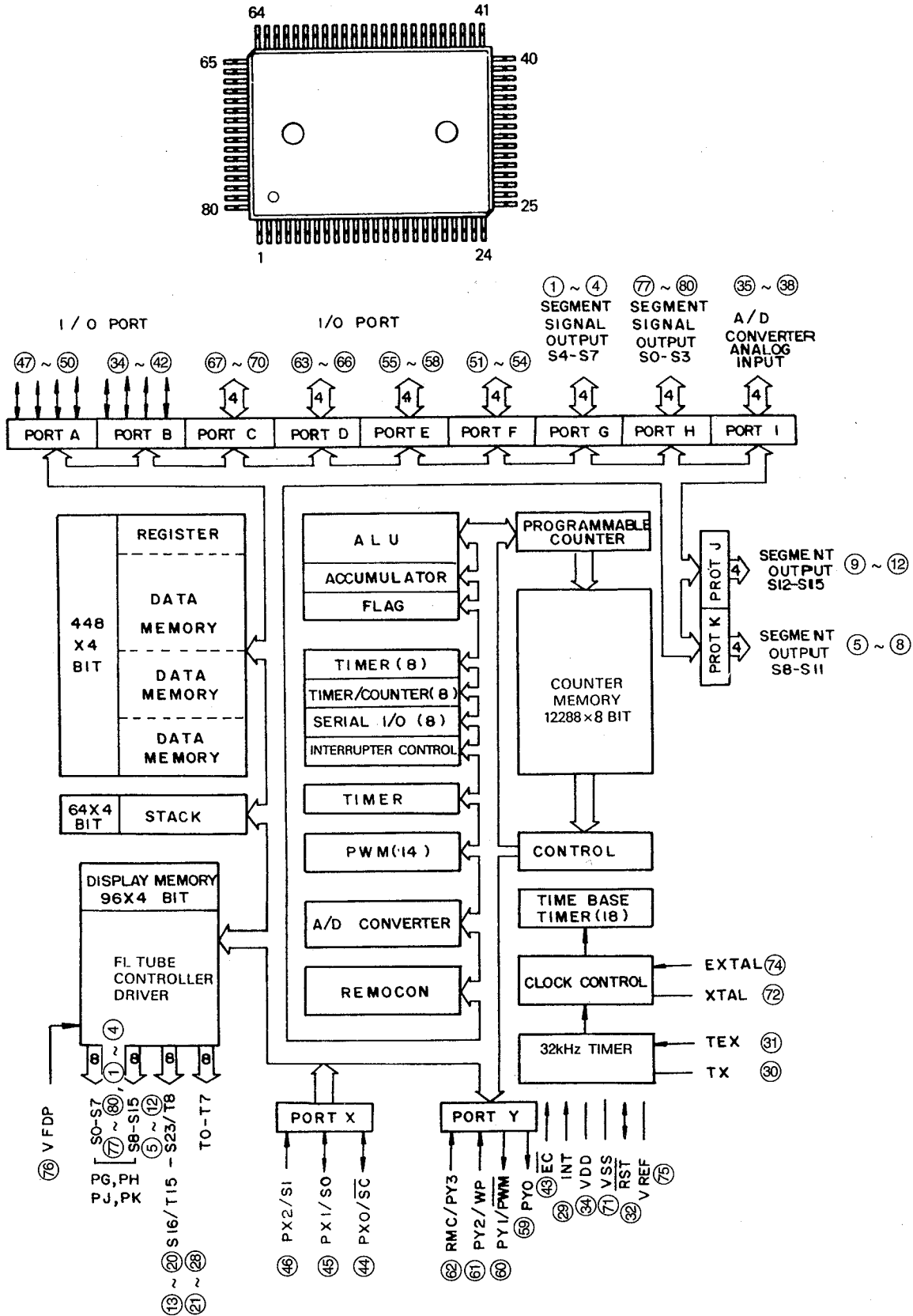
| Ref. No.                        | Mfr. Part No.       | Description                  | Version           | Ref. No.           | Mfr. Part No. | Description              | Version                  |
|---------------------------------|---------------------|------------------------------|-------------------|--------------------|---------------|--------------------------|--------------------------|
| R842/843                        | 3069102970          | Carbon Film                  | 1 kohm 1/5W J     | C847/848           | 3479222061    | Electrolytic SA          | 22 uF 35 V M             |
| R844/845                        | 3069302970          | Carbon Film                  | 3 kohm 1/5W J     | C849/850           | 3679152120    | Mylar                    | 0.0015 uF 100 V J USA/CA |
| R850                            | 3069471970          | Carbon Film                  | 470 ohm 1/5W J    | C849/850           | 3679102120    | Mylar                    | 0.001 uF 100V J Eur.     |
| R865                            | 3069103970          | Carbon Film                  | 10 kohm 1/5W J    | C851               | 3519151935    | Ceramic Tubular          | 150 pF 50 V K            |
| R867/868                        | 3069104970          | Carbon Film                  | 100 kohm 1/5W J   | C852/853           | 3479222971    | Electrolytic SA          | 2.2 uF 50 V M            |
| R869                            | 3069102970          | Carbon Film                  | 1 kohm 1/5W J     | C856/857           | 3679392120    | Mylar                    | 0.0039 uF 100 V J        |
| R870                            | 3069562970          | Carbon Film                  | 5.6 kohm 1/5W J   | C858               | 3479310141    | Electric SG              | 100 uF 25 V M            |
| R888/889                        | 3069271970          | Carbon Film                  | 270 ohm 1/5W J    | TC801              | 3579200130    | Ceramic, Disc            | 20 pF 50 V K             |
| R890/891                        | 3069221970          | Carbon Film                  | 220 ohm 1/5W J    | TC802              | 3579100030    | Ceramic, Disc            | 10 pF 50 V K             |
| R892-898                        | 3069271970          | Carbon Film                  | 270 ohm 1/5W J    |                    |               |                          |                          |
| <b>COILS</b>                    |                     |                              |                   | <b>FILTERS</b>     |               |                          |                          |
| L801                            | 2648601430          | Coil, 20.8 mH                |                   | CF801-803          | 3908011001    | SFE10.7MA8               |                          |
| T801                            | 2608201120          | AM ANT                       |                   | CF804              | 3908001380    | SFZ450F                  |                          |
| T802                            | 2638201150          | OSC., AM                     |                   | CF805              | 3908001020    | BFU450C                  |                          |
| T803                            | 2838501110          | FM Quad DET(A)               |                   | <b>CONNECTORS</b>  |               |                          |                          |
| T804                            | 2838501210          | FM Quad DET(B)               |                   | CN105              | 4428560120    | Connector, GB200-12S-LS  |                          |
| T805                            | 2848001250          | AM IFT, P-7SB                |                   | <b>DIODES</b>      |               |                          |                          |
| T806/807                        | 2658001050          | MPX 19 k/38 kHz, Coil, Black |                   | D801               | 2258599103    | Zener, UZ 5.1 BSB        |                          |
| VR801                           | 3248020343          | Semi, 20K(B)                 |                   | D802/803           | 2058322101    | 1N4148M                  |                          |
| VR802                           | 3248050343          | Semi, 50K(B)                 |                   | VD1/VD2            | 2058819106    | KV1236Z, Diode, Varactor |                          |
| VR803                           | 3248050243          | Semi, 5K(B)                  |                   | <b>ICs</b>         |               |                          |                          |
| VR804                           | 3248020443          | Semi, 200K(B)                |                   | IC801              | 2168017128    | LA1266                   |                          |
| <b>MISCELLANEOUS</b>            |                     |                              |                   | IC802              | 2138017112    | LM7001                   |                          |
| 33                              | 4408108310          | Terminal, Antenna            | USA/CA            | IC803              | 2168411105    | HA12016                  |                          |
|                                 | 4408108210          | Terminal, Antenna            | Eur.              | <b>TRANSISTORS</b> |               |                          |                          |
| FE1                             | 3928101790          | FM Front End,3-505H          | USA/CA            | Q801               | 2208406103    | KTC1923Y, NPN            |                          |
| FE1                             | 3928801890          | FM Front End,FE407-G60       | Eur.              | Q802               | 2018211100    | 2SK168, FET              |                          |
| XT801                           | 3908101031          | Resonator, 7.2MHz            |                   | Q803               | 2208606108    | KTC2240/BKTC3200, NPN    |                          |
| <b>END OF ASS'Y P.C.B TUNER</b> |                     |                              |                   | Q804               | 2208222105    | DTA114YS, PNP            |                          |
| <b>P3</b>                       | <b>054002007503</b> | <b>ASS'Y P.C.B SURROUND</b>  |                   | Q805/806           | 2208606104    | KTC1815Y/BKTC3198Y,NPN   |                          |
| <b>CAPACITORS</b>               |                     |                              |                   | Q808               | 2208222105    | DTA114YS, PNP            |                          |
| C501                            | 3479210071          | Electrolytic SA              | 10 uF 50 V M      | <b>RESISTORS</b>   |               |                          |                          |
| C502                            | 3479347041          | Electric SG                  | 47 uF 25 V M      | R801               | 3069104970    | Carbon Film              | 100k ohm 1/5W J Eur.     |
| C503-505                        | 3479210071          | Electrolytic SA              | 10 uF 50 V M      | R802               | 3069623970    | Carbon Film              | 62K ohm 1/5W J Eur.      |
| C506                            | 3479347041          | Electric SG                  | 47 uF 25 V M      | R803               | 3069471970    | Carbon Film              | 470 ohm 1/5W J           |
| C507/508                        | 3479210071          | Electrolytic SA              | 10 uF 50 V M      | R804               | 3069332970    | Carbon Film              | 3.3 kohm 1/5W J          |
| C509/510                        | 3479347041          | Electric SG                  | 47 uF 25 V M      | R805/806           | 3069331970    | Carbon Film              | 330 ohm 1/5W J           |
| C511                            | 3519101935          | Ceramic Tubular              | 100 pF 50 V K     | R807               | 3069103970    | Carbon Film              | 10 kohm 1/5W J           |
| C512                            | 3479210971          | Electrolytic SA              | 1 uF 50 V M       | R808               | 3069332970    | Carbon Film              | 3.3 kohm 1/5W J          |
| C513                            | 3479247871          | Electrolytic SA              | 0.47 uF 50 V J    | R809               | 3069473970    | Carbon Film              | 47 kohm 1/5W J           |
| C514                            | 3479347041          | Electric SG                  | 47 uF 25 V M      | R810               | 3069820970    | Carbon Film              | 82 ohm 1/5W J            |
| C515                            | 3519681935          | Ceramic Tubular              | 680 pF 50 V K     | R811               | 3069243970    | Carbon Film              | 24 kohm 1/5W J           |
| C516                            | 3479210971          | Electrolytic SA              | 1 uF 50 V M       | R812               | 3069103970    | Carbon Film              | 10 kohm 1/5W J           |
| C517                            | 3479347041          | Electric SG                  | 47 uF 25 V M      | R813               | 3069272970    | Carbon Film              | 2.7 kohm 1/5W J          |
| C518                            | 3479210971          | Electrolytic SA              | 1 uF 50 V M       | R814               | 3069472970    | Carbon Film              | 4.7 kohm 1/5W J          |
| C519                            | 3519681935          | Ceramic Tubular              | 680 pF 50 V K     | R815               | 3069222970    | Carbon Film              | 2.2 kohm 1/5W J USA/CA   |
| C520                            | 3479210971          | Electrolytic SA              | 1 uF 50 V M       | R815               | 3069332970    | Carbon Film              | 3.3k ohm 1/5W J Eur.     |
| C521                            | 3519101935          | Ceramic Tubular              | 100 pF 50 V K     | R816               | 3069272970    | Carbon Film              | 2.7 kohm 1/5W J          |
| C522                            | 3679104297          | Mylar                        | 0.1 uF 63 V J     | R817/818           | 3069104970    | Carbon Film              | 100 kohm 1/5W J          |
| C523                            | 3679223297          | Mylar                        | 0.022 uF 63 V J   | R819               | 3069473970    | Carbon Film              | 47 kohm 1/5W J           |
| C524/525                        | 3479247971          | Electrolytic SA              | 4.7 uF 50 V M     | R820               | 3069223970    | Carbon Film              | 22 kohm 1/5W J           |
| C526-528                        | 3679224297          | Mylar                        | 0.22 uF 63 V J    | R821-823           | 3069102970    | Carbon Film              | 1 kohm 1/5W J            |
| C529                            | 3679684297          | Mylar                        | 0.68 uF 63 V J    | R824               | 3069821970    | Carbon Film              | 820 ohm 1/5W J           |
| C530                            | 3619471110          | Poly                         | 470 pF 50 V J     | R825               | 3069152970    | Carbon Film              | 1.5 kohm 1/5W J          |
| C531                            | 3679473120          | Mylar                        | 0.047 uF 100 V J  | R826               | 3069103970    | Carbon Film              | 10 kohm 1/5W J           |
| C532                            | 3679222120          | Mylar                        | 0.0022 uF 100 V J | R827               | 3069102970    | Carbon Film              | 1 kohm 1/5W J            |
| C533                            | 3479210971          | Electrolytic SA              | 1 uF 50 V M       | R828               | 3069101970    | Carbon Film              | 100 ohm 1/5W J           |
| C534                            | 3479322131          | Electric SG                  | 220 uF 16 V M     | R829/830           | 3069104970    | Carbon Film              | 100 kohm 1/5W J          |
| C535                            | 3679562120          | Mylar                        | 0.0056 uF 100 V J | R831/832           | 3069223970    | Carbon Film              | 22 kohm 1/5W J           |
| C536/537                        | 3479210971          | Electrolytic SA              | 1 uF 50 V M       | R833/834           | 3069332970    | Carbon Film              | 3.3 kohm 1/5W J USA/CA   |
| C538                            | 3479322131          | Electric SG                  | 220 uF 16 V M     | R833/834           | 3069203970    | Carbon Film              | 2k ohm 1/5W J Eur.       |
| C539                            | 3479210071          | Electrolytic SA              | 10 uF 50 V M      | R835/836           | 3069473970    | Carbon Film              | 47 kohm 1/5W J           |
| C540                            | 3479222871          | Electrolytic SA              | 0.22 uF 50 V K    | R837               | 3069392970    | Carbon Film              | 3.9 kohm 1/5W J          |
| C541-543                        | 3479210971          | Electrolytic SA              | 1 uF 50 V M       | R838-839           | 3069332970    | Carbon Film              | 3.3 kohm 1/5W J USA/CA   |
| C544-546                        | 3679104297          | Mylar                        | 0.1 uF 63 V J     | R838/839           | 3069243970    | Carbon Film              | 2.4k ohm 1/5W J Eur.     |
| C547/548                        | 3679224297          | Mylar                        | 0.22 uF 63 V J    | R840-841           | 3069332970    | Carbon Film              | 3.3 kohm 1/5W J USA/CA   |
| C549                            | 3679104297          | Mylar                        | 0.1 uF 63 V J     |                    |               |                          |                          |
| C550                            | 3679473120          | Mylar                        | 0.047 uF 100 V J  |                    |               |                          |                          |

| Ref. No.           | Mfr. Part No. | Description             | Version           | Ref. No.  | Mfr. Part No.                | Description                     | Version         |
|--------------------|---------------|-------------------------|-------------------|---|------------------------------|---------------------------------|-----------------|
| C551               | 3619681110    | Poly                    | 680 pF 50 V J     | R527  | 3069182970                   | Carbon Film                     | 1.8 kohm 1/5W J |
| C552               | 3679104297    | Mylar                   | 0.1 uF 63 V J     | R528  | 3069564970                   | Carbon Film                     | 560 kohm 1/5W J |
| C553               | 3619681110    | Poly                    | 680 pF 50 V J     | R529-531  | 3069102970                   | Carbon Film                     | 1 kohm 1/5W J   |
| C554               | 3679473120    | Mylar                   | 0.047 uF 100 V J  | R532  | 3069334970                   | Carbon Film                     | 330 kohm 1/5W J |
| C555               | 3479210061    | Electrolytic SA         | 10 uF 35 V M      | R533-535  | 3069153970                   | Carbon Film                     | 15 kohm 1/5W J  |
| C556               | 3479210971    | Electrolytic SA         | 1 uF 50 V M       | R536-538  | 3069104970                   | Carbon Film                     | 100 kohm 1/5W J |
| C557/558           | 3679104297    | Mylar                   | 0.1 uF 63 V J     | R539  | 3069470970                   | Carbon Film                     | 47 ohm 1/5W J   |
| C559               | 3479210971    | Electrolytic SA         | 1 uF 50 V M       | R540/541  | 3069104970                   | Carbon Film                     | 100 kohm 1/5W J |
| C560               | 3479210061    | Electrolytic SA         | 10 uF 35 V M      | R542  | 3069473970                   | Carbon Film                     | 47 kohm 1/5W J  |
| C561               | 3679472120    | Mylar                   | 0.0047 uF 100 V J | R543  | 3069752970                   | Carbon Film                     | 7.5 kohm 1/5W J |
| C562               | 3479222071    | Electrolytic SA         | 22 uF 50 V M      | R544  | 3069473970                   | Carbon Film                     | 47 kohm 1/5W J  |
| C563               | 3679562120    | Mylar                   | 0.0056 uF 100 V J | R545  | 3069153970                   | Carbon Film                     | 15 kohm 1/5W J  |
| C564               | 3479310121    | Electric SG             | 100 uF 10 V M     | R546  | 3069752970                   | Carbon Film                     | 7.5 kohm 1/5W J |
| C565               | 3579104530    | Ceramic Tubular         | 0.1 uF 50 V K     | R547  | 3069473970                   | Carbon Film                     | 47 kohm 1/5W J  |
| C566               | 3679562120    | Mylar                   | 0.0056 uF 100 V J | R548  | 3069153970                   | Carbon Film                     | 15 kohm 1/5W J  |
| C567               | 3579471130    | Ceramic Disc            | 470 pF 50 V K     | R549  | 3069223970                   | Carbon Film                     | 22 kohm 1/5W J  |
| C568               | 3679104297    | Mylar                   | 0.1 uF 63 V J     | R550  | 3069106970                   | Carbon Film                     | 10 Mohm 1/5W J  |
| C569               | 3479347041    | Electric SG             | 47 uF 25 V M      | R551  | 3069223970                   | Carbon Film                     | 22 kohm 1/5W J  |
| C570/571           | 3679473120    | Mylar                   | 0.047 uF 100 V J  | R552  | 3069104970                   | Carbon Film                     | 100 kohm 1/5W J |
| C572               | 3679104297    | Mylar                   | 0.1 uF 63 V J     | R553  | 3069822970                   | Carbon Film                     | 8.2 kohm 1/5W J |
| C573               | 3679332120    | Mylar                   | 0.0033 uF 100 V J | R554  | 3069752970                   | Carbon Film                     | 7.5 kohm 1/5W J |
| C574               | 3579471130    | Ceramic Disc            | 470 pF 50 V K     | R555  | 3069560970                   | Carbon Film                     | 56 ohm 1/5W J   |
| C576/577           | 3579271130    | Ceramic Disc            | 270 pF 100 V K    | R556  | 3069183970                   | Carbon Film                     | 18 kohm 1/5W J  |
| C578-580           | 3519101935    | Ceramic Tubular         | 100 pF 50 V K     | R557  | 3069562970                   | Carbon Film                     | 5.6 kohm 1/5W J |
| C582               | 3479347041    | Electric SG             | 47 uF 25 V M      | R558  | 3069220970                   | Carbon Film                     | 22 ohm 1/5W J   |
| C583               | 3579103530    | Ceramic Tubular         | 0.01 uF 50 V K    | R559  | 3069153970                   | Carbon Film                     | 15 kohm 1/5W J  |
| C584               | 3519101935    | Ceramic Tubular         | 100 pF 50 V K     | R560  | 3069220970                   | Carbon Film                     | 22 ohm 1/5W J   |
| C585               | 3479310121    | Electric SG             | 100 uF 10 V M     | R561  | 3069183970                   | Carbon Film                     | 18 kohm 1/5W J  |
| <b>CONNECTORS</b>  |               |                         |                   | R562  | 3069153970                   | Carbon Film                     | 15 kohm 1/5W J  |
| CNT106             | 4428560080    | Connector, GB200-08S-LS |                   | R563  | 3069470970                   | Carbon Film                     | 47 ohm 1/5W J   |
| CNT107             | 4428560060    | Connector, GB200-06S-LS |                   | R564  | 3069105970                   | Carbon Film                     | 1 Mohm 1/5W J   |
| CNT602             | 4428507010    | Wafer 9P                |                   | R565-567  | 3069102970                   | Carbon Film                     | 1 kohm 1/5W J   |
| <b>DIODES</b>      |               |                         |                   | R569  | 3069471970                   | Carbon Film                     | 470 ohm 1/5W J  |
| D501-503           | 2058322101    | 1N4148M                 |                   | R570  | 3069102970                   | Carbon Film                     | 1 kohm 1/5W J   |
| <b>ICs</b>         |               |                         |                   | R571/572  | 3069102970                   | Carbon Film                     | 1 kohm 1/5W J   |
| IC501/502          | 2168206103    | KIA7559S/KIA4559S       |                   | R573  | 3069101970                   | Carbon Film                     | 100 ohm 1/5W J  |
| IC503/504          | 2138017108    | LC4966                  |                   | <b>X-TAL</b>  |                              |                                 |                 |
| IC505              | 2168206104    | KIA7559P/KIA4559P       |                   | X501  | 3938131740                   | Resonator, 2MHz                 |                 |
| IC506              | 2138007124    | TC9176P                 |                   | <b>END OF ASS'Y P.C.B SURROUND</b>                          |                              |                                 |                 |
| IC507              | 2168020115    | NJM2177L                |                   | <b>P5 05858200079 ASS'Y COMMANDER</b>                       |                              |                                 |                 |
| IC508              | 2168020114    | NJU9701D                |                   | 1   | 048582001124                 | Cover, top                      |                 |
| IC509              | 2138009115    | MC14094BCP              |                   | 2   | 8582001210                   | Cover, Bottom                   |                 |
| <b>TRANSISTORS</b> |               |                         |                   | 3   | 8583004410                   | Cover, Battery                  |                 |
| Q501/502           | 2208222105    | DTA114YS, PNP           |                   | 4   | 048552003671                 | Inlay, Commander                |                 |
| Q503/504           | 2208622106    | DTC114YS, NPN           |                   | 5   | 048722000991                 | Button, Silicon                 |                 |
| Q505/506           | 2208222105    | DTA114YS, PNP           |                   | 6   | 8555040210                   | Cover, Upper                    |                 |
| Q507/508           | 2208622106    | DTC114YS, NPN           |                   | 7   | 6555009710                   | Spring, Battery (+)             |                 |
| <b>RESISTORS</b>   |               |                         |                   | 8   | 6555009810                   | Spring, Battery (-)             |                 |
| R501               | 3069101970    | Carbon Film             | 100 ohm 1/5W J    | 9   | 6555605310                   | Spring, Battery (B)             |                 |
| R502/503           | 3069104970    | Carbon Film             | 100 kohm 1/5W J   | 10  | 8019120103                   | Screw, PM 2x10 ZNB              |                 |
| R504               | 3069101970    | Carbon Film             | 100 ohm 1/5W J    | C01   | 3409247022                   | Electric SS                     | 47 uF 10 V M    |
| R505-508           | 3069104970    | Carbon Film             | 100 kohm 1/5W J   | C02   | 3519103935                   | Ceramic Tubula                  | 0.01 uF 50 V M  |
| R510/511           | 3069154970    | Carbon Film             | 150 kohm 1/5W J   | C04   | 3519470935                   | Ceramic Tubula                  | 47 pF 50 V M    |
| R512/513           | 3069101970    | Carbon Film             | 100 ohm 1/5W J    | D01   | 2408001139                   | Diode, IR-LED EL-5HIR7          |                 |
| R514/515           | 3069223970    | Carbon Film             | 22 kohm 1/5W J    | IC01  | 2138313214                   | IC, u-PD6126A                   |                 |
| R516               | 3069124970    | Carbon Film             | 120 kohm 1/5W J   | Q01   | 2208606112                   | KTD1302, NPN                    |                 |
| R517               | 3069103970    | Carbon Film             | 10 kohm 1/5W J    | R01   | 3069229970                   | Carbon Film                     | 2.2 ohm 1/5W J  |
| R518               | 3069104970    | Carbon Film             | 100 kohm 1/5W J   | R02   | 3069101970                   | Carbon Film                     | 100 ohm 1/5W J  |
| R519               | 3069101970    | Carbon Film             | 100 ohm 1/5W J    | X-TAL   | 3938101890                   | CRA455, Resonator, Ceramic      |                 |
| R520               | 3069473970    | Carbon Film             | 47 kohm 1/5W J    | <b>END OF ASS'Y COMMANDER</b>                               |                              |                                 |                 |
| R521               | 3069362970    | Carbon Film             | 3.6 kohm 1/5W J   | <b>P4-2 054002007969 ASS'Y P.C.B OUTLET FOR EUROPE ONLY</b> |                              |                                 |                 |
| R522               | 3069564970    | Carbon Film             | 560 kohm 1/5W J   | 5508302535  | Fuse, 5T 2.5 A, 250 V, SEMKO |                                 | Eur.            |
| R523               | 3069182970    | Carbon Film             | 1.8 kohm 1/5W J   | CNT201CD  | 4358850216                   | CTB, 0216, BL102R, MXH40113-2   | Eur.            |
| R524               | 3069101970    | Carbon Film             | 100 ohm 1/5W J    | CNT202CD  | 4359852214                   | CTB, 0114, LV, Diamond, SL R#22 | Eur.            |
| R525               | 3069104970    | Carbon Film             | 100 kohm 1/5W J   | 48  | 4448103610                   | Outlet, AC, YKE31-0090          | Eur.            |
| R526               | 3069472970    | Carbon Film             | 4.7 kohm 1/5W J   | P1/P2   | 4228001410                   | Pin, Solder                     | Eur.            |

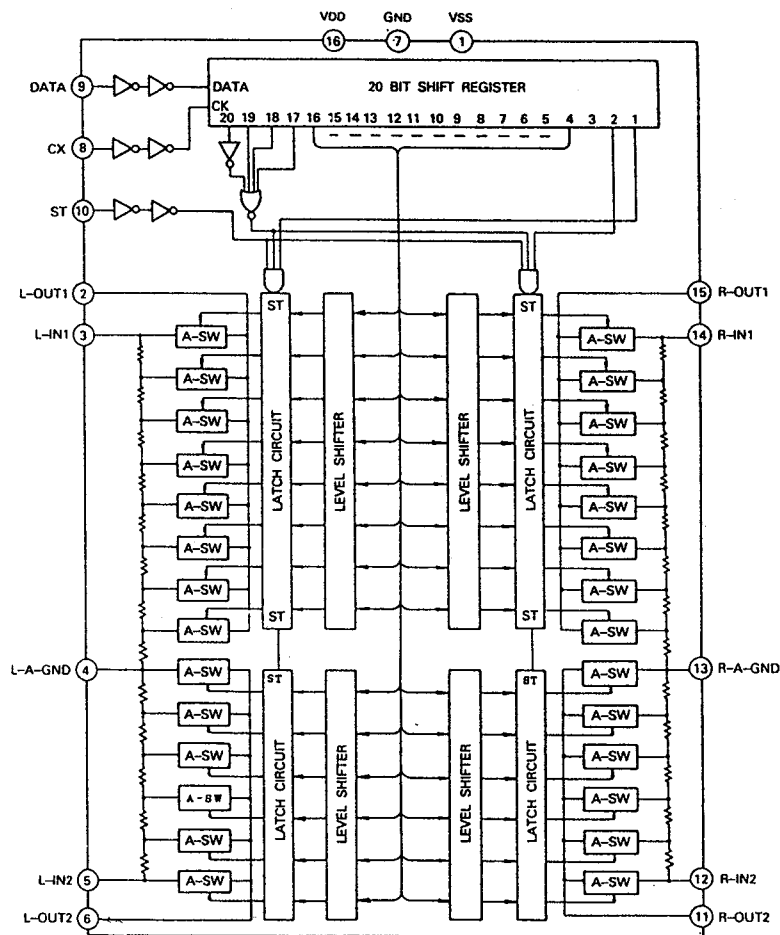
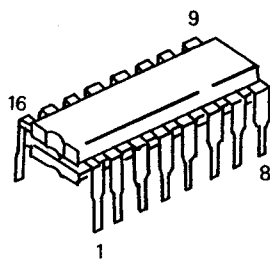


# SEMICONDUCTOR LEAD IDENTIFICATION & INTERNAL DIAGRAM

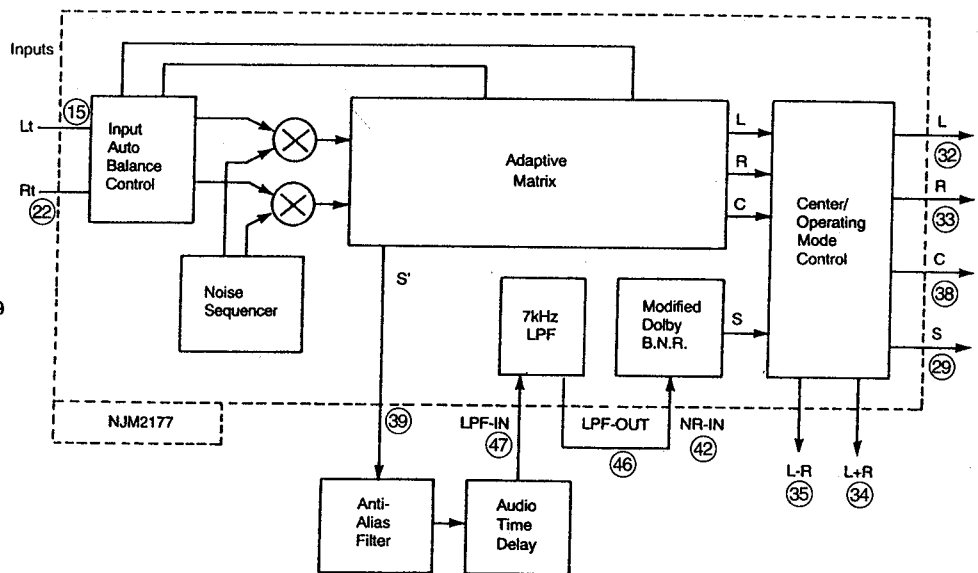
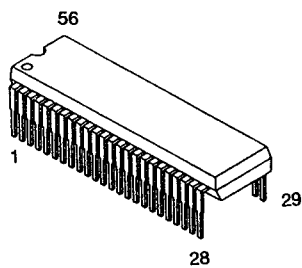
CXP50116 : IC401  
(Top View)



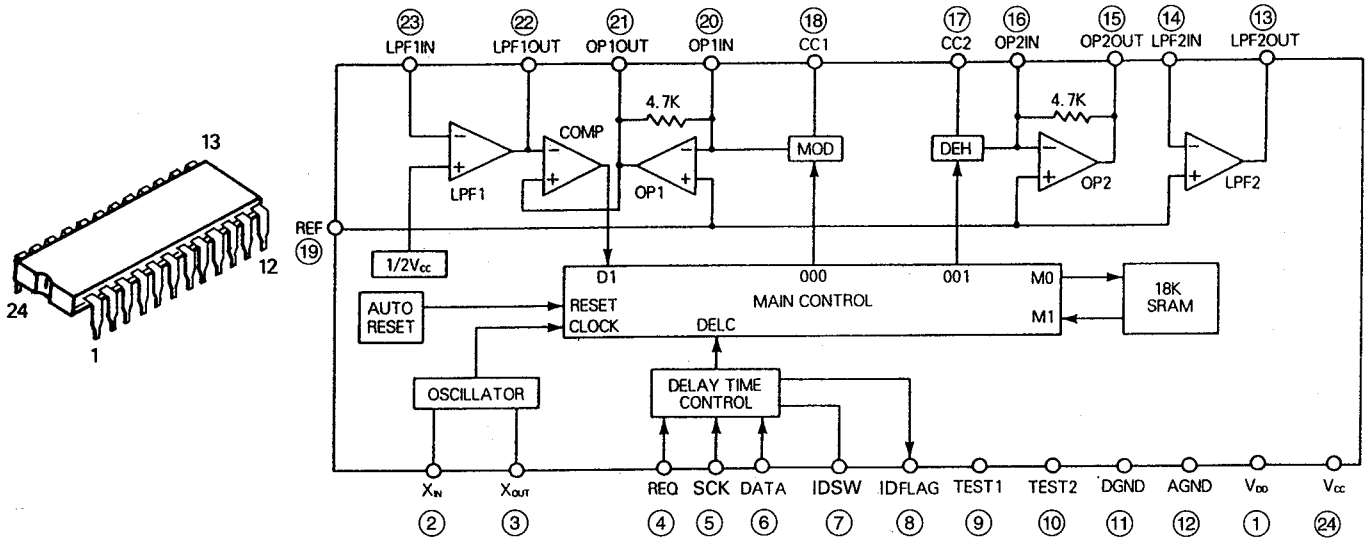
TC9176 : IC506



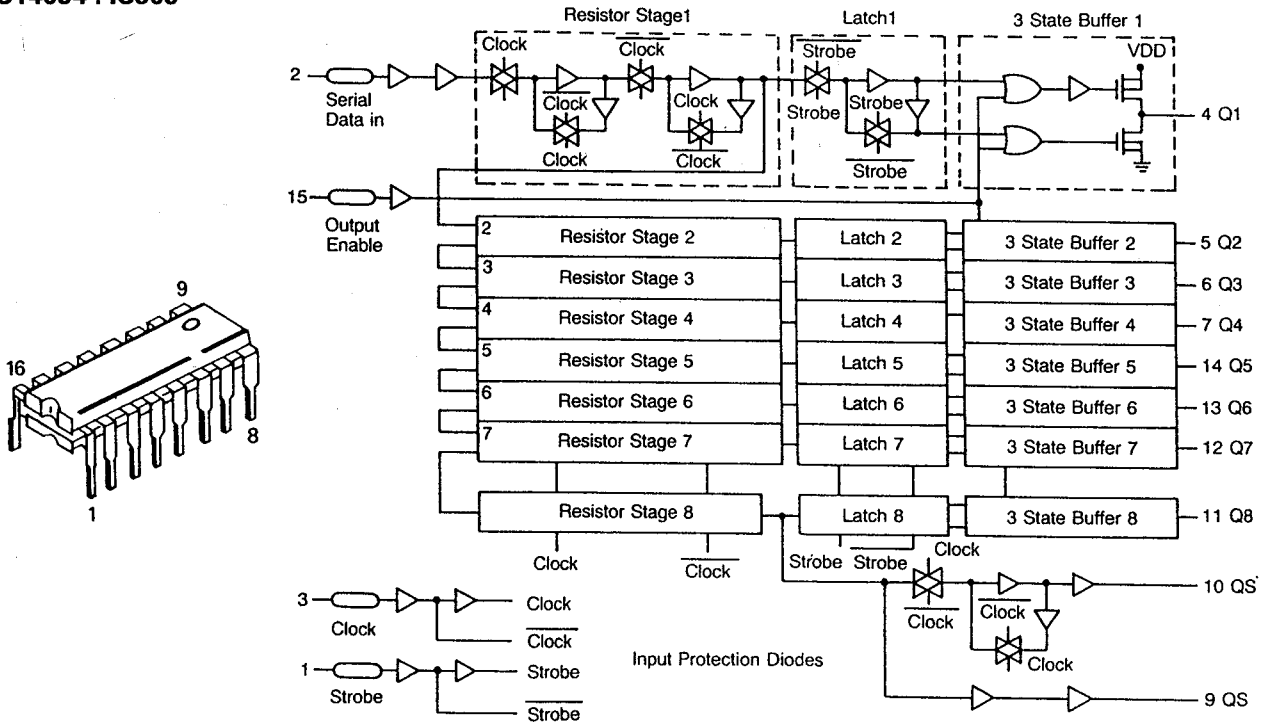
NJM2177 : IC507



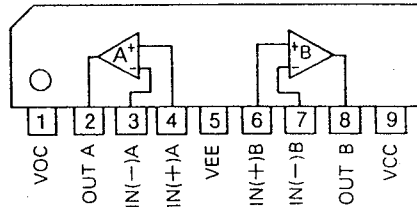
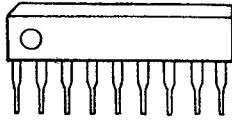
**NJU9701 : IC508**



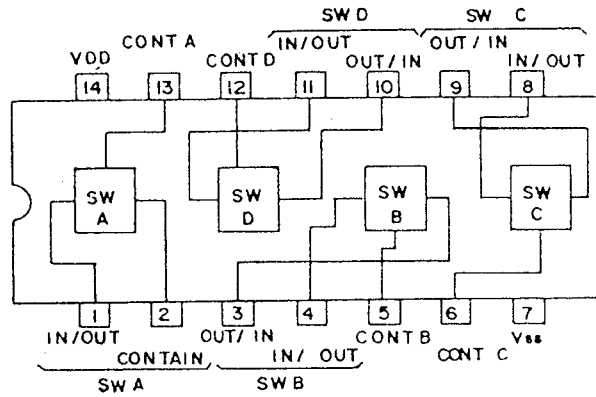
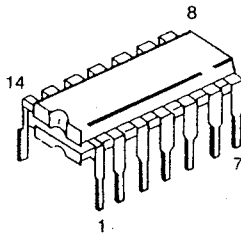
**MC14094 : IC509**



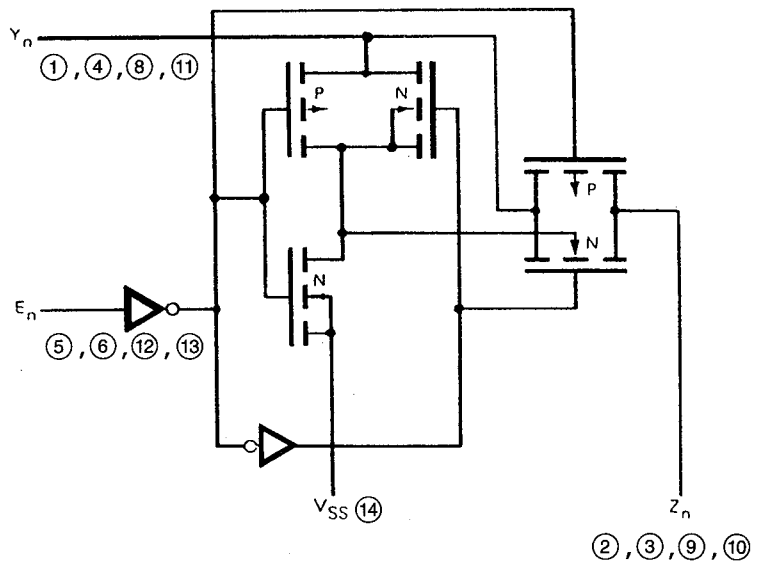
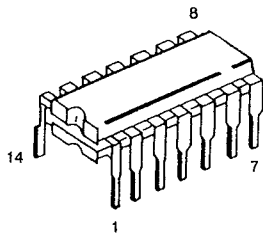
**KIA4559S : IC501, IC502, IC701  
(KIA7559)**



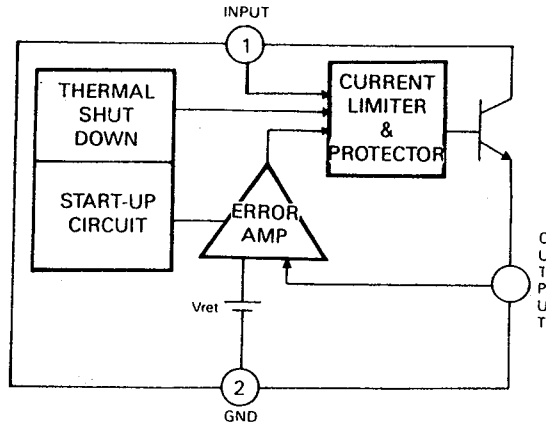
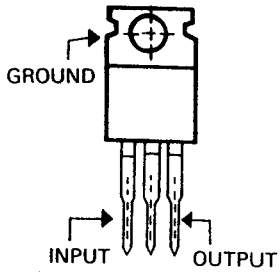
**LC4966B : IC503, IC504**



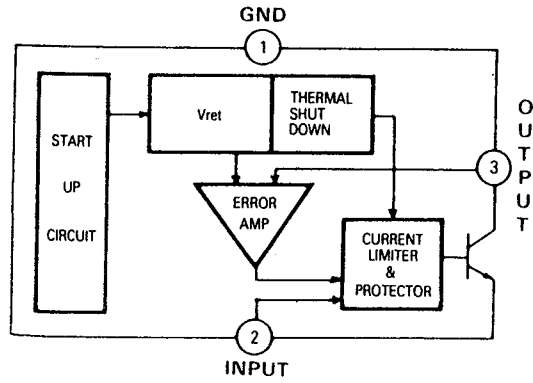
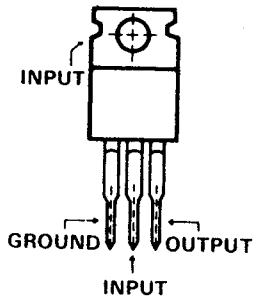
**GD4066 : IC301**



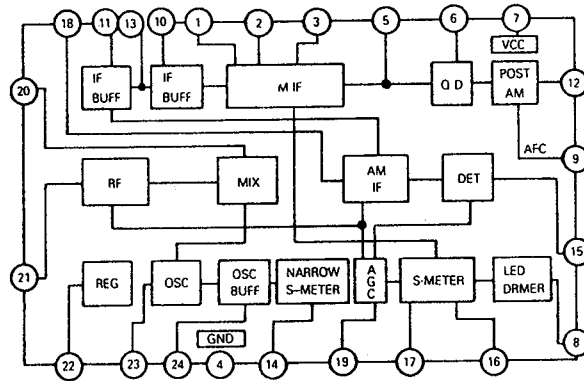
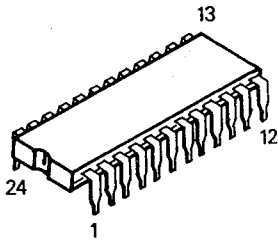
**GD78XX : IC201, IC202, IC203**



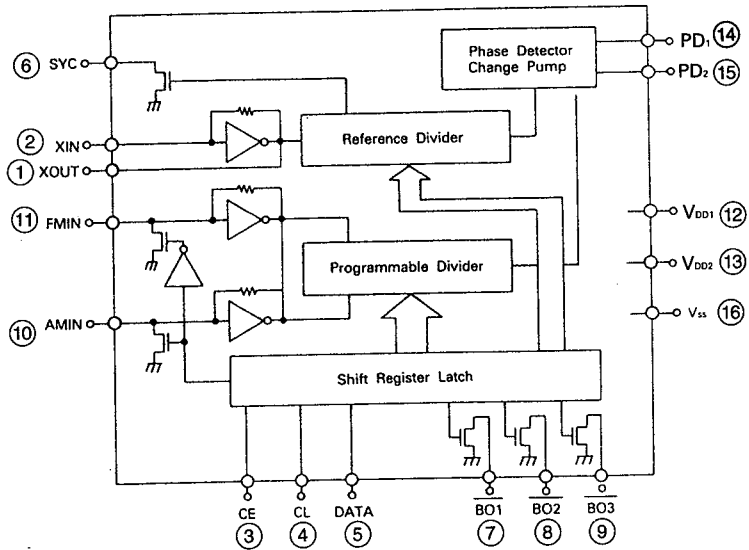
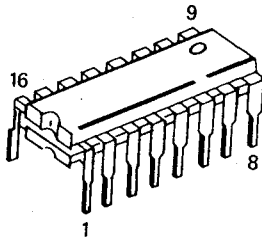
**GD7915 : IC204**



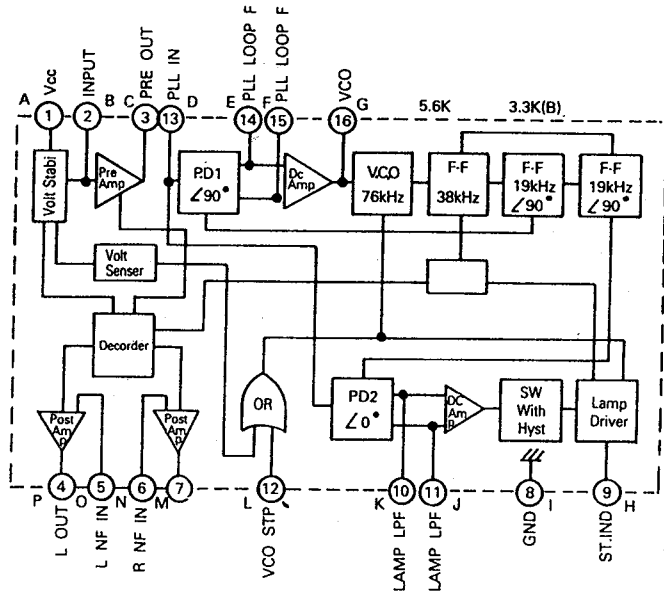
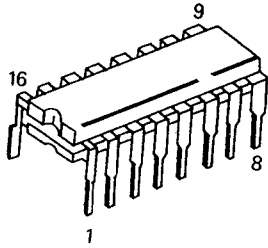
**LA1266 : IC801**



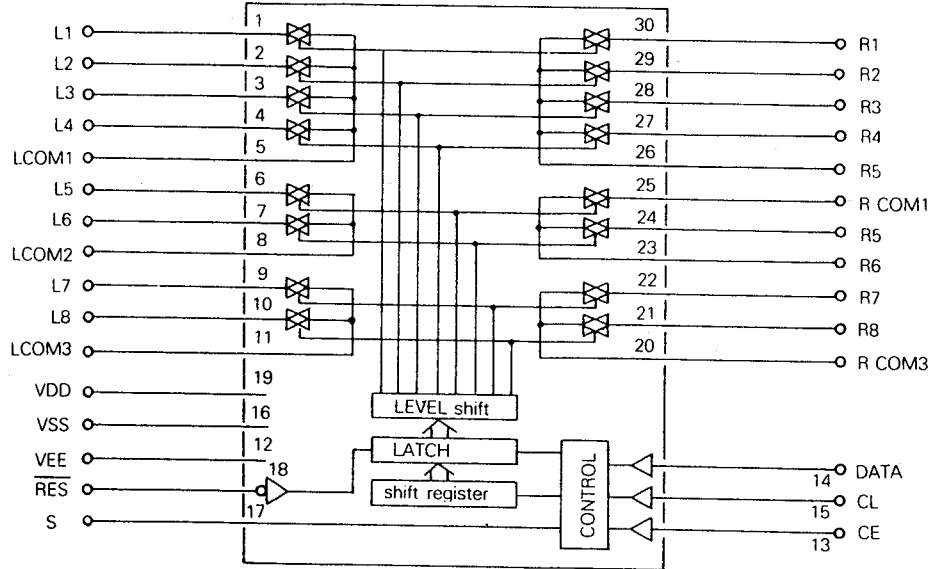
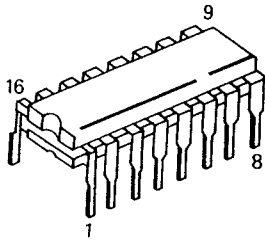
**LM7001 : IC802**



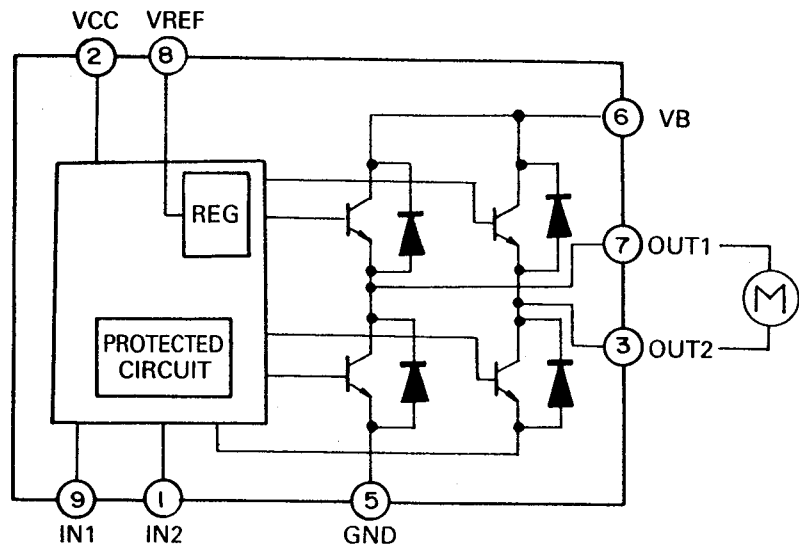
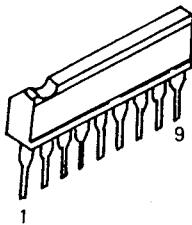
HA12016 : IC803



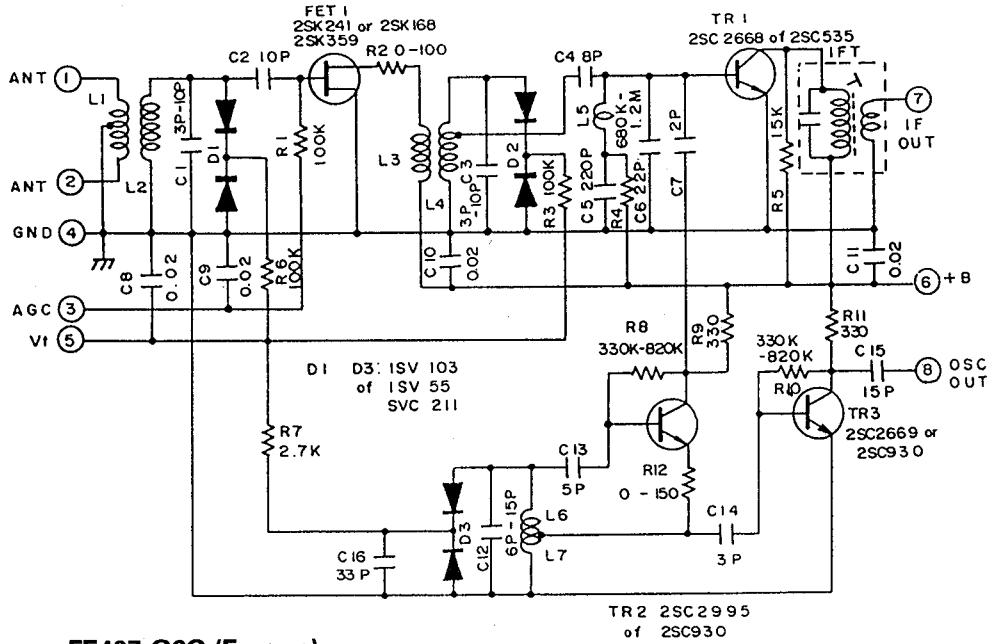
LC7821 : IC101, IC102



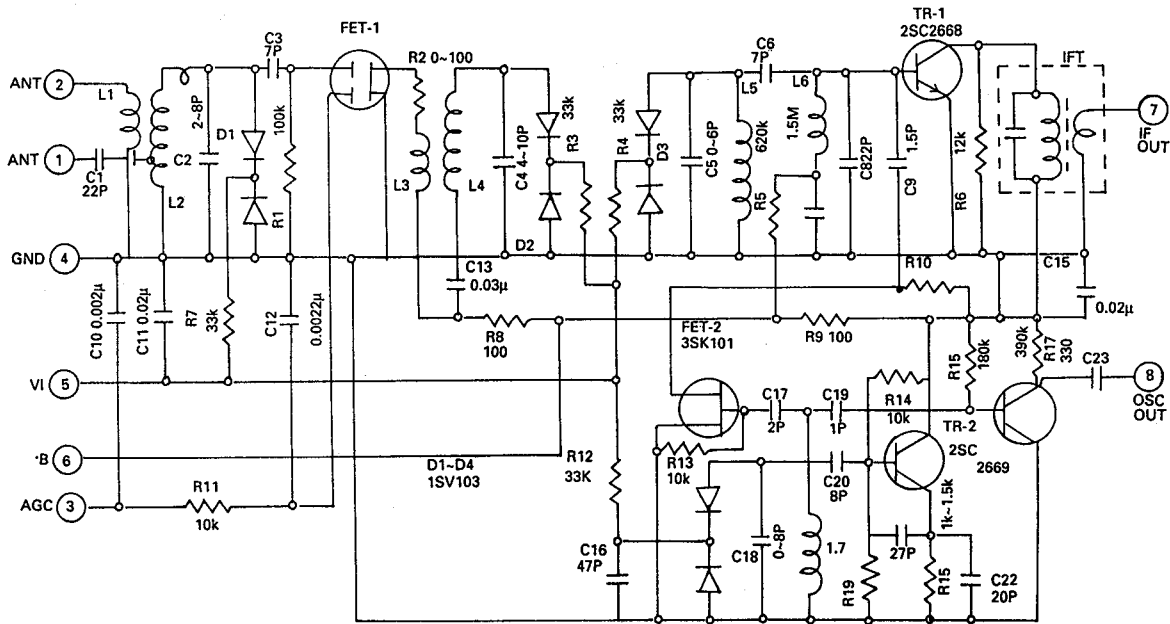
TA7291S : IC603



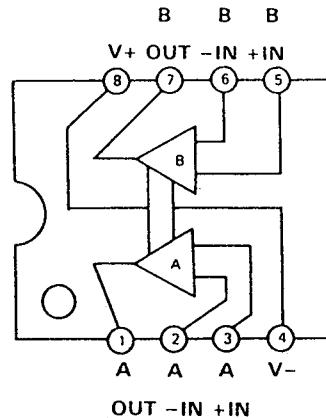
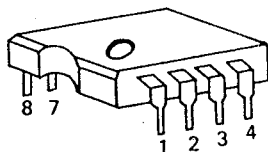
**FRONT-END : FE FTH3-505H(USA/CA)**



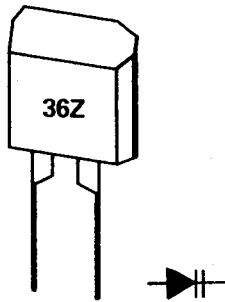
**FE407-G60 (Europe)**



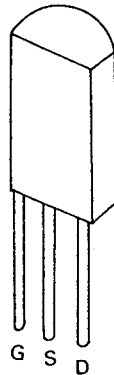
**IC104, IC105, IC505, IC601, IC602**  
**(KIA 4559P)**  
**(KIA 6259P : IC103)**



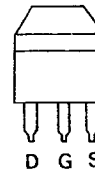
KV1236Z : VD1, VD2



2SK168D : Q802



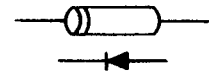
KTC1923Y : Q801



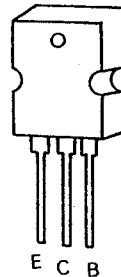
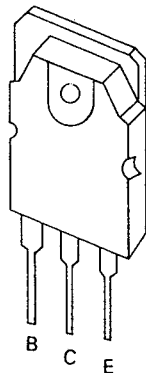
IN4148 : D101~D114, D219~D224  
D303, D301, D302, D401~D420  
D501~D503, D802, D803

IN4002 : D201~D205  
D212~D217  
D426

6A3 : D208~D211



2SC3181 : Q216L/R  
2SA1264 : Q217L/R  
KTD718 : Q115, Q126  
KTB688 : Q116, Q127

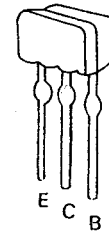


2SC4137 : Q213 L/R,  
Q112, Q123

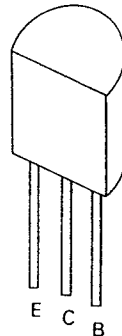
DTA114Y : Q130, Q602, Q604, Q105,  
Q501, Q502, Q804, Q223, Q505,  
Q506, Q808

DTC114Y : Q260, Q503, Q504, Q507,  
Q508, Q203

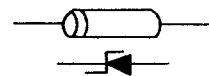
DTC114T : Q605



2SD1302S : Q601, Q603, Q701, Q702,  
Q805, Q806  
KTC2240BL : Q106, Q107, Q117, Q118,  
Q2072L/R, Q210L/R, Q803  
KTC2235C : Q113, Q124  
KTA949 : Q110, Q121, Q211L/R  
KTA1015Y : Q703, Q301, Q303, Q305,  
Q219, Q205 L/R  
KTC1815Y : Q101~Q104, Q108, Q109  
Q119, Q120, Q128, Q129  
Q201, Q401, Q402, Q302  
Q304, Q306  
Q218L/R, Q220, Q221  
KTA970 : Q206 L/R, Q208L/R  
Q209 L/R

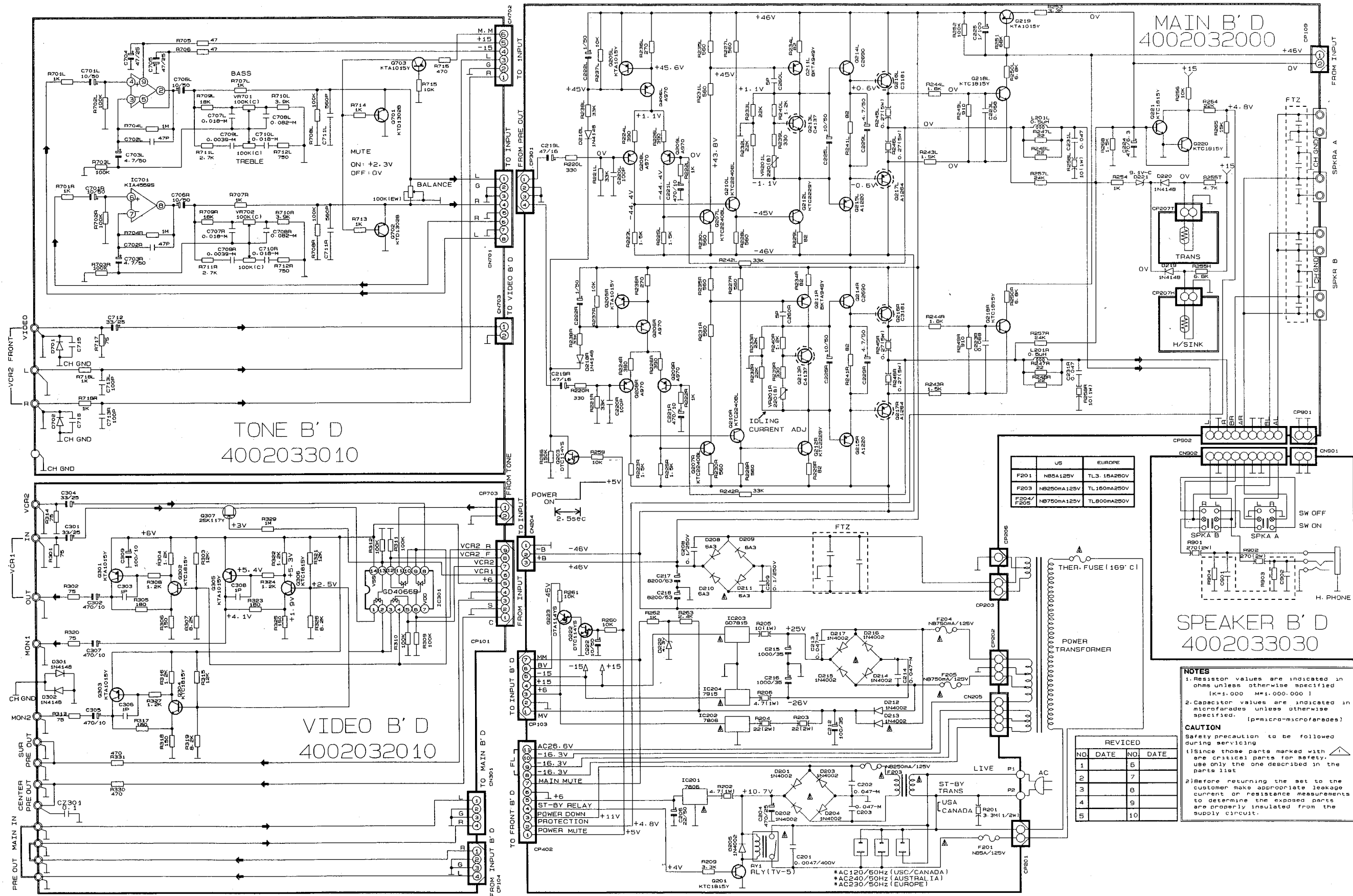


ZD9. 1BS : D221, D424 ZD16BM: D422, D423  
ZD4.3BS : D222, D421, D602  
ZD5.1 : D801

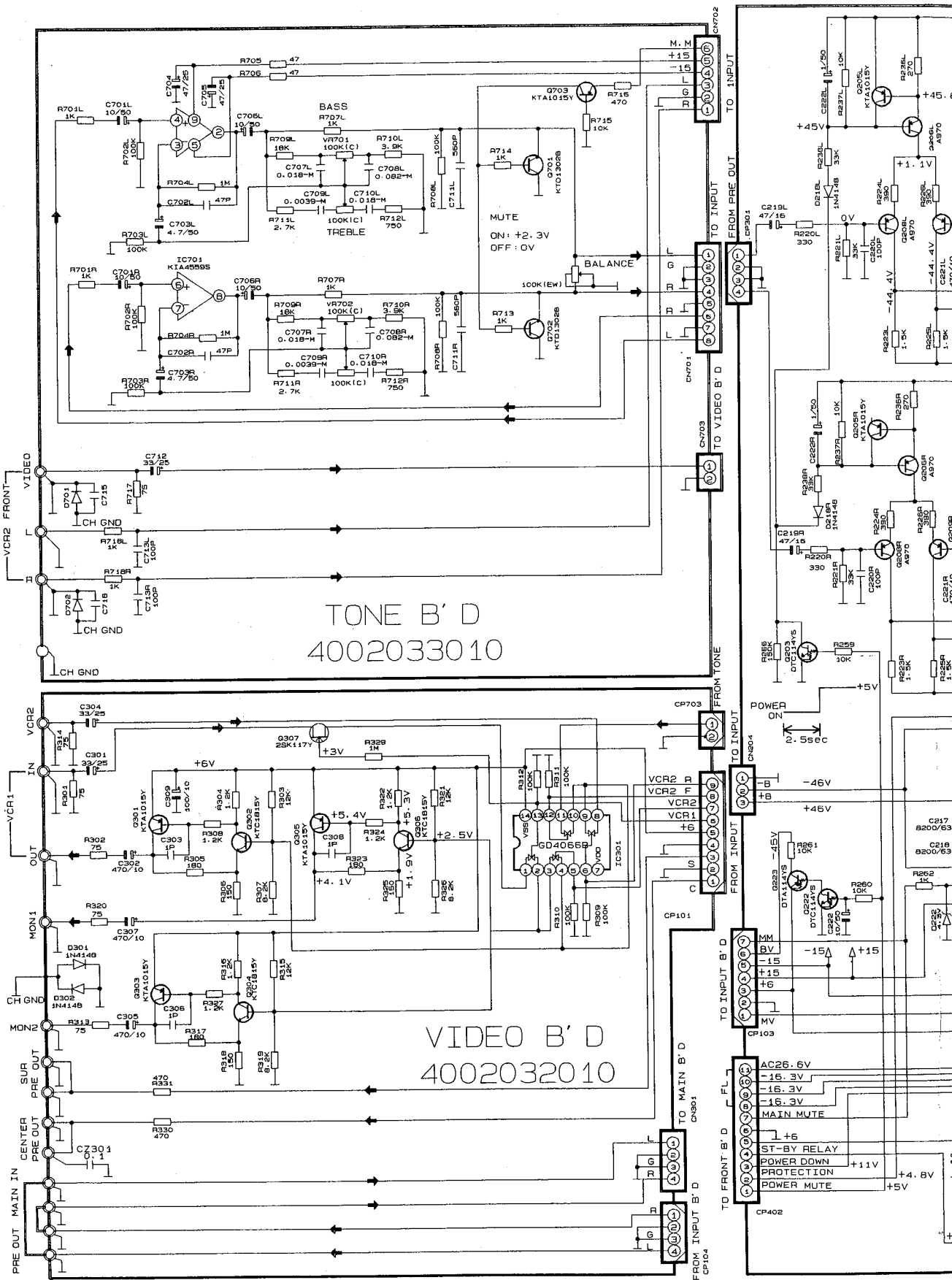


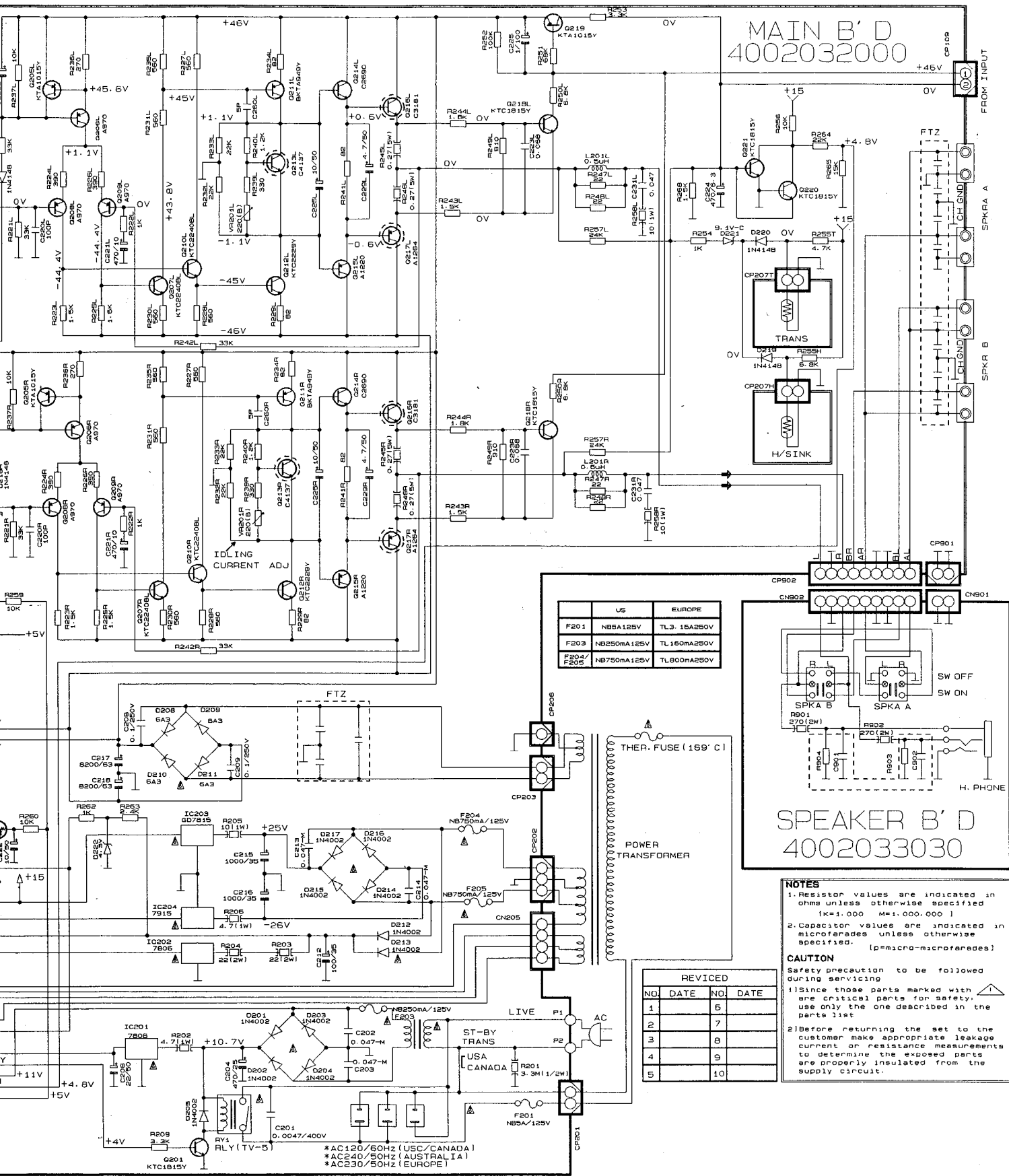


SCHEMATIC DIAGRAM I



# SCHEMATIC DIAGRAM I





MAIN B'D  
4002032000

SPEAKER B'D  
4002033030

|               | US          | EUROPE      |
|---------------|-------------|-------------|
| F201          | NB5A125V    | TL3.16A250V |
| F203          | NB250mA125V | TL160mA250V |
| F204/<br>F205 | NB750mA125V | TL800mA250V |

**NOTES**

- Resistor values are indicated in ohms unless otherwise specified (K=1,000 M=1,000,000)
- Capacitor values are indicated in microfarads unless otherwise specified. (p=micro-microfarads)

**CAUTION**

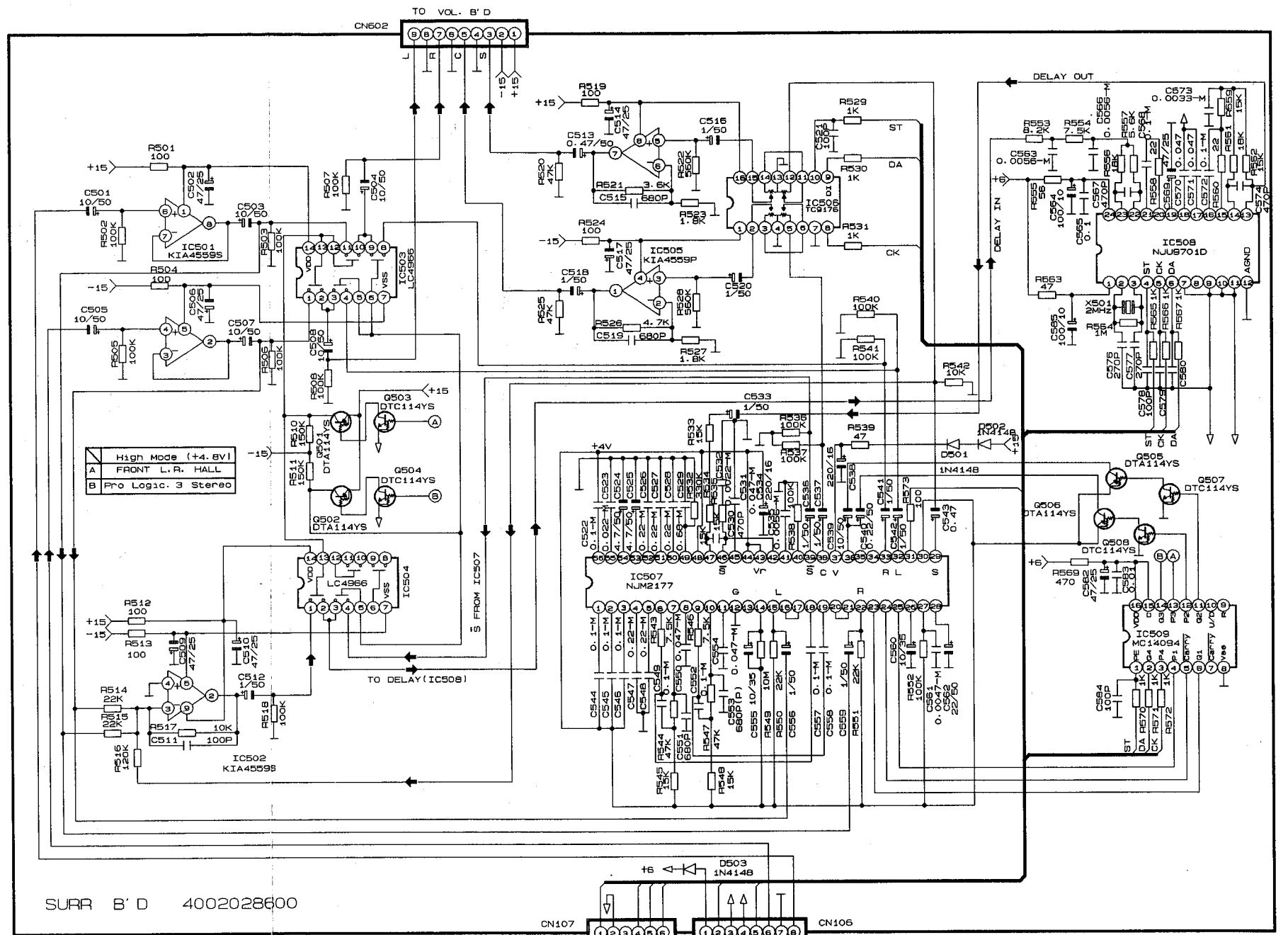
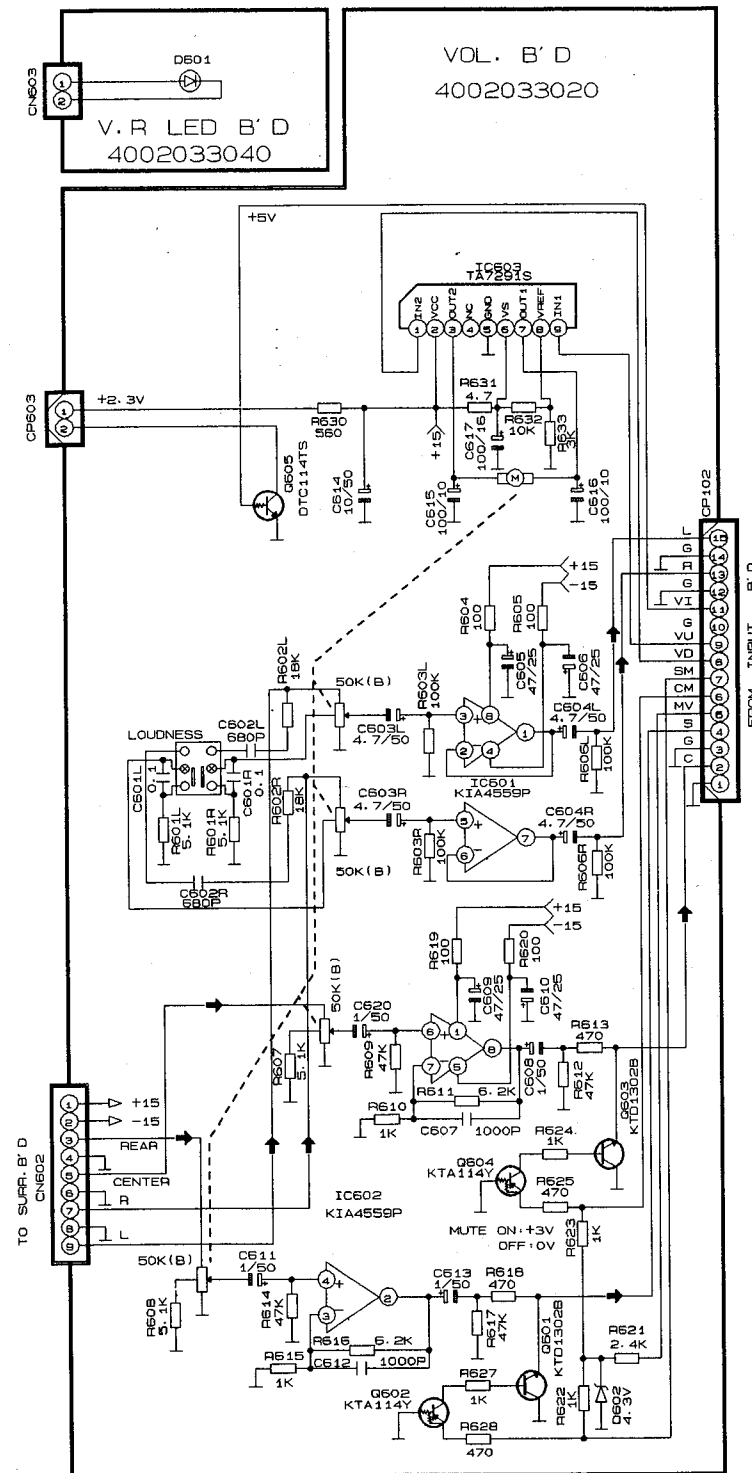
Safety precaution to be followed during servicing

- Since those parts marked with a triangle are critical parts for safety, use only the one described in the parts list
- Before returning the set to the customer make appropriate leakage current or resistance measurements to determine the exposed parts are properly insulated from the supply circuit.

REVISED

| NO. | DATE | NO. | DATE |
|-----|------|-----|------|
| 1   |      | 5   |      |
| 2   |      | 7   |      |
| 3   |      | 8   |      |
| 4   |      | 9   |      |
| 5   |      | 10  |      |

SCHEMATIC DIAGRAM II



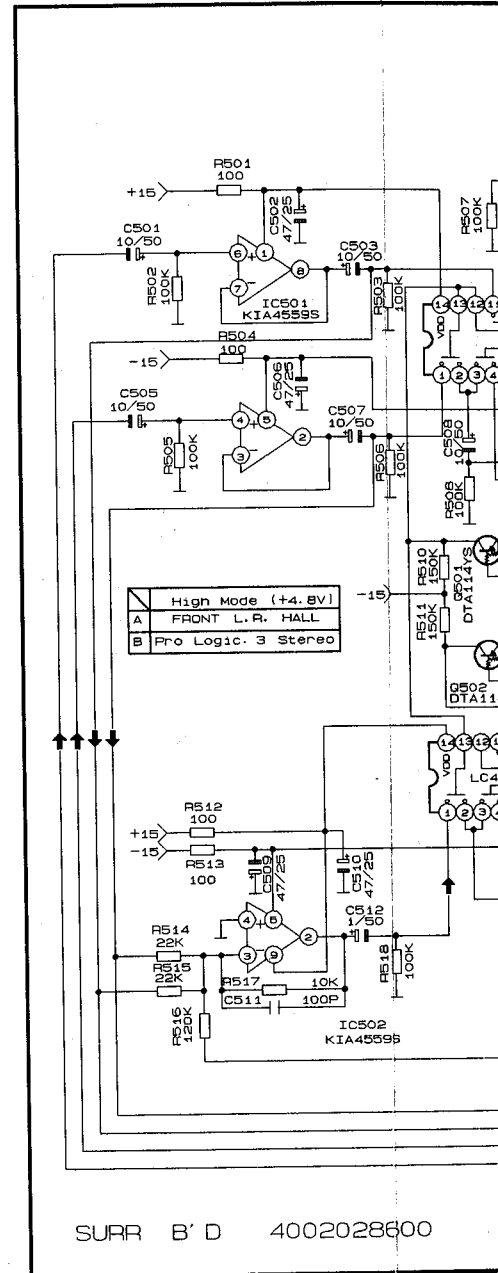
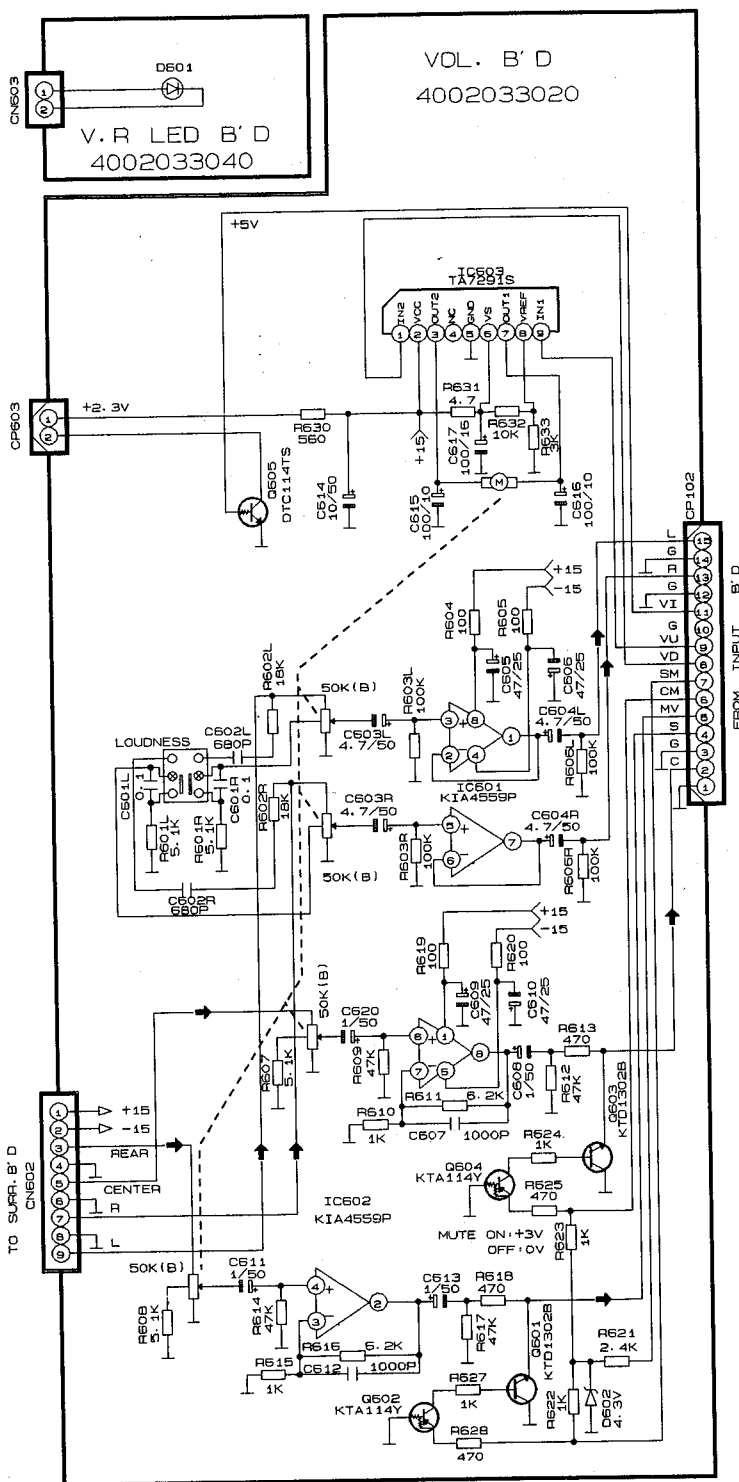
SURR B'D 4002028600

**NOTES**  
 1. Resistor values are indicated in ohms unless otherwise specified [K=1,000 M=1,000,000]  
 2. Capacitor values are indicated in microfarads unless otherwise specified. (p=micro-microfarads)  
**CAUTION**  
 Safety precaution to be followed during servicing  
 1) Since those parts marked with a triangle are critical parts for safety, use only the one described in the parts list.  
 2) Before returning the set to the customer make appropriate leakage current or resistance measurements to determine the exposed parts are properly insulated from the supply circuit.

(SMODE)  
 NJM2177 +5V  
 P1N31 3STEREO: +2.5V  
 HALL: +5V  
 OFF: 0V

| REVISED |      |    |      |
|---------|------|----|------|
| NO      | DATE | NO | DATE |
| 1       |      | 5  |      |
| 2       |      | 7  |      |
| 3       |      | 8  |      |
| 4       |      | 9  |      |
| 5       |      | 10 |      |

SCHEMATIC DIAGRAM II



NOTE

1. R...
2. C...

CAU

58 f

cur

11 S

u

p

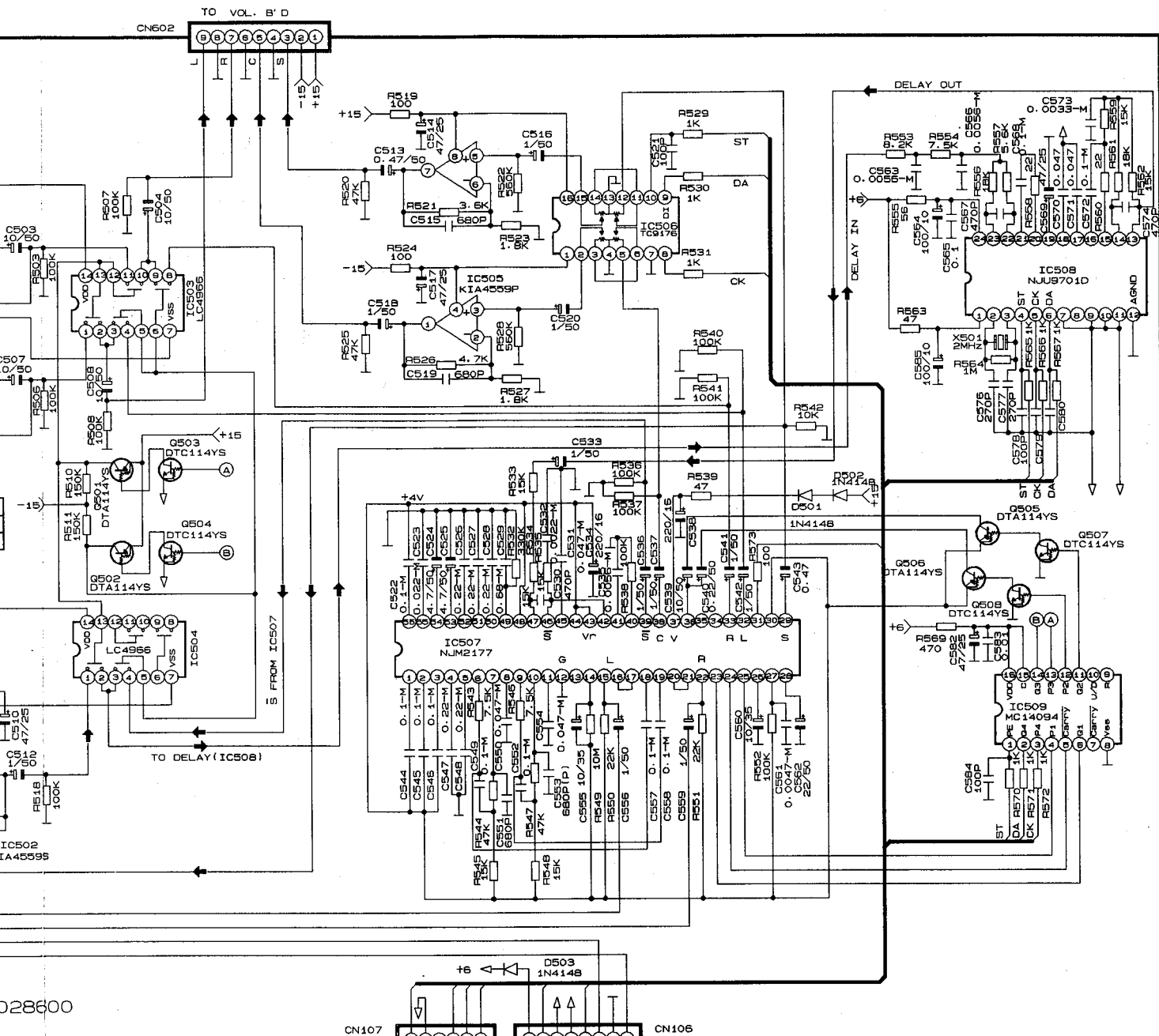
21 B

c

c

t

s



028600

**NOTES**

1. Resistor values are indicated in ohms unless otherwise specified [K=1,000 M=1,000,000]
2. Capacitor values are indicated in microfarads unless otherwise specified. [p=micro-microfarads]

**CAUTION**

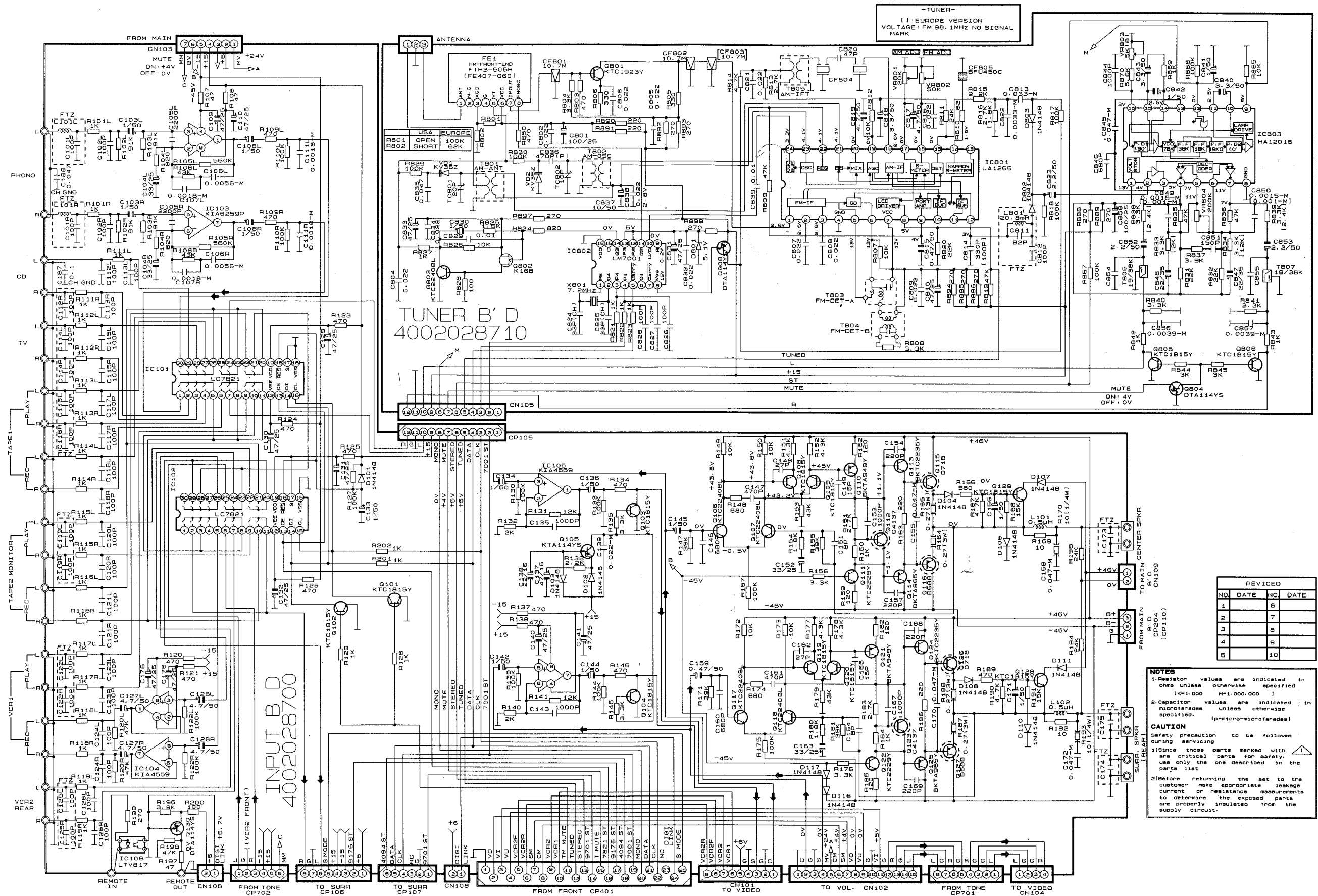
Safety precaution to be followed during servicing

- 1) Since those parts marked with are critical parts for safety, use only the one described in the parts list
- 2) Before returning the set to the customer make appropriate leakage current or resistance measurements to determine the exposed parts are properly insulated from the supply circuit.

| REVISED |      |     |      |
|---------|------|-----|------|
| NO.     | DATE | NO. | DATE |
| 1       |      | 6   |      |
| 2       |      | 7   |      |
| 3       |      | 8   |      |
| 4       |      | 9   |      |
| 5       |      | 10  |      |

(SMODE)  
 NJM2177 PROLOGIC: +5V  
 PIN31 3STEREO: +2.6V  
 HALL: +5V  
 OFF: 0V

SCHEMATIC DIAGRAM III

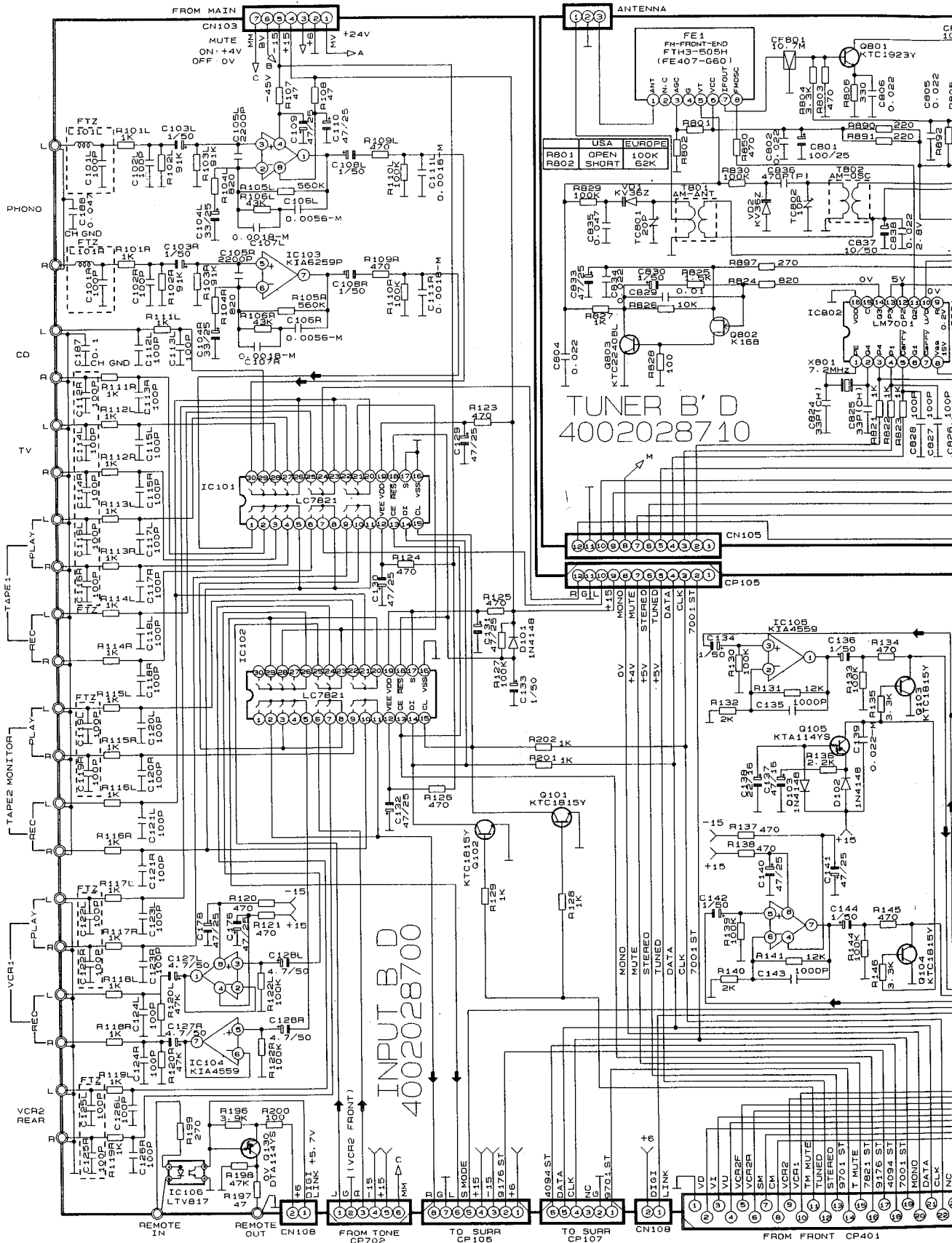


| REVISED |      |     |      |
|---------|------|-----|------|
| NO.     | DATE | NO. | DATE |
| 1       |      | 6   |      |
| 2       |      | 7   |      |
| 3       |      | 8   |      |
| 4       |      | 9   |      |
| 5       |      | 10  |      |

**NOTES**  
 1. Resistor values are indicated in ohms unless otherwise specified (K=1,000 M=1,000,000)  
 2. Capacitor values are indicated in microfarads unless otherwise specified. (p=micro-microfarads)

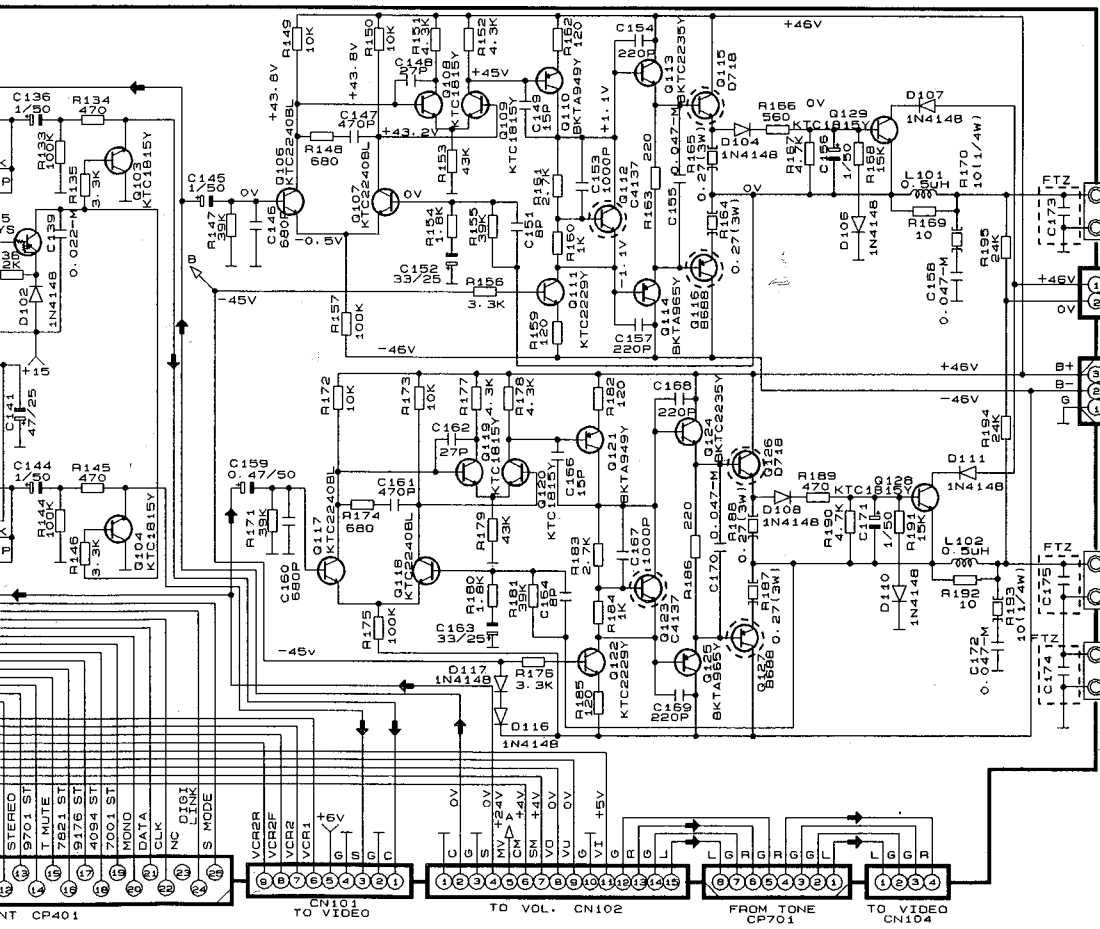
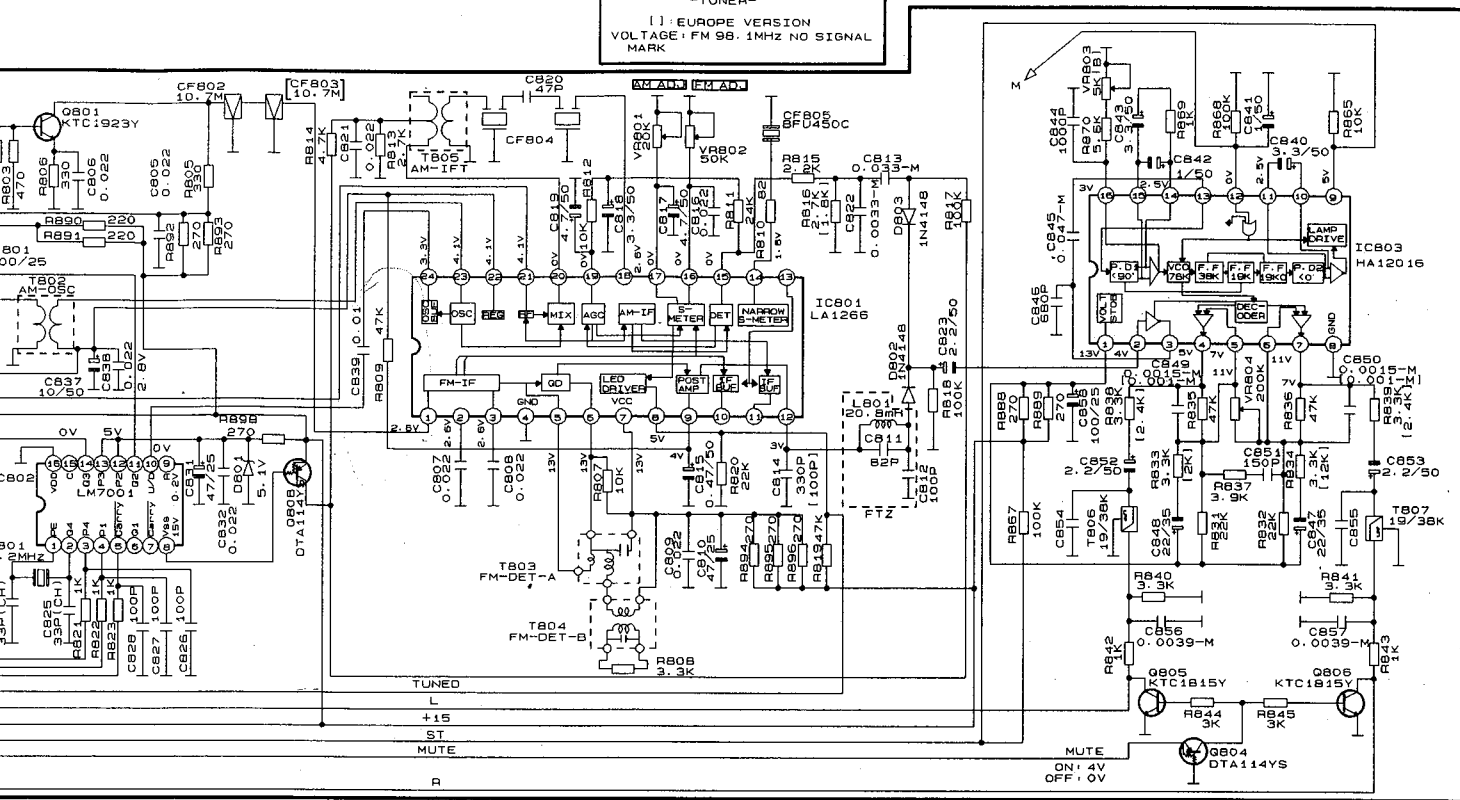
**CAUTION**  
 Safety precaution to be followed during servicing:  
 1) Since those parts marked with a triangle are critical parts for safety, use only the one described in the parts list.  
 2) Before returning the set to the customer make appropriate leakage current or resistance measurements to determine the exposed parts are properly insulated from the supply circuit.

# SCHEMATIC DIAGRAM III





-TUNER-  
 1. EUROPE VERSION  
 VOLTAGE: FM 96.1MHz NO SIGNAL  
 MARK



TO MAIN CENTER SPKR  
 B'D  
 CN109

FROM MAIN  
 B'D  
 CN104

TO VOL. CN102

FROM TONE  
 CP701

TO VIDEO  
 CN104

| REVISED |      |     |      |
|---------|------|-----|------|
| NO.     | DATE | NO. | DATE |
| 1       |      | 6   |      |
| 2       |      | 7   |      |
| 3       |      | 8   |      |
| 4       |      | 9   |      |
| 5       |      | 10  |      |

**NOTES**

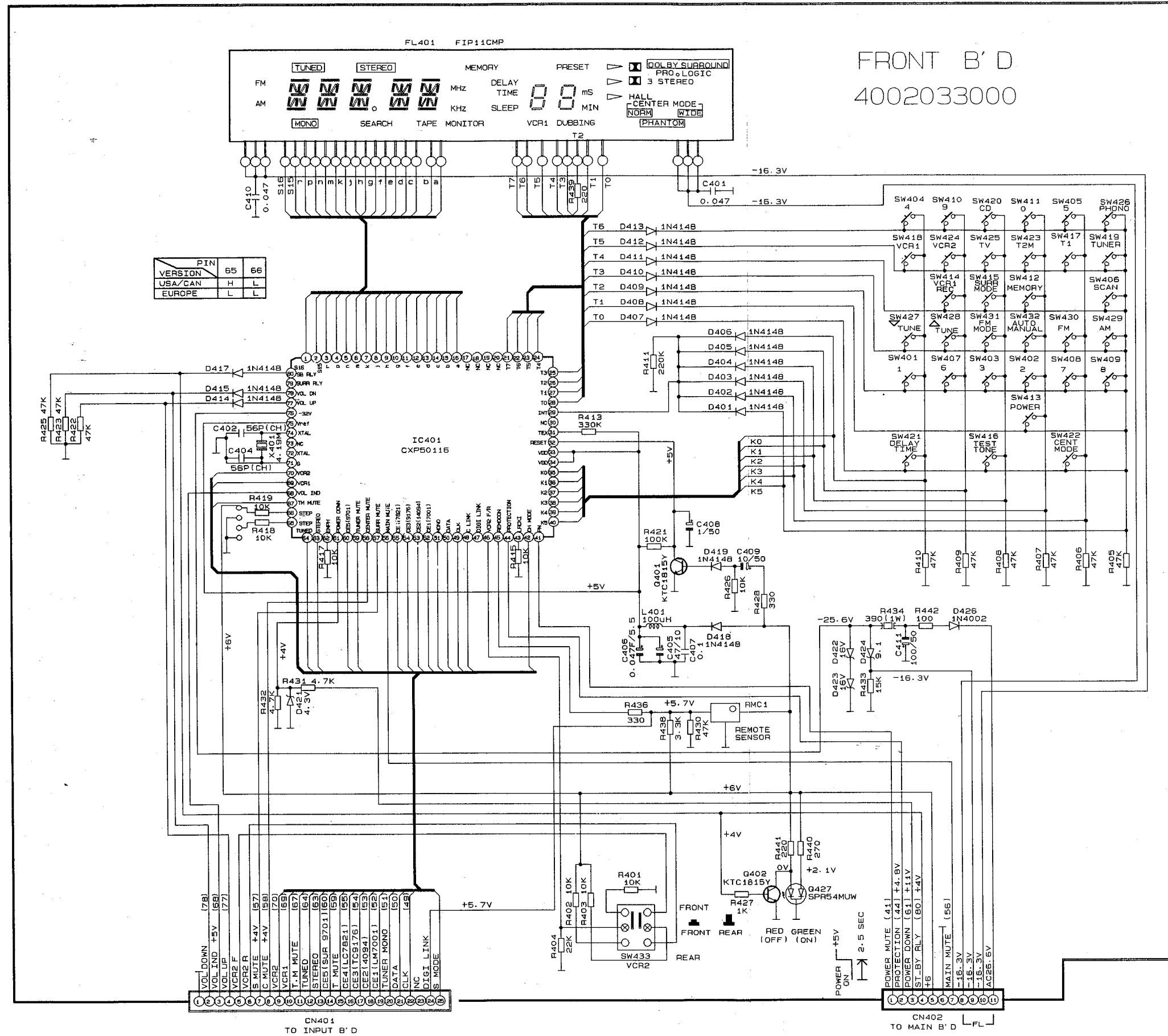
- Resistor values are indicated in ohms unless otherwise specified (K=1,000 M=1,000,000)
- Capacitor values are indicated in microfarads unless otherwise specified. (p=micro-microfarads)

**CAUTION**

Safety precautions to be followed during servicing

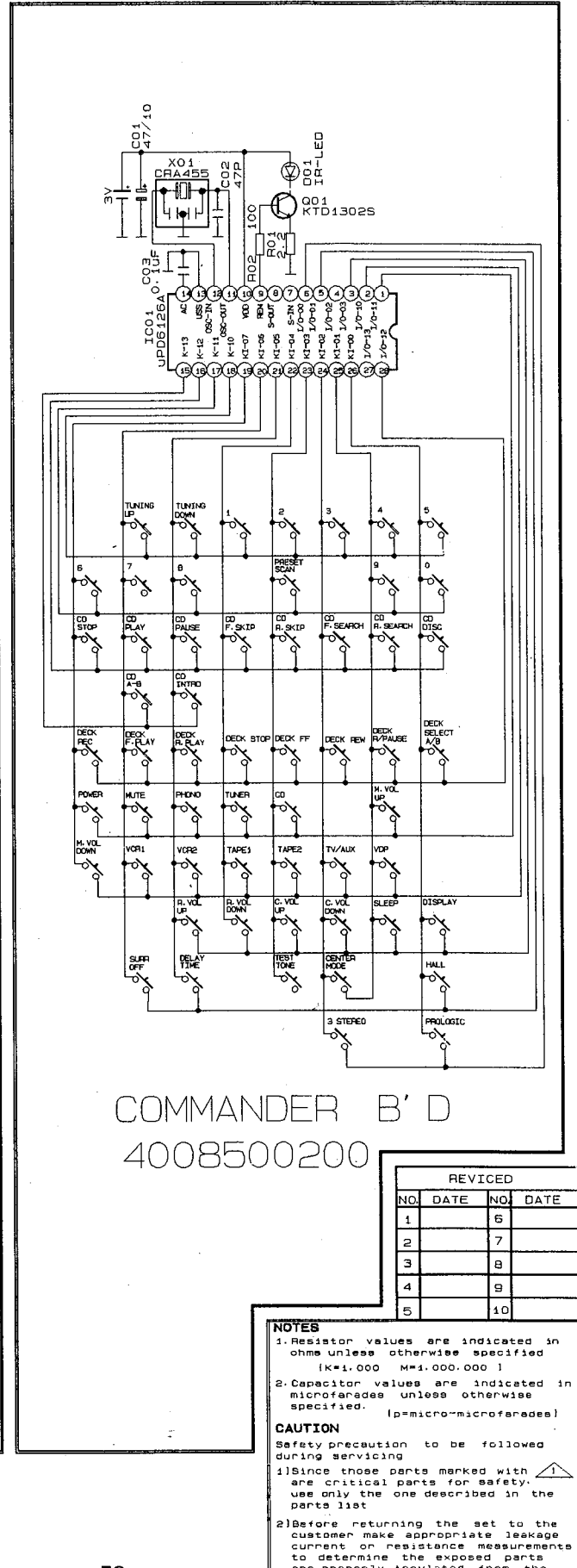
- Since those parts marked with a triangle are critical parts for safety, use only the one described in the parts list
- Before returning the set to the customer make appropriate leakage current or resistance measurements to determine the exposed parts are properly insulated from the supply circuit.

**SCHEMATIC DIAGRAM IV**



FRONT B'D  
4002033000

|         |    |    |
|---------|----|----|
| PIN     | 65 | 66 |
| VERSION | H  | L  |
| USA/CAN | L  | L  |
| EUROPE  | L  | L  |



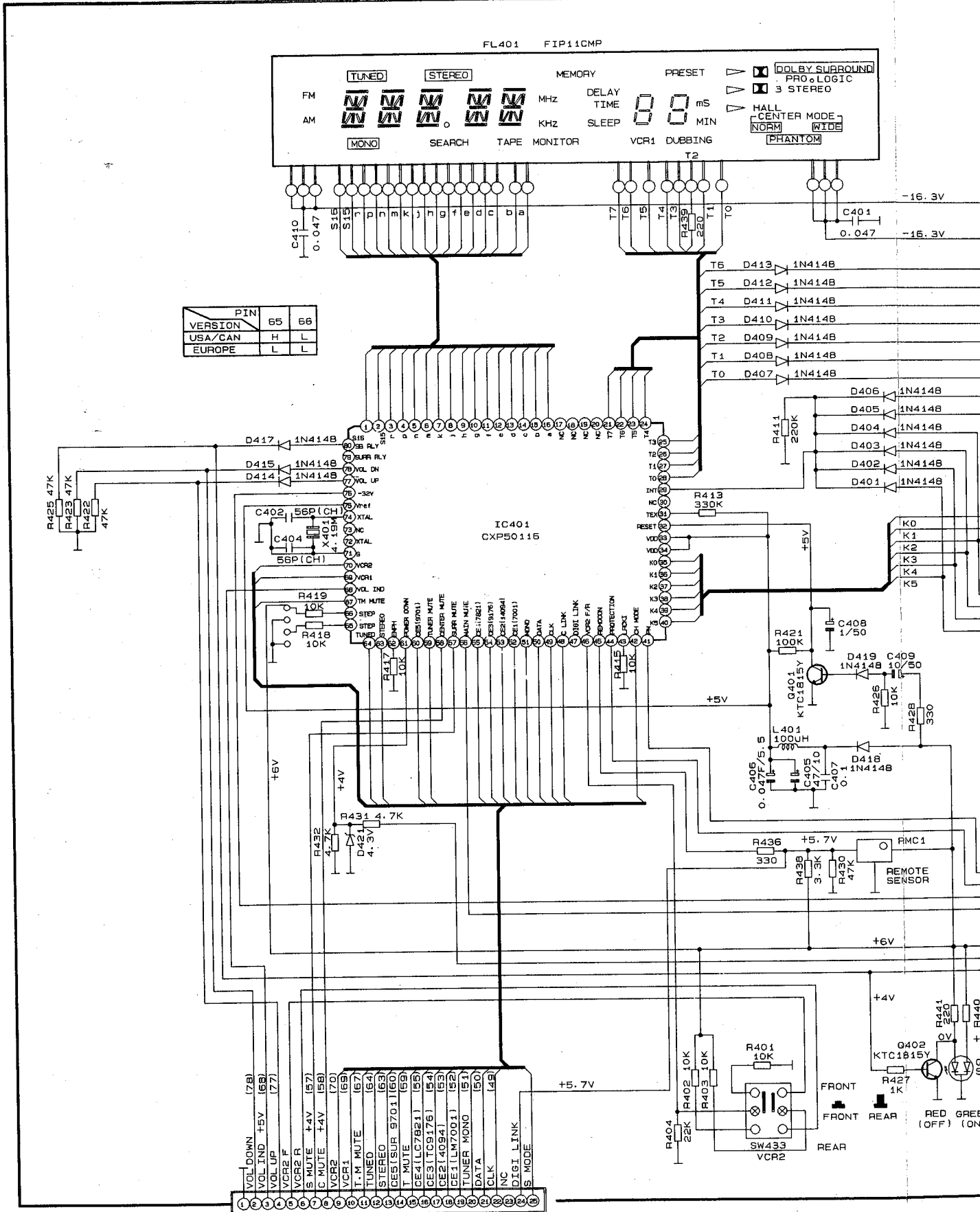
COMMANDER B'D  
4008500200

| REVISED |      |     |      |
|---------|------|-----|------|
| NO.     | DATE | NO. | DATE |
| 1       |      | 6   |      |
| 2       |      | 7   |      |
| 3       |      | 8   |      |
| 4       |      | 9   |      |
| 5       |      | 10  |      |

**NOTES**  
1. Resistor values are indicated in ohms unless otherwise specified (K=1,000 M=1,000,000)  
2. Capacitor values are indicated in microfarads unless otherwise specified. (p=micro-microfarads)

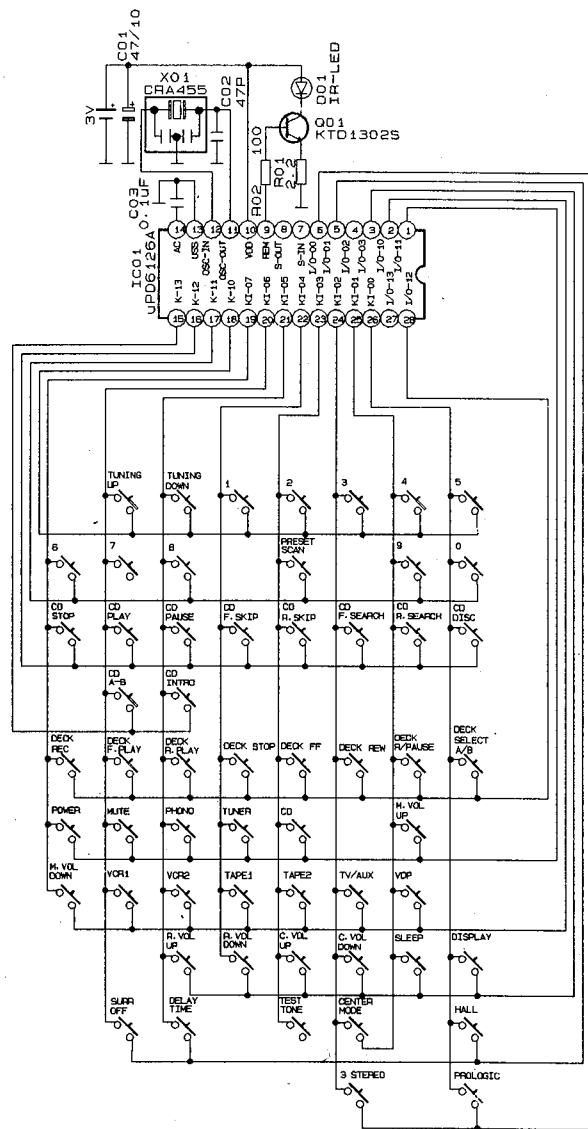
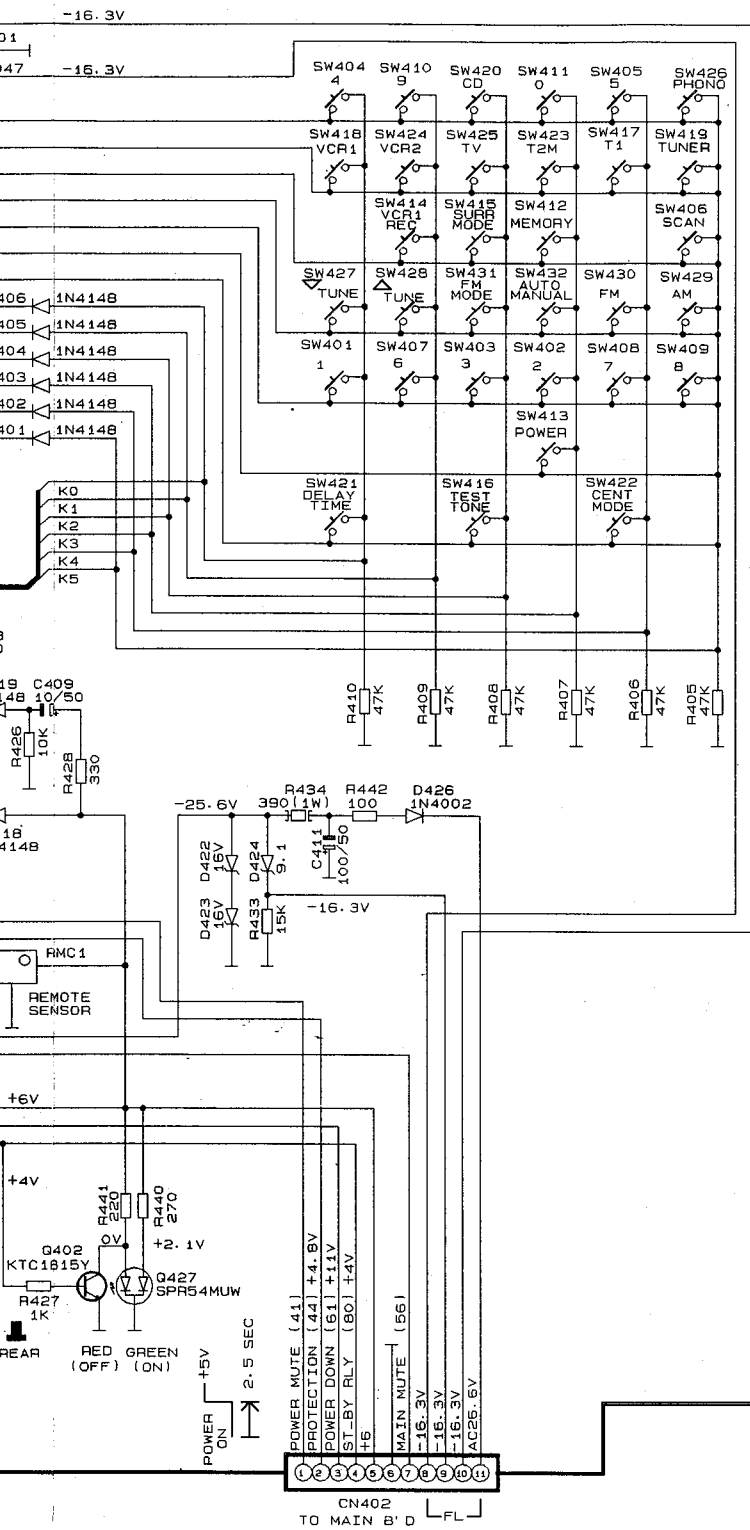
**CAUTION**  
Safety precaution to be followed during servicing  
1) Since those parts marked with are critical parts for safety, use only the one described in the parts list  
2) Before returning the set to the customer make appropriate leakage current or resistance measurements to determine the exposed parts are properly insulated from the supply circuit.

**SCHEMATIC DIAGRAM IV**



| VERSION | 65 | 66 |
|---------|----|----|
| USA/CAN | H  | L  |
| EUROPE  | L  | L  |

# FRONT B' D 4002033000



# COMMANDER B' D 4008500200

| REVISED |      |     |      |
|---------|------|-----|------|
| NO.     | DATE | NO. | DATE |
| 1       |      | 6   |      |
| 2       |      | 7   |      |
| 3       |      | 8   |      |
| 4       |      | 9   |      |
| 5       |      | 10  |      |

**NOTES**

- Resistor values are indicated in ohms unless otherwise specified (K=1,000 M=1,000,000)
- Capacitor values are indicated in microfarads unless otherwise specified. (p=micro-microfarads)

**CAUTION**

Safety precaution to be followed during servicing

- Since those parts marked with are critical parts for safety, use only the one described in the parts list
- Before returning the set to the customer make appropriate leakage current or resistance measurements to determine the exposed parts are properly insulated from the supply circuit.