

# SERVICE MANUAL

## TD-1120

AM / FM Stereo Tuner

## TD-1121

MW / LW / FM Stereo Tuner

## Specifications

### FM SECTION

|                                                                  |                  |
|------------------------------------------------------------------|------------------|
| Tuning Range                                                     | 87.5—108.0MHz    |
| Scanning Frequency Interval (Auto/Manual)                        |                  |
| USA/Australia Version                                            | 0.1MHz           |
| Europe Version                                                   | 0.05MHz          |
| Usable Sensitivity IHF at $S+N+D/ND=30dB$ , $2.0\mu V/(11.2dBf)$ |                  |
| THD at 1KHz, 100% MOD,                                           |                  |
| Mono                                                             | 0.2%             |
| Stereo                                                           | 0.4%             |
| Stereo Separation at 1 KHz                                       | 45dB             |
| Signal to Noise Ratio IHF,                                       |                  |
| Mono                                                             | 70dB             |
| Stereo                                                           | 65dB             |
| Frequency Response 20Hz—15KHz                                    | +0.5/—3dB        |
| Audio Output Voltage, 1KHz, 100% Mod                             | 600mV            |
| De-emphasis                                                      | Europe/Australia |
| Version                                                          | 50 $\mu$ sec     |

### AM/MW/LW SECTION

|                                           |                |
|-------------------------------------------|----------------|
| Tuning Range                              |                |
| USA Version                               | 520—1610KHz    |
| Europe/Australia Version                  | 531—1620KHz    |
| MW                                        | 531—1602KHz    |
| LW                                        | 153—281KHz     |
| Scanning Frequency Interval (Auto/Manual) |                |
| USA/MW Version                            | 10KHz          |
| Europe/Australia Version                  | 9KHz           |
| LW                                        | 1KHz           |
| Usable Sensitivity IHF at $S+N/N=20dB$ ,  |                |
| Loop Antenna                              | 800 $\mu V/m$  |
| MW                                        | 800 $\mu V/m$  |
| LW                                        | 1600 $\mu V/m$ |
| Signal to Noise Ratio, 30% Mod ref        | 45dB           |
| MW                                        | 45dB           |
| LW                                        | 40dB           |
| Audio Output Voltage, 400Hz, 30% Mod      | 160mV          |
| Power Consumption                         | 10Watts        |
| Unit Dimension (W×H×D)                    | 440×70×225mm   |
| Unit Weight                               | 3Kg            |



**Sherwood**

Note: Design and specifications subject to change without notice for improvements.

# Electrical Measurements & Adjustment

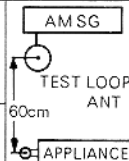
\* Before making adjustment, operate the appliance for more than 2 minutes.

## TUNER SECTION

- ※Note: 1.0dB = 1μV  
2. FM 100% Mod. = 75KHz Dev.  
3. DVM = Digital Volt Meter  
4. SG = Signal Generator  
5. SSG = Stereo Signal Generator

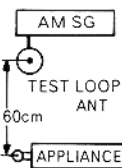
### 1. MW Adjustment

- Selector..... TUNER, MW (AM)
- In case of 2band appliance (AM/FM), MW is converted into AM.

| No. | Subject         | Feed Signal                                                                                                                                                                                                                                                                                                                                                     |         | Setting     | Measure                                          | Adjust | Adjust                                     | Remark                                                                               |
|-----|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|--------------------------------------------------|--------|--------------------------------------------|--------------------------------------------------------------------------------------|
|     |                 | From                                                                                                                                                                                                                                                                                                                                                            | To      | Appliance   | Output                                           | Point  | For                                        |                                                                                      |
| 1   | TUNING VOLTAGE  | 520KHz                                                                                                                                                                                                                                                                                                                                                          | 1610KHz | *1)520KHz   | TP6<br>Connect DVM                               | L203   | DC1 ±0.2V                                  |                                                                                      |
|     |                 |                                                                                                                                                                                                                                                                                                                                                                 |         | * 2)1610KHz | Same as above                                    | TC203  | DC9 ± 0.3V                                 |                                                                                      |
|     |                 | <ul style="list-style-type: none"><li>• Repeat the step * 1) and * 2) until DVM reads the tuning voltage mentioned above.</li><li>• In case the freq. step is 9KHz, the freq. of AM SG and appliance should be changed to *1)531KHz and *2)1602KHz.</li></ul>                                                                                                   |         |             |                                                  |        |                                            |                                                                                      |
| 2   | IF              | AM IF<br>Genescope                                                                                                                                                                                                                                                                                                                                              | ANT     | 1000 KHz    | Connect IF<br>Genescope                          | L205   | Symmetrical<br>curve on AM<br>IF Genescope |   |
| 3   | RF<br>TUNING    | * 1) AM SG<br>600KHz, 77dB<br>400Hz(30% Mod.)                                                                                                                                                                                                                                                                                                                   | ANT     | 600KHz      | Output Connect<br>AC Voltmeter &<br>Oscilloscope | L202   | Maximize<br>audio output                   |  |
|     |                 | * 2) AM SG<br>1400KHz, 77dB                                                                                                                                                                                                                                                                                                                                     | ANT     | 1400KHz     | Same as above                                    | TC202  | Same as above                              |                                                                                      |
|     |                 | <ul style="list-style-type: none"><li>• FEED SIGNAL should be fed to Loop ant. through the Test Loop ant., 60cm distant from the appliance.</li><li>• Repeat the step *1) and * 2) until no further improvement occurs.</li><li>• In case the freq. step is 9KHz, the freq. of AM SG and appliance should be changed to * 1) 603KHz and * 2) 1404KHz.</li></ul> |         |             |                                                  |        |                                            |                                                                                      |
| 4   | SIGNAL<br>METER | AM SG<br>1000KHz, 82dB<br>400Hz(30% Mod.)                                                                                                                                                                                                                                                                                                                       | ANT.    | 1000KHz     |                                                  | R211   | TUNE LED<br>lights slightly                |                                                                                      |
|     |                 | <ul style="list-style-type: none"><li>• In case the freq. step is 9KHz, the freq. of AM SG and appliance should be changed to 999KHz.</li></ul>                                                                                                                                                                                                                 |         |             |                                                  |        |                                            |                                                                                      |

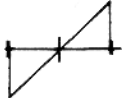
### 2. LW Adjustment

- Selector..... TUNER, LW
- This adjustment is necessary to 3 band (MW/LW/FM) appliance on

| No. | Subject           | Feed Signal                                                                                                                                                                   |        | Setting<br>Appliance | Measure<br>Output                                | Adjust<br>Point | Adjust<br>For            | Remark                                                                              |
|-----|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------------------|--------------------------------------------------|-----------------|--------------------------|-------------------------------------------------------------------------------------|
|     |                   | From                                                                                                                                                                          | To     |                      |                                                  |                 |                          |                                                                                     |
| 1   | TUNING<br>VOLTAGE | 153KHz                                                                                                                                                                        | 281KHz | * 1) 153KHz          | TP6<br>Connect DVM                               | LL204           | DC1.2± 0.2V              |                                                                                     |
|     |                   |                                                                                                                                                                               |        | * 2) 281 KHz         | Same as above                                    | LTC204          | DC5.2± 0.2V              |                                                                                     |
|     |                   | • Repeat the step * 1) and * 2) until DVM reads the tuning voltage mentioned above.                                                                                           |        |                      |                                                  |                 |                          |                                                                                     |
| 3   | RF<br>TUNING      | * 1) AM SG 160<br>KHz, 80dB<br>400Hz (30% Mod.)                                                                                                                               | ANT.   | 160KHz               | Output Connect<br>AC Voltmeter &<br>Oscilloscope | LL201           | Maximize<br>audio output |  |
|     |                   | * 2) AM SG 250<br>KHz, 80dB<br>400Hz (30% Mod.)                                                                                                                               | ANT.   | 250KHz               | Same as above                                    | LTC201          | Same as above            |                                                                                     |
|     |                   | • FEED SIGNAL should be fed to Loop ant. through the Test Loop ant., 60cm distant from the appliance.<br>• Repeat the step * 1) and * 2) until no further improvement occurs. |        |                      |                                                  |                 |                          |                                                                                     |

### 3. FM adjustment

- Selector..... TUNER, FM (MONO/STEREO)
- Deviation..... UL/CSA (75KHz Dev.)  
EUROPE (40KHz Dev.)

| No. | Subject        | Feed Signal        |        | Setting   | Measure                  | Adjust | Adjust                                       | Remark                                                                                |
|-----|----------------|--------------------|--------|-----------|--------------------------|--------|----------------------------------------------|---------------------------------------------------------------------------------------|
|     |                | From               | To     | Appliance | Output                   | Point  | For                                          |                                                                                       |
| 1   | TUNING VOLTAGE |                    | 108MHz | 108MHz    | TP6<br>connect DVM       | L107   | DC 8.8 ± 0.2V                                |                                                                                       |
| 2   | IF             | FM<br>IF Genescope | ANT    | 98MHz     | connect IF<br>Genescope  | L206   | Symmetrical<br>S curve on FM<br>IF Genescope |  |
|     |                |                    |        |           | TP4 & TP5<br>connect DVM |        | DC 0 ± 50mV                                  |                                                                                       |
|     |                |                    |        | Detune    | connect<br>Oscilloscope  | L206   | Maximize<br>noise output                     |                                                                                       |
|     |                |                    |        |           | TP4 & TP5<br>connect DVM |        | DC 0 ± 50mV                                  | In case IF<br>Genescope<br>is not<br>available                                        |

# Electrical Parts List

|   |                 |                                                                                                     |     |                 |                                                                                         |                                 |                             |  |
|---|-----------------|-----------------------------------------------------------------------------------------------------|-----|-----------------|-----------------------------------------------------------------------------------------|---------------------------------|-----------------------------|--|
| 3 | RF<br>TUNING    | *1)<br>FM SG<br>90MHz, 1.58 $\mu$ V<br>1KHz(75KHz Dev.)                                             | ANT | 90MHz<br>MONO   | Output<br>connect AC<br>Volt meter &<br>Distortion<br>Analyzer and<br>Oscilloscope      | L101,<br>L102,<br>L203,<br>L204 | Maximize<br>audio output    |  |
|   |                 | *2) FM SG<br>106MHz, 1.58 $\mu$ V<br>1KHz(75KHz Dev.)                                               | ANT | 106MHz<br>MONO  | Same as<br>above                                                                        | TC101,<br>TC102                 | Same as<br>above            |  |
|   |                 | • Repeat the step *1) and *2) until no further improvement occurs.                                  |     |                 |                                                                                         |                                 |                             |  |
| 4 | THD<br>(MONO)   | FM SG<br>98MHz, 60dB<br>1KHz(75KHz Dev.)                                                            | ANT | 98MHz<br>MONO   | *1) Output<br>connect DVM                                                               | L207                            | DC 0 $\pm$ 0.05V            |  |
|   |                 |                                                                                                     |     |                 | *2) Output<br>connect AC<br>Voltmeter &<br>Distortion<br>Analyzer                       |                                 | Minimize<br>distortion      |  |
|   |                 | • Adjust the step *1) first, and the step *2) next, and repeat until no further improvement occurs. |     |                 |                                                                                         |                                 |                             |  |
| 5 | MPX<br>(VCO)    | FM SSG<br>98MHz, 60dB<br>1KHz(75KHz Dev.)<br>pilot 19KHz<br>(9% Mod.)                               | ANT | 98MHz<br>STEREO | TP3<br>connect<br>Freq. Counter                                                         | VR301                           | Read 76KHz                  |  |
|   |                 | • Before adjustment, set the FM SSG to "Mod. OFF."                                                  |     |                 |                                                                                         |                                 |                             |  |
|   |                 |                                                                                                     |     |                 |                                                                                         |                                 |                             |  |
| 6 | THD<br>(STEREO) | FM SSG<br>98MHz, 60dB<br>1KHz(75KHz Dev.)<br>pilot 19KHz<br>(9% Mod.)                               | ANT | 98MHz<br>STEREO | Output<br>connect AC<br>Volt meter &<br>Distortion                                      | T101                            | Minimize<br>distortion      |  |
|   |                 |                                                                                                     |     |                 |                                                                                         |                                 |                             |  |
|   |                 |                                                                                                     |     |                 |                                                                                         |                                 |                             |  |
| 7 | MUTE<br>LEVEL   | FM SG<br>98MHz, 10 $\mu$ V<br>1KHz(75KHz Dev.)                                                      | ANT | 98MHz<br>STEREO | Output<br>connect<br>Oscilloscope                                                       | R212                            | Muting occurs<br>marginally |  |
|   |                 |                                                                                                     |     |                 |                                                                                         |                                 |                             |  |
|   |                 |                                                                                                     |     |                 |                                                                                         |                                 |                             |  |
| 8 | SEPARATION      | *1)<br>FM SSG<br>98MHz, 60dB<br>1KHz(75KHz Dev.)<br>pilot 19KHz(9%<br>Mod)<br>(L ch MOD.)           | ANT | 98MHz<br>STEREO | R Ch Output<br>connect AC<br>Volt meter &<br>Distortion<br>Analyzer and<br>Oscilloscope | R311                            | Minimize<br>Output          |  |
|   |                 | *2)<br>Same as above<br>(R ch MOD.)                                                                 |     |                 | L ch Output<br>connect same<br>as above                                                 | R311                            | Minimize<br>Output          |  |
|   |                 | • Repeat the step *1) and *2) until no further improvement occurs.                                  |     |                 |                                                                                         |                                 |                             |  |

| Ref No.           | Parts No.  | Description                 | Position | Remark   |
|-------------------|------------|-----------------------------|----------|----------|
| • ICS             |            |                             |          |          |
| IC201             | 2168017128 | LA1266                      | 3C       |          |
| IC301             | 2168411105 | HA12016                     | 3B       |          |
| IC501             | 2138010101 | MN1527KMA                   | 1B       |          |
| • TR & FETS       |            |                             |          |          |
| Q101              | 2018213100 | FET 3SK74L                  | 2D       |          |
| Q102              | 2018206110 | FET 2SK161                  | 3D       |          |
| Q103              | 2008406103 | KTC1293Y                    | 2D       |          |
| Q104~105          | 2008406103 | KTC1293Y                    | 3D       |          |
| Q106              | 2008406101 | LM9018F                     | 2D       |          |
| Q201              | 2208606104 | KTC1815Y                    | 3C       |          |
| LQ202~            | 2208606104 | KTC1815Y                    | 2C       | LW       |
| LQ205             |            |                             |          |          |
| Q401L/R~          | 2208606104 | KTC1815Y                    | 2B       |          |
| Q404              |            |                             |          |          |
| Q407              | 2208606104 | KTC1815Y                    | 3A       |          |
| Q409              | 2208606104 | KTC1815Y                    | 3A       |          |
| LQ411             | 2208606104 | KTC1815Y                    | 3A       | LW       |
| Q504              | 2208606104 | KTC1815Y                    | 1B       |          |
| Q406              | 2208206105 | KTA1015Y                    | 3A       |          |
| Q408              | 2208206105 | KTA1015Y                    | 3A       |          |
| LQ410             | 2208206105 | KTA1015Y                    | 3A       | LW       |
| Q505              | 2208206105 | KTA1015Y                    | 1B       |          |
| Q501              | 2018211100 | FET 2SK168D                 | 1A       |          |
| Q502              | 2208606108 | KTC2240BL                   | 1A       |          |
| • VARACTOR DIODES |            |                             |          |          |
| VD101/            | 2058819107 | KV1310A-3                   | 2D       |          |
| 102/104           |            |                             |          |          |
| VD103             | 2058819107 | KV1310A-3                   | 2D       | FTZ      |
| VD201,            | 2058819106 | KV1236Z                     | 2C       | AM/FM    |
| 202,203           |            |                             |          |          |
| VD201,            | 2058819106 | KV1235Z                     | 2C       | MW/LW/FM |
| 202,203           |            |                             |          |          |
| • COILS           |            |                             |          |          |
| L101              | 2648001260 | FM ANT (A)                  | 2D       |          |
| L102              | 2648001270 | FM ANT (B)                  | 2D       |          |
| L203              | 2648001280 | FM RF(A)                    | 2D       |          |
| L204              | 2648001290 | FM RF(B)                    | 2D       |          |
| L106              | 2648601400 | Inductor 2.2 $\mu$ H        | 2D       |          |
| L107              | 2638001060 | FM OSC                      | 3D       |          |
| LL201             | 2608201130 | LW Matching Coil            | 2C       | LW       |
| L202              | 2608201120 | AM RF                       | 2C       |          |
| L203              | 2638201150 | MW OSC                      | 2C       |          |
| LL204             | 2638401060 | LW OSC                      | 2C       | LW       |
| • FILTERS         |            |                             |          |          |
| CF201             | 390800150  | C.F SFZ450B                 | 2C       |          |
| CF202             | 3908001020 | C.F BFU450CN                | 2C       |          |
| CF204,CF101       | 3908011001 | C.F 10.7 MA8                | 2C,2D    |          |
| CF102             | 3908011001 | C.F 10.7 MS3Gr-A            | 2C       | LW       |
| • LEDS            |            |                             |          |          |
| LED               | 2308220130 | SW 56 URC RED               | 4C       |          |
| LCD               | 2338009920 | SLC-60106RSN                | 2A       |          |
| • TRIMMERS        |            |                             |          |          |
| TC101~103         | 3838001000 | C.T TZ03R-110F              | 2D       |          |
| TC202             | 3838001000 | C.T TZ03R-110F              | 2C       |          |
| TC203             | 3838001000 | C.T TZ03R-110F              | 2C       |          |
| LTC201            | 3838001000 | C.T TZ03R-110F              | 2C       | LW       |
| LTC204            | 3838001000 | C.T TZ03R-110F              | 2C       | LW       |
| • RESISTERS       |            |                             |          |          |
| R409              | 3039339472 | M.O 3.3 ohm 1W              | 2A       |          |
| R412              | 3039101572 | M.O 100ohm 2W               | 3A       |          |
| R506              | 3039151472 | M.O 150ohm 1W               | 1A       |          |
| R208              | 3009220273 | C.F 22 ohm $\frac{1}{4}$ W  | 3C       |          |
| R301              | 3009220273 | C.F 22 ohm $\frac{1}{4}$ W  | 3B       |          |
| R107              | 3069560970 | C.F 560 ohm $\frac{1}{4}$ W | 2D       |          |
| R210              | 3069820920 | C.F 820 ohm $\frac{1}{4}$ W | 3C       |          |
| R128              | 3009101273 | C.F 100 ohm $\frac{1}{4}$ W | 3D       |          |
| R123              | 3069101970 | C.F 100 ohm $\frac{1}{4}$ W | 3D       |          |
| R502              | 3069151970 | C.F 150 ohm $\frac{1}{4}$ W | 1A       |          |
| R106,R114         | 3069181970 | C.F 180 ohm $\frac{1}{4}$ W | 2D       |          |
| R519              | 3069181970 | C.F 180 ohm $\frac{1}{4}$ W | 1B       |          |
| R127              | 3069331970 | C.F 330 ohm $\frac{1}{4}$ W | 3C       |          |
| R203              | 3009471273 | C.F 470 ohm $\frac{1}{4}$ W | 2C       |          |
| R126,R112         | 3069471970 | C.F 470 ohm $\frac{1}{4}$ W | 2D       |          |

| Ref No.      | Parts No.  | Description                  | Position | Remark |
|--------------|------------|------------------------------|----------|--------|
| R505         | 3069471970 | C.F 470 ohm $\frac{1}{4}$ W  | 1A       |        |
| R113         | 3069561970 | C.F 560 ohm $\frac{1}{4}$ W  | 2D       |        |
| R115,125     | 3069561970 | C.F 560 ohm $\frac{1}{4}$ W  | 3D       |        |
| R410         | 3069561970 | C.F 560 ohm $\frac{1}{4}$ W  | 2A       |        |
| R413,416     | 3069821970 | C.F 820 ohm $\frac{1}{4}$ W  | 3A       |        |
| R305         | 3069102970 | C.F 1K ohm $\frac{1}{4}$ W   | 3B       |        |
| R414,417     | 3069102970 | C.F 1K ohm $\frac{1}{4}$ W   | 3A       |        |
| R411         | 3069102970 | C.F 1K ohm $\frac{1}{4}$ W   | 2A       |        |
| R501,503     | 3069102970 | C.F 1K ohm $\frac{1}{4}$ W   | 1A       |        |
| R110,124     | 3069222970 | C.F 2.2K ohm $\frac{1}{4}$ W | 2D       |        |
| R215,120     | 3069222970 | C.F 2.2K ohm $\frac{1}{4}$ W | 2C       |        |
| R205         | 3069222970 | C.F 2.2K ohm $\frac{1}{4}$ W | 3C       |        |
| R313,314     | 3069222970 | C.F 2.2K ohm $\frac{1}{4}$ W | 3B       |        |
| R404,315L/R  | 3069222970 | C.F 2.2K ohm $\frac{1}{4}$ W | 2B       |        |
| 316L/R       |            |                              |          |        |
| R228         | 3069272970 | C.F 2.7K ohm $\frac{1}{4}$ W | 2B       |        |
| R317L/R      | 3069332970 | C.F 3.3K ohm $\frac{1}{4}$ W | 2B       |        |
| R308         | 3069392970 | C.F 3.9K ohm $\frac{1}{4}$ W | 2B       |        |
| R402         | 3069472970 | C.F 4.7K ohm $\frac{1}{4}$ W | 2B       |        |
| R302         | 3069562970 | C.F 5.6K ohm $\frac{1}{4}$ W | 3C       |        |
| R303,304     | 3069562970 | C.F 5.6K ohm $\frac{1}{4}$ W | 3B       |        |
| R406         | 3069562970 | C.F 5.6K ohm $\frac{1}{4}$ W | 2B       |        |
| R119         | 3069822970 | C.F 8.2K ohm $\frac{1}{4}$ W | 3D       |        |
| R118         | 3069103970 | C.F 10K ohm $\frac{1}{4}$ W  | 3D       |        |
| R213,415     | 3069103970 | C.F 10K ohm $\frac{1}{4}$ W  | 2C       |        |
| R206,218,219 | 3069103970 | C.F 10K ohm $\frac{1}{4}$ W  | 3C       |        |
| R401,405     | 3069103970 | C.F 10K ohm $\frac{1}{4}$ W  | 2B       | LW     |
| R418,LR419   | 3069103970 | C.F 10K ohm $\frac{1}{4}$ W  | 3A       |        |
| R504,524     | 3069103970 | C.F 10K ohm $\frac{1}{4}$ W  | 1A       |        |
| R510,511,517 | 3069103970 | C.F 10K ohm $\frac{1}{4}$ W  | 1B       |        |
| R518,520     | 3069103970 | C.F 10K ohm $\frac{1}{4}$ W  | 1B       |        |
| R209         | 3069183970 | C.F 18K ohm $\frac{1}{4}$ W  | 3C       |        |
| R201,202,214 | 3069223970 | C.F 22K ohm $\frac{1}{4}$ W  | 2C       |        |
| LR224        | 3069223970 | C.F 22K ohm $\frac{1}{4}$ W  | 2C       |        |
| R310,312     | 3069223970 | C.F 22K ohm $\frac{1}{4}$ W  | 3B       |        |
| R516         | 3069223970 | C.F 22K ohm $\frac{1}{4}$ W  | 3B       |        |
| R111         | 3069273970 | C.F 27K ohm $\frac{1}{4}$ W  | 2D       |        |
| R103,109     | 3069333970 | C.F 33K ohm $\frac{1}{4}$ W  | 2D       |        |
| R117         | 3069333970 | C.F 33K ohm $\frac{1}{4}$ W  | 3D       |        |
| R105         | 3069473970 | C.F 47K ohm $\frac{1}{4}$ W  | 2D       |        |
| R403,407     | 3069473970 | C.F 47K ohm $\frac{1}{4}$ W  | 2B       |        |
| R116         | 4069473970 | C.F 47K ohm $\frac{1}{4}$ W  | 3D       |        |
| R512~515     | 3069473970 | C.F 47K ohm $\frac{1}{4}$ W  | 1B       |        |
| R521~523     | 3069473970 | C.F 47K ohm $\frac{1}{4}$ W  | 1B       |        |
| LR221        | 3069473970 | C.F 47K ohm $\frac{1}{4}$ W  | 2C       | LW     |
| LR222        | 3069473970 | C.F 47K ohm $\frac{1}{4}$ W  | 2C       | LW     |
| LR226        | 3069473970 | C.F 47K ohm $\frac{1}{4}$ W  | 2C       | LW     |
| LR227        | 3069473970 | C.F 47K ohm $\frac{1}{4}$ W  | 2C       | LW     |
| R307         | 3069513970 | C.F 51K ohm $\frac{1}{4}$ W  | 2B       |        |
| R309         | 3069513970 | C.F 51K ohm $\frac{1}{4}$ W  | 3B       |        |
| R204         | 3069683970 | C.F 68K ohm $\frac{1}{4}$ W  | 2C       |        |
| R311         | 3069683970 | C.F 68K ohm $\frac{1}{4}$ W  | 3B       |        |
| R101,104     | 3069104970 | C.F 100K ohm $\frac{1}{4}$ W | 2D       |        |
| R216,217     | 3069104970 | C.F 100K ohm $\frac{1}{4}$ W | 3C       |        |
| R306         | 3069104970 | C.F 100K ohm $\frac{1}{4}$ W | 3B       |        |
| R122         | 3069474970 | C.F 470K ohm $\frac{1}{4}$ W | 3D       |        |
| R102         | 3069105970 | C.F 1M ohm $\frac{1}{4}$ W   | 2D       |        |
| LR225        | 3069155970 | C.F 1.5M ohm $\frac{1}{4}$ W | 2C       | LW     |
| VR301        | 3248333220 | SEMI 3.3K ohm                | 3B       |        |
| R211,212     | 3248332230 | SEMI 22K ohm                 | 2C       |        |
| LR220        | 3069104970 | C.F 100K ohm $\frac{1}{4}$ W | 2C       | LW     |
| LR223        | 3069104970 | C.F 100K ohm $\frac{1}{4}$ W | 2B       | LW     |
| • CAPACITORS |            |                              |          |        |
| C101,C107    | 3579101130 | Ceramic 100PF/50V            | 2D       |        |
| C102         | 3579102530 | Ceramic 0.001 $\mu$ F/50V    | 2D       |        |
| C103         | 3579223530 | Ceramic 0.023 $\mu$ F/50V    | 3D       |        |
| C104,106     | 3579223540 | Ceramic 0.023 $\mu$ F/50V    | 2D       |        |
| C105         | 3579102530 | Ceramic 1000PF/50V           | 2D       |        |
| C108,109     | 3529809210 | Ceramic 8PF/50V(CH)          | 3D       |        |
| C110         | 3579103530 | Ceramic 0.01PF/50V           | 2D       |        |
| C111,112     | 3579223530 | Ceramic 0.022PF/50V          | 3D       |        |
| C113,114     | 3529209210 | Ceramic 2PF/50V(CH)          | 3D       |        |
| C115         | 3529609110 | Ceramic 6PF/50V(RH)          | 3D       |        |
| C116         | 3529109210 | Ceramic 1PF/50V(CH)          | 3D       |        |
| C117         | 3529809110 | Ceramic 8PF/50V(RH)          | 3D       |        |
| C118         | 3529330210 | Ceramic 33PF/50V(CH)         | 3D       |        |
| C119         | 3529150110 | Ceramic 15PF/50V(RH)         | 3D       |        |
| C120,121     | 3579103530 | Ceramic 0.01 $\mu$ F/50V     | 3D       |        |
| C122         | 3579472530 | Ceramic 0.0047 $\mu$ F/50V   | 3D       |        |
| C123         | 3409210131 | Elect 100 $\mu$ F/16V        | 3D       |        |

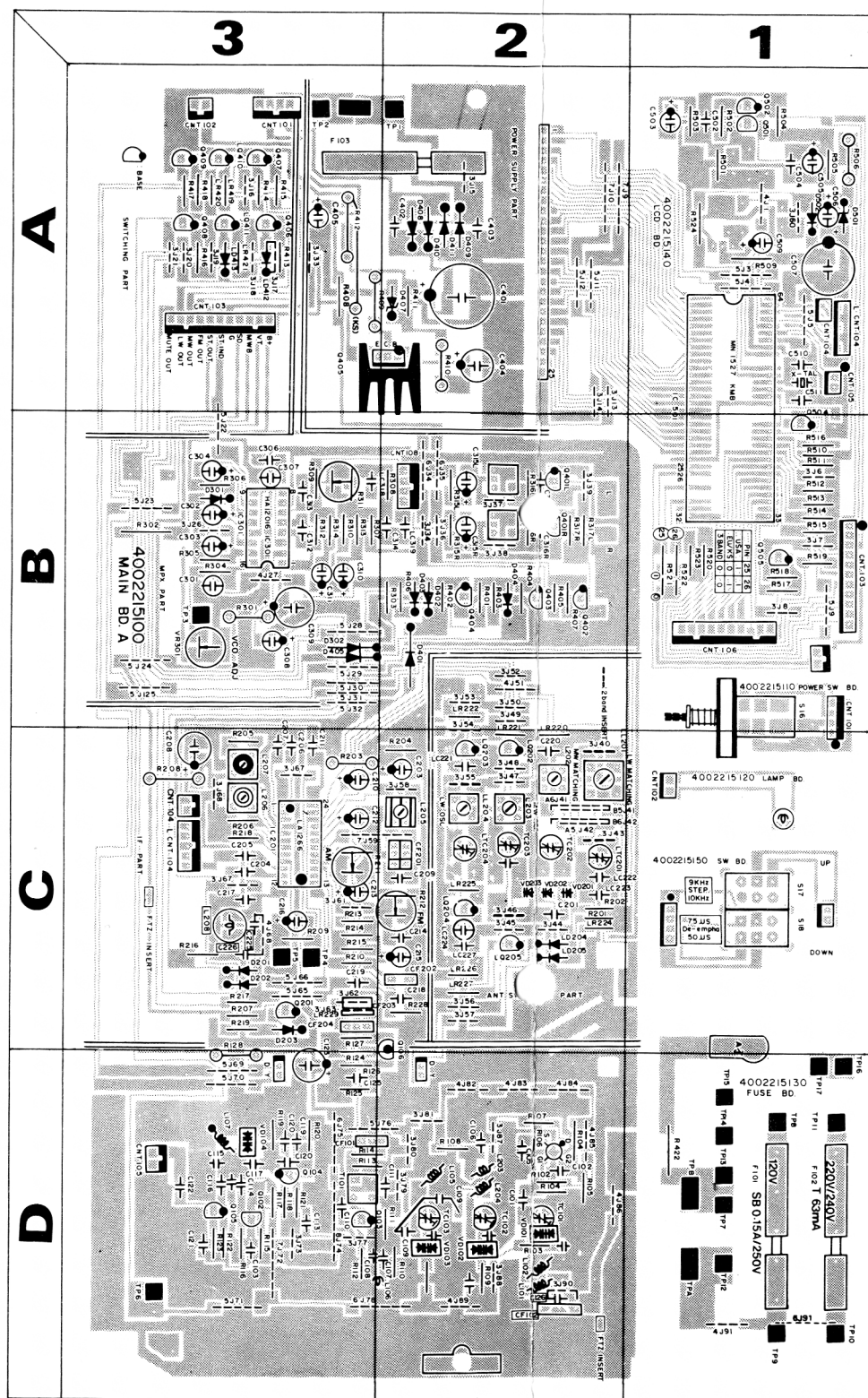
# Parts List & Top & Bottom View of P.C Boards

| Ref No.       | Parts No.  | Description               | Position | Remark    |
|---------------|------------|---------------------------|----------|-----------|
| C125          | 3579223530 | Ceramic 0.023 $\mu$ F/50V | 2D       |           |
| C201          | 3579473530 | Ceramic 0.047 $\mu$ F/50V | 2C       |           |
| C202          | 3619471110 | Poly 470p                 | 2C       |           |
| C203          | 3479210061 | Elect 10 $\mu$ F/35V      | 2C       |           |
| C204,205      | 3579102530 | Ceramic 0.001 $\mu$ F/50V | 3C       |           |
| C206,207      | 3579473530 | Ceramic 0.047 $\mu$ F/50V | 3C       |           |
| C208          | 3479210061 | Elect 10 $\mu$ F/35V      | 3C       |           |
| C209          | 3579470130 | Ceramic 47PF/50V          | 2C       |           |
| C210          | 3479210061 | Elect 10 $\mu$ F/35V      | 2C       |           |
| C211          | 3579103530 | Ceramic 0.01 $\mu$ F/50V  | 3C       |           |
| C212          | 3479247971 | Elect 4.7 $\mu$ F/50V     | 2C       |           |
| C213          | 3479210061 | Elect 10 $\mu$ F/35V      | 2C       |           |
| C214          | 3579470130 | Ceramic 0.047 $\mu$ F/50V | 2C       |           |
| C215,C216     | 3479233971 | Elect 3.3 $\mu$ F/50V     | 2C, 3C   |           |
| C217          | 3579331130 | Ceramic 330PF/50V         | 3C       |           |
| C218          | 3679322120 | Mylar 0.0032 $\mu$ F/100V | 2C       |           |
| C219          | 3679563120 | Mylar 0.056 $\mu$ F/100V  | 3C       |           |
| C220          | 3579223530 | Ceramic 0.022 $\mu$ F/50V | 2C       |           |
| LC221         | 3579473530 | Ceramic 0.047 $\mu$ F/50V | 2C       | LW        |
| LC222         | 3579270530 | Ceramic 27PF/50V          | 2C       | LW        |
| LC223         | 3579103530 | Ceramic 0.01 $\mu$ F/50V  | 2C       | LW        |
| LC224         | 3619171110 | Poly 170P                 | 2C       | LW        |
| LC225,226     | 3579101130 | Ceramic 100PF/50V         | LW       |           |
| C301          | 3619102110 | Poly 1000P                | 3B       |           |
| C302          | 3479210971 | Elect 1 $\mu$ F/50V       | 3B       |           |
| C303,304      | 3479233971 | Elect 3.3 $\mu$ F/50V     | 3B, 3B   |           |
| C305          | 3479210970 | Elect 1 $\mu$ F/50V       | 3B       |           |
| C306          | 3679473120 | Mylar 0.047 $\mu$ F/100V  | 3B       |           |
| C307          | 3619681110 | Poly 680P                 | 3B       |           |
| C308          | 3479222971 | Elect 2.2 $\mu$ F/50V     | 3B       |           |
| C309          | 3409222131 | Elect 220 $\mu$ F/16V     | 3B       |           |
| C310,C311     | 3479222041 | Elect 22 $\mu$ F/25V      | 3B, 3B   |           |
| C312,C313     | 3679152120 | Mylar 0.0015 $\mu$ F/100V | 3B, 3B   |           |
| C314          | 3579221130 | Ceramic 220PF/50V         | 2B       |           |
| C315L/R       | 3479210971 | Elect 1 $\mu$ F/50V       | 2B       |           |
| C316L/R       | 3679392120 | Mylar 0.0039 $\mu$ F/100V | 2B       |           |
| LC318,319     | 3679472120 | Mylar 0.0047 $\mu$ F/100V | 2B       | LW        |
| C318          | 3479210871 | Elect 0.1 $\mu$ F/50V     | 2B       |           |
| C401          | 3409210241 | Elect 1000 $\mu$ F/25V    | 2A       |           |
| C402          | 3679223120 | Mylar 0.022 $\mu$ F/100V  | 2A       |           |
| C403          |            | Mylar 0.022 $\mu$ F/100V  | 2A       |           |
| C404          | 3409210141 | Elect 100 $\mu$ F/25V     | 2A       |           |
| C501          | 3579102530 | Ceramic 0.001 $\mu$ F/50V | 1A       |           |
| C502          | 3479210971 | Elect 1 $\mu$ F/50V       | 1A       |           |
| C503,504      | 3579103530 | Ceramic 0.01 $\mu$ E/50V  | 1A, 1A   |           |
| C505,506      | 3479247031 | Elect 47 $\mu$ F/16V      | 1A, 1A   |           |
| C507          | 3409222211 | Elect 2200 $\mu$ F/6.3V   | 1A       |           |
| C509          | 3479210971 | Elect 1 $\mu$ F/50V       | 1A       |           |
| C510,511      | 3479210971 | Ceramic 220PF/50V(CH)     | 1A       |           |
| ●CONNECTORS   |            |                           |          |           |
| Connector     | 4358502180 | Ass'y 2P 180M/M           | 1A       |           |
| Connector     | 4358502181 | Ass'y 2P 180M/M           | 3D       |           |
| Connector     | 4368504160 | Ass'y 4P 160M/M           | 3A       |           |
| Connector     | 4358502120 | Ass'y 2P 120 M/M          | 3A       |           |
| Connector     | 4358510100 | Ass'y 10P 100M/M          | 4C       |           |
| Connector     | 4358511180 | Ass'y 11P 180M/M          | 1B       |           |
| ●FUSES        |            |                           |          |           |
| Fuse          | 5508110931 | SB 31.8M/M 0.15A/250V     | 1A       | A         |
| Fuse          | 5508300534 | TL 20M/M 63MA/250V        | 1A       | B,C,D,E,F |
| ●TRANSFORMERS |            |                           |          |           |
| Transformer   | 2828055607 | Power Transformer         | A        |           |
|               | 2828056907 | Power Transformer         | B        |           |
|               | 2828056707 | Power Transformer         | C,D      |           |
|               | 2828057007 | Power Transformer         | E,F      |           |

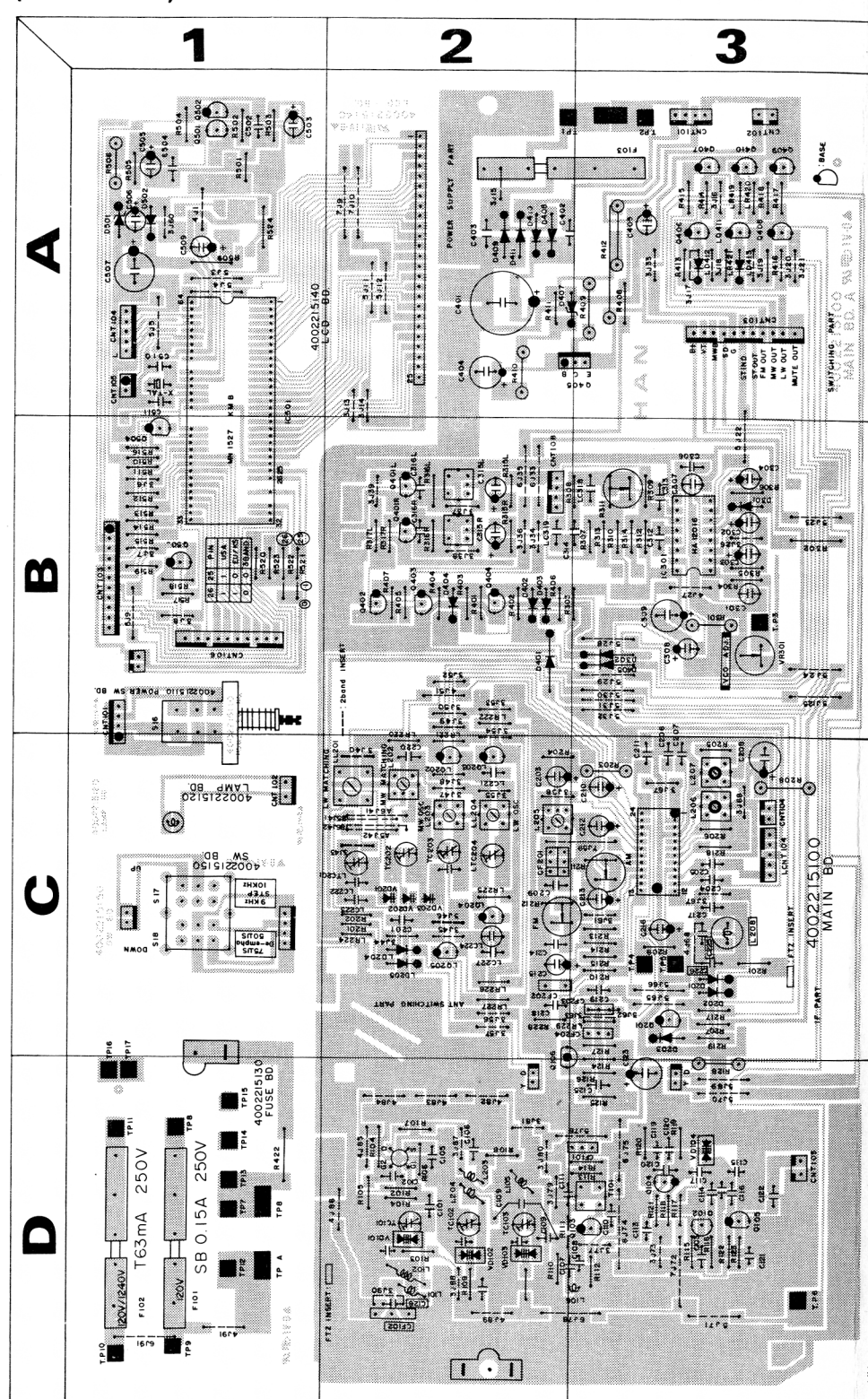
## \*REMARK

| VERSION | COUNTRY                       | AC INPUT           | REMARK         |
|---------|-------------------------------|--------------------|----------------|
| A       | USA/CANADA                    | 120V/60Hz          | UL CSA         |
| B       | U.S. MILITARY/OTHER COUNTRIES | 120, 220V/60, 50Hz |                |
| C       | GENERAL EUROPE                | 220V/50Hz          | IEC-65         |
| D       | GERMANY                       | 220V/50Hz          | FTZ            |
| E       | AUSTRALIA/BRITISH             | 240V/50Hz          | SAA, BSI       |
| F       | SCANDINAVIAN COUN.            | 220V/50Hz          | SE, N, D, F, S |

### MAIN BOARD 4002215100 (Top View)

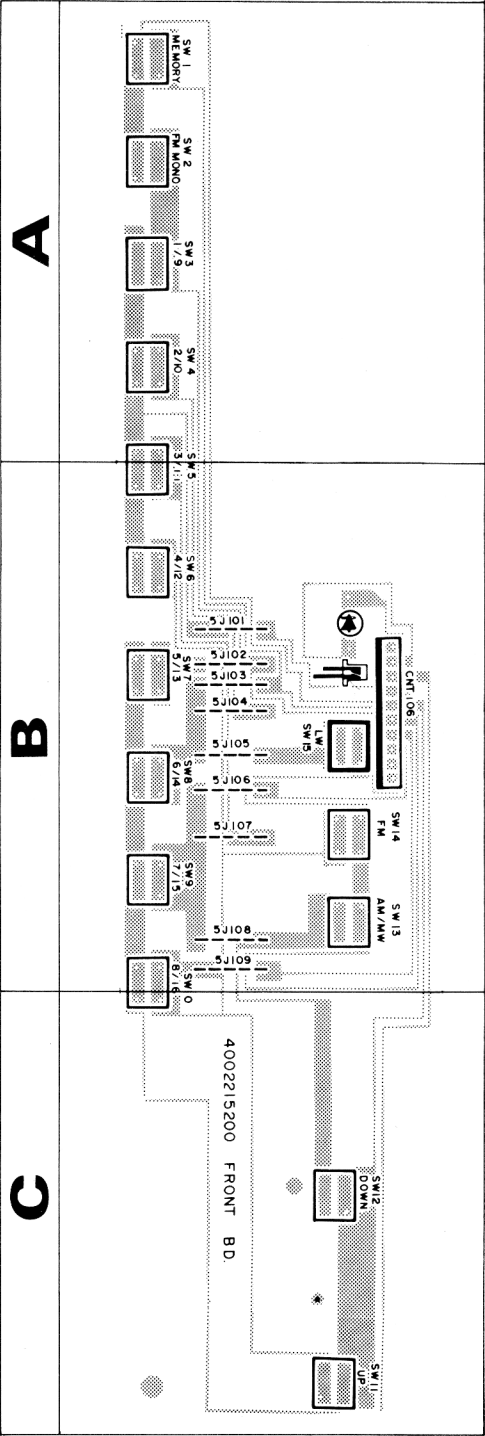


### (Bottom View)

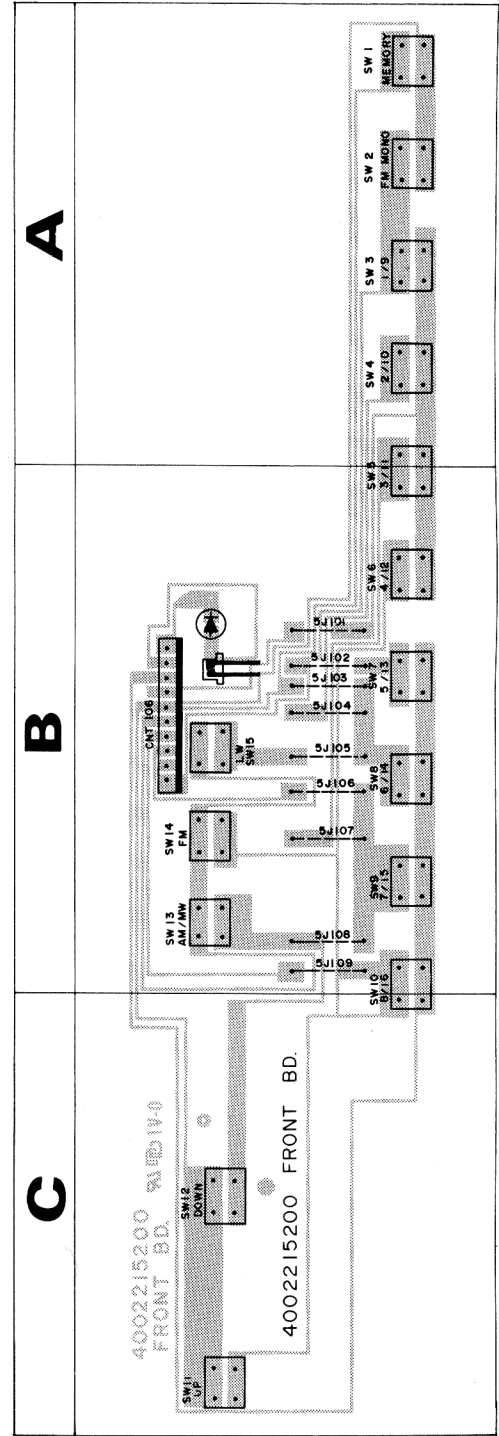


FRONT BOARD 4002215200

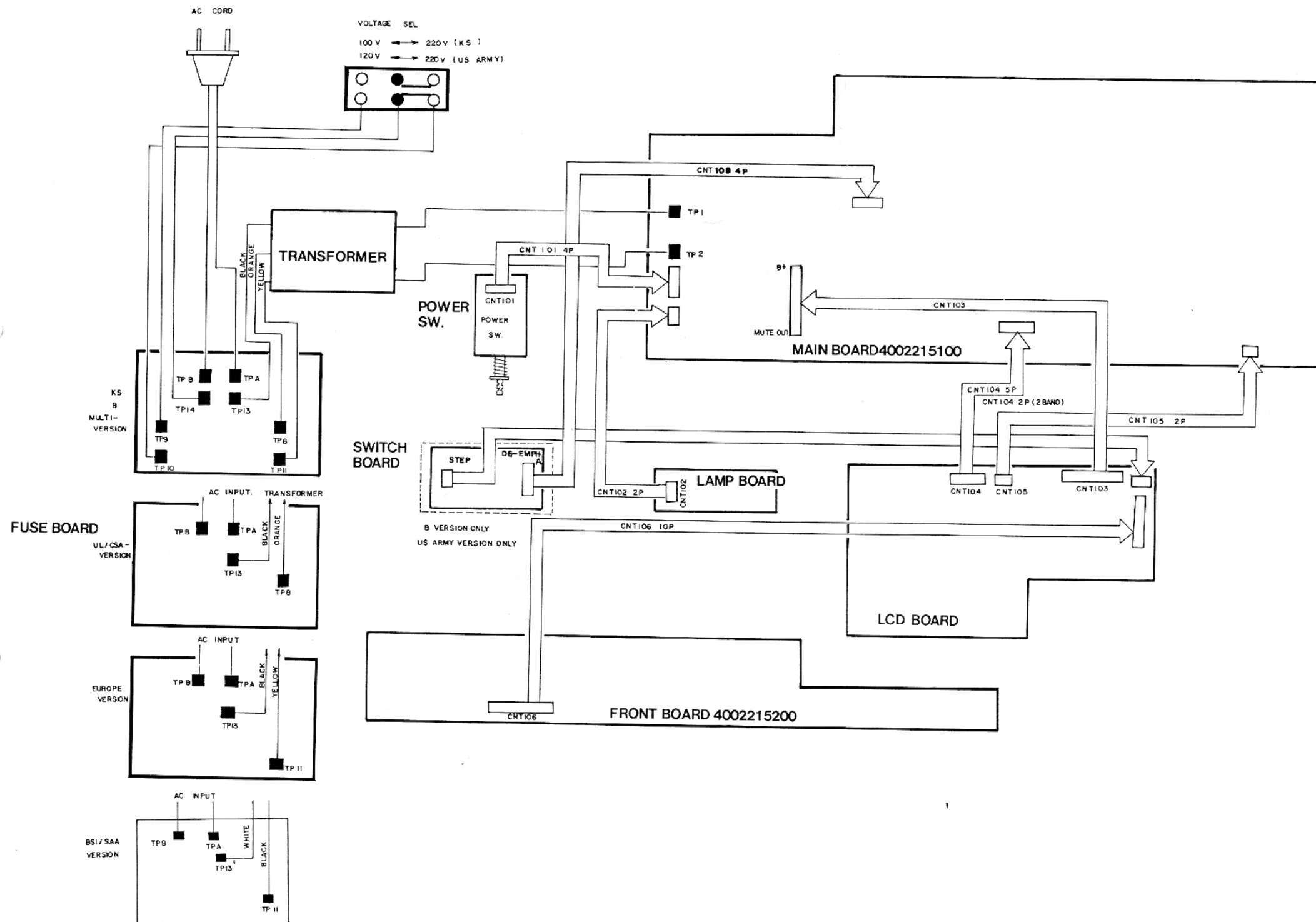
— TOP VIEW —



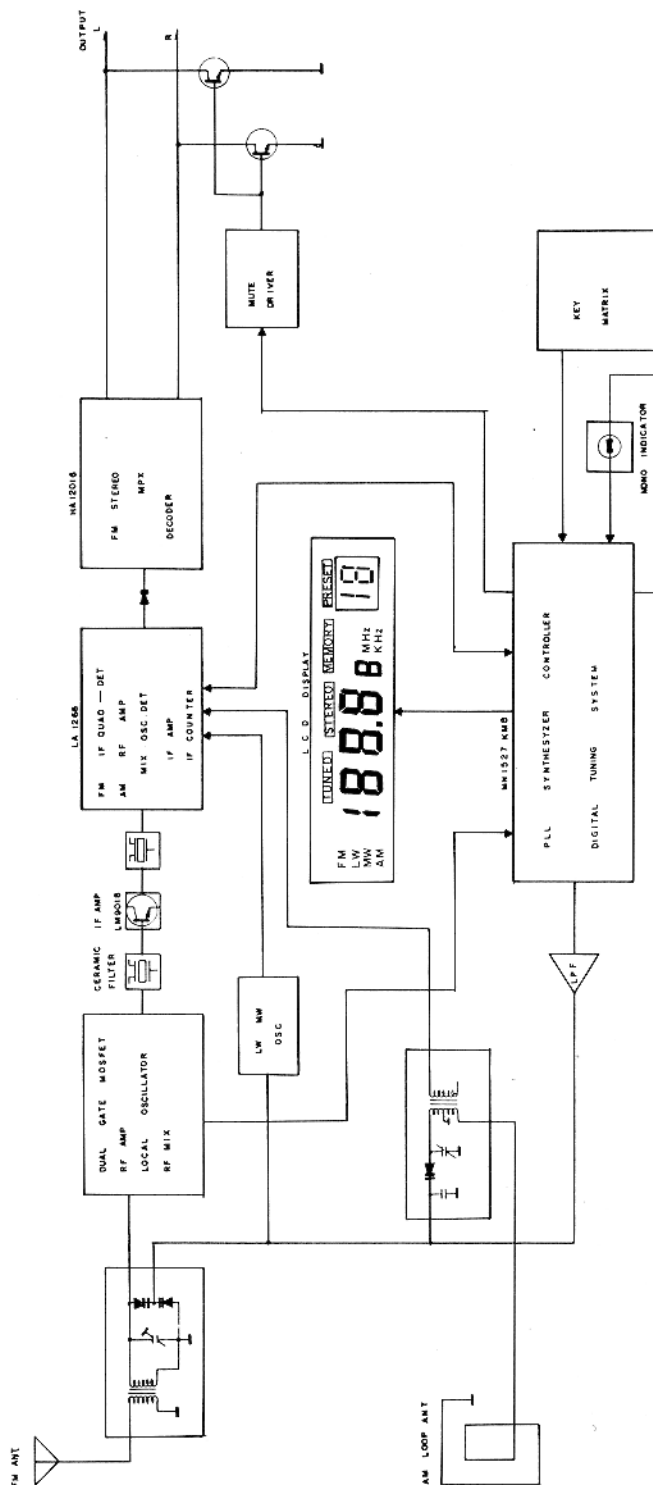
— BOTTOM VIEW —



# Point to Point Wiring Diagram



## Block Diagram



Parts List & Exploded View of Cabinet & Chassis

| NO. | PARTS NO.    | DESCRIPTION          | POSITION | Q'TY | VERSION                    |
|-----|--------------|----------------------|----------|------|----------------------------|
| 1   | 048602015111 | PANEL FRONT          | 1D       | 1    | A<br>B<br>C<br>D<br>E<br>F |
| 2   | 048521004011 | BODY FRONT           | 2C       | 1    |                            |
| 3   | 6121602210   | MAIN CH              | 3C       | 1    |                            |
| 4   | 046102021921 | BACK CH              | 5A       | 1    |                            |
|     | 046102021931 |                      |          | 1    |                            |
|     | 046102021941 |                      |          | 1    |                            |
|     | 046102021951 |                      |          | 1    | A<br>B<br>C<br>D<br>E<br>F |
|     | 046102021961 |                      |          | 1    |                            |
|     | 046102021971 |                      |          | 1    |                            |
| 5   | 046122015911 | TOP COVER            | 2A       | 1    |                            |
| 6   | 048545048211 | BUTTON POWER         | 1D       | 1    |                            |
| 7   | 6555004340   | SPRING PUSH          | 1D       | 1    | A, B, C, E<br>D, F         |
| 8   | 4628201041   | SW PUSH(POWER)       | 2C       | 1    |                            |
| 9   | 048555016711 | FILTER L.C.D         | 2D       | 1    |                            |
| 10  | 6042001210   | HOLDER L.C.D         | 2C       | 1    |                            |
| 11  | 2528203810   | LAMP                 | 2C       | 1    |                            |
| 12  | 048553007511 | WINDOW DISPLAY       | 2E       | 1    | A, B, C, E<br>D, F         |
| 13  | 048553008311 | WINDOW L.W           | 2F       | 1    |                            |
| 13  | 048535019011 | BADGE                |          | 1    |                            |
| 14  | 8545048710   | KNOB TACT(C)         | 3E       | 3    |                            |
| 15  | 6555004350   | SPRING PUSH          | 3E       | 1    |                            |
| 16  | 6045006210   | GUIDE LED(B)         | 3D       | 1    | A, B, C, E<br>D, F         |
| 17  | 048543014011 | KNOB TACK(A-1)       | 3D       | 1    |                            |
| 18  | 048543014111 | KNOB TACT(B)         | 4E       | 1    |                            |
| 19  | 4658001810   | TACT SW              | 3D       | 14   |                            |
| 20  | 6725002110   | CUSHION FOOT         | 5F       | 4    |                            |
| 21  | 048543014012 | KNOB TACK(A-2)       | 4E       | 1    | A, B, C, E, F<br>D         |
| 22  | 046035101410 | BASE FOOT            | 3C       | 2    |                            |
| 23  | 6123405410   | COVER BOTTOM         | 5B       | 1    |                            |
| 24  | 6705004220   | SPACER               | 4C       | 4    |                            |
| 25  | 7505201930   | H/SINK               | 4B       | 1    |                            |
| 26  | 4438101510   | RCA JACK (2P)        | 5B       | 1    | A, B, C, E, F<br>D         |
| 27  | 4408102610   | TREMINAL PUSH(4P)    | 5B       | 1    |                            |
|     | 4408001310   | TERMINAL PUSH(2P)    |          | 1    |                            |
| 28  | 6518000210   | HOLDER ANT           | 6B       | 1    |                            |
| 29  | 2608207050   | AM ANT LOOP          | 6B       | 1    |                            |
| 30  | 4308003910   | AC POWER CODR        | 5A       | 1    | A, B, C, D, E, F           |
| 31  | 6518000111   | STOPPER CORD         | 6B       | 1    |                            |
| 32  | 2828055607   | TRANSFORMER          | 3B       | 1    |                            |
|     | 2828056907   |                      |          | 1    |                            |
|     | 2828056707   |                      |          | 1    |                            |
|     | 2828057007   |                      |          | 1    |                            |
| 33  | 8535011010   | DIFFUSER             | 2E       | 1    | A<br>B<br>C<br>D<br>E<br>F |
| 34  | 8119230083   | SCREW #2 PTC 3x8B    | 1F       | 3    |                            |
| 35  | 8129230081   | SCREW #2 FTC 3x8 Y   | 1D       | 2    |                            |
| 36  | 8109230081   | SCREW #2 BTC 3x8 Y   | 4E, 3D   | 10   |                            |
| 37  | 8159440083   | SCREW WSAM 4x8 B     | 3B       | 4    |                            |
| 38  | 8119226081   | SCREW #2 PTC 2.6x8 Y | 4D, 3D   | 9    |                            |
| 39  | 8109230061   | SCREW #2 BTC 3x6 Y   | 4F, 5F   | 7    | A<br>B<br>C<br>D<br>E<br>F |
| 40  | 8109230083   | SCREW #2 BTC 3x8 B   | 6B, 5B   | 9    |                            |
| 41  | 8159440081   | SCREW WSAM 4x8 Y     | 3A       | 2    |                            |
| 42  | 8159230101   | SCREW #2 WPTC 3x14 Y | 4B       | 3    |                            |
| 43  | 8159230081   | SCREW #2 WPTC 3x8Y   | 5C       | 2    |                            |
| 44  | 8305000211   | T/FROMER B.K.T       | 3A       | 2    |                            |
| 45  | 6035101410   | BASE FOOT            | 4C       | 2    | A<br>B<br>C<br>D<br>E<br>F |
| 46  | 6165123710   | SHIELD FENCE(A)      | 5B       | 1    |                            |
| 47  | 6160123810   | SHIELD FENCE(B)      | 6C       | 1    |                            |
|     | 6165125030   | SHIELD FENCE         |          | 1    |                            |
|     | 6165125110   | SHIELD FENCE(A)      |          | 1    |                            |
|     | 6165125620   | SHIELD BOTTOM(3)     |          | 1    |                            |
|     | 6165125510   | SHIELD CAP(3)        |          | 1    | A<br>B<br>C<br>D<br>E<br>F |
|     | 6165125910   | SHIELD FENCE(B)      |          | 1    |                            |
|     | 4618001610   | SLIDE SWITCH         |          | 2    |                            |
|     | 4618000410   | SLIDE SWITCH         |          | 1    |                            |
|     | 6515000630   | HOLDER VOLTAGE       |          | 1    |                            |
|     | 4438301110   | ANT TERMINAL         |          | 1    |                            |

\*REMARK

| VERSION | COUNTRY                     | AC INPUT             | REMARK (SAFETY) |
|---------|-----------------------------|----------------------|-----------------|
| A       | USA/CANADA                  | 120V/60Hz            | UL, CSA         |
| B       | US MILITARY/OTHER COUNTRIES | 120V/60Hz, 220V/50Hz |                 |
| C       | GENERAL EUROPE              | 220V/50Hz            | IEC-65          |
| D       | GERMANY                     | 220V/50Hz            | FTZ             |
| E       | AUSTRALIA/BRITISH           | 240V/50Hz            | SAA, BSI        |
| F       | SCANINABIAN COUNTRY         | 220V/50Hz            | SE, N, D, Fi, S |

