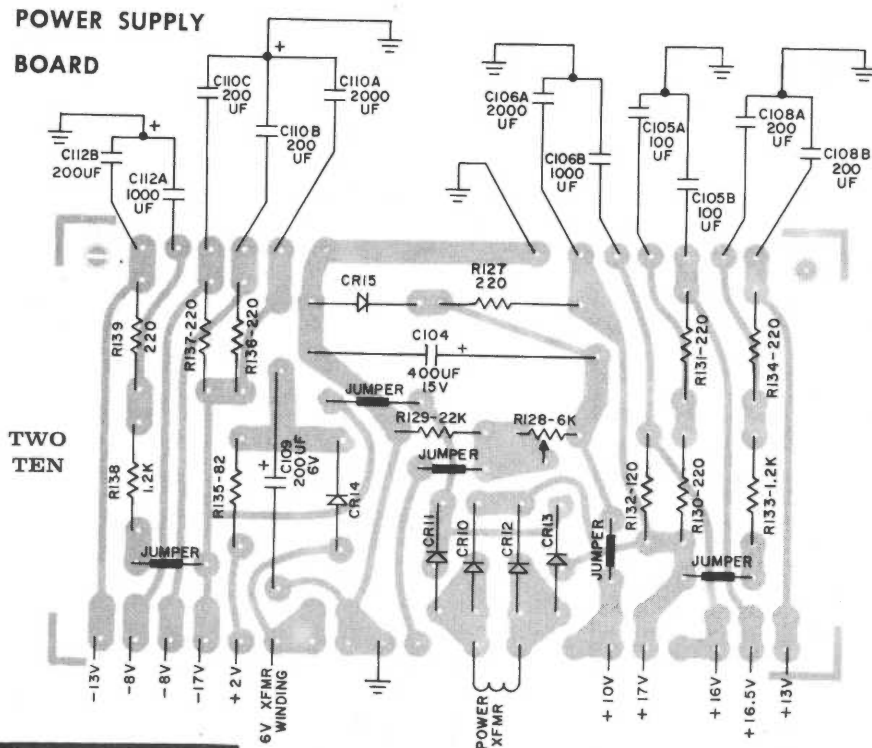
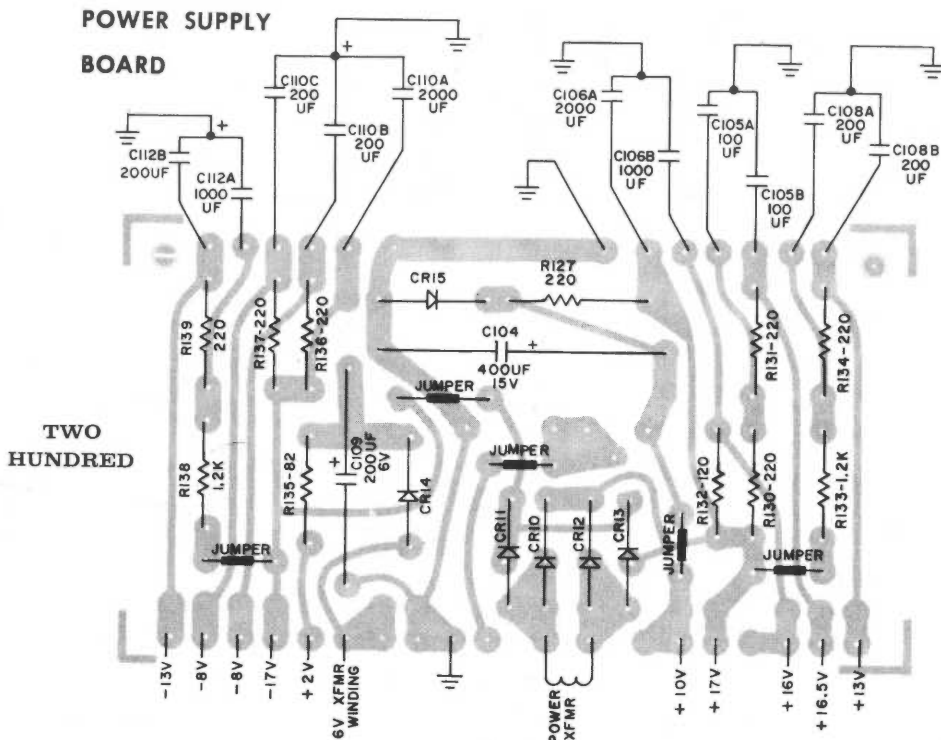


# SERVICE AND TECHNICAL MANUAL

## MODELS

### TWO HUNDRED TWO TEN



**harman kardon**

INCORPORATED

55 AMES COURT, PLAINVIEW, N. Y. 11803

### ALIGNMENT PROCEDURES

Do not attempt alignment unless the following equipment is available.

### EQUIPMENT DESCRIPTION

1. FM Signal Generator
2. Oscilloscope
3. AC VTVM

4. Audio Generator
5. Multiplex Stereo Generator
6. AM Signal Generator

### RF AND IF ALIGNMENT

Function Selector FM STEREO

| STEP | CONNECT SIGNAL GENERATOR                                    | GENERATOR FREQUENCY   | DIAL SETTING      | OUTPUT INDICATOR                                    | ADJUST  | ADJUST FOR                     | NOTES  |
|------|---|---|-------------------|---|---|--------------------------------|--|
| 1    | To Antenna Terminals Through A 270 Ohm Resistor On Hot Side | Approx. 100 MC, Where There Is No Station — 400 CPS, 75KC Deviation | Same As Generator | D.C.V.T.V.M. On Positive Terminal Of C38 And Ground | 1st, 2nd, 3rd FM IF Transformer, L7, L8, L5, FM Output Coil In Tuner & Primary Of Ratio Detector L6 | Maximum Indication On Meter DC | Maintain Low Enough Input Level So That Limiter Is Below Saturation (Limiting). Use 2/3 Of Obtainable Max. Indication On DC Meter As Reference. Set R31 To Physical Center |
| 2    | Same  | 90 MC<br>400 CPS<br>75 KC<br>Deviation                              | 90 MC             | Same  | Osc. Trimmer  | Same                           | Same   |
| 3    | Same  | 106 MC<br>400 CPS<br>75 KC<br>Deviation                             | 106 MC            | Same  | Antenna Trimmer & RF Trimmer  | Same                           | Same   |
| 4    | Same  | Same  | Same              | "FM Output" As Per FM IF Board Layout               | Ratio Detector Secondary L6   | Zero DC Volts                  | Inject Enough Signal So That Limiter Is Well Saturated   |

### MULTIPLEX ALIGNMENT PROCEDURE

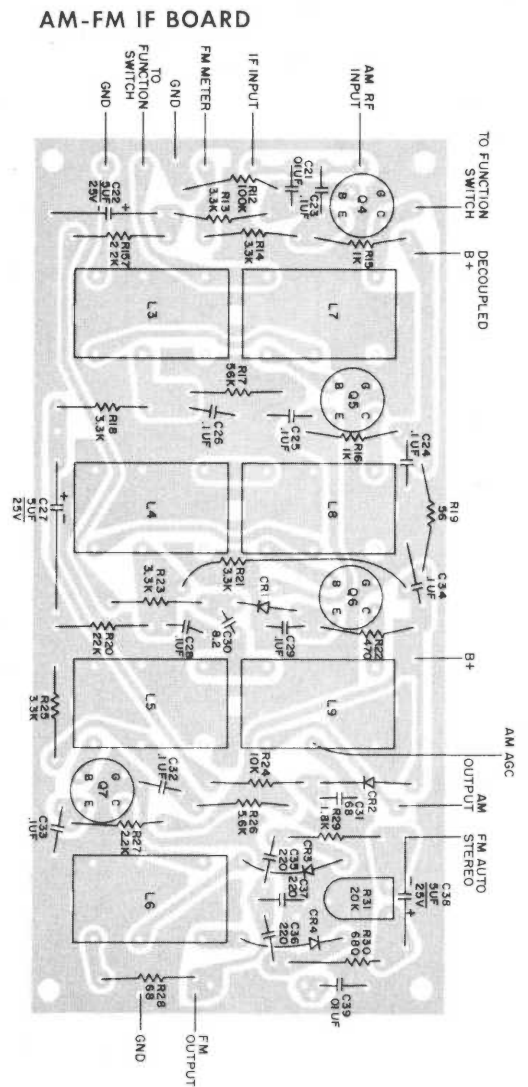
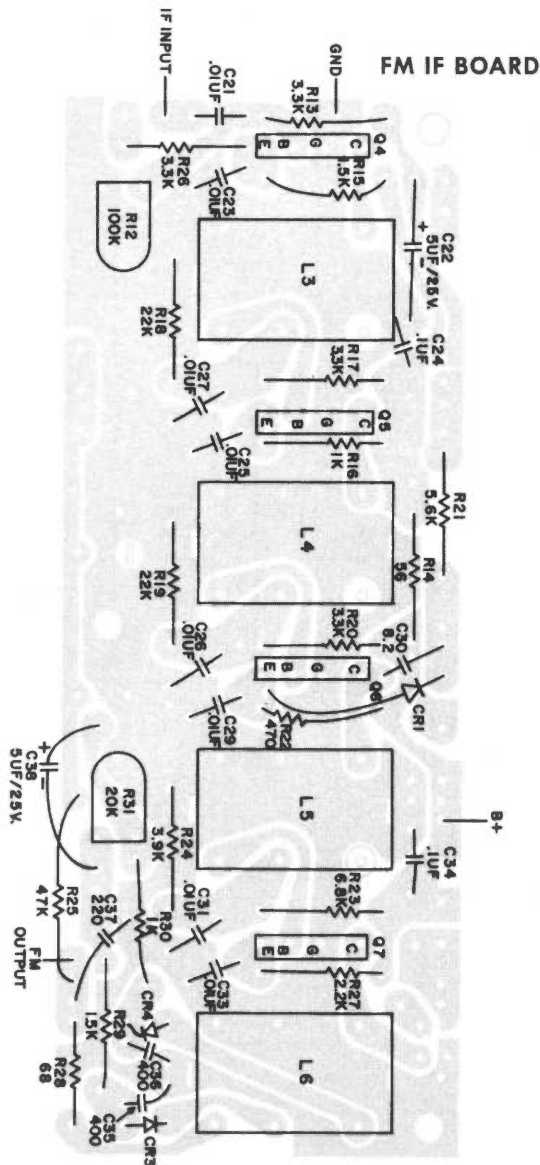
Function selector in FM Stereo

| STEP | CONNECT SIGNAL GENERATOR                 | GENERATOR FREQUENCY                                 | DIAL SETTING | OUTPUT INDICATOR                                      | ADJUST                                 | ADJUST FOR  | NOTES  |
|------|--|---|--------------|---|--|-------------|--|
| 1    | Junction of R69, L10 and C45             | Audio Generator<br>67 KC                            | —            | AC VTVM AT Junction R41, C50, L13                     | 67 KC Coil, L10                        | Minimum     | FM Stereo  |
| 2    |  | Audio Generator<br>72 KC                            | —            |   | 72 KC Coil L11                         | Minimum     | FM Stereo  |
| 3    | Antenna Terminals Through Dummy Resistor | 100 MC Modulated 100% By Stereo Multiplex Generator | 100 MC       | VTVM at Collector of Q8                               | Stereo Bias Adjust R40                 | 10 Volts DC | —  |
| 4    | Same                                     | Same  | Same         | Scope at 38KC Transformer Secondary Junction L14, CR6 | Top & Bottom of 19 KC Coil L13 and L14 | Maximum     | Stereo Indicator Should be Lit After This Adjustment |
| 5    | Same                                     | Same  | Same         | Scope at Minimum Channel                              | 38 KC Transformer L14                  | Minimum     |  |

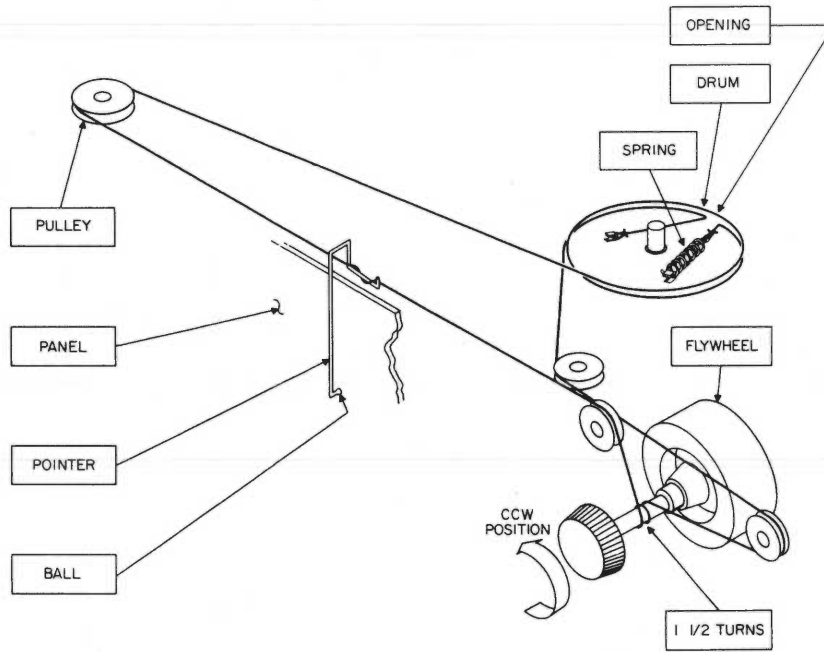
AM ALIGNMENT PROCEDURE

1. Use lowest input signal for usable indication. (Function Switch in AM)

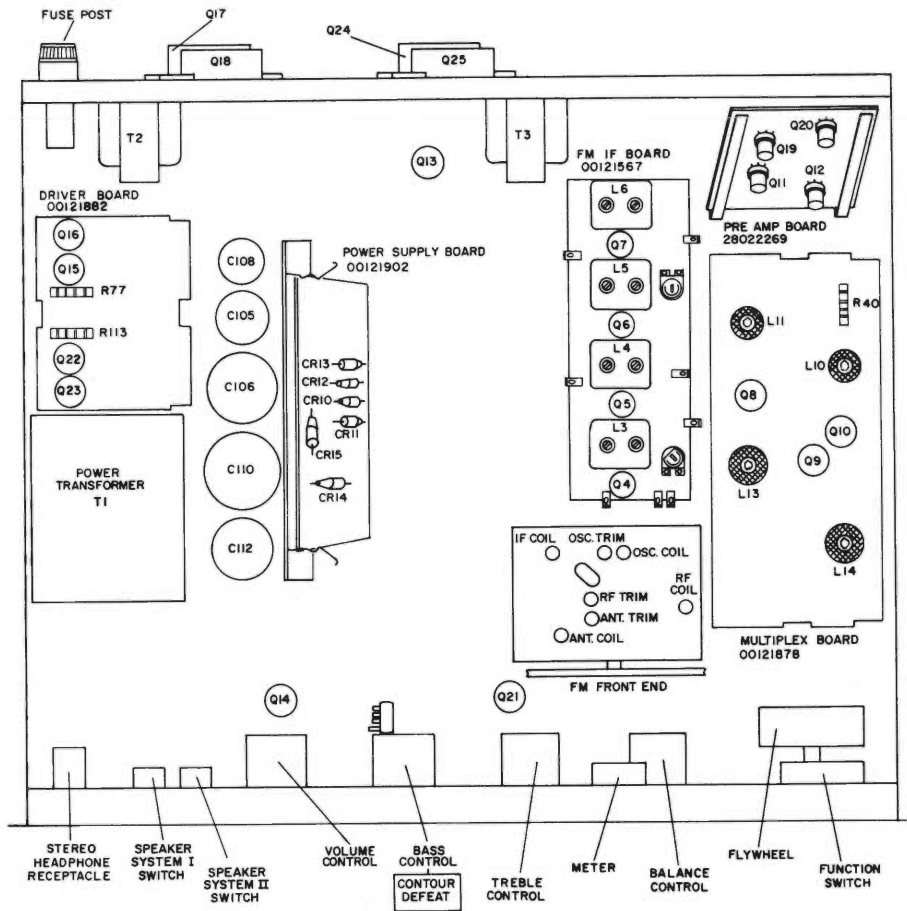
| STEP | ALIGN.                | GENERATOR SETTING |         | FEED SIGNAL                                    | OUTPUT INDICATOR            | DIAL SETTING | ADJUST                                 | ADJUST FOR               | NOTES |
|------|-----------------------|-------------------|---------|--|-----------------------------|--------------|--|--------------------------|-------|
|      |                       | FREQ.             | MOD.    |  |                             |              |  |                          |       |
| 1    | IF                    | 455 KC            | 400 CPS | Base of Q4 thru .001 MFD Cap                   | AC VTVM at Tape Output Jack | Low End      | 1st, 2nd & 3rd AM IF Trans. L7, L8, L9 | Maximum Meter Indication |       |
| 2    | OSC                   | 600 KC            | 400 CPS | Couple signal loosely by loop around loopstick | Same                        | 600 KC       | Osc. Coil L17                          | Same                     |       |
| 3    | OSC                   | 1400 KC           | 400 CPS | Same   | Same                        | 1400 KC      | Osc. Trimmer                           | Same                     |       |
| 4    | Repeat Steps 2 and 3  |                   |         |  |                             |              |  |                          |       |
| 5    | RF                    | 600 KC            | 400 CPS | Same   | Same                        | 600 KC       | Loopstick Ring RF Trans.               | Same                     |       |
| 6    | RF                    | 1400 KC           | 400 CPS | Same   | Same                        | 1400 KC      | Antenna Trimmer RF Trimmer             | Same                     |       |
| 7    | Repeat steps 5 and 6. |                   |         |  |                             |              |  |                          |       |



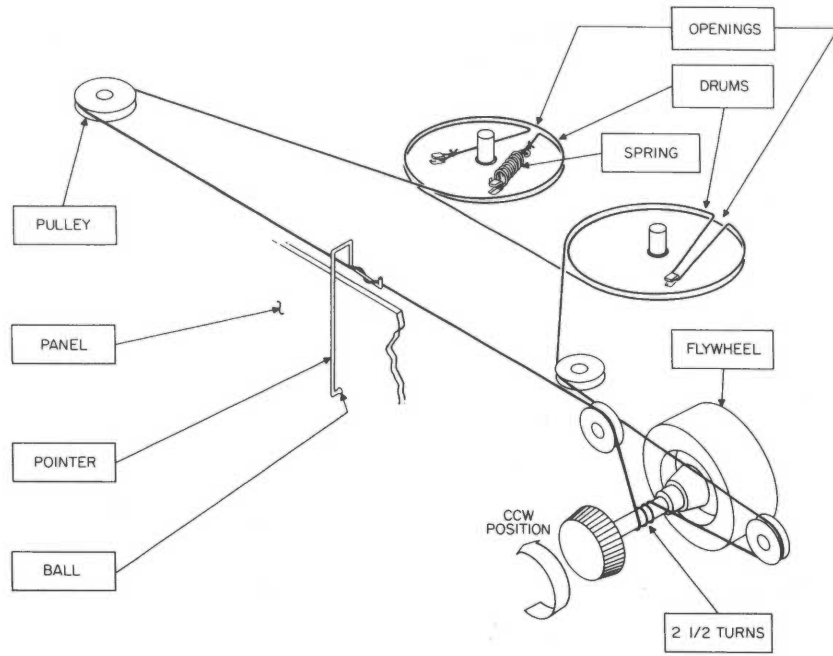
**STRINGING DIAGRAM**  
**TWO HUNDRED**



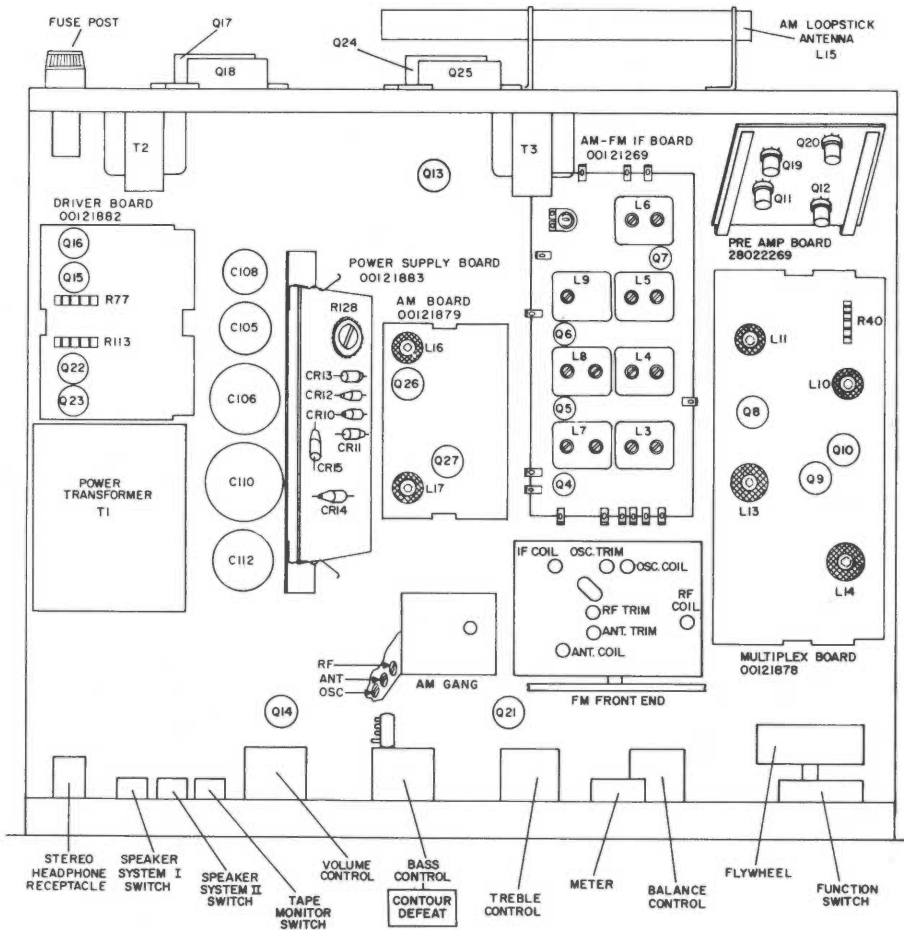
**CHASSIS LAYOUT**  
**TWO HUNDRED**



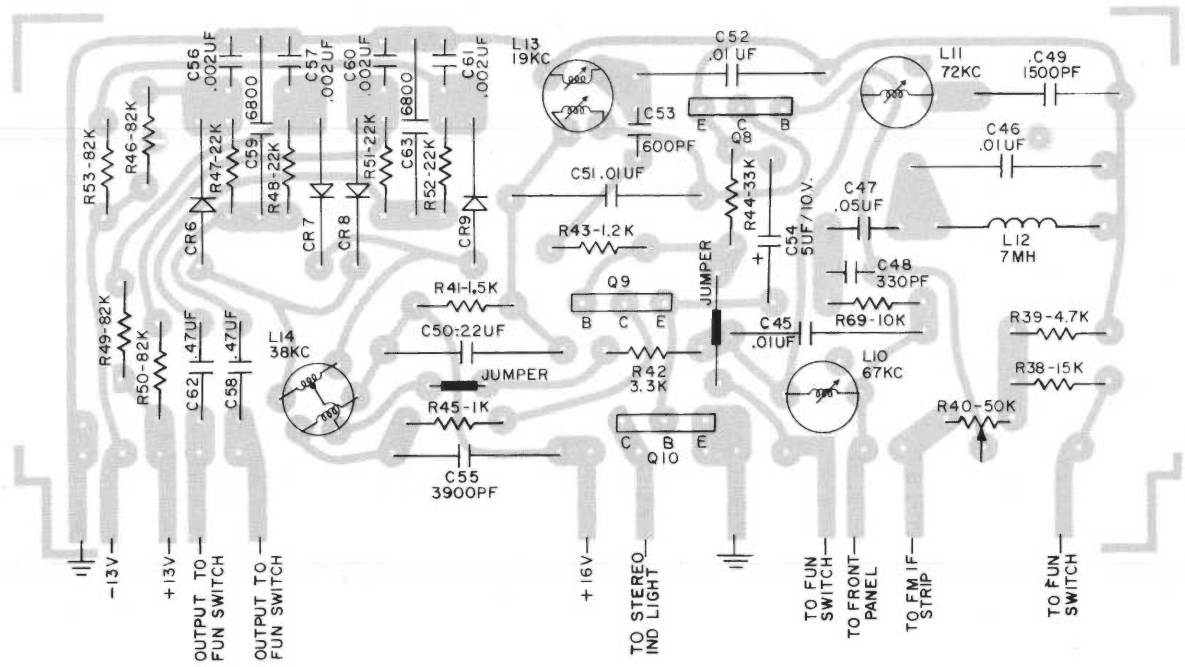
## STRINGING DIAGRAM TWO-TEN



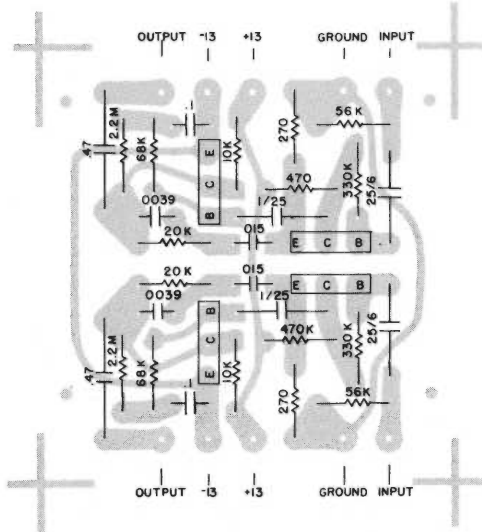
## CHASSIS LAYOUT TWO-TEN



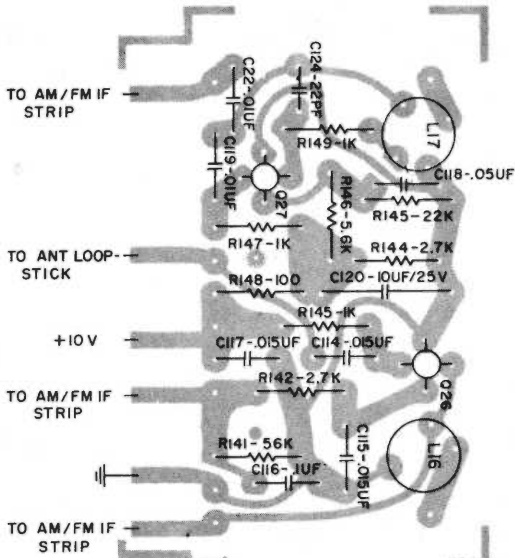
### MULTIPLEX BOARD



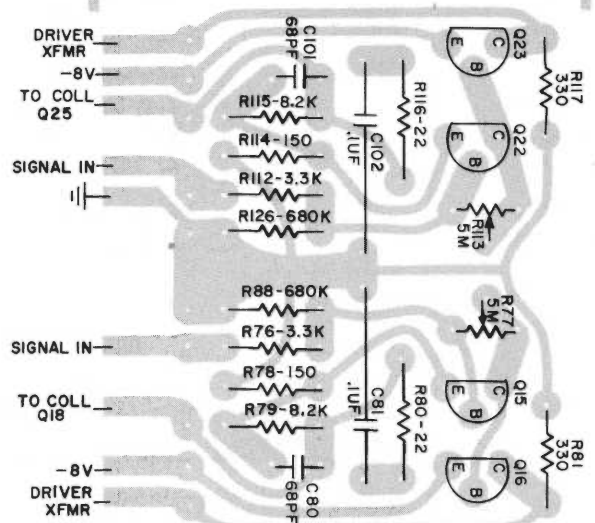
### PRE-AMP BOARD

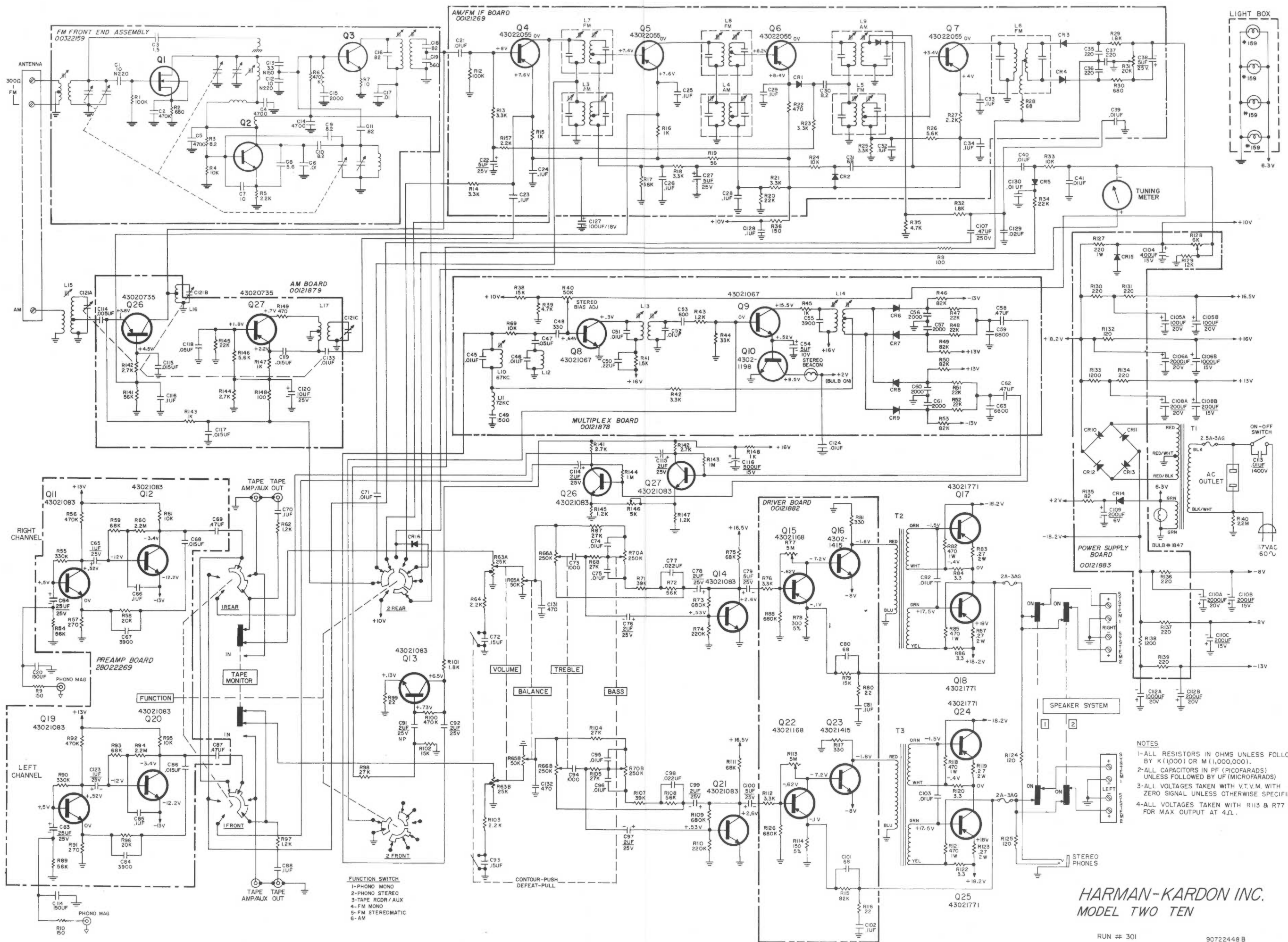


### AM BOARD



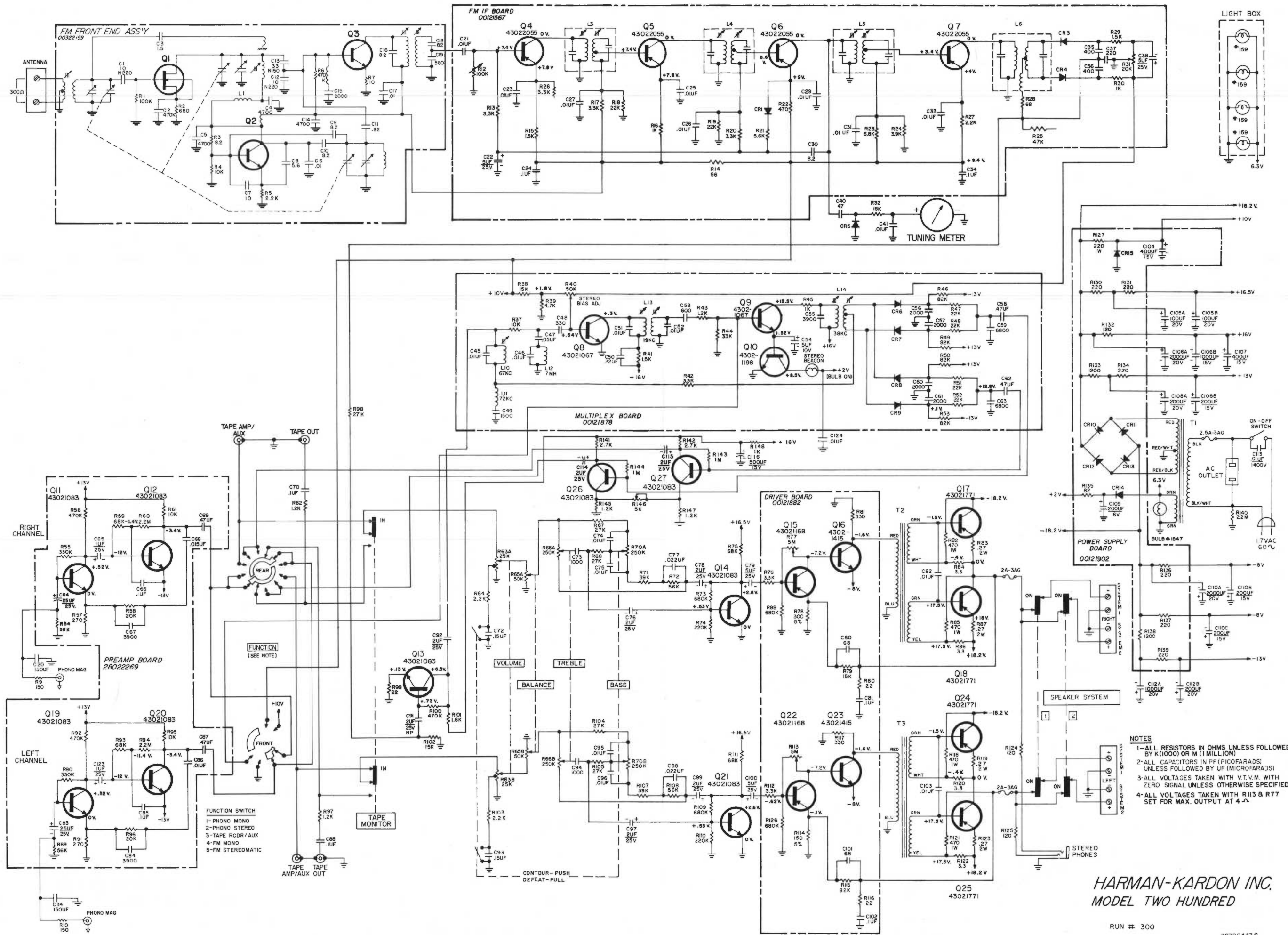
### DRIVER BOARD





- NOTES**
- 1-ALL RESISTORS IN OHMS UNLESS FOLLOWED BY K (1,000) OR M (1,000,000).
  - 2-ALL CAPACITORS IN PF (PICOFARADS) UNLESS FOLLOWED BY UF (MICROFARADS)
  - 3-ALL VOLTAGES TAKEN WITH V.T.V.M. WITH ZERO SIGNAL UNLESS OTHERWISE SPECIFIED.
  - 4-ALL VOLTAGES TAKEN WITH R13 & R77 SET FOR MAX OUTPUT AT 4Ω.

**HARMAN-KARDON INC.**  
**MODEL TWO TEN**



- NOTES**
- 1- ALL RESISTORS IN OHMS UNLESS FOLLOWED BY K (1000) OR M (1 MILLION)
  - 2- ALL CAPACITORS IN PF (PICOFARADS) UNLESS FOLLOWED BY UF (MICROFARADS)
  - 3- ALL VOLTAGES TAKEN WITH V.T.V.M. WITH ZERO SIGNAL UNLESS OTHERWISE SPECIFIED
  - 4- ALL VOLTAGES TAKEN WITH R113 & R77 SET FOR MAX. OUTPUT AT 4

**HARMAN-KARDON INC.**  
**MODEL TWO HUNDRED**