Because of the very large output power in mono, 70V RMS audio distribution systems may be driven without a step-up transformer.

On the rear of the unit are slide switches to engage a four second turn-on delay and a low frequency load protector if they are desired by the user. Activation of those systems results in the unit going into the standby mode which is indicated by two (one for each channel) yellow lights (LED's) located on the front panel.

In order to confirm signal path both from input to output, green "SIGNAL" presence indicators are located on the front panel. Directly above these lights are red "IOC" indicators that are useful in determining the operating conditions of the amplifier, i.e. clipping, overload protection transient distortion, etc.

Balanced, variable gain XLR inputs (on the back panel plug-in module) as well as ¼" unbalanced phone jacks are available. The variable gain is adjustable between 0-10 ±30% and is useful when additional sensitivity is needed. Effectively, the input sensitivity is increased allowing the PSA2 to be driven to full output with relatively small input signals.

Also on the input module are switchable high and low pass 3-pole Butterworth filters; factory set for 50Hz and 15KHz. (Other rolloff points are available with minor circuit modifications; See Sec. 3.8.) These filters help prevent load damage at sub-sonic and ultra-high signal frequencies.

A 50Hz-20KHz wide spectrum generator test tone, rear panel slide switch activated, is available at the banana dual binding output jacks with the output level determined by front panel level controls. This feature is extremely useful in system troubleshooting.

A useful tool to help provide cleaner sound without overloading the amplifier is the "Automatic Gain Control" circuitry. This variable threshold compressor will keep the output signal at a constant level even though the input may increase. The level at which this circuit is activated (threshold) is determined by the AGC threshold control accessible from the rear panel. AGC is limited to 13dB of compression to reduce the probability of regeneration in "live" sound reinforcement systems.

If the unit should heat excessively due to a cooling system failure, the thermal-sensing self-analyzer will automatically decrease the output signal to a safe operating level. **In other words, the output transistors cannot overheat!.**

Should the large power transformers overheat because of excessive strain on the high-voltage supply (i.e. too low of a load impedance) that particular channel will go into the STANDBY mode. After the transformer cools the unit will return to normal operation.

A means for isolating or uniting chassis ground from or with electrical ground is provided on the rear panel. The grounds are always connected internally with a resistance of 2.7 ohms.

Because of the four heavy duty rubber feet located on the bottom of the unit, it is possible to stack several amplifiers a-top one another. Standard 19" (ANS I C83.9-A72) mounting is also incorporated as well as front panel handles for easier mobility.

1.3 Service Policies

Due to the sophisticated circuitry of your unit, only qualified, fully trained technicians should be allowed to service it. Please observe the following label on the rear panel. **CAUTION: TO PREVENT ELECTRIC SHOCK DO NOT OPEN. NO USER SERVICABLE PARTS INSIDE. REFER SERVICING TO A QUALIFIED TECHNICIAN.**

For service, return the unit to the factory in the original packing or in replacement packing obtainable from the Crown factory. For warranty service, the unit must be returned to the factory or an approved service station (Amcron customers consult your local Crown representative). In either case, enclose a brief letter explaining the problem you are experiencing. This will help to insure a speedy and effective response.

Crown will pay shipping costs for warranty service upon receiving copies of all shipping receipts.

Before returning your unit to the factory for service, authorization should be obtained from the Technical Service Department . All shipments should be sent by either UPS or truck freight (insured). The factory will then return your serviced unit by one of the above methods.

Upon receipt of the warranty registration card from your dealer, Crown will automatically send you the Crown Care Card. This is a plastic, wallet-sized card. This is your warranty certificate.

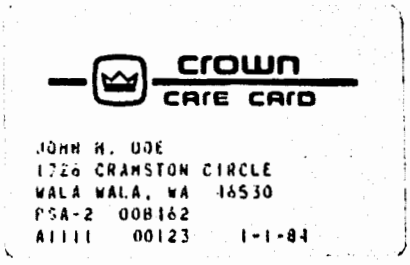


Fig. 1.2 Crown Care Card

Output Power: 220 watts per channel minimum RMS (both channels operating) into an 8 ohm load, 20Hz-20KHz at a rated RMS sum total harmonic distortion of 0.05% of the fundamental output voltage (tested per FTC specifications). 250 watts ±1dB per channel, 20Hz-20KHz into 8 ohms with no more than 1.0% THD (EIA Std. SE-101-A).

Output Power (4 ohms): 400 watts ±1dB per channel, 20Hz-20KHz into 4 ohms with no more than 1.0% THD (EIA Std. SE 101-A).

Output Power (2 ohms): 685 watts +1dB at 1KHz per channel into 2 ohms with no more than 1.0% THD.

Frequency Response: +0.1dB 20Hz-20KHz at 1 watt into 8 ohms +0 -1.5dB DC-80KHz.

Harmonic Distortion: Less than 0.002% from 20Hz-1KHz and increasing linearly to 0.05% at 20KHz at 220 watts into 8 ohms, per channel.

IM Distortion: Less than 0.01% from 0.25 watts to 220 watts into 8 ohms per channel.

Slewing Rate: Greater than 30 volts per microsecond.

Damping Factor: Greater than 700, DC to 400Hz into 8 ohms.

Output Impedance: Less than 12 milliohms in series with less than 1.2 microhenries.

Load Impedance: Rated for 16, 8, and 4 ohm usage, safe with all loads.

Voltage Gain: 20 ±2% or 26dB ±.2dB at maximum gain.

Input Sensitivity: 2.1 volts for 220 watts into 8 ohms.

Output Signal: Unbalanced, dual channel.

2.3 Monaural Specifications (Exclusive of Balanced Input Module)

Output Power (8 ohms): 800 watts ±1dB; 20Hz-20KHz into 8 ohms with no more than 1.0% THD (EIA std. SE101-A).

Output Power (16 ohms): 500 watts ±1dB; 20Hz-20KHz into 16 ohms with no more than 1.0% THD (EIA Std. SE-101-A).

Output Power (4 ohms): 1370 watts ±1dB at 1KHz into 4 ohms with no more than 1.0% THD.

Frequency Response: ±0.2dB, DC-20KHz at 1 watt into 16 ohms.

Harmonic Distortion: Less than 0.003% from 20Hz to 1KHz and increasing linearly to 0.08% at 20KHz, 500 watts into 16 ohms.
Less than 0.005% from 20Hz to 1KHz and increasingly linearly to 0.12% at 20KHz, 800 watts into 8 ohms.

IM Distortion: Less than 0.015% from 0.25 watts to 500 watts into 16 ohms.
Less than 0.015% from 0.25 watts to 700 watts into 8 ohms.

Slewing Rate: Greater than 60 volts per microsecond.

Damping Factor: Greater than 700, DC-400Hz into 16 ohms.

Output Impedance: Less than 24 milliohms in series with less than 2.4 microhenries.

Load Impedance: Rated for 16 and 8 ohm usage, safe with all loads.

Voltage Gain: 40 ±2% or 32dB ±.2dB at maximum gain.

Input Sensitivity: 2.2 volts for 500 watts into 16 ohms.

Output Signal: Balanced, single channel. Channel 1 controls are active; Channel 2 inactive but not removed from operation.

2.4 Balanced Input Module Specifications

Controls: Channel 1 and Channel 2 input gain adjust with the AGC Threshold, is accessible from the rear on the Balanced Input Module.

Hum and Noise: -85dBm equivalent input noise 20Hz-20KHz, 600 ohm source, gain set at unity.

Frequency Response: Flat ±0.2dB 20Hz to 20KHz.

High and Low Pass Filters: 3 pole Butterworth 18dB/octave; 50Hz and 15KHz standard frequencies. (Other roll-off points available; see Sec. 3.8 for details.) Slide switch activated.

Compressor Action: Range of compression restricted to 13dB by design (wider range would aggravate feedback in live performance). Threshold adjustable from overload level of main amplifier to 12dB lower.

Balanced Input Voltage Gain: Variable 0-10

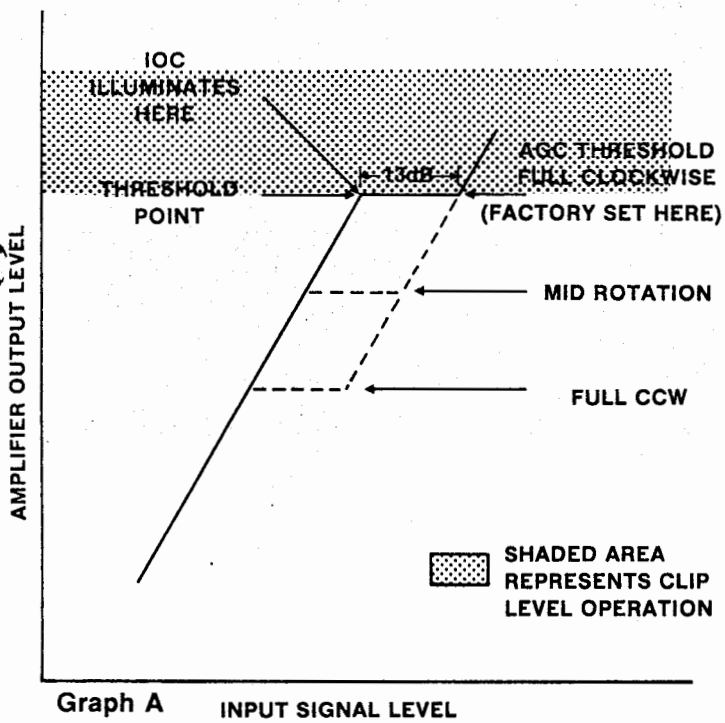
Test Tone: Switch activated wide spectrum 50Hz-20KHz tone.

Common Mode Rejection: 70dB 5HZ-3KHz
55dB 20KHz (see Graph 2.10).

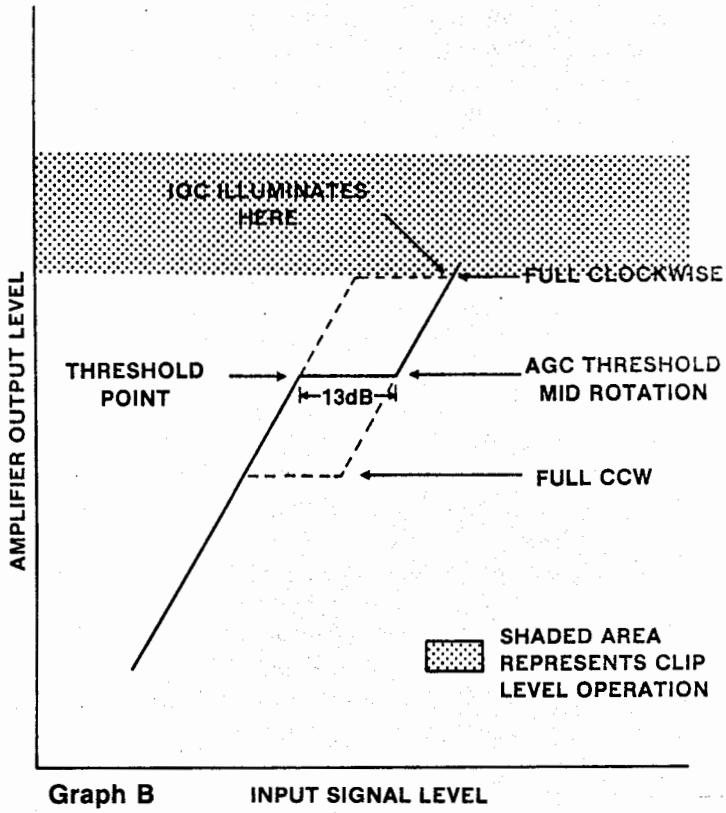
PSA-2 AGC Set-Up Procedure

Due to the increased concern over the PSA-2 AGC Threshold adjustments, the following explanation is provided:

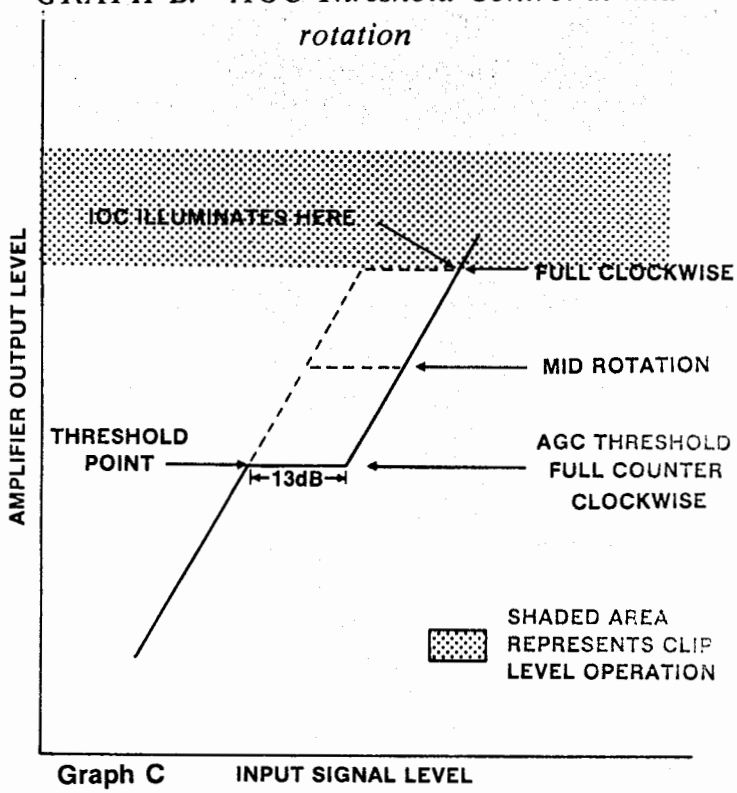
The Automatic Gain Control circuitry in the PSA-2 is active constantly. Its threshold point (point at which the output begins its constant level) is variable by the rotation of the rear panel AGC Threshold Control (Fig. 3.2I, Instruction Manual). The unit is shipped from the factory with the control fully clockwise. This means a higher output level is attainable before any limiting action takes place as compared to a lower output level with the control decreased (turned ccw). Observe the following graphs of various control positions and functions.



GRAPH A: AGC Threshold Control at full clockwise



GRAPH B: AGC Threshold Control at mid rotation



GRAPH C: AGC Threshold Control at full counter-clockwise

As shown on these graphs, no matter where the Threshold Control is adjusted, a constant 13dB of compression is available after that point. With an increased input level under 13dB, the output signal will not rise. Over 13dB, the signal will continue to rise as if the limiter/compressor circuitry was not utilized. Note that the shaded areas indicate the "clip area" of operation. This is the reason the front panel IOC indicators begin and continue to illuminate throughout this region. Therefore, it may by possible to operate the amplifier with the IOC indicators illuminated (graph A), but with relatively little distortion produced at the output of the amplifier because of the constant limit on the signal.

There are basically two methods which may be used to properly adjust the AGC Threshold Control; the listening or the measurement method. The listening method procedures as well as the mesurement procedures are listed below.

Listening Method

This method requires the use of two important tools; your right and left ears (one may be used in case of emergency).

1. Connect the PSA-2 as shown in Fig. 3.4 of the Instruction Manual.

2. Loosen the locking level nut from the AGC Threshold Control and adjust full counter-clockwise (minimum).

3. Increase the listening level (either by the input source or by the front panel input level controls) until the output remains at a constant level. This level is the 13dB of limiting shown in the previous graphs.

4. Continue increasing the input source until the ouput level rises abruptly (limiting no longer effective).

5. Increase the AGC Threshold Control to maximum desired listening level ("x" dB).

6. The input may now be increased by the same amount ("x" dB) without increasing the output level into severe clipping.

Measurement Method

1. Connect the PSA-2 as shown in Fig. 3.4 of the Instruction Manual except replace the load with a RMS voltmeter.

2. Determine the amount of voltage necessary to produce the desired wattage level with a specific speaker. For example:

Speaker rating; 8 ohm
Desired wattage; 30 watts continuous
Desired voltage; calculated by $E^2=PR$
$E^2=30x8$
$E^2=240$
$E=15.5$ VRMS

3. Loosen the locking level nut from the AGC Threshold Control, and adjust to full counter-clockwise (minimum).

4. Increase the input level until the output remains at a constant voltage (use an input signal representative of the application).

5. Continue increasing the input signal until the output voltage rises abruptly (limiting no longer effective).

6. Increase the AGC Threshold Control to the desired RMS voltage.

7. Input may now be increased without altering the output level voltage (for the 13dB range).

The AGC circuitry is limited to 13dB in order to eliminate severe feedback problems that could exist during pauses of program material.

Should the AGC circuitry not be desired for use, it may be deactivated by the removal of several components. Refer to the Balanced Input Module Schematic MI-277;

1. To deactivate both channels remove LM339 Comparator, U6.

2. To deactivate only channel 1, remove U4 (do not remove U6).

3. To deactivate only channel 2, remove U5 (do not remove U6).

The AGC THRESHOLD ADJUST (FIG. 3.2I) controls the point at which the Automatic Gain Control is activated (See Graph 2.10). The unit is shipped from the factory with this adjustment full clockwise but may be readjusted to suit a specific situation such as helping to protect low power loads.

The PSA-2 internal TEST-TONE generator is activated by the slide switch located between the XLR balanced input jacks. (Fig. 3.2J) Its product may be heard (or observed) through the standard output jacks and is controlled via the front panel level controls. Because the TEST-TONE is a "wide-band" frequency pulse, it is possible to hear the tone throughout the woofer midrange and tweeter range **Caution: Always turn input level controls completely CCW. before activating the TEST TONE generator; BRING LEVEL UP SLOWLY!!**

Each channel of the balanced input module incorporates a low pass and high pass filter slide switch (Fig. 3.2E,F). By engaging either switch, that respective channel's filter is activated at the factory set frequency of 50Hz for the high pass filter and 15KHz for the low pass filter. Should the rolloff frequency need changing, it will be necessary to change several components located on the input module. Listed in Fig. 3.9 are the component changes and value formulas needed for any desired cut-off frequencies.

The remaining controls not yet discussed are the Ch1 or 2 GAIN ADJUSTS (Fig. 3.2K). This potentiometer controls the PSA-2 input module internal amplifier gain (from 0-10). In most cases, the input sensitivity of the PSA-2 is sufficient to achieve full output from most mixers, etc. However, if additional gain is necessary, simply increase the control being careful not to overload the input stages of the amplifier (the unit is factory shipped with input gain adjustment at unity gain).

Isolating chassis ground from signal ground is done by simply removing the shorting strap from the ground terminal strip located next to the fan vent (Fig. 3.2L). This may help remove any "ground loop hums" caused by multiple ground paths, i.e...mounting several units together on same rack rail.

3.9 The Protection Mechanisms

The PSA-2 is protected against all common hazards which plague high power amplifiers, including shorted, open, mismatched loads; overloaded power supplies; excessive temperature, chain destruction phenomena input overload damage, and high frequency overload blowups.

The basic output protection mechanism represents a dramatic departure from conventional designs. Computer analysis of transistor stress test data, leading to the design of appropriate dynamic transistor environment analog circuits, forms the heart of the system. A continuous flow of operating data produces an analog output proportional to the changing Safe Operating Area (SOA) of the transistor. This output controls the limits imposed by a current gain stage ahead of the output section. The output limits this change along with actual operating conditions. The maximum advantage may then be taken of the transistors actual SOA, without the risk of destroying the device when conditions are less than ideal.

Component changes for various highpass and lowpass cutoff frequencies

1. C103, 203, 104, 204, 105, and 205 all equal C*
2. R107, 207, 108, 208, 109, and 209 all equal R*
3. R* and C* are chosen according to the following general limitations:
   a) 1K< R*< 330K (increasing R* value gives increased noise)
   b) R102, 202 > 2K
   c) R104, 204 <1M
4. With valid values of R* and C*, the other resistor and capacitor values are chosen according to the following formulas:

R102, 202= $\frac{.7184}{2\pi f_h C^*}$

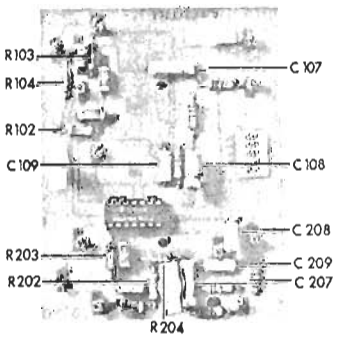
R103, 203= $\frac{.2820}{2\pi f_h C^*}$

R104, 204= $\frac{4.941}{2\pi f_h C^*}$

C107, 207= $\frac{1.392}{2\pi f_l R^*}$

C108, 208= $\frac{3.546}{2\pi f_l R^*}$

C109, 209= $\frac{.2024}{2\pi f_l R^*}$



when f_h = highpass cuttoff
when f_l = lowpass cuttoff
5. For values shown in schematic f_h = 50Hz and f_l = 15KHz

Fig. 3.9 Low/High Pass Conversion Formulas

SECTION 4
THEORY OF OPERATION

4.1 General Information

The PSA-2 is a high power direct coupled amplifier. It is unique in that it automatically and continously analyzes its own dynamic environment and thus is able to control the output level relative to the output transistors Safe Operating Area. The result: maximum output with maximum safety.

4.2 Block Diagram Circuit Theory

Refer to the block diagram, Fig. 4.1. The diagram does not show all circuit connections or feedback loops due to circuit complexity, but there is sufficient data to grasp the function of each circuit. Note also that only channel one is shown for simplicity.

An input signal is fed to the initial stages via the standard unbalanced input or the balanced input. Both cannot be used simultaneously due to the "interrupt" function of the unbalanced input jacks.

The balanced input jacks are located on a seperate, rear panel plug-in module board which also contains many of the professional features unique to the PSA-2.

A Variable Gain stage, next in line on the Balanced Input Module, adds an adjustable voltage gain (0-10) ahead of the main amplifier.

Connected to this stage, are Hi and Lo pass filters, factory set at 50Hz and 15KHz respectively.

The resultant of the above mentioned stage, along with a switch-controlled wide-bandwidth Test Tone Generator signal, is fed to the Compressor-Limiter circuitry. At its output point, an unbalanced signal may enter if so desired via ¼" phone jacks.

The input amplifier receives the signal next and sends any necessary error-correcting info to the Compressor Control circuitry as well as sending the main signal on to the Balanced Stage. Essentially, this feedback path (from the output of the input amp through the Compressor Control circuitry) adjusts the amount of compresssion needed at that particular instant to provide distortion-free output.

In order to drive the Positive and Negative Output Stages, a Balanced Stage is necessary. Should a situation be encountered where protection of the Output Stages is needed, the Protection Circuitry will automatically reduce the drive available to the Balanced Stage and thus remove the stress on the output devices.

Both the Positive and Negative Output Stages consist of four SOA analyzed and V_{BE} matched output transistors plus a predriver/driver combination that also aid in carrying the quiescent power load. Together they help form the quasicomplementary, Class AB method of operation used in the PSA-2.

Feeding positive current to the POSITIVE OUTPUT STAGE, and negative current to the NEGATIVE OUTPUT STAGE, are the POS and NEG Vcc (High Voltage) Supplies. The common point between the two Output Stages is ground. A departure from previous smaller Crown amps, this method allows sophisticated information to be fed to the protection Circuitry from the Output Stages with reference to ground. Both channel's High Voltage supplies work independently of one another.

The point Common to the Neg and Pos Vcc supplies is the "hot"signal of the output terminal which also feed the front panel Display, the Mono switch (for selectable stereo-mono output) and several of the main feedback paths.

The Control Logic is responsible for the action of the Lo Freq Protect, Delay, Standby and thermal protection of the unit. When signaled by the Lo Freq Protect, Standby and/or Delay feature, the Control Logic will remove the power from the Vcc supplies. In the case of Low Freq Protect, when the output has subsided it will place the high voltage supplies back into operation from STANDBY or cycle through the same procedure again depending upon the existence of the problem. Thermal protection may involve the same procedure as mentioned above but only in extreme cases. A thermal switch

imbedded in the high voltage transformer's windings will activate the Control Logic when potentially damaging current demands are being placed on it.

The Low Voltage supply drives all low-power signal path circuitry including the Control Logic, Display and Fan speed logic. At an internal temperature of 47° C, the unit will automatically shift to "high" fan speed operation for additional cooling.

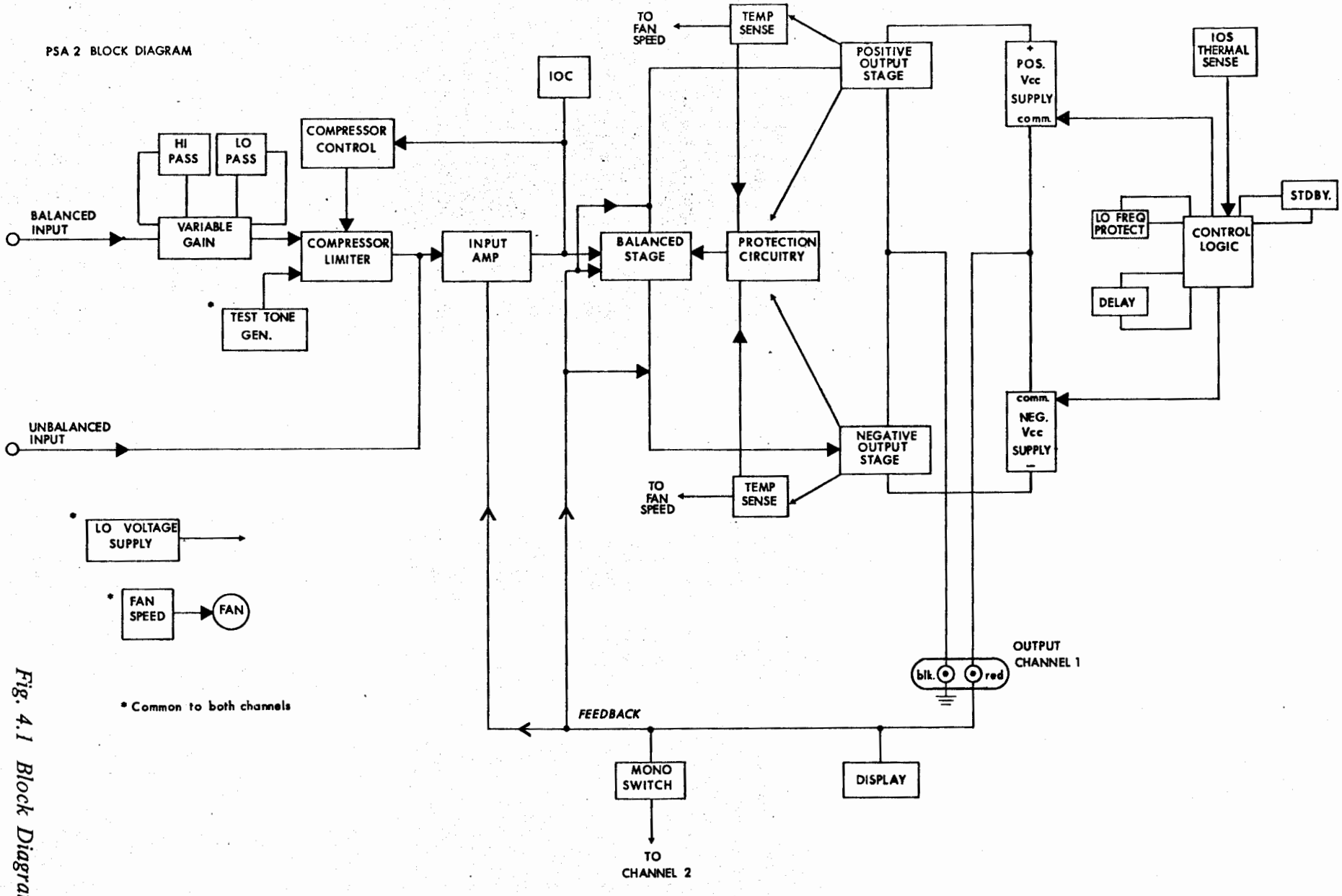
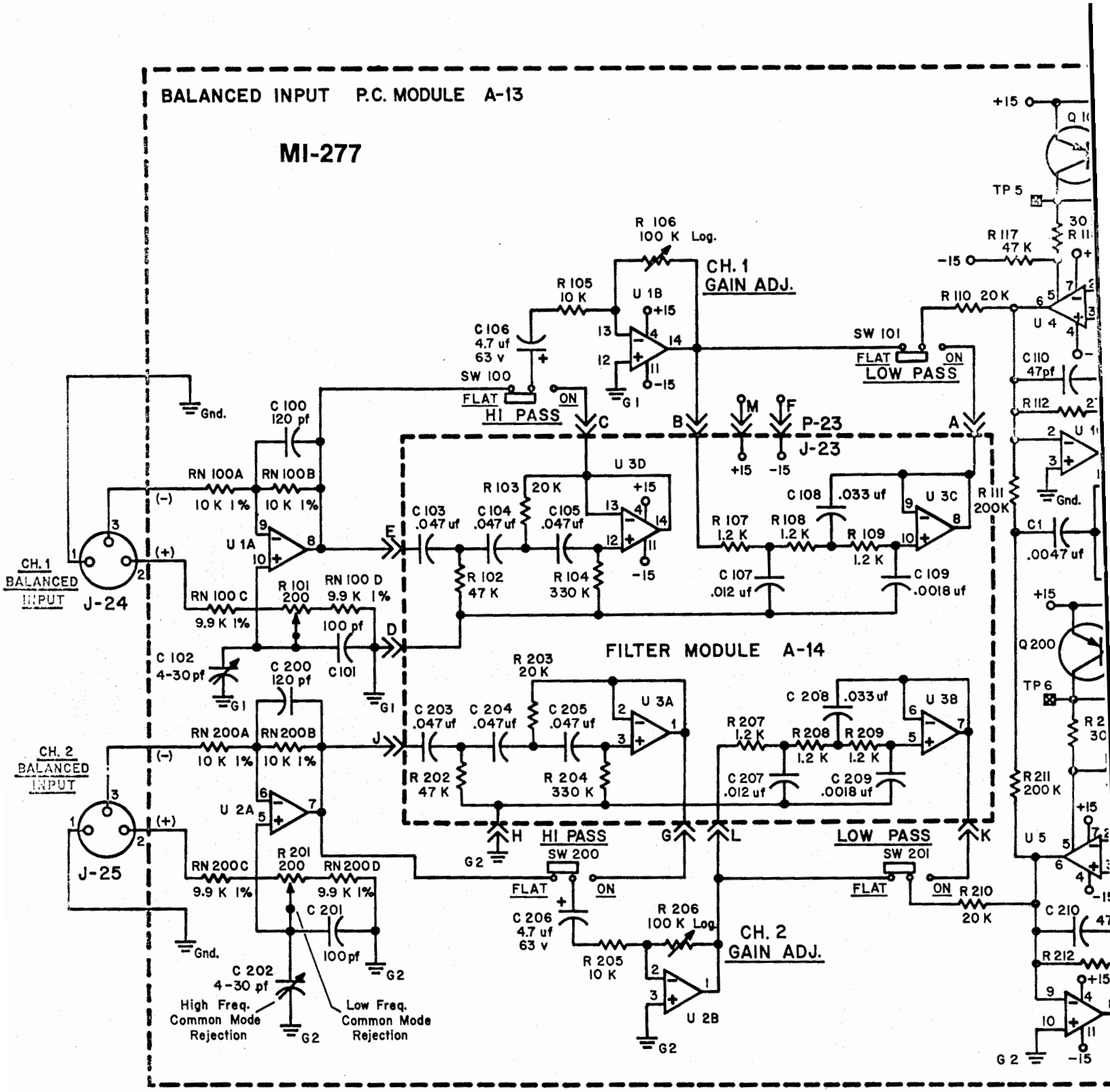
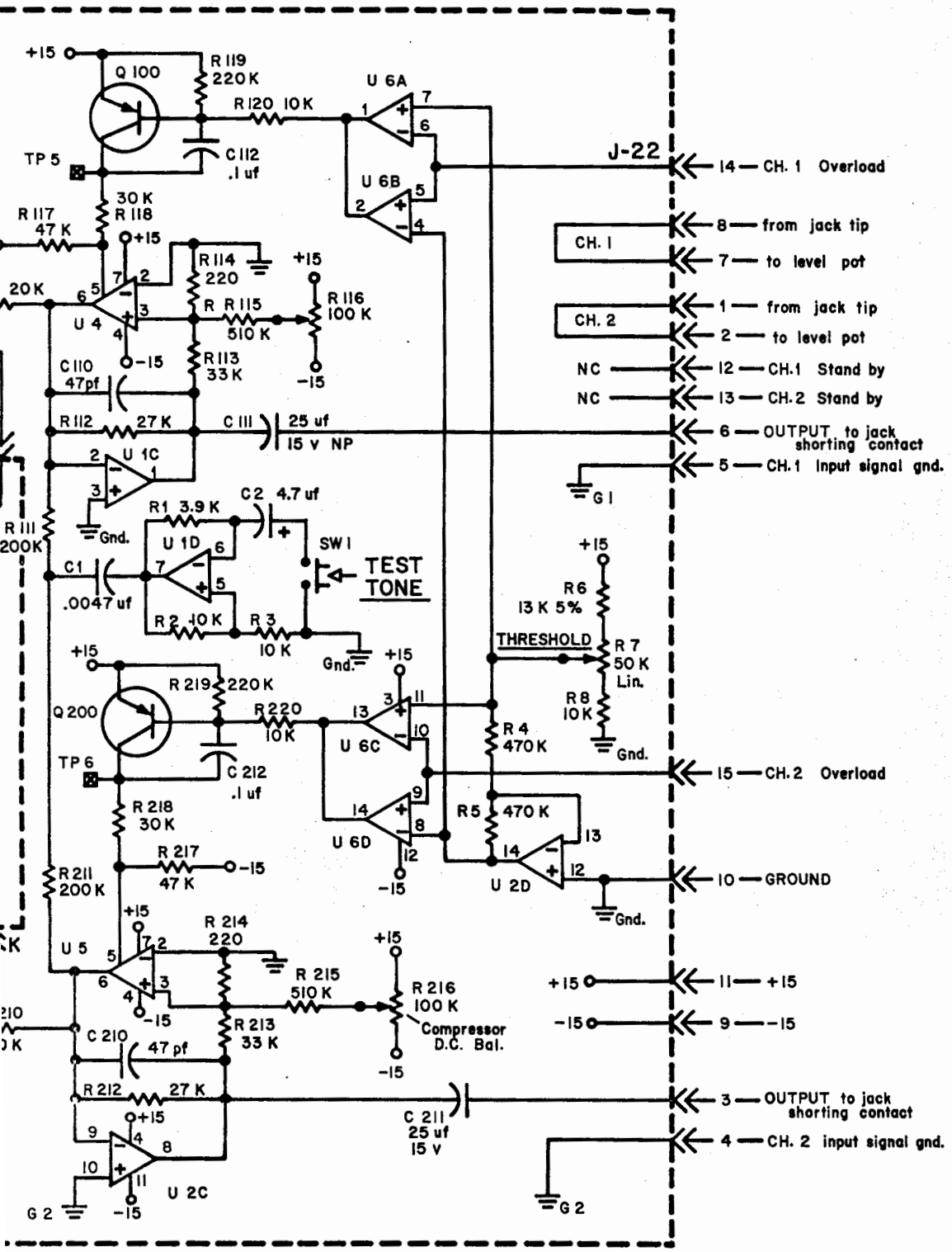


Fig. 4.1 Block Diagram



BALANCED INPUT MODULE

- THREE SEPARATE GROUNDS JOIN AT BOARD.
- FOR STEREO TRACKING COMPRESSOR, ADD JUMPER TP5 TO TP6.
- UNDERLINED CAPTIONS DENOTE REAR PANEL MARKINGS.
- HIGH PASS FILTER SHOWN IN FLAT POSITIO
- LOW PASS FILTER SHOWN IN FLAT POSITIO
- TEST TONE GENERATOR SHOWN INACTIVE.



IN FLAT POSITION.

IN FLAT POSITION.

HOWN INACTIVE.

Cable Brothers Ltd.
Professional Sound Specialists
7915 Argyll Road
EDMONTON, ALTA. T6C 4A9
Phone 465-9731

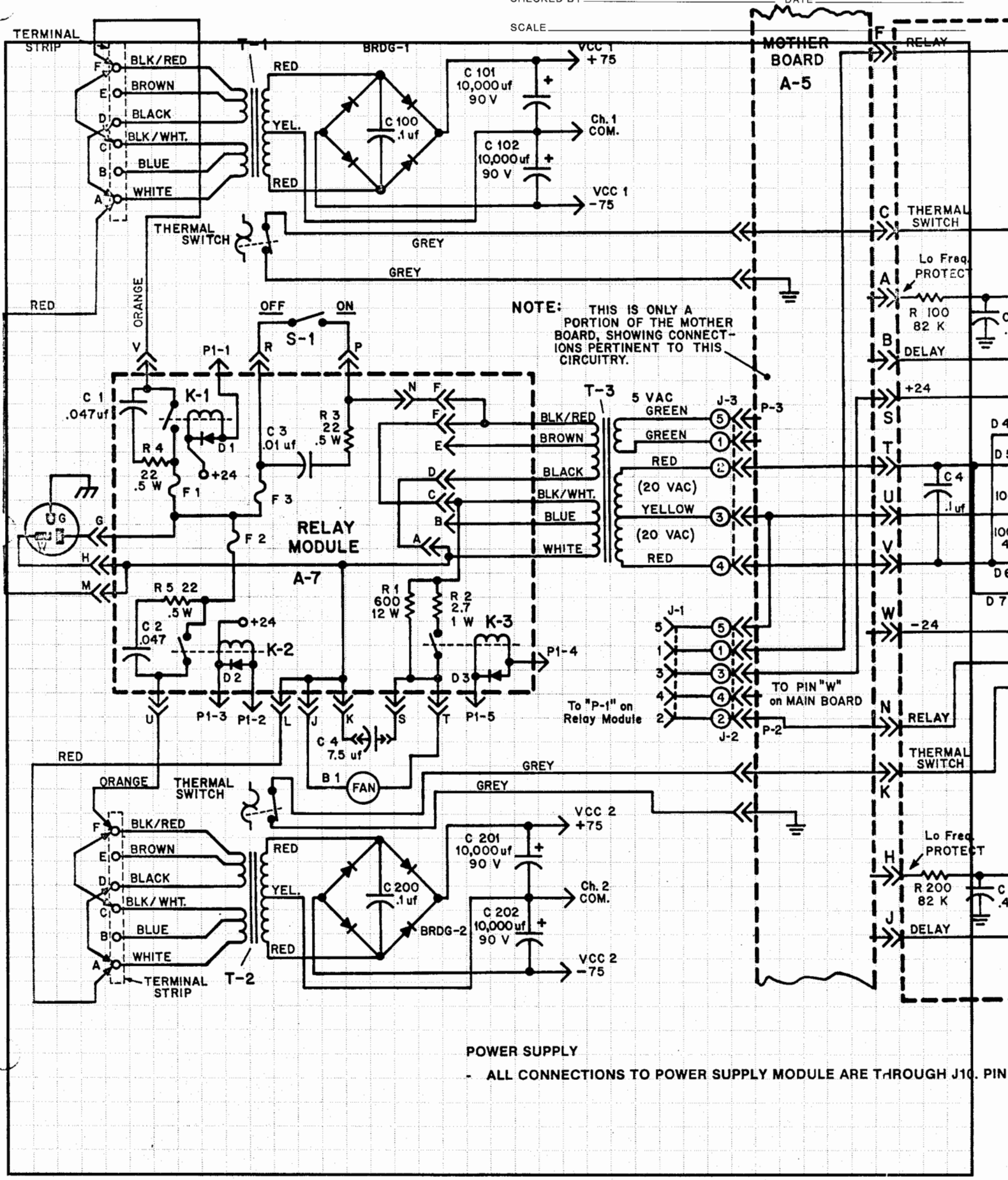
JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

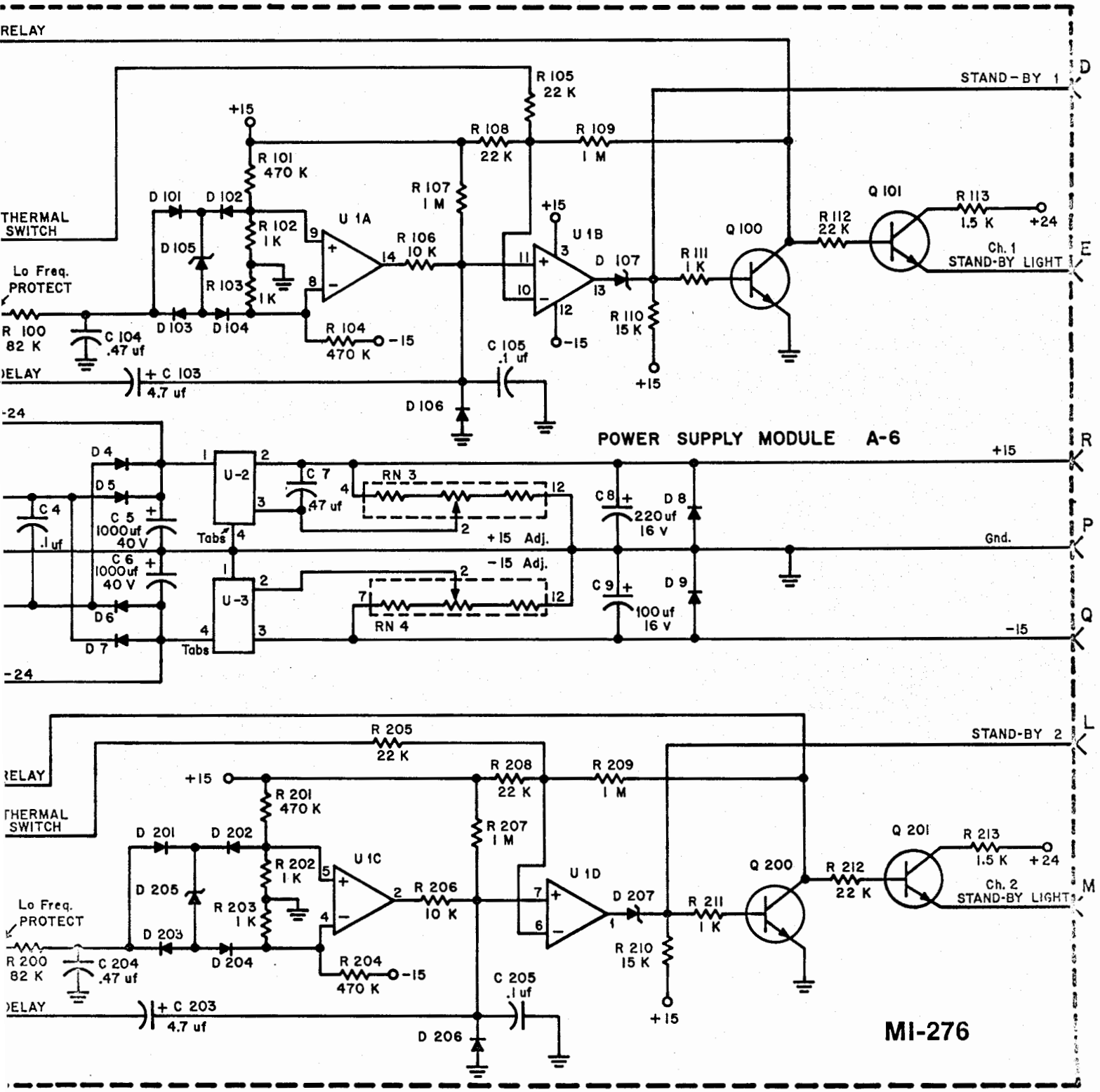
CHECKED BY _____ DATE _____

SCALE _____



POWER SUPPLY

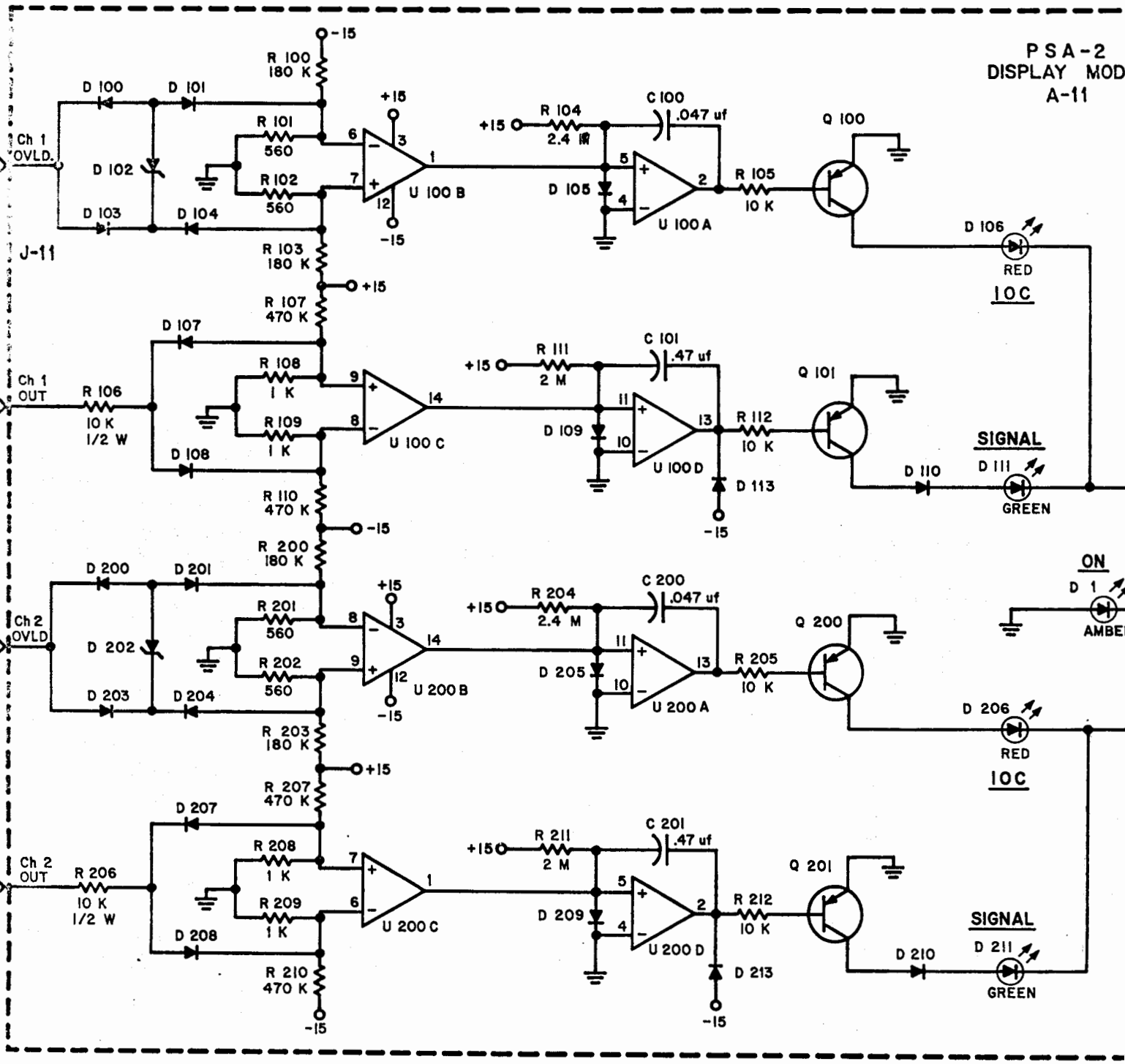
- ALL CONNECTIONS TO POWER SUPPLY MODULE ARE THROUGH J10. PIN



HOLLIES PIN NUMBERS ARE SHOWN

DISPLAY

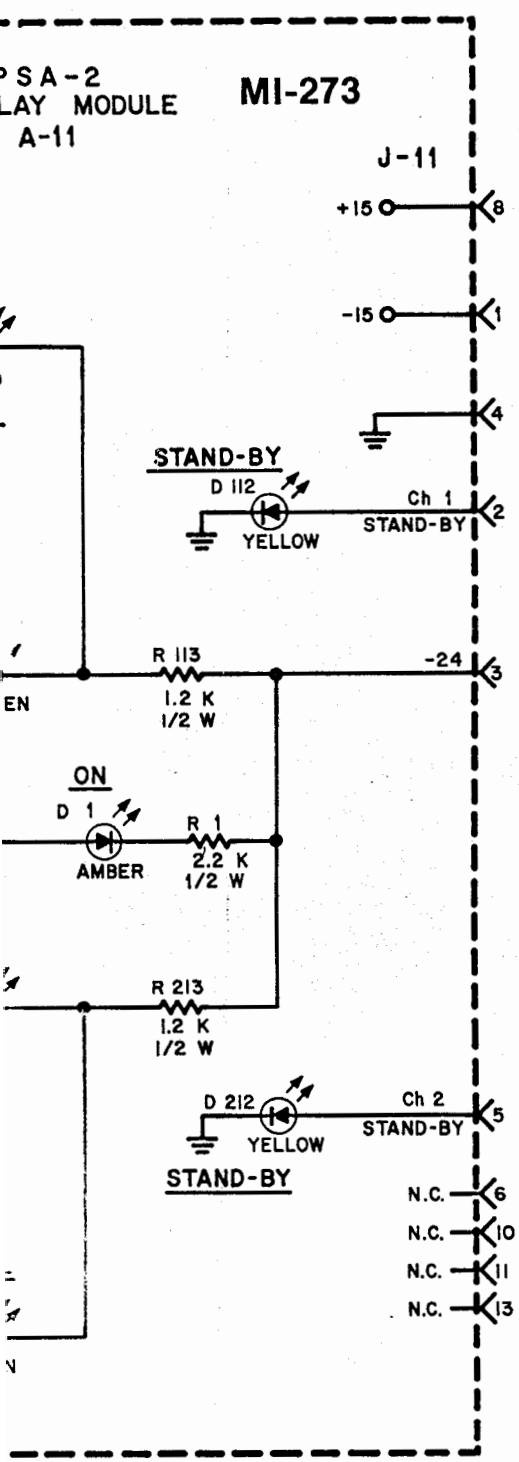
- CONNECTIONS THROUGH J11. PIN NUMBERS ARE SHOWN.
- D113 AND D213 OMITTED FROM EARLY UNITS -- MAY BE RETROFITTED TO PREVENT SIGNAL FROM FALSE TRIGGERING IOC.

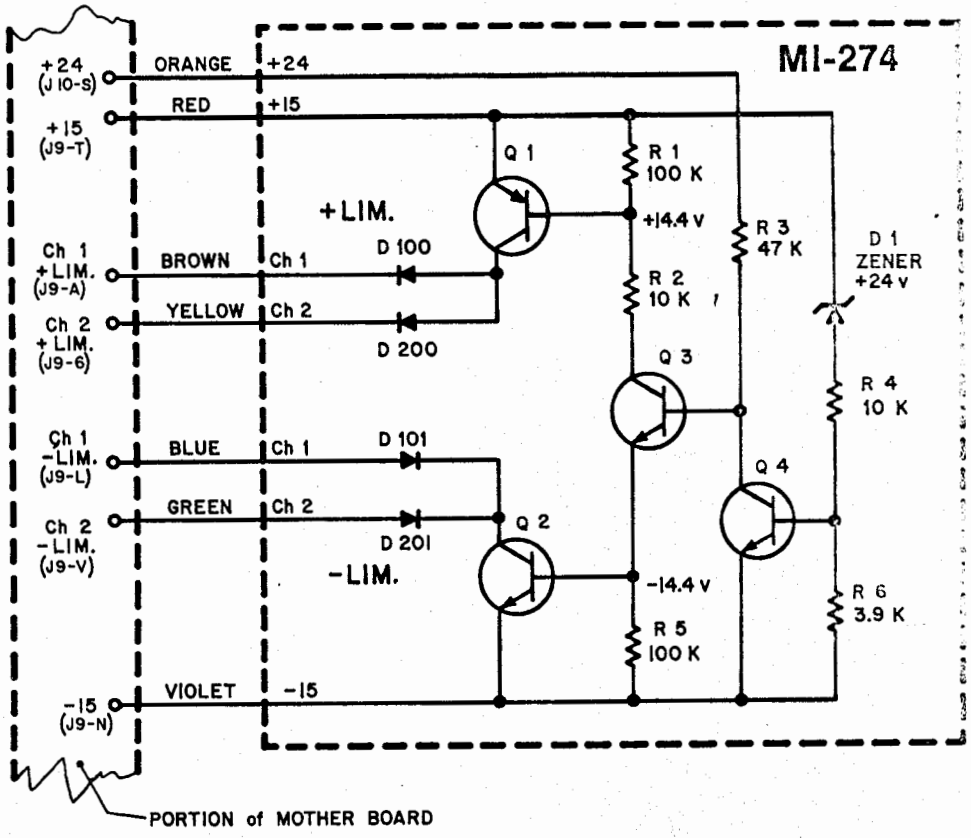


MUTING MODULE

- WIRES ARE SOLDERED TO MOTHER BOARD AT THE PIN NUMBERS GIVEN IN PARENTHESIS.

MUTING MODULE A-15





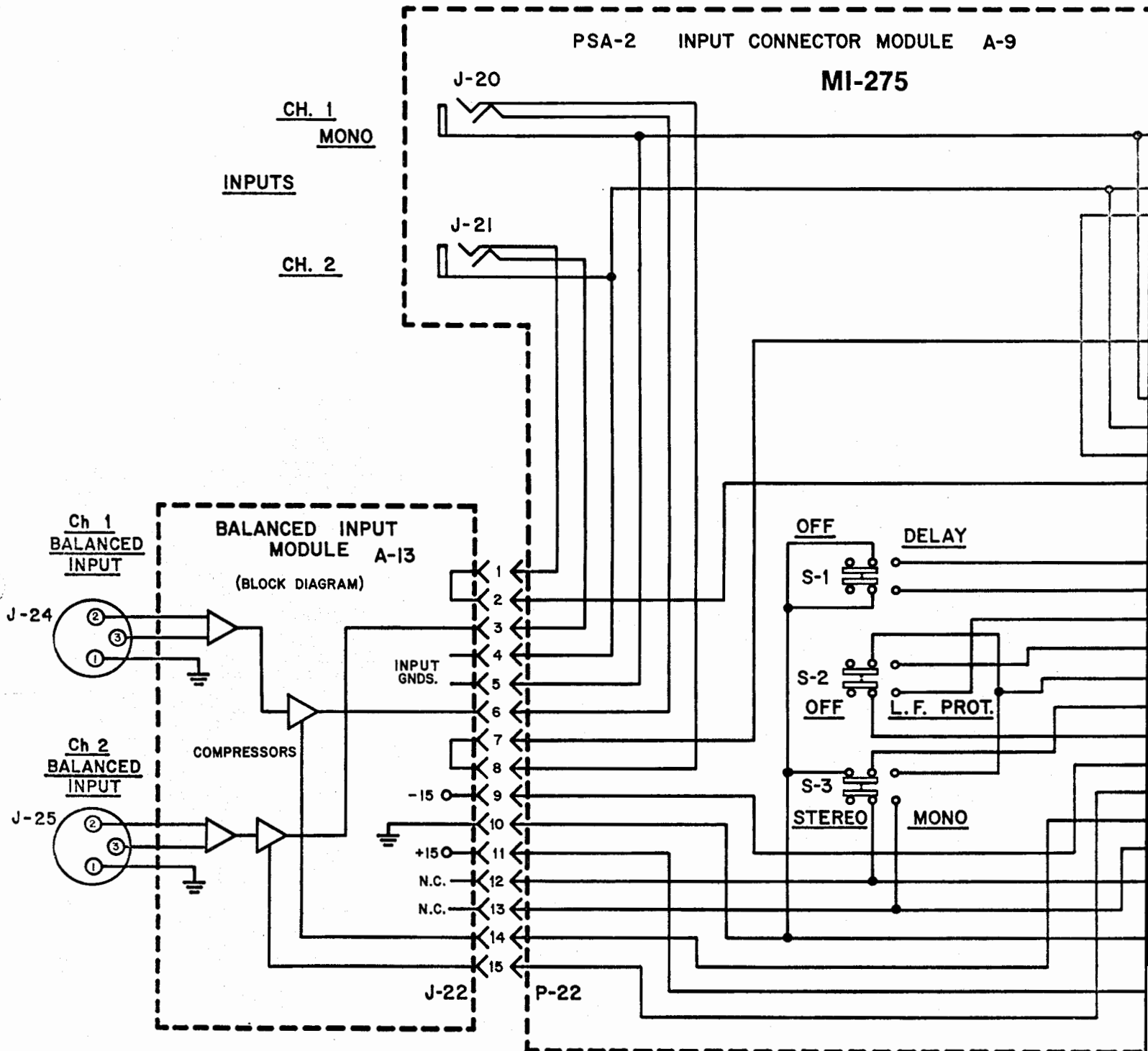
PSA-2 Schematic

NOTE:

THIS IS A REPRESENTATIVE SCHEMATIC ONLY AND DOES NOT NECESSARILY REFLECT THE EXACT CIRCUITRY OF YOUR UNIT. PLEASE REFER TO THE RESPECTIVE SERVICE MANUAL FOR FURTHER TECHNICAL INFORMATION.

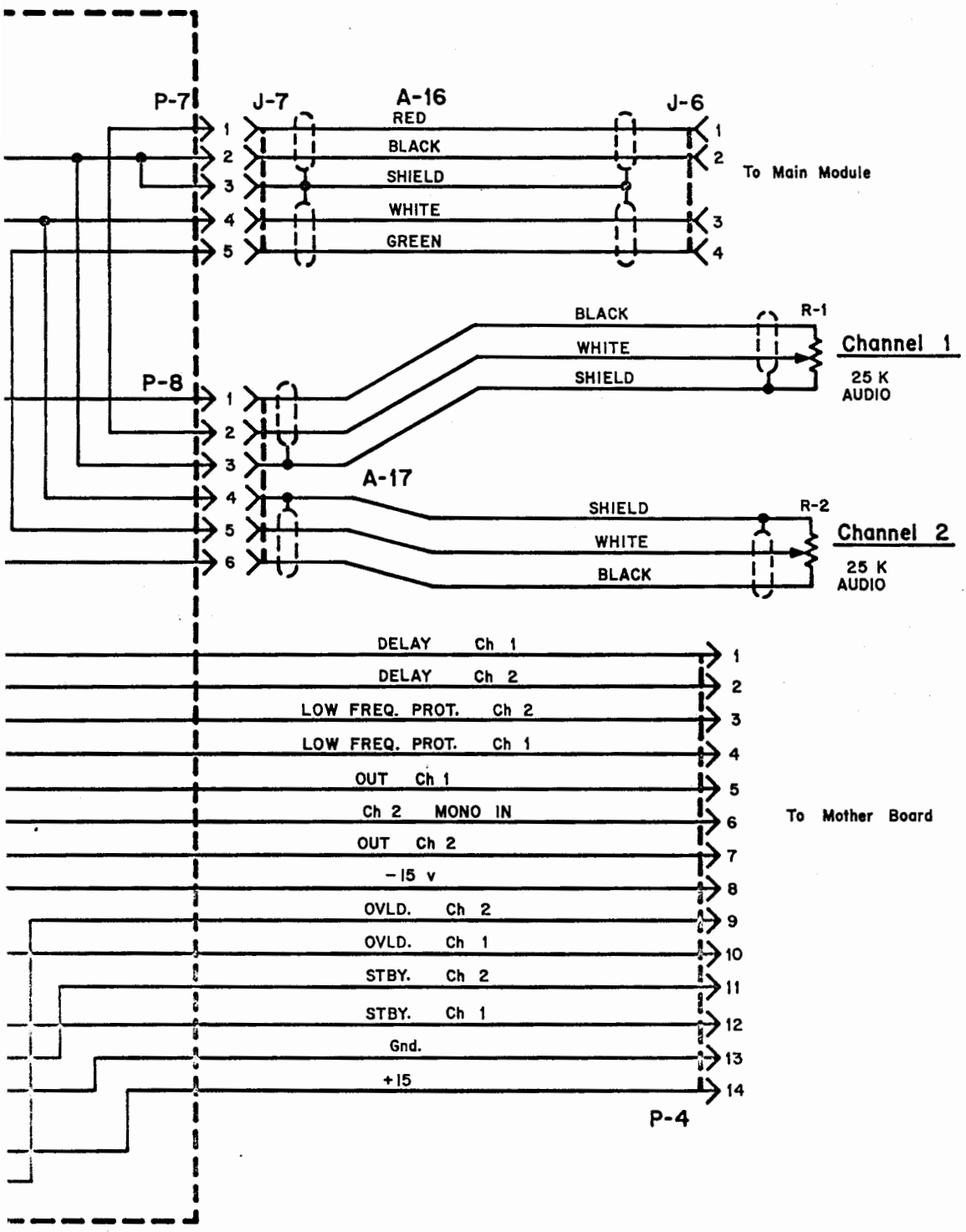
GENERAL:

- CIRCUITS SHOWN START WITH SN9989.
- ALL RESISTORS ARE IN OHMS, ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE DESIGNATED.
- ALL RESISTORS ARE .25 WATT, 5% UNLESS OTHERWISE DESIGNATED.
- COMPONENTS COMMON TO BOTH CHANNELS ARE NUMBERED 10 TO 99 PER BOARD.
- LEFT CHANNEL COMPONENTS ARE NUMBERED FROM 100 TO 199 PER BOARD (EXCEPT OUTPUT MODULE; 300 - 399).
- RIGHT CHANNEL COMPONENTS ARE NUMBERED FROM 200 TO 299 (EXCEPT OUTPUT MODULE; 400 - 499).
- UNDERLINED CAPTIONS DENOTE FRONT OR REAR PANEL MARKINGS.

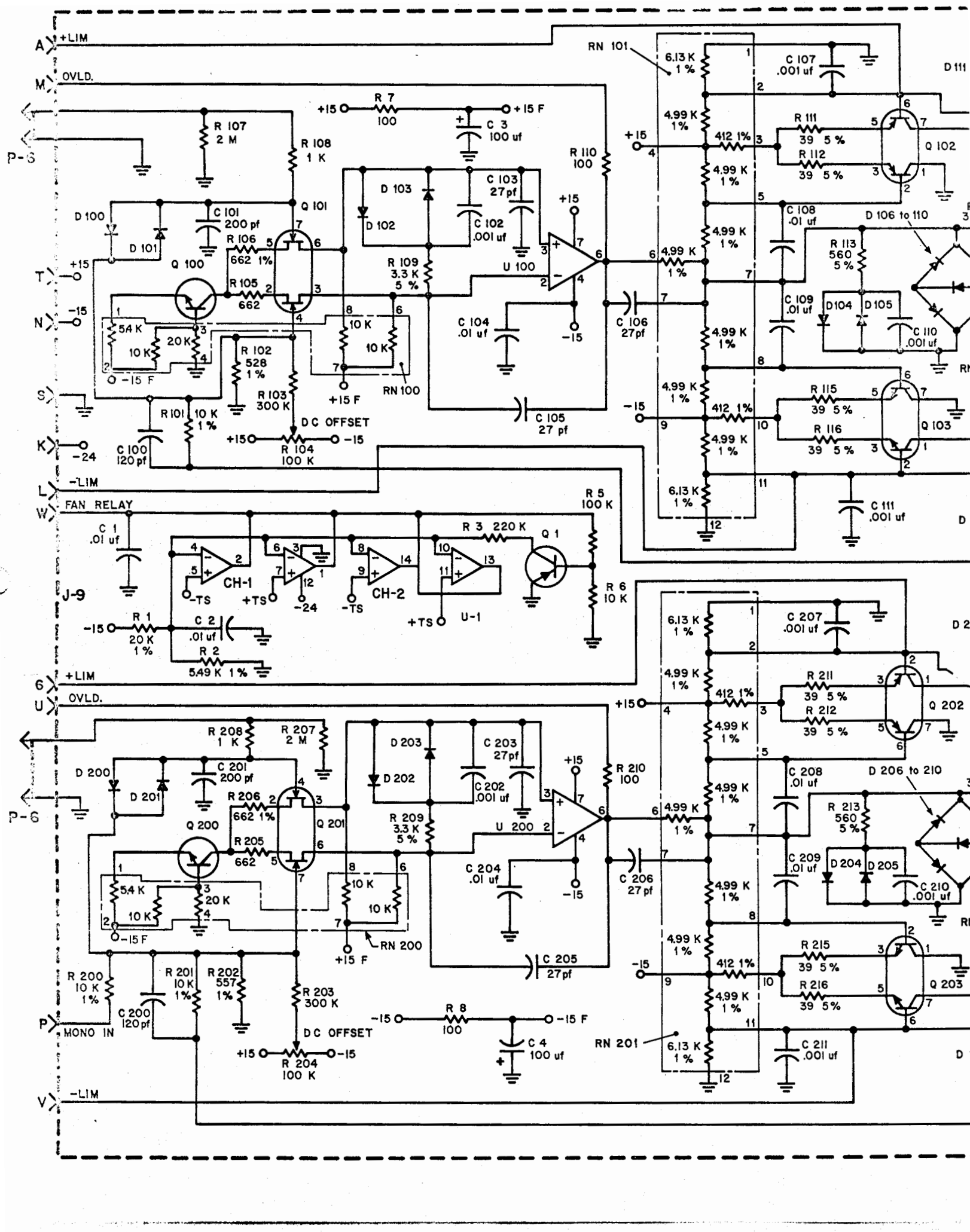


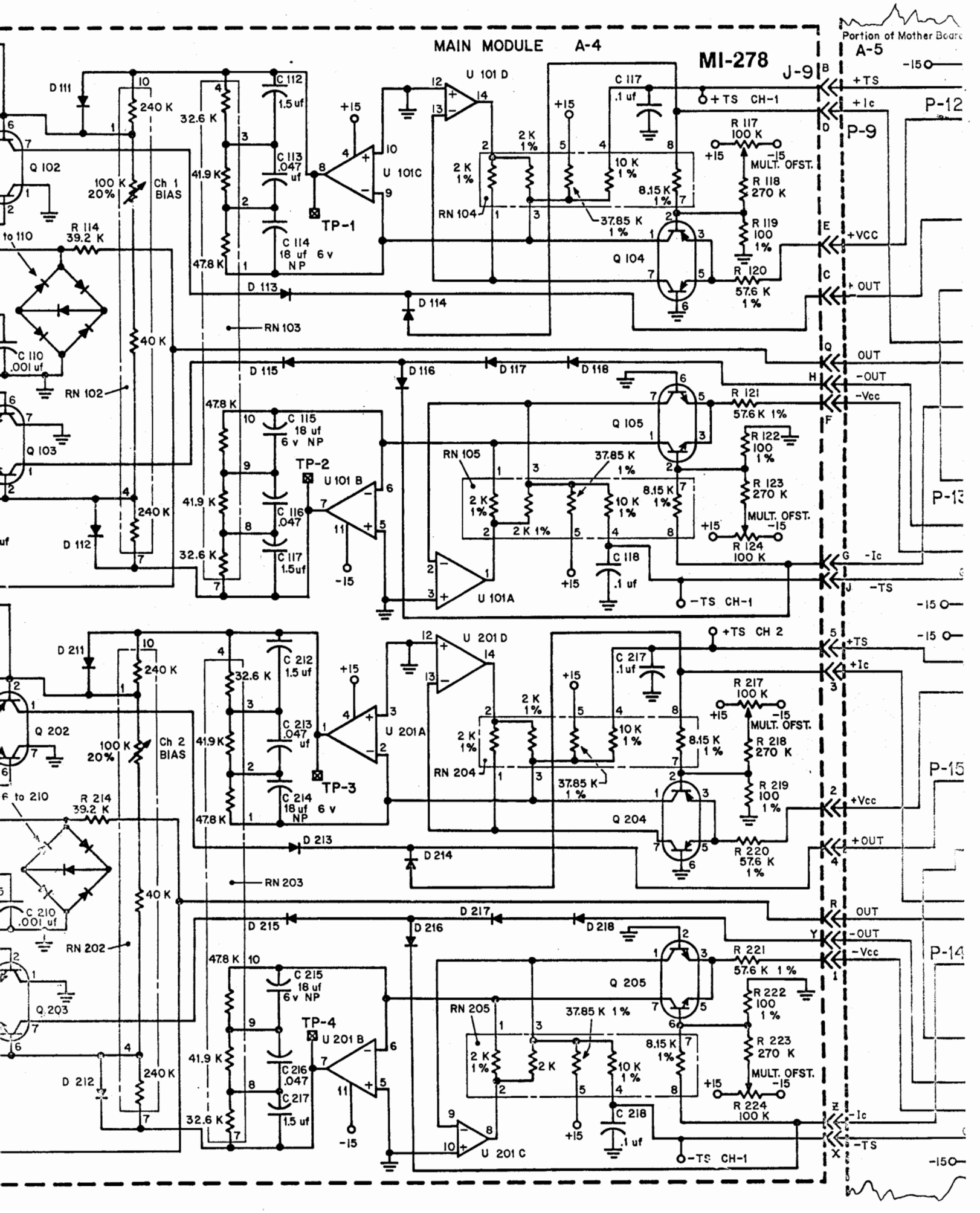
INPUT CONNECTOR MODULE

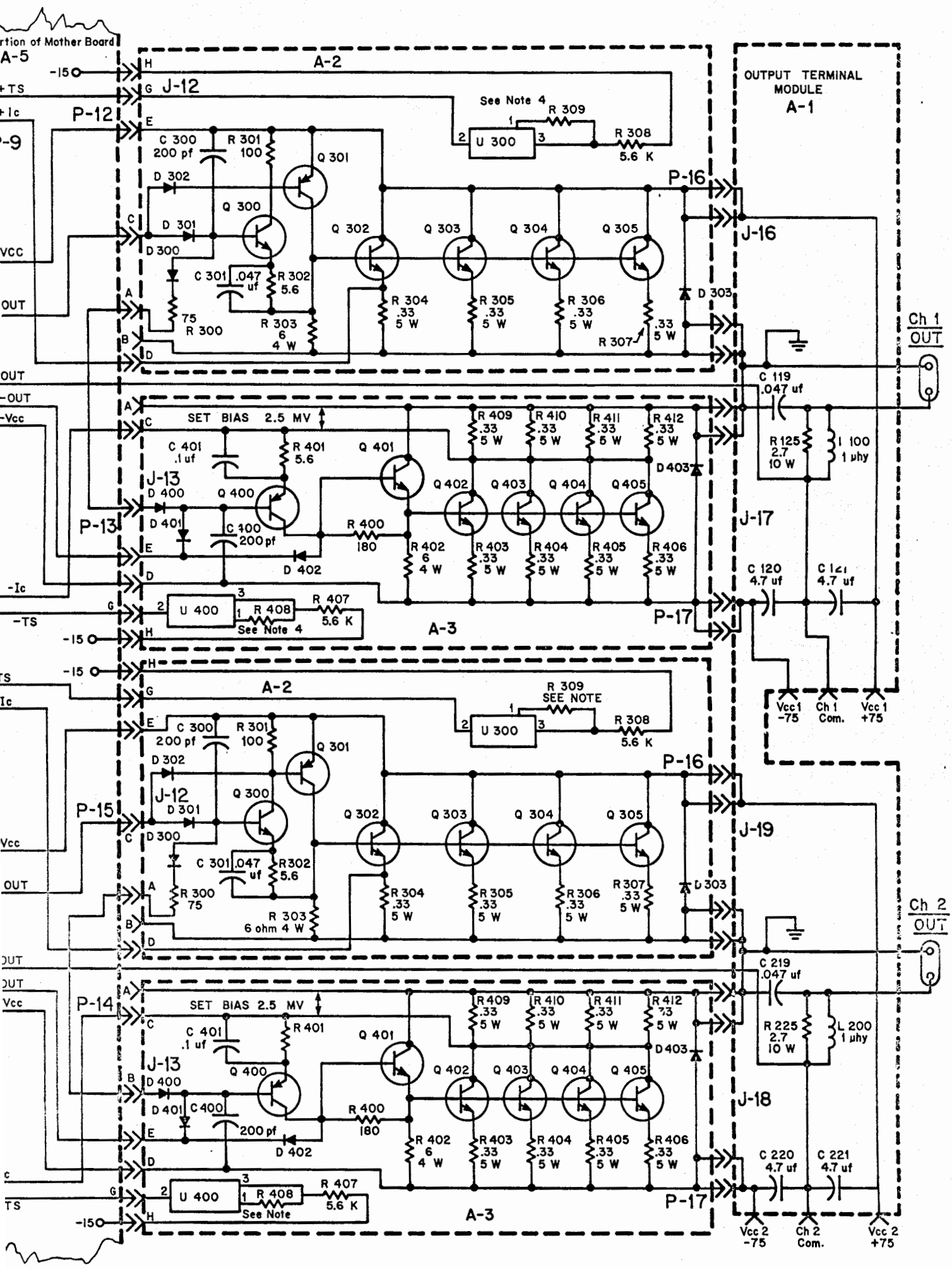
- DELAY, LOW FREQUENCY PROTECT AND STEREO-MONO SWITCH



SWITCH SHOWN INACTIVE.


A +LIM
M OVLD.
P-6
T +15
N -15
S
K -24
L -LIM
W FAN RELAY
J-9
6 +LIM
U OVLD.
P-6
P MONO IN
V -LIM
R 107 2 M
R 108 1 K
R 7 100
C 3 100 uf
+15 F
R 110 100
D 100
D 101
C 101 200 pf
Q 100
Q 101
R 106 662 1%
R 105 662
D 103
D 102
C 103 27pf
C 102 .001 uf
R 109 3.3 K 5 %
U 100
C 104 .01 uf
C 106 27pf
C 105 27 pf
54 K
10 K
20 K
10 K
O -15 F
R 102 528 1%
R 103 300 K
10 K
10 K
RN 100
+15 F
R 101 10 K 1%
C 100 120 pf
DC OFFSET
R 104 100 K
RN 101
6.13 K 1%
4.99 K 1%
412 1%
C 107 .001 uf
R 111 39 5 %
R 112 39 5 %
Q 102
C 108 .01 uf
D 106 to 110
R 113 560 5%
C 109 .01 uf
D104
D105
C 110 .001 uf
R 115 39 5 %
R 116 39 5 %
Q 103
C 111 .001 uf
R 5 100 K
C 1 .01 uf
R 3 220 K
Q 1
CH-1
CH-2
U-1
-TS
+TS
-24
R 6 10 K
R 1 20 K 1%
C 2 .01 uf
R 2 5.49 K 1%
R 208 1 K
R 207 2 M
D 200
D 201
C 201 200 pf
Q 200
Q 201
R 206 662 1%
R 205 662
D 203
D 202
C 203 27pf
C 202 .001 uf
R 209 3.3 K 5 %
U 200
C 204 .01 uf
C 206 27pf
C 205 27pf
5.4 K
10 K
20 K
10 K
O -15 F
10 K
10 K
RN 200
+15 F
R 210 100
D 206 to 210
R 213 560 5%
C 208 .01 uf
C 209 .01 uf
D 204
D 205
C 210 .001 uf
R 211 39 5 %
R 212 39 5 %
Q 202
C 207 .001 uf
R 215 39 5 %
R 216 39 5 %
Q 203
C 211 .001 uf
RN 201
R 200 10 K 1%
R 201 10 K 1%
R 202 557 1%
R 203 300 K
C 200 120 pf
DC OFFSET
R 204 100 K
R 8 100
C 4 100 uf
-15 F


MAIN MODULE A-4
MI-278
Portion of Mother Board A-5
J-9
P-12
P-9
P-13
P-15
P-14
D 111
240 K
Q 102
100 K 20%
Ch 1 BIAS
R 114 39.2 K
to 110
C 110 .001 uf
RN 102
Q 103
240 K
D 112
32.6 K
41.9 K
47.8 K
C 112 1.5 uf
C 113 .047 uf
C 114 18 uf 6 v NP
TP-1
+15
U 101C
U 101 D
2 K 1%
2 K 1%
RN 104
C 117 .1 uf
10 K 1%
8.15 K 1%
37.85 K 1%
R 117 100 K
MULT. OFST.
R 118 270 K
R 119 100 1%
R 120 57.6 K 1%
Q 104
+TS CH-1
+Ic
+VCC
+ OUT
D 113
D 114
RN 103
40 K
D 115
D 116
D 117
D 118
C 115 18 uf 6 v NP
TP-2
U 101 B
C 116 .047
C 117 1.5uf
U 101A
RN 105
R 121 57.6 K 1%
Q 105
R 122 100 1%
R 123 270 K
R 124 100 K
C 118 .1 uf
-TS CH-1
OUT
-OUT
-Vcc
-Ic
-TS
-15
D 211
240 K
Q 202
100 K 20%
Ch 2 BIAS
R 214 39.2 K
C 210 .001 uf
RN 202
Q 203
240 K
D 212
C 212 1.5 uf
C 213 .047 uf
C 214 18 uf 6 v NP
TP-3
U 201 D
U 201A
RN 204
C 217 .1 uf
R 217 100 K
R 218 270 K
R 219 100 1%
R 220 57.6 K 1%
Q 204
+TS CH 2
+Vcc
+OUT
D 213
D 214
RN 203
40 K
D 215
D 216
D 217
D 218
C 215 18 uf 6 v NP
TP-4
U 201 B
C 216 .047
C 217 1.5 uf
U 201 C
RN 205
R 221 57.6 K 1%
Q 205
R 222 100 1%
R 223 270 K
R 224 100 K
C 218 .1 uf
-TS CH-1



- D300 AND D400 ARE THERMALLY JOINED TO Q300 AND Q400.
- R309 AND R408 ARE SELECTED TO MATCH GRADE OF U300 AND U400.
- DIODES D106-D110 AND D206-210 ARE OMITTED FROM CIRCUIT AFTER SN10243.