



BLACK CANYON INDUSTRIAL PARK * 8146 N. 23RD AVENUE
PHOENIX, ARIZONA 85021 * (602) 995-0608

OPERATIONAL PROCEDURES

CX-11, SERIES A

HF SSB DELUXE INTEGRATED STATION

IMPORTANT

BEFORE APPLYING POWER IT IS ABSOLUTELY ESSENTIAL TO
READ AND OBSERVE CLOSELY ALL INSTALLATION AND OPERATING
INSTRUCTIONS IN THIS MANUAL.

THE CX-11, SERIES A DIFFERS IN IMPORTANT RESPECTS FROM
OTHER TRANSCEIVERS.

POSSIBLE SERIOUS DAMAGE TO THE EQUIPMENT WHICH MAY
RESULT FROM FAILURE TO COMPLY WITH ALL INSTALLATION AND
OPERATING INSTRUCTIONS HEREIN WILL NOT BE COVERED BY
WARRANTY.

SIGNAL ONE CORPORATION
BLACK CANYON INDUSTRIAL PARK
8146 N. 23RD AVE.
PHOENIX, ARIZONA 85021

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Forward

There were 111 Signal/One CX-11A's produced. At one time Paul Kollar W8CXS kept a list of who owned each one. And he had probably repaired each of them.

Paul was an incredible man. He only repaired Signal/One radios, and did it extremely well. He was meticulous in his work and made notes about what was wrong with the radios, and how to fix them. He knew the history of the company and the radios, and could go on for hours telling the history of Signal/One. He was the acknowledged master of Signal/One repair.

This is an update of the original manual that includes all of Paul's notes, drawings, and corrections to the schematics. Additional material on modifications has been included, as has a number of photographs.

I hope you find the information contained herein useful and informative.

Bill Turini KA4GAV
HAManuals
February, 2000



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Section 1

CX-11A Description



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Features and Specifications

FEATURES:

1. **DUAL VFO's, INDEPENDENT CONTROL:** Capable of simultaneously receiving two separate frequencies within the same band and transmitting on either.
2. **150 WATT OUTPUT** from a solid state, no tune final utilizing only 50% of its 300 Watt output capability through the use of Motorola® RF Power and Hybrid Linear Amplifier Modules.
3. **SYNTHESIZED HF 160-10M BAND COVERAGE:** Additional 1 MHz bands may be added by programming the diode matrix.
4. **UNEQUALED SELECTIVITY** from 3 cascaded crystal filters, IF shift plus active audio band pass filters and a tuneable peak notch filter. All add up to the most powerful anti-QRM system available today.
5. **ACTIVE DOUBLE BALANCED SILICONIX® MIXERS** provide a plus 20 dbm, 3rd. order intercept point (best attainable receiver IMD in an amateur band transceiver).
6. **RF SPEECH PROCESSOR.** RF envelope clipper plus cascaded 8 pole crystal filters in SSB
7. **LED FREQUENCY READOUT:** Six digit, 100 Hz resolution display. .43" character height; brightness and multiple colors insure accurate wide angle interpretation.
8. **CW KEYER; INDEPENDENT AGC; QSK-FASTBREAK IN CW; VOX; RIT; NOISE BLANKER; FULL METERING ALL STANDARD WITH SIGNAL/ONE**
9. **POWER SUPPLY (BUILT-IN):** Heavy duty HyperSil® tape wound transformer for exceptional regulation and power with compact size and weight.
10. **MODULAR CONSTRUCTION** utilizing a mass termination ribbon interconnection 3M® system for easy circuit board accessability.

SIGNAL/ONE MODEL CX-11A SPECIFICATIONS

GENERAL:

1. **Frequency Coverage:** All amateur bands 1.8 to 30 MHz in full 1 MHz ranges. An additional 1 MHz band may be added in any of the four ranges; 2.0; 4.0:7.0; 8.0:14.0; and 15.0:21.0 MHz by programming the diode matrix for the LSI Digital PLL Synthesizer.
2. **Frequency Control:** Two identical, precision VFO's 1 MHz tuning range, 50 KHz overlap with nominal 25 KHz per knob resolution.
3. **Readout:** Accuracy linearity and resetability to 100 HZ at any point in any band after calibration against WWV at 15 MHz. MSI Digital Frequency Counter, six digit .43" character height, high brightness and multiple red, amber and green LED's insure accurate wide angle interpretation. Readout updates 20 times per second.
4. **Spotting:** Push button provides audio beat note for spotting when using separate VFO's or Transmit Offset/Transceive Mode.
5. **T/R Switching:** Push-to-talk or fast-attack VOX; QSK, full break-in CW; fast key-up receiver recovery independent of AGC decay. Isolated terminals for control of external amplifier.
6. **CW Keyer:** Built-in electronic keyer with independent speed and weight control, 5 to 60 wpm. Separate jacks for keyer paddle and manual key.
7. **Frequency Control Modes:** Transceive with either VFO, "split" using both VFO's, transceive on either VFO plus independent receive-only on the other, or "Transmit and Receive Offset" transceive (Transmit and receive frequencies track and may be instantly offset up to plus or minus 3 KHz from receive frequency).
8. **Emission Modes:** SSB, CW, FSK
9. **Power Supply:** Built-in heavy duty supply for 115/230 volts, 50 to 400 Hz. HyperSil® Transformer for exceptional regulation and power with very small size and weight. Completely self protecting - both thermal and current overload. Requires approximately 100 watts receive, 600 watts peak at full input.
10. **Construction:** All critical circuitry (except large power supply components) is modular on glass epoxy etched circuit boards utilizing gold plated sockets and pins for easy removal of all transistors, integrated circuits and circuit boards connected by a mass termination ribbon cable system.
11. **Size and Weight:** 16¼"W, x 7¼"H, x 14" deep overall, less feet. 40 pounds.

RECEIVING SYSTEM:

1. **Active Mixers.** Two Quad JFET Siliconix® mixers.
2. **Sensitivity.** Better than -116 dBm (.25 µV) for 10 dB S/N ratio at 10 meters (2.4 KHz bandwidth). Matched 50 ohm measurement (10 dB noise figure).
3. **Selectivity.** Standard SSB - dual matched 2.4 kHz 8 pole crystal band-pass filters deliver 16 pole 1.4:1 shape factor performance (6dB/60dB).
4. **Dynamic Range.** 98 dB with a 2.4 KHz bandwidth.
5. **Third Order Intercept Point.** Plus 20 dBm based on two -23 dBm signals at the antenna connector, separated by 25 kHz, creating intermodulation distortion products not less than 90 dB below either of the interfering signals.
6. **Cross Modulation.** With a desired signal greater than -52 dBm, in a 2.4 kHz bandwidth, an unwanted signal, 30% modulated, removed not less than 25 kHz must be greater than plus 2 dBm to produce an output 30 dB below the output produced by the desired signal.
7. **Compression.** (Blocking) with a desired signal of -52 dBm an unwanted signal more than 25 kHz removed must be greater than plus 7 dBm to reduce the output by 3 dB.
8. **Synthesizer Phase Noise.** in 1 Hz bandwidth, -80 db below carrier.
9. **Post Detection Peak/Notch Filter** with adjustable frequency notch depth and 2.4, 1.5, 1.0, 0.4, 0.1 kHz bandwidth selectivities.
10. **Audio Output.** 2 watts.
11. **IF Shift.** Second IF adjustable up to plus or minus 2 kHz with respect to IF filter passband for interference rejection and receiver audio passband selection. Tracking error, zero.
12. **Dual Receive.** Two channels usable separately or simultaneously, continuously variable relative RF gain control. Either channel may be used for transceiving and the other for receive-only.
13. **Noise Blanker.** Pre-IF blanker with adjustable threshold.

TRANSMITTING SYSTEM:

1. **Power Amplifier.** Solid state, completely broad-band driver and final; two rugged, Motorola® RF power transistors MRF 422, linear power amplifier conduction-coupled to massive extruded heat sink. 150 watts dissipation rating at 25 C ambient. Complete thermal protection. Pre-tuned bandpass output filter requires no adjustment. Nominal 50 ohm output impedance will operate into any VSWR without damager. Driver and final broadband 1.8 to 30 MHz.
2. **Power Output.** 150 watts CW/PEP output all bands and modes. Output continuously adjustable down to less than 1 watt.
3. **Intermodulation Distortion.** 35 dB below each of two tones at full PEP output, typical.
4. **Harmonic and Spurious Output.** -65 dB min. Meets FCC part 97.73 (-40dB plus 10Log of mean power output).
5. **Carrier and Undesired Sideband Suppression.** 60 dB minimum.
6. **Speech Processing.** RF envelope clipping plus cascaded 8 pole crystal filters in SSB. Clipping adjustable 0 to 20 dB nominal.
7. **Metering.** PA current, PA voltage, clipping, drive, forward and reflected power.

NOTE:

All Signal One Products significantly exceed FCC specifications limiting spurious emissions.

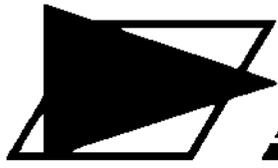
Price and specifications subject to change without notice or obligation.



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PHOTO - FRONT



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PHOTO - REAR



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LIMITED WARRANTY

Signal/One agrees to repair or replace without charge any equipment parts or accessories which are defective as to workmanship or materials to the original purchaser for a period of 1 year from the date of purchase. Provided that:

1. The purchaser returns the defective unit to Signal/One factory service department, transportation prepaid when directed to do so.
2. Notice of failure is provided Signal/One factory service department, in writing within one year of date of purchase.
3. The equipment was purchased from a factory authorized distributor and the warranty card validated at the time of purchase.
Warranty void when passed to a third party.

This warranty is void if equipment is altered, modified or repaired by other than authorized Signal/One factory service department.

Signal/One reserves the right to make any changes in design or to make additions to, or improvements in, Signal/One products without imposing any obligations upon Signal/One to install them in previously manufactured Signal/One products.

No other warranties expressed or implied shall be applicable to Signal/One equipments and the foregoing constitutes the sole liability of the company with respect to its manufactured products.

WARRANTY REPAIRS

Equipment to be returned under the guarantee should be preceded by notification giving full particulars of the defect. Signal/One factory service department will provide instructions with respect to returning unit for service.

Serial No.

OUT OF WARRANTY REPAIRS

If equipment is to be repaired or modified after expiration of warranty, correspondence should be directed as above. Signal/One will provide service instructions direct from the factory. Correspondence should be directed to:

SIGNAL/ONE CORPORATION
Black Canyon Industrial Park
Phoenix, Arizona 85021

UNDER THE REGULATIONS OF THE MAGNUSON-MOSS WARRANTY ACT, THE SIGNAL/ONE WARRANTY POLICY IS CLASSIFIED AS A LIMITED WARRANTY.

ALL SIGNAL ONE PRODUCTS MANUFACTURED IN THE UNITED STATES OF AMERICA



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Section 2

Operational Procedures



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WARNING

LINEAR AMPLIFIER OPERATION The CX-11A external mercury reed relay has a contact rating of 25 VA max., 100 VDC max., 1 AMP max. switching current, and 2 AMP max. carry current rating. Linear Amplifier unprotected T/R relay coils can produce an inductive voltage kick as high as several thousand volts on relay opening.*

The majority of Amateur Linear Amplifiers are not designed for high speed T/R switching transceivers that feature full QSK break in, i.e. Vacuum Reed Relays required both in the transceiver and linear. The Alpha 77D and 77S are the only linears currently manufactured that can utilize the full QSK capability of the CX-11A.

ADDITIONAL OPERATING INFORMATION The clipping internal adjustment has been set and with the clipping pot at 0, whistling into the microphone with the meter function in the clipping position the meter should not exceed S-1 with the output control at 10 giving full power output.

EXTERNAL KEYER OPERATION To key the CX-11A, an external keyer must supply a ground to the Key Jack; open circuit voltage is -3.5 VDC, 0 VDC keyed in transmit.

* Exceeding the contact rating will void the warranty for the CX-11A external reed relay.



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BASIC CONTROL SETUP

<u>Control</u>	<u>Setting</u>
AC	Off (Button Out)
Audio Filter	Off
Selectivity	2.4
Keyer	Any Position
Sidetone Level	Mid-Range
Calibrate	In
FSK Shift	CCW
Mode	USB or LSB
Clipping	3
TX Drive	0
AGC	Slow
TX Offset	Mid-Range
Meter	FWD PWR
TX VFO	A
Control	PTT
RX Channel	A, Center Knob Any Position
RX Shift	0, Both Knobs
Noise Blanker	Off
MHZ	1, 3, 7, 14, 21, 28 or 29
RF Gain	10
Audio Gain	3
Anti Vox	0
Vox Cain	3
Vox Delay	2
ANT Slide Switch (Rear Panel)	Comm

Connector Assembly Procedure

Mic Jack Assembly PJ-068

Solder Mic cable to Jack as follows:

1. Tip of jack - PTT circuit
2. Ring of jack- Mic audio
3. Sleeve of jack - Common ground



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Check for the following conditions before energizing the radio:

1. Antenna connected to rear panel jack.
2. Fuses installed per rear panel markings.
3. Dummy plug installed in accessory jack (radio will not operate without plug). Note - red dots must match; reversing plug will cause damage.
4. A.C. Power Cord connected.
5. Loudspeaker connected to rear panel "spkr". Jack or earphones plugged into front panel "audio" jack.

The CX-11A may now be energized by depressing the AC pushbutton - you will now be able to receive some signals by tuning VFO A.

To Transmit, depress the tune button and advance the TX drive control until the amber warning light on the meter face just begins to turn on, or until the forward power meter indication ceases to increase. The amber light marks the point of excessive drive. A red warning light is also included on the meter face, it shows that the high current power supply is out of regulation when lit -- under no circumstances should the drive control be advanced to the point at which this red light turns on. The out-of-regulation condition is usually caused when trying to operate with inadequate station wiring and/or excessively low line voltage.

Depress the "PTT" or "VOX" pushbutton to cancel the "tune" button; the CX11A is now ready for normal full-power transmission on either Single Sideband or CW. It is not advisable to remain in "tune" for more than one minute; long periods of this type of transmission could allow the amplifier or power supply to activate the automatic high temperature cut-off circuitry. When this happens, the transmitter will become inoperative until the heat sinks have been allowed to cool sufficiently. (The red meter light will indicate during thermal cut-off; also, the meter will indicate zero with the "P.A. Volt" button depressed).



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Explanation Of Control Functions

Note: All controls only associated with the receive function are marked with green lettering; transmit with red. Any controls which affect both receive and transmit are marked with yellow lettering.

1. **AC** On/Off -- self explanatory
2. **Mode** Every CX-11A will operate in the AM, LSB, USB, and CW 1 positions; the CW2 FSKI/CW3 & FSK 2 positions represent modes requiring the installation of optional crystal filters.
3. **Control Pushbuttons**
 - a **PTT**; Push-To-Talk:pressing the button sets up the condition in which the transmitter can only be actuated by an external switch, such as a microphone pushbutton, footswitch -- while in AM, LSB, USB, or FSK modes. In the CW mode, the transmitter is automatically actuated by keying either a standard hand key or auto key paddle.
 - b **VOX**; voice actuation: Transmitter will be automatically actuated upon speaking into microphone.
 - c **TUNE**: Actually a misnomer -- creates a "key down" CW transmit condition regardless of mode switch position; useful in setting or measuring RF output power.
 - d **TRANSMIT**: Depressing this button forces a transmit condition. To return to receive simply depress PTT or VOX. In the CW mode, the effect is to provide standard non-break-in operation.
4. **MHZ** Used to select the desired one-megahertz-wide range of operation. Separate low-pass and high-pass filters are selected for six ranges covering 1.8 - 30 MHz. The selectivity of the receive band pass filters further enhance the receive circuitry's excellent linearity in the presence of strong out of band signals.
6. **VFO A** Precision permeability tuned oscillator provides 1 MHz + tuning range for both transmit and receive; approx 25 KHZ/knob revolution.
7. **VFO B** Identical to VFO A. Dual VFO's provide simultaneous reception of two different frequencies, if desired.
8. **Receive Channel Selector**
 - a) Large outer knob selects which VFO determines the receive frequency; A, B, or both A & B.
 - b) Small knob is a balance control which can be used to modify the relative signal levels of two different stations being received in the A+B receive mode.



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9. RX Shift

- a) The larger outer knob provides the operator with a means of moving the IF passband up or down relative to the "Zero-Beat" frequency. (Used for placing selectivity skirt at optimum point for rejecting interfering signals).
- b) The small center knob is used to offset the frequency of VFO A during receive. This feature is activated by pulling out on the knob and rotating it while watching the results on the readout. The offset is automatically cancelled during transmit.

10. Noise Blanker

Very effective in reducing pulse noise. The control should only be advanced far enough to reduce noise to an acceptable level. Be sure to return the knob to the full off position when the noise blanker is not required; otherwise, strong signals within 15 KHZ may appear to cause receiver distortion.

11. RF Gain (Outer Knob)

Normally left in the full clockwise position; this control may be rotated counter clockwise to manually override the automatic Gain Control circuitry. Many operators reduce the RF Gain to eliminate annoying background interference while receiving relatively strong stations.

12. AF Gain (Inner Knob)

Use this knob to control the audio output level of the receiver. Notice that the control has no effect on the CW Sidetone or Spot Tone levels (for which separate controls are provided).

13. Calibrate

Caution: Allow 5 min. warm-up before making adjustments. Switching the knob clockwise causes a signal to appear every 100 KHZ. Using the appropriate VFO, set the readout to indicate any exact multiple of 100 KHZ (last three digit, are zero). Then insert a thin blade screwdriver into the calibrate knob; adjust to obtain zero beat.... this is best heard by manipulating the IF shift control to obtain good audio response near zero beat. The calibration procedure need only be performed once at WWV 15.0 MHz to insure accurate frequency readouts on any selected band.

14. Audio Filter

The CX-11A is equipped with a versatile peak/notch/filter. When switched to the "notch" position, a narrow segment of the receiver's audio response is greatly attenuated. Switching to "peak" provides a condition which is exactly opposite to that provided in "notch"; that is, all but a narrow bandwidth is greatly attenuated. The center fre-



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quency about which a "notch or peak" is located is governed by the position of the "center frequency" knob.

15. Audio Selectivity

Normally, this switch should remain in the 2.4 KHZ position. Narrower bandwidths down to only 100 HZ are provided to optimize the reception of weak signals in the presence of noise and/or strong interfering signals.

16. AGC

Receiver Automatic Gain Control; normally left in the "slow" position. The RF Gain Control must be used to manually set the Receiver Gain if this control is turned to "off".

17. TX VFO

These pushbuttons specify what controls will be used to determine the transmit frequency:

A; transmit frequency set by VFO A.

A.T.O.; transmit frequency set by VFO A and by the position of the "A TX Offset" control. A green dot will appear in the readout to remind the operator that this offset mode has been selected.

B; transmit frequency set by VFO B.

18. VFO Spot

Serves two purposes:

- 1) Allows an audible beat tone to be produced -- used to synchronize the two VFO's to a higher resolution than provided by the readout. (See "Spot Level" Control description).
- 2) When depressed, the frequency shown on the readout is exactly equal to the transmit frequency -- useful in avoiding having to transmit in order to check transmission frequency.

19. Spot Level

The loudness of the VFO spot tone is independent of the AF gain control. Set the spot level control for the desired loudness.

20. VOX Gain

Used to set the minimum level at which the operators voice will actuate the VOX circuit.

21. AntiTrip

Clockwise rotation of this control increases the VOX circuits immunity to being actuated by receiver audio output.

22. Delay

Controls the amount of time that the VOX circuit remains actuated after the operator has stopped talking into the microphone.



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23. **Meter Pushbuttons**

Meter reads received signal strength during receive except when "P.A. VOLT" or "P.A. CUR." buttons are depressed.

- a) **P.A. VOLT:** Press to monitor the power amplifier voltage. Note that signal strength indications cannot be observed with this function selected. Approximately 50 volts* full scale.
- b) **P. A. Cur.:** Press to monitor power amplifier current consumption. Approximately 50 amps* full scale. Note that signal strength indications cannot be observed whenever this button is depressed.
- c) **CLIPPING:** When this button is depressed, the meter will give a relative indication of the amount of RF clipping present during voice transmissions.
- d) **DRIVE:** When this button is depressed, the meter will indicate the activity of the ALC (Automatic Level Control) circuitry during transmit. The meter reading should never be allowed to rise above 20% deflection. A condition of excessive drive will usually result in distorted transmissions. The yellow warning light on the left side of the meter face is also an indicator of excessive drive, but responds much faster than the meter movement.
- e) **FWR PWR:** When this button is depressed, the meter shows a relative indication of forward power during transmit. An 80% meter deflection corresponds to 150 watts output (see manual for calibration data). (see page 14, Table 1)
- f) **REV PWR:** When this button is depressed, the meter shows a relative indication of reverse power. (See 6B, Table 1)

24. **TX Drive** (Center Knob)

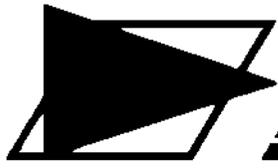
Controls the power output of the transmitter; always follow these rules when adjusting this control:

- 1) Do not advance TX drive any further than the point at which the power output ceases to increase.
- 2) Do not advance TX drive beyond the point at which the yellow warning light just begins to indicate and/or the drive meter shows a higher than 20% deflection.
- 3) Reduce drive if the red warning light shows the slightest indication (power supply overload condition).

25. **Clipping**

RF speech clipping may be used to increase the average output power without increasing peak output power during voice transmissions. This feature is extremely effective in extending ones readability under marginal conditions. Use only as much clipping as necessary - as with any clipping process, audio distortion is an unavoidable by-product. The knob is usually left at 2 or 3 during normal operating conditions.

* With modified meter multiplier values.



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26. A TX Offset

Allows the operator to offset the transmit frequency as much as 3 KHZ with respect to the receive frequency when using VFO A for



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Addendum to Item # 26 A TX Offset:

A/T.O. CW Transceive Operation

1. Depress A/T.O.
2. Depress Spot Button and set A/T.O. offset control 800 Hz high in relation to receiver frequency displayed on digital counter. (Approx. 7 o'clock on A/T.O. knob).
3. When set, no additional adjustments are necessary for any frequency tuned by PTO A unless a shift of the transmit CW frequency is desired, for example, during a DX pile up a slight shift of 100 Hz up or down.

A PTO Transceive Operation

1. Pull RX Shift knob and depress Spot button. Set for 800 Hz low in relation to the receive frequency. displayed on digital counter. (Approx. 11 o'clock on A/T.O. knob).



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DETERMINING ACTUAL FORWARD AND REFLECTED POWER

Table 1:

METER INDICATION	EQUIVALENT WATTS
0.0	0
0.2	1
0.4	2
0.6	4
0.8	7
1.0	10
1.2	14
1.4	19
1.6	25
1.8	33
2.0	40
2.2	48
2.4	57
2.6	66
2.8	75
3.0	85
3.2	100
3.4	108
3.6	118
3.8	130
4.0	140
4.2	150
4.4	170
4.6	190
4.8	200
5.0	210



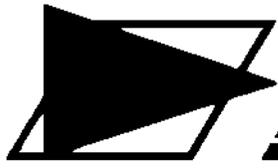
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A TX Offset (cont'd.)

both transmit and receive. Pressing the "A.T.O." pushbutton activates this feature. The offset is observed directly in the readout either by actually transmitting or by depressing the spot button. At first, this may seem redundant in view of the fact that a similar offset feature is included in receive (ref. RX Shift, VFO A); however, advanced operating techniques show the inclusion of both to be a valuable asset. Additional references to the feature and its uses are contained in the instruction manual.

27. **Keyer** The CX-11A is unique in that it includes a sophisticated Morse code keyer circuit featuring variable speed, variable "weight" and partial or full dot memory selection.
- a) Speed: Advance clockwise (large outer knob) to increase speed.
 - b) Weight: Full counter-clockwise is best for slower speeds - increasing weight as speed increases helps improve readability.
 - c) Dot Memory: Pull out center (weight) knob for full dot memory - push in for partial memory.
28. **Sidetone Level**
Sets loudness of CW sidetone; which is independent of the AF Gain control setting.
29. **FSK Shift**
Sets mark to space frequency difference for operating radio teletype. VFO B must be used for transmit in this mode.
30. **Optional Filters**
Available for CW2; FSK 1 / CW3; and FSK 2. Standard filter - 400 Hz band width. Deluxe filter - 350 Hz band width. CW2, FSK 1/ CW3 function in USB; FSK 2 functions in LSB.
31. **Optional Programmable Switch Positions**
Rx and Tx. Four additional positions available to cover frequencies from 1.5 - 30 MHz. Factory programmed;
- | | |
|---|--------|
| A | 4 MHz |
| B | 10 MHz |
| C | 18 MHz |
| D | 24 MHz |

Synthesizer Diode / Programmable coverage for MARS, Embassy Government and future band expansion: Consult factory.



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Rear Panel Connections



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REAR PANEL FUNCTIONS

1. **KEY:** Hand key operation and key return for QSK operation.
2. **KEYER:** Paddle key operation.
3. **J20:** External PTT operation. (T/R)
4. **PATCH:** Transmit audio input from external phone patch; 680 ohm impedance. (AFSK)
5. **HI-IF:** 39-40 MHz IF receiver output.
6. **LOW-IF:** 8.8 MHz IF receiver output.
7. **L.O.:** 41-69 MHz Synthesizer output.
8. **MDX7ASB:** 120 VAC fuse (Buss MDL 10 - supersedes panel designation).
9. **GBB25AFB:** +24V fuse (Buss AGC 25 - supersedes panel designation).
10. **POWER:** AC input, 120V or 220V depending on internal switch selection on AC Power Board located on the right rear side of chassis.
11. **ACCESSORY PLUG, TOP:** Input/output voltages for accessory operation. Contact factory for ribbon cable and plug assemblies.

ACCESSORY PLUG, BOTTOM:
 - A. Standard: Fast break QSK operation.
 - B. Optional: Alpha fast break QSK operation.
12. **SPEAKER:** 4 ohm impedance standard or will automatically match 600 ohm, receive audio phone patch input.
13. **RELAY:** Transmit ground, for external linear operation. Please read WARNING: LINEAR AMPLIFIER OPERATION.
14. **J19:** FSK mode; grounding J19 shifts PTO B, 1.5 KHz as set by front panel FSK control. [or spare on early serial numbers] +15 volts @ 1.7ma. being keyed.
15. **ALC:** Input from linear amplifier, high impedance. Negative ALC -8,VDC transmit RF output minimum.



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16. **RCVR:** Separate receive antenna input as selected by AUX COM Switch. Use COM for normal transceive operation on one antenna.
17. **GROUND:** Use heavy copper for earth ground.
18. **ANTENNA:** 50 ohm impedance nominal, use PL 259 connector.
19. **BAND SWITCH:** Optional wafer switch can be mounted to rear switch bracket to control external band switching functions.



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Section 3

Final Test and Alignment Procedures



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1. Install 10 amp fuse in the 110 volt AC line. Set switch on Brd. (A18) to 115 volts. Install 10 MHz clock on Brd. (A9). Install power and accessory plugs. Put red dot on both sides of accessory plug at arrow end. Also put red dot on chassis at arrow end of accessory jack.
2. Before powering radio, the following resistance checks should be made; Readings are approximate: A. Violet wire to +15 volt regulator, 33 ohms. B. Yellow wire to -15 volt regulator, 260 ohms. C. Grey wire to +5 volt regulator, 4 ohms. D. Junction of R2 and R3 on Brd. (A3), 850 to 1K ohm. E. Other end of R2, 800 ohms. F. Other end of R3, 650 ohms. G. Either end of R5 or R7, 450 to 1.5K ohm.
3. Use Variac to slowly bring up voltage to the radio. Check for high current draw and check voltages on the +15, -15 and +5 volt regulators as voltage comes up. Check that readouts, meter light and red LED come on. Red LED will come on with no fuse in 24 volt DC line or with low supply voltage. If there is normal current draw, disconnect Variac and use line voltage for remainder of tests.
4. Check for +15, -15 and +5 volts on their respective regulators. The junction of R2 and R3 will always have +15 volts. In PTT check that the other end of R2 has -15 volts and R3 has 0 volts. In TUNE, check that R2 has 0 volts and R3 has -15 volts.
5. Adjust BFO Brd. (A4). With the ribbon cable connected and the power on, make sure there is always at least one of the two coax cables connected as there is no ground return on the ribbon and high current will flow. Adjust BFO with radio in TUNE. Check that fan comes on in about 20 sec. Locate group of 3 pins near 8.8135 MHz crystal. Solder center pin to the nearest crystal. Connect frequency counter to Jack 427 on BFO Box. Switch mode to LSB. Adjust C1 for 8.8135 MHz. Switch to USB. Adjust R4 for 8.8165 MHz. Repeat C1 and R4 adjustments because of interaction. If signals cannot be brought on frequency, solder center pin to other pin. Now C1 will adjust the USB signal and R4 the LSB signal.

With radio in PTT and RX SHIFT at center, adjust R5 on Mother Brd. (A7) for 8.8165 MHz in USB and 8.8135 MHz in LSB.

Connect Spectrum Analyzer to Jack 427 and adjust C8 for +6 dBm (.446 V. rms) at 8.8 MHz. Check frequencies in previous steps because of interaction.

Connect Coax 427 and connect Spectrum Analyzer to Jack 119. Peak L4.



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- L5 and C23 for maximum output at 34.2 MHz. Adjust C15 for +2 dBm (.282 V. rms). Connect Coax 119. Install BFO in radio.
6. Check Audio Output. Remove Coax 186 from J 10 on Brd. (A9). Inject audio signal to Coax and check that it is audible in speaker.
 7. Check AGC and "S" Meter. Turn on AGC. Turn RF GAIN control full CCW and check that "S" Meter goes full scale. Remove Coax 387 from J 11 on Brd. (A9). Inject 8.8 MHz signal from RF generator to J 11 and check that the "S" Meter moves. With a level up to -30 dBm, vary frequency thru zero beat and listen for a clean, distortion free tone. Reconnect Coax 387 to J 11.
 8. Adjust IF. With an AC Voltmeter at the speaker output, peak T4 and T5 on Brd. (A8) for maximum noise.
 9. IF Sensitivity. Set AGC control to off. Remove Coax 247 from Brd. (A22) and connect to RF generator. Set reference noise level at -10 dB on AC voltmeter using AF GAIN control. Turn on RF signal and adjust frequency for peak signal on AC voltmeter. Adjust output of generator for 0 dB on AC voltmeter and read output level of generator. This is the sensitivity of the IF and should be approx. .12 - .15 uV.
 10. Initial "S" Meter Calibrate. Mechanically zero meter with screw. Turn AGC to SLOW. With Coax 247 connected to RF Generator as in step 9, inject a -107 dBm signal and adjust pot standing off Brd. (A9) for "S1" reading. With -73 dBm signal, adjust R30 for "S9". With -30 dBm signal* adjust R52 for +60 dB "S" Meter reading. Repeat procedure due to interaction. Reconnect Coax 247. * With modified "S" meter circuit, use -13dBm signal. 0.5 μ V should just make meter move.
 11. RX PTO Adjust. Set both PTO's at 14.700 MHz. Set RX CHANNEL to "A". Remove Coax 254 and connect Spectrum Analyzer to J 6 on Brd. (A26). Peak L2,L3 and L4 for maximum output at 31.2 MHz. Adjust R14 for +6 to +7 dBm maximum level. Switch RX CHANNEL to "B". Adjust R13 for +6 to +7 dBm maximum level. Reconnect Coax 254. (.446 to .500 V. rms, bridged ????)
 12. TX PTO. Remove Coax 58 and connect Spectrum Analyzer to J 8 on Brd. (A26). With radio in TUNE, check for -4 to 0 dBm maximum level on 40 MHz signal. Return radio to PTT.
 13. 24 Volt Supply. Set RI CCW on Brd. (A3). Turn radio on, then off and quickly install 25 amp fuse in 24 volt line. Read voltage at junction of R5 and R7 as the filter capacitors discharge. Check that R1 adjusts this voltage. If okay, turn radio on and adjust R1 for 24 V. Seal pot. Check that there are 38 volts on the cathode end of CR9. Ad



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just R2 on A31 ("S" Meter Brd.) until front panel red LED goes out. Adjust additional 60 degrees.

14. Synthesizer. Check for +15 volts on orange wire of synthesizer regulator. Set bandswitch to 29 MHz. Remove synthesizer box from radio. Remove Coax 130 and connect frequency counter to J 2. Using a non-metal blade, adjust L1 for 8 volts on pin 13 of U5 on Brd.(A17). Seal coil. Frequency at J2 should be 69.0000 MHz. Connect Spectrum Analyzer to J2 and check for clean +17 dBm signal at 69 MHz.
15. TX LOW PASS FILTERS. Remove Coax 179 and connect Tracking Generator to J1, Rear Switch, Brd. (A19)(A27). Remove Coax 198 and connect Spectrum Analyzer to J1, Front Switch, Brd. (A19)(A27). Check frequency response against manual in all bandswitch positions. Reconnect Coax 179 and 198.
16. RX LOW PASS FILTERS. Connect tracking generator to antenna jack. Remove Coax 234 and connect spectrum analyzer to J2, toward front of Brd. (A2). Check frequency response against manual in all bandswitch positions. Radio must be ON when checking D, 28 and 29 MHz positions.
17. RECEIVE MIXER ADJUST. Connect AC voltmeter to speaker output. Set receiver reference noise level at -10 dB on voltmeter. Inject 14.475 MHz .5 uV signal to antenna jack and peak on voltmeter using PTO. Peak L1, L2 and L3 on Brd. (A24) for peak on voltmeter. Adjust output level of generator for 0 dB reading; this should be .35 uV or less for 10 dB SN+N ratio. Check for +15 volts in PTT and 0 volts in TUNE on the land next to the S/O Logo on Brd. (A22).
18. TX MIXER ADJUST. Remove short coax and connect spectrum analyzer to J9 on Brd. (A10). Connect 50 ohm load on end of coax removed. On 14.5 MHz and with radio in TUNE, turn TX DRIVE cw and adjust L1, L2 and L3 for -2 to +2 dBm level. Reconnect coax.
19. NULL CARRIER. Switch radio to USB and VOX. Set VOX GAIN control 2 to 3. Remove Coax 182 and connect spectrum analyzer to J6 on Brd.(A9). Set scope at I KHz/div. and 300 Hz resolution. Inject a 1000 Hz, 10 mV AM signal to MIC jack to trip VOX. Adjust R74 to null carrier on 8.8 MHz signal. Seal pot. Carrier should be 45 to 55 dB down from sidebands. Reconnect coax.
- 20a. Inject 10 mv, 1,000 Hz signal into Mike jack. Read 60 mv at coax 148 on board A9, bridged with VTVM.
- 20b. CLIPPING ADJUST. Looking from side of radio, adjust vertical MIC GAIN pot on Brd. (A6). Push CLIPPING button. Set CLIPPING control ccw. Connect microphone to MIC jack. While whistling into MIC, adjust R1



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on Brd. (A7) for S1 reading.

21. VOLTAGE ON BIAS FEEDTHRU CAPACITOR. Check that there are 2.5 to 3 volts on the bias feedthru capacitor in receive in all modes. In SSB transmit only, there should be 24 volts.
22. DRIVER BIAS. Remove ribbon connector from J2 on Brd. (A36). Use jumpers and reconnect pins 1 and 2. Use separate supply and connect + 24 volts to pins 3,4, 5 or 6 of ribbon. Bias current from supply in receive and CW transmit should be 320 to 340 mA. In SSB transmit, adjust R22 on board (A5) for 420 to 440 mA. Seal pot. Reconnect ribbon.
23. FINAL BIAS. Remove Coax 179 from J4 and Coax 228 from J3 on Brd. (All). Remove Final Amplifier heat sink from chassis. Disconnect + 24 wire from J1. Use separate supply and connect + 24 volts to J1. Bias current from supply in receive and CW transmit should be 120 to 180 mA. In SSB transmit (or with +24 volts on J2) adjust R11 on Brd. (All) for 400 mA. Seal pot. Reconnect Coax 179 and 228; +24 volt wire to J1 and reinstall heat sink.
24. CALIBRATE REFLECTOMETER AND ALC. Connect dummy load thru a watt meter to the antenna jack. Set TX DRIVE ccw. Push REV. PWR. button. With radio in TUNE, increase TX DRIVE for a low power output. Null reading with C6 on Brd. (A33). Push FWD PWR. button. Increase TX DRIVE for watt meter reading of 150 W. Adjust R1 on board (A16) to the extreme opposite rotation from where front panel LED comes on. With an output of 150 watts, adjust C9 on Brd. (A33) for 4.2 reading on panel meter 0 to 5 scale. (86.6 volts RF @ 50 Ohms) Advance TX DRIVE fully cw and adjust R1 on board (A16) to limit output to 150 watts. Check for 150 watts output on all bands readjusting R1 if necessary. In the 1 MHz position, read power output with PTO's at 1.8MHz. Check that amber LED is on indicating limiting action around 125 watts (79 V. RF) output and the TX DRIVE control about the 10 to 12 o'clock position. The DRIVE indication should be approx. 2 on the 0 to 5 scale. With the High Power Option only, set C9 for forward reading of 4.8 and set R1 for 200 watts output on all bands.
25. 2 TONE IMD TEST. Connect dummy load through watt meter to antenna jack and spectrum analyzer to attenuator on dummy load. Switch radio to USB and push VOX button. Set VOX GAIN control to 3. A 400 Hz and a 1200 Hz audio tone is mixed through a resistive coupler and fed to the MIC jack. Set TX DRIVE to mid range. With the 400 Hz tone connected, increase level of tone to approx. .3 volts until VOX trips. Advance CLIPPING for an output of 37 watts for a 150 watt radio or 50 watts for a 200 watt radio. Disconnect 400 Hz tone. Connect 1200 Hz tone and increase output to same level of 400 Hz tone without changing TX



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DRIVE or CLIPPING. Reconnect 400 Hz tone, power output will rise slightly. Look at the output with spectrum analyzer (300 hz resolution and 1 KHz/div.) and check that the secondary sideband levels are 25 dB down.

26. CW WAVESHAPe CHECK. Switch radio to CW1. Connect oscilloscope to attenuator on dummy load. Key radio with full output into dummy load. Check for proper CW envelope.
27. PTO SWITCHING. Leave radio and scope as in Step. 26. Remove Coax 4 from J2 on board (A26). Push TX "A" button and set RX CHANNEL at B. There should be no output while keying radio. Reconnect Coax 4 and remove Coax 11 from J4 on Brd. (A26). Push TX "B" button and set RX CHANNEL at A. There should be no output while keying radio. Reconnect Coax 11. Display should switch between A and B when keying.
28. KEYER. Plug keyer paddle in rear panel KEYER jack and check SPEED, WEIGHT DOT MEMORY and SIDETONE LEVEL controls. Check for full break-in (QSK) in the PTT mode and VOX delay in the VOX mode. Plug straight key in rear panel KEY jack and check manual keying. Check for full power output in the CW mode.
29. PTT and VOX. Switch radio to USB or LSB. Plug microphone into MIC jack. Push PTT button and key microphone. Radio should go into transmit mode. Push TRANSMIT button. Radio should go into transmit mode like a PTT lock. Push VOX button. Check VOX GAIN, VOX DELAY and ANTI-VOX controls. Check that there is no carrier output in the CW mode when the PTT or VOX circuits are activated.
30. RELAY, ALC and FSK REAR PANEL JACKS. With the radio upright and in TUNE there should be 22 ohms across the RELAY jack. Using a variable power supply, a 0 to -6 volts on the center pin of the ALC jack should reduce the output from full power to 0. Shorting J19 to ground will shift the frequency of "B" PTO down a maximum of 1.5 KHz with the FSK SHIFT control fully cw.
31. FINAL "S" METER CALIBRATE. Repeat Step 10 with signal generator connected to antenna jack.



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32. METER and FREQUENCY CONTROL FUNCTIONS. Use dummy load or antenna as necessary.

METER FUNCTION	0 to 5 relative scale reading
P.A. VOLT	2.4*
P.A. CURRENT	.2 idle. 1.7 in TUNE at 150 watts output*.
CLIPPING	.25 whistling into mic with CLIPPING fully ccw.
DRIVE	3.2 at 150 watts output.
FWR. PWR.	4.2 at 150 watts, 4.8 at 200 watts output.
REV. PWR.	Dependent on SWR and output power.

* Scale modified for 0-50 Volts

TX VFO	RX CHANNEL	READOUT, SPOT out	READOUT, SPOT in
A	A	A	A
A	A+B	A	A
A	B	B	A
A/TO	A	A	A (+/-) 2 KHz A TX OFFSET
A/TO	A+B	A	A (+/-) 2 KHz A TX OFFSET
A/TO	B	B	A (+/-) 2 KHz A TX OFFSET
B	A	A	B
B	A+B	A	B
B	B	B	B

Check RX A+B function. Check for RX (+/-) 1.5 KHz shift on VFO A control. Check spot level control. Check OVERANGE and OFFSET indicators on readouts.

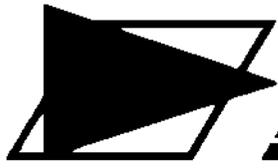
33. PTO. From cold start, the PTO's should not drift more than 200 Hz/hour.
34. NOISE BLANKER ADJUST. Set PTO's at 14.500 MHz. Set spectrum analyzer at 50 KHz resolution for a center frequency of 8.8150 MHz. Connect probe to anode side of CR3. Turn NOISE BLANKER control to approx. 3 o'clock position. Turn on 100 KHz calibrate signal and using PTO, center signal at 8.8150 MHz on analyzer. Adjust T3 on Brd. (A8) for maximum amplitude of approx. -25 dBm. Check operation by placing oscilloscope probe with sweep of 2 mS/div. at collector of Q7. With noise blanker control ccw, collector of Q7 should be -15 V; and full



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cw, +3.5 V. With noise source on, the blanked out noise pulses will be present on the scope and vary smoothly as the noise blanker control is varied over its mid-range.

35. AUDIO FILTER, NOTCH, PEAK and CENTER FREQUENCY CONTROL CHECK. Check AUDIO SELECTIVITY control. Check CW I filter if installed. Check 100 KHz marker signal is received on all bands. Check AUDIO jack using headphones.
36. IF SHIFT ADJUST. In receive, with RX SHIFT control at 0, adjust R5 on Brd. (A7) for equal noise pitch while switching between USB and LSB - no antenna connected.
37. AGC VOLTAGE CHECK. With a -20 dBm, 14 MHz signal at the antenna, peak PTO for maximum "S" meter reading. The voltage on wire 347 (green), Brd. (A9) should be +4 Volts with the connector on the board.
38. WWV CALIBRATE. Set radio in USB and RX SHIFT at -2. Set PTO for 15.000.0 KHz. Adjust pot thru hole in CAL/WWV knob for zero beat on WWV. Make sure there is about (+/-) 2.5 KHz range either side of zero beat. If not, adjust C 23 on Brd. (A4) thru lower hole in side of chassis
39. Spray light coat of Filtercoat on fan filter and install in radio.
40. For High Power Option, check external fan bracket and thermal turn on switch. Switch should turn on approx. 60 degrees C.
41. Check that all circuit board screws and front / rear panel nuts are tight. Put on cabinet, first centering the bottom half with the front panel. Check for blemishes and clean skirt of all knobs.
42. Serial number on rear heat sink. Run final check in transmit and receive with radio in cabinet.



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Section 4

CX-11A Modifications



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Board	Ref		Notes
	1	Most drawings have many errors. Drawings were intended to partially cover the older CX-11 model, which had numbered wires. A ribbon/wire connector system is used on the CX-11A, but plug connections were not standardized on the first few produced. Caution on these, since plug-in units are <u>not</u> interchangeable with later radios. Radio #1058 was the 20th produced with ribbon cables and is standard. #908 was third ribbon cable radio and is non-standard.	What is the S/N scheme on the CX-11? Also, any history on the CX-11A? Does the total of 110 produced include the CX-11s?
A3	2	Q2 (2N2060) is reversed 180 degrees in socket, board marking is wrong, install with keyway toward center of board. Change R24 from 470K to 220K Ohms for proper operation of the overcurrent shut down circuit. A matched pair of 2N3904 transistors may be used as Q2 if the 2N2060 is not available, emitters toward dot mark on board.	
A3	3	Change R7 from 1 Ohm to 0.5 Ohms, 3 to 5 watt size to correct marginal voltage input to +5 volt regulator circuit with low line voltage conditions.	
A3	4	R33 (120 Ohms, 1/4 watt) is overheating. Change to 110 Ohms, 1 watt size, or parallel 220 Ohm, 1/2 watt resistors which are closer to the optimum size for the 5v relay, 110 Ohms.	
A3	5	T/R Voltage is not going to zero, so on separate VFO operation, output shows breakups on leading edge of CW waveform. Note that Q7 on audio board just turns <u>off</u> the -15 volt bias on the PTO's and the +15 volt regulator on the board (VR-1), and R2 drive the residual -15 volts down to 0 volts, and for proper operation, this voltage should be +.01 to +.05 volts to absorb the high current pulse on CW transmit. R2 is too large and must be paralleled with enough resistance to provide the required + volts. Typical value is 2K ohms.	

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Board	Ref		Notes
A3	6	Slight frequency shift on one VFO when the other VFO is selected for transmit. R4 is too large to provide the required stiffness of the supply to the voltage balancing diodes. Change R4 from 1K ohms to 560 ohms - 1 watt to reduce the shift. Selection of diodes for CR17 & CR18 may be needed to refine the results. Also, R3 (1K ohm) must be paralleled with a resistor to reduce the voltage shift of the R/T line to minimum. Typical value is 2K ohms.	
A3	7	As received, band "D" tuned 25-26 MHz. Reprogrammed diode matrix to new W.A.R.C. band 24-25 MHz by removing one diode (Plug-in)	
A3	8	Inaccurate P.A. current reading. Factory changes were made on the meter board to correct excess meter deflection, but not enough to completely correct the calibration. With current measured by voltage drop across parallel 0.05 Ohm resistors (0.025 ohm total), meter resistance at 35 ohms, resistor R4 meter board (A13) of 1K ohms +/- 10%, the resistor on A3 must bring total to 1250 ohms. R39 would be 220 ohms if the 1K resistor on the meter board is accurate. Change R39 from 100 ohms on A3. Full scale will now be 0-50 amps.	(The book notations of 0-25 amps full scale were <u>never</u> correct.)
A6	9	Capacitor C15 (4.7 µf) is installed in reverse polarity. Should be changed to that (+) goes to ground and change board markings.	
A6	10	As received, C32 was reversed polarity causing no CW sidetone. (46 µf). Original drawings showed C32 & C33 incorrect polarity.	
A13	11	P.A. volts reading is meaningless. R3 on meter switch board A13 is 33K ohms +/- 10% resulting in meter reading of 3.6 +/- . Changing R3 to 47K to 50K Ohms will give a 0-50 volt scale, so the meter reading will be 2.4 for 24 volts on the regulated power supply which is a useful reading. Some meters are non-linear, so the new R3 may require a selected, high value, parallel resistor to be added.	

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Board	Ref		Notes
A6 & A1	12	As received, CW waveform has no break shaping with straight key or external keyer. Change C6 (22 μ f) on A6 to 47 μ f or 60 μ f as needed to delay switching back to receive enough to pass the full CW waveform. The actual shape of the break side is determined by C-18 in the PTO module A1. Originally was 4.7 μ f, but 2.2 μ f is better to sharpen the break shape. A small high frequency burst was noted on the base of Q6 on the audio board A6 due to high resistance in the connections from C6 thru various boards back to the mode switch, A34. A good ground on Pin #1-E on the mode switch cures this or a wire from Pin #1-E back to the audio board mounting screw near C6 is better.	Since this depends on foil, connector, resistance of the mother boards, it may not be a problem in most radios.
A34	13	Short first dot with internal keyer. Jumper out CR-1 on mode switch, A34. Note that this diode is <u>only</u> used for full breakin keying with the Alpha 77D linear amplifier that is connected to the CX-11A thru the accessory plug wiring. Note that Q-1 on A34 is reversed and only acts as a diode. The built-in time delays require this for the internal keyer.	May add socket pins for Q-1.
A1	14	Noted that no grease was factory applied to the brass slide bar of the PTO's and the bar is wearing badly. Also check for shaft play when dial is pressed in and out, 100-200Hz is normal. Some stamped anti-backlash washers were used that had burrs and after a short time, the shaft becomes loose. Proper washers were machined smooth.	
Chassis	15	As received, the plug at the anti-vox control was reversed with pin #1 down. This reduced speaker output when anti-vox control was full CCW.	Note that coax #60 goes to the output of the audio amplifier on the control board.
A17	16	Resistor R17 is changed form 2.2K to 1.5K ohms to improve synthesizer operation at high temperatures.	

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Board	Ref		Notes
A3	17	Resistor R34 (22ohms - 1/4 watt) is in series with the external amplifier keying relay. Resistor may burn with some linear amplifiers. Change to at least 1/2 watt size. For Alpha 70-77 linears, install 100 ohms, 2 watt size for best operation and long relay life. Most Henry amps use 27 ohms - 1 watt.	Select exact size using test clips across amp control line for minimum sparking.
A31	18	Red and amber lamps glow faintly on some radios. Install 2.7K ohm - 1/4 watt resistors from L.E.D. hot terminal pin on board to ground for each to stop continuous glowing.	
A18	19	Change V150LA10A M.O.V. at location C-1 to 0.01 µf - 1KV disc capacitor.	
A18	20	Early radios used 14 pin DIP relay which was underrated for switching the internal fan. (200VDC contacts) Replace with Aromat or similar relay rated for 125 VAC switching at 0.5 amp or more. Latest relays have 400 Ohm coils for 12 volt operation which require a 100 ohm resistor at R12 on power board A3. Some radios had Aromat (Yellow color) 5 volt relays with 70 ohm coil which require 220 ohms as R12 on board A3. Note that this allows only 3.3 volts to operate the relay, but seems to be satisfactory. The early DIP, 14 pin relays were 12 volt with 500 ohm coils and require 1000 ohms as R12.	All radios were incorrect with 220 ohm causing overheating of the relays and early failure.
A9	21	Non-linear "S" meter. Design error in IC-2A connections. Must be changed from non-inverting to inverting operational amplifier circuit to allow correct "S" meter calibration above "S-9". Note that on early boards, no "S-1" adjustment control exists. The circuit for Q4 on the AGC board, A9, must be changed to a gain type stage and add a gain control for it. This becomes the "S-1" adjustment to be set with 1 microvolt input to the receiver. With both circuits in place, the "S" meter may be calibrated for 5 dB / "S" point below "S-9" and correct scale calibration above "S-9" to 60 dB scale switch is 50,000 microvolts. If still non-linear above "S-9", select new size for R29 (0 - 1.2K). Use pin jacks.	See Item #23



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Board	Ref		Notes
A9	22	On early and late radios, the connections to J1, J2, J3 coax cables #131, 154, 174, are "Berg" connectors. These leak RF badly causing strong signals every 100 KHz with the Calibrate control off. Most radios use gold colored SMB or SMC coaxial connectors. Berg connectors should be changed to the SMC plug/jack arrangement or the coax may be soldered direct to the board holes with "Zero" length leads. Very early boards used a different component placement which requires extensive rearrangement of parts, and addition of L-C filter and feedthru capacitor along with the Berg connector replacement to reduce 100 KHz signals.	
A9	23	Audio overshoot, slow AGC attack time. Change oversize C23 from 10 µf to 0.01 µf capacitor. Additional AGC improvements are to: Change C24 to 10 µf; Change R22 to 1 K Ohms; Jumper across R29 (1.2K) or change to smaller value to correct non-linearity at high signal levels, typical 680 to 470 Ohms.	See item #21
A9	24	Early radios may "pop" the speaker when the microphone button is released and the receiver recovers before the transmitter stops on SSB operation. All radios should have the modification which adds a 2N3904 transistor, 8.7 v zener diode, and resistors under the board, tacked in on the foil.	This was included on the latest production board foil design.
A20	25	For receiver front end protection from lightning and overloads, add two strings of diodes at location DS-1 on the receiver high pass filter board. Back-to-back 8.7 Volt zener and 1N4148 or similar switching diodes arranged to clip both + and - voltages. Some wiring errors in use of 3.9V zeners, change if they are 1N5228B type to stop broadcast station cross mod.	Standard on late radios.
A16	26	CW waveshaping to suit individual, but good results from: Removing C5; Retaining C13 as 0.047 µf; Jumpering ineffective R24 control; Jumper out CR-6 (1N270). Improved CW sidetone quality by changing C8 to 0.1 µf, but this also sharpens the "Break" CW shape, so C12 must be changed to 1.5 to 2.2 µf to compensate. To insure that one VFO stops before the other starts on split operation, add 1.5 µf capacitor from Q8 base to ground. Installing C5 as 0.01 to 0.1 µf will soften the click on "Make" if desired.	Select value of C5 for best shape.



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Board	Ref		Notes
A16	27	Change R16 from 1 Meg to 1.5 Meg ohms for better drive meter operation. Change R5 from 10K to 18K Ohms to allow transmitter to work into a higher SWR load without exceeding the transistor ratings.	
A10	28	Add double sided circuit board piece to side of board to shield the transmitter mixer from the driver board. Tack solder in place. Change mixer cutoff circuit from R/T line to ALC control to insure complete cutoff. 2 resistors and foil cut are required. Also transistor Q3 is plugged in differently.	
Chassis	29	Rear jack J19 is not connected on early radios. Later radios is marked RTTY and is used for FSK operation. On rear accessory jack, J10, upper jack, splice a wire to the orange lead of ribbon cable which goes to pin #3 (Wire #229) and connect wire to J19 / mark jack RTTY.	
A8	30	Due to low I.F. gain and high loss CW filters, a one transistor amplifier is needed for the plug in filters. Note that the standard factory supplied board will not fit on CW3 / FSK position directly. Modifications are required for connections.	
A6	31	Add 0.01 μ f capacitor at Jack J4 (Sidetone Level) and J9 (VOX Gain Control), to ground to reduce RF feedback. If microphone gain is too low, add 100 μ f - 15 Volt capacitor across R6 (near Q1) and reset mike gain control. Low impedance mikes increase hum, ground loop problems. If phone patch input gain is too low, or wrong impedance for the type of phone patch used, change R9 (680) to 47K Ohms. This makes phone patch input high impedance instead of 600 Ohms. Ground loop at Mike jack causes hum. An insulated type Mike jack will reduce hum, Collins #647-2739-001, Jack, J2, NSN (Switchcraft).	



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Board	Ref		Notes
A11	32	To optimize power output vs frequency better: Change C-1 from 100 pf to 200 pf (Add second 100 pf chip capacitor on <u>top</u> of existing one); Change C-4 from 680 pf to 1680 pf (Add 1000 pf chip capacitor on <u>top</u> of existing C-4 - CAUTION to use a <u>thin</u> capacitor due to clearance problems). Add 1000 pf chip capacitors in parallel with both C-2 and C-3 (Place between foils near other capacitors); Change C-5 to 560 pf - 300 volt, mica type capacitor, soldered directly to output coil T-3 (Note on some early radios, a chip capacitor at C5 location may be on the top side of the circuit board under T-3. <u>This must be removed.</u> Also some radios may have a 390 pf mica on T-3 which should be changed to the 560 pf size); Change R17 to 39 Ohms - 5 watts to improve bias stability. (Many different sizes were originally used).	
A29	33	Early boards displayed yellow decimal for "Overrange" indication on IC-3. Remove existing R9 (150) and connect new R9 (150 - 1/4 watt) to pin #6 of IC-1, red band display digit. IC-1 must be changed to Hewlett-Packard #5082-7650 which has a left side decimal if one of the red digits is not this type already.	
A17	34	Early boards had some incorrect resistor wattages. Check R15 for 10 Ohms - 1 watt (Early paralleled resistor combination); R18 for 390 Ohms - 1/2 watt (was 1/4 watt); R21 for 220 Ohms - 1/2 watt (Early paralleled resistors); R29 for 100 Ohms - 1 watt (was 1/4 watt).	Synthesizer board.
A2	35	Early radios may have band pass filters for band "A" connected to the 1-2 MHz filter instead of the 3-5 MHz filter for proper operation on 4 MHz. Band "D" may be connected to wrong filter for proper 24 MHz operation.	
A27	36	Early radios had wrong connections to transmit low pass filters for proper operation of band "B" on 10 MHz and band "C" on 18 MHz WARC bands. The printed circuit boards holding the band switch wafers have foils etched on <u>both</u> sides of the boards for late radios. Otherwise, jumpers must be added.	Band switch must be removed for modification.



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Board	Ref		Notes
A33	37	(High Power) The modification to use the vacuum relay omitted connection of CR-1 (1N4003) across relay windings to protect the switching transistor from spike damage. A foil cut and 2 jumpers are needed to connect CR-1. Capacitor C2 (.01), from +24 Volt to ground, was omitted due to circuit board foil trace conflicts. Install C2 under board at +24 V input jack.	
All	38	Wiring error in late radios. Torroid T-2 wound with single #22 wires instead of twisted pairs of #22 wires as in early radios. Overheating wire and torroid core due to 20 amp collector current. Rewind with 6 turns #18 wires (red/green bifilar) wound. Use Amidon FT-50-61 replacement core if original is damaged. Inductance of T-2 is still too low for 1.8 MHz operation, move capacitors C12 & C13 to +24 Volt end of L3 & L4.	Will improve efficiency and output 25 to 50 watts on 1.8 MHz and some on 3.5 MHz. Will prevent future capacitor damage if 1.8 MHz operation is done at over 100 watts.
A28	39	Add 1 μ f monolithic capacitor at +5 Volt input pin. short leads & mounted under board to reduce 100 KHz birdies in receiver on low bands.	
A3	40	Rear panel I.C. regulators. All plug connectors should be checked for loose pins. Most "tinned" color connector pins must be adjusted to make good contact.	



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Board	Ref		Notes
A15	41	Design error causes "1.5" position to rolloff at 800 Hz. Change R13, R14, R15 to 5.60K Ohms - R16, R17 to 7.87K Ohms, R18, R19, to 9.31K Ohms - C9 to .022150 μ f - C10 to .003221 μ f - C11 to low side of .022 μ f - C20 to low side of .033 μ f - C21 to .056440 μ f. Note that C12 and C13 remain at original .01 μ f sizes. Gold socket pins for the 7 resistors will allow corrections in cutoff frequencies if desired. Note that a true "2.4" KHz active filter is available at pin #7 of IC-3. The stop may be moved at the selector switch to provide one more position and the "Bypass", which was the "2.4" position, can now be designated as "X". A Berg pin is placed in the switch and a wire with connector run to one side of C21 which goes to pin #7 of IC-3.	
A26	42	Select CR-2 (1N270) diode) for minimum noise level when SPOT LEVEL control is set at maximum. Note that pin jacks are in place for this diode already.	
A26	43	Plug coax cable #168 into <u>only</u> the hot pin of the board jack to eliminate a buzz in the loudspeaker at zero audio gain due to ground loop. Coax shield of connector is not plugged in.	
A9	44	Microphone talk-thru into the receiver (on receive). Change Q13 from a 2N3904 to a 2N3563 type transistor that the circuit was originally designed for. Substitutes that also work are ECG-108, WEP-56, SK3452/108.	
A9	45	Meter reads down scale if CR-7 (1N270) is leaky.	
A5/A10	46	Remove R-19 (51 Ohms) from board A10. Add 51 Ohms, 1/4 watt across the input jack, J-10 of board A5. Standard on late radios.	Stabilizes amplifier.
A5	47	Resistors R26 and R27 (82 Ohms, 1 watt) overheat and go high in value, causing oscillations on some bands. Change to 2 watt size, carbon composition.	
A6	48	Low VOX sensitivity. Change R15 from 220K to 470K Ohms.	



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Board	Ref		Notes
A11	49	On early radios, R1, R2, R3, R4, R5, R6, R7, R8 were 1 watt composition type resistors. Late radios use 3 watt metal film type resistors for reliability.	
Tests	50	Receive audio gain. 10 millivolts into coax #186 (Removed from J10 on board A9) gives 18 mv across coax #55 on board A3 and 130 mv across a 4 Ohm loudspeaker with AF gain at maximum. CALIBRATE tone gives 4.3 volts across speaker.	
Chassis	51	On early radios, without the printed circuit boards on lower rear of chassis, use tooth type lockwashers on the A.C. socket to insure that the Green (A.C. Ground) safety wire is secure.	
Chassis	52	Early radios may have 1 or 2 .01 µf capacitors at the PHONES jack. Should be a single .001 µf.	
All	53	The use of MRF-422 transistors with BLUE dot codes will cause the amplifier to oscillate at low frequency in broadcast band. <u>Only</u> transistors with RED dot codes or ORANGE dot codes should be used. In some cases, YELLOW or GREEN dot codes will work perfectly if on low end of their Beta ranges.	
A5	54	Note that <u>only</u> the nut and bolt that hold transistor Q4 (2N5190) complete the Collector connection. Insure that nut is <u>tight</u> . Add jumper wire if the foil is already burned.	
A10	55	Add 10K Ohms from junction, CR3/CR4/R5, to ground to improve mixer turn-on timing.	Insures mixer is on before RF output starts.
A3	56	Change C12 & C18 from 0.1 µf to 1.0 µf and C27 from 0.1 µf to 0.22 µf to improve receiver audio amplifier frequency response.	
Notch Adjust Control	57	Early radios used a 5K Ohm, metal cased control. Later radios used 10K Ohm plastic control which makes adjustment too difficult. change this to 5K Ohms, A-B U5K type, lug or pin types will fit.	



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Board	Ref		Notes
A9	58	Frequency readout accuracy is poor due to use of a non-adjustable 10 MHz I.C. oscillator (Dale XO-33A). Change this to the factory optional High Accuracy oscillator, A9A, board. An adjustable 10 MHz TCXO may be used if arranged to plug into the existing 14 pin I.C. socket, much less costly.	
A33	59	The factory installed vacuum relay circuit, for the High Power Option, that replaces the reed type relay, K-2, does not use the receiver switching relay, K-1. When using an Auxiliary antenna, transmitter RF can damage receiver circuits. Relay K-1 should be installed, to ground the receiver input while transmitting. Magnecraft W172 DIP-8, Magnecraft W172 DIP-4, ECG RLY-F71C24 relays are suitable. Coil is wired in parallel with K-2.	
A1-PTO's	60	Early radios used 560 Ohms for R-17, but Q-1 transistor had to be selected to insure reliable starting of oscillator. Some used type J308 transistors as Q-1. Late production changed R-17 to 330 Ohms so that almost any J310 transistor would work properly.	Note that C11 is not on late circuit boards.
A9	61	Due to a board etching error, capacitors C-28 and C-29 are in parallel, 1 μ f, instead of series 2.2 μ f as in the CX-11. Since the AGC voltage changes polarity across the capacitors, non-polarized types are required instead of the existing tantalum type. SLOW AGC is improved if both C-28 and C-29 are 1.5 μ f, monolithic types is preferred.	
A17	62	The level of 100 Hz tones on low bands may sometimes be reduced by setting the synthesizer voltage, as described in step #14 of alignment list, at 69 MHz, to higher than the 8.0 Volts specified. Up to 10 Volts may be used, with reduction in the tone levels. Insure that Volts at 41 MHz end of the range has enough control also.	



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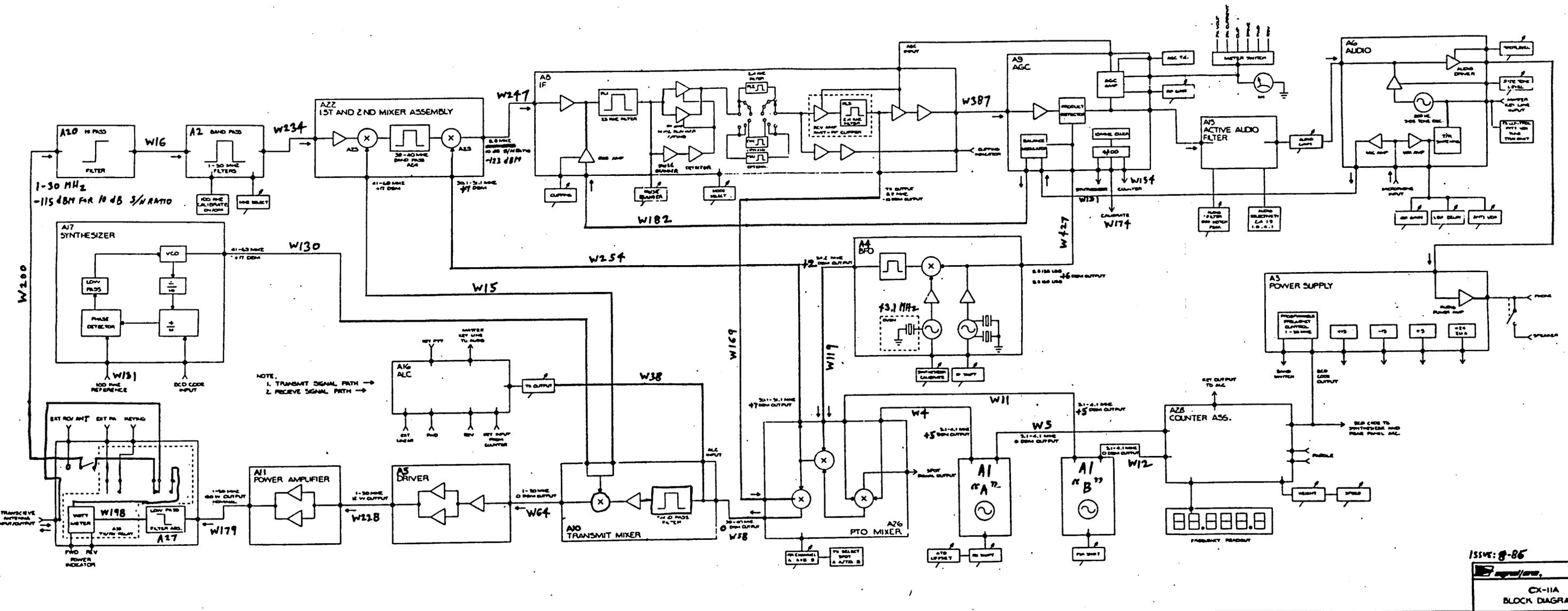
Board	Ref		Notes
A9	63	In early radios, CR-16 and CR-17 were 1N456 diodes and R59 was 330 Ohms. This allowed some carrier on SSB to leak through. Late radios used PIN type diodes, MPN-3500, for CR-16 and CR-17 and R59 was 1.2K Ohms to reduce the carrier leak. Type BA-282 diodes may be used, since the MPN-3500 type is no longer made, and was replaced with a larger plastic cased type MPN-3400 series which do not fit as well.	
A9	64	Early radios did not have the control to adjust "S-1" with 1 microvolt input. A 1K Ohm trimpot was added and Q-4 transistor was rewired to a "Gain" type amplifier stage, in all late radios. Q4 was changed from a metal cased 2N5179 transistor to a 2N3904 plastic type transistor.	
Chassis	65	Although the main fuse holder is marked "MDX-7A SB", a 10 amp fuse is now specified. The factory used MDL-10 fuses, but these are rated to open with less than 32 Volts. The proper fuse <u>must</u> be rated at 125 Volts or higher. A ceramic body fuse such as Buss ABC-10, a fast blow type, works well.	



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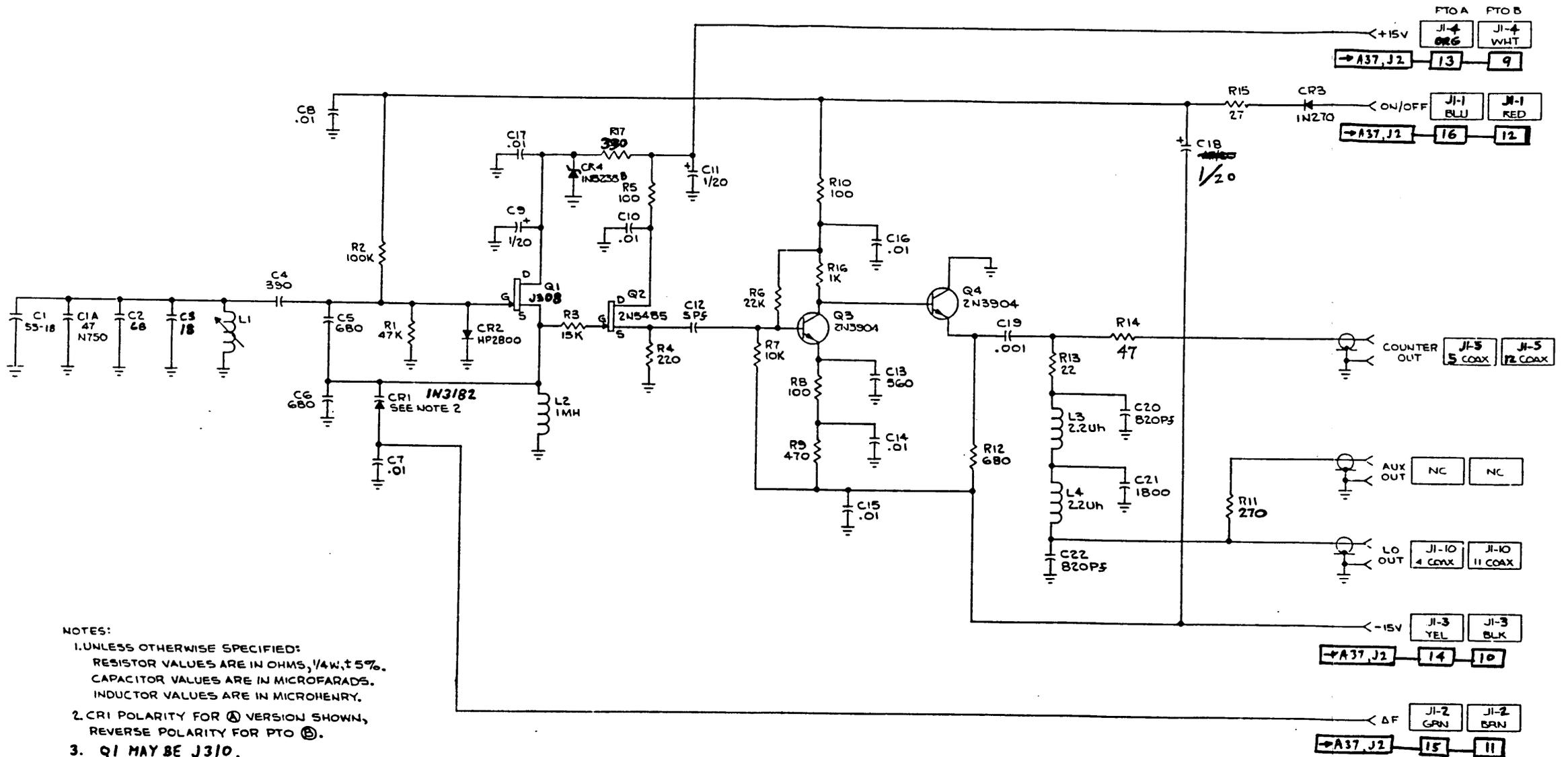
Section 5

Schematic and Drawings



ISSUE: 8-86

CX-11A
BLOCK DIAGRAM
HIGH POWER



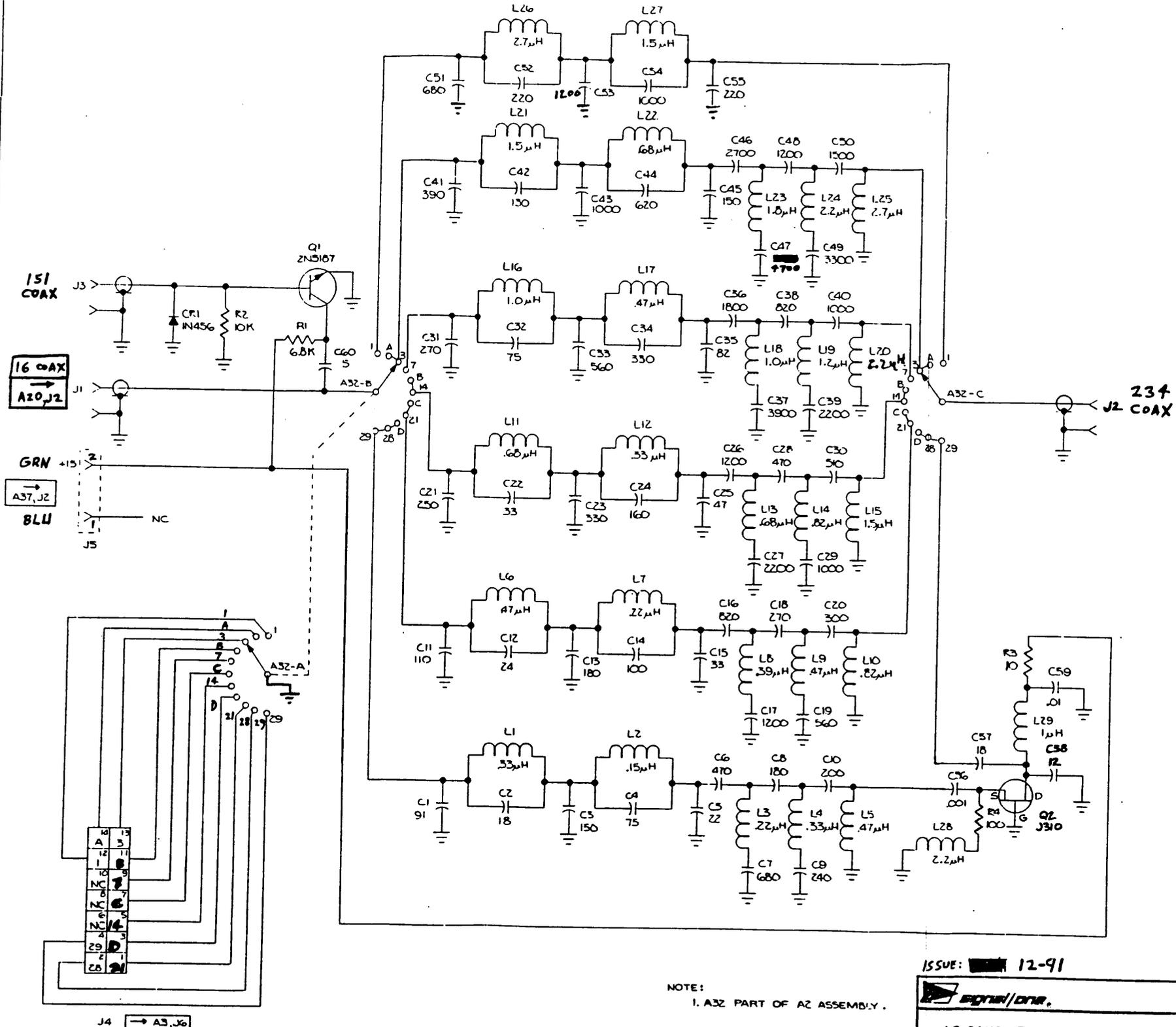
NOTES:

1. UNLESS OTHERWISE SPECIFIED:
RESISTOR VALUES ARE IN OHMS, 1/4W, ±5%.
CAPACITOR VALUES ARE IN MICROFARADS.
INDUCTOR VALUES ARE IN MICRohenRY.
2. CR1 POLARITY FOR (A) VERSION SHOWN,
REVERSE POLARITY FOR PTO (B).
3. Q1 MAY BE J310.
4. SELECT C18 FOR TRAILING EDGE CW SHAPING.

 **AI**
PERMEABILITY TUNED OSC.

NOTES:

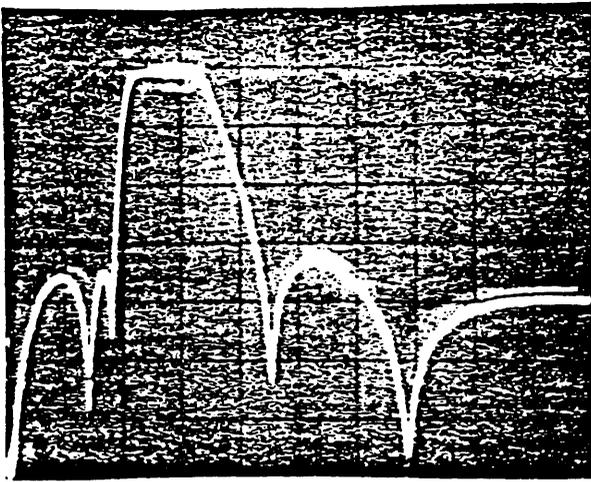
- 2. SWITCHES "B" AND "C" ARE NOT DRAWN WITH CONTACTS IN CORRECT SEQUENCE. SWITCH "A" IS CORRECTED.
- 3. REAR WAFER IS A32A.
- 4. C58 IS 5.5-18 PF CERAMIC TRIMMER IN LATE MODELS.



NOTE:
1. A32 PART OF A2 ASSEMBLY.

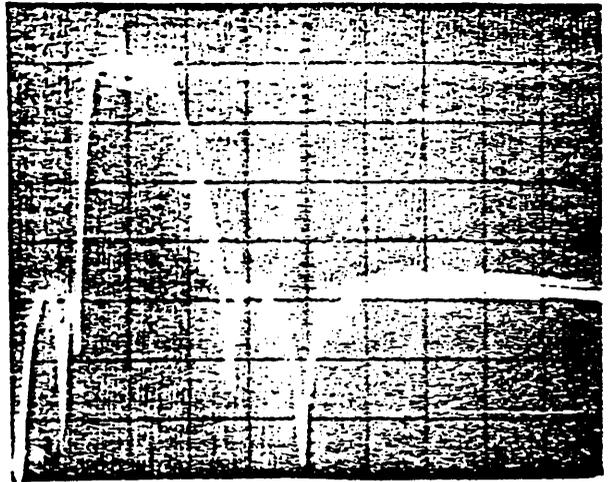
ISSUE: 12-91

A2 BAND PASS FILTER
A32 A, B, C-MHZ SWITCH



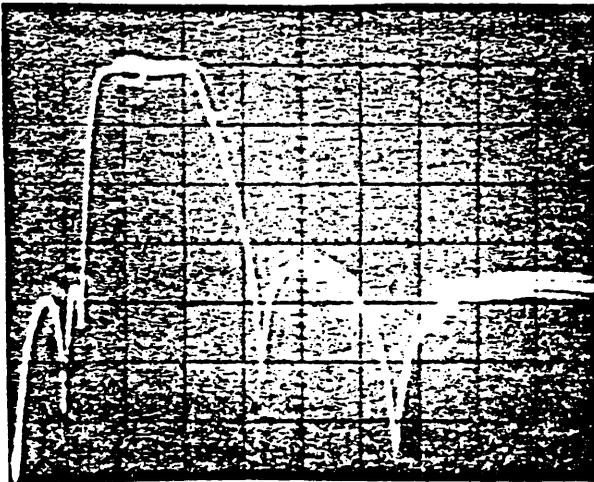
33 - 23 MHz.
10 MHz/DIV. MARKER 30 MHz.

(D) 22 - 28, 29



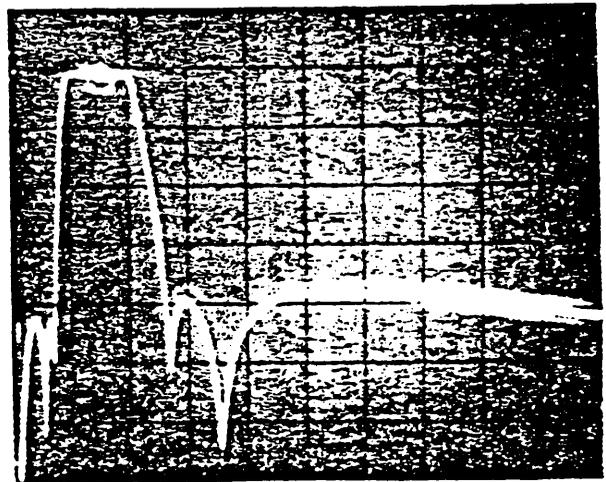
25 - 14 MHz.
10 MHz/DIV. MARKER 20 MHz.

(C) 15 - 21



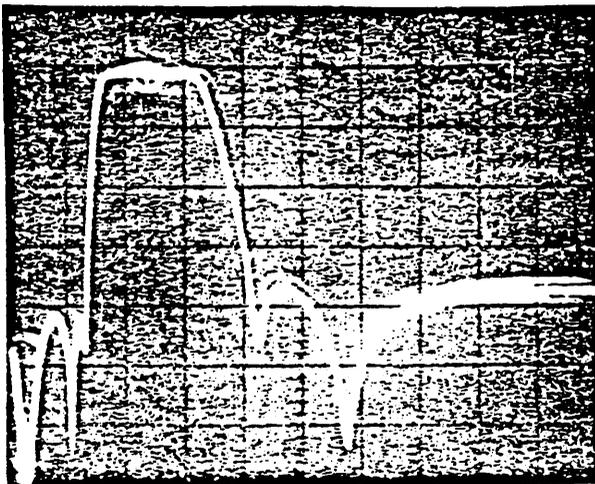
15 - 8 MHz.
5 MHz/DIV. MARKER 10 MHz.

(B) 8 - 14



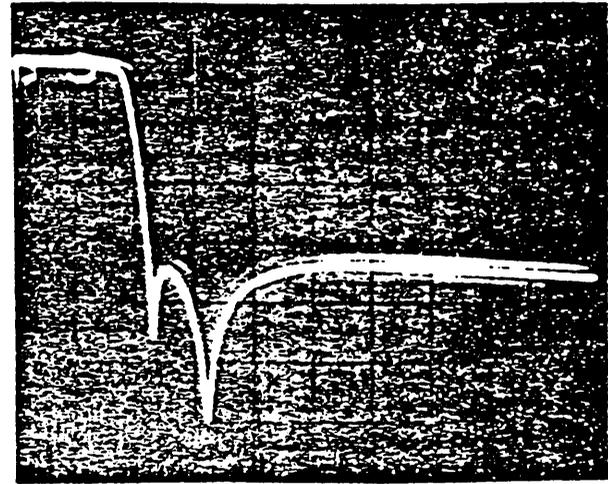
9 - 5 MHz.
5 MHz/DIV. MARKER 7 MHz.

7 MHz



5 - 3 MHz.
2 MHz/DIV. MARKER 4 MHz.

3, A - 45, 6

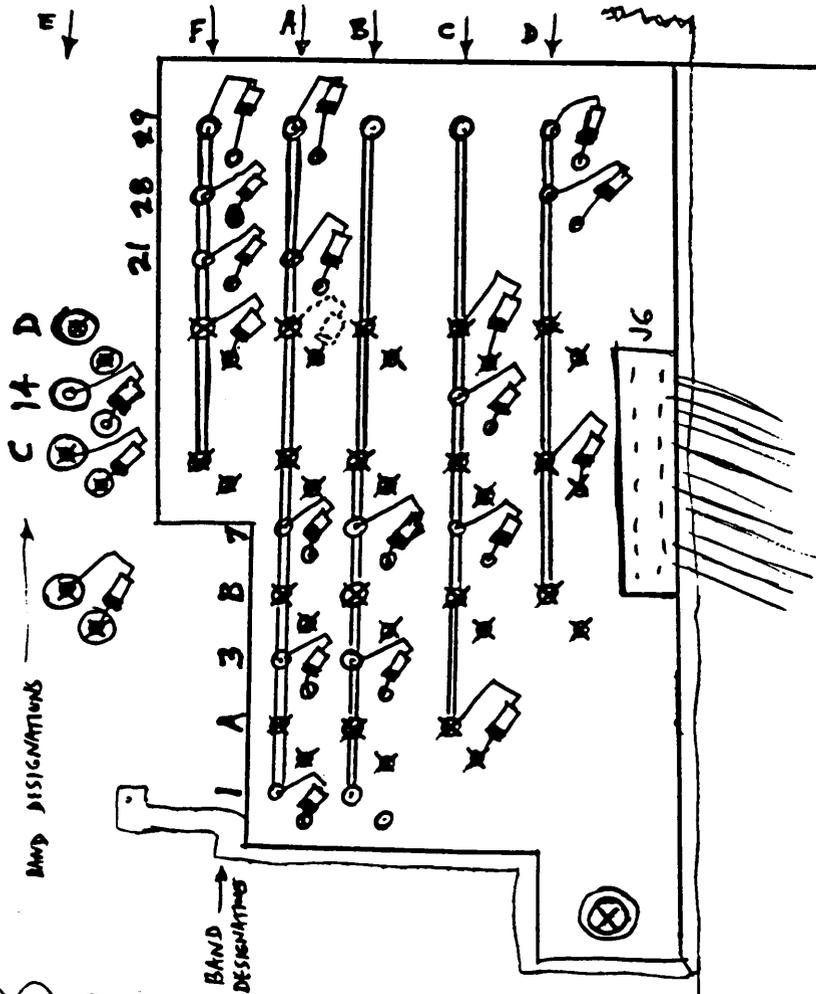


3 - 0 MHz.
2 MHz/DIV. MARKER 2 MHz.

1 or 2 MHz

CX-11A POWER BOARD A-3

-10- -20- -1- -2- -4- -8- = DIGITS OF FREQUENCY BAND



DIGITS	BAND
20 + 1 + 8	= 29 MHz
20 + 8	= 28
20 + 1	= 21
20 + 4	= 24
10 + 4	= 14
10 + 8	= 18
1 + 2 + 4	= 7
10	= 10
1 + 2	= 3
4	= 4
1	= 1 MHz

⊗ = SOCKET PIN PLUG-IN

⊙ = SOLDERED IN POINTS

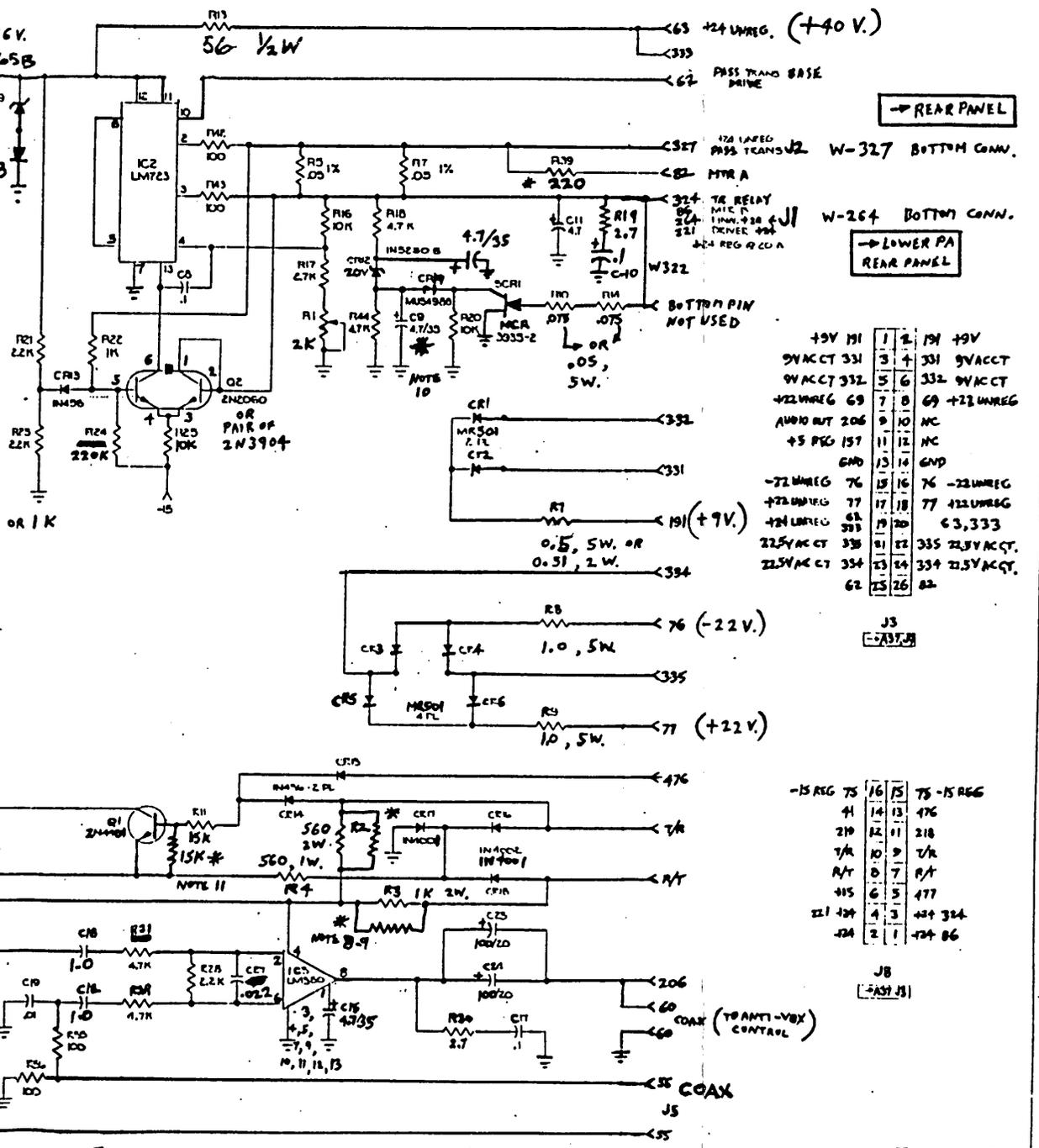
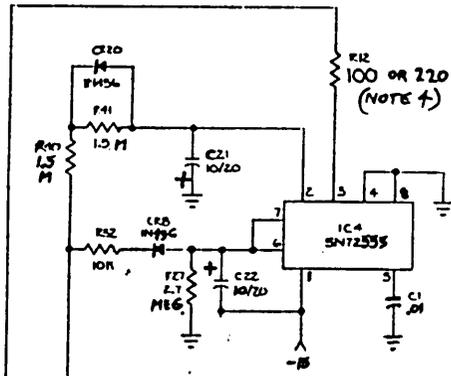
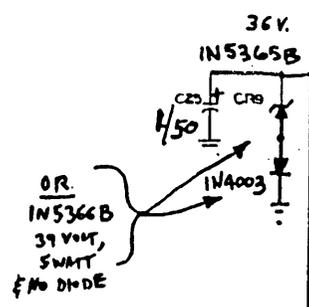
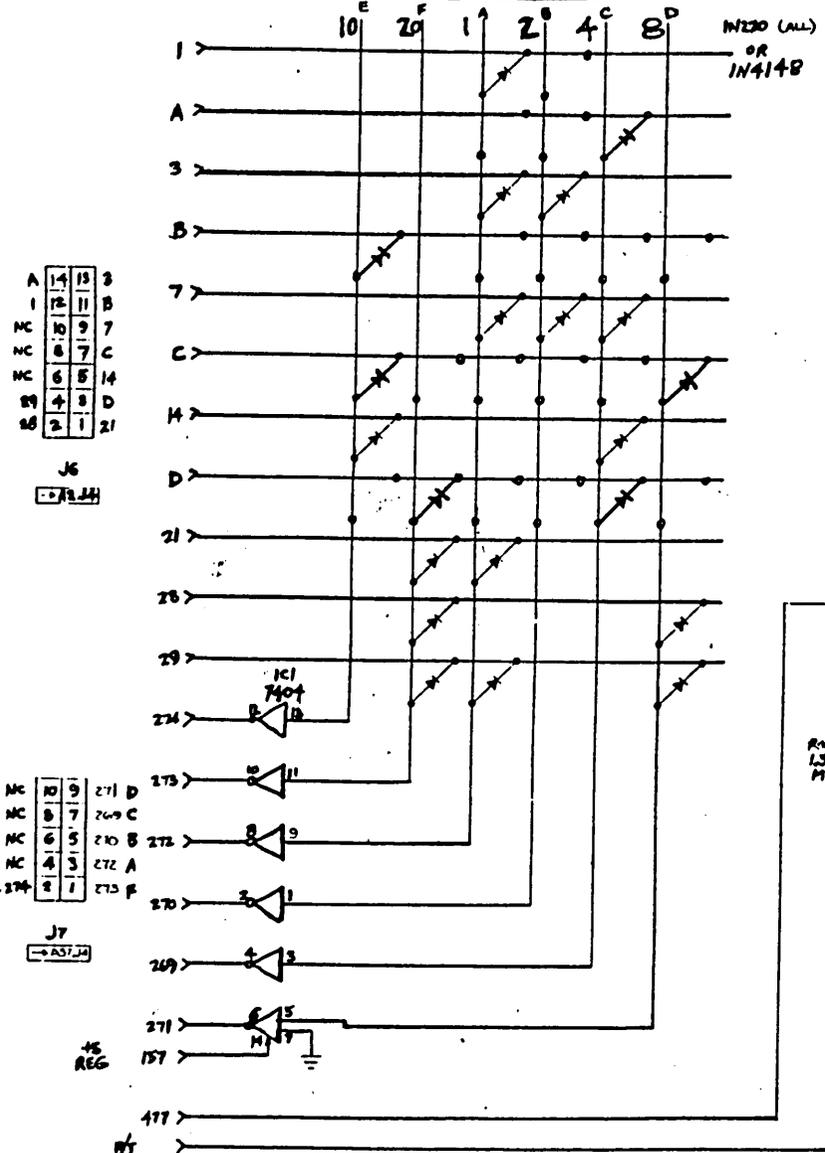
⏏ = 1N270, CATHODE IS BANDED

⏏ = REMOVED DIODE

VIEW FROM COMPONENT SIDE OF BOARD

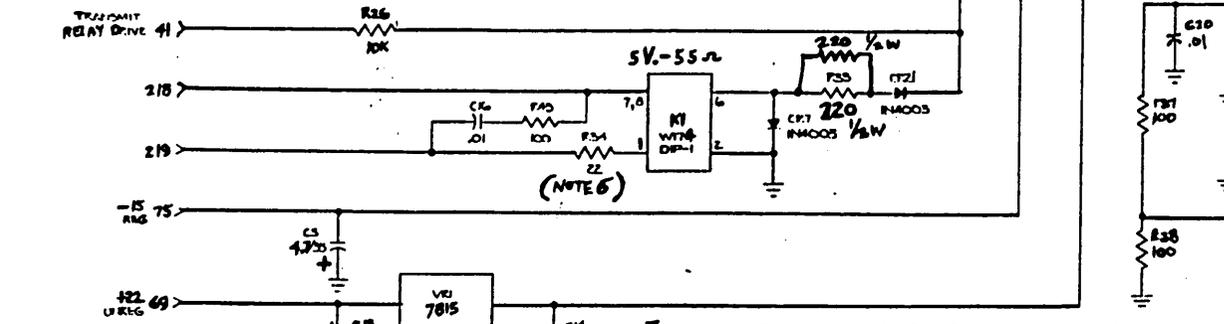
NOTE: TO CHANGE BAND "D" FROM 25 MHz TO 24 MHz, REMOVE PLUG-IN DIODE FROM ROW A (VERTICAL ROW) ON THE "D" HORIZONTAL ROW. THIS REMOVES 1 DIGIT.

BAND DIGITS



19V 191	1	2	19V 19V
9V ACCT 331	3	4	331 9V ACCT
9V ACCT 332	5	6	332 9V ACCT
+22V REG 69	7	8	69 +22V REG
AUDIO OUT 206	9	10	NC
+5 REG 157	11	12	NC
GND	13	14	GND
-22V REG 76	15	16	76 -22V REG
+22V REG 77	17	18	77 +22V REG
+24V REG 333	19	20	333, 333
22.5V ACCT 338	21	22	338 22.5V ACCT
22.5V ACCT 334	23	24	334 22.5V ACCT
62	25	26	62

15 REG 75	16	15	75 -15 REG
41	14	13	476
219	12	11	218
T/R	10	9	T/R
R/T	8	7	R/T
415	6	5	477
21	4	3	474 324
74	2	1	74 86

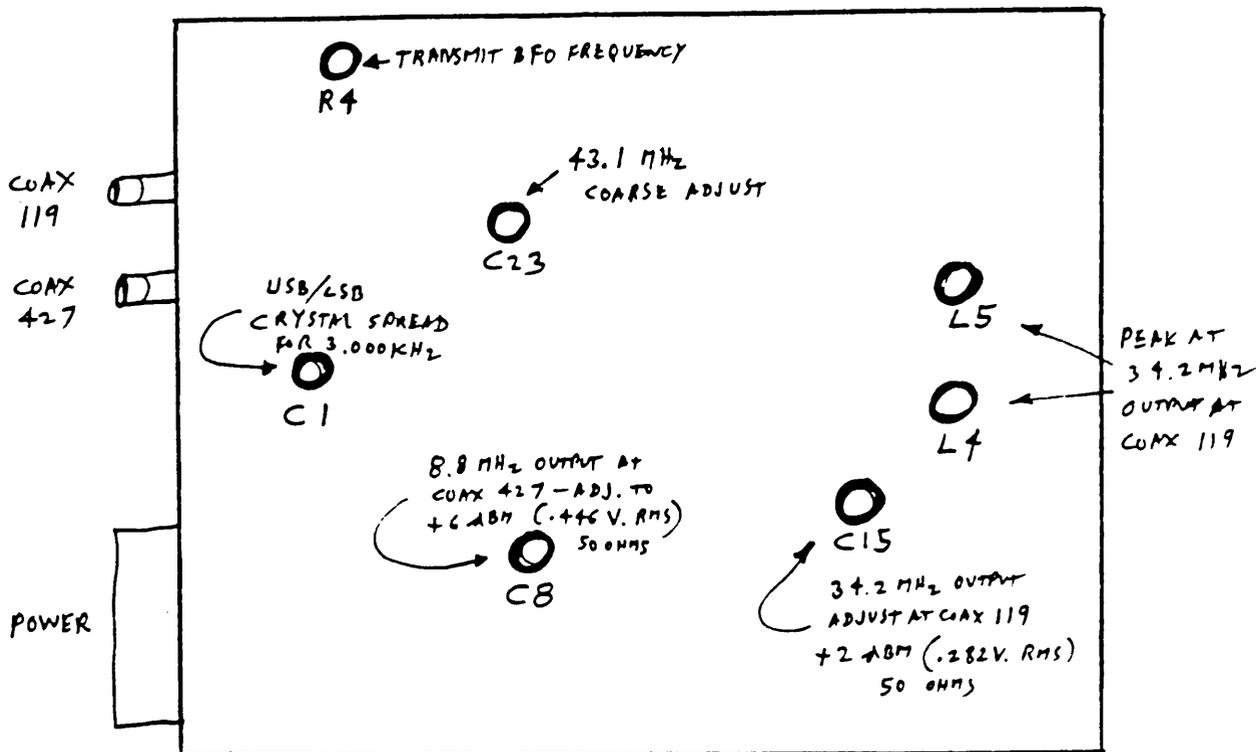


- NOTES:**
1. R39 SELECTED (100 TO 270 OHMS) TO CORRECT PA. METER TO 0-50 AMPS RANGE [TOTAL MUST BE 1215 OHMS WITH R47 & R48]
 2. R2, A3, R4, CR16, R7, R8 SELECTED TO GIVE T/R VOLTAGE OF +.03 TO +.1 V. ON TRANSMIT & R/T TO 0 ON RECIVE.
 3. CR9 IS SELECTED WITH/WITHOUT DIODE FOR +30V TOTAL OR LESS (HPT).
 4. R12 VARYS WITH TYPE OF RELAY - USED ON A1B (VOLTAGE OF COIL). 220 OHMS PER 5 V. COILS. - 100 OHMS FOR 12V. COILS. - 1K FOR DISPLAYS.
 5. KEY MARKING ON BOARD FOR Q2 IS 180 REVERSED.
 6. CHANGE R34 TO 100 J, 2W FOR ALPHA AMPLIFIERS - 27 J, 1W FOR HENRYS.
7. CR-19 MAYBE MBS-4991.
8. R3 MAYBE ORIGINAL 1K OHM, 2W WITH PARALLEL RESISTOR.
9. R2 MAYBE ORIGINAL 560 OHM, 2W WITH PARALLEL RESISTOR.
10. C9 REMOVED IN ALL LATE MODELS.
11. 15K ADDED ON LATE MODELS.

12. CHANGE C12 + C18 FROM 0.1 TO 1.0 UFD AND C27 FROM 0.1 TO .022 UFD TO IMPROVE AUDIO.

CX-11A BFO ASSEMBLY A-4

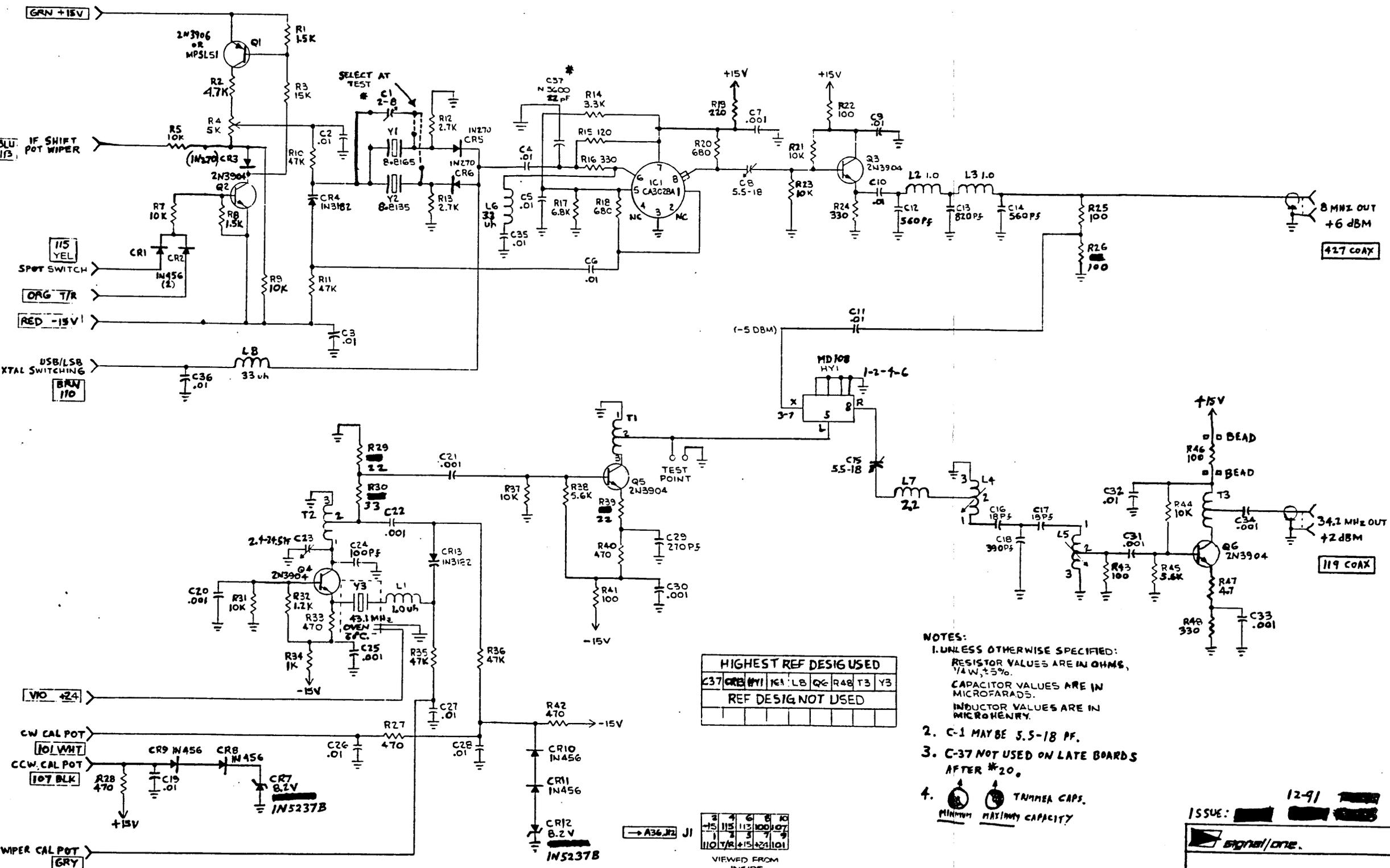
CONTROL LOCATIONS



NORMAL USB = 8816.500 KHz

LSB = 8813.500 KHz

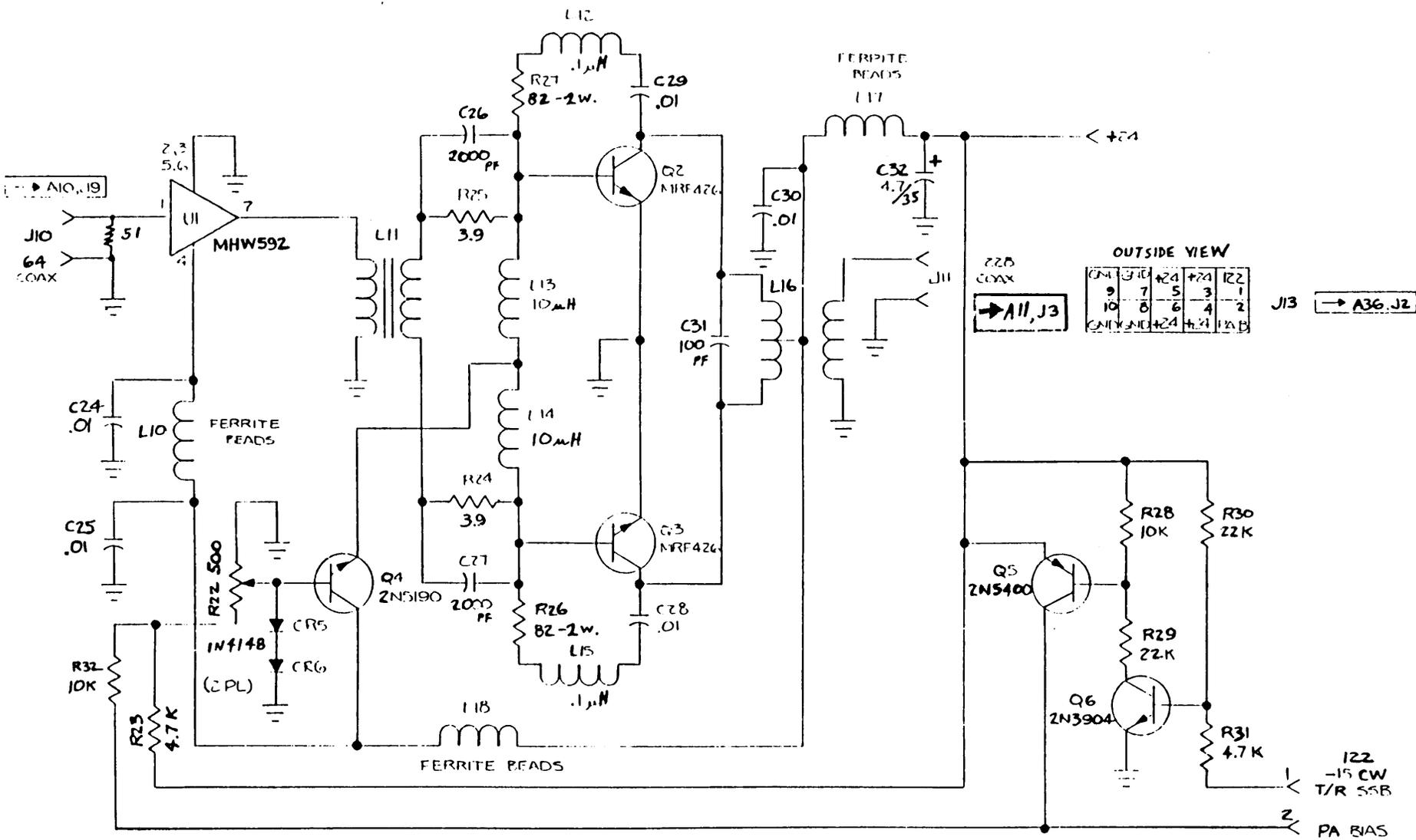
1. MONITOR AT JACK FOR COAX 427. PRESS "SPOT" BUTTON TO ACTIVATE TRANSMIT BFO ADJUSTMENT R-4.
2. INSURE THAT AT LEAST ONE COAX CABLE IS ATTACHED AT ALL TIMES IF BOX IS LOOSE FROM CHASSIS DUE TO NO GROUND WIRE IN POWER PLUG.



HIGHEST REF DESIG USED						
C37	CR1	Y1	Y2	Y3	Q6	Q5
REF DESIG NOT USED						

- NOTES:
- UNLESS OTHERWISE SPECIFIED: RESISTOR VALUES ARE IN OHMS, 1/4 W, 5%. CAPACITOR VALUES ARE IN MICROFARADS. INDUCTOR VALUES ARE IN MICROHENRY.
 - C-1 MAYBE 5.5-18 PF.
 - C-37 NOT USED ON LATE BOARDS AFTER #20.
 - TUNMER CAPS. MINIMUM MAXIMUM CAPACITY

VIEWED FROM INSIDE BFO ENCLOSURE

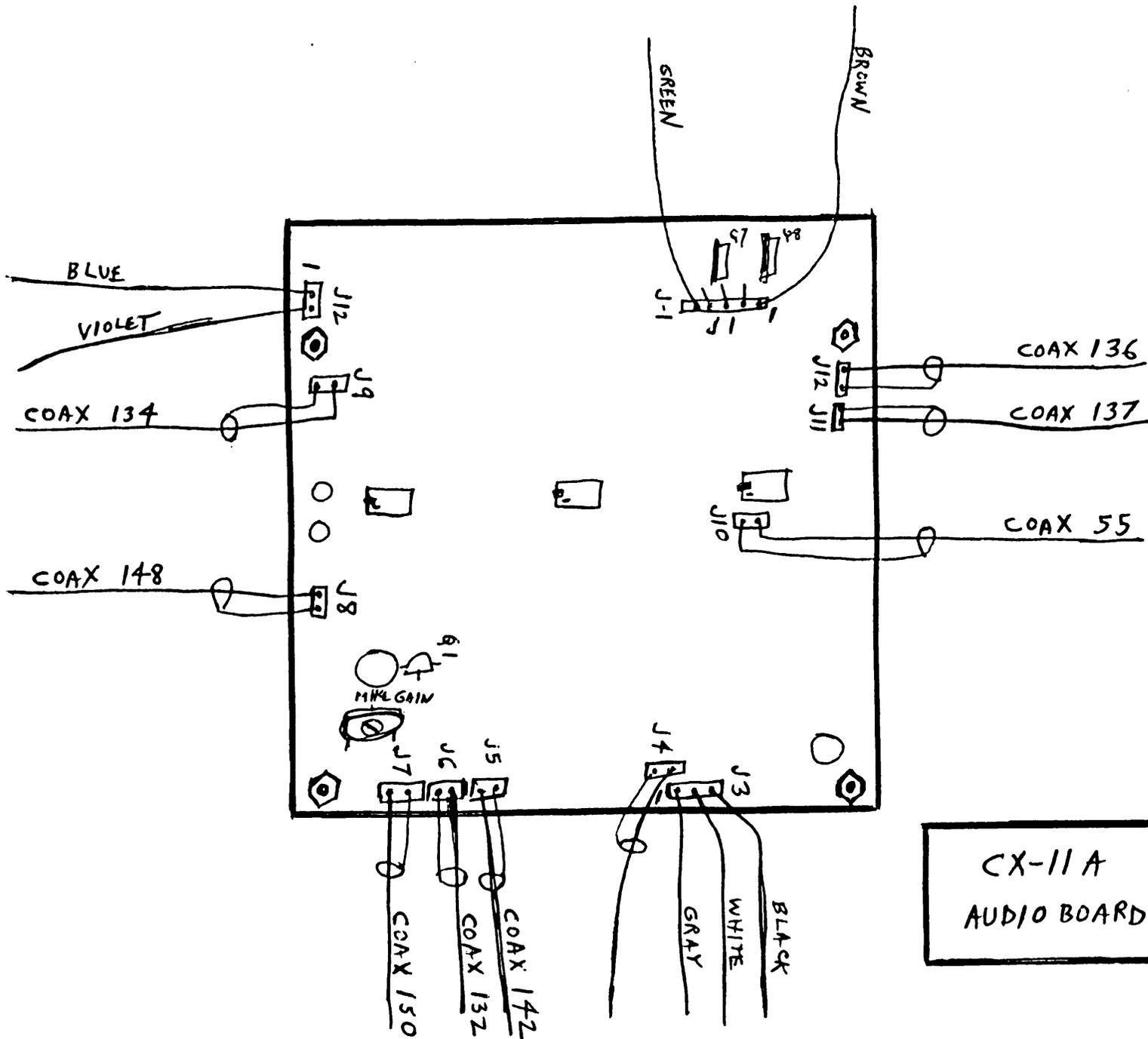


- NOTES: 1. CR5 & CR6 TOUCH Q2 & Q3.
 2. IF 51 OHMS ACROSS J10, R19 MUST BE REMOVED FROM BOARD A10.
 3. CHANGE R22 AND R27 TO 2 WATTS.

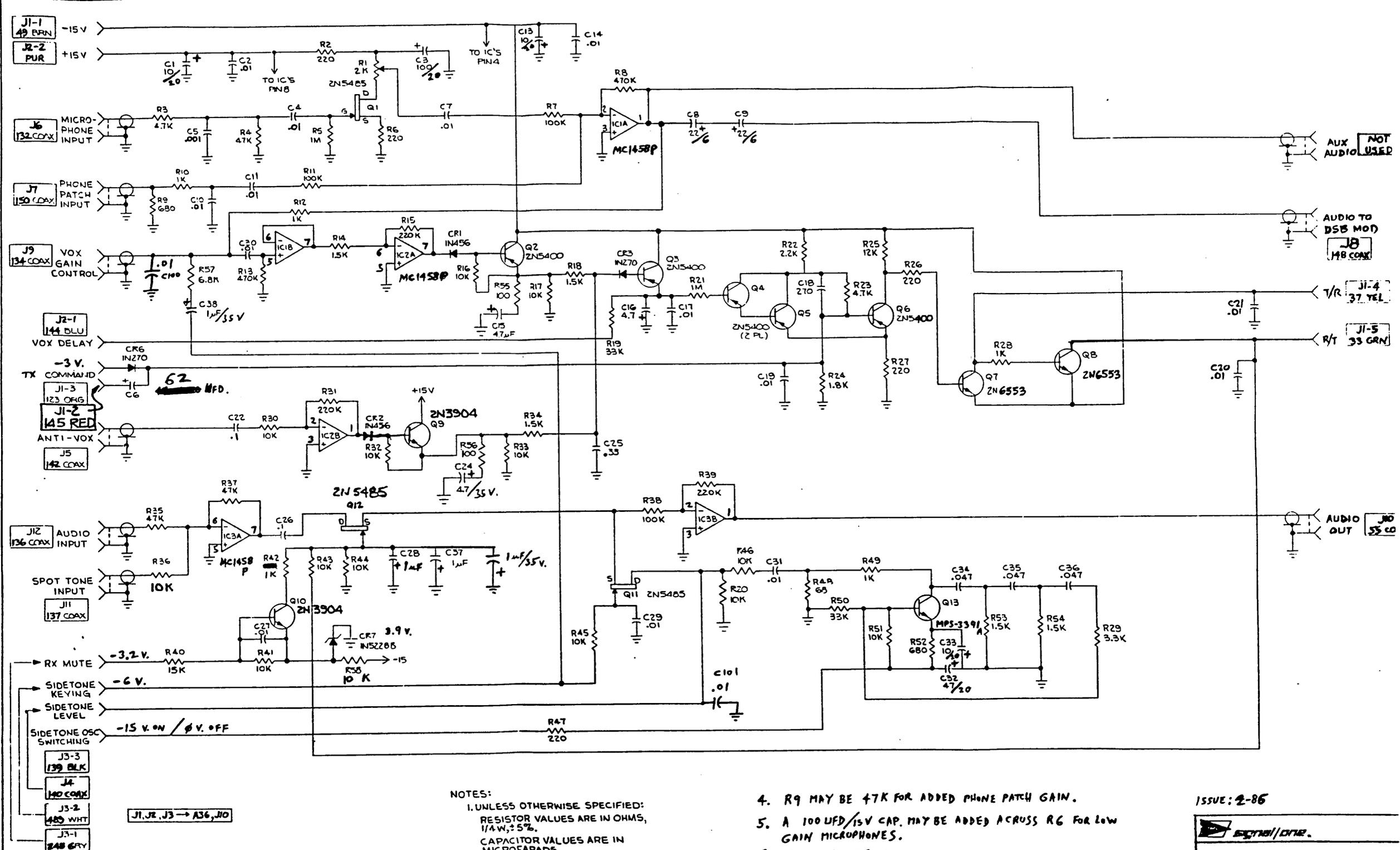
ISSUE: ~~12-91~~ 12-91



A5
 DRIVER AMPLIFIER



CX-11A
AUDIO BOARD A6

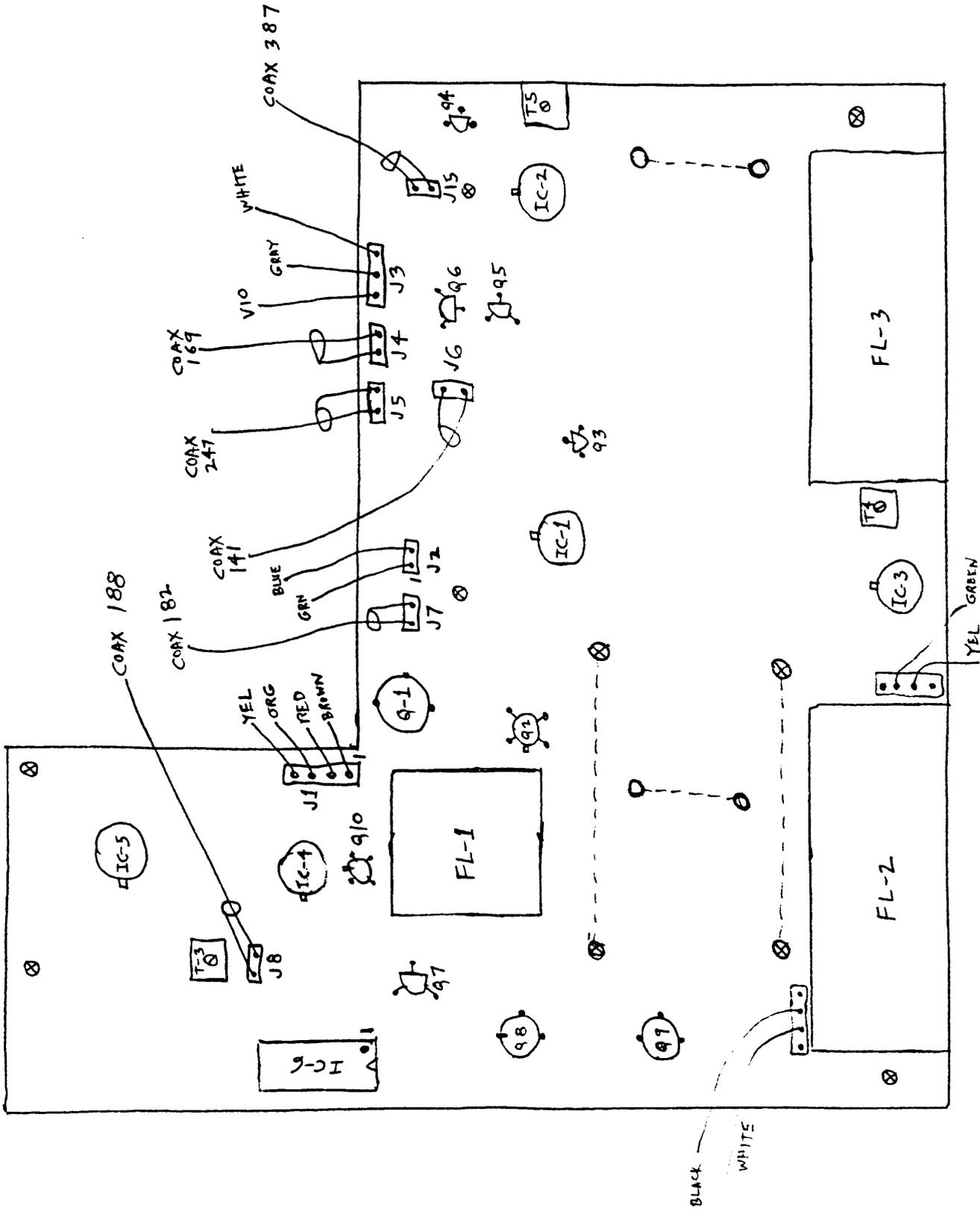


- NOTES:
1. UNLESS OTHERWISE SPECIFIED: RESISTOR VALUES ARE IN OHMS, 1/4 W, ±5%. CAPACITOR VALUES ARE IN MICROFARADS.
 2. C6 ORIGINALLY WAS 22 UFD.
 3. C100 AND C101 ARE LATE MODEL ADDITIONS.

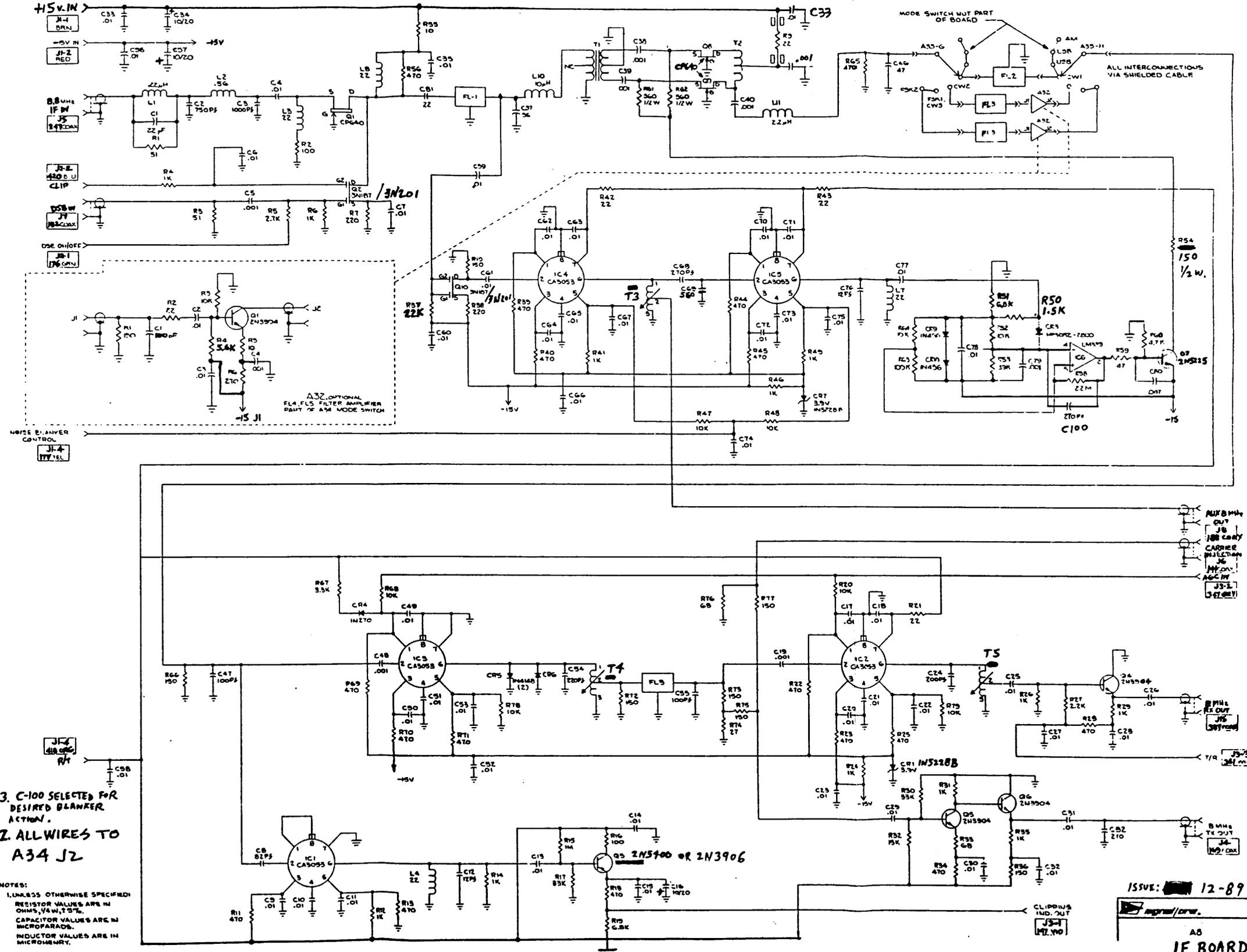
4. R9 MAY BE 47K FOR ADDED PHONE PATCH GAIN.
5. A 100 UFD/15V CAP. MAY BE ADDED ACROSS R6 FOR LOW GAIN MICROPHONES.
6. Q2 THRU Q6 2N3906 OR 2N5400.
7. OLD UNITS - R36 WAS 4.7K - CHANGE TO 10K.
8. LATEST UNITS - R40 WAS 47K - CHANGE TO 15K.

ISSUE: 2-86

AG
AUDIO BOARD



IF BOARD - A8
CX-11A

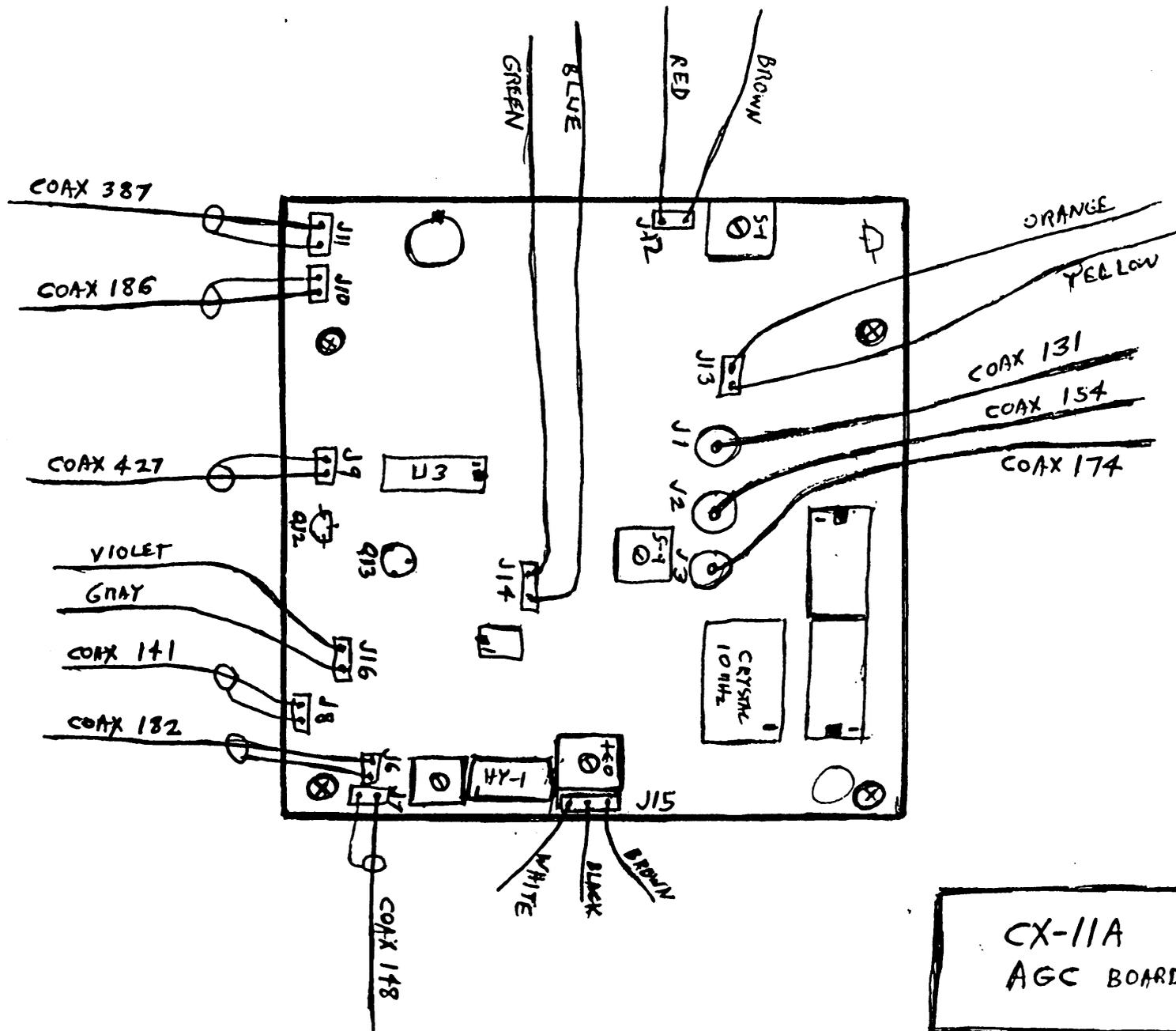


3. C-100 SELECTED FOR DESIRED BLANKER ACTION.
 2. ALL WIRES TO A34 J2

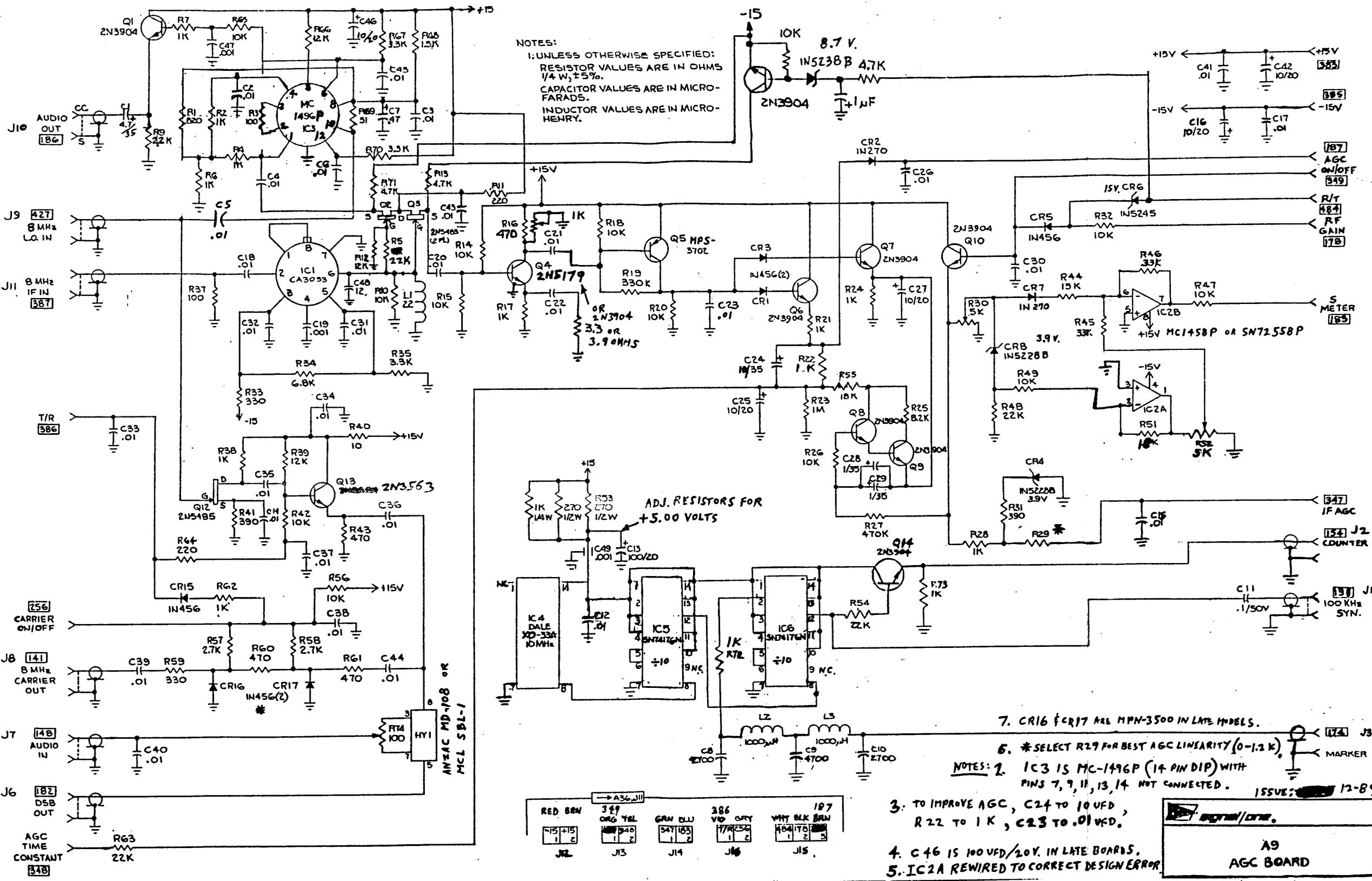
NOTES:
 1. UNLESS OTHERWISE SPECIFIED, RESISTOR VALUES ARE IN OHMS, K=10³, M=10⁶. CAPACITOR VALUES ARE IN MICROFARADS. INDUCTOR VALUES ARE IN MICROHENRY.

ISSUE: 12-89

AS IF BOARD



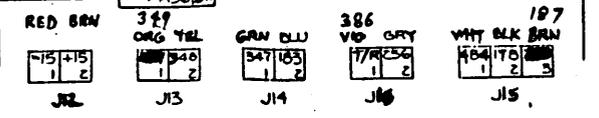
CX-11A
AGC BOARD A9



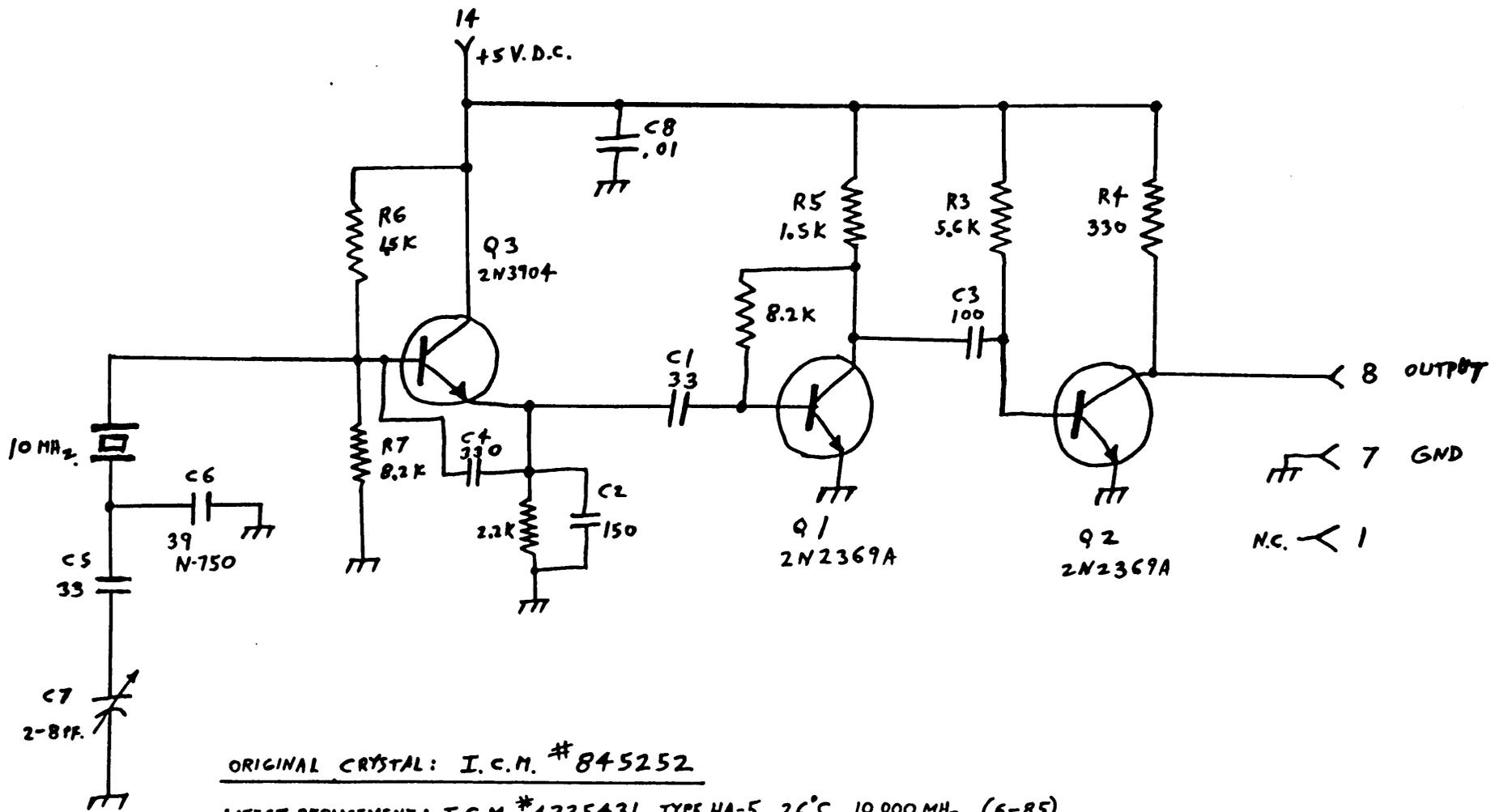
NOTES:
 1. UNLESS OTHERWISE SPECIFIED:
 RESISTOR VALUES ARE IN OHMS
 1/4 W, ±5%.
 CAPACITOR VALUES ARE IN MICRO-
 FARADS.
 INDUCTOR VALUES ARE IN MICRO-
 HENRY.

ADJ. RESISTORS FOR
 +5.00 VOLTS

- 7. CR16 & CR17 ARE MPN-3500 IN LATE MODELS.
- 8. *SELECT R29 FOR BEST AGC LINEARITY (0-1.2K).
- NOTES: 2. IC3 IS MC-1496P (14 PIN DIP) WITH PINS 7, 9, 11, 13, 14 NOT CONNECTED.
- 3. TO IMPROVE AGC, C24 TO 10 UFD, R22 TO 1K, C23 TO .01 UFD.
- 4. C46 IS 100 UFD/20V. IN LATE BOARDS.
- 5. IC2A REWIRED TO CORRECT DESIGN ERROR.



ISSUE: 12-89
**A9
 AGC BOARD**



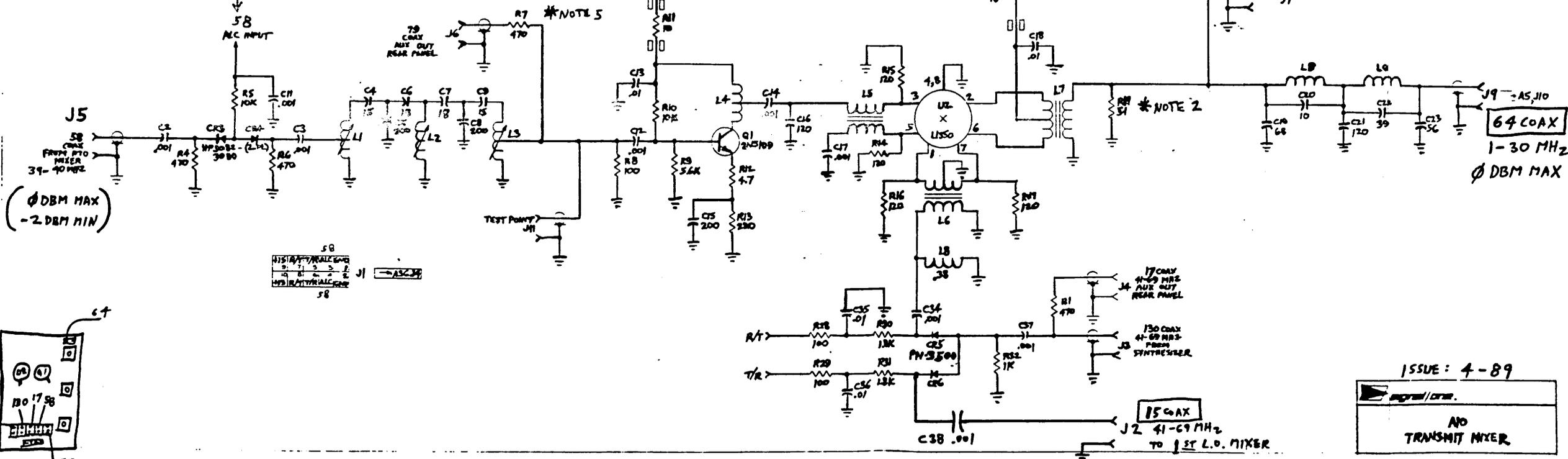
SIGNAL/ONE CX-11A

A9A OPTIONAL PLUG-IN
BOARD TO I.C. CRYSTAL
SOCKET OF AGC BOARD A-9

6-81 MFG.

(ALC FROM A16)

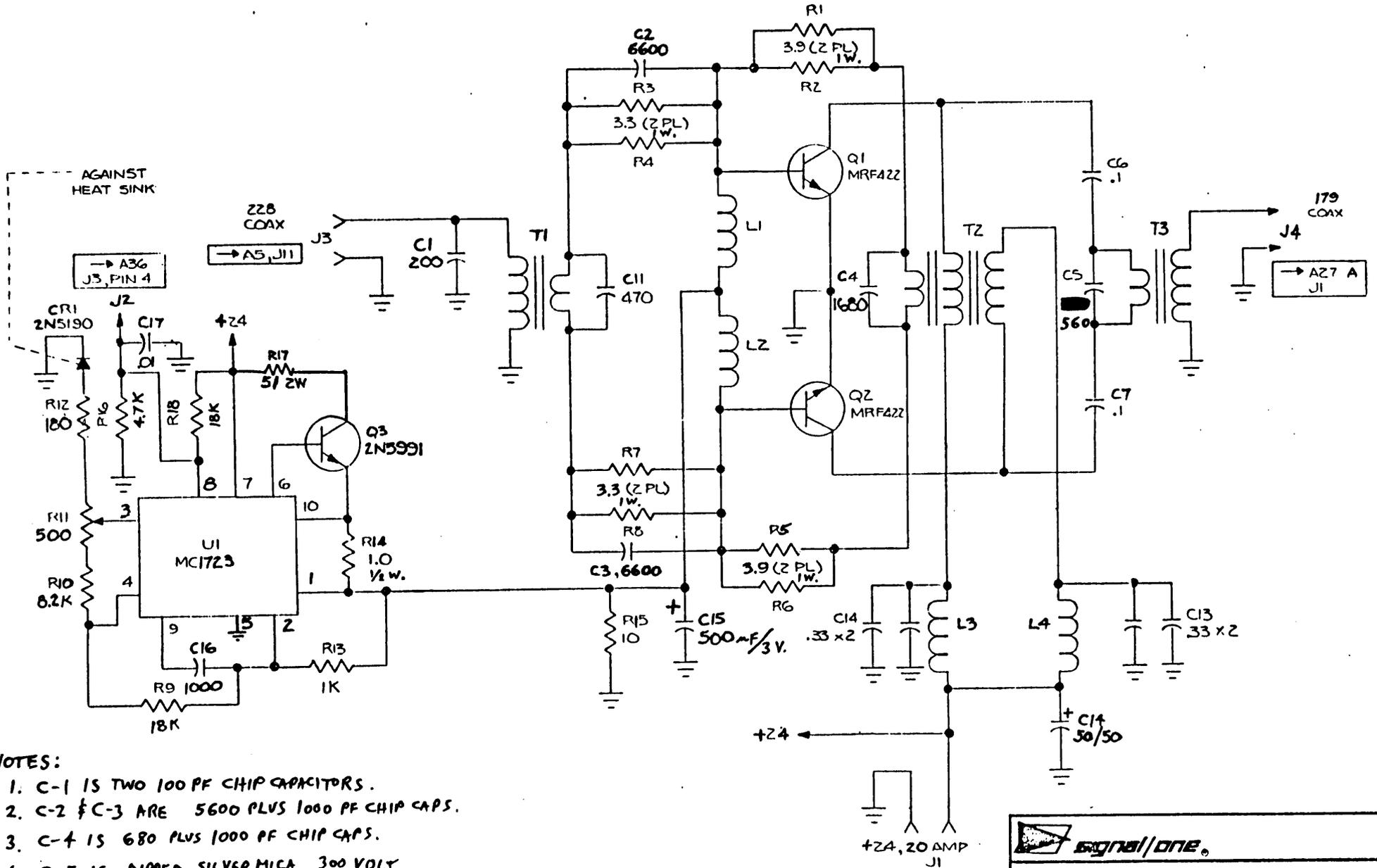
130 ↑
1K
DRIVE CONTROL



- NOTES: 1. BOARD IS LOCATED ON HEAT SINK WITH DRIVER BOARD.
 2. R19 REMOVED ON LATE MODELS AND PLACED AT INPUT JACK OF DRIVER BOARD, A5:
 3. Q3 CIRCUIT WAS REWIRED IN LATE MODELS, BUT SHOULD BE RETURNED TO THIS ORIGINAL CIRCUIT.
 4. THIS DRAWING CORRECTS ORIGINAL ERRORS ON COMPONENT DESIGNATIONS.
 5. R7 AND COAX ON BOARD WAS NOT INSTALLED ON LATE MODELS TO REDUCE LEAKAGE. COAX 79 IS STILL IN PLACE.

ISSUE: 4-89

NO
TRANSMIT MIXER

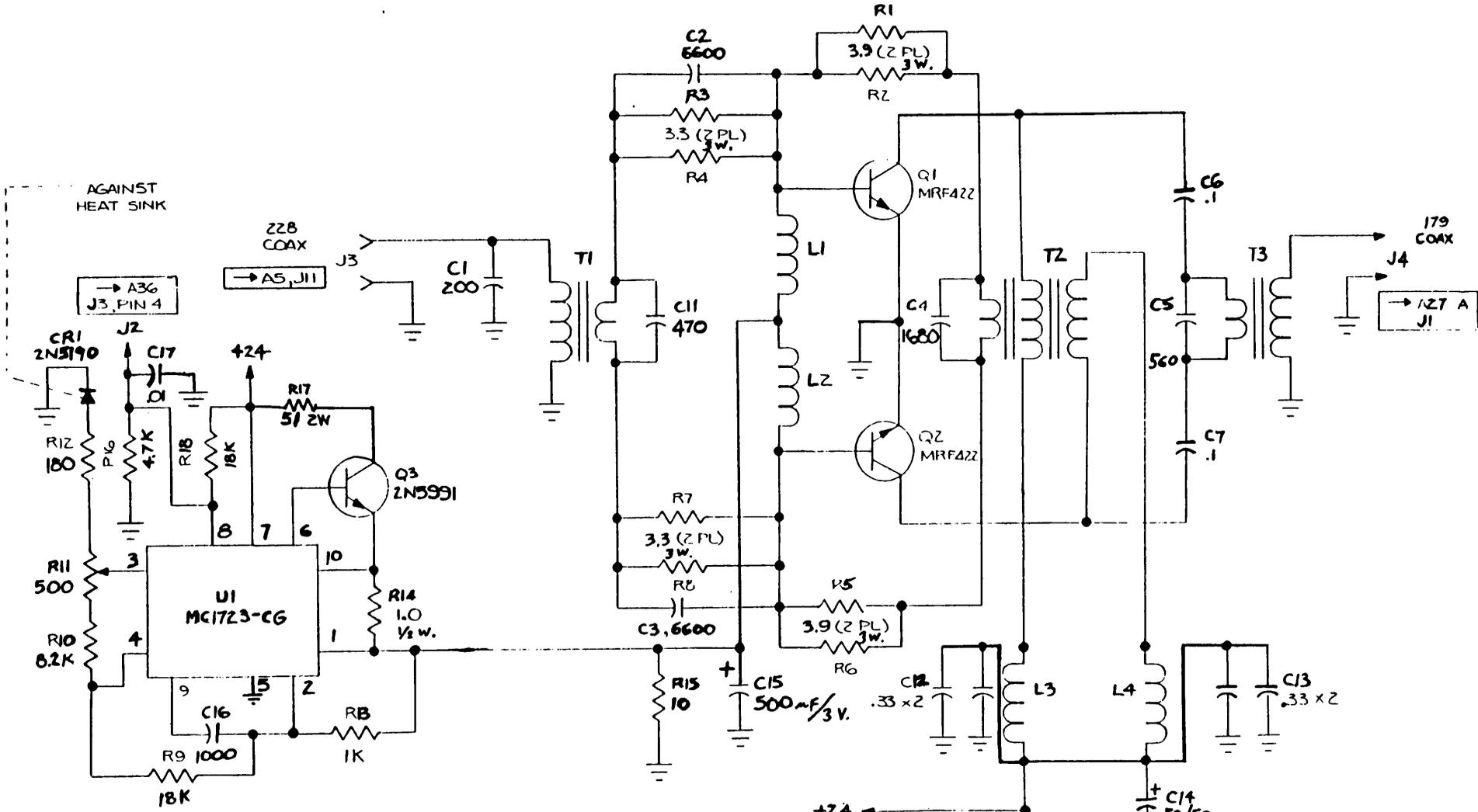


NOTES:

1. C-1 IS TWO 100 PF CHIP CAPACITORS.
2. C-2 & C-3 ARE 5600 PLUS 1000 PF CHIP CAPS.
3. C-4 IS 680 PLUS 1000 PF CHIP CAPS.
4. C-5 IS DIPPED SILVER MICA, 300 VOLT.



ALL FINAL AMPLIFIER



AGAINST HEAT SINK

→ A36 J3, PIN 4

→ A5, J11

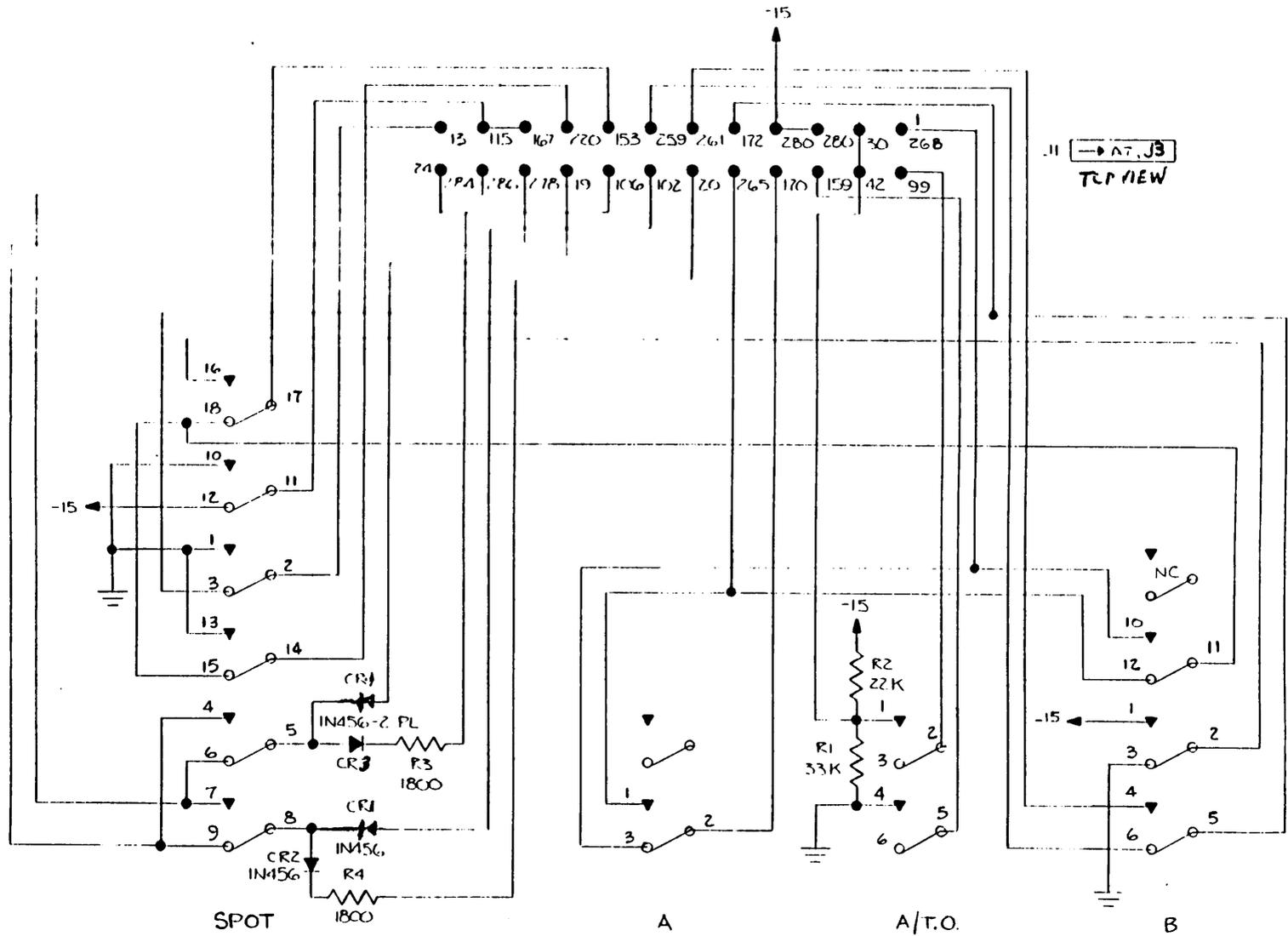
179 COAX
→ 127 A J1

- NOTES:**
1. C-1 IS TWO 100 PF CHIP CAPACITORS.
 2. C-2 & C-3 ARE 5600 PLUS 1000 PF CHIP CAPS.
 3. C-4 IS 680 PLUS 1000 PF CHIP CAPS.
 4. C-5 IS DIPPED SILVER MICA, 300 VOLT.
 5. R-17 MAYBE 3 WATT; OR 47Ω OR PARALLEL 100 OHMS;
OR 39 OHMS-5 WATT IN LATEST UNITS FOR IMPROVED BIAS STABILITY.
 6. C-12 AND C-13 MAYBE SINGLE .68 UF CHIPS IN LATEST PRODUCTION UNITS.
 7. C-12 AND C-13, ORIGINALLY CONNECTED TO T-2 SIDE OF L3 & L4, MAY BE MOVED TO +24 VOLT SIDE FOR IMPROVED 1.8 MHz OPERATION.

LATEST PRODUCTION UNITS

ISSUE: 12-89

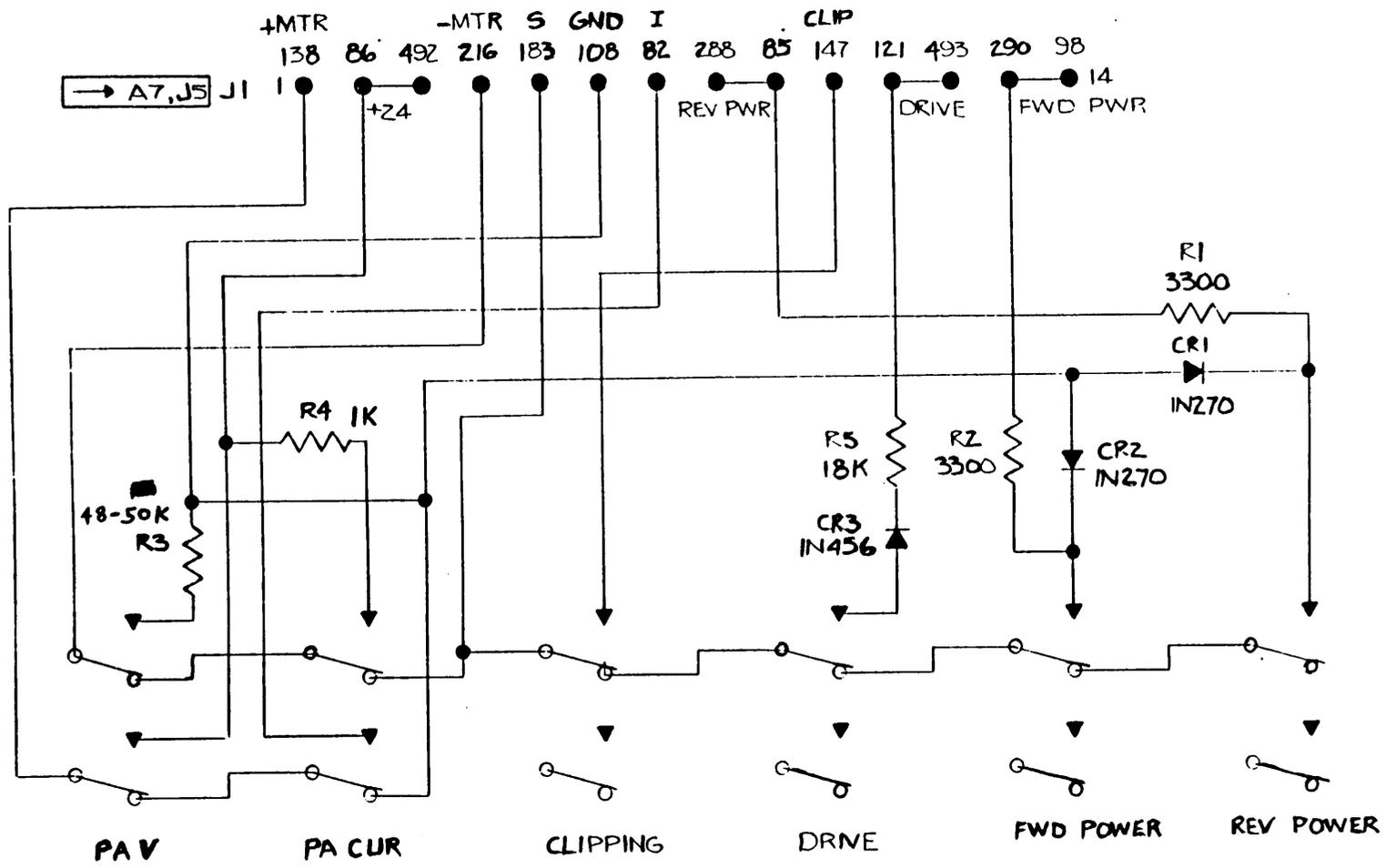
signal/ONE.
ALL FINAL AMPLIFIER



SPOT		A		A/T.O.		B	
10	1	•	•	•	•	•	1
11	2	•	•	•	•	•	2
12	3	•	•	•	•	•	3
13	4	•	•	•	•	•	4
14	5	•	•	•	•	•	5
15	6	•	•	•	•	•	6
16	7	•	•	•	•	•	7
17	8	•	•	•	•	•	8
18	9	•	•	•	•	•	9

ISSUE: 12-91

A12
TX PTO SWITCH

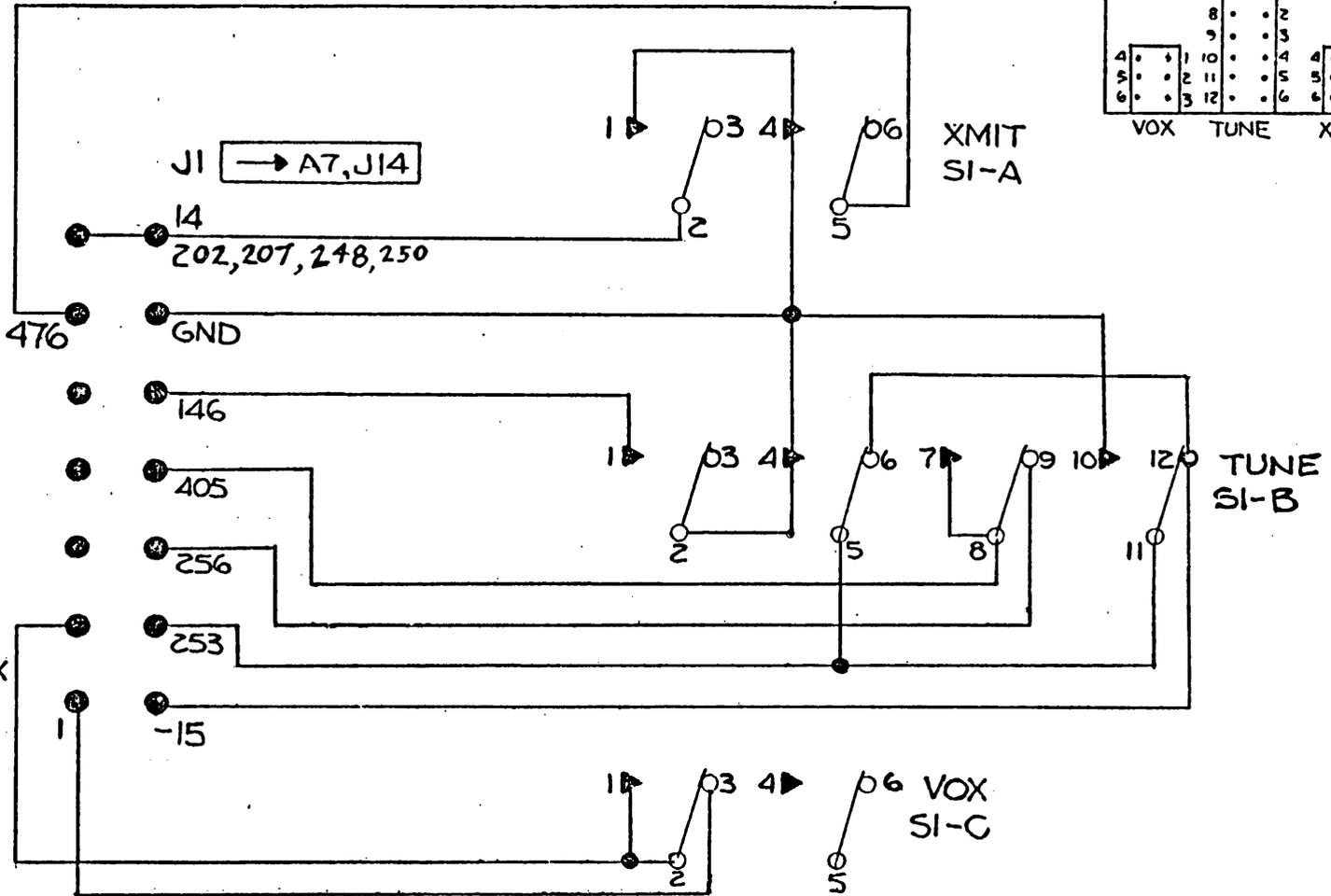
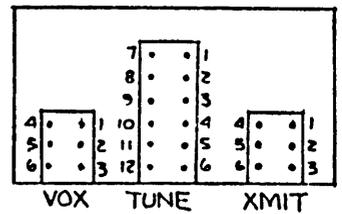


NOTES:
 1. R3 CHANGED FROM 33K TO 50K, 1% TO GIVE P.A. VOLTS RANGE OF 0-50 VOLTS.
 [MAY BE SELECTED 100K PARALLEL RESISTORS] SELECT SIZE FOR Z. & METER READING.

ISSUE: 12-89



AI3
METER SWITCH



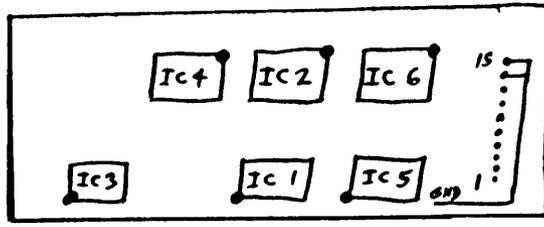
NOTE:

1. PTT
BLANK POSITION
RELEASES SI-A,B,C
2. BOARD PLUGS DIRECTLY INTO A7.

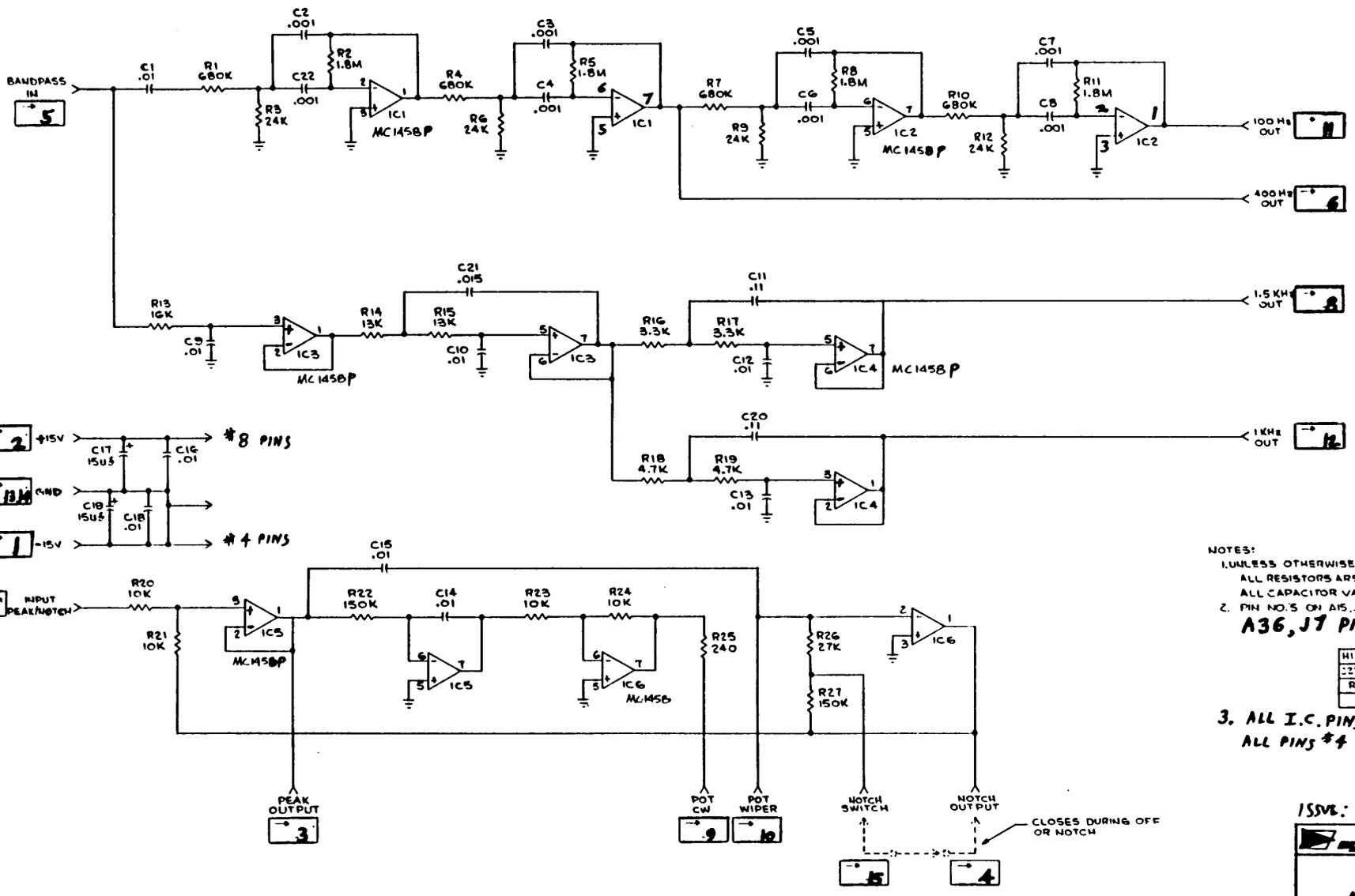


A14

TRANSMIT MODE SWITCH



RADIO FRONT →



- NOTES:
1. UNLESS OTHERWISE SPECIFIED:
ALL RESISTORS ARE IN OHMS, 1/4 W, ±5%.
ALL CAPACITOR VALUES ARE IN MICROFARADS.
 2. PIN NO.'S ON AIS-11 CORRESPOND TO ALL
A36, J7 PIN NUMBERS.

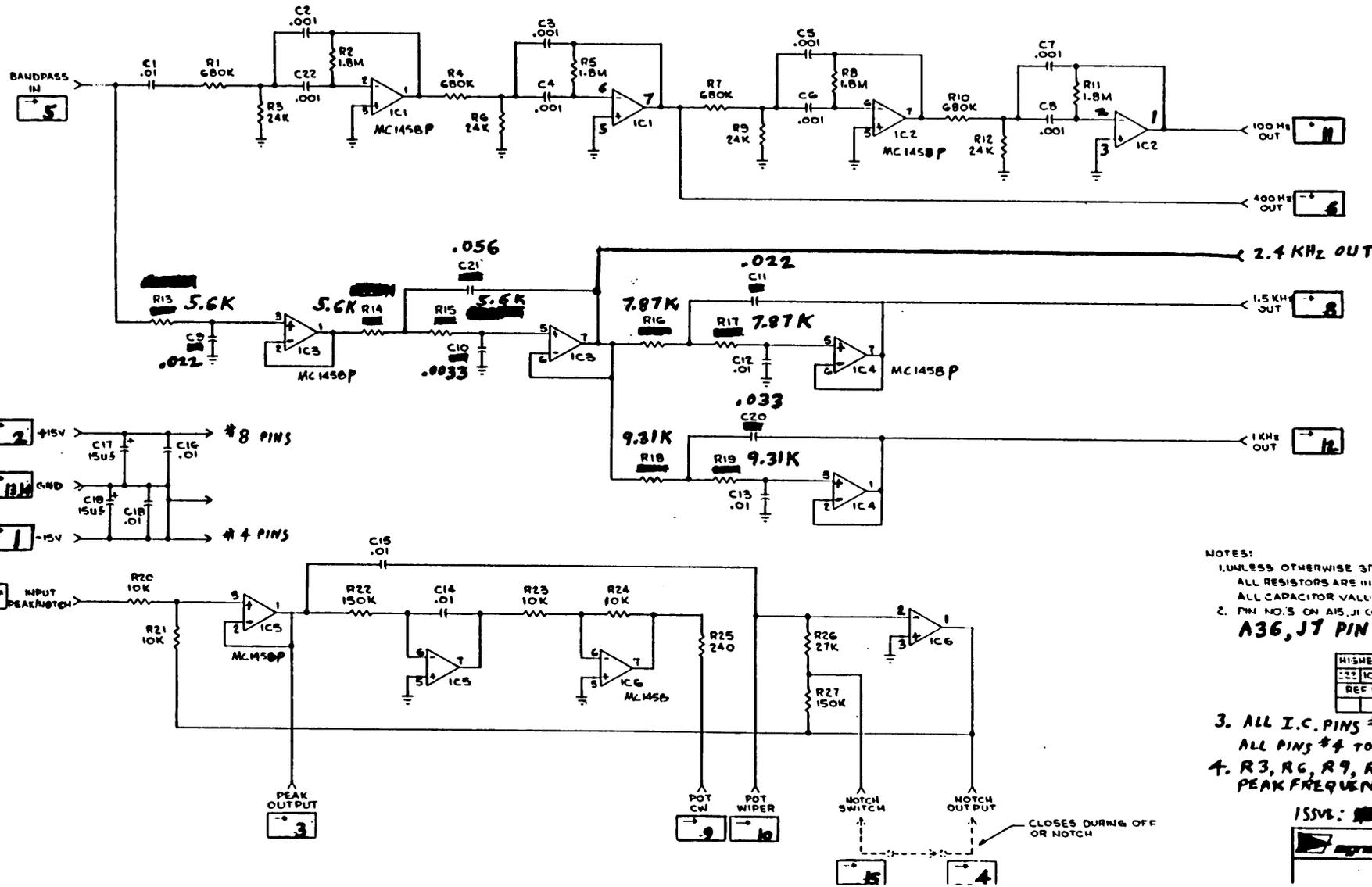
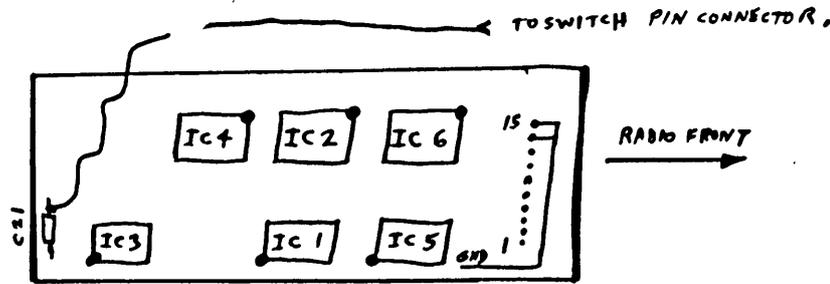
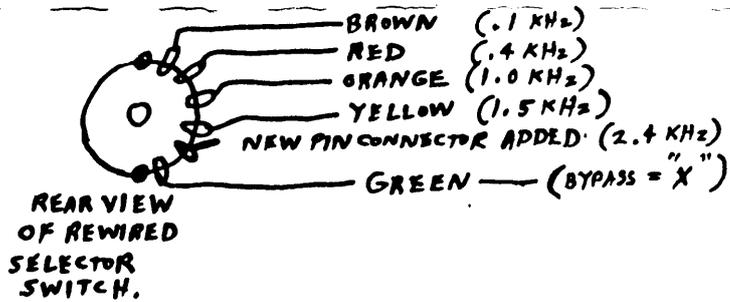
HIGHEST REF DES USED
22 IC3 R17
REF DES NOT USED

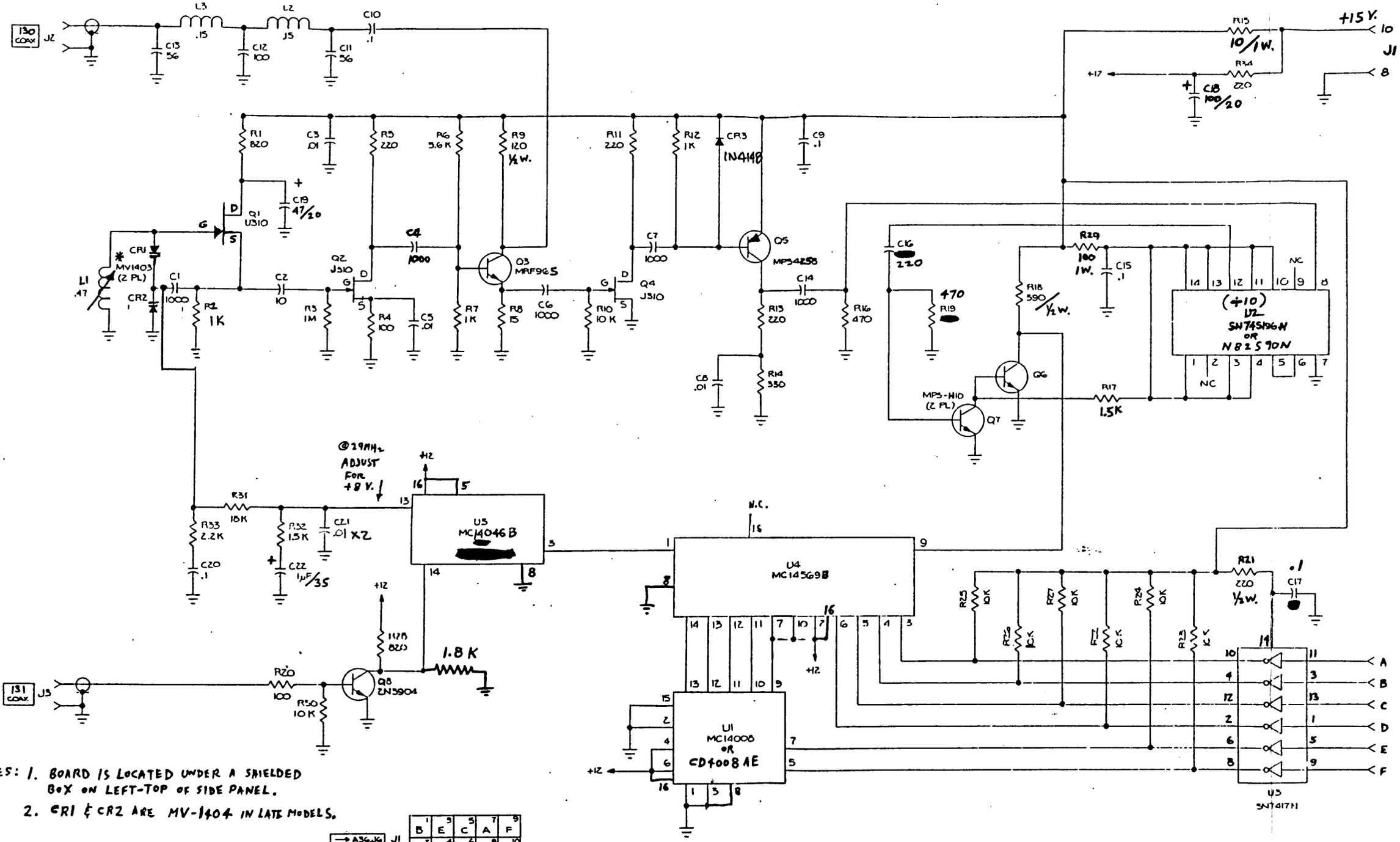
3. ALL I.C. PINS #8 TO +15V. AND
ALL PINS #4 TO -15V.

ISSUE: 4-85



AIS
AUDIO FILTER BOARD





① 29MH±
ADJUST
FOR
+8 V. ↓

NOTES: 1. BOARD IS LOCATED UNDER A SHIELDED BOX ON LEFT-TOP OF SIDE PANEL.

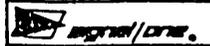
2. CR1 & CR2 ARE MV-1404 IN LATE MODELS.

→ ASG/J6 J1

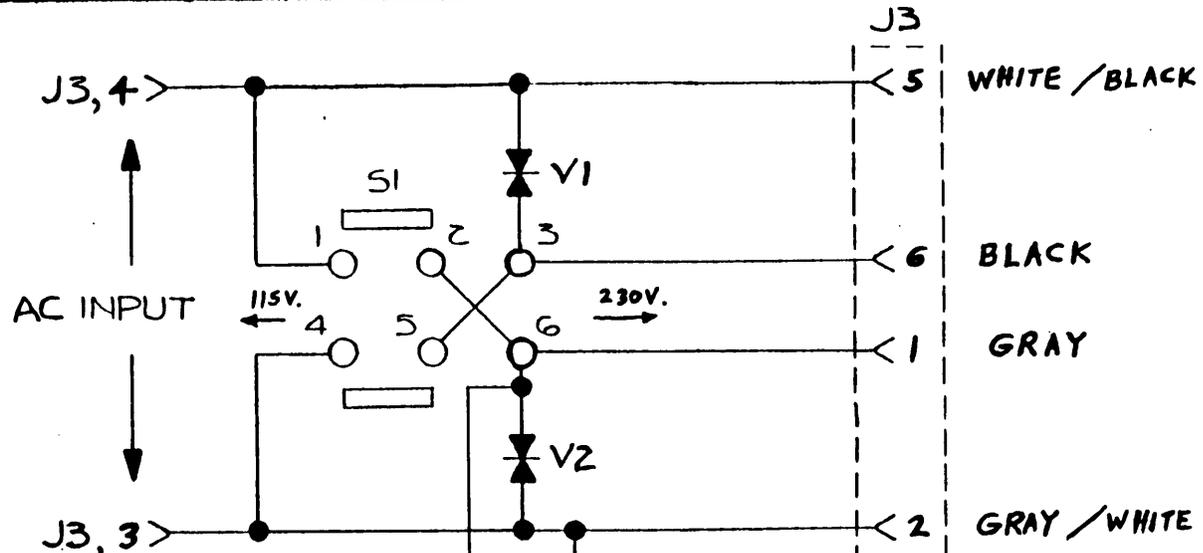
1	3	5	7	9
B	E	C	A	F
2	4	6	8	10
D	NC	NC	GND	+15

AS VIEWED FROM COMPONENT SIDE
(EACH PIN BYPASSED WITH .01 μf AT CONNECTOR SOCKET.)

ISSUE: 9-86



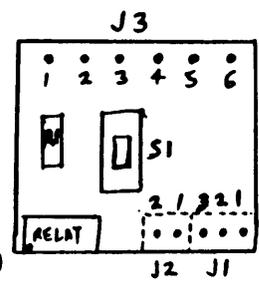
AIT
SYNTHESIZER



POWER TRANS
PRIMARY
J3 (1,2) (5,6)
(MEASURES: 0.9 TO 1.0 OHMS)

J2 → A37, J6
BROWN TO PIN 11
BLACK TO PIN 10 (477)

AROMAT AW6219440B
* HB1E - DC 5V. (70 OHM COIL)
(OR) HB1E - DC 12V. (400 OHM COIL)
(OR) MAGNECRAFT # 171VDIP-2 (500Ω COIL)
VOLT



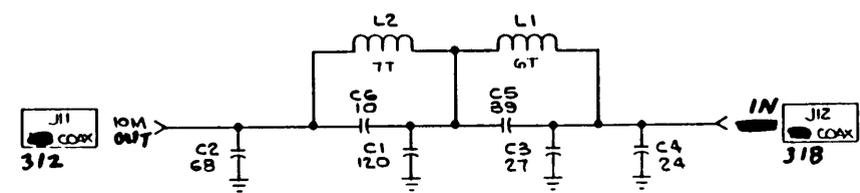
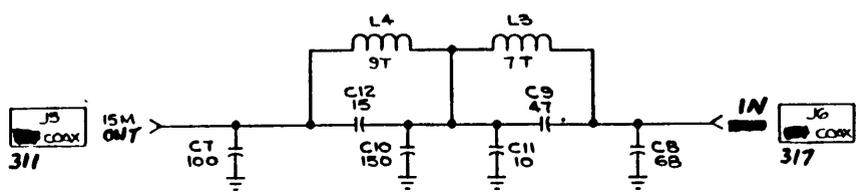
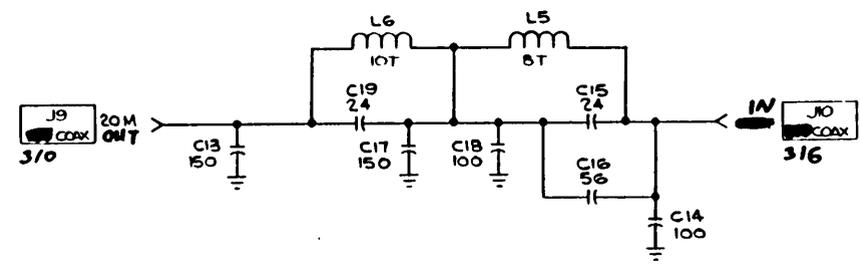
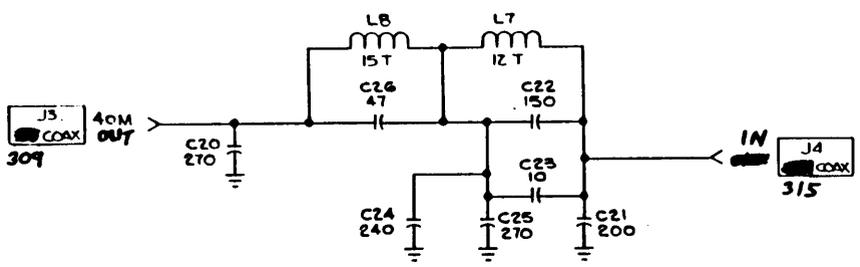
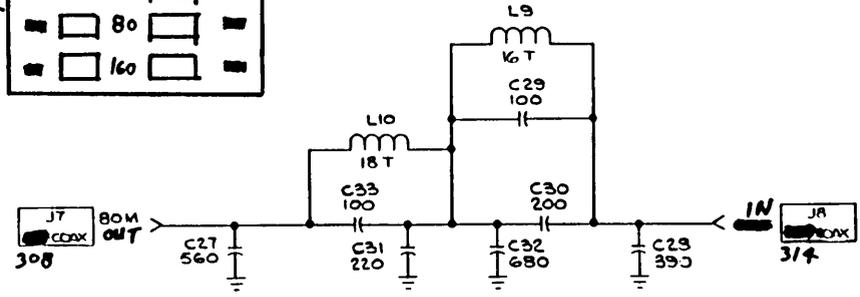
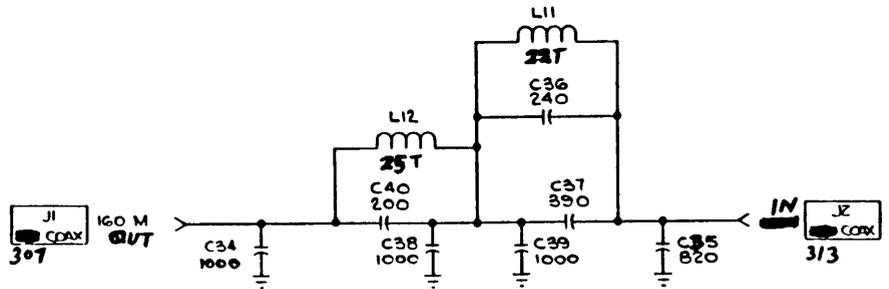
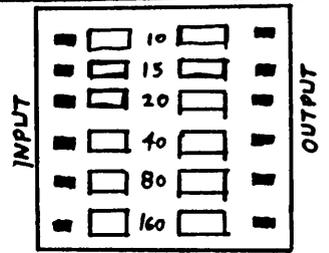
NOTES: 1. R12 ON A3 MUST BE CHANGED FOR RELAY VOLTAGE THAT IS USED. $5V/70\Omega = 220 R12$, $12V/400\Omega = 100 R12$, $5V/500\Omega = 1000 R12$.

NOTES: 2. WIRE COLORS TO J1 ARE VARIED.



ISSUE: 8-85

A18
AC POWER BOARD

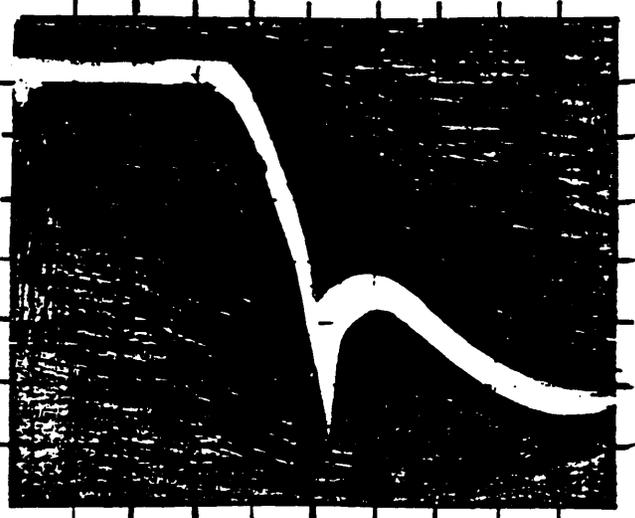


HIGHEST REF DESIG USED			
C40	L12		
REF DESIG'S NOT USED			

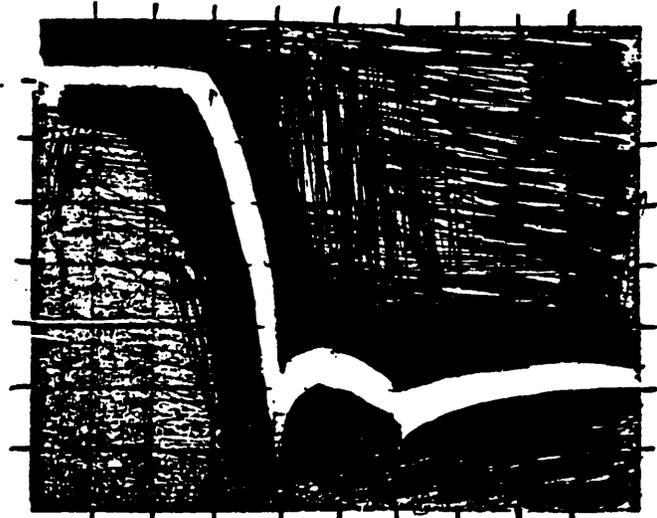
NOTES:
 1. UNLESS OTHERWISE SPECIFIED:
 CAPACITOR VALUES ARE IN MICROFARADS.
 INDUCTOR VALUES ARE IN MICROHENRY.
 2. "IN" FROM FINAL AMPLIFIER - "OUT" TO REFLECTOMETER.

ISSUE: 6-85

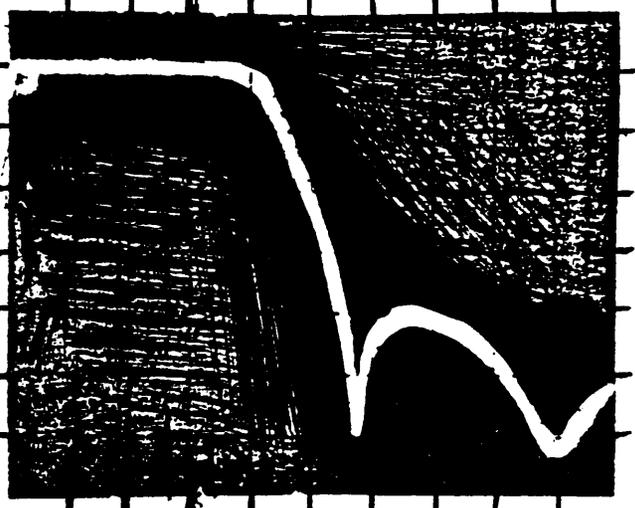
A19
 T/X LOW PASS FILTER BOARD



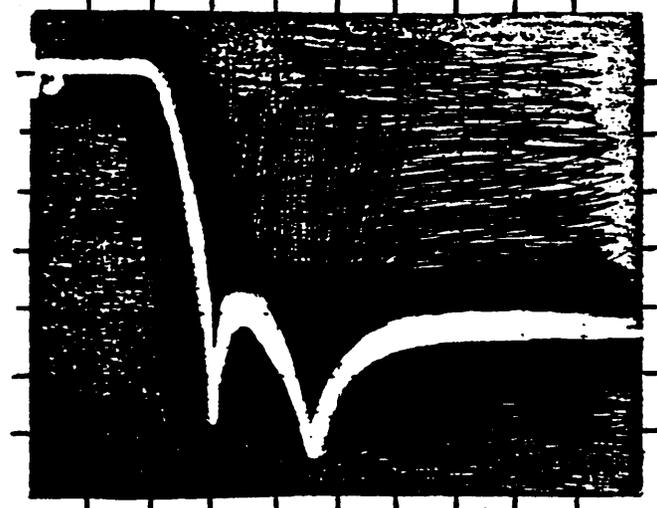
30 - 25 MHz.
 10 MHz/DIV. MARKER 30 MHz.
 20, 19, D - 27 THRU 29 MHz



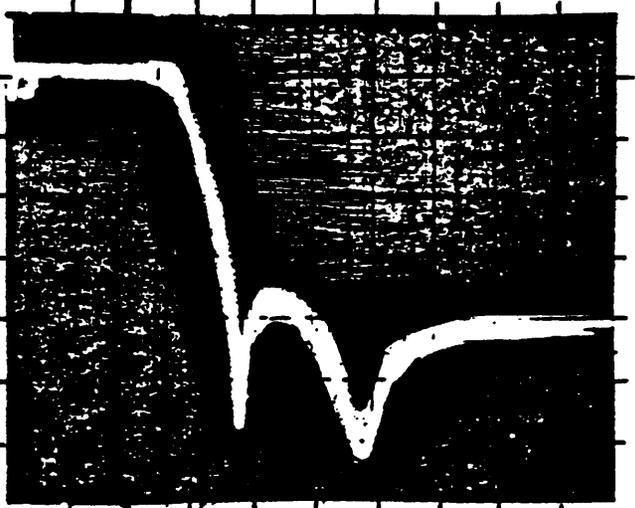
25 - 15 MHz.
 10 MHz/DIV. MARKER 30 MHz.
 21, C - 15 THRU 20 MHz.



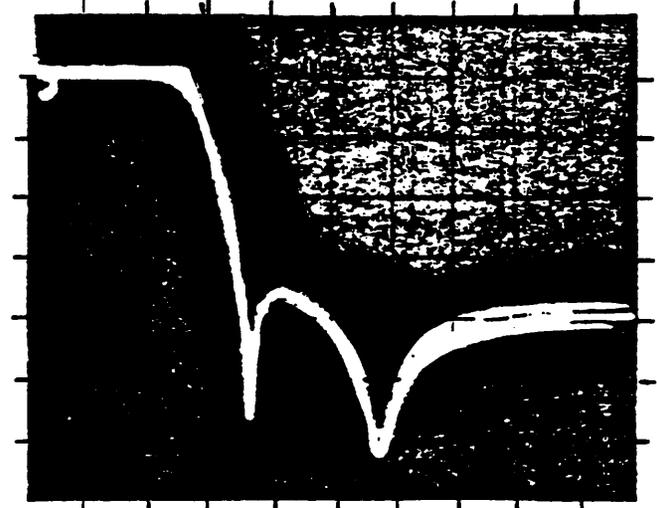
15 - 9 MHz.
 5 MHz/DIV. MARKER 20 MHz.
 14, B - 8 THRU 13 MHz



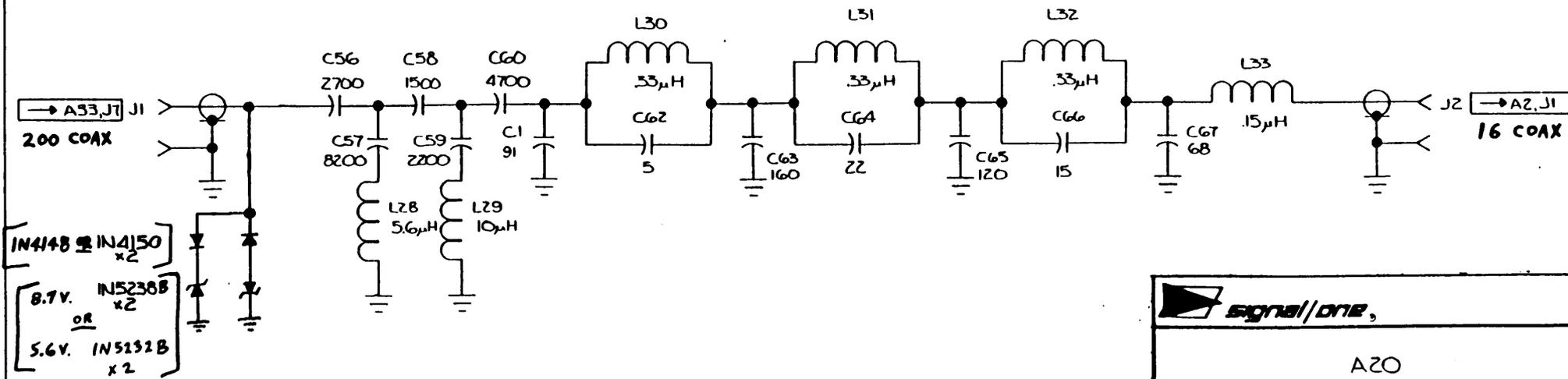
9 - 5 MHz.
 5 MHz/DIV. MARKER 20 MHz.
 7 MHz



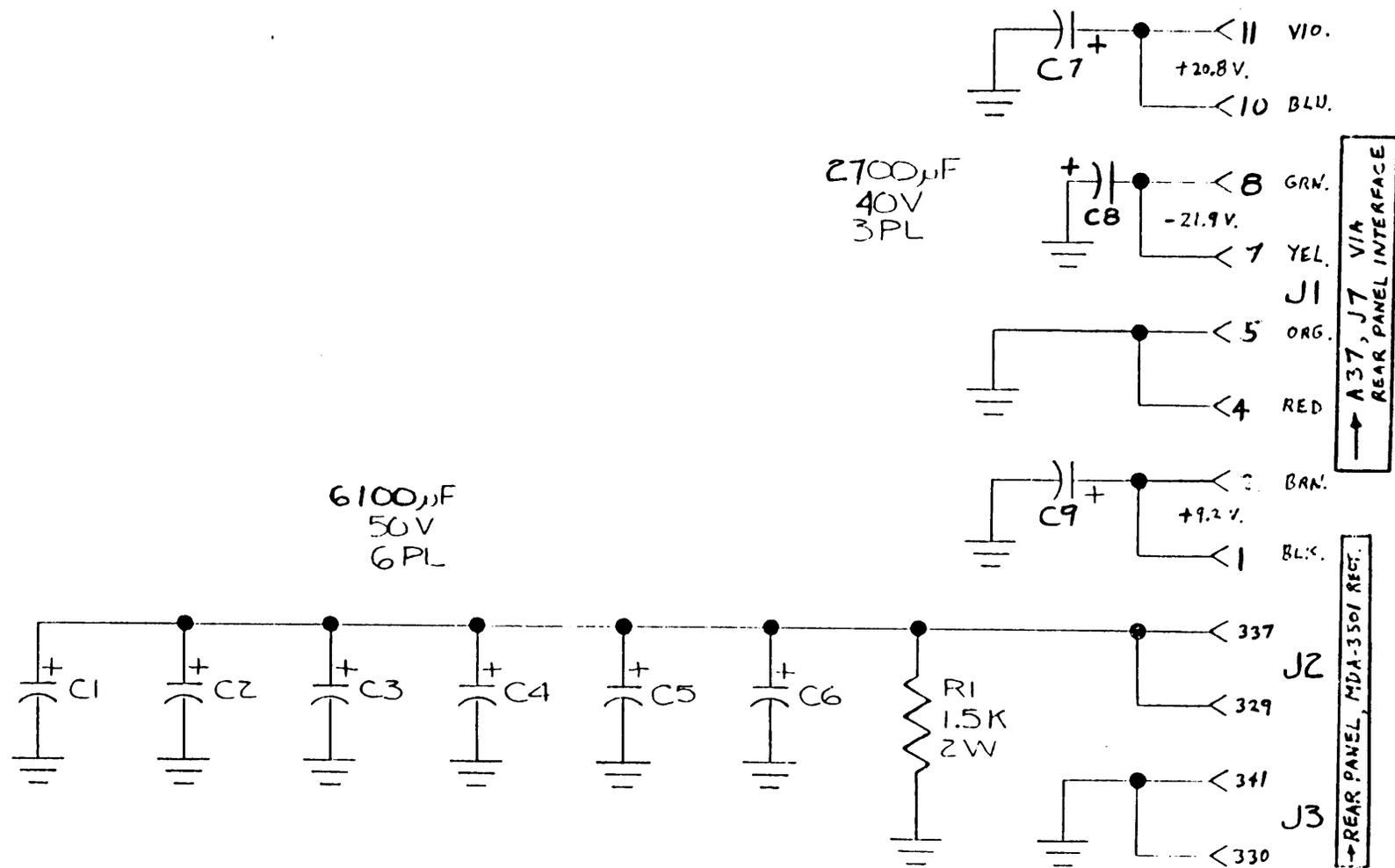
5 - 3 MHz.
 2 MHz/DIV. MARKER 5 MHz.
 3, A - 4, 5, 6



3 - 0 MHz.
 1 MHz/DIV. MARKER 2.5 MHz.
 1022 MHz



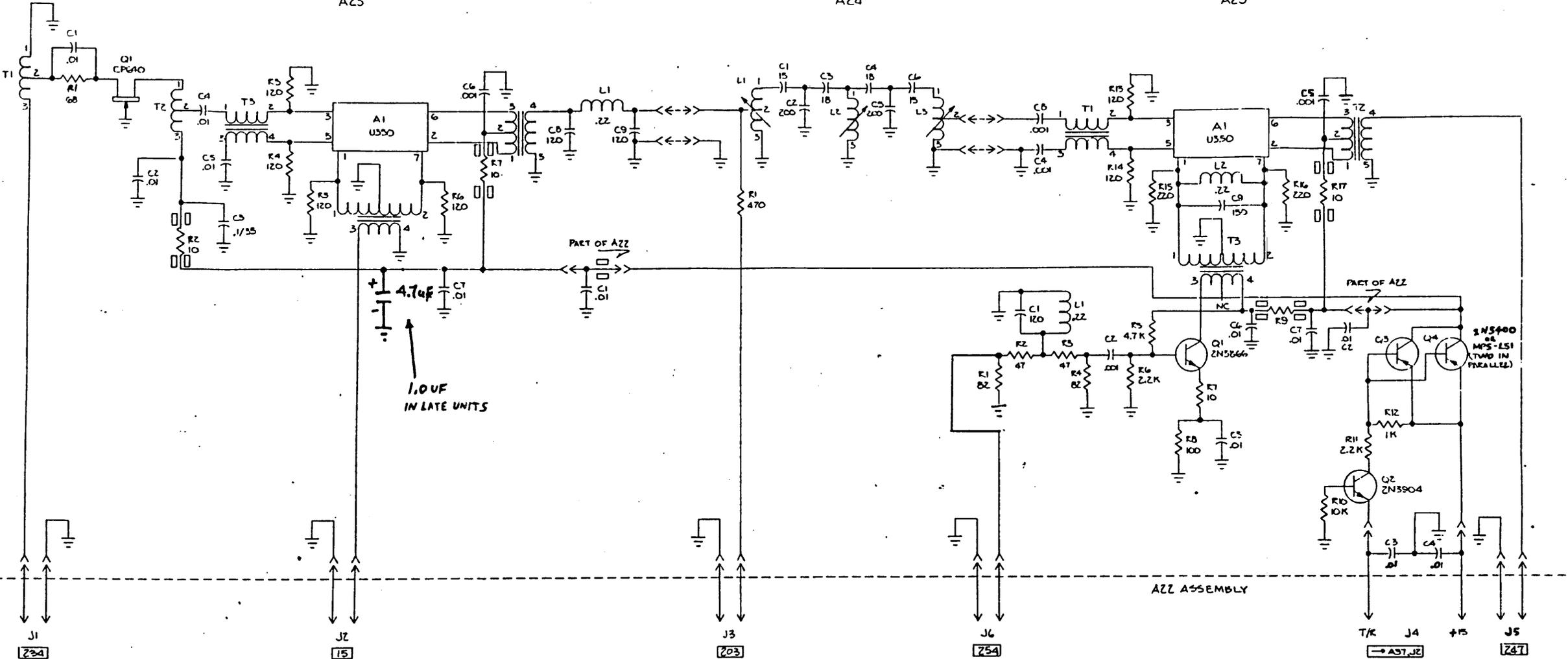
AZO
RX HIGH PASS FILTER



NOTES: 1. CONNECTORS VIEWED FROM BOTTOM OF BOARD (PWSIDE)
 ← REAR OF CHASSIS



AZI
 POWER SUPPLY FILTER BOARD

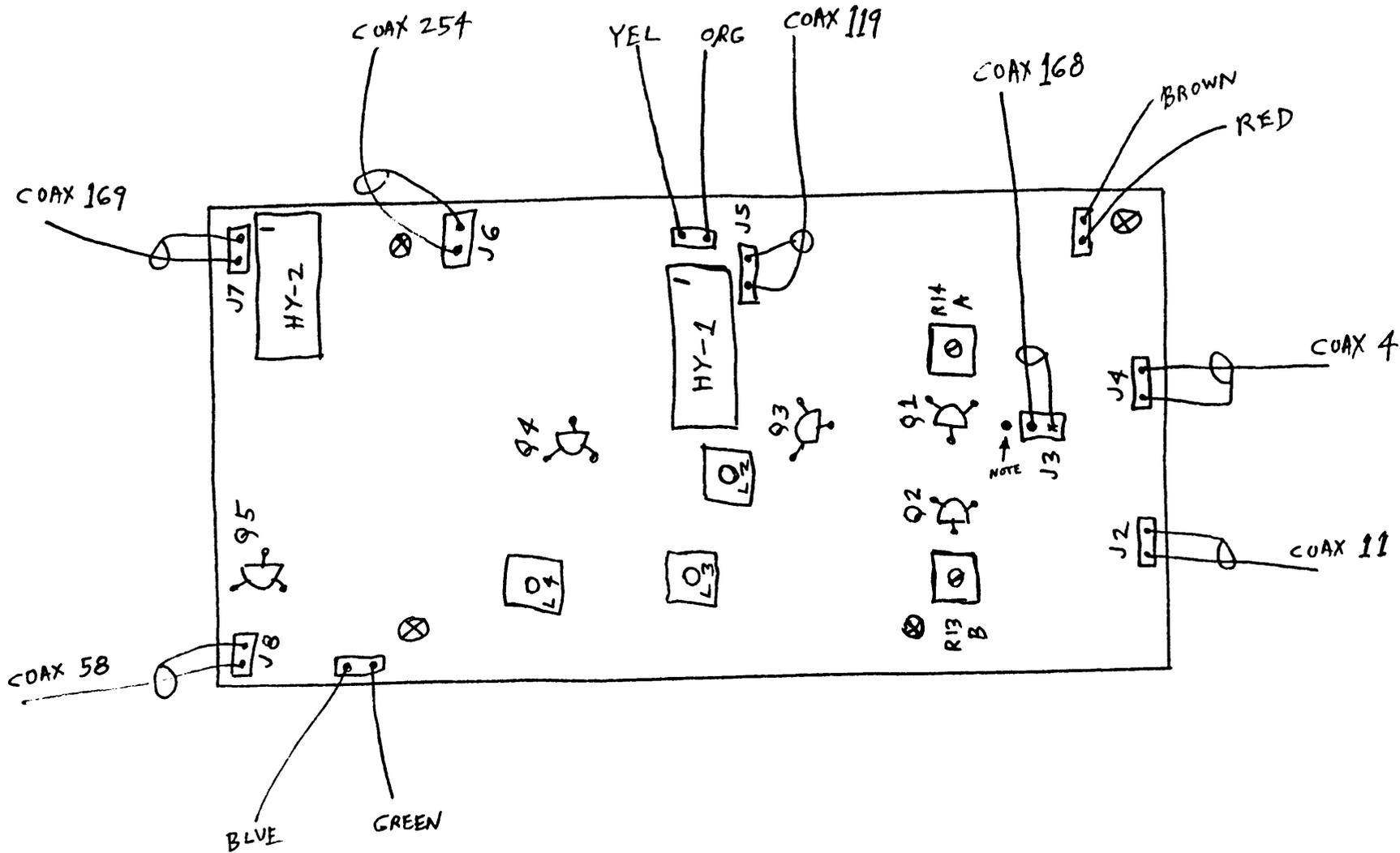


→ A2, J2

→ A27, J2

ISSUE: 2-86

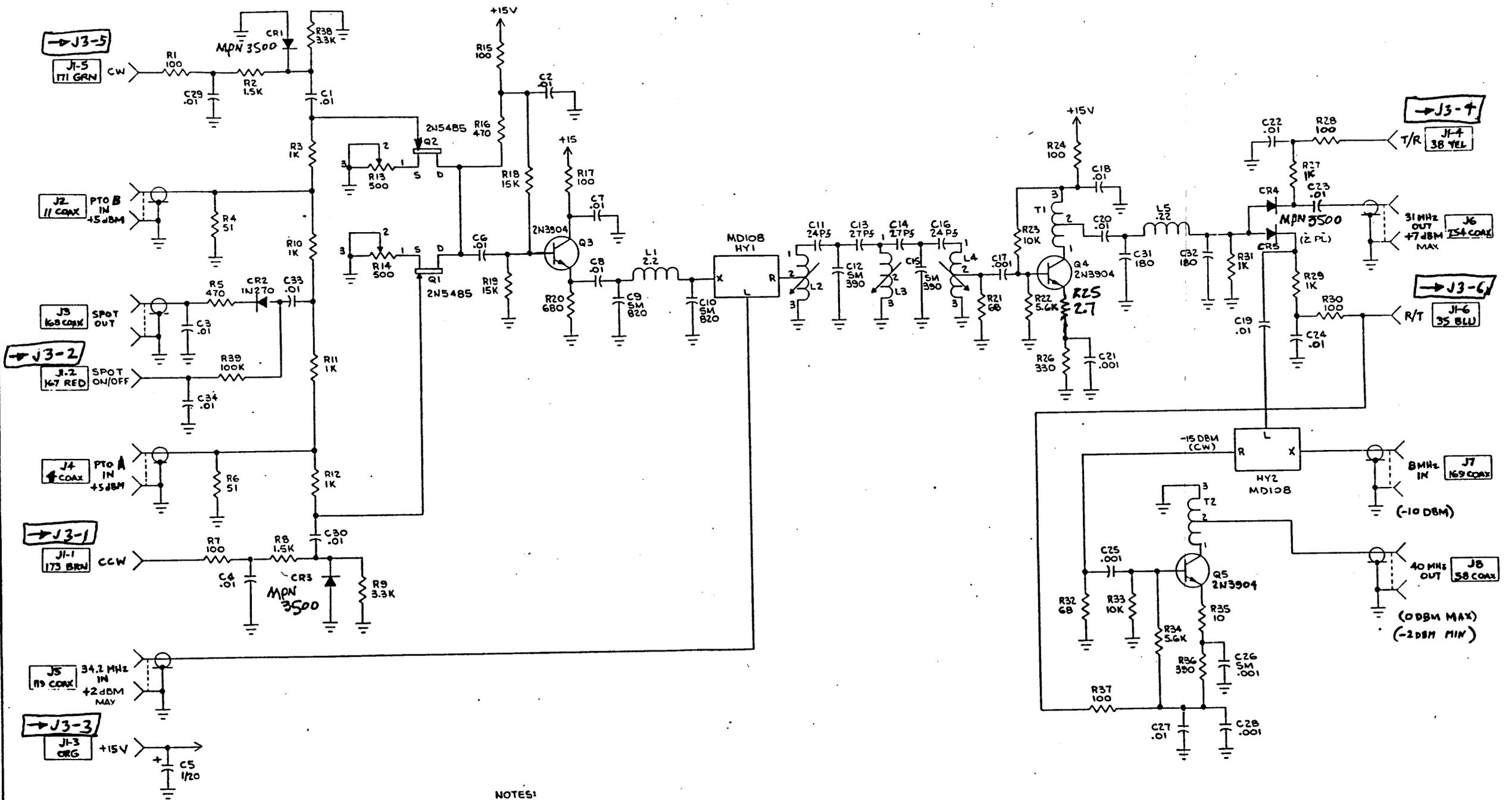
A22 MIXER ASSEMBLY
INCLUDES A23, A24, A25



- NOTES:
1. GROUND PIN OF J3 IS NOT USED. ONLY THE CENTER CONDUCTOR OF COAX 168 IS PLUGGED IN. PREVENTS GROUND LOOP HUM IN RECEIVER.
 2. EARLY MODELS USE 3 POWER/CONTROL JACKS (SHOWN). LATER MODELS USE 2 DOUBLE PLUGS AND JACKS RELOCATED, WIRE COLORS ARE SAME.

PTO MIXER BOARD - A26

CX-11A

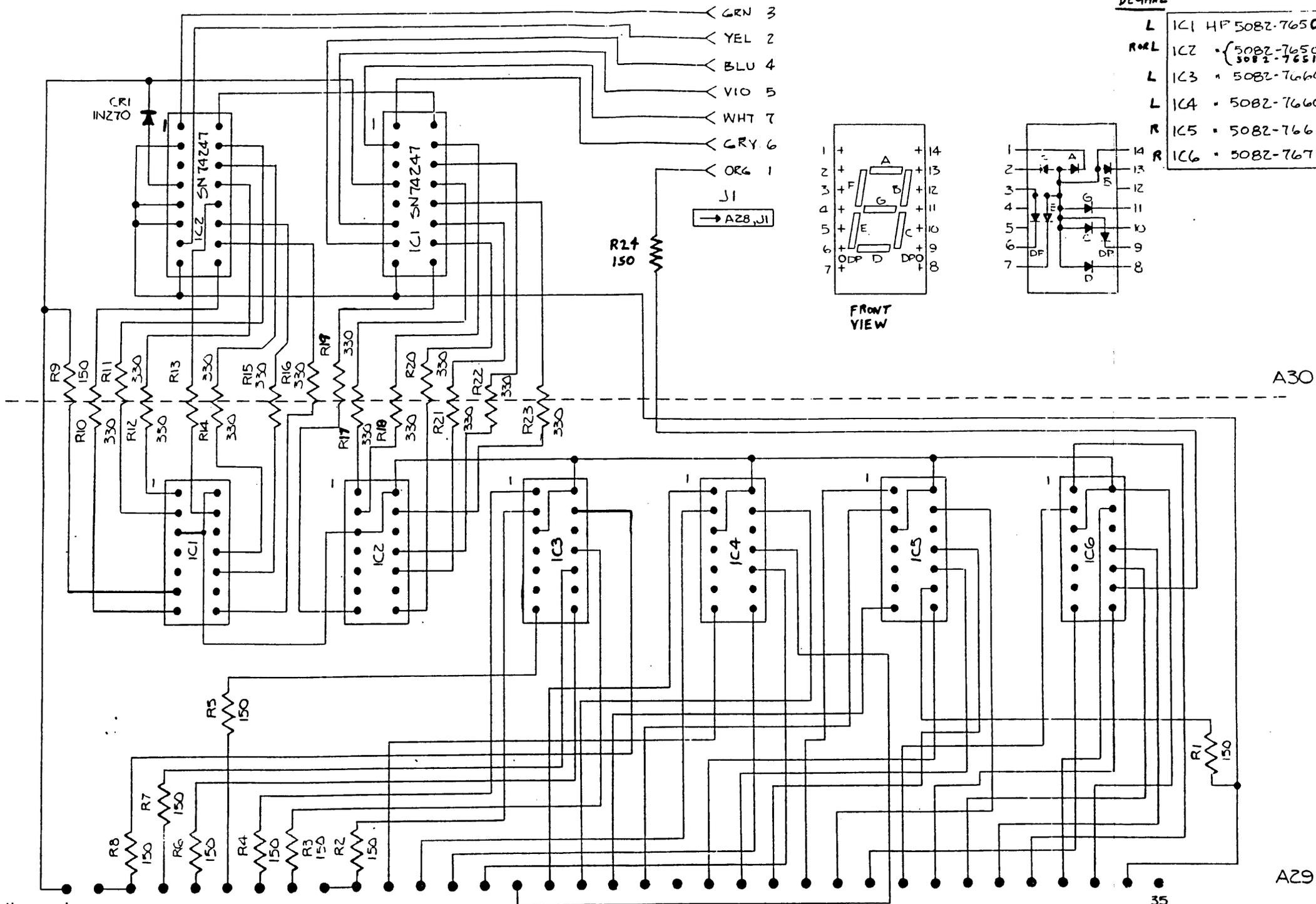


HIGHEST REF DESIG USED					
R39	C34	L4	CR5	T2	HY2
REF DESIG NOT USED					

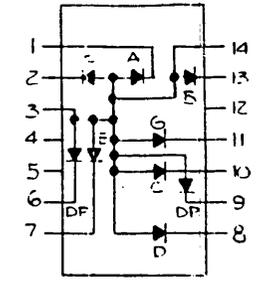
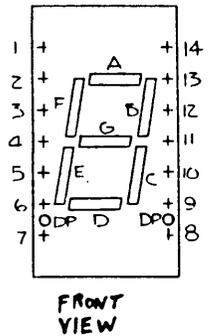
NOTES:
 1. UNLESS OTHERWISE SPECIFIED:
 RESISTOR VALUES ARE IN OHMS,
 1/4 W, ±5%.
 ALL CAPACITOR VALUES ARE
 IN MICROFARADS.
 ALL INDUCTOR VALUES ARE
 IN MICROHENRY.
 2. ALL WIRES TO A54, J3.

ISSUE: 12-91

signal/one
 A26
 PTO MIXER BOARD

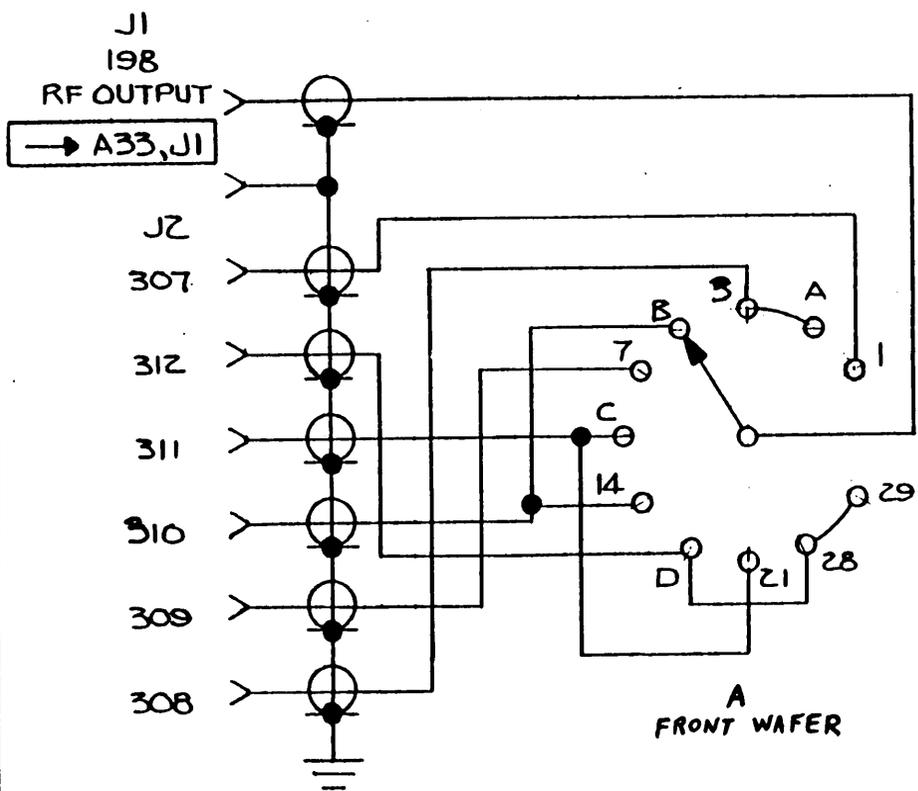


DECIMAL	COMPONENT	COLOR
L	IC1 HP 5082-7650	RED
R	IC2 (5082-7650)	RED
L	IC3 = 5082-7660	YEL
L	IC4 = 5082-7660	YEL
R	IC5 = 5082-7661	YEL
R	IC6 = 5082-7671	GRN

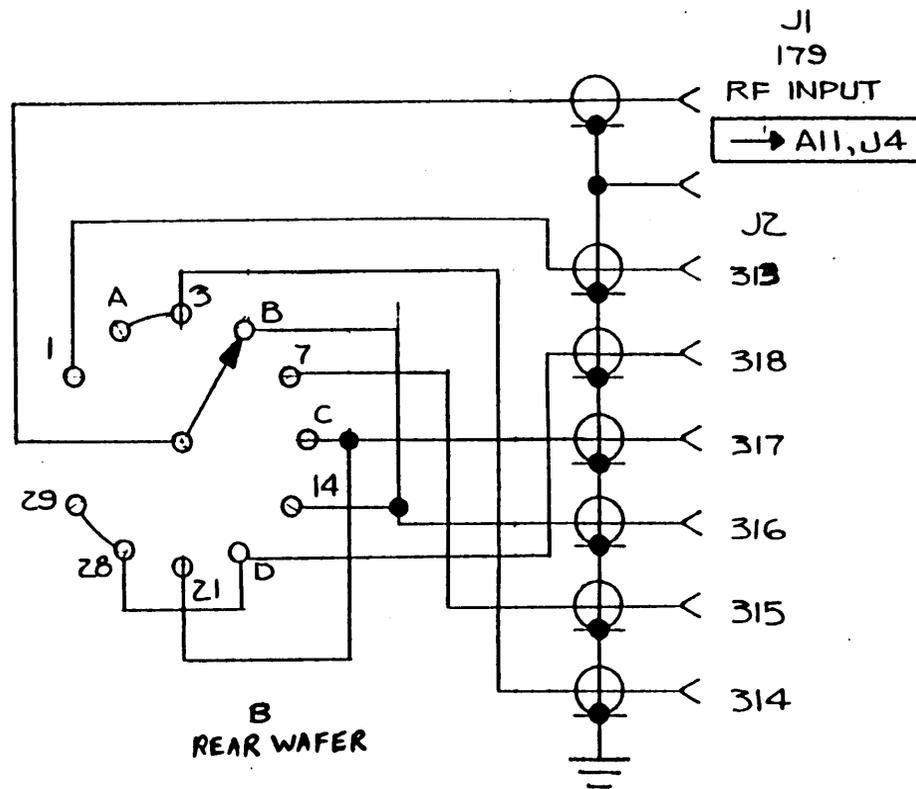


SPRAGUE/DOR

AZ9,30
LED READOUT BOARD

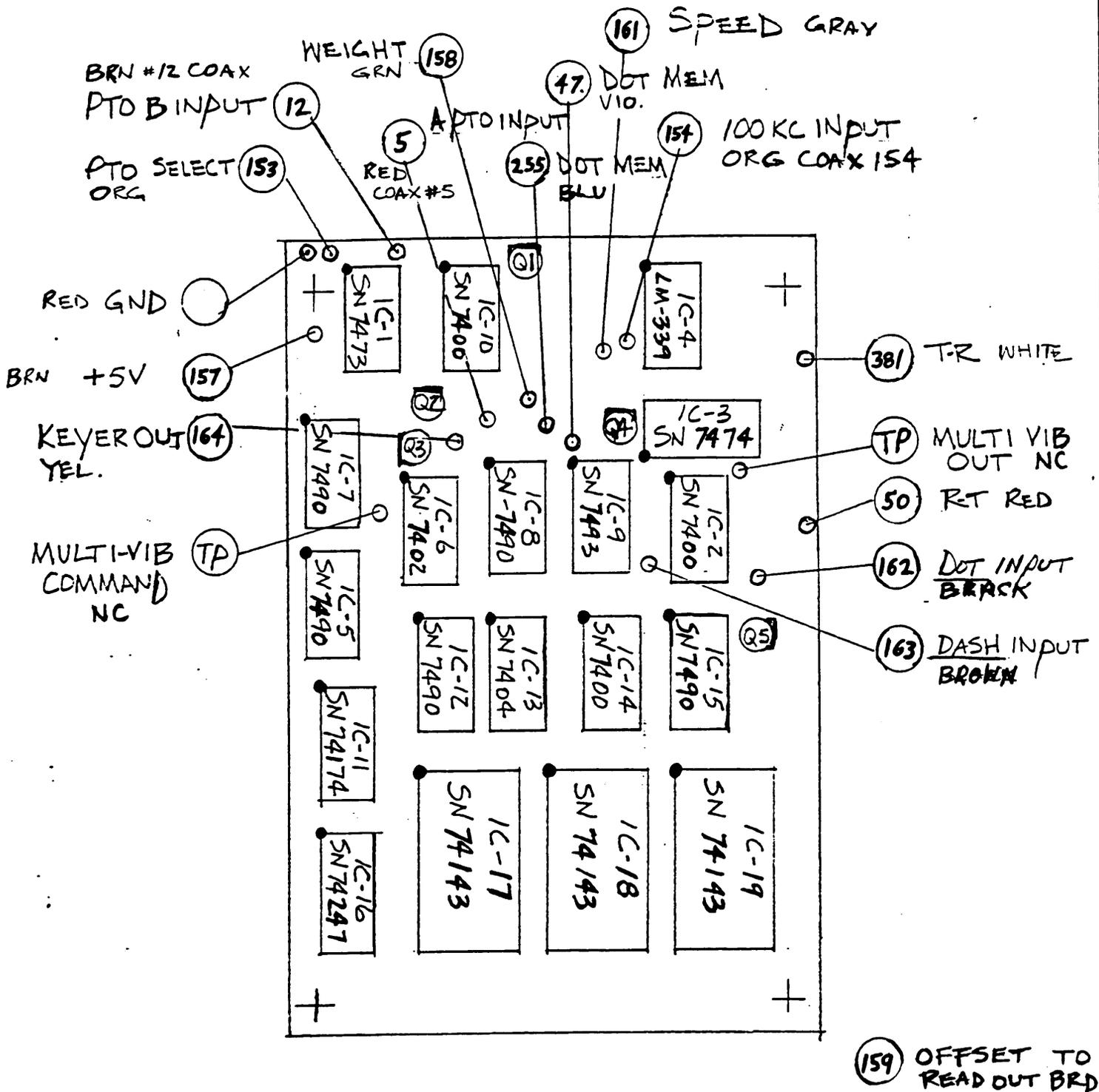


307-318 → A19, J1-12



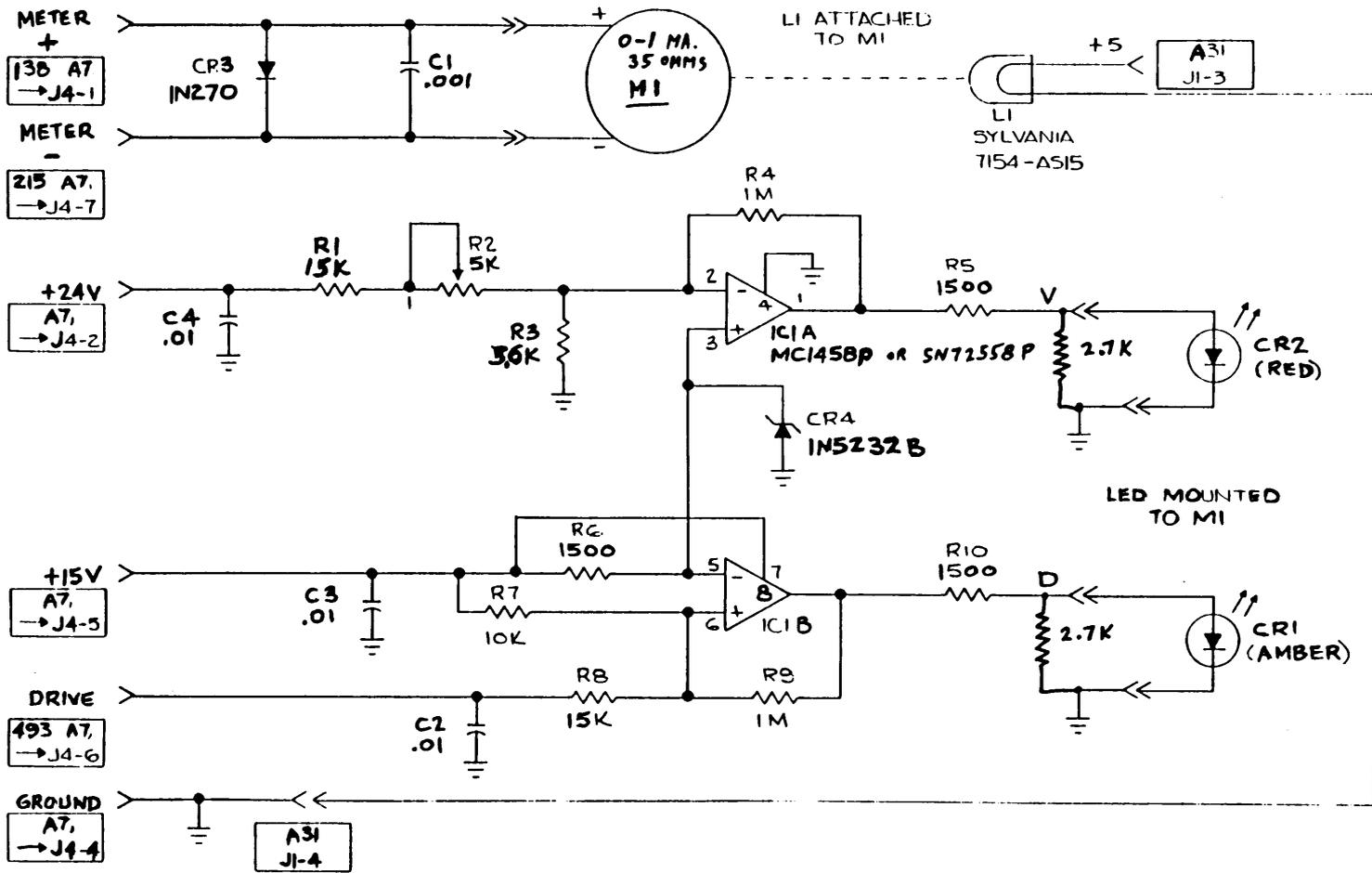
A27
TX FILTER SWITCH

SIGNAL/ONE



CX-11A SIGNAL ONE COUNTER KEYS

MOUNTED TO
A31 CIRCUIT BOARD

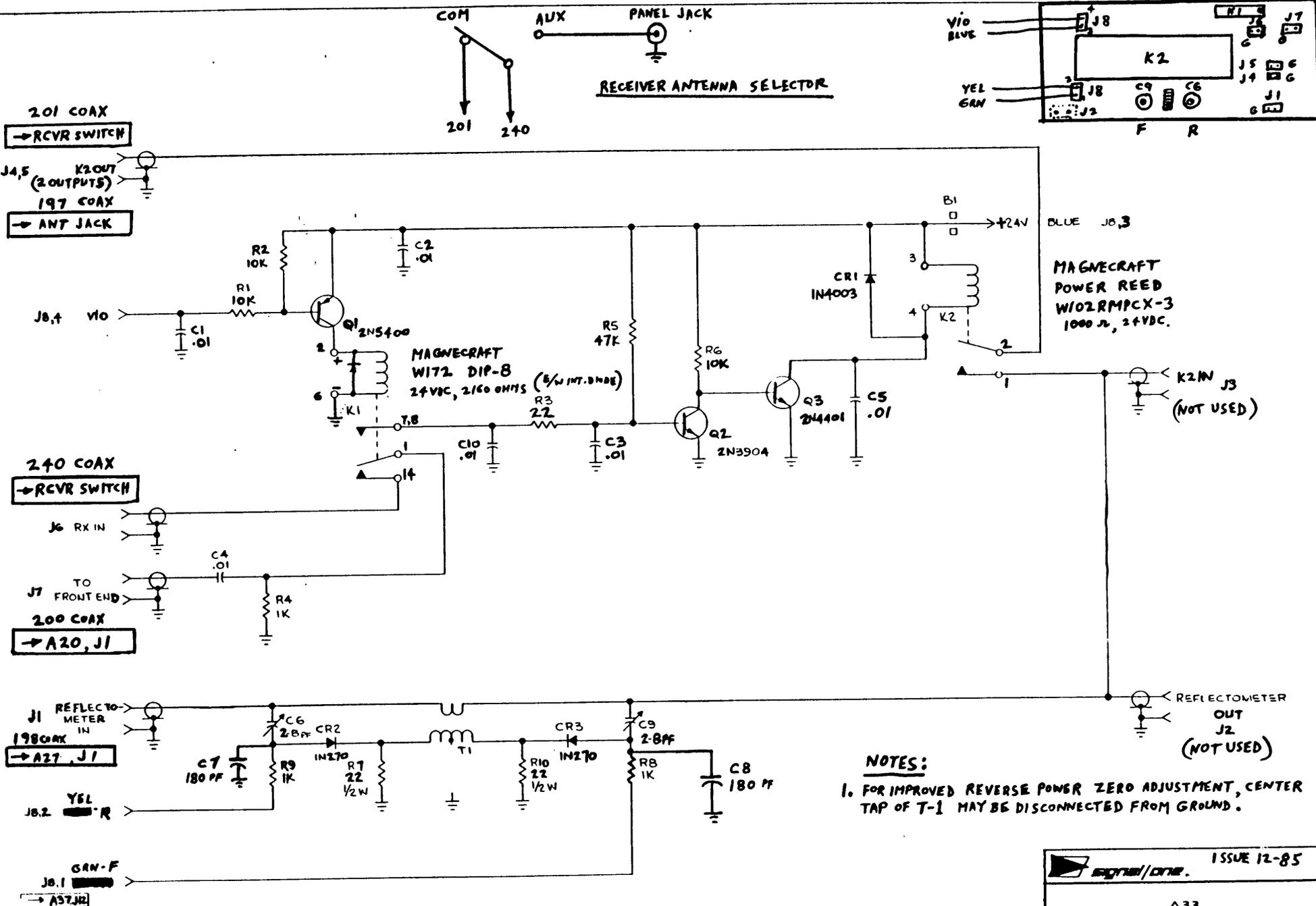


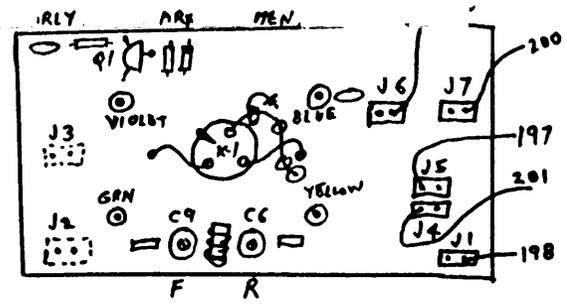
NOTE:

1. UNLESS OTHERWISE SPECIFIED:
RESISTOR VALUES ARE IN OHMS.
1/4 W ± 5%.
- CAPACITOR VALUES ARE IN
MICROHENRY.

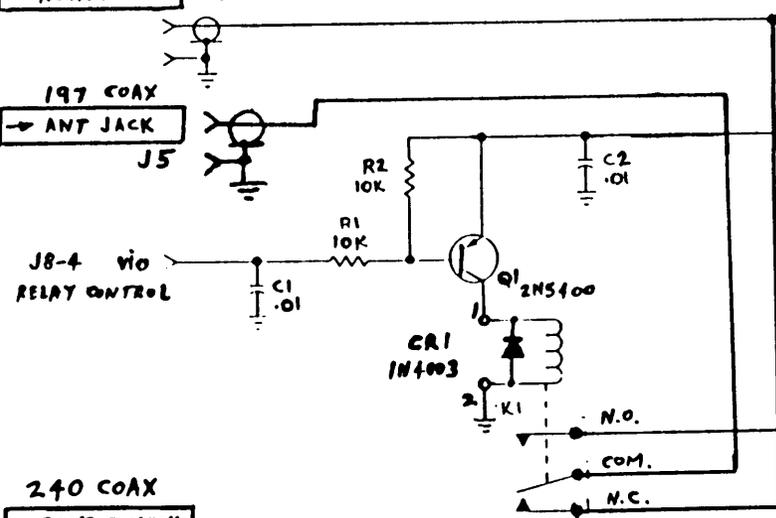
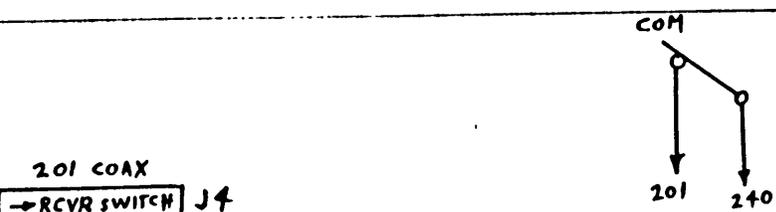


A31
S-METER BOARD

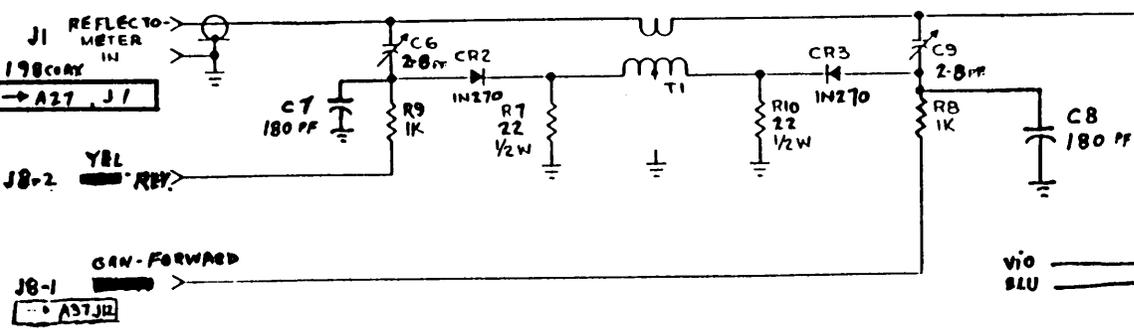
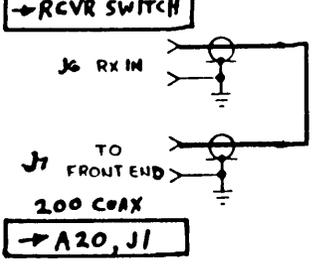




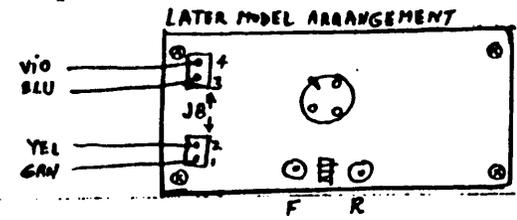
RECEIVER ANTENNA SELECTOR



K-1
 RELAY: JENNINGS RJ1A-26S
 OR KILOVAC HC-1
 26.5 V.D.C. 335 OHMS



NOTES:
 1. FOR IMPROVED REVERSE POWER ZERO ADJUSTMENT,
 CENTER TAP OF T-1 MAYBE DISCONNECTED FROM GROUND.



ISSUE 3-87
**A33 HIGH POWER
 T/R RELAY BOARD**

201 COAX
REAR JACK: J4
 AUX-COM
 SWITCH

197 COAX
ANT JACK
 J5

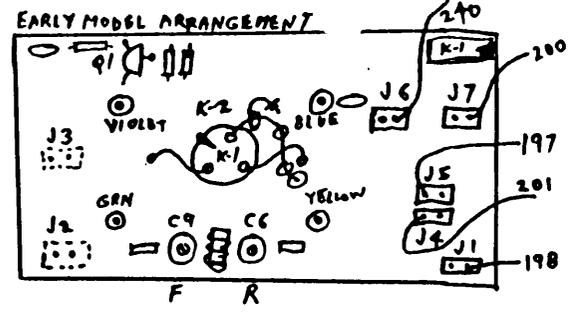
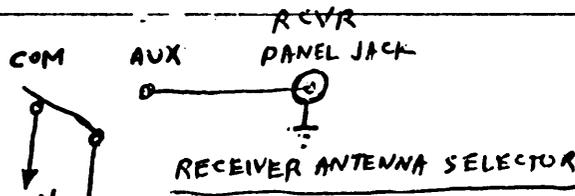
240 COAX
REAR JACK SWITCH

RCVR
 J6 RX IN
 J7 TO FRONT END
 200 COAX
A20, J1

J1 REFLECTO-
 METER
 IN
 198 COAX
A27, J1

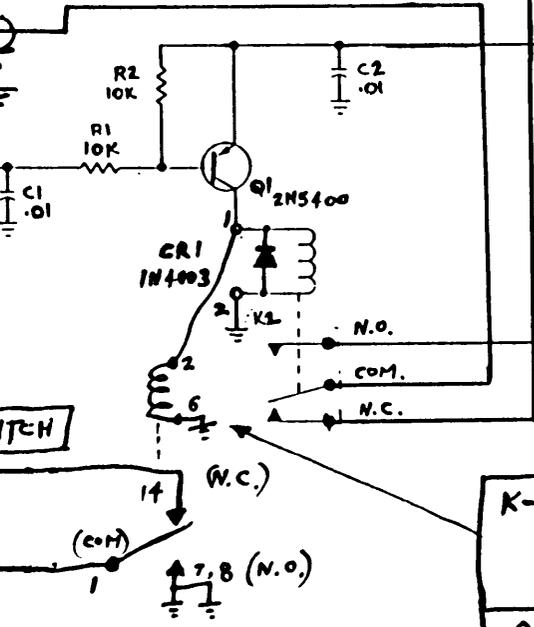
J8-2 YEL
 REV

J8-1 GRN-FORWARD
A37, J2



K-2 RELAY: JENNINGS RJ1A-26S
 OR KILOVAC HC-1
 26.5 V.D.C. 335 OHMS

K-1 RELAY: MAGNECRAFT
 W172DIP-4
 24 VDC - 2200 OHMS
 OR W172DIP-8
 OR ECG RLY-F71C24



B1
 J8-3
 24V BLUE

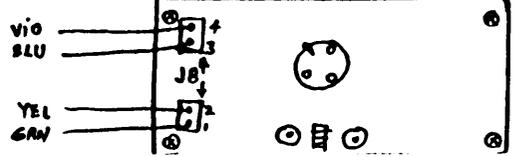
K2 IN J3
 (NOT USED)

REFLECTOMETER
 OUT
 J2
 (NOT USED)

NOTES:

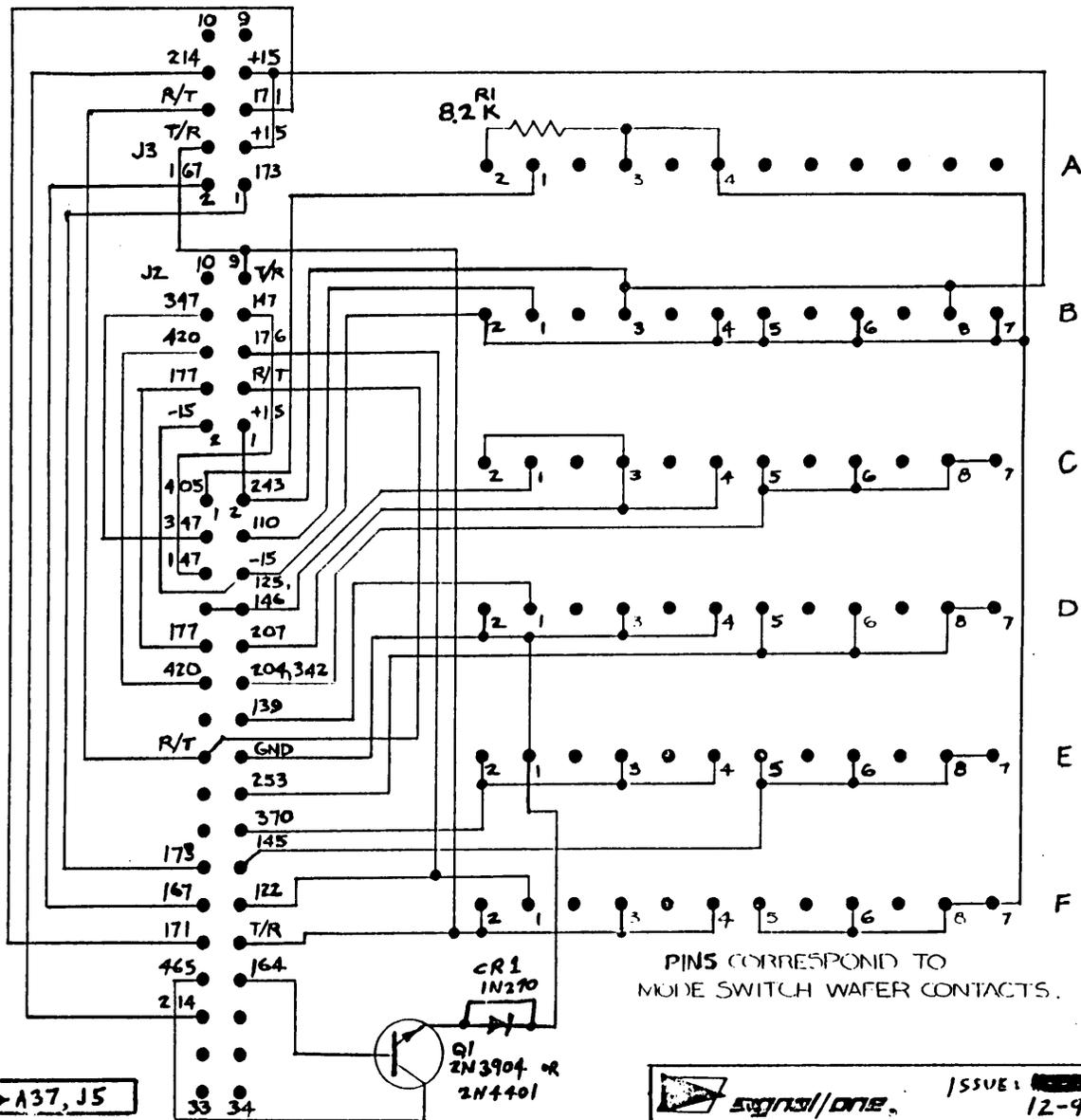
1. FOR IMPROVED REVERSE POWER ZERO ADJUSTMENT, CENTER TAP OF T-1 MAYBE DISCONNECTED FROM GROUND.
2. ALTERNATE FOR K-1 IS W118DIP-4 OR W172DIP-8.

LATER MODEL ARRANGEMENT



ISSUE 12-92

A33 HIGH POWER
 T/R RELAY BOARD



NOTES:

1. J3 TO A26 JACKS (ANSI-6) - PINS 7-8 TO RF GAIN.
2. J2 TO A8, J1.

PINS CORRESPOND TO MODE SWITCH WAFER CONTACTS.

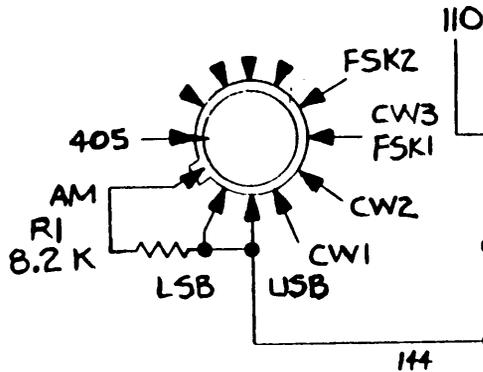
→ A37, J5

ISSUE: 12-91

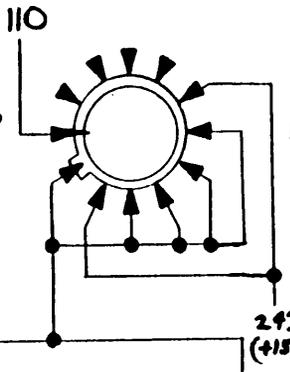
J1

A34
MODE SWITCH BOARD

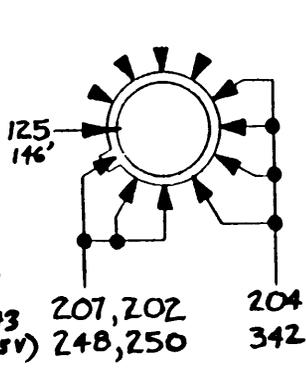
A
CARRIER



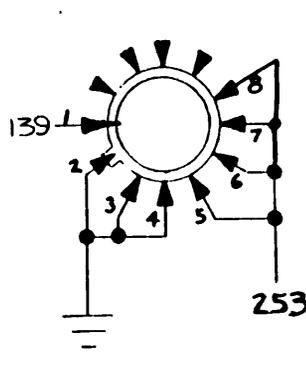
B
USB/LSB



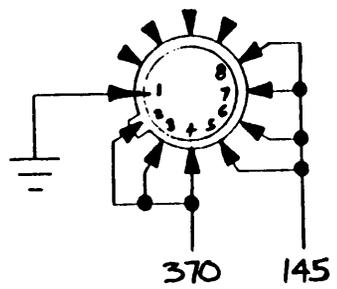
C
XMIT CONTROL



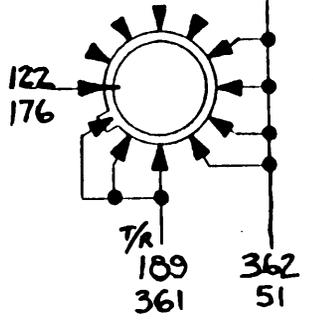
D
SIDETONE



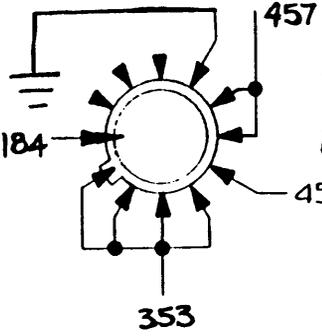
E
RELAY DELAY



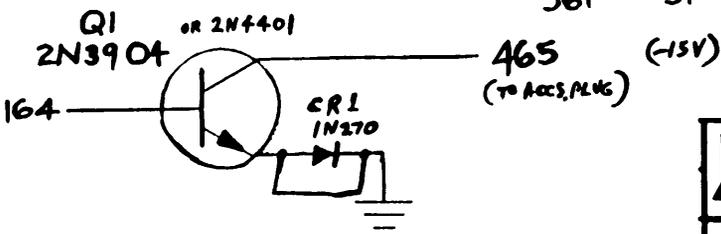
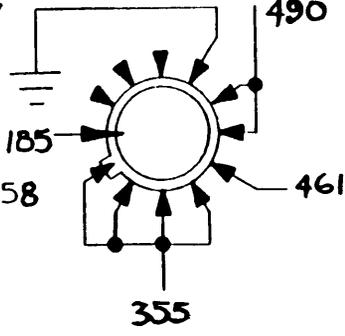
F
DSB CONTROL



G
XTAL FILTER



H
XTAL FILTER



NOTES: 3. CR1 JUMPERED TO IMPROVE FIRST CW DOT COMPRESSION.

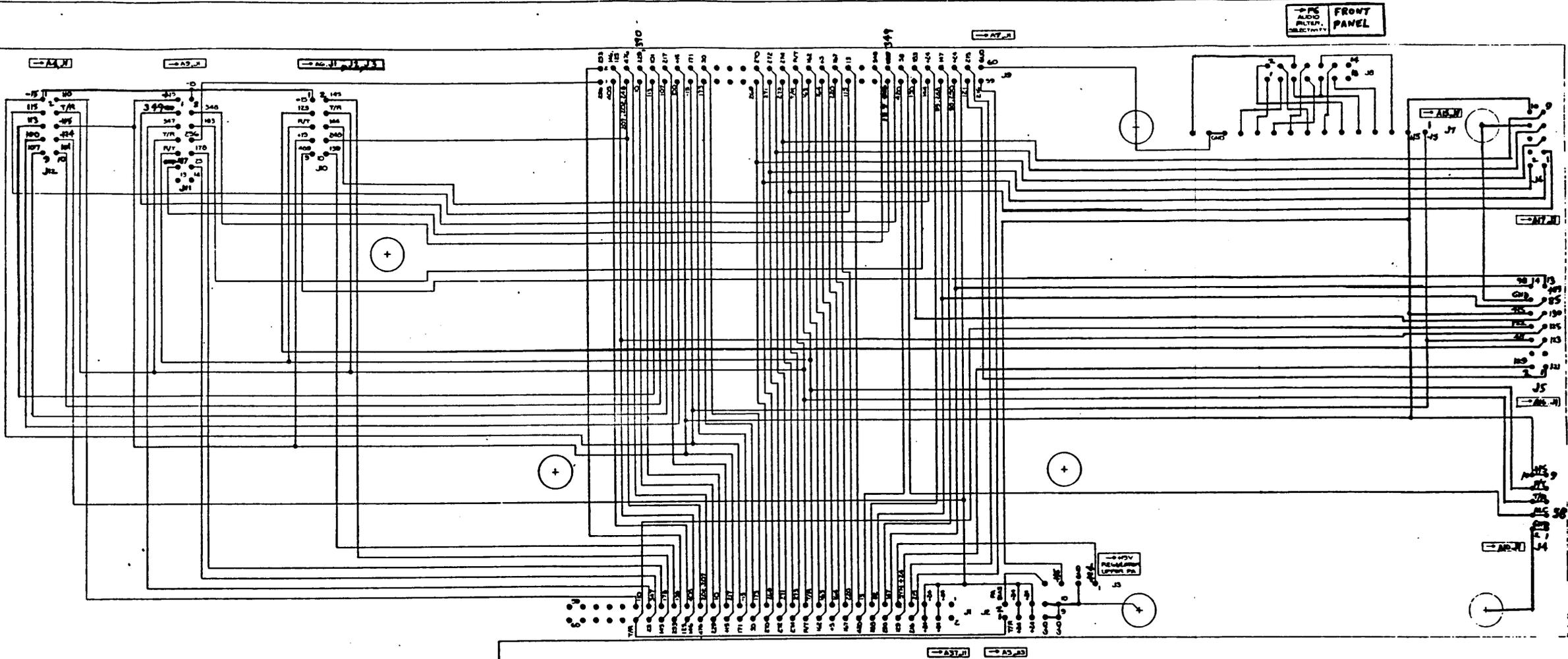
NOTES:

1. A35 BOARDS PART OF A34 ASSEMBLY.
2. CIRCUITRY SHOWN FOR CLARIFICATION.



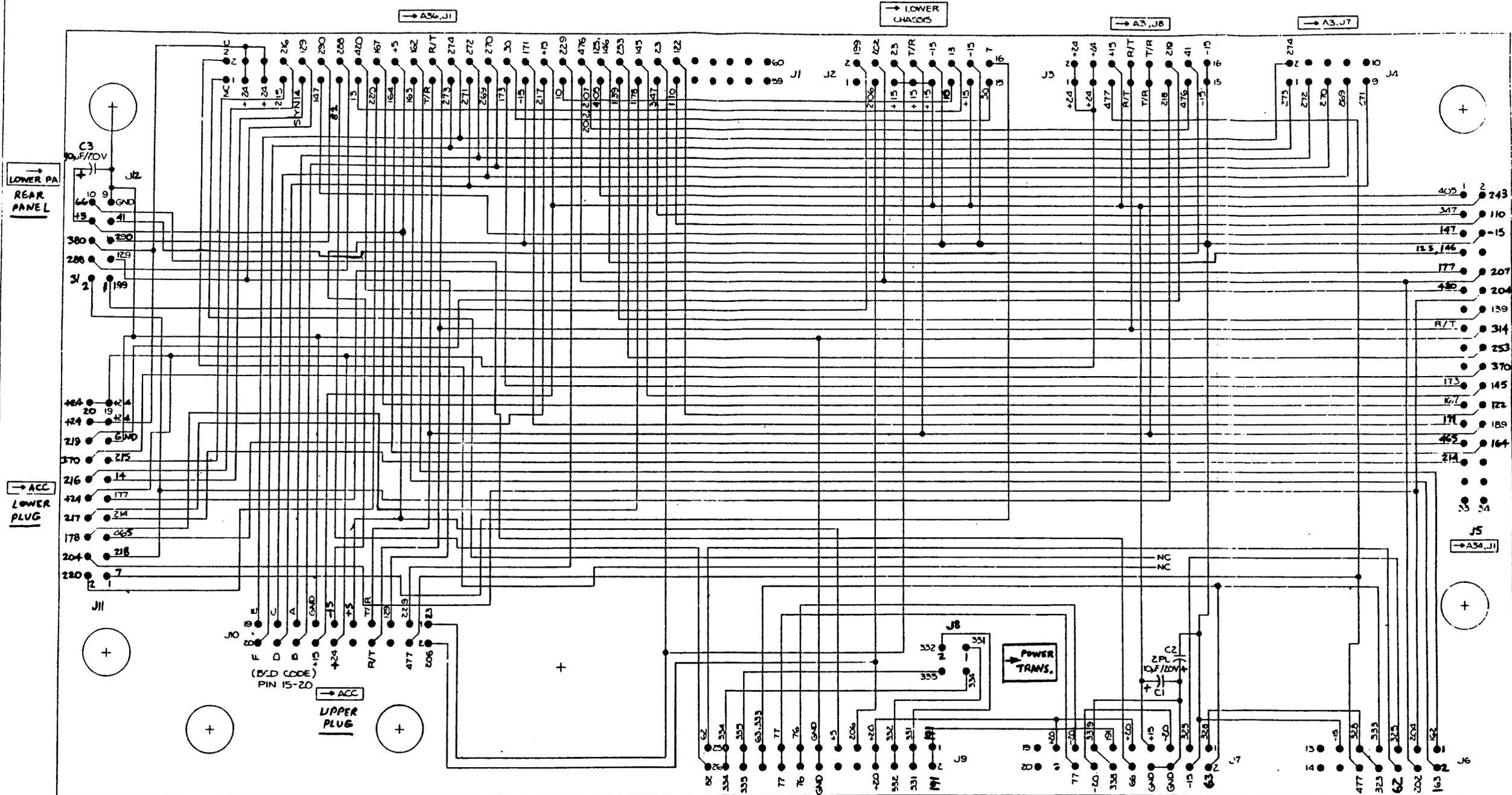
ISSUE: 4-85

A35, A, B, C, D, E, F
MODE SWITCH WAFER BOARDS

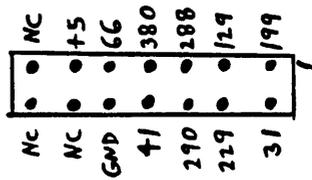


NOTES: 1. TOP VIEW - REAR OF CHASSIS ↓ .

ISSUE: 9-87

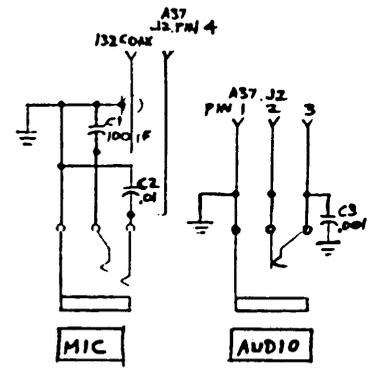
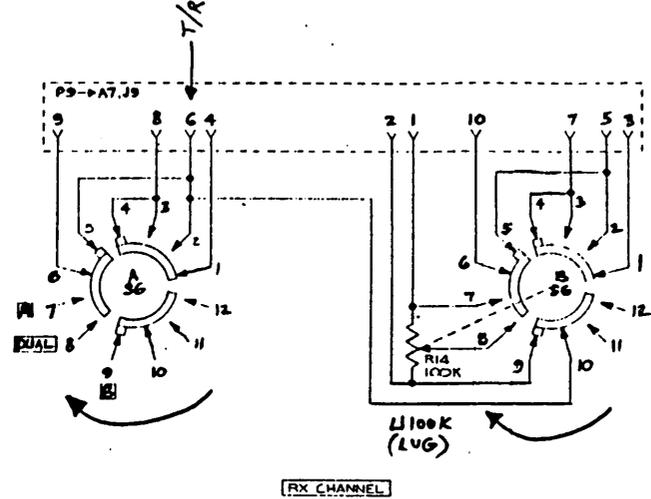
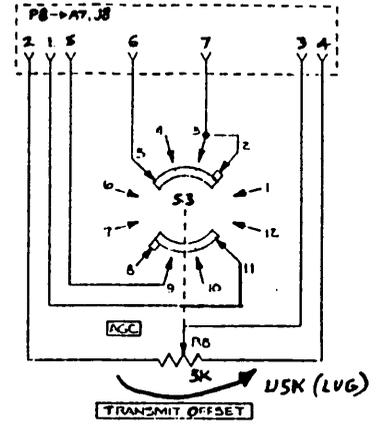
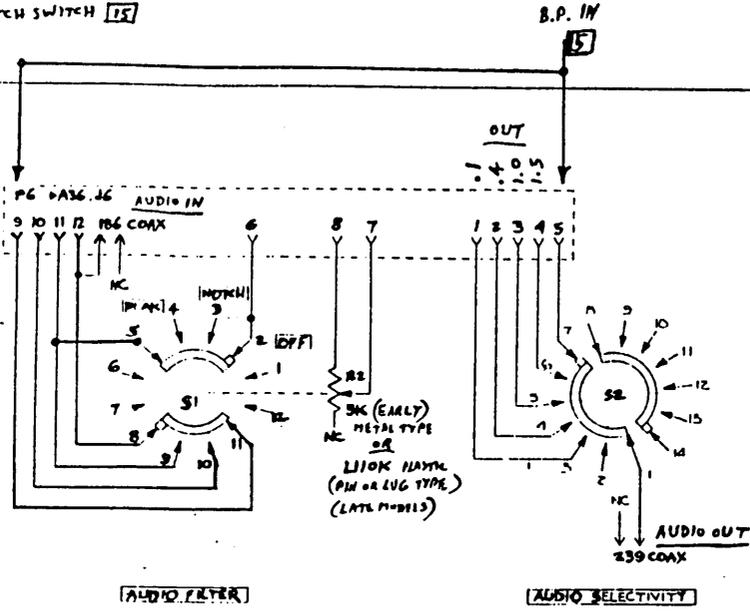


NOTES: 1. VIEW OF BOARD FROM PLUG SIDE (CHASSIS BOTTOM)
 [REAR OF CHASSIS ↓]



J12 (REV. A ONLY)

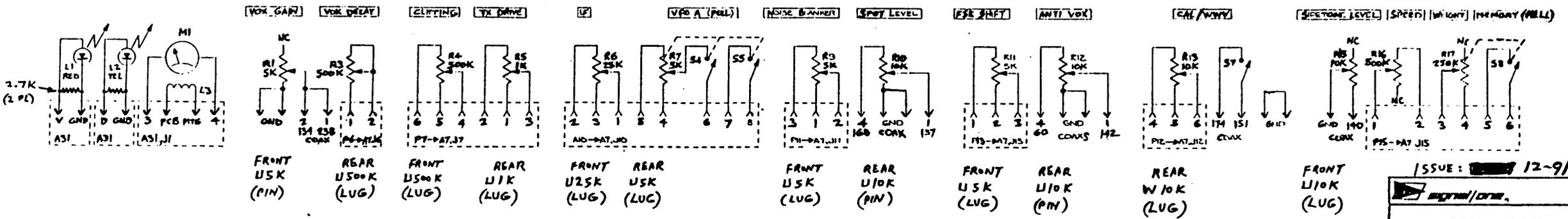
PIN 12 = IN-PEAK/MATCH [7]
 PIN 11 = MATCH OUTPUT [2]
 PIN 10 = PEAK OUTPUT [8]
 PIN 6 = MATCH SWITCH [15]



REAR VIEW - SHOWN IN SLOW POSITION

REAR VIEW - SHOWN IN B POSITION

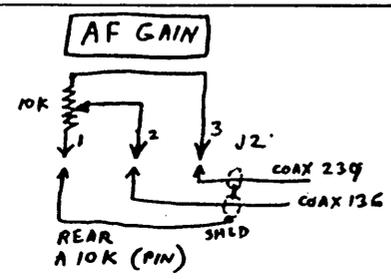
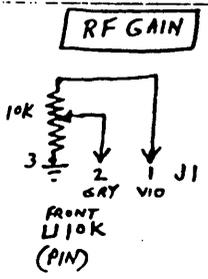
FRONT B 500K (LUG)
 REAR S 250K (LUG)



ISSUE: 12-91

signal/one

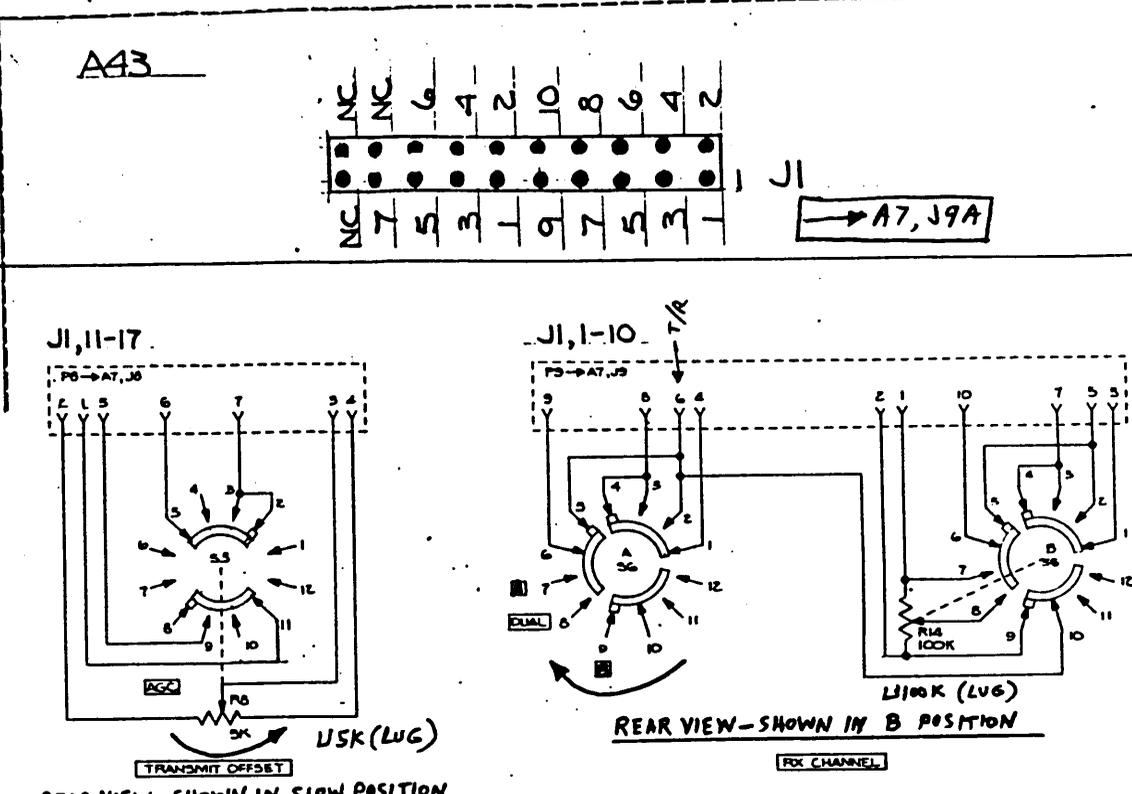
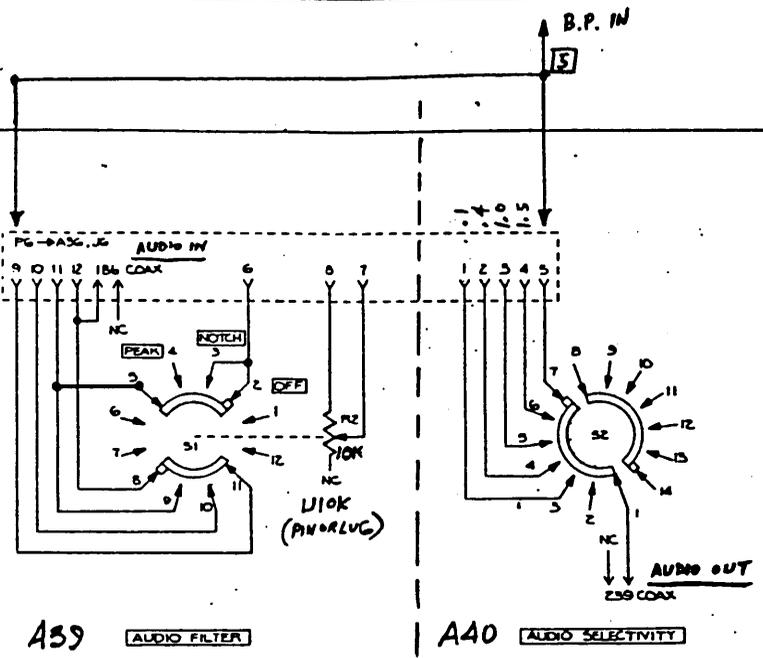
FRONT PANEL INTERFACE



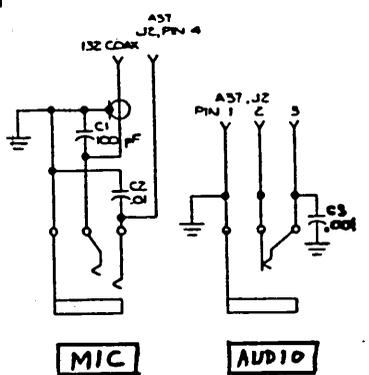
CONTROL NOTES:
 A = CLOCKWISE - LOG ±10%
 B = COUNTER CLOCKWISE - LOG ±10%
 S = MODIFIED LINEAR ±10%
 L = LINEAR ±10%
 W = CERMET LINEAR ±10%
 EQUIPPED WITH SAMBA LUGS OR P.C. BOARD PINS.
 A.B. "MOD POTS"

CONTROL NOTES:
 A = CLOCKWISE - LOG
 B = CCW - LOG
 S = MODIFIED LINEAR
 U = LINEAR
 W = CERAMET LINEAR
 EQUIPPED W/ SOLDER LUGS OR P.C. BOARD PINS
 A.B. "MOD POTS" ±10%

NOTE
 A39, A40
 1. REV A; BOARD A41, A42,
 A43, A44 AS SHOWN.



PIN 12 = IN PEAK / MATCH [7]
 PIN 11 = NOTCH OUTPUT [14]
 PIN 10 = PEAK OUTPUT [3]
 PIN 6 = NOTCH SWITCH [15]

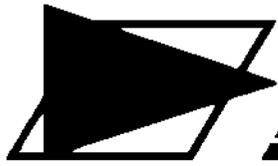




signal/one

***BLACK CANYON INDUSTRIAL PARK * 8146 N. 23RD AVENUE
PHOENIX, ARIZONA 85021 * (602) 995-0608***

Upper Chassis



signal/one

***BLACK CANYON INDUSTRIAL PARK * 8146 N. 23RD AVENUE
PHOENIX, ARIZONA 85021 * (602) 995-0608***

Lower Chassis



**BLACK CANYON INDUSTRIAL PARK * 8146 N. 23RD AVENUE
PHOENIX, ARIZONA 85021 * (602) 995-0608**

SIGNAL ROUTING, COAXIAL CABLE

WIRE

- 4 Coax PTO A out to PTO Mixer Brd.(A 26) .
- 5 Coax PTO A out to Counter (A 28) .
- 11 Coax PTO B out to PTO Mixer Brd.(A 26) .
- 12 Coax PTO B out to Counter (A 28) .
- 15 Synthesizer LO (A17) out from (A 10)to Receiver Mixer (A 22) .
- 16 Antenna in from HP Filter (A20) Lower PA Box to RX BP Filter (A2) .
- 17 Coax Synthesizer L.O. out from (A IO) to Rear Panel Jack.
- 55 Coax RX Audio from Audio Brd. (A6) to Power Supply (A 3) .
- 58 Coax 40 MHz out from PTO Mixer (A26) to TX Mixer (A10) .
- 60 Coax Audio out from Power Supply to Anti Vox Pot.
- 64 Coax RF out from TX Mixer (A10) to Driver (A5) input.
- 79 Coax Aux 40 MHz out from TX Mixer (A10) to "Hi-IF" Jack.
- 119 Coax 34.2 MHz out from BFO Box (A4) to PTO Mixer (A26) .
- 132 Coax from Mike Jack to Audio Brd. (A6) .
- 134 Coax from Vox Gain Control to Audio Brd. (A6) .
- 136 Coax RX Audio in to Audio Brd.(A6) from Audio Gain Control.
- 137 Coax Spot Tone input to Audio Brd. (A6) from Spot Level Control.
- 140 Coax to Sidetone Level Control from Audio Brd. (W.
- 141 Coax 8 MHz Carrier out from AGC Brd. (A9) to IF (A8) .
- 142 Coax from Anti Vox Control to Audio Brd. (W.
- 148 Coax Double Side Band Audio input to AGC Brd. (A9) from Audio Brd. (W.
- 150 Coax Phone Patch input to Audio Brd. (A6) to Patch Jack.
- 151 Coax 100KHz Cal. Signal to RX Filter Brd. (A2) from Cal. Switch.
- 154 Coax 100 KHz to Counter (A28) from AGC (A9) .
- 168 Coax Spot Tone output from PTO Mixer (A26) to Spot Tone Level Control.
- 169 Coax 8 MHz TX input to PTO Mixer (A26) from IF (A8) .
- 174 Coax 100 KHz from AGC (A9) to Cal. ON/OFF Switch.
- 179 Coax PA (All) out to RX/TX Relay Brd. (A33) .
- 182 Coax Double Side Band input to IF (A8) from AGC (A9) .
- 186 Coax Product Det. Audio out from AGC (A9) to Audio Filter Switch.
- 188 Coax Aux. 8 MHz out from IF (A8) to "L.O.-IF" Jack.
- 197 Coax from TX/RX Relay (A33) to Antenna Jack.
- 198 Coax from TX L.P. Switch (A27-A) to TX/RX Relay (A33) .
- 200 Coax TX/RX Relay (A33) to RX H.P. Filter (A20) .
- 201 Coax RX Line from TX/RX Relay (A33) to Ant. Switch.
- 203 Coax 40 MHz Aux. input to Receive Mixer (A22) from "Hi-IF" Jack.
- 228 Coax RF out from Driver (A5) to P.A. (All) .

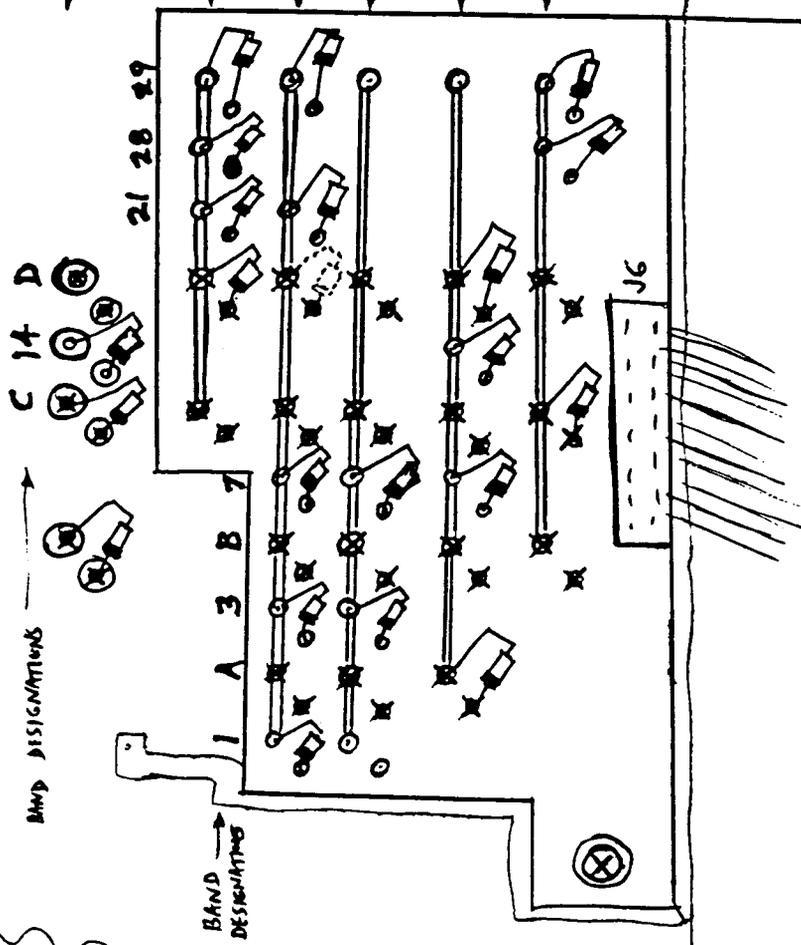


**BLACK CANYON INDUSTRIAL PARK * 8146 N. 23RD AVENUE
PHOENIX, ARIZONA 85021 * (602) 995-0608**

234 Coax RX Signal from RX Filter (A2) to Receive Mixer (A22).
 238 Coax Vox Gain Control to S1 TX Control Switch (AM).
 239 Coax input to Audio Gain Control from Selectivity Switch.
 240 Coax input to RX/Tx Relay (A33) from Antenna Switch.
 247 Coax 8 MHz RX input to IF (A8) from Receive Mixer (A22).
 254 Coax 31 MHz L.O. out from PTO Mixer (A26) to Receive Mixer (A22).
 307 Coax LPF #1 RF output to Bandswitch Wafer (A27-A).
 308 " " #2 " " " " " "
 309 " " #3 " " " " " "
 310 " " #4 " " " " " "
 311 " " #5 " " " " " "
 312 " " #6 " " " " " "
 313 Coax LPF #1 RF input from Bandswitch Wafer (A27-B).
 314 " " #2 " " " " " "
 315 " " #3 " " " " " "
 316 " " #4 " " " " " "
 317 " " #5 " " " " " "
 318 " " #5 " " " " " "
 387 Coax 8 MHz RX IF out from IF (A8) to AGC (A9).
 427 Coax 8 MHz L.O. Signal from BFO Box (A) to AGC (A9).

CX-11A POWER BOARD A-3

-10- -20- -1- -2- -4- -8- = DIGITS OF FREQUENCY BAND
 E ↓ F ↓ A ↓ B ↓ C ↓ D ↓



DIGITS	BAND
20+1+8	= 29 MHz
20+8	= 28
20+1	= 21
20+4	= 24
10+4	= 14
10+8	= 18
1+2+4	= 7
10	= 10
1+2	= 3
4	= 4
1	= 1 MHz

⊗ = SOCKET PIN PLUG-IN
 ⊙ = SOLDERED IN POINTS

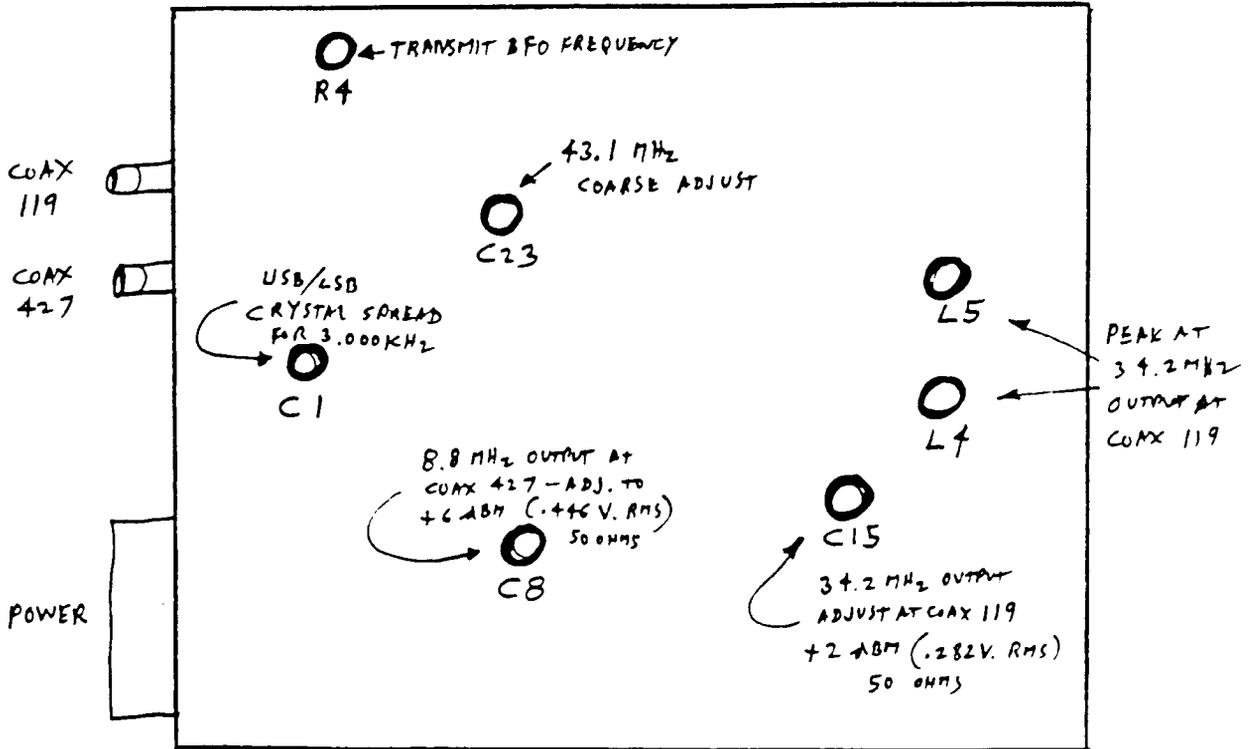
⏏ = 1N270, CATHODE IS BANDED ⊞ = REMOVED DIODE

VIEW FROM COMPONENT SIDE OF BOARD

NOTE: TO CHANGE BAND "D" FROM 25 MHz TO 24 MHz, REMOVE PLUG-IN DIODE FROM ROW A (VERTICAL ROW) ON THE "D" HORIZONTAL ROW. THIS REMOVES 1 DIGIT.

CX-11A BFO ASSEMBLY A-4

CONTROL LOCATIONS



NORMAL USB = 8816.500 KHz

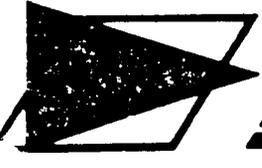
LSB = 8813.500 KHz

1. MONITOR AT JACK FOR COAX 427. PRESS "SPOT" BUTTON TO ACTIVATE TRANSMIT BFO ADJUSTMENT R-4.
2. INSURE THAT AT LEAST ONE COAX CABLE IS ATTACHED AT ALL TIMES IF BOX IS LOOSE FROM CHASSIS DUE TO NO GROUND WIRE IN POWER PLUG.



REAR PANEL FUNCTIONS

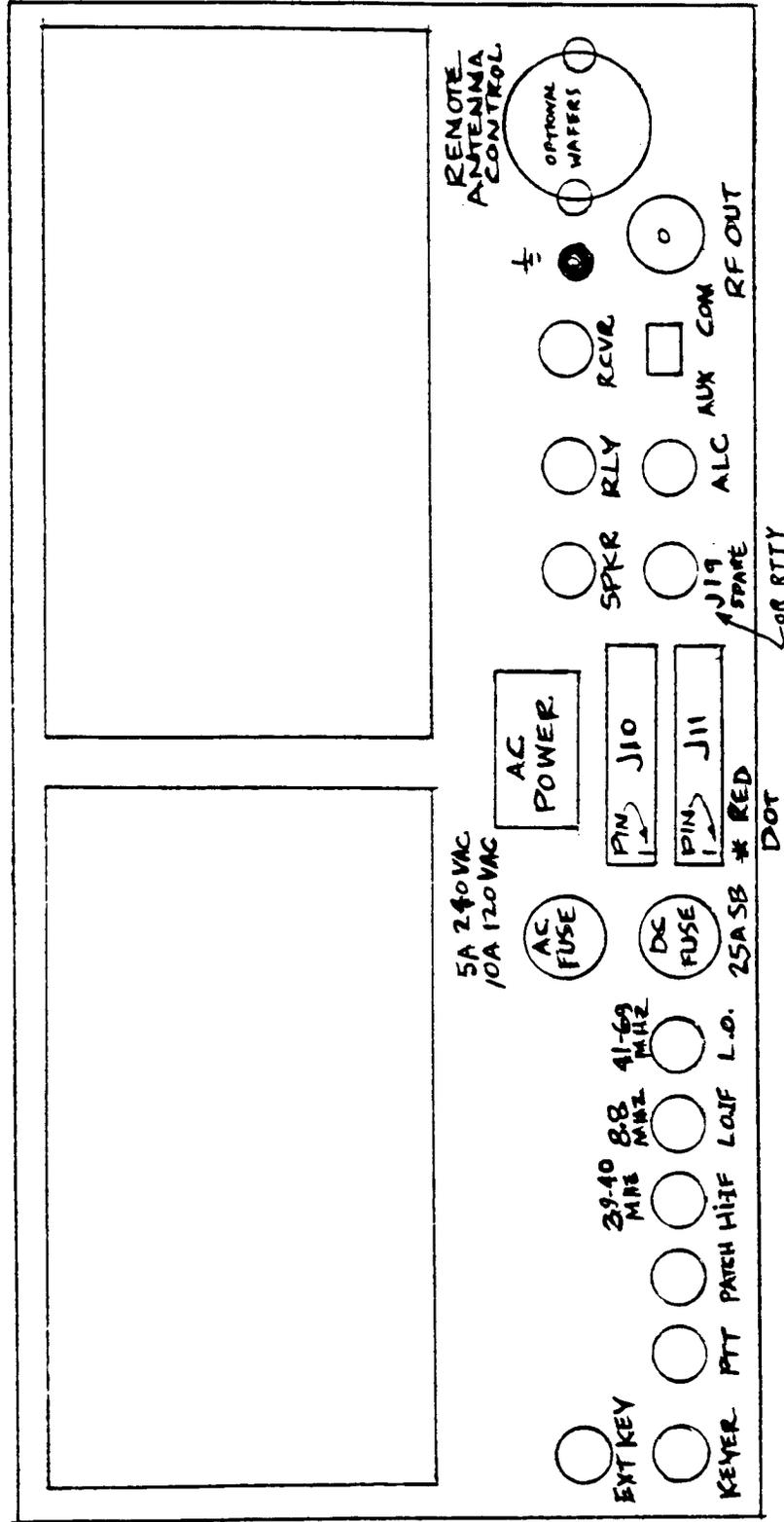
1. KEY: Hand key operation and key return for QSK operation.
2. KEYER: Paddle key operation.
3. J20: External PTT operation.
4. PATCH: Transmit audio input from external phone patch; 680 ohm impedance.
5. HI-IF: 39-40 MHz IF receiver output.
6. LOW-IF: 8.8 MHz IF receiver output.
7. L.O.: 41-69 MHz Synthesizer output.
8. MDX7ASB: 120 VAC fuse (Buss MDL 10 - supercedes panel designation).
9. GBB25AFB: +24V fuse (Buss AGC 25 - supercedes panel designation).
10. POWER: AC input, 120V or 220V depending on internal switch selection on AC Power Board located on the right rear side of chassis.
11. ACCESSORY PLUG, TOP: Input/output voltages for accessory operation. Contact factory for ribbon cable and plug assemblies.
ACCESSORY PLUG, BOTTOM:
 - A. Standard: Fast break QSK operation.
 - B. Optional: Alpha fast break QSK operation.
12. SPEAKER: 4 ohm impedance standard or will automatically match 600 ohm, receive audio phone patch input.
13. RELAY: Transmit ground for external linear operation. Please read WARNING: LINEAR AMPLIFIER OPERATION.
14. J19: FSK mode; grounding J19 shifts PTO B, 1.5 KHz as set by front panel FSK control. **[OR SPARE ON EARLY SERIAL NUMBERS] +15 VOLTS @ 1.7 MA. BEING KEYED.**
15. ALC: Input from linear amplifier, high impedance. Negative ALC -8,VDC transmit RF output minimum.
16. RCVR: Separate receive antenna input as selected by AUX COM Switch. Use COM for normal transceive operation on one antenna.
17. GROUND: Use heavy copper for earth ground.
18. ANTENNA: 50 ohm impedance nominal, use PL 259 connector.
19. BAND SWITCH: Optional wafer switch can be mounted to rear switch bracket to control external band switching functions.



SIGNAL ONE

CX-11A

" REAR PANEL CONNECTIONS "



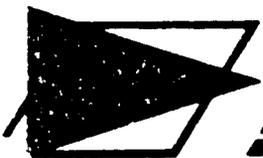
* Voltages Supplied to J10 on rear panel:

- pin 14, +15 vdc @ 100 mA. pin 12, + 24 vdc @ 1 amp.
- 11, -15 vdc @ 100 mA. 7, T/R -15/0 @ 50 mA.
- 9, + 5 vdc @ 50 mA. 8, R/T 0/-15 @ 50 mA.

BCD CODE:

- (capable of driving one TTL load)
- 1 MHz A,B,C,D
- 10 MHz A,B

Refer to Rear Panel Chassis Interface Schematic for pin out and voltage locations.

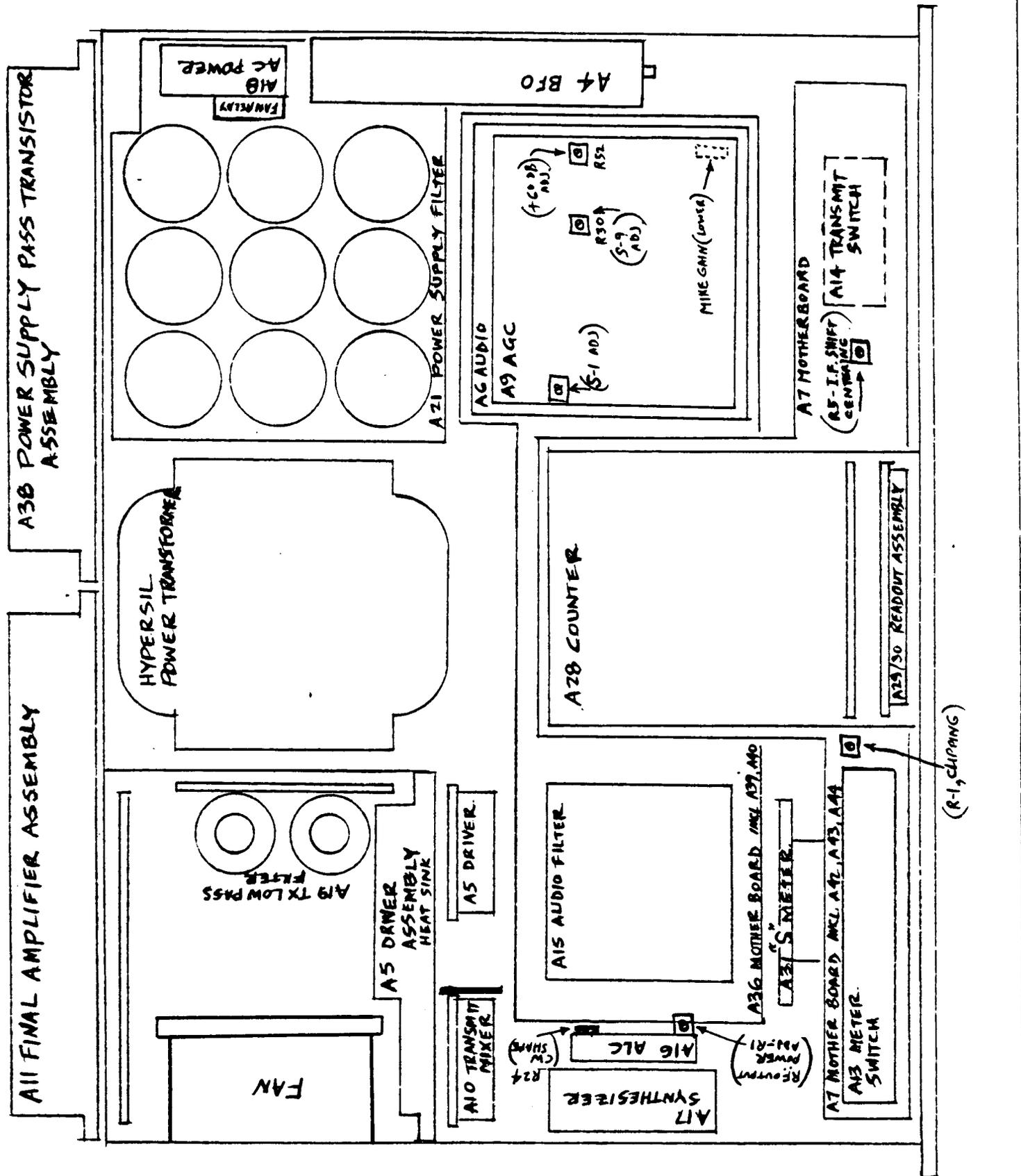


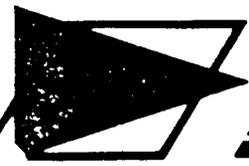
signal/one

BOARD LAYOUT - CX11A

" UPPER CHASSIS "

ISSUE: 8-85



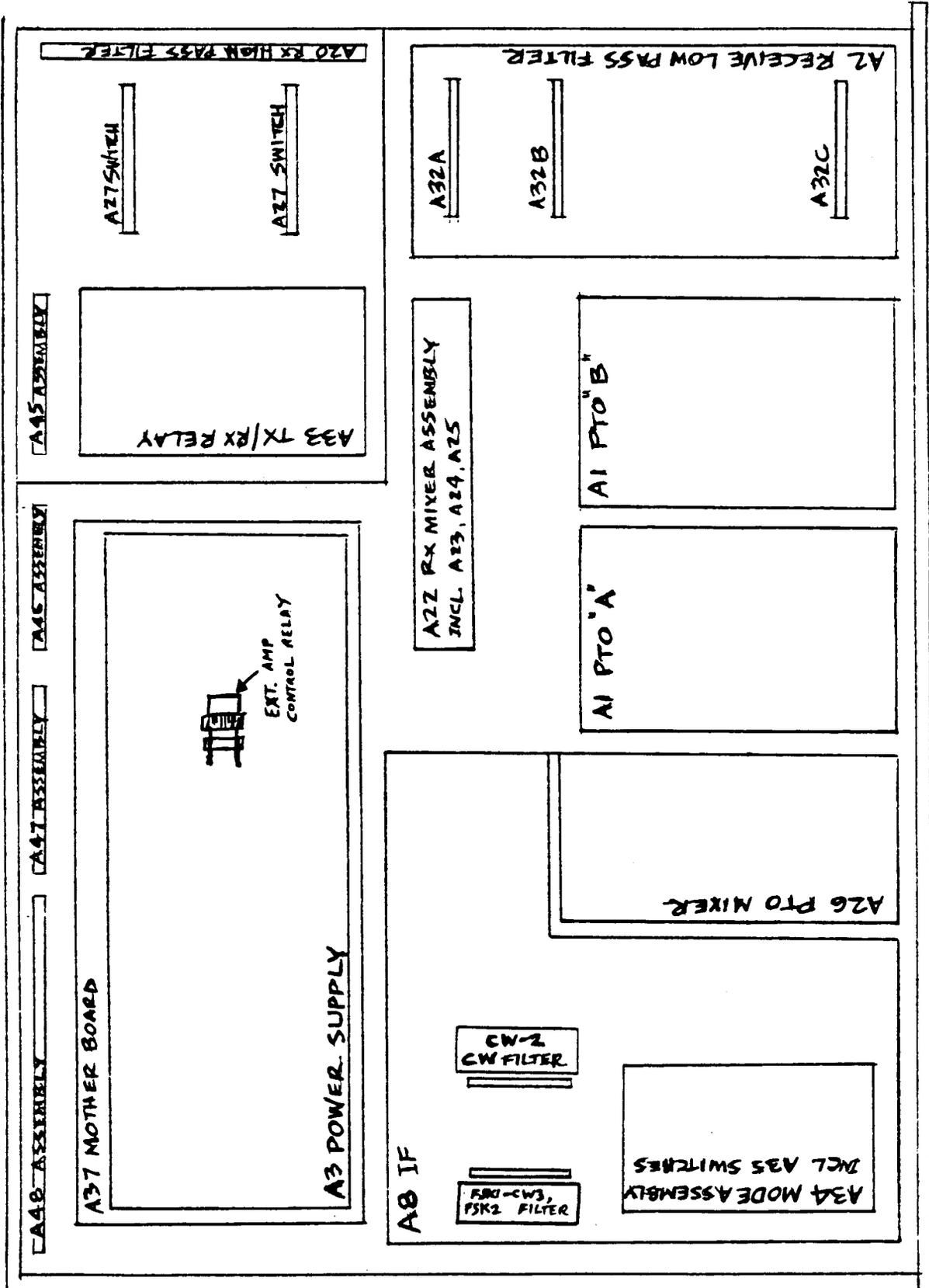


SIGNAL ONE

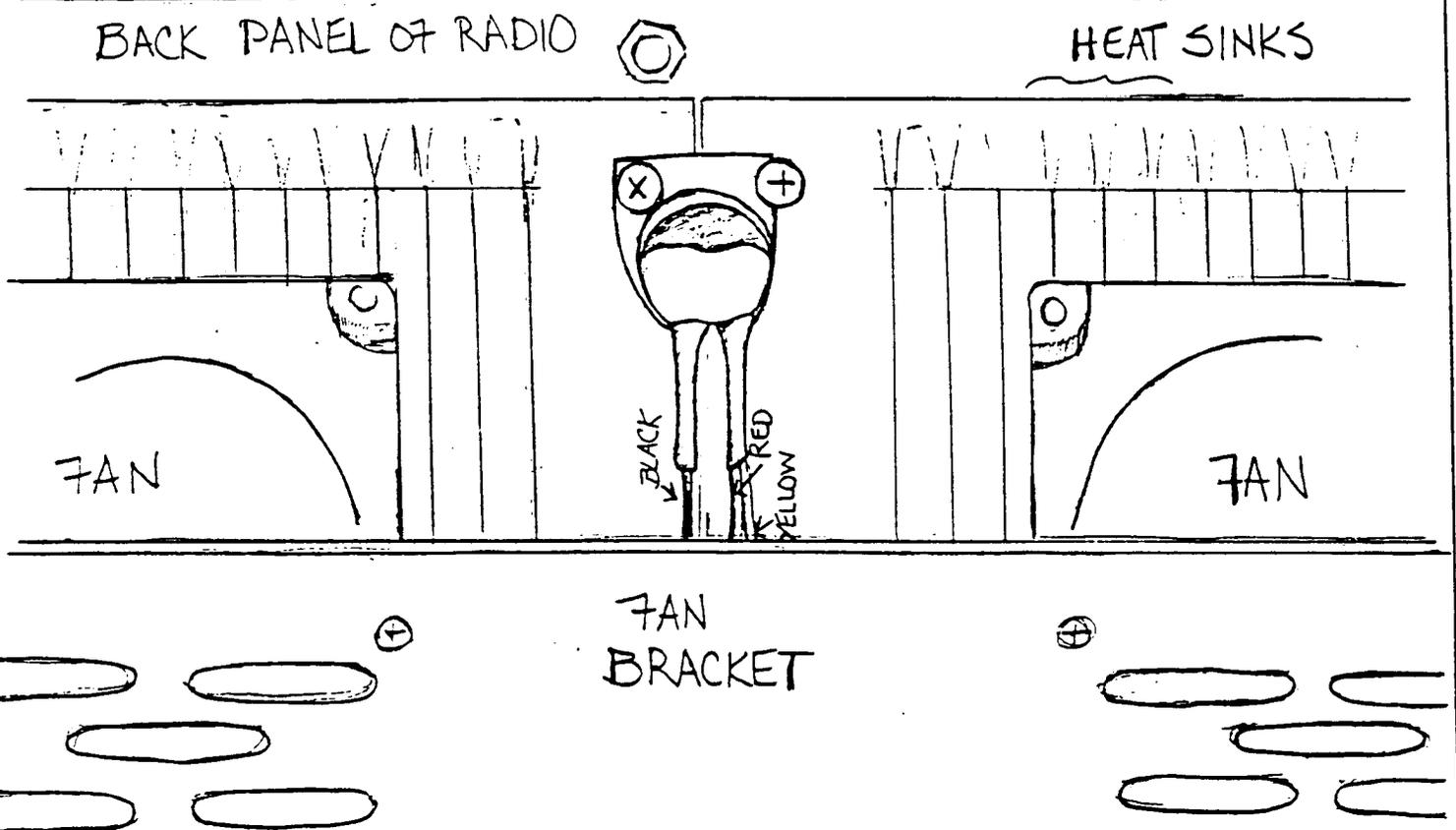
BOARD LAYOUT - CX11A

" LOWER CHASSIS "

ISSUE: 8-85



FAN BRACKET MOUNTING INSTRUCTIONS



1. Mount Thermostat to heat sinks (top center as shown in diagram).
2. Plug in AC Power Cord to rear of radio.
3. Remove outer mounting screws (2 each heat sink).
4. Attach Blower Assembly.
5. Replace screws.