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CINCINNATI ELECTRONICS CORP OHIO

RADIO SET AN/PRC-70().(U)

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TECHNICAL REPORT

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(19) RADIO SET AN/PRC-70 ().

(9) FINAL REPORT.

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C.A. BUCHER

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(15) CINCINNATI ELECTRONICS
CORPORATION

CINCINNATI, OHIO 45241

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ABSTRACT

This final report on the development of the Radio Set AN/PRC-70 manpack receiver-transmitter is concerned with the technical aspects and problems encountered in the development and test of the 21 (ET/ST) Engineering Test/Service Test Models.

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1.0 Purpose

As authorized under contract number DAAB07-71-C-0319, the purpose of this development has been to provide the design, fabrication, test, and delivery of twenty-one (21) Engineering Test/Service Test models of the Radio Set AN/PRC-70. This equipment provides simplex single sideband (SSB), frequency modulation (FM), amplitude modulation (AME), frequency shift keying (FSK) and continuous wave (CW) communications in the frequency range of 2.0 to 76.0 MHz for operation in a Manpack environment.

2.0 System Description

The AN/PRC-70 is a lightweight multi-mode radio system consisting of the following:

- Basic manpack receiver-transmitter - RT-1133/PRC-70
- Combination Antenna Systems
- Complementary equipment, inter-connecting cables and carrying bags and frames.

The basic receiver-transmitter serves as the heart of the system. Its wide frequency range (2-76 MHz in 100 Hz steps) and its multi mode capability (CW, FSK, SSB, AME, FM) provide full operational compatability with a large number of equipments. In addition the AN/PRC-70 will interface with the AN/GRA-71, AN/GRA-39, AN/GSH-6, AT-784 and secure communications applique equipment both in the HF and VHF frequency range. Two AN/PRC-70 systems may be interconnected by a single cable to provide retransmission of voice on any two frequencies in the 2-76 MHz band (FM from 30 to 76 MHz). The receiver desensitization and transmitter noise performance has been designed to meet the increased demand for high performance in environments of large signal densities.

The basic AN/PRC-70 receiver-transmitter provides reliable reception and transmission of AME, CW, SSB, and FSK from 2-76 MHz, and FM from 30-76 MHz. FM voice is normally adjusted for 50 kHz channelization and a modification kit provides for 25 kHz channelization. The transmitter power output is 30 watts from 2-76 MHz, and is matched to the antenna by a completely automatic static/binary antenna coupler. This automatic coupler frees the user from positional constraints while providing maximum radiated power under widely varying conditions thus increasing combat effectiveness. The coupler has sufficient range to match impedances represented by a 6 ft. , 9 ft. , and a 15 ft. whip, $\lambda/2$ doublet and a 300 ft. low radiation angle long wire, each in its respective frequency range.

3.0 Components Description

3.1 Basic Receiver-Transmitter RT-1133/PRC-70 (see figure 1). The Receiver-transmitter RT-1133/PRC-70 (referred to hereafter as the RT unit) is the major assembly of the AN/PRC-70 radio set. This unit is housed in a metal case assembly and contains the receive and transmit circuitry. Two finger-operated release latches are provided to attach the battery case to the RT unit. The operator's controls and the various connectors are located on the front panel of the RT unit.

3.2 Accessory Carrying Bag (see figure 2). The Accessory Carrying Bag is a nylon duck bag with a shoulder strap. This bag is used for carrying the following equipment:

- (1) Handset H-138B/U
- (2) Headset H-251/U
- (3) Telegraph Key KY-605/U
- (4) Whip Antenna Assembly AS-2974/PRC-70
- (5) Low Radiating Angle Antenna Assembly AS-2973/PRC-70
- (6) Burst Cable Assembly

- 3.3 Carrying Kit (see figure 2). The Carrying Kit is used to carry the radio set in the one-man portable configuration. In the two-man load configuration, it is also used to carry additional components (the Ancillary Carrying Bag), of the radio set to the selected site of operation. The kit contains the following items:
- (1) Rucksack frame
 - (2) Packboard plate and shelves for rucksack frame
 - (3) Packboard webbing
- 3.4 Two-Man Load Carrying Bags (figure 2). The two-Man load Carrying Bags are used whenever additional operating methods are required. The bags are identified as the Mast Carrying Bag and Ancillary Carrying Bag and are carried by a second man. When the Two-Man Load Carrying Bags are used, an additional carrying kit (1A7) is required to carry the Ancillary Carrying Bag. This bag is a mounted on the carrying kit in the same manner as the Receiver-Transmitter.
- 3.5 Doublet Antenna Assembly AS-2975/PRC-70 (Figure 4). The Doublet Antenna is a half-wave portable antenna cable of being tuned to any operating frequency between 2 and 30 MHz. The assembly consists of the following components:
- (1) Two lengths of antenna wire with frequencies marked on the wires at intervals corresponding to 90% of a quarter wavelength for every half MHz from 2 to 30 MHz. Each wire is wound on a lightweight hand reel.
 - (2) A balun assembly which couples and matches the feed line to the two balanced antenna wires.
 - (3) A 40-foot coaxial feed line (or cable assembly).
- 3.6 Whip Antenna Assembly AS-2974/PRC-70 (see figure 3). The whip antenna consists of a foldable 6-foot antenna and a foldable 9-foot antenna. These 2 antennas may be joined together to form a 15-foot whip antenna. The 6-foot antenna is used in the 4 to 76 MHz range, and the 15-foot antenna is used in the 2 to 30 MHz range. The following accessories are provided with the whip antenna:
- (1) An adjustable antenna base used with the 6-foot or 9-foot section.

- (2) A rigid antenna base used with the 15-foot during stationary setup.
- (3) A halyard assembly with stakes and guy ropes used with the 15-foot antenna setup.
- (4) A grounding stake assembly used to ground and stabilize the radio set during operation with any antenna in any configuration other than portable.

3.7 Low Radiating Angle Antenna Assembly AS-2973/PRC-70. This assembly consists of a 300-foot length of antenna wire wound on a reel, a 40-foot length of nylon cord wound on a lightweight bobbin with a 6-ounce lead weight attached. This antenna is used in the 6 to 30 MHz frequency range.

3.8 Mast Assembly (Figure 4 & 5). The mast assembly is used to erect the Doublet Antenna (AS-2975/PRC-70) and may also be used to erect the 300-foot Low Radiating Angle Antenna (AS-2973/PRC-70). The assembly consists of the following items:

(1) Two 15-foot masts, each consisting of five 3-foot sections. The two 15-foot masts can be joined together to form a 30-foot mast for erecting the low radiating angle antenna

- (2) Two base assemblies with locking pins
- (3) Six stake assemblies
- (4) Two guy plates
- (5) One insulator
- (6) One transition adapter
- (7) One halyard assembly
- (8) Eight guy rope assemblies
- (9) Guy rope bobbin assemblies (two each)
- (10) Mast Carrying Bag

3.9 Burst CW Cable Assembly. This assembly is located in the Accessory Bag and consists of two cables with their connectors and is designed to adapt the

radio set to Keyer KY-468/GRA-71 (KE-8B), and Recorder Signal Data, RO-291/GSH-6 equipment for burst CW transmission and reception.

3. 10 Maintenance Cable Assembly. This assembly consists of adapter cables used by higher category maintenance for testing and troubleshooting the RT unit. The maintenance cable assembly is not used for operator or organizational maintenance.

3. 11 Technical Characteristics

The following subparagraphs describe the technical characteristics of the radio set.

3. 11. 1 Receiver-Transmitter RT-1133/PRC-70

Input Voltage ----- 20 to 32 Vdc

Power Requirements

Receive Mode ----- 7 watts maximum

Low-power Xmit Mode ----- 50 watts maximum

High-power Xmit Mode

FSK, CW, FM, and AM ----- 160 watts maximum

SSB ----- 115 watts maximum

Power Output:

High-power Mode

CW, FM*, FSK ----- 30 watts average $\pm$ 1.5 db

SSB ----- 30 watts pep $\pm$ 1.5 db

(Peak Envelope Power)

AME ----- 7.5 watts carrier, $\pm$ 1.5 db

7.5 watts upper sideband

* FM transmit enabled only in 30.0000 to 75.9999 MHz range.

Low-power Mode ----- transmitter output reduced 10 ± 1 dB below high power output in all modes

Frequency Range ----- 2.000 to 75.9999 MHz in 100 Hz steps

Duty Cycle ----- 9 to 1 receive-to-transmit ratio.

Modes: Upper sideband voice; 2 kHz Tone-keyed CW, FSK burst (Tones 1575 Hz and 2425 Hz); Compatible AM (2.000-75.9999 MHz);
FM (30.0000-75.9999 MHz)

Receiver Sensitivity: (RF input levels required to obtain 10 dB)

	$S + N + D / N + D$	
FM -----		0.50 μ V Typical
SSB, FSK, CW -----		0.25 to 0.50 μ V (varies with frequency)
AM -----		2.0 μ V Typical

Receiver Selectivity

FM -----	32 kHz @ 6 dB
	70 kHz @ 60 dB
SSB, CW, FSK -----	2.8 kHz @ 6 dB
	4.0 kHz @ 26 dB
	6.0 kHz @ 60 dB
AM -----	6.0 kHz @ 6 dB
	14.0 kHz @ 60 dB

3.11.2 Doublet Antenna AS-2975/PRC-70:

Frequency Range ----- 2 to 30 MHz

Input Impedance ----- 72 ohms

3. 11 3 Whip Antenna AS-2974/PRC-70:

6-foot Section ----- 4 to 76 MHz

9-foot Section ----- 3 to 76 MHz

15-foot Section ----- 2 to 30 MHz

3. 11. 4 Low Radiating Angle Antenna AS-2973/PRC-70:

Frequency Range----- 6 to 30 MHz

4.0 Receiver-Transmitter (RT 1133/PRC-70) Description

A block diagram of the basic receiver-transmitter is shown in Figure 1. Antenna connection is made on the front panel connectors, either the whip connector, BNC, or binding post. An automatic matching network matches the various antennas to 50 ohms with a 1.5:1 VSWR maximum. Once the antenna is tuned, no dc power is drawn by any of the matching network circuits, either in receive or transmit, thereby providing maximum battery life. The matching network has full memory capabilities; even with the set turned off, without the use of conventional servo-driven networks. A radio silence position, termed "Rec Only", removes the network from the signal path, providing optimum reception without the need for tune up.

The receiver is a triple conversion superhetrodyne with the successive IF frequencies of 111.455, 11.455, and .455 MHz. The received signal entering from the antenna coupler, passes through the input filtering and into the upconversion mixer. The input filtering consists of a 2 - 76 MHz bandpass filter. The signal is upconverted in the wide dynamic range mixer to a VHF IF of 111.455 MHz. Upconversion methods offer minimum VFO tuning range and maximum rejection of antenna radiation. IF and image responses are rejected by a simple lowpass filter. The selectivity/gain stage is followed by a selective crystal filter, with 32 kHz bandwidth. A FET low noise amplifier provides more gain before mixing down to the second IF of 11.455 MHz. The 11.455 MHz IF provides additional amplification and filtering before being converted to 455 kHz where ultimate selectivity is acquired. AGC circuits control gain throughout the system, each sequenced systematically to provide optimum signal handling and ultimate S/N ratio performance.

The squelch circuitry provides squelch operation completely independent of electromagnetic noise levels, thus eliminating the need for an operator-adjusted threshold control.

The synthesizer generates all necessary injection frequencies for the system, including necessary tones for tone squelch, CW, FSK and coupler network status. The basic injection frequency for the first mixer covers the range of 113.4550 to 187.4549 MHz. This signal is generated by a unique VFO providing signal to noise ratios before unattainable in any but crystal oscillators followed by crystal filters. This VFO is phase locked to the standard by means of two interpolation loops, one for 10 MHz and 1 MHz steps, the other for 100 kHz and lower steps.

The transmitted signal path is shown by the dashed lines in Figure 2. Input audio signals, voice, CW, & FSK are bandlimited, and shaped in the audio amplifier section, before application to the modulator circuits. The FM signal, plain and cypher, is generated at 11.455 MHz, by a voltage controlled crystal oscillator (VCXO), the output of which is amplified, filtered and applied to the mixer which converts the signal to the 111.455 MHz IF. All other transmit signals are generated at 455 kHz where speech processing, filtering and amplification takes place. This signal is then converted to 11.455 MHz where it follows the same path taken by the FM signal. After transition through the tuner in the reverse direction, the signal is amplified in the transmit broadband amplifier to .25 watts, the level of which is held constant by an ALC loop.

In the power amplifier section, the 0.25 watt signal is amplified to a level of either 30 watts or 3 watts equivalent out of the antenna matching network. The power amplifier section is composed of broadband stages, hybrid coupled together eliminating tuning and providing isolation between the two parallel stages. The networks hold power output constant across the frequency range, while VSWR detectors provide control for device protection against any antenna load between a short circuit and an open circuit. Harmonic filters follow the power amplifier.

The antenna matching network uses low loss components in a static/binary T network. The static/binary network principle provides freedom from troublesome electro mechanical servo systems. It provides contiguous coverage, rapid tune up, and full circuit memory requiring no dc power after tune up. A sensing circuit is also provided to monitor the VSWR and actuate an audible "NO TUNE" indication when the VSWR shows a mismatch approximating a ratio of 3:1. This "NO TUNE" indication is a series of "beeps" in the audio output.

The system is compatible with various standard battery types and operates with any DC voltage from 20 to 32 volts. High efficiency switching regulators maintain all internal voltages within 5% of nominal over all environmental conditions. Power drain of less than 6.5 watts in receive and less than 160 watts worst case transmit assures a battery life which meets mission requirements. A 9 to 1 receive to transmit cycle is recommended but the unit can be considered to be a continuous duty device at the sacrifice of battery life. The unit will not be damaged, even at maximum temperature, if keyed continuously.

System mechanical layout permits rapid failure location and correction through the use of numerous accessible test points, plug in modular construction, and planar PC layout.

The module system layout is shown in Figure 36. A typical plug in module is shown in figure 38. The removal slot can be seen in the upper left hand corner. Planar construction is also evident which results in relatively simple layout and ease of fabrication. Figure 37 shows the use of an ordinary screw driver to effect removal of a module for analysis.

Schematics for the modules are provided in this report as Addendum 2. The changes which resulted from the test observation have been included in these drawings which represent the modules and units in the delivered configuration.

5.0 Factual Data Analysis DC Input Current Requirement

Figure 6 shows the D. C. current requirement for the AN/PRC-70 radio set. Typically when delivering 30 watts output power in CW, FM, FSK modes of operation 144 watts of D. C. input power is required for a +24 DC source. SSB and AME operation require 108 watts D. C. input when measured with two tones and a PEP power output of 30 watts. In voice mode less than 70 watts are required. In the low power mode (3 watts RF output), less than 40 watts of D-C input power are required from a +24 source. Receive mode requires less than 6.5 watts of D. C. input power. These power requirements translate to a battery life as shown in Table 5.1. Also shown are some of the major characteristics of the batteries.

<u>Battery</u>	<u>Type</u>	<u>Temp. Range</u>	<u>Condition</u>	<u>Battery Life</u>	<u>Weight Lbs.</u>
BB 651 ()/U	NICAD	-40°F to +140°F	1 Min Xmit FM 9 Min Rec. SSB	9 Hrs. 12 Hrs.	11.5
BB 534 ()/U	Silver Zinc	-20° F to +120°F	1 Min Xmit FM 9 Min Rec. SSB	10 Hrs. 13.5 Hrs.	8.5

TABLE 5.1

5.2 GRA-71 Operation

The oscilloscope photos in Figure 7, 8, & 9 show the operation of the GRA-71 between two AN/PRC-70 radio equipments. The key line is the output of the GRA-71 entering Radio A; the RF output is that of Radio A which enters Radio B antenna port; the audio output is that of Radio B which enters the decode device or the GSH-6. The significance of the photos is the absence of "key clicks" or tails and the overall system response.

Successful tests were also conducted to verify the operation of the GRA-71 in conjunction with the GSH-6.

5.3 CW Mode Operation

During this testing, a problem was uncovered in the turn-around time of the AN/PRC-70 when operating in CW mode. The problem occurred wherein the first character was not transmitted when starting a message. This was due to a receive-to-transmit turn-around of 100 milliseconds. Upon investigation it was found that a transient went into the transmit audio section and shut off an operational amplifier for this period. Filtering was added to the power line plus a minor revision of the switching to alleviate this problem. The turn-around time is now less than 5 milliseconds which provides excellent CW performance.

5.4 RF Power Output and Receiver Sensitivity

Figures 10 and 11 shows the typical power output achieved while operating at cold temperature extremes. Several design deficiencies were noted during this phase of the testing and design changes resulted in acceptable performance.

Figures 12, 13, & 14 shows the typical receiver sensitivity performance obtained at temperature extremes.

5.5 Fungus

The Fungus Testing was completed and the only identifiable growth was a small amount noted on the rubber protective caps used on the 2-wire antenna input connector. No corrective action is planned since this item is an approved MIL type component purchased from a qualified source.

5.6 Humidity

Humidity testing has been completed. The unit performed satisfactorily during this test. Following completion of the test an examination of the boards revealed that tiny blisters (air bubbles) were present under the conformal coating. Investigation has shown that this phenomenon occurs when proper cleaning is not accomplished before coating. Corrective action will be taken on all future systems.

5.7 Antenna Matching

One of the major design efforts in this development was directed toward solving the remaining problems in the antenna matching network. These were, in particular, the inability of the system to tune a 15-foot whip below 3.0 MHz, and various frequency "holes" when using the long wire. Modifications have been made with the addition of a transformer for use with the long wire antenna which links the impedance to 1000 ohms, and a logic change to the 15-foot whip. These changes have been incorporated into all systems. Table 1 shows the matching capability of the 21 ET/ST systems as measured with actual antennas. These measurements were made at Cincinnati Electronics with the equipment set on the ground and located approximately 300 feet from any large building or structure. As indicated a "hole" still exists around 20 MHz when using a 6 ft. whip.

5.8 Desensitization

Figure 15 shows the typical desensitization of the AN/PRC-70 Radio Set. The measurement was made by obtaining a 26 dB signal-to-noise ratio at the desired signal and increasing the interfering signal until this output signal-to-noise was degraded by 6 dB.

5.9 Wideband Delay

Figure 16 shows the absolute delay of a total system operating in wideband mode (one AN/PRC-70 transmitting and one AN/PRC-70 receiving). The photos in Table 2 show the response of the system at various repetition rates.

5.10 AGC Characteristics

The following table shows the AGC attack and decay characteristics in all modes.

AGC CHARACTERISTICS

Mode	Attack Time	Discharge Time
AM	15 ms	0.81 sec
CW	15 ms	0.81 sec
FSK	15 ms	0.81 sec
SSB	15 ms	1.25 sec

Figure 19 shows the AGC gain characteristics.

5.11 Audio Distortion

Table 3 shows the typical audio distortion. At the high level (300,000 μ V) the linear mode modulations are very close to saturation; hence the distortion varies drastically. Some radios have AM distortion as high as 26 percent. In all cases the distortion improves to under 5 percent when the level is reduced by 6 dB.

5.12 Receiver Squelch

Table 4 shows the receiver signal-to-noise squelch in all modes of operation. The squelch system has been adjusted in a laboratory environment, as well as in the field, to achieve optimum operational performance. In the FM mode the squelch has been operated with the AN/PRC-77 and in SSB/AM it has been operated with other AN/PRC-70's and randomly selected signals to prove compatibility.

TABLE 4. SQUELCH CHARACTERISTICS

MODE	Un-squelch Output SINAD	Squelch Output SINAD	Decay Time (Sec)	Attack Time (msec)
SSB	4 dB	4 dB	1.2	80
AME	4 dB	4 dB	1.2	80
FM	6.5 dB	6.5 dB	1.2	80

Squelch Operation is disabled in the CW and FSK modes.

5.13 Transmit FM Deviation

Although FM deviation is preset at the module level, when measured at the system level it is typically ± 9 kHz for a 1 kHz tone. The 150 Hz tone when measured at system level is ± 3 kHz

5.14 Transmit Intermodulation Distortion

Table 5 shows the 3rd and 5th order intermodulation products typically being achieved as well as for the carrier suppression, hum, noise, and lower sideband.

5.15 Antenna Matching

Table 6 shows the antenna coupler matching capability. This data has been taken with the developed antenna loads. Table 1 shows the tuning of the actual 6, 9, and 15-foot long whip antennas. The coupler will match 50 ohms

up to 65 MHz and above this point is very marginal. Upon investigation it was found that the network is not capable of matching this load above this frequency without reduction of center point capacity. If the center point capacity is reduced, the 9 and 6-foot long whip antennas cannot be tuned. No action is presently planned to correct the 50 ohm matching problem since it is only a test condition. A matching network as part of the test set is, however, being considered. The 15-foot whip and other antenna matching have been corrected by a logic change. A photo of a dummy load is shown by Figure 19. Figures 20 thru 34 are computer plots of dummy load box inductor and capacitor settings. These plots are for load SN2. The plots for the other loads have been supplied with each specific load already delivered.

5.16 Reliability Tests

The reliability tests consisting of a Reliability Acceptance Test and a Reliability Index determination test have been successfully completed. The Reliability Acceptance tests indicated an MTBF greater than 1000 hours after a total of 7897 hours were accumulated on six (6) units. The RID test indicated an MTBF of 1867 hours after a total of 16,800 hours were accumulated on the test samples. The results of these tests are detailed in the applicable test reports.

6.0 Conclusions

6.1 Electrical Design

The ET/ST units retain all the important features of the engineering prototype models and exhibit definite improvements over earlier design concepts for this type equipment.

6.2 Advantages over Existing Equipments

Comparison to existing equipments relative to electrical performance characteristics and capabilities is not meaningful because there is no equipment which was required to have all the features listed under Technical Characteristics (see Section 3.11)

The advantages therefore are mainly a repetition of these major characteristics as required by the applicable specification. These are:

- Broad frequency coverage, 2 to 76 MHz
- Practically continuous tuning, 100 Hz steps
- Fast automatic tuning into a wide variety of antenna configurations, average tuning time approx. 1 sec.
- Optimum antenna radiation efficiency because of automatic tuning feature. Also provided with audible indicator to tell operator that antenna is mistuned.
- High or low RF power selection, 3W or 30 W
- Ability to operate in a variety of common communication modes compatible with existing systems, SSB, AME, CW, FSK & FM.
- Size and weight. Transportable in rucksack frame, total RT weight less than 18 lbs.
- Completely transistorized (silicon) to operate over temperature range of -50°F to +160°F.
- High inherent availability because of high demonstrated MTBF and low MTTR. Calculation yields 99.98%. Assuming good depot and maintenance procedures a Field Availability of 90% can be anticipated.

6.3 Design Improvements

The more important improvements in design of the AN/PRC-70 as a result of the test program include the following:

- 1) Mechanical reinforcements and protection pads to enable successful drop test results.
- 2) Antenna Coupler modifications which enabled the system to tune the 6, 9, & 15 foot whip antennae as well as the doublet and long wire.
- 3) Improvement of card guide rivets (solid instead of hollow) resulted in more consistent grounds and improved equipment performance.
- 4) Circuit modifications to enable units to perform within specification at cold and hot extremes.

ADDENDUM 1

Human Factors Engineering Final Report - J004

The primary objective of the AN/PRC-70 Human Factors Engineering program was to promote the development of a functionally integrated equipment in compliance with a person's capabilities.

The basic human-machine interfaces, as detailed in the system specifications, have been successfully implemented. Information flow and operator task loading have been optimized in the AN/PRC-70 control panel through selective displays and placements of the controls.

Information flow and maintenance personnel taskloadings have been optimized by use of selected test points, placement of these points and construction of the equipment. The successful completion of the Maintainability Demonstration showed that the mechanical design and the electrical test point selection were adequate to meet the maintainability requirements specified.

Complete equipment supportability has been assured through effective interfaces between the Human Factors Engineers and the Maintainability, Reliability, Engineering, and Technical Publications working groups.

FIGURES

Figure No.

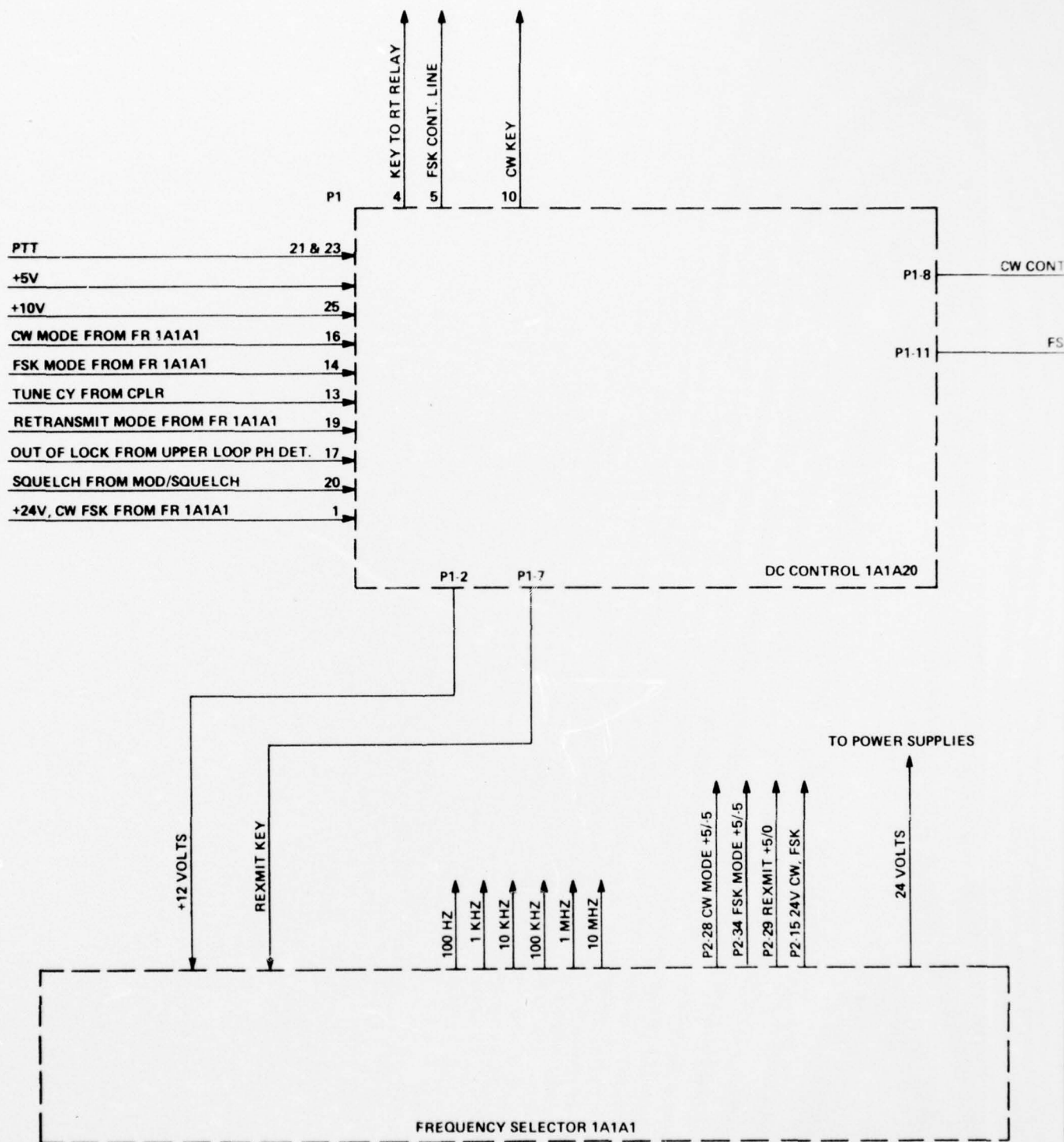
1 (2 sheets)	Receiver Transmitter RT-1133/PRC70 Block Diagram
2	Accessory Carrying Bag & Carrying Kits
3	Whip Antenna Assy AS-2974/PRC -70
4	Doublet Antenna Assy AS-2975/PRC -70 and contents of Ancillary Carrying Bag
5	Mast Section for Antenna Systems and Contents of Mast Carrying Bag
6	DC Current Requirement
7, 8, 9	Operation with GRC-71
10, 11	Transmit RF Power Output
12, 13, 14	Receiver Sensitivity
15	Densensitization Curve
16	Overall Delay, Wideband Mode
17	FM Selectivity Plot
18	AM Selectivity Plot
19	AGC Gain Characteristics
20	Dummy Antenna Load
21 thru 35	Inductance & Capacitance Settings vs. Frequency for Dummy Loads for simulating 6 ft., 9 ft., 15 ft., Doublet and 300 ft. long wire antenna
36	Location of Modules in RF Unit
37	Module Removal Photograph
38	Upconverter Module

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2



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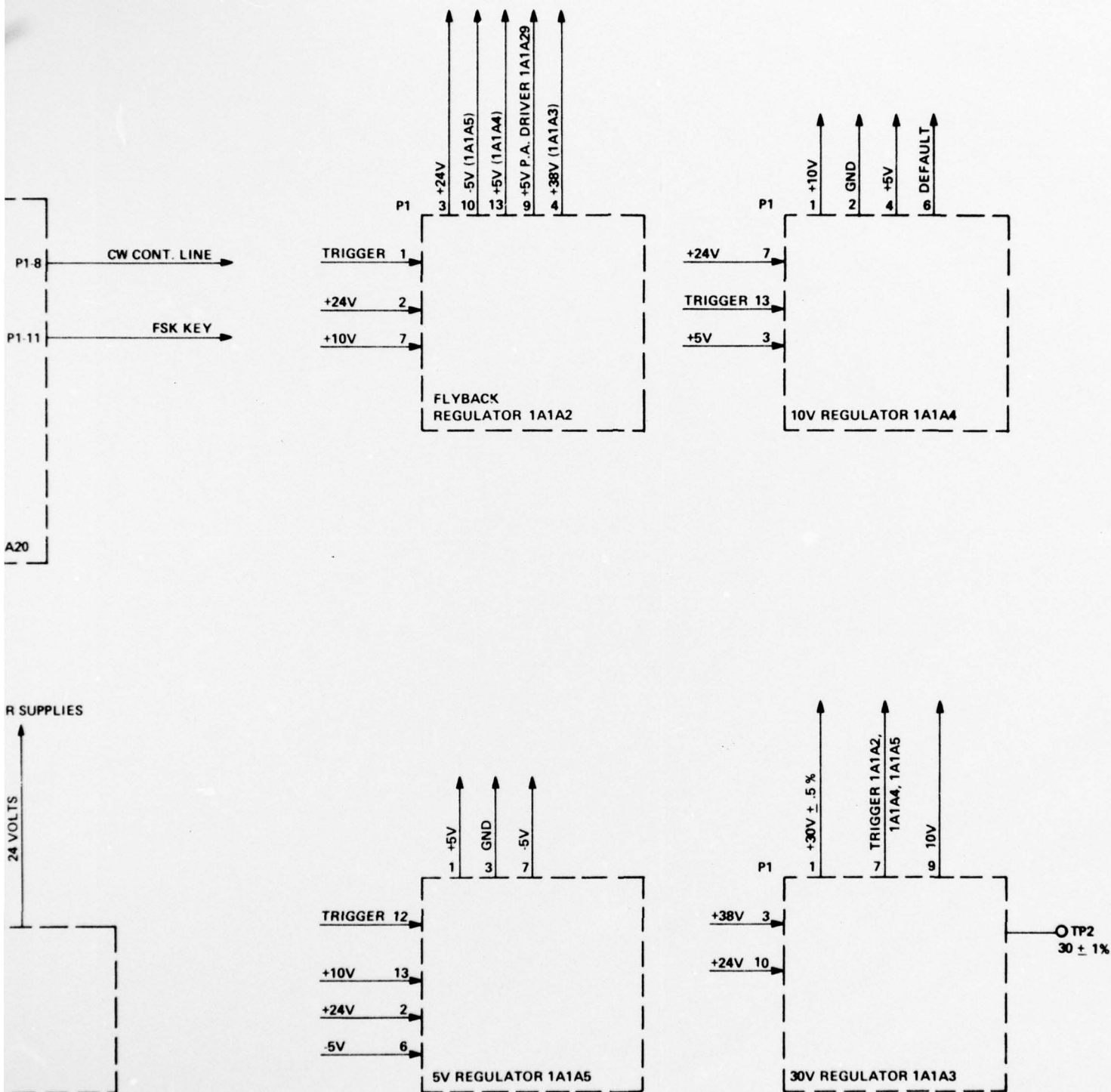
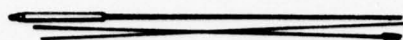
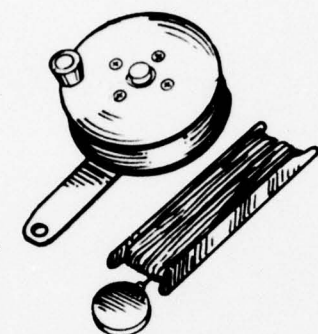


Figure 1 Receiver-transmitter block diagram (sheet 2 of 2)



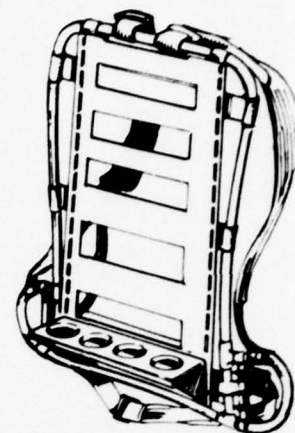
COMBINATION WHIP ANTENNA



300 FT. LOW RADIATING
ANGLE ANTENNA



ACCESSORY
CARRYING
BAG



CARRYING KIT



KEY



HEAD SET

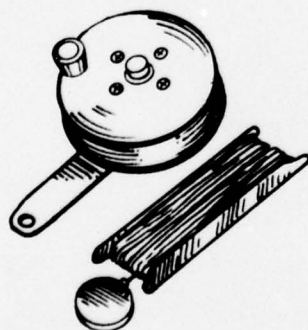
ONE-MAN CW CONFIGURATION



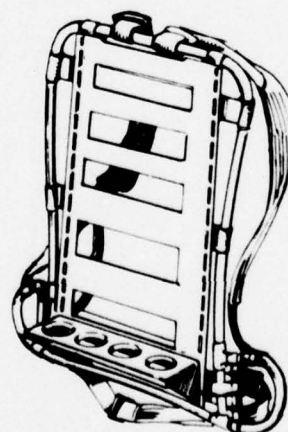
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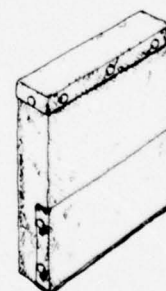
HEAD SET



300 FT. LOW RADIATING
ANGLE ANTENNA



CARRYING KIT



ANCILLARY
CARRYING BAG



ACCESSORY
CARRYING
BAG

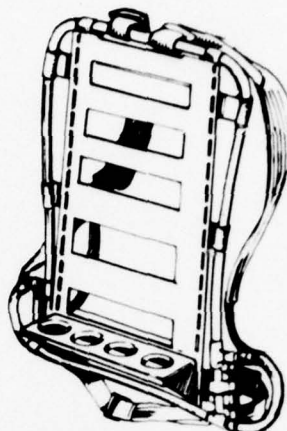
NOTE: NOT DRAWN TO SCALE



KIT



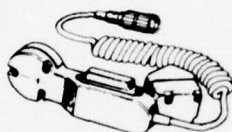
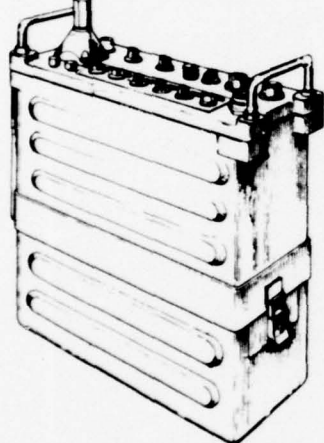
ACCESSORY
CARRYING
BAG



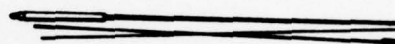
CARRYING KIT

ONE-MAN VOICE CONFIGURATION

RECEIVER-TRANSMITTER
WITH BATTERY

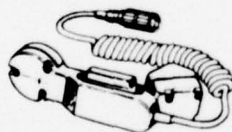


HAND SET



COMBINATION WHIP ANTENNA

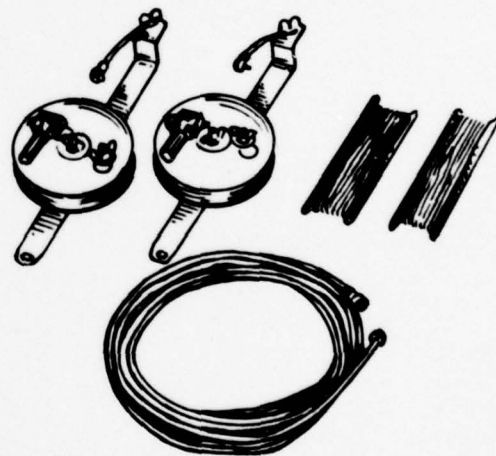
TWO-MAN CONFIGURATIONS (VOICE AND CW)



HAND SET



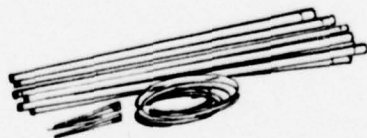
MAST CARRYING
BAG



HALF WAVE DOUBLET ANTENNA



ACCESSORY
CARRYING
BAG



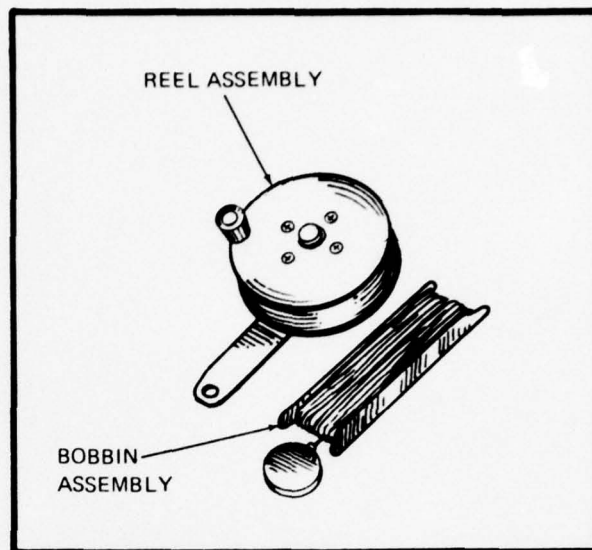
MAST ASSEMBLY

Figure 2 One- and two-man load configurations



ACCESSORY
CARRYING
BAG

NOTE: NOT DRAWN TO SCALE



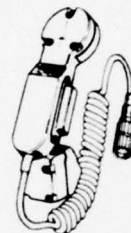
REEL ASSEMBLY

BOBBIN
ASSEMBLY

LOW RADIATING ANGLE ANTENNA
ASSEMBLY AS-2973/PRC-70



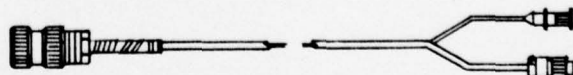
HEADSET H-251/U



HANDSET H-138B/U



TELEGRAPH KEY KY-605/U



BURST CABLE
ASSEMBLY

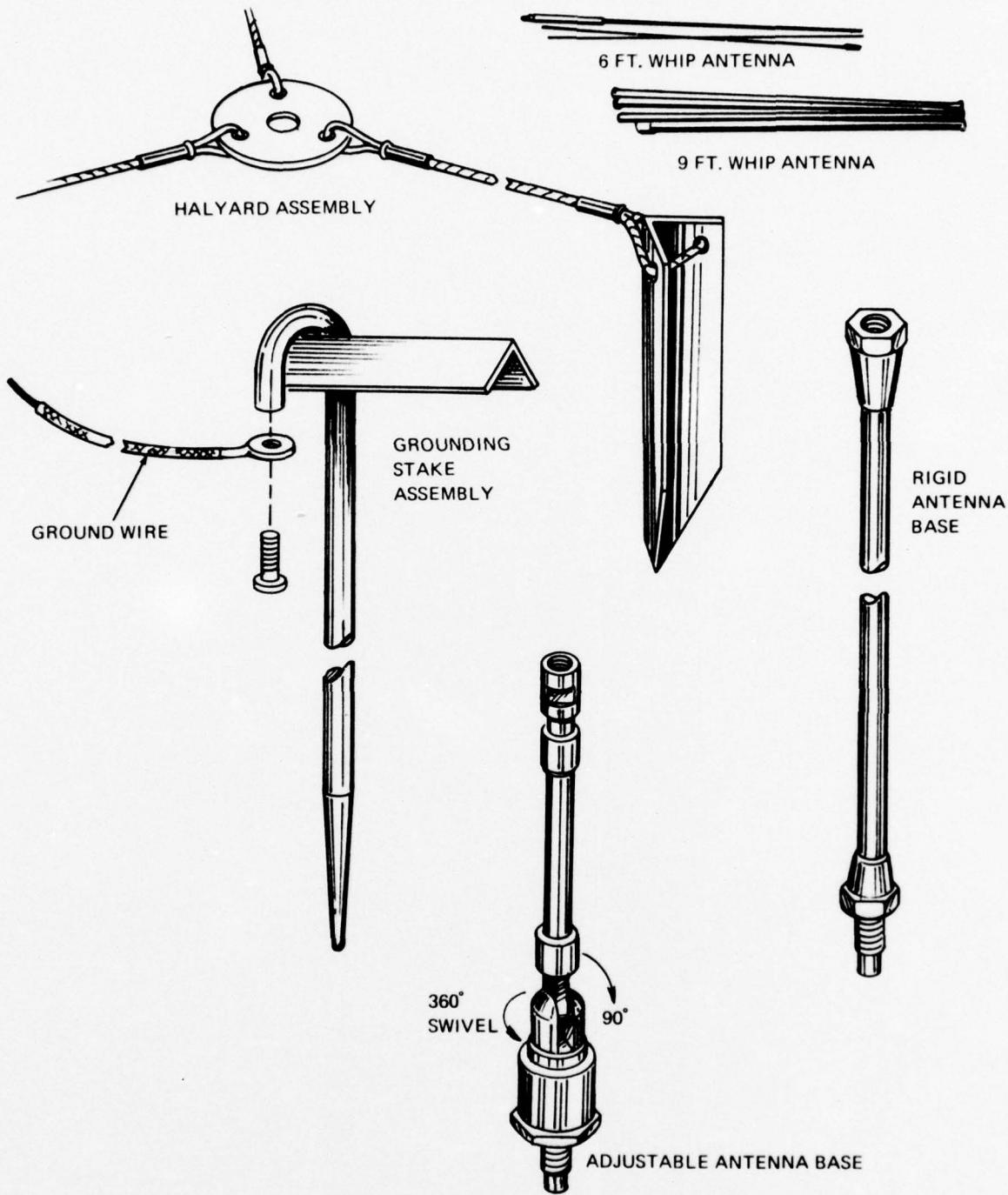
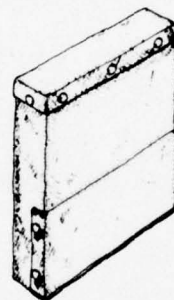


Figure 3 Whip Antenna Assy and Accessory Bag Contents

2



ANCILLARY
CARRYING
BAG

NOTE: NOT DRAWN TO SCALE

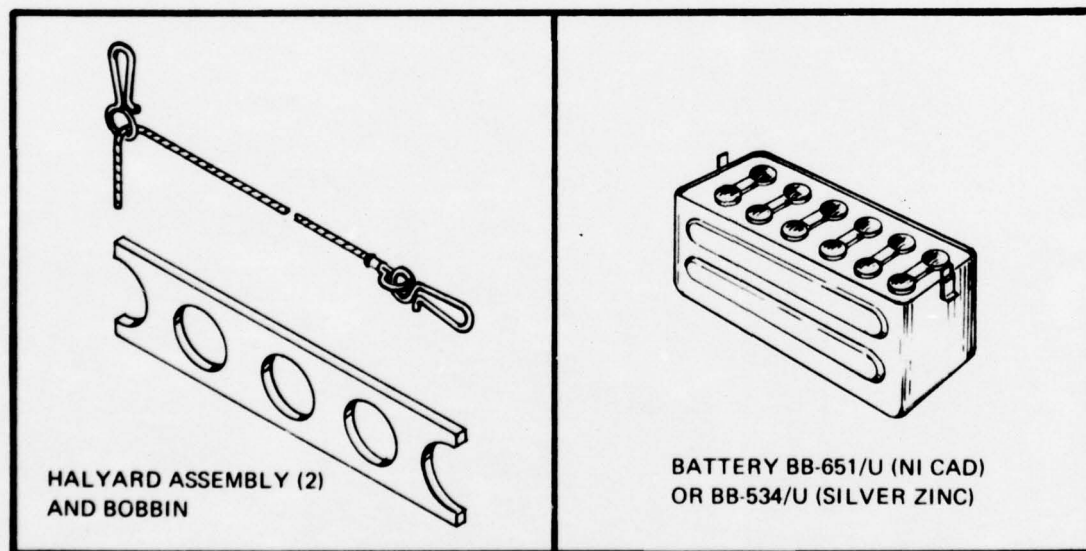
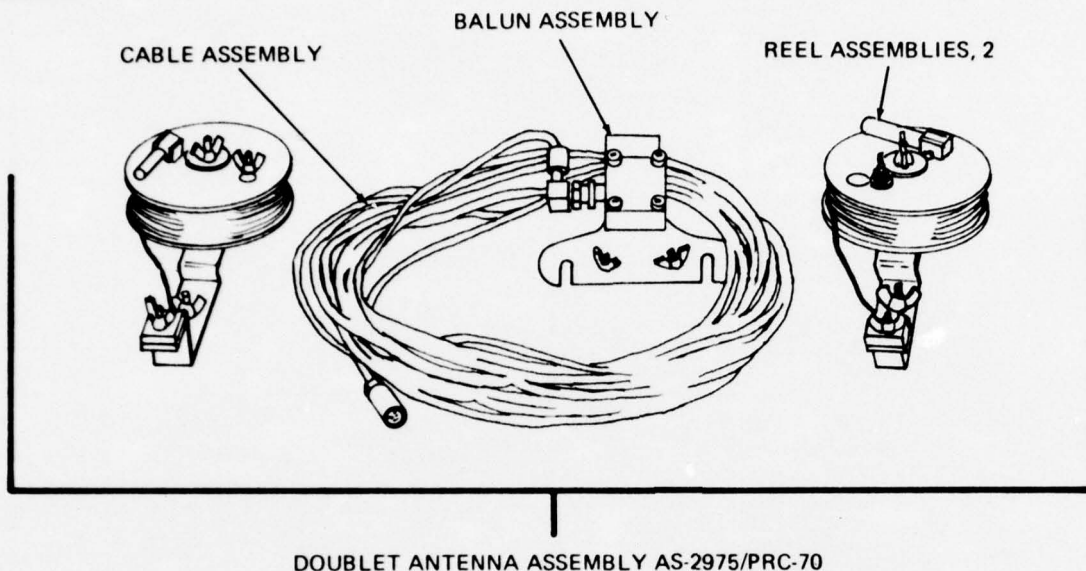
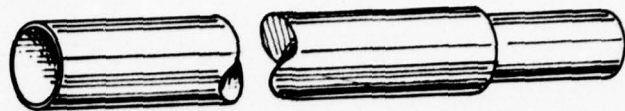


Figure 4 Contents of Ancillary Carry Bag

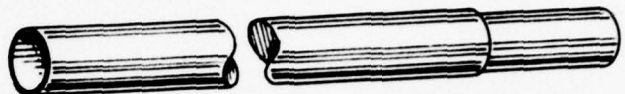
MAST
CARRYING
BAG



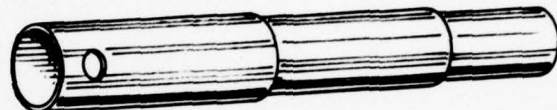
NOTE: NOT DRAWN TO SCALE



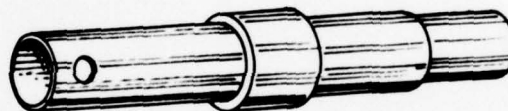
MAST SECTIONS, LARGE DIAMETER, 5



MAST SECTIONS, SMALL DIAMETER, 5



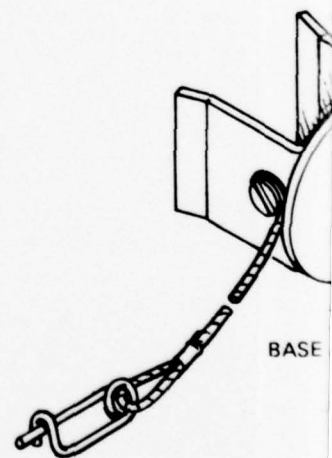
TRANSITION ADAPTER, 1



INSULATOR, 1



BASE LOCKING PINS, 2



BASE

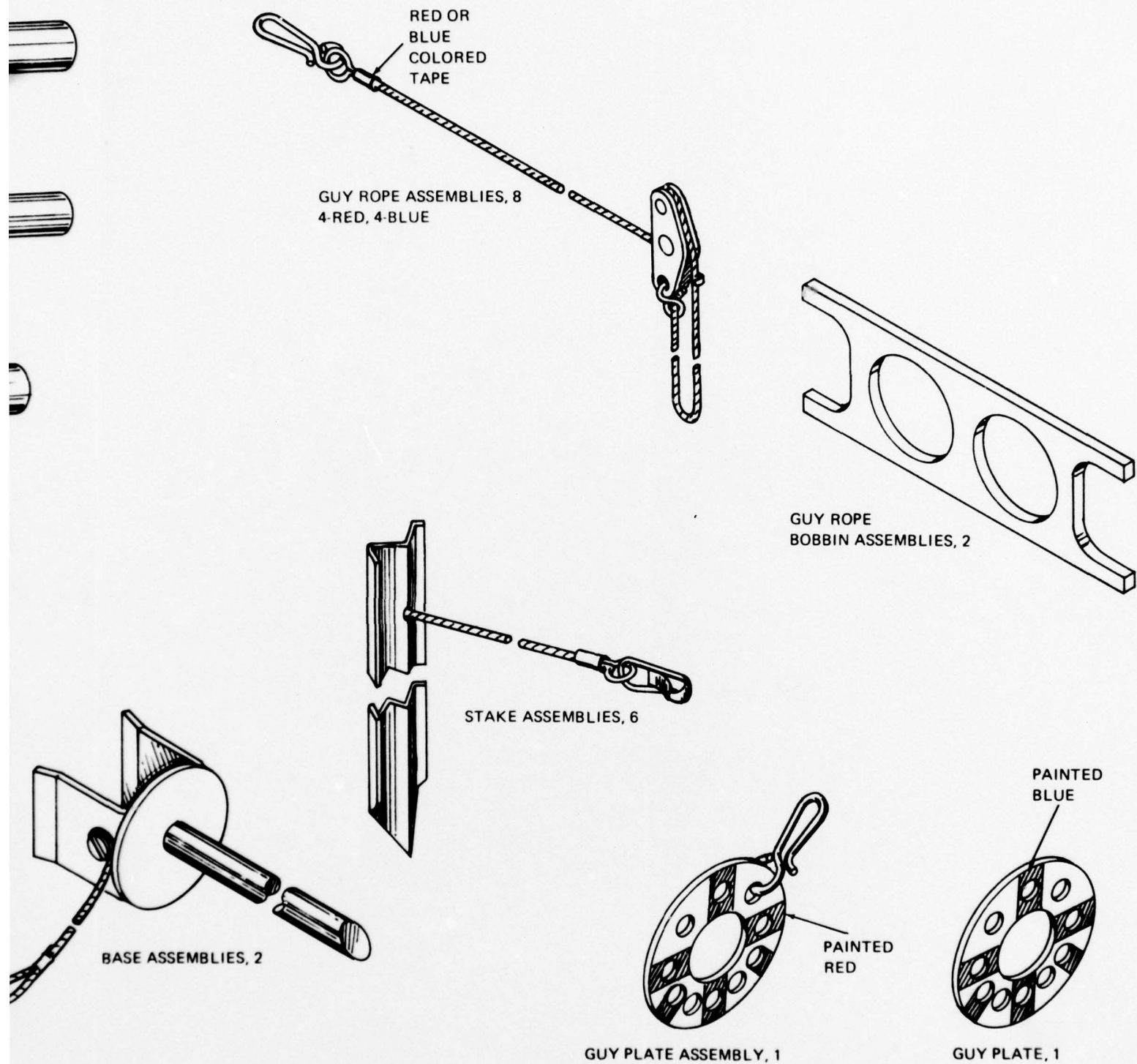


Figure 5 Doublet Antenna-Mast Carrying Bag

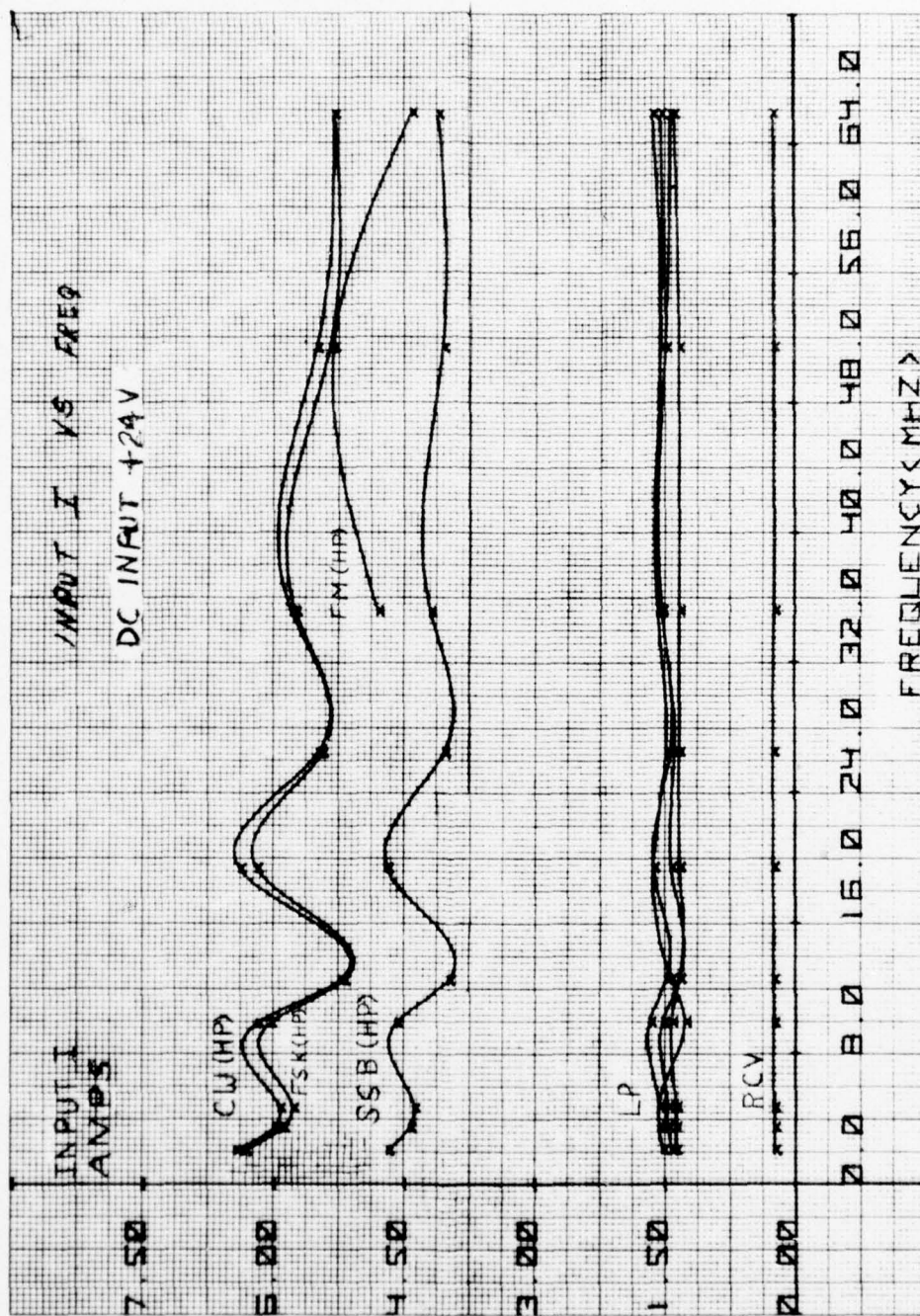
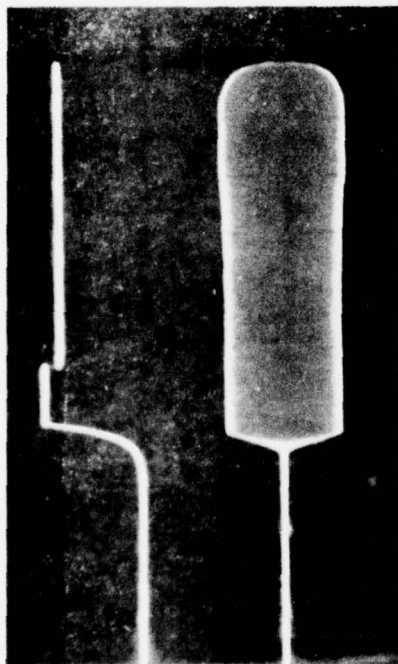


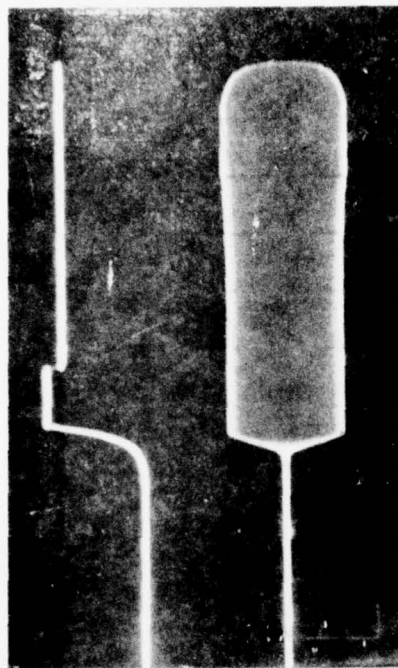
Figure 6 Input Current vs. Frequency - PRC-70

OPERATION OF THE GRA-71 BETWEEN TWO AN/PRC-70 RADIO SETS

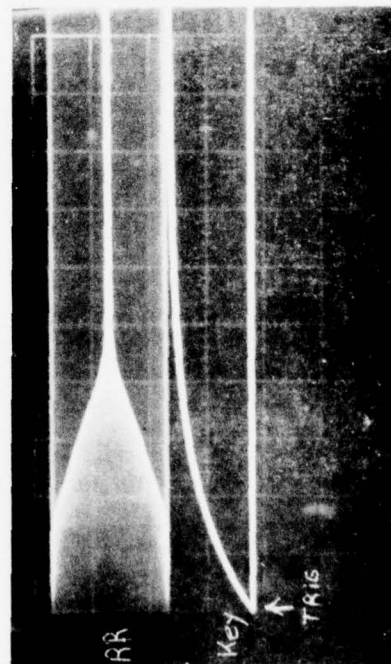
PRC-70 WITH GRA-71
IDY SIGNAL



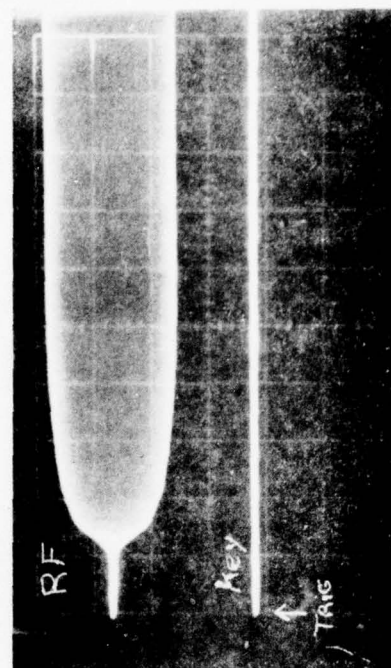
0.5 MSEC/DIV



0.5 MSEC/DIV



50 μ SEC/DIV

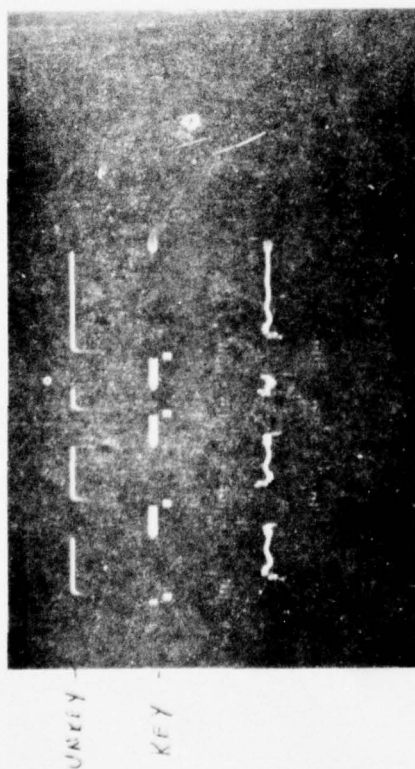


0.1 MSEC/DIV

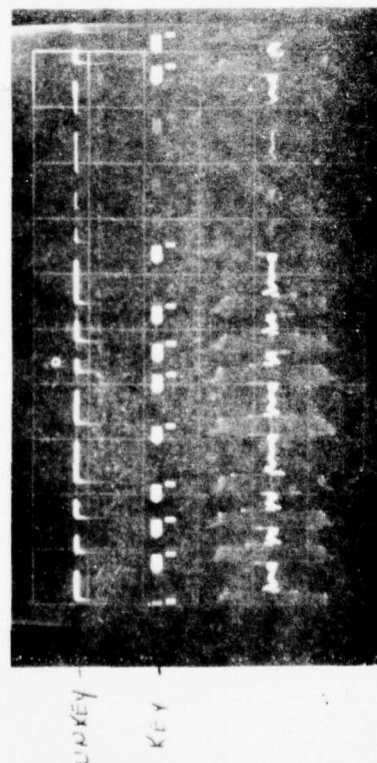
Figure 7

OPERATION OF THE GRA-71 BETWEEN TWO AN/PRC-70 RADIO SETS - CONT

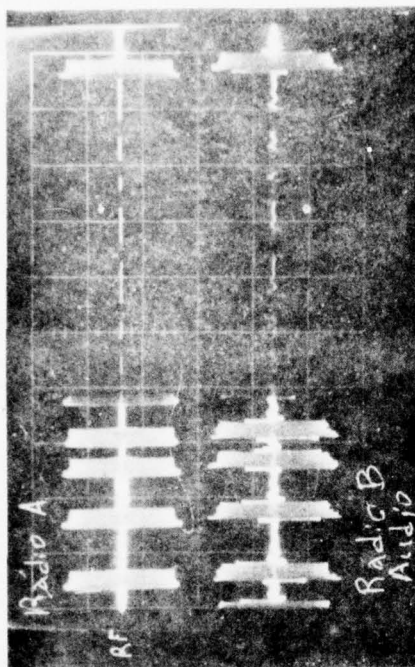
PRC-70 WITH GRA-71
(CODE)



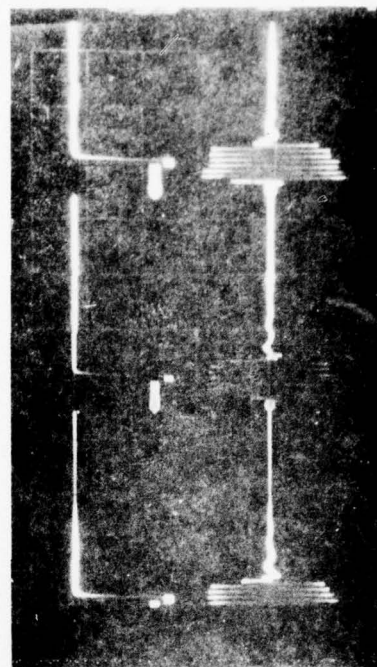
10 MS/DIV



10 MS/DIV



10 MS/DIV

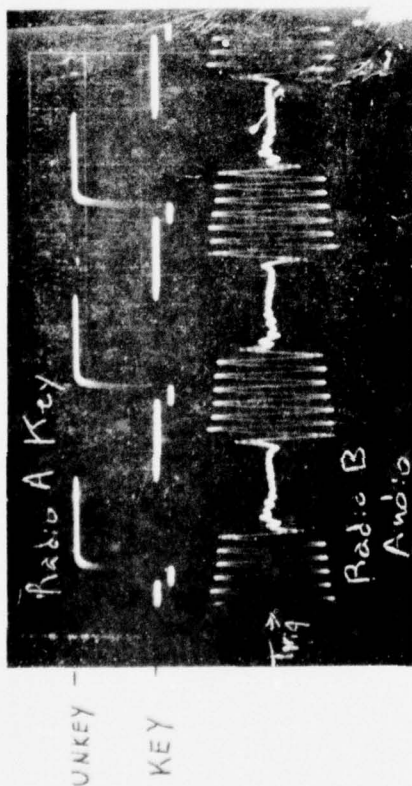


5 MS/DIV

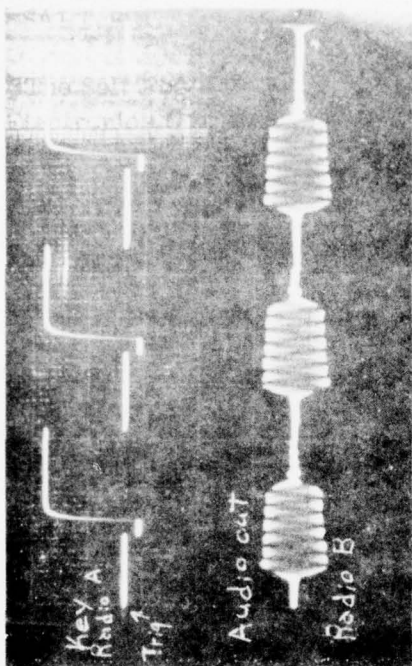
Figure 8

OPERATION OF THE GRA-71 BETWEEN TWO AN/PRC-70 RADIO SETS - CONT

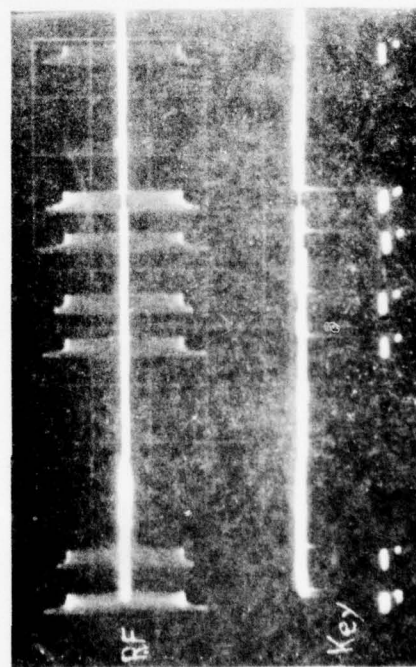
PRC-70 WITH GRA-71
IDY SIGNAL



2 MS/DIV



2 MS/DIV



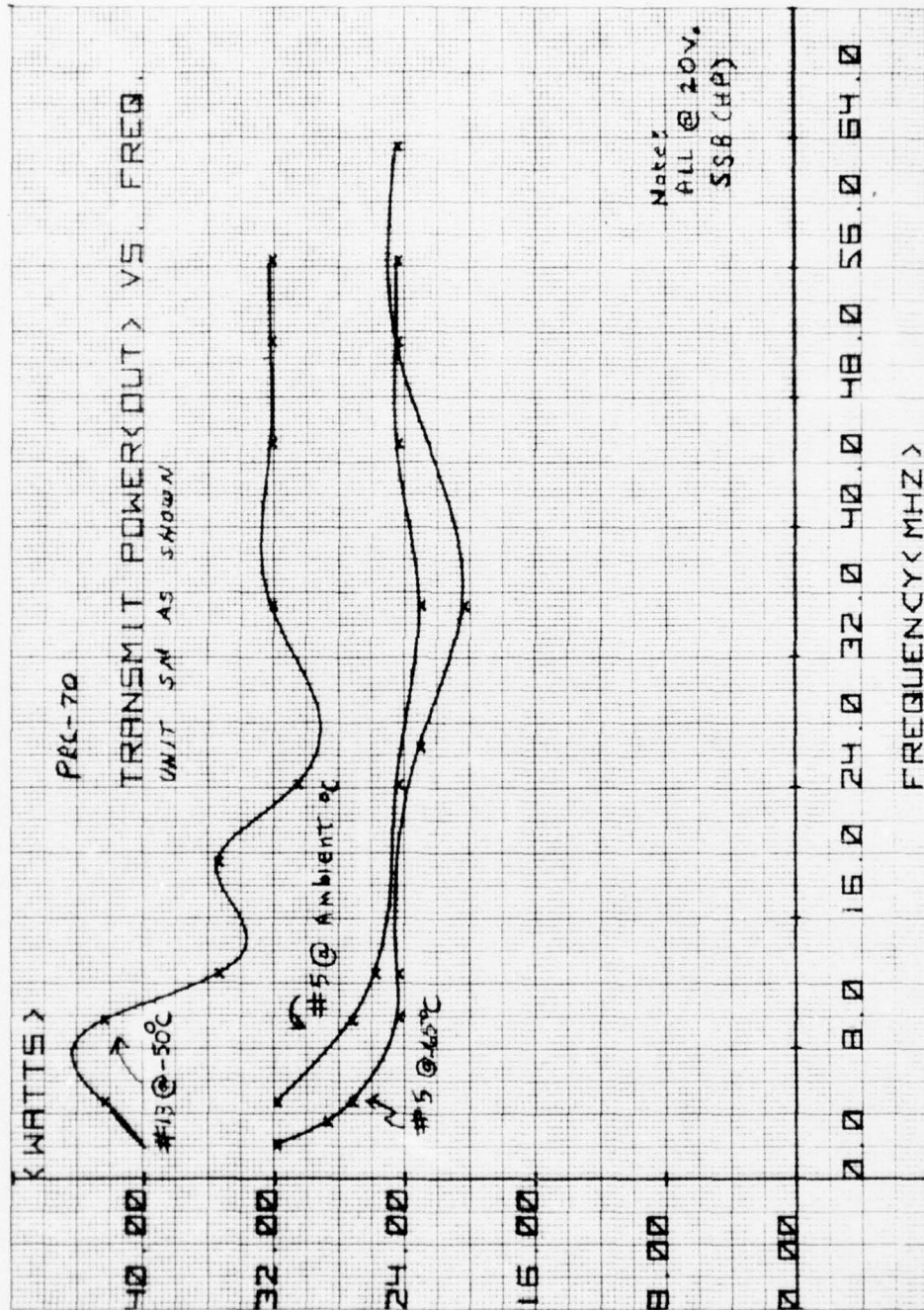
10 MS/DIV



5 MS/DIV

Figure 9

BEST AVAILABLE COPY



Transmit Power (Out) vs. Frequency S/N 13 at -50°C, S/N 5 at ambient °C, S/N 5 at -65°C

Figure 10

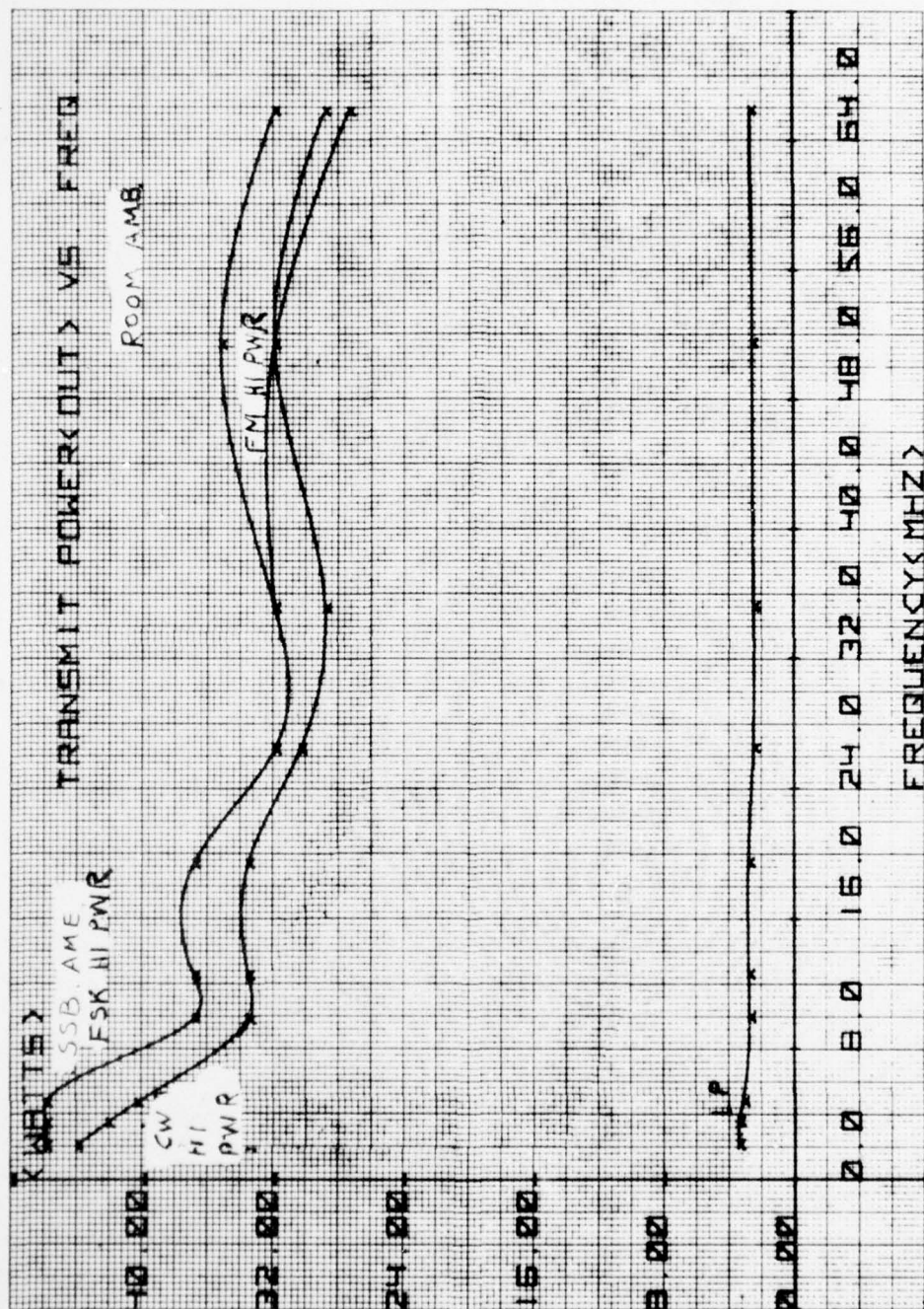


Figure 11 Transmit Power (Out) vs. Frequency at Room Ambient

BEST AVAILABLE COPY

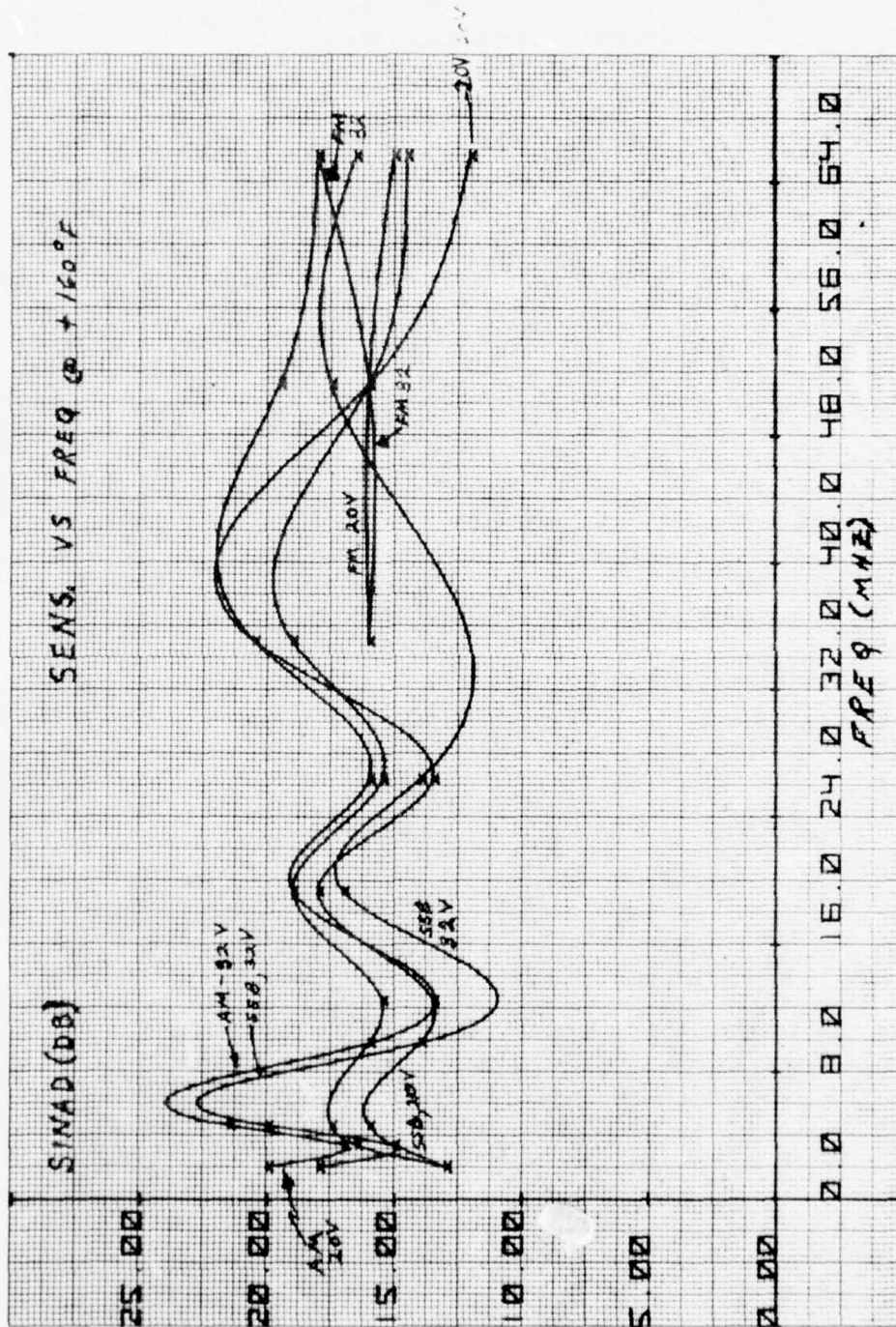


Figure 12 Sensitivity vs. Frequency at +160°F

BEST AVAILABLE COPY

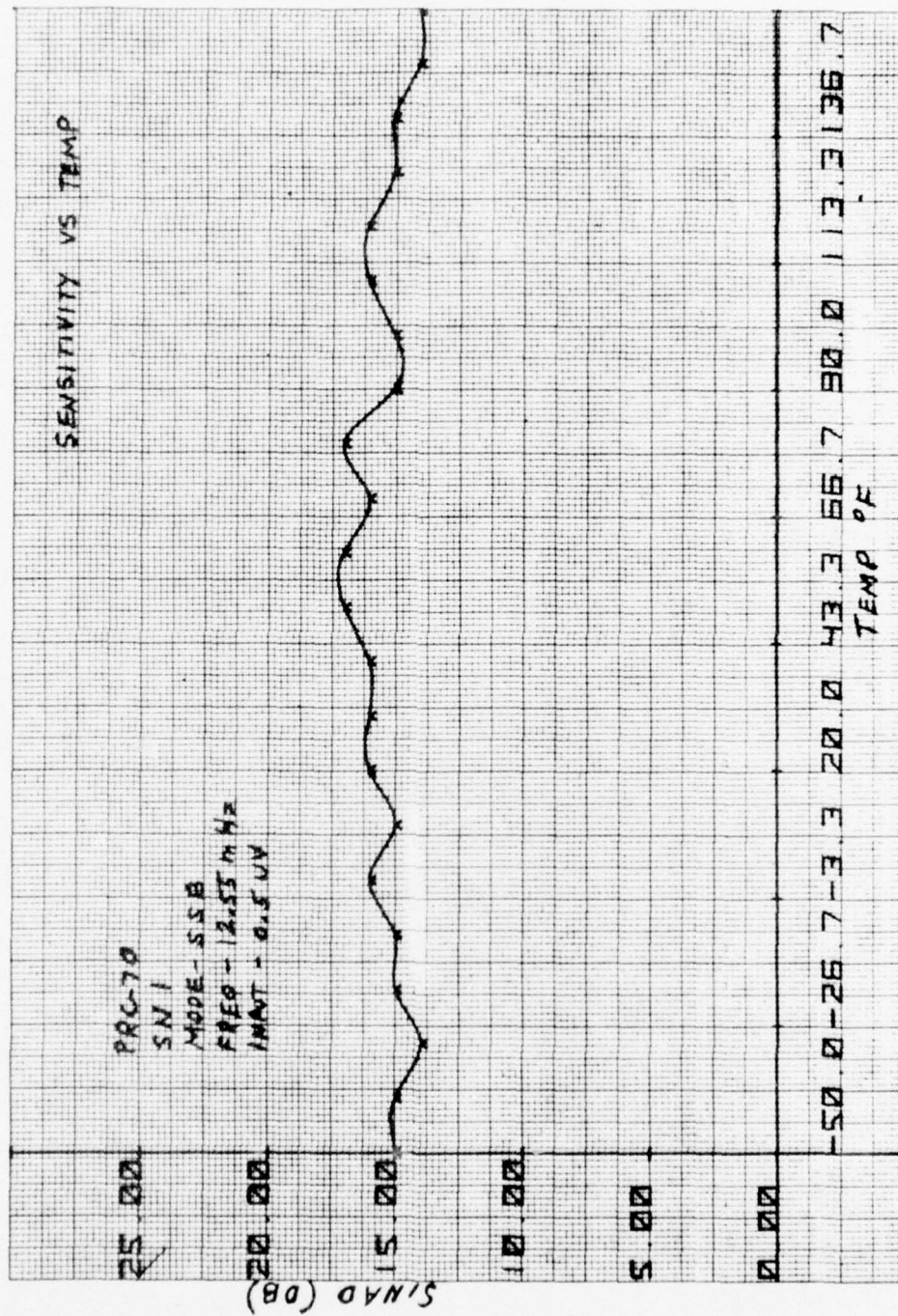


Figure 13 Sensitivity vs. Temperature

BEST AVAILABLE COPY

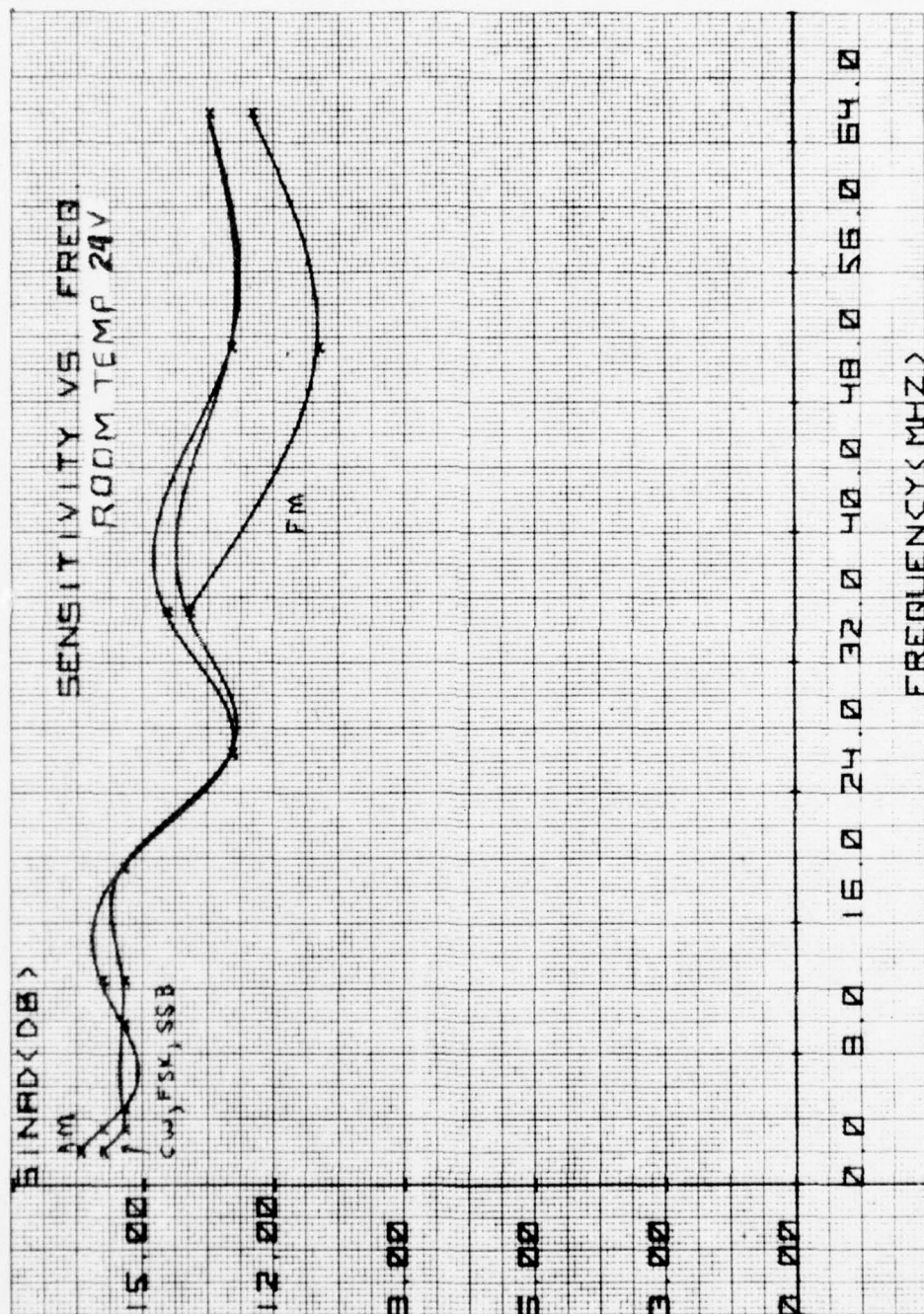


Figure 14. Sensitivity vs. Frequency

BEST AVAILABLE COPY

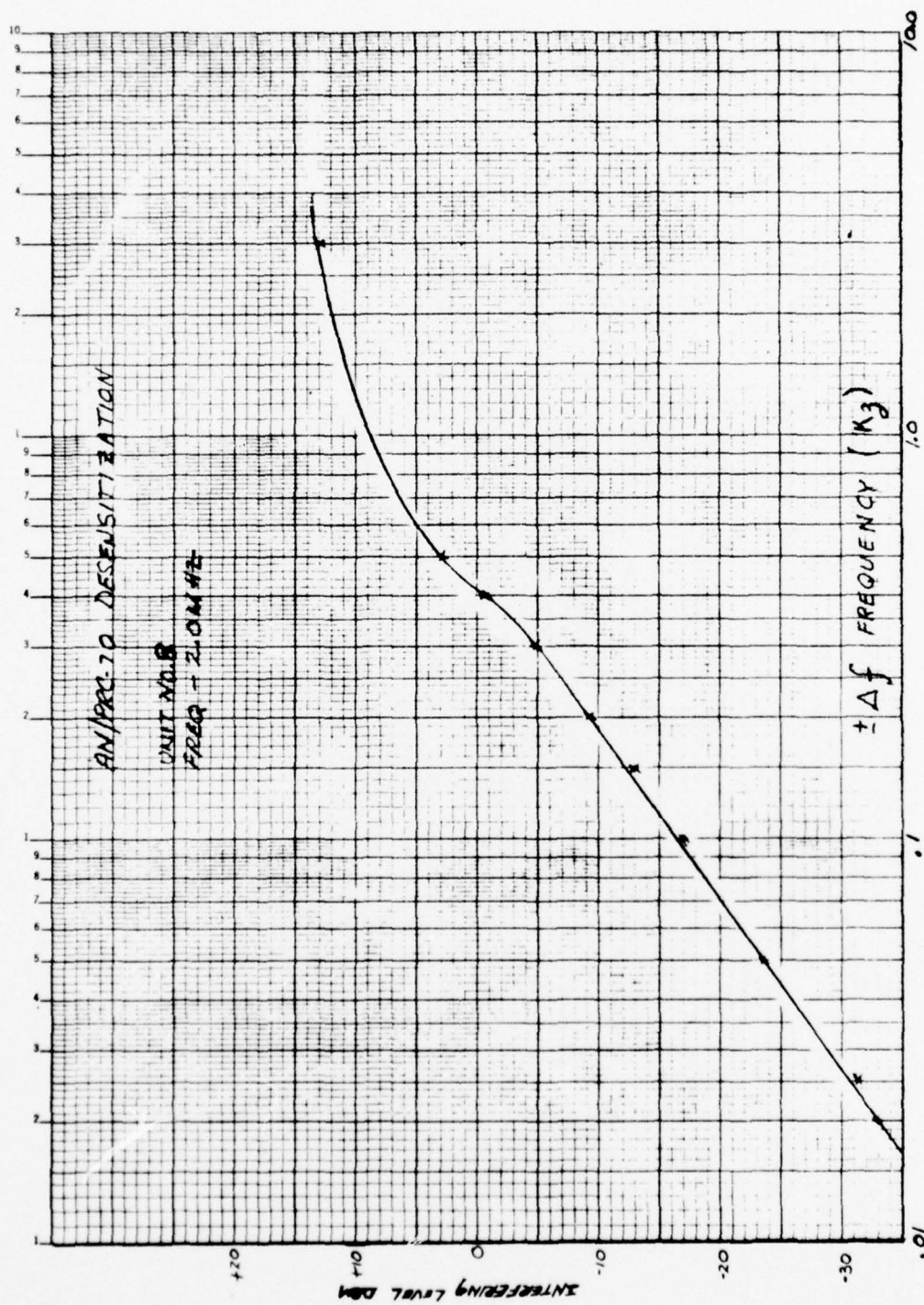


Figure 15 AN/PRC-70 Desensitization Data

BEST AVAILABLE COPY

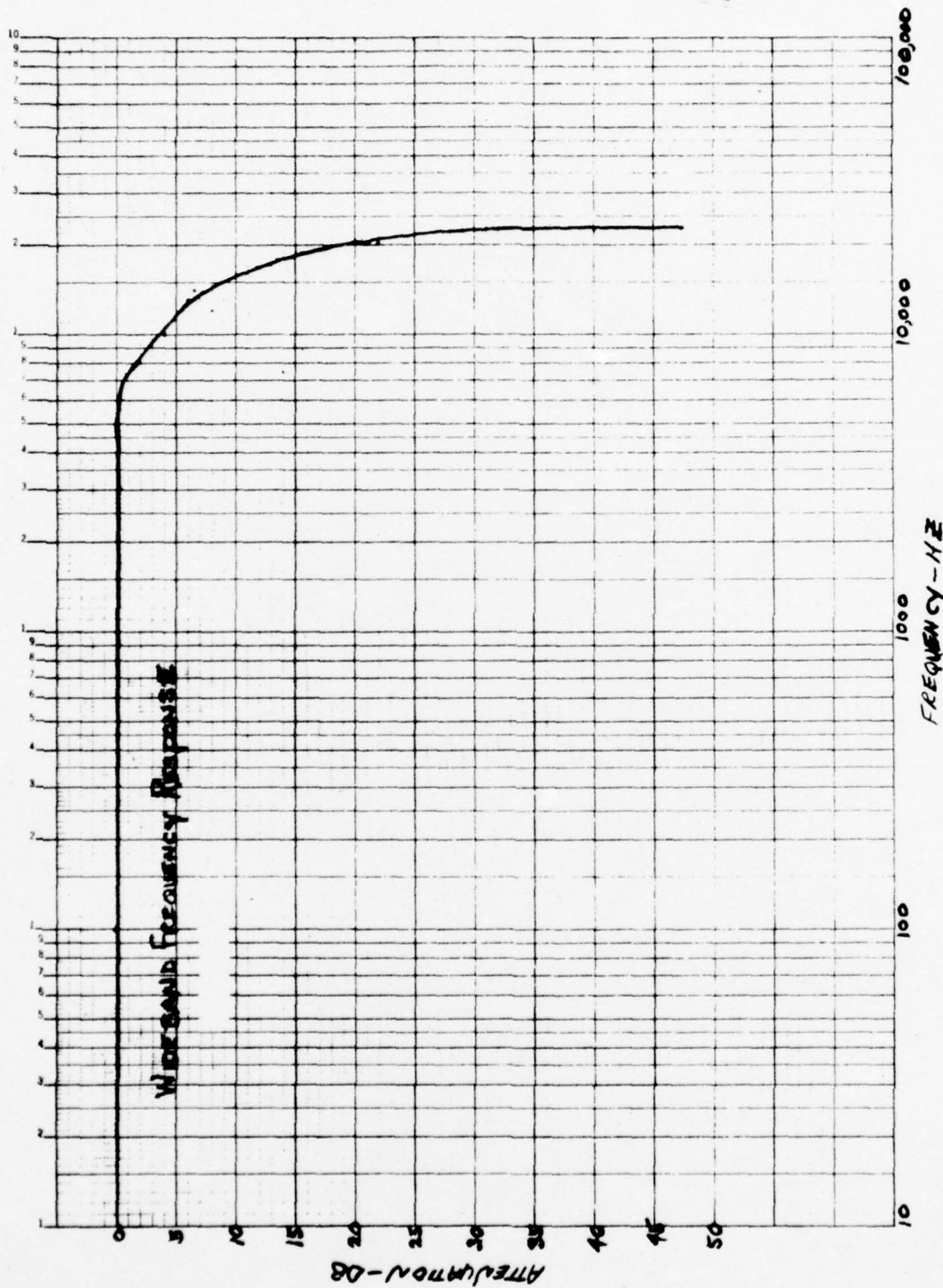


Figure 16 Wideband Frequency Response

BEST AVAILABLE COPY

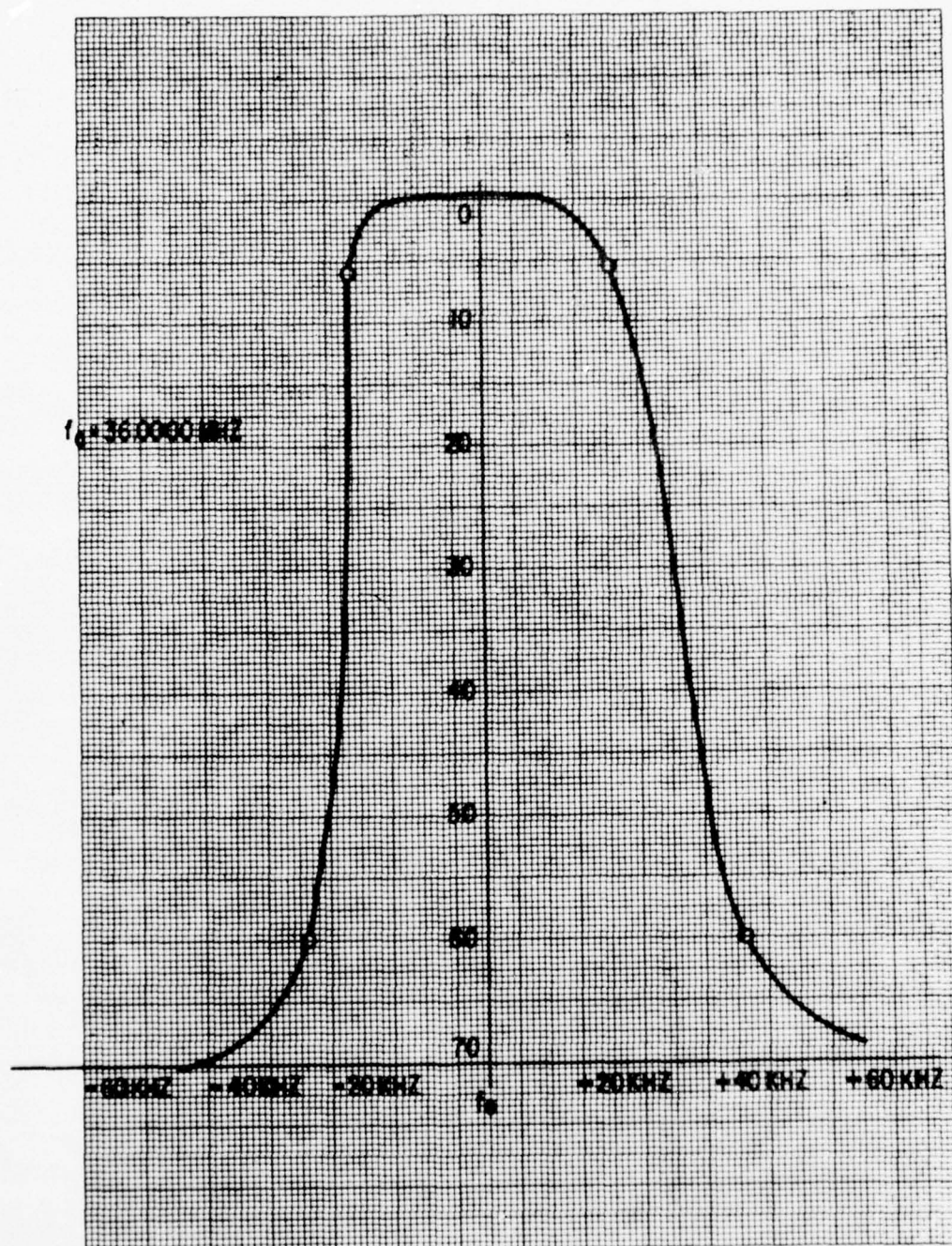


Figure 17 FM Selectivity

BEST AVAILABLE COPY

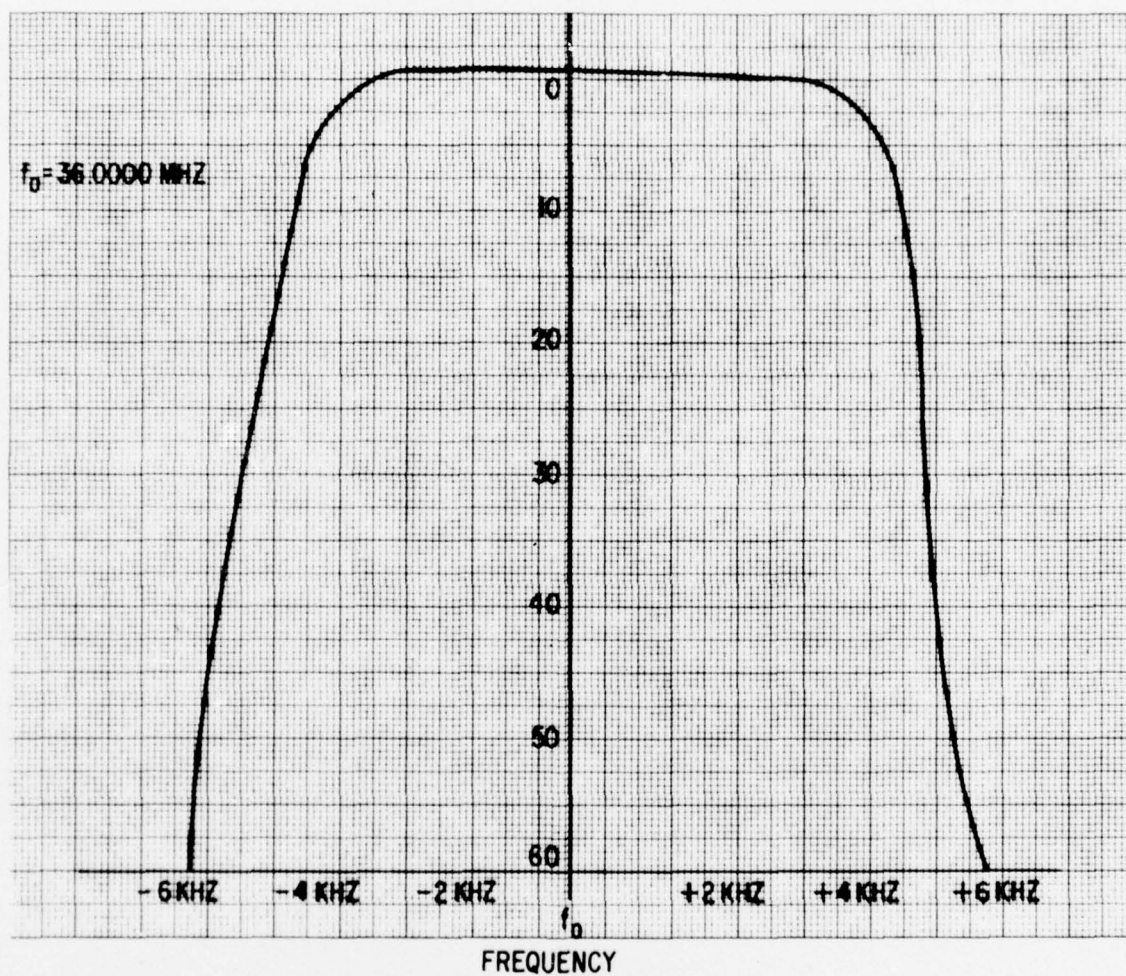


Figure 18 AM Selectivity

BEST AVAILABLE COPY

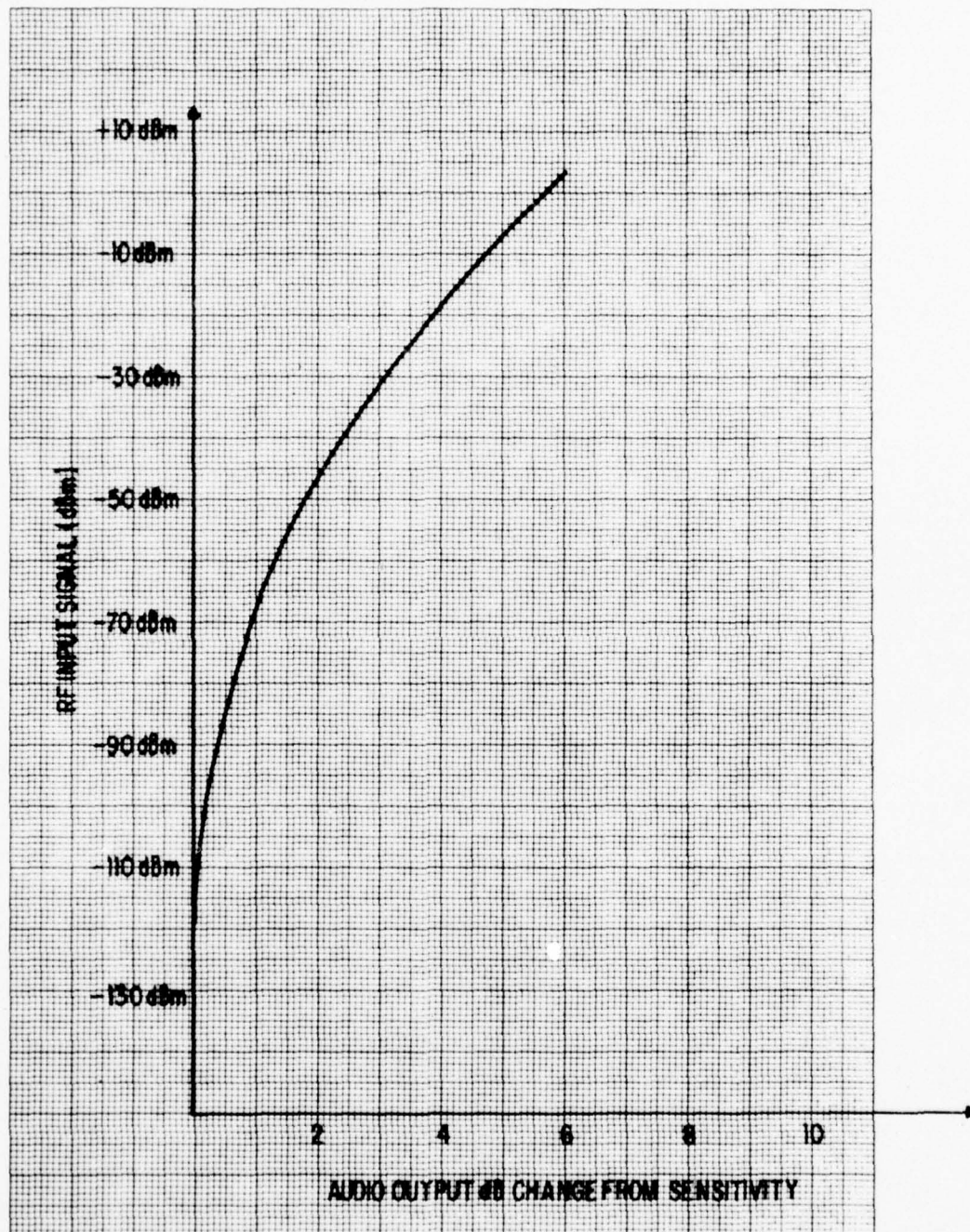


Figure 19 AGC Gain Characteristics

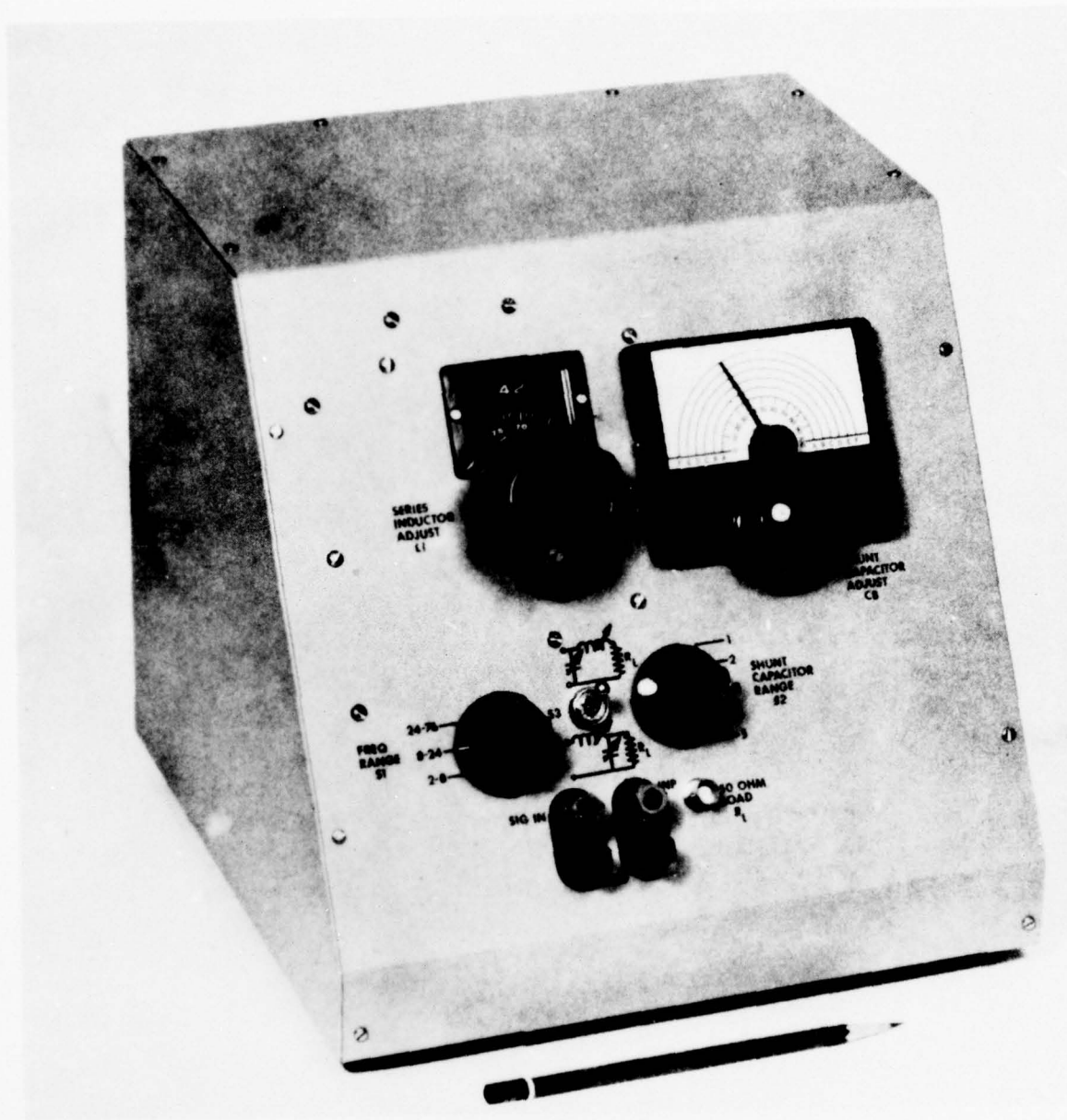


Figure 20 Dummy Antenna Load

SN=2

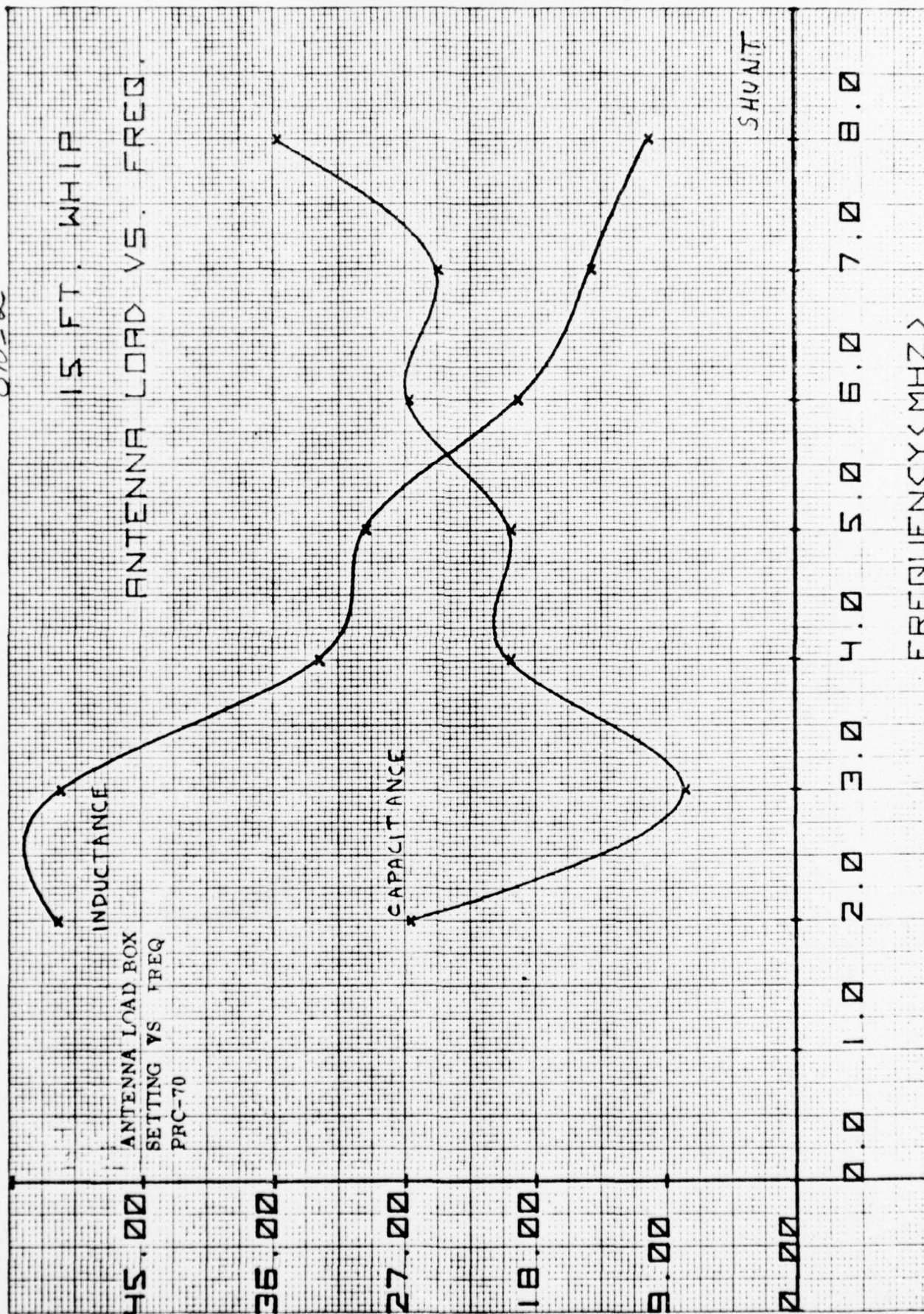


FIG. 21

$SN=2$

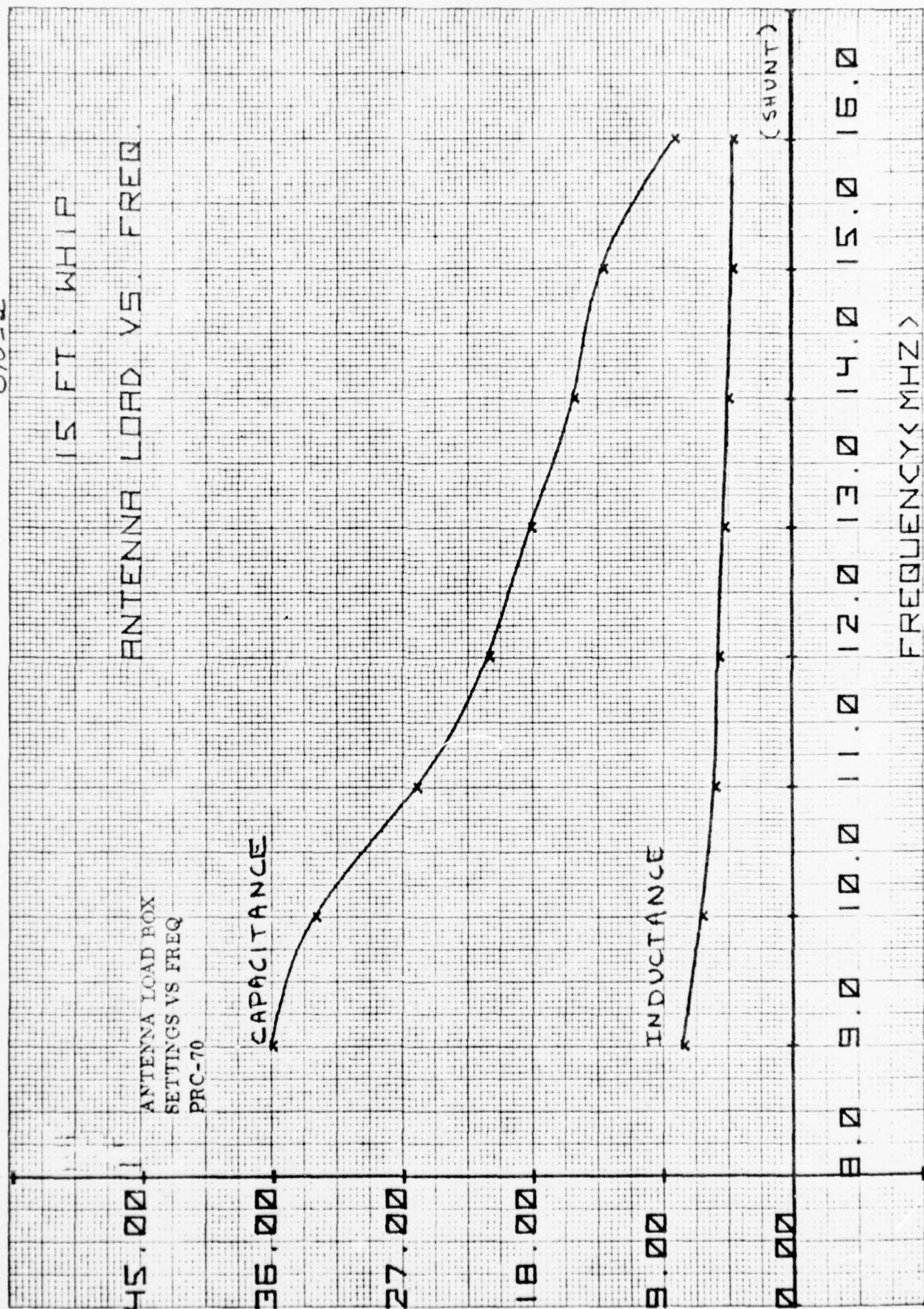


FIG 22

SN=2

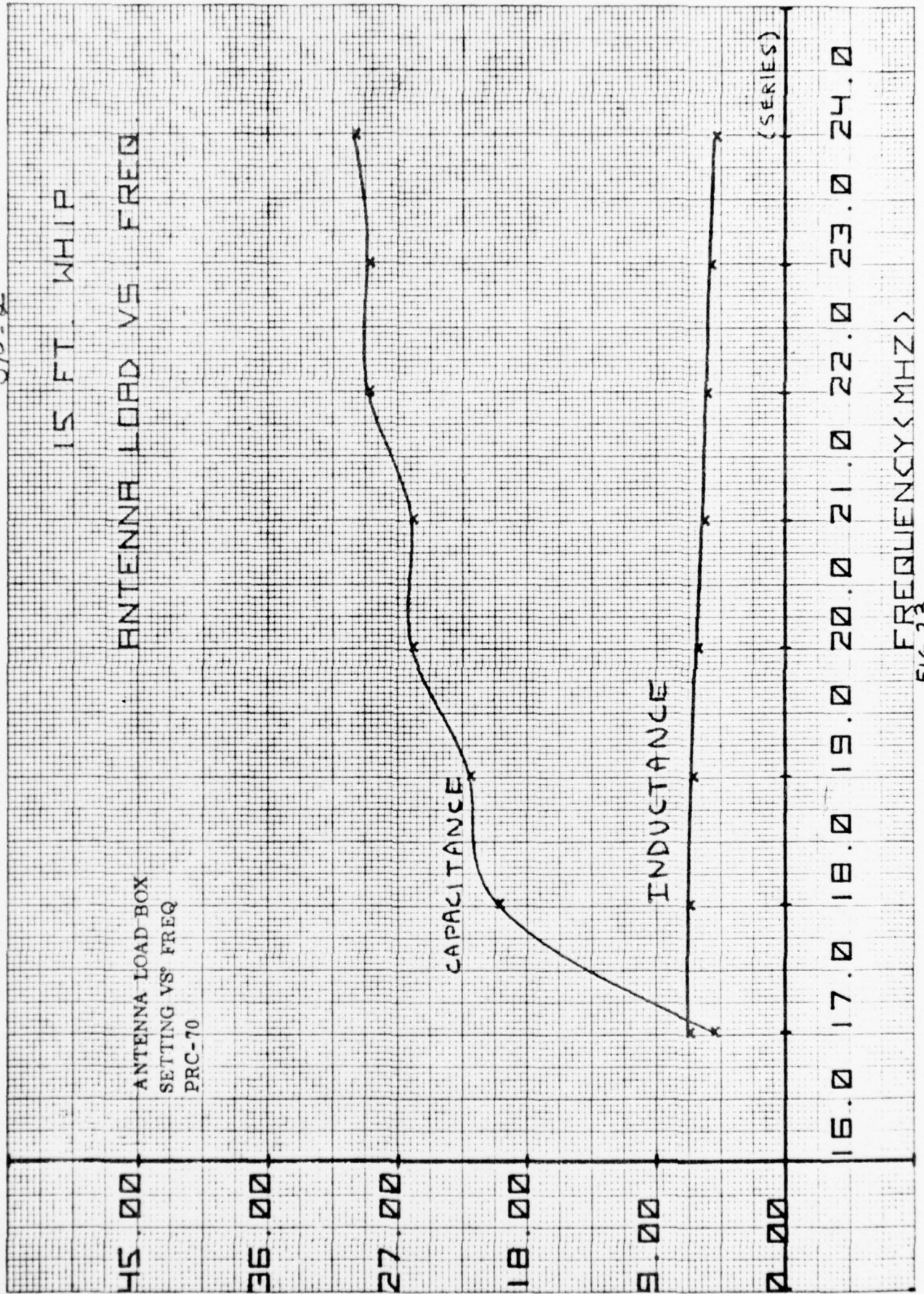


FIG 23

SN=2

15 FT. WHIP

ANTENNA LOAD VS. FREQ.

ANTENNA LOAD BOX

SETTING VS. FREQ

PRC-70

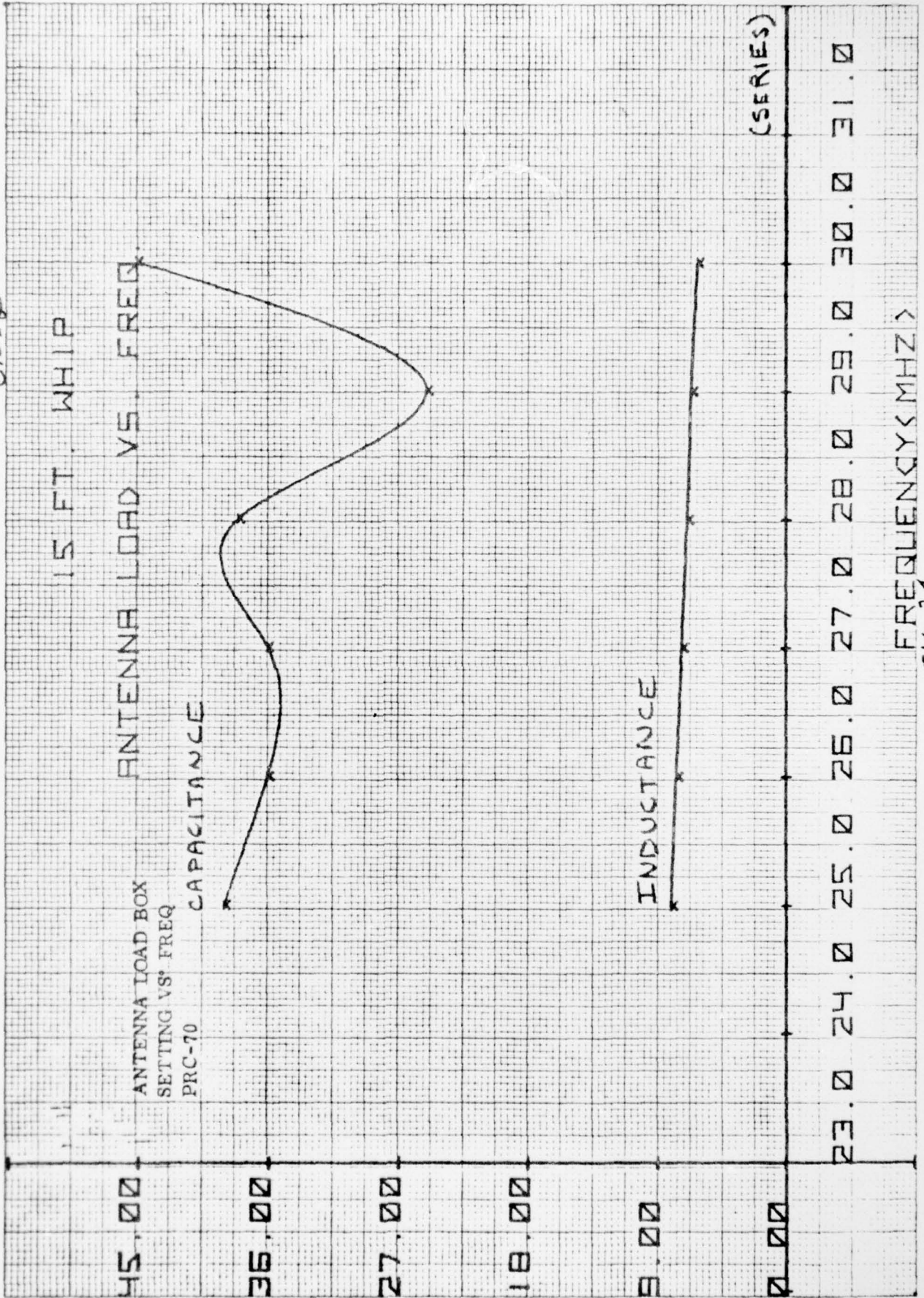
CAPACITANCE

INDUCTANCE

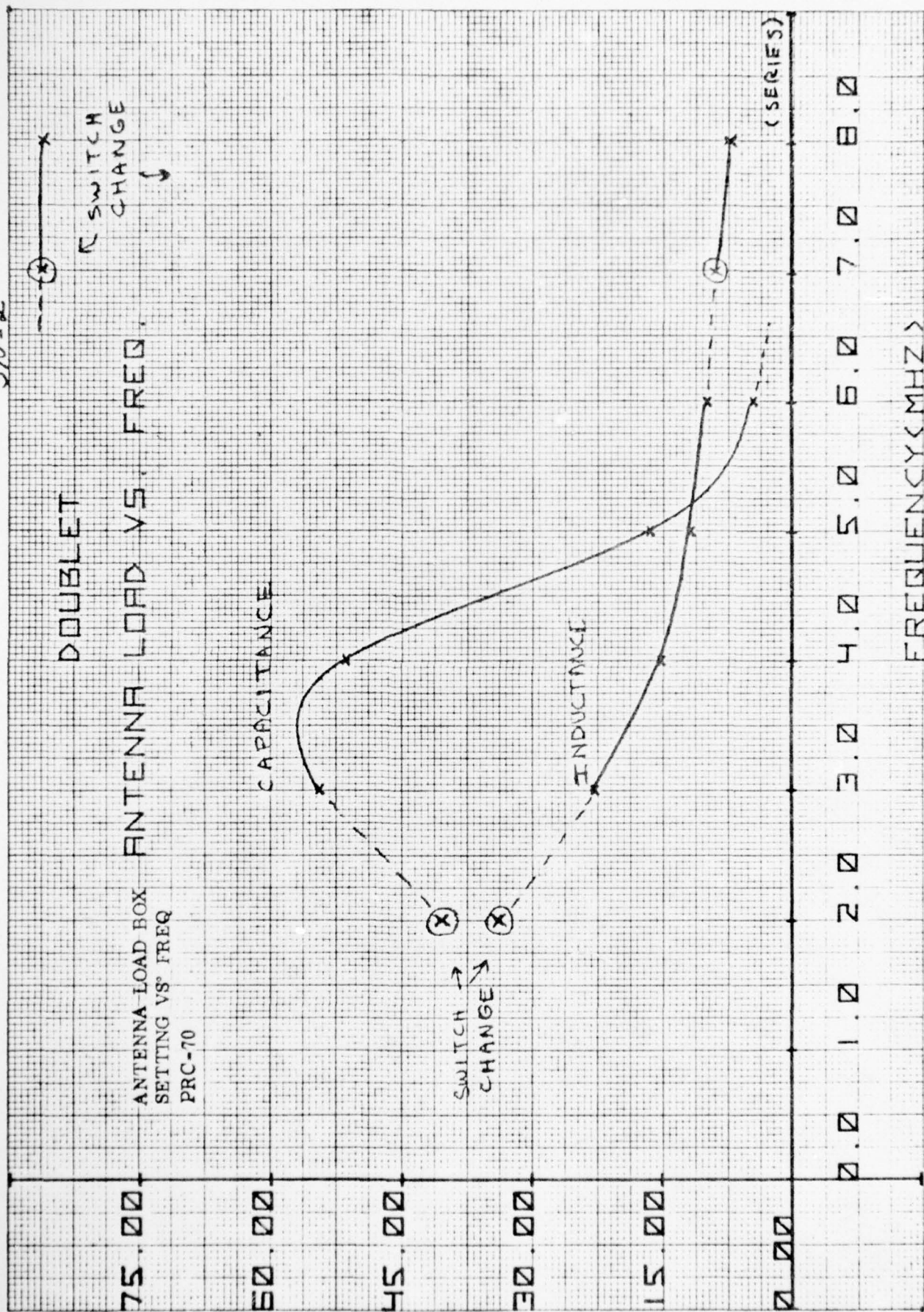
(SERIES)

FREQUENCY (MHZ)

FIG 24



SN=2



SN=2

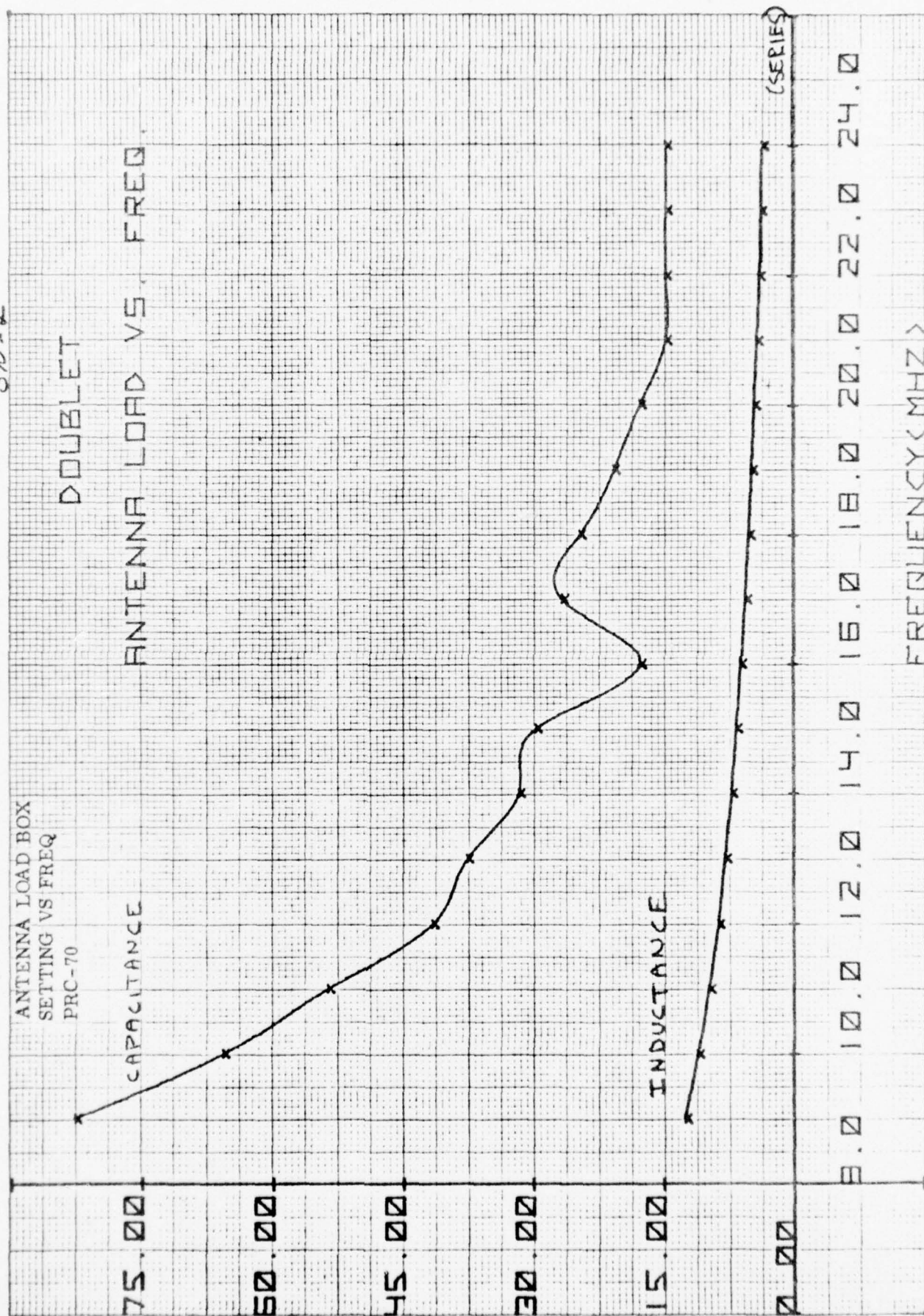


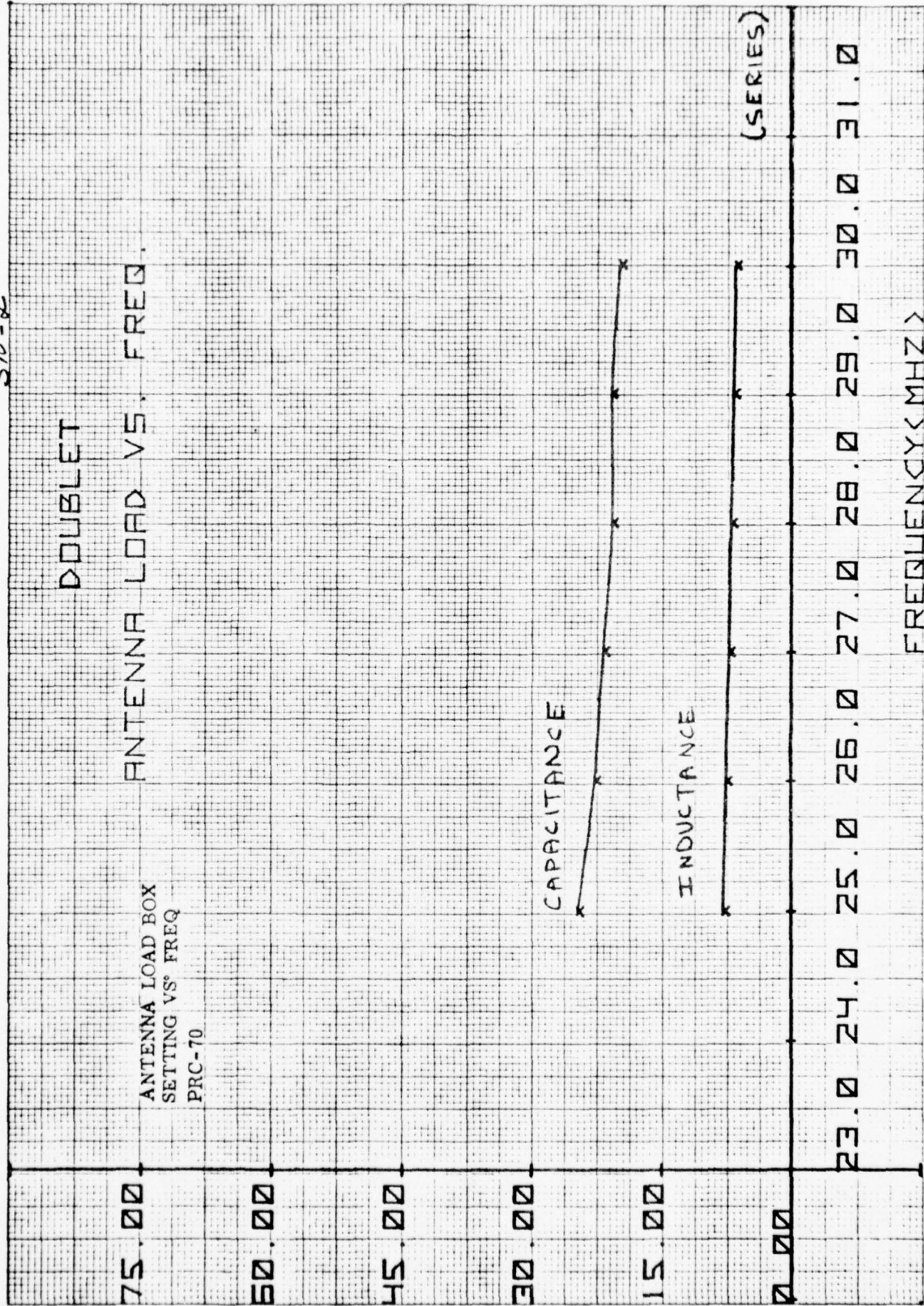
FIG 26
FREQUENCY (MHZ)

SN=2

DOUBLET

ANTENNA LOAD VS. FREQ.

ANTENNA LOAD BOX
SETTING VS. FREQ
PRC-70



SN-2

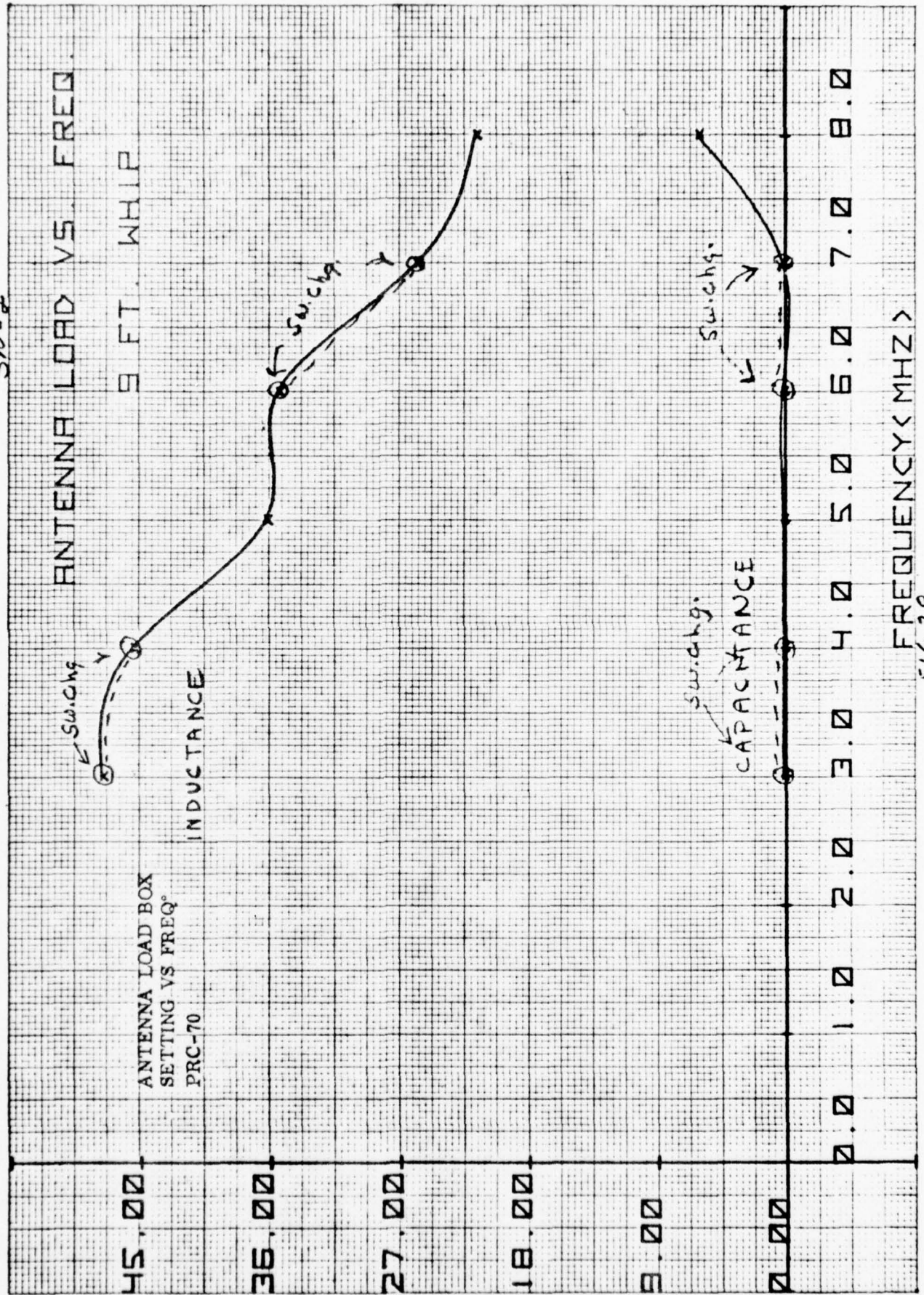
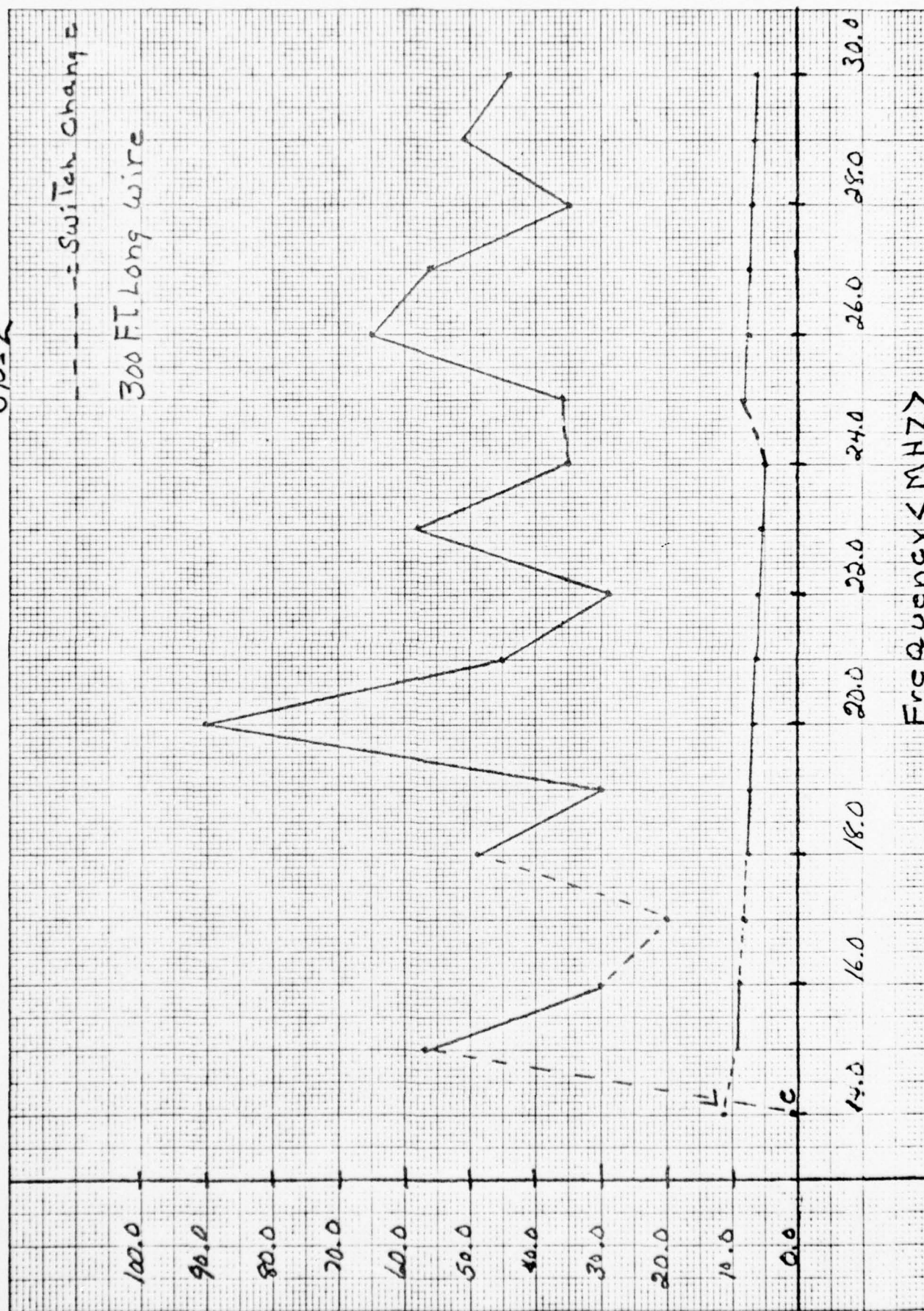


FIG 28

SN=2

--- Switch Change

300 FT Long wire

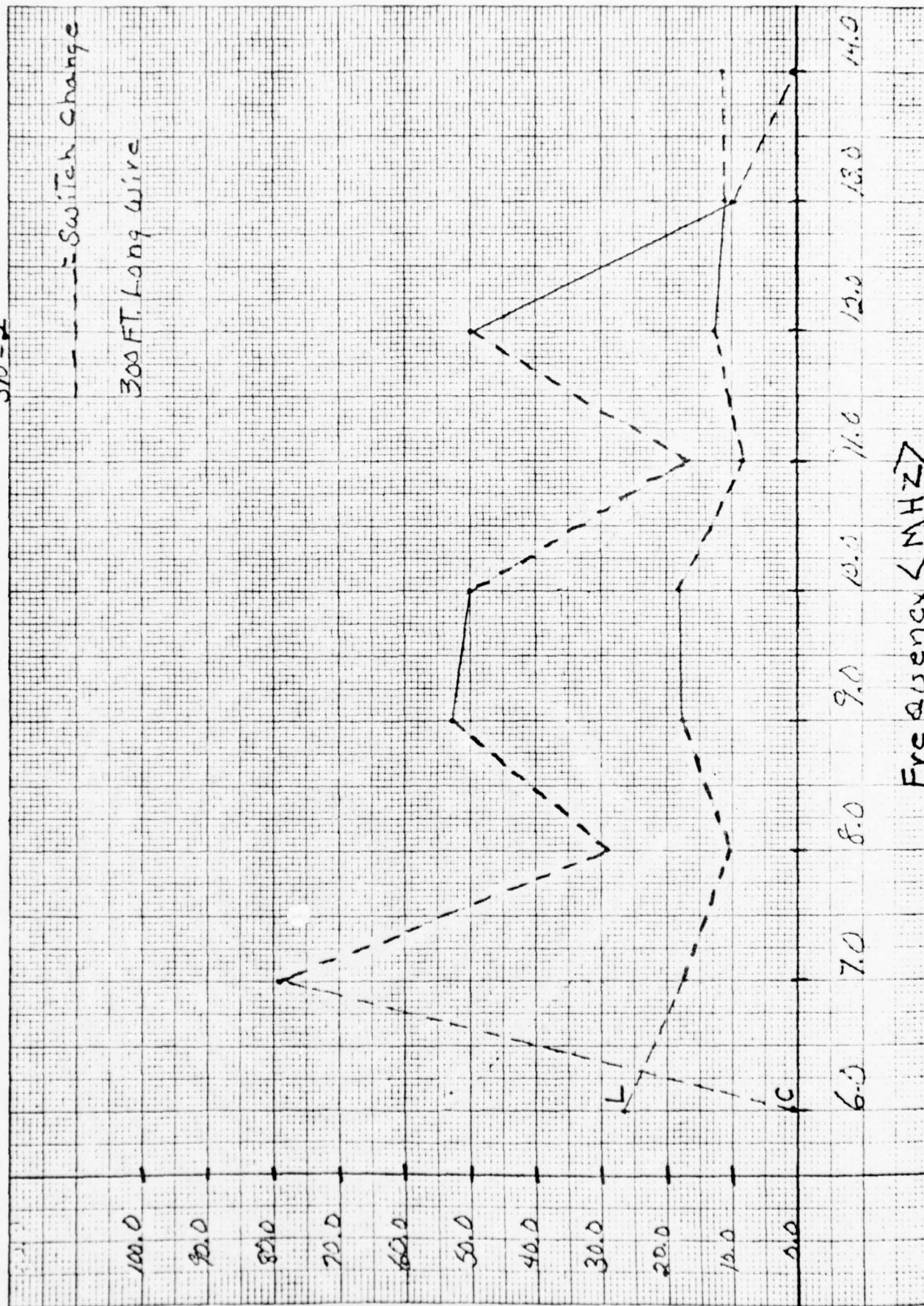


Frequency < MHz >
FIG 29

K-E 10 X 10 TO 1/2 INCH 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 1323

SN=2



Frequency (MHz)
FIG 36

SN=2

6 FT. WHIP

ANTENNA LOAD VS. FREQ.

ANTENNA LOAD BOX
SETTINGS VS FREQ
PRC-70

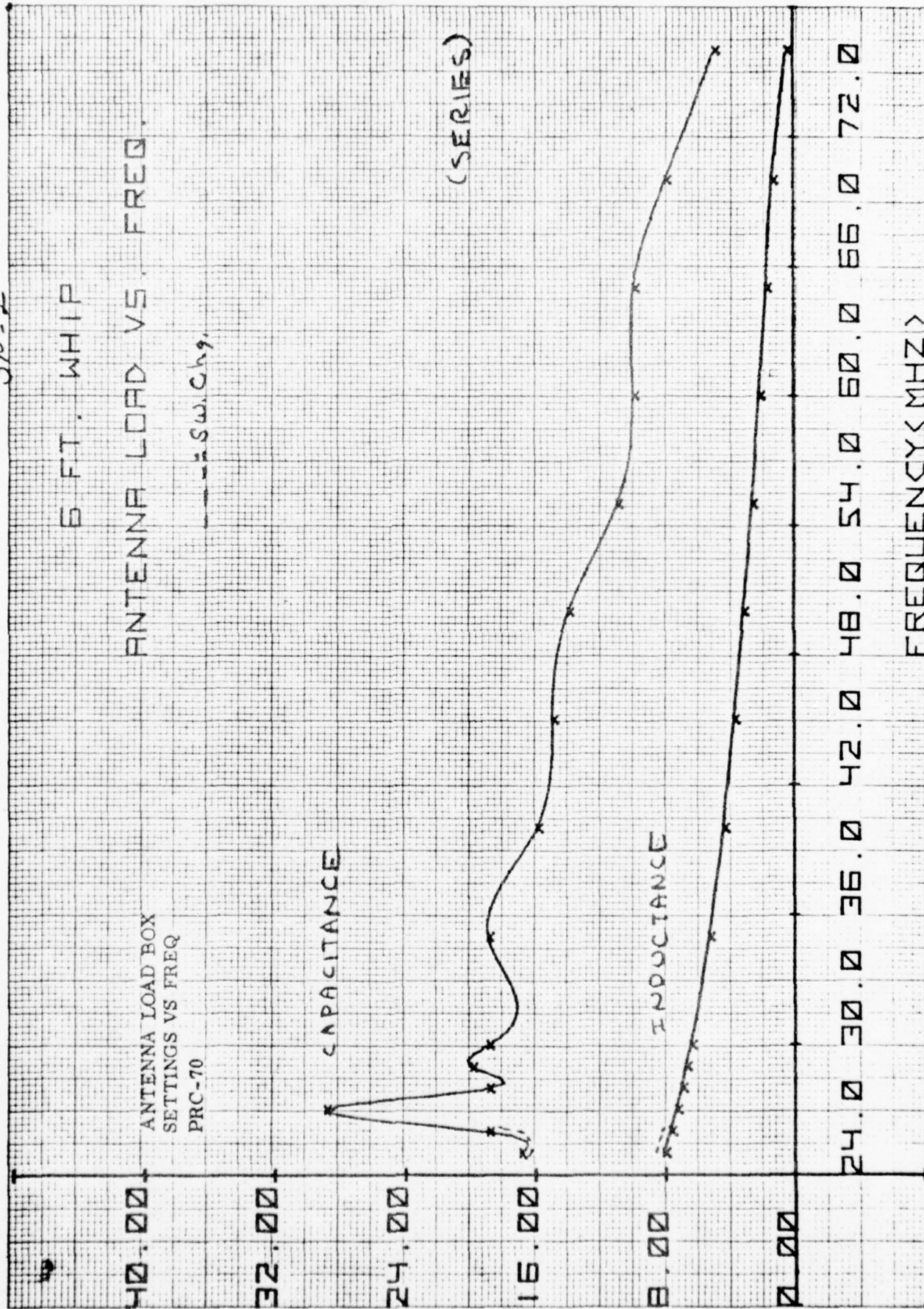
--- S.W. Chg.

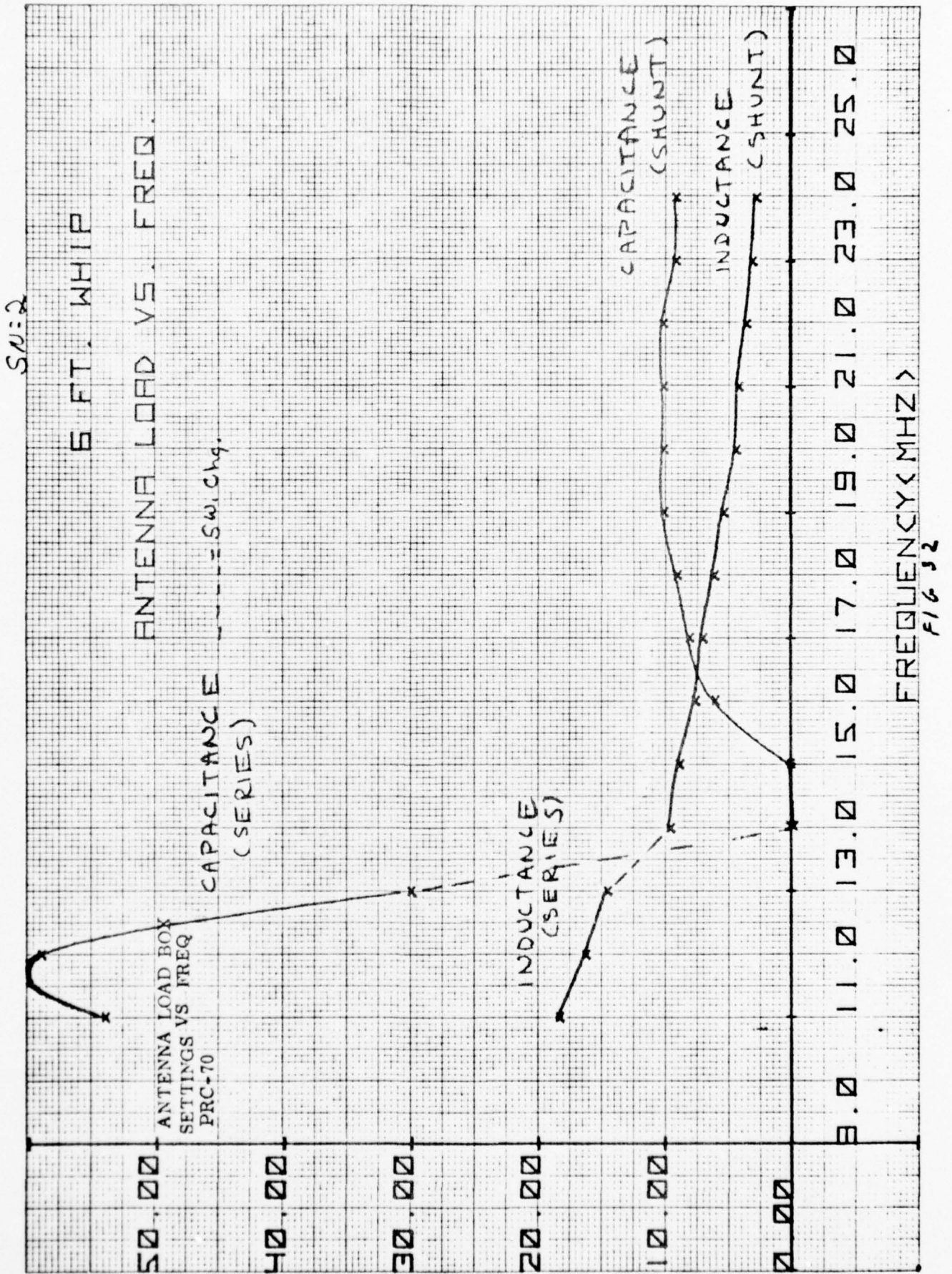
CAPACITANCE

(SERIES)

INDUCTANCE

FREQUENCY (MHZ)
Fig 31





SN=2

ANTENNA LOAD VS. FREQ.

5 FT. WHIP

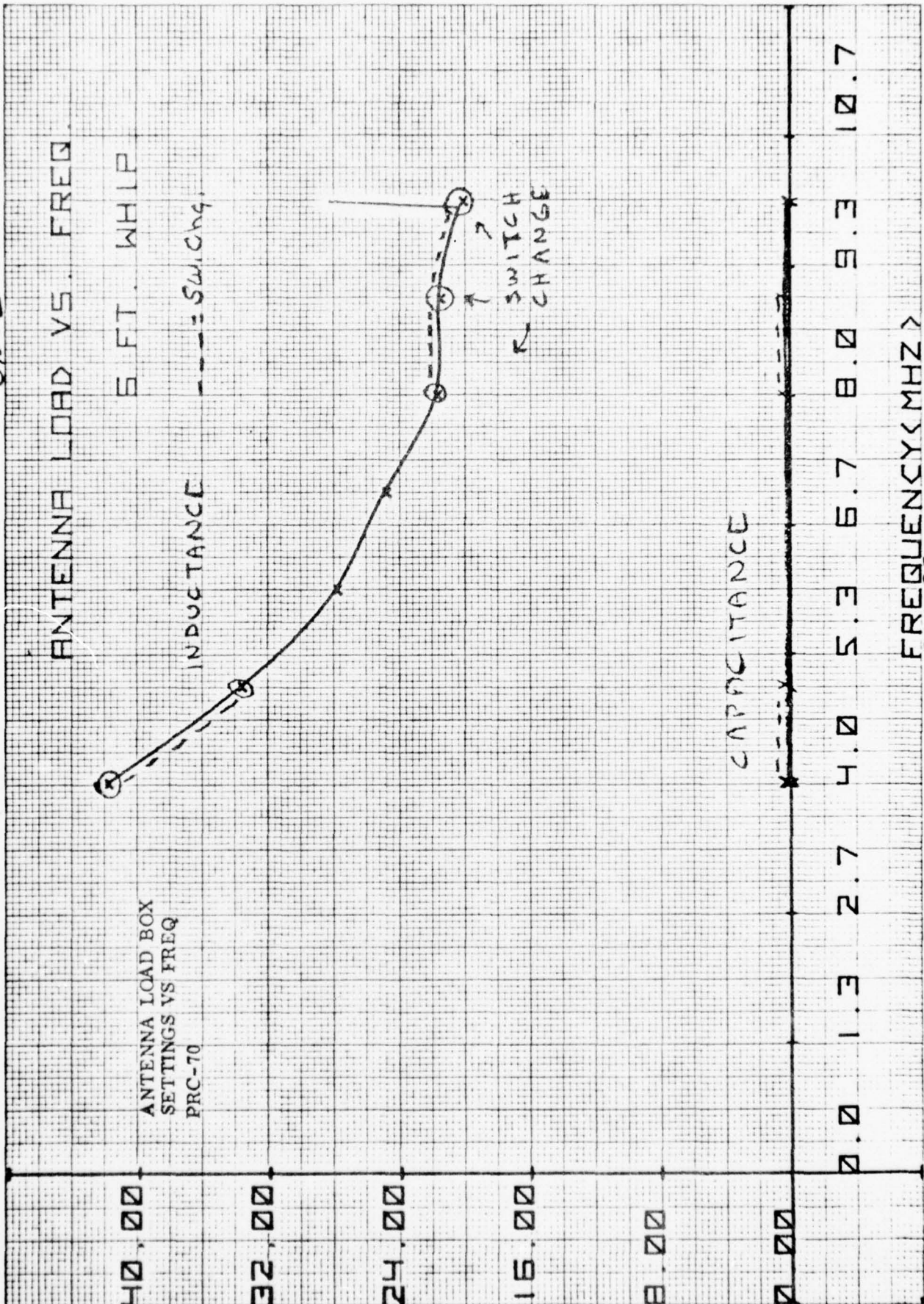
ANTENNA LOAD BOX
SETTINGS VS FREQ
PRC-70

INDUCTANCE --- = SW. CHG.

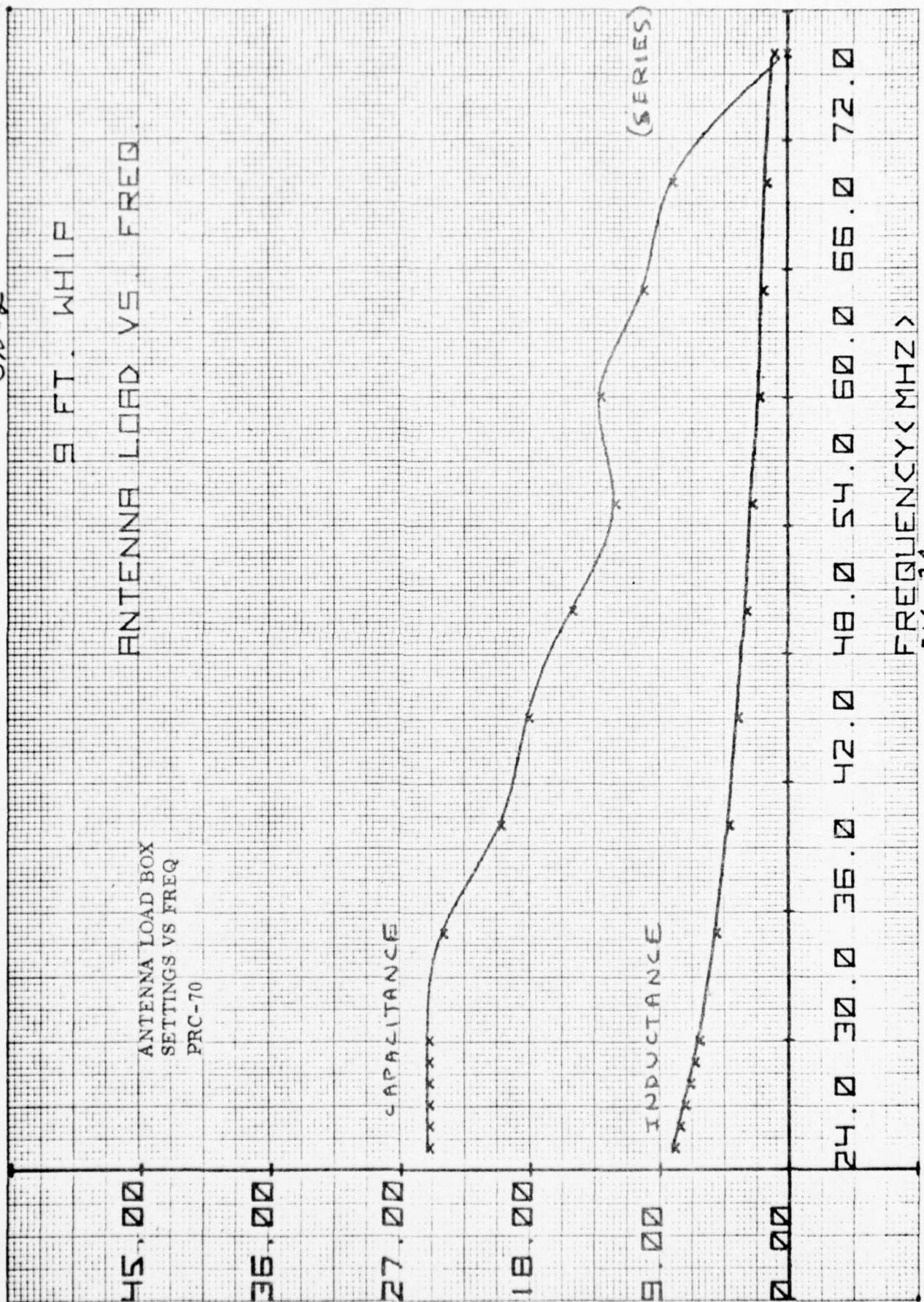
SWITCH
CHANGE

CAPACITANCE

FREQUENCY (MHZ)
FIG 33



SN=2

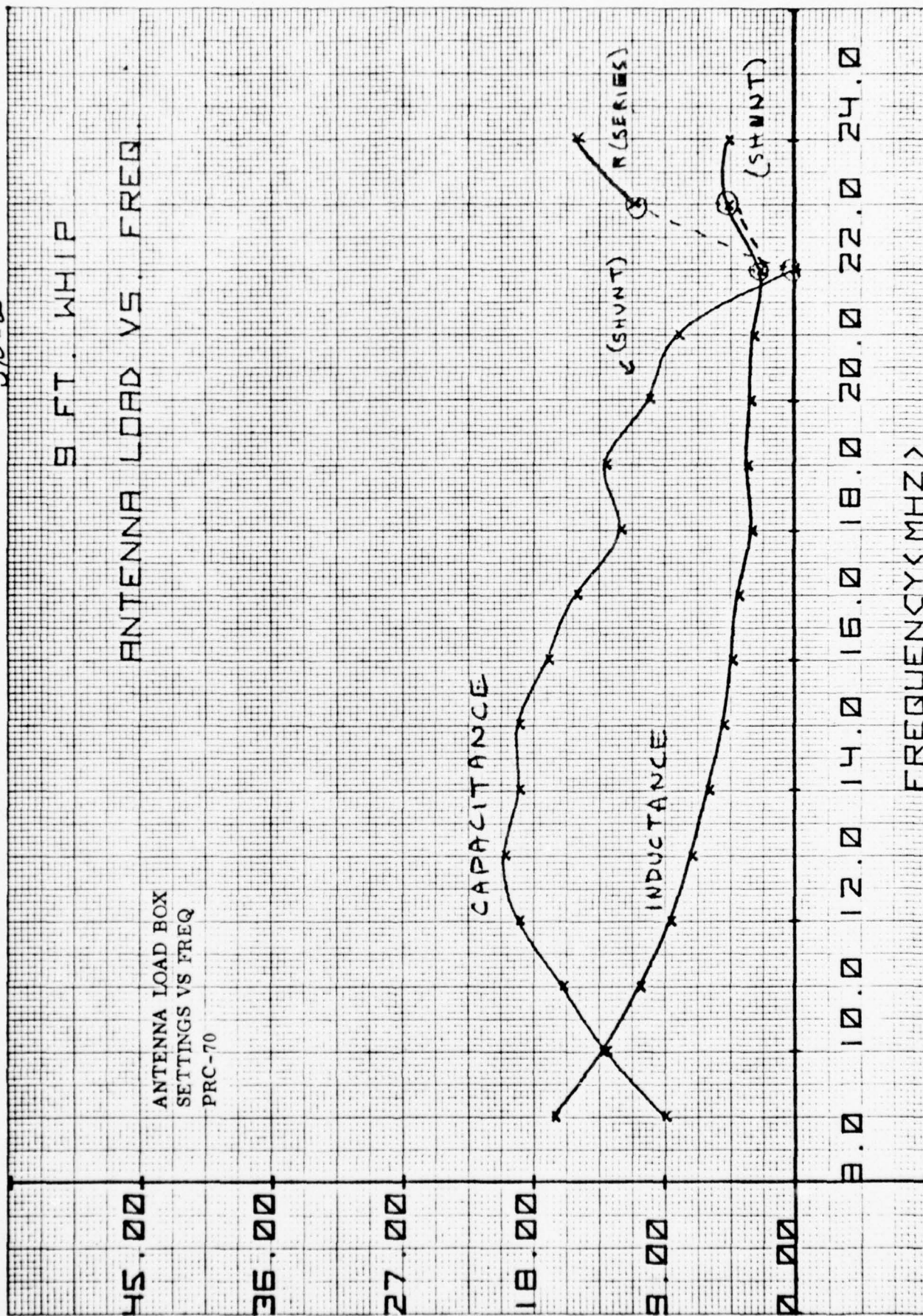


SN=2

9 FT. WHIP

ANTENNA LOAD VS. FREQ.

ANTENNA LOAD BOX
SETTINGS VS FREQ
PRC-70



FREQUENCY (MHZ) >
FIG 35

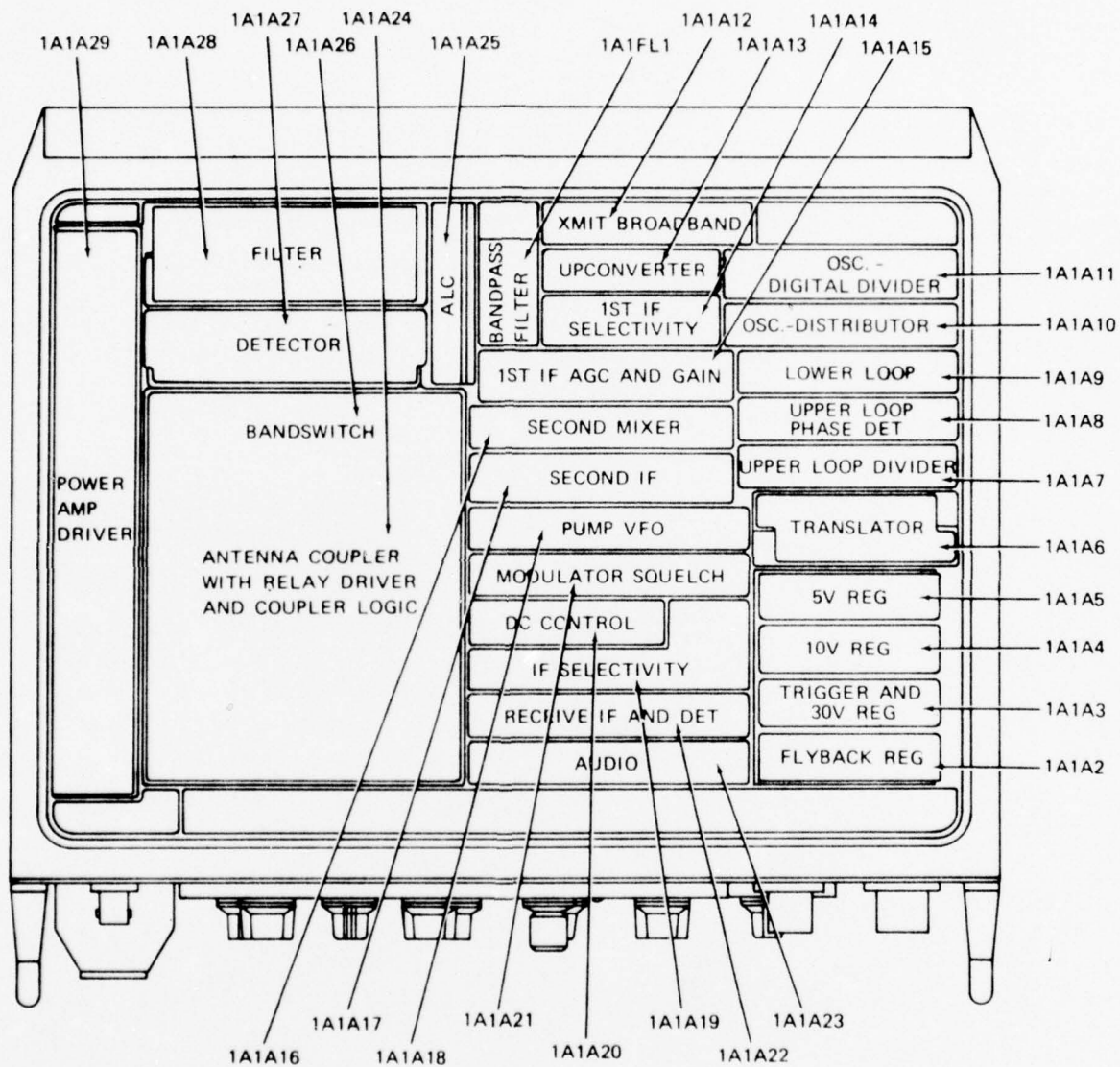


Figure 36 Module locations

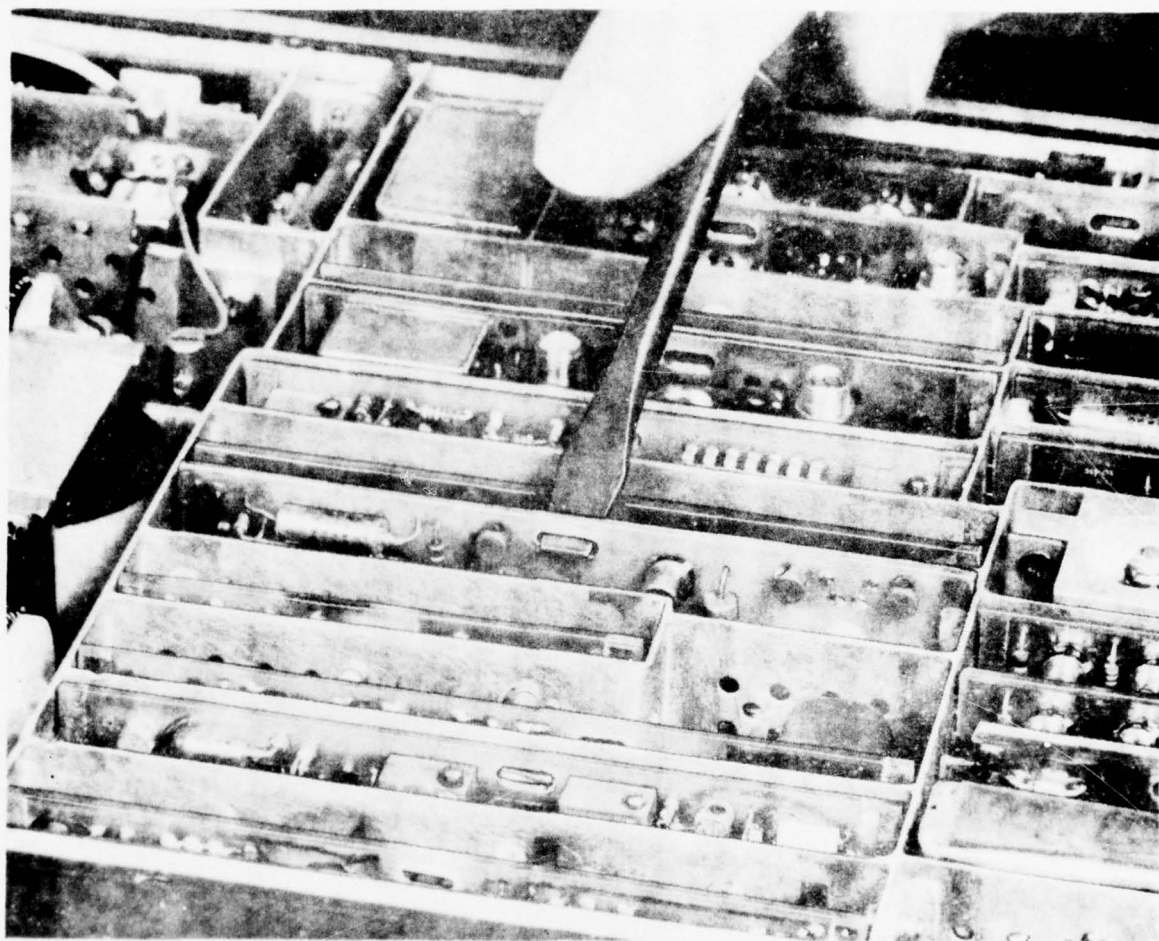


Figure 37 Module removal

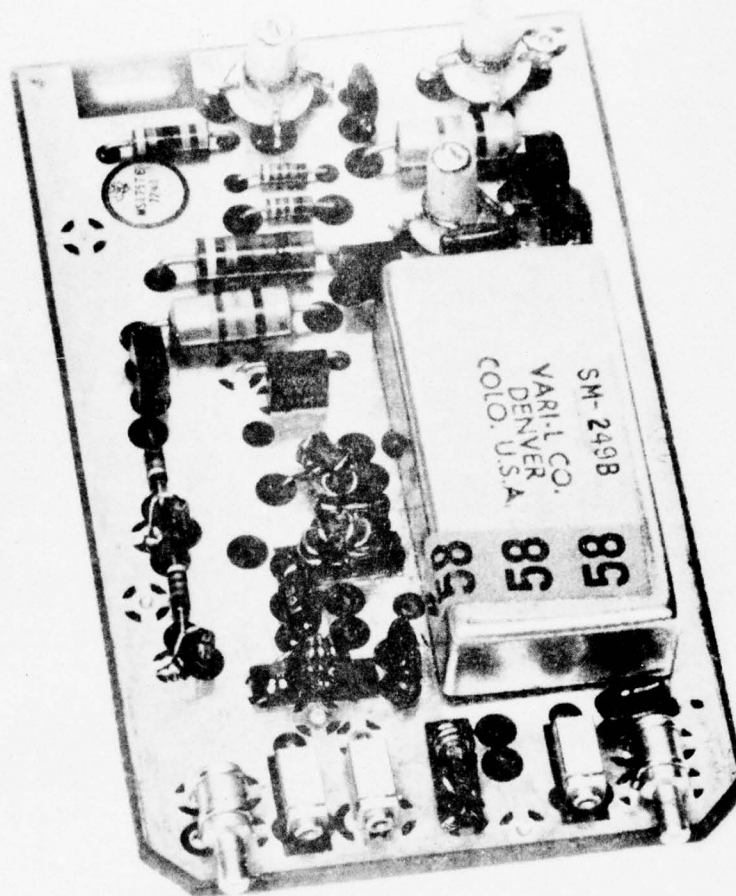


Figure 38 Upconverter Module (1A 1A 13)

TABLES

1. Antenna Matching
2. System Response Vs. Pulse Repetition Rate
3. Audio Distortion (Receive)
4. Squelch Characteristics
(In Para. 5.12)
5. Transmitter Intermodulation Distortion
6. Antenna Matching (Loads)

TABLE 1. ANTENNA MATCHING

Frequency (MHz)	6 Foot Whip	9 Foot Whip	15 Foot Whip	Doublet Ant	Long Wire 300 Foot
2.0			Y	Y ^(b)	
3.0		Y	Y	Y	
4.0	Y	Y	Y	Y	
5.0	Y	Y	Y	Y	
6.0	Y	Y	Y	Y	Y
7.0	Y	Y	Y	Y	Y
8.0	Y	Y	Y	Y	Y
9.0	Y	Y	Y	Y	Y
10.0	Y	Y	Y	Y	Y
11.0	Y	Y	Y	Y	Y
12.0	Y	Y	Y	Y	Y
13.0	Y	Y	Y	Y	Y
14.0	Y	Y	Y	Y	Y
15.0	Y	Y	Y	Y	Y
16.0	Y	Y	Y	Y	Y
17.0	Y	Y	Y	Y	Y
18.0	Y	Y	Y	Y	Y
19.0	Y	Y	Y	Y	Y
20.0	N ^(a)	Y	Y	Y	Y
21.0	Y	Y	Y	Y	Y
22.0	Y	Y	Y	Y	Y
23.0	Y	Y	Y	Y	Y
24.0	Y	Y	Y	Y	Y
25.0	Y	Y	Y	Y	Y
26.0	Y	Y	Y	Y	Y
27.0	Y	Y	Y	Y	Y
28.0	Y	Y	Y	Y	Y
29.0	Y	Y	Y	Y	Y
30.0	Y	Y	Y	Y	Y
31.0	Y	Y			
32.0	Y	Y			
33.0	Y	Y			
34.0	Y	Y			
35.0	Y	Y			
36.0	Y	Y			
37.0	Y	Y			

(a) N = no

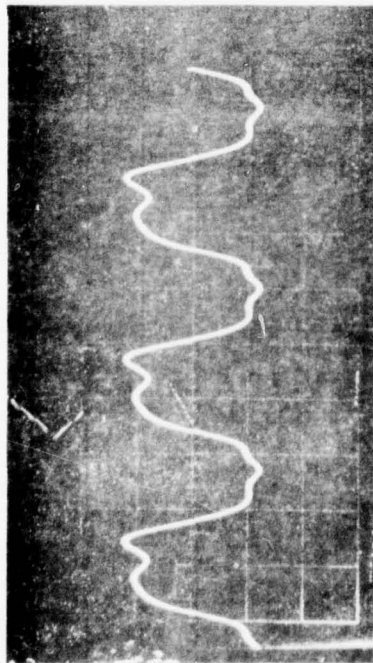
(b) Y = yes

TABLE 1. ANTENNA MATCHING - CONT

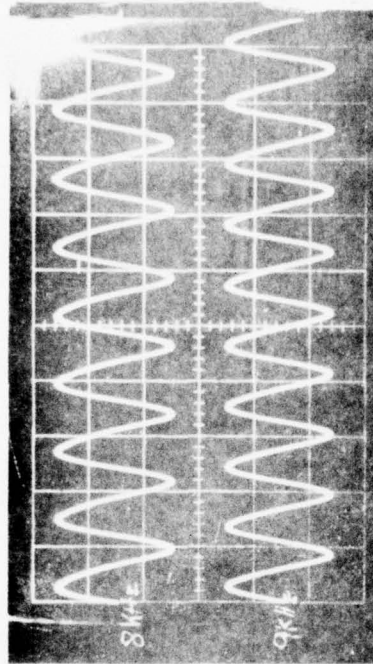
Frequency (MHz)	6 Foot Whip	9 Foot Whip	15 Foot Whip	Doublet Ant	Long Wire 300 Foot
38.0	Y	Y			
39.0	Y	Y			
40.0	Y	Y			
41.0	Y	Y			
42.0	Y	Y			
43.0	Y	Y			
44.0	Y	Y			
45.0	Y	Y			
46.0	Y	Y			
47.0	Y	Y			
48.0	Y	Y			
49.0	Y	Y			
50.0	Y	Y			
51.0	Y	Y			
52.0	Y	Y			
53.0	Y	Y			
54.0	Y	Y			
55.0	Y	Y			
56.0	Y	Y			
57.0	Y	Y			
58.0	Y	Y			
59.0	Y	Y			
60.0	Y	Y			
61.0	Y	Y			
62.0	Y	Y			
63.0	Y	Y			
64.0	Y	Y			
65.0	Y	Y			
66.0	Y	Y			
67.0	Y	Y			
68.0	Y	Y			
69.0	Y	Y			
70.0	Y	Y			
71.0	Y	Y			
72.0	Y	Y			
73.0	Y	Y			
74.0	Y	Y			
75.0	Y	Y			
76.0	Y	Y			

TABLE 2. SYSTEM RESPONSE VS. PULSE REPETITION RATE

PRC-70
FM-5.6 KHZ



PULSE RATE - 3.0 KHZ

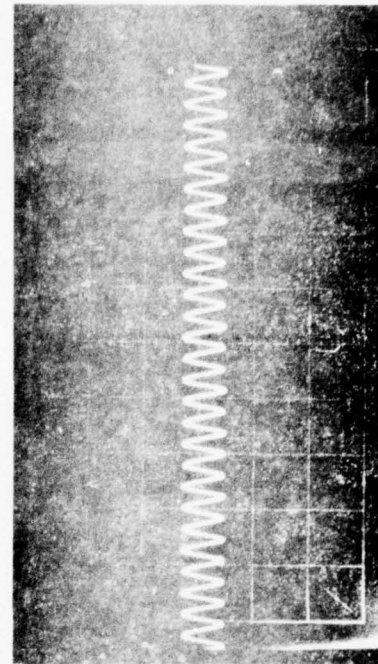


PULSE RATE - 8.0 KHZ

PULSE RATE - 9.0 KHZ



PULSE RATE - 6.0 KHZ



PULSE RATE - 13.0 KHZ

TABLE 3 TYPICAL AUDIO DISTORTION

SSB Mode 1 kHz Tone

Audio Frequency Hz	Input Level (uv)				
	30	300	3000	30,000	300,000
500	2.7%	2.7%	2.8%	2.9%	2.9%
1000	3%	3%	3.1%	3.3%	3.4%
3000	1%	1%	1%	1%	1%
Limits (max)	3%	3%	3%	3%	3%

AM Mode 30% Modulation 1 kHz Tone

Audio Frequency Hz	Input Level (uv)				
	30	300	3000	30,000	300,000
500	2%	1.5%	1.5%	1.4%	6.7%
1000	2%	1.4%	1.4%	1.5%	7.7%
3000	2.4%	1.6%	1.7%	1%	1%
Limits (max)	3%	3%	3%	3%	3%

FM Mode + 8 kHz Deviation 1 kHz Tone

Audio Frequency Hz	Input Level (uv)				
	30	300	3000	30,000	300,000
500	1.6%	1.6%	1.6%	1.6%	1.8%
1000	2.7%	3%	3.1%	3%	3.8%
3000	1.2%	1.1%	1%	1%	1.1%
Limits (max)	7%	7%	7%	7%	7%

TABLE 5 . TRANSMIT INTERMODULATION DISTORTION

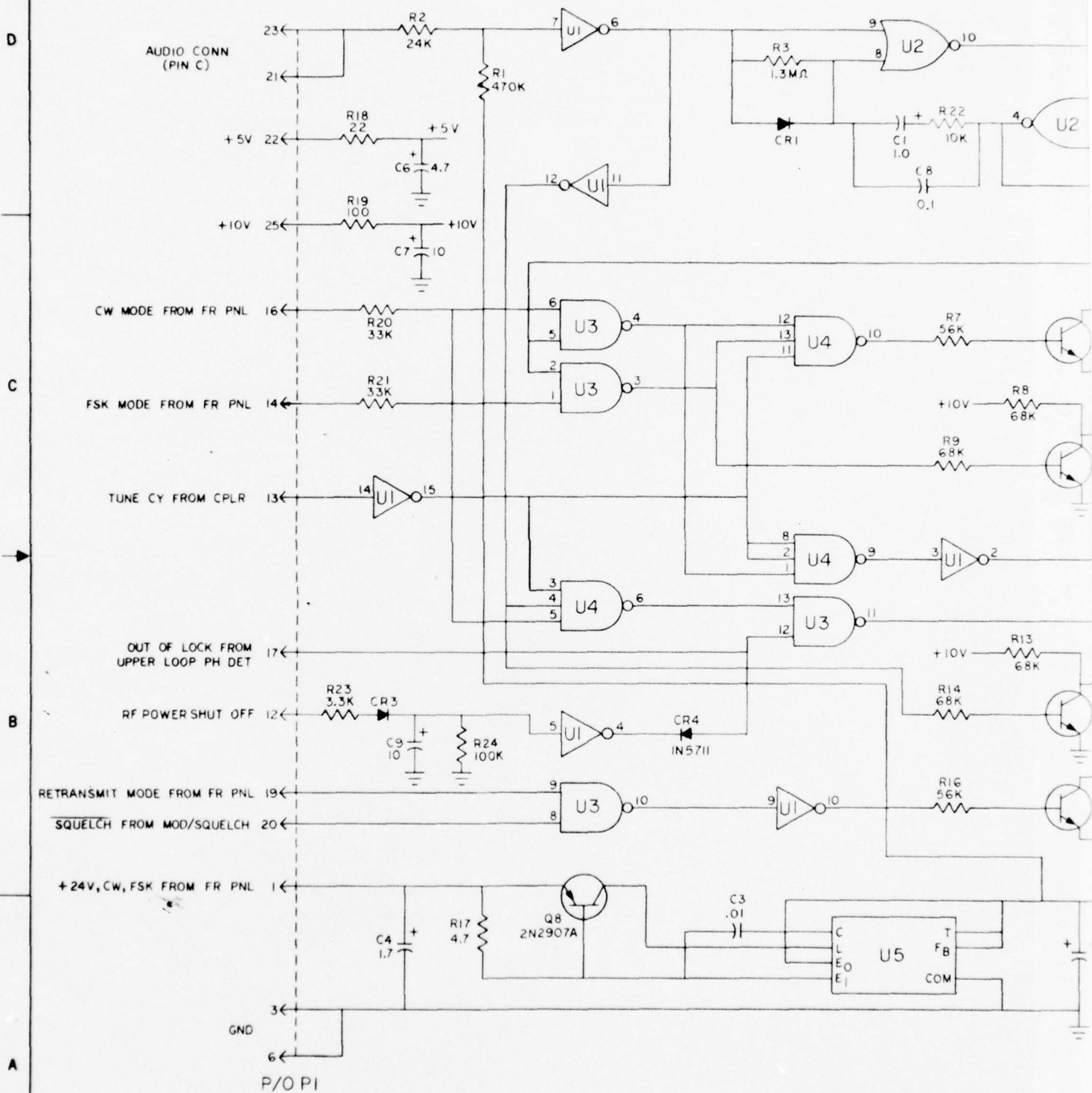
Frequency (MHz)	3rd Order IM	5th Order IM	Carrier Suppression	Hum & Noise	Lower Sideband
2.051	38 40	44 35	57 55	45 45	60 60
3.450	32 32	44 40	53 53	45 45	60 60
4.678	35 30	43 40	50 52	45 45	60 60
9.895	35 32	40 42	50 50	45 45	60 60
12.550	34 30	40 46	55 55	45 45	60 60
19.400	38 29	40 40	50 52	45 45	60 60
26.428	35 36	36 35	50 50	45 45	60 60
35.126	38 30	36 37	50 50	45 45	60 60
51.350	36 32	34 32	50 50	45 45	60 60
65.750	28 29	34 30	50 50	45 45	60 60
Limits (max.)	25 dB Below Output Tones	25 dB Below Output Tones	45 dB Below PEP	40 dB Below Output Tones	50 dB Below Output Tones

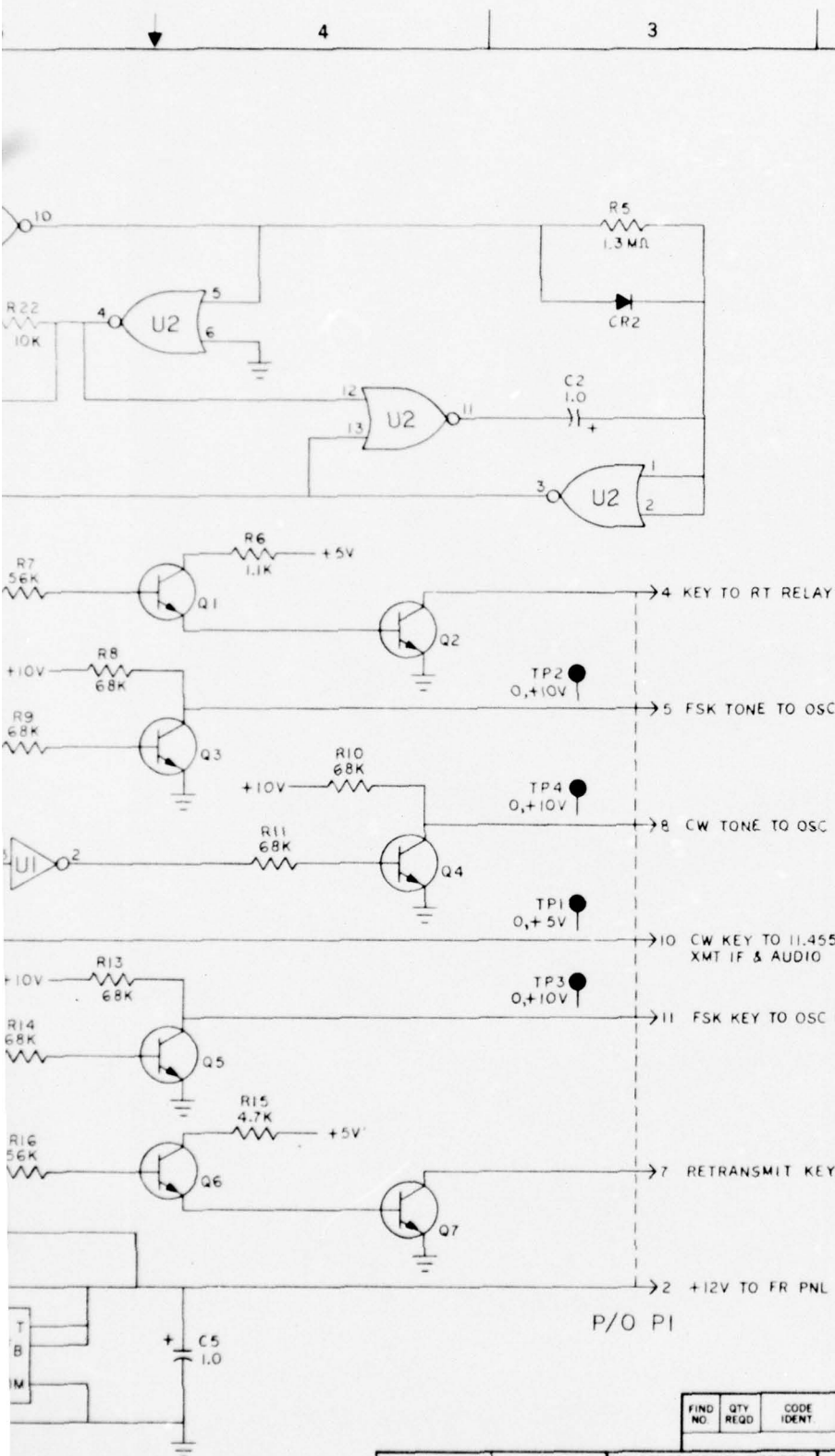
TABLE 6 ANTENNA MATCHING (LOADS)

Freq. (MHz)	6' Whip				9' Whip				15' Whip				Doublet				300' Long Wire			
	R	X	Tune	No Tune	R	X	Tune	No Tune	R	X	Tune	No Tune	R	X	Tune	No Tune	R	X	Tune	No Tune
2.0510	X				X				50		✓		40		✓		X			
									-150					+40						
3.5020	X				70		✓		75		✓		45		✓		X			
					-1500				-700					+65						
5.6600	40		✓		40		✓		40		✓		36		✓		X			
	-1400				-700				-260					-10						
8.1000	80		✓		60		✓		100		✓		35		✓		140		✓	
	-700				-340				-100					+45			-150			
12.5500	50		✓		90		✓		80		✓		30		✓		500		✓	
	-350				-120				-28					+18			-200			
19.4000	120		✓		60		✓		200		✓		38		✓		250		✓	
	-100				-33				+50					+70			0			
29.9999	150		✓		200		✓		600		✓		30		✓		430		✓	
	-30				+30				-200					+40			+130			
36.7777	100		✓		150		✓		X				X				X			
	-15				+100															
50.8000	120		✓		300		✓		X				X				X			
	-80				+50															
76.9000	250		✓		110		✓		X				X				X			
	-245				-110															

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
B		REDRAWN W/O CHG. ON NO. 11	5 APR 74	
C		ADDED R22 & C5	26 NOV 74	
D		ADDED PIN 12, R23, R24, CR3, CR4, C9 & UNUSED PORTION OF U1 ON F316	29 JULY 75	

BEST AVAILABLE COPY

NOTES:

1. COMPONENT VALUES ARE IN OHMS, MICROFARADS, OR MICROHENRIES UNLESS OTHERWISE SPECIFIED.
2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REF DESIGNATION.
3. ALL TRANSISTORS ARE TYPE 2N2222A. ALL DIODES TYPE 1N4148 UNLESS OTHERWISE SPECIFIED.
4. INTEGRATED CIRCUITS: +5V (U1) = TERM NO. 1, 16
(U2-U4) = TERM NO. 14
GND (U1) = TERM NO. 8
(U2-U4) = TERM NO. 7

UNIT NO. 1A1A20

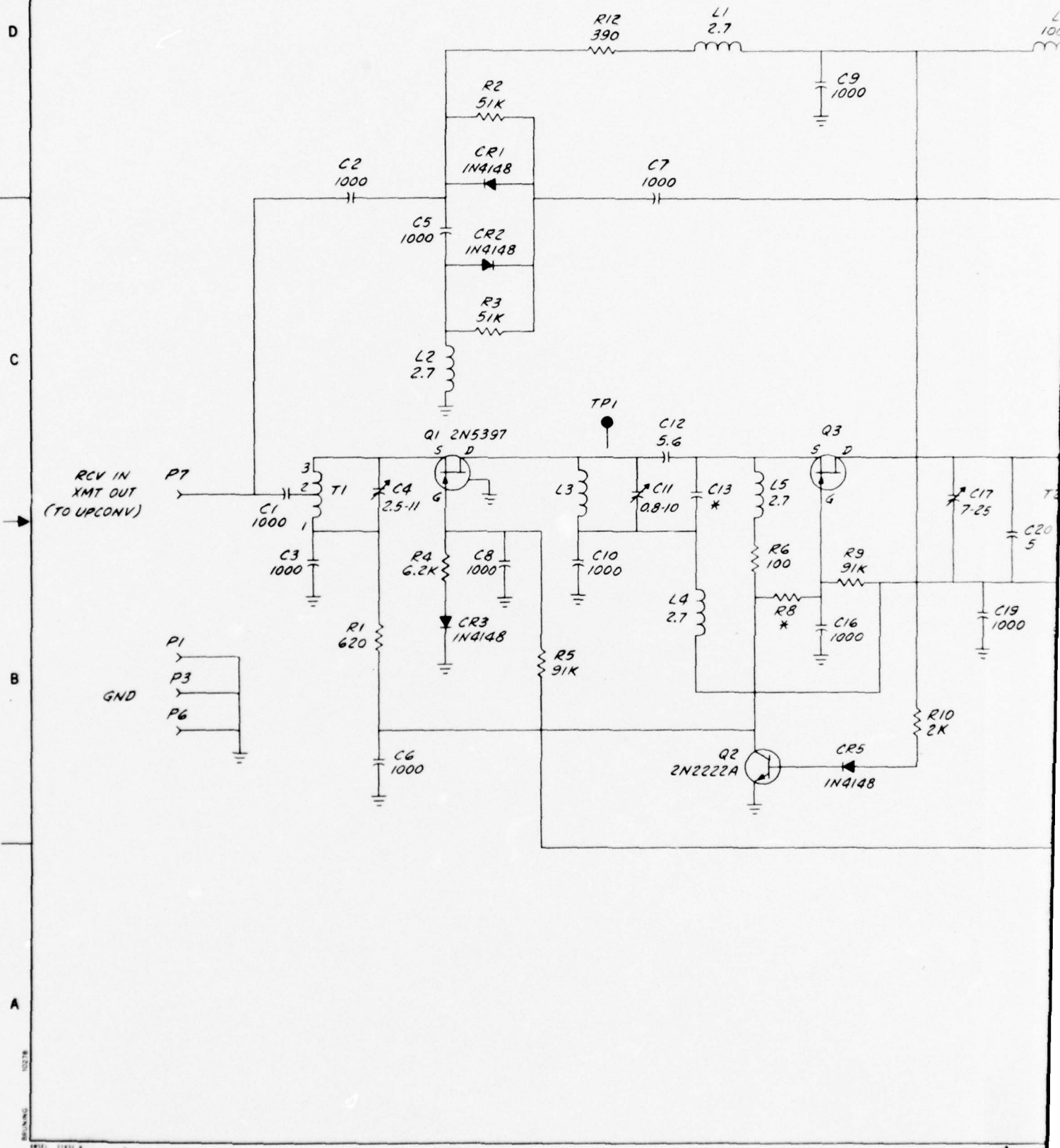
P/O PI

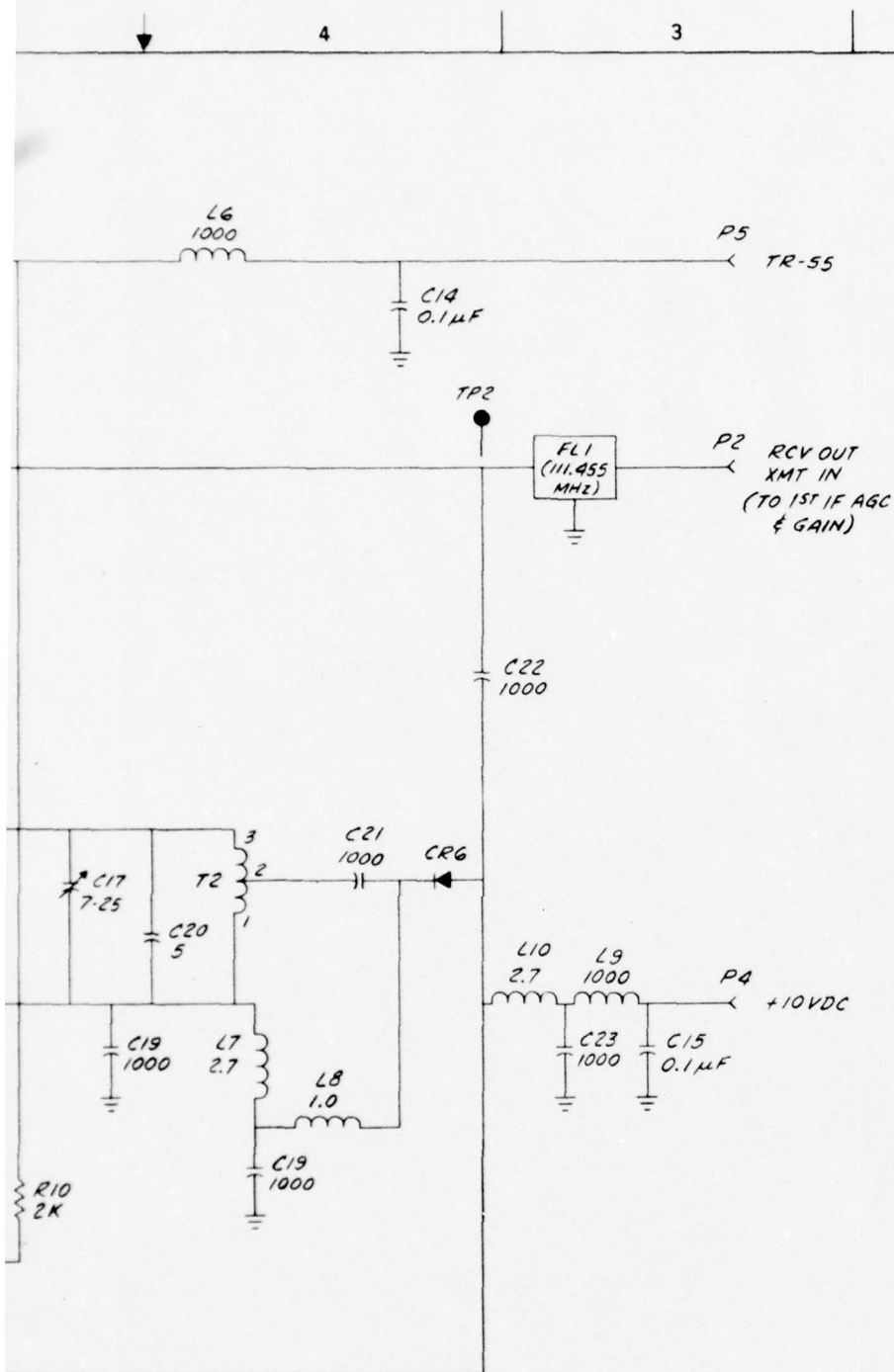
FIND NO.	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES			U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703			
MATERIAL			80045 DAAB07.71.C-0319 ELECTRONICS COMMAND			
SM-D-745620 DLSMB 746363			REVIEWED APPROVED DATE 12 MAY 1973			
NEXT ASSY USED ON			SIZE CODE IDENT NO D 80063 SM-D-745819			
APPLICATION			SCALE NONE SHEET			

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	E	REDRAWN W/O CHG. C/N NONE. WMF	12 JUN 74	
	F	DELETED R13 C/N NONE	20 NOV 74	

NOTES:

1. COMPONENT VALUES ARE IN OHMS, PICOFARADS, OR MICROHENRIES UNLESS OTHERWISE SPECIFIED.
2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REF DESIGNATION.
3. * DENOTES SELECT VALUE.

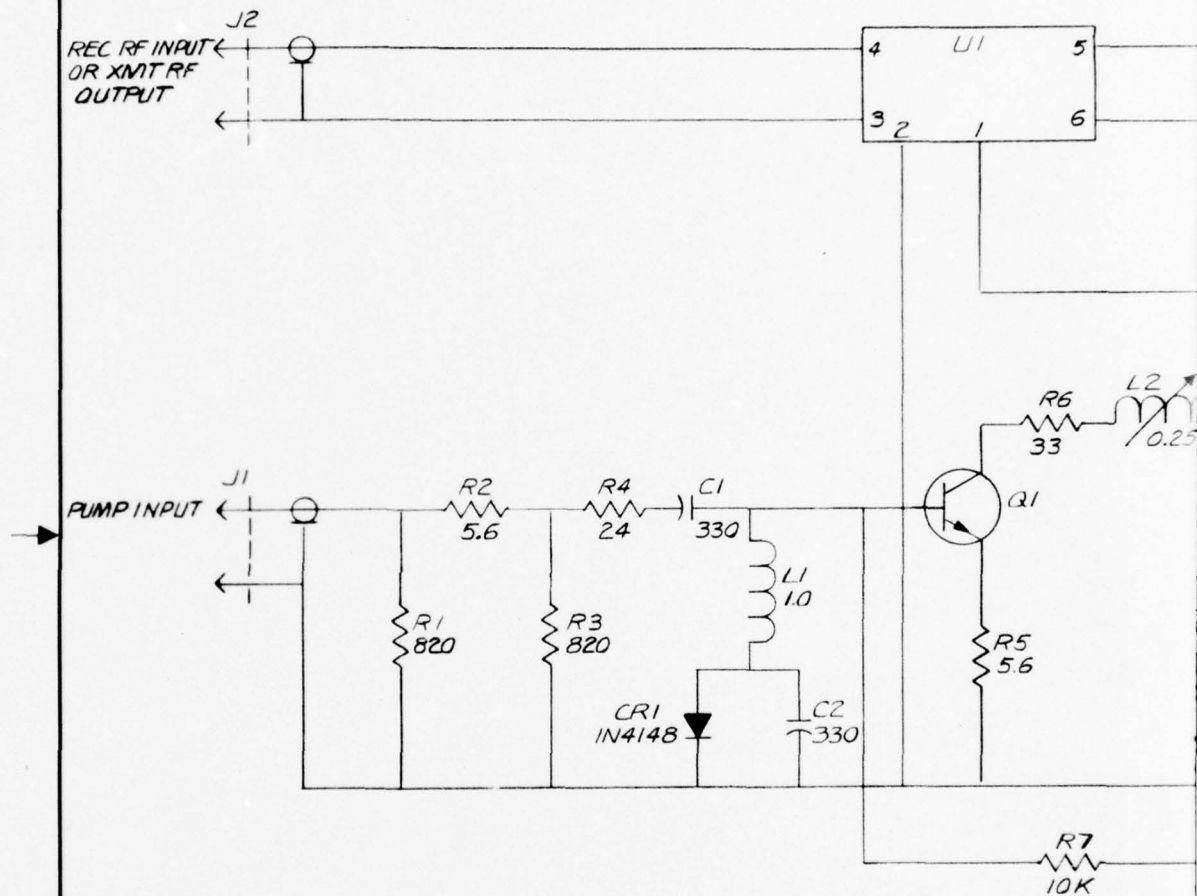
UNIT NO. 1A1A14

FIND NO.	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES				U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703		
MATERIAL:				SCHEMATIC DIAGRAM, FIRST IF SELECTIVITY		
SM-D-745821 (UL SM-P-746360)				ELECTRONICS COMMAND		
NEXT ASSY USED ON				REVIEWED		
APPLICATION				APPROVED		
				DATE 12 MAY 1973		
				SIZE CODE IDENT NO.		
				D 80063 SM-D-745821		
				SCALE NONE SHEET		

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NOTES:

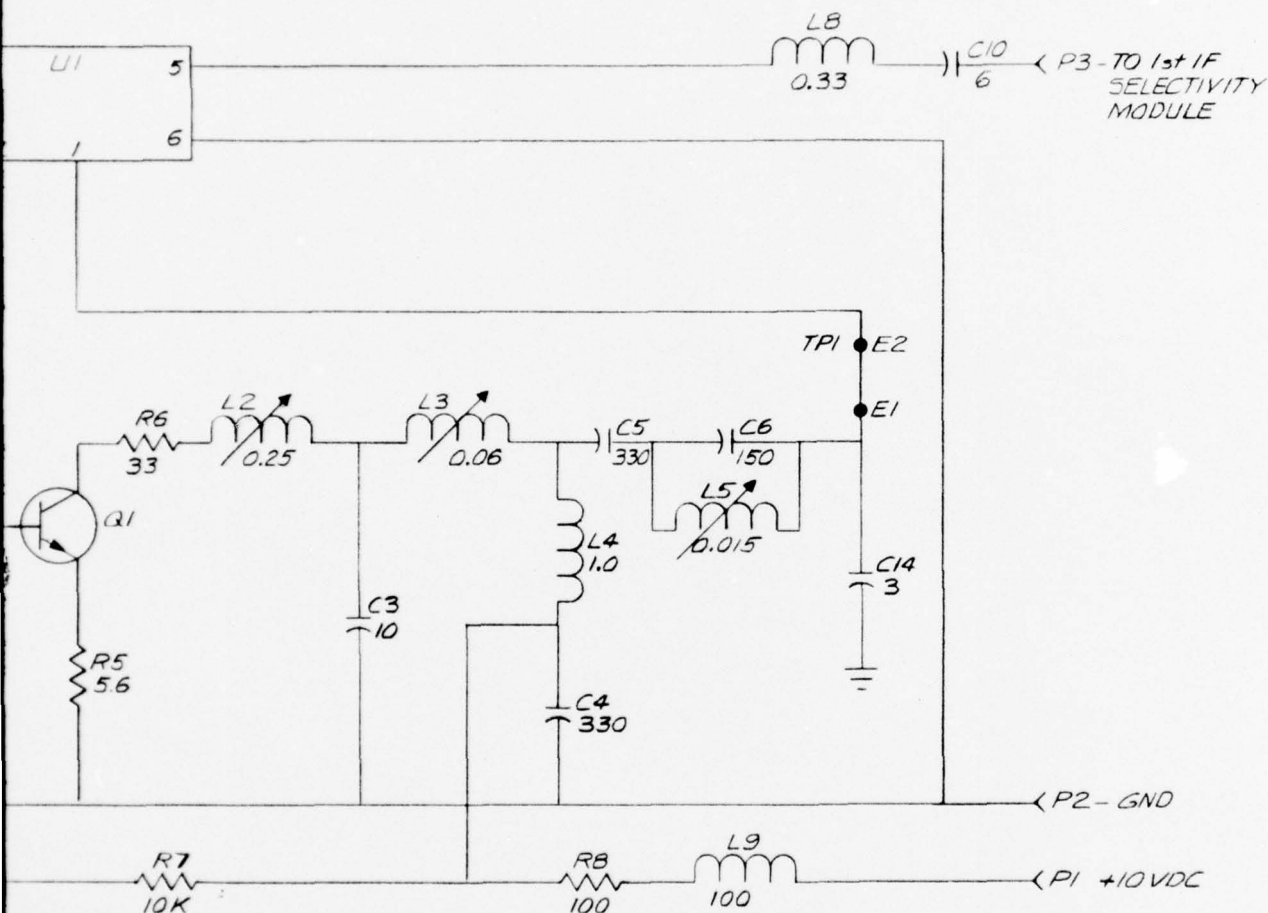
1. COMPONENT VALUES ARE IN OHMS, PICO FARADS, OR MICROHENRIES UNLESS OTHERWISE SPECIFIED.
2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REF DESIGNATION.

		UNLES
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		FRACTI
		MATER
5M-D-745622	DSM-B-74365	
NEXT ASSY	USED ON	
APPLICATION		

10278
BRUNING

AMSEL 17X22 P

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
E	REDRAWN W/ NO CHANGES CN NINE JHS	8 JAN 74	
F	DELETED C13 9/11 F304	6/4/75	



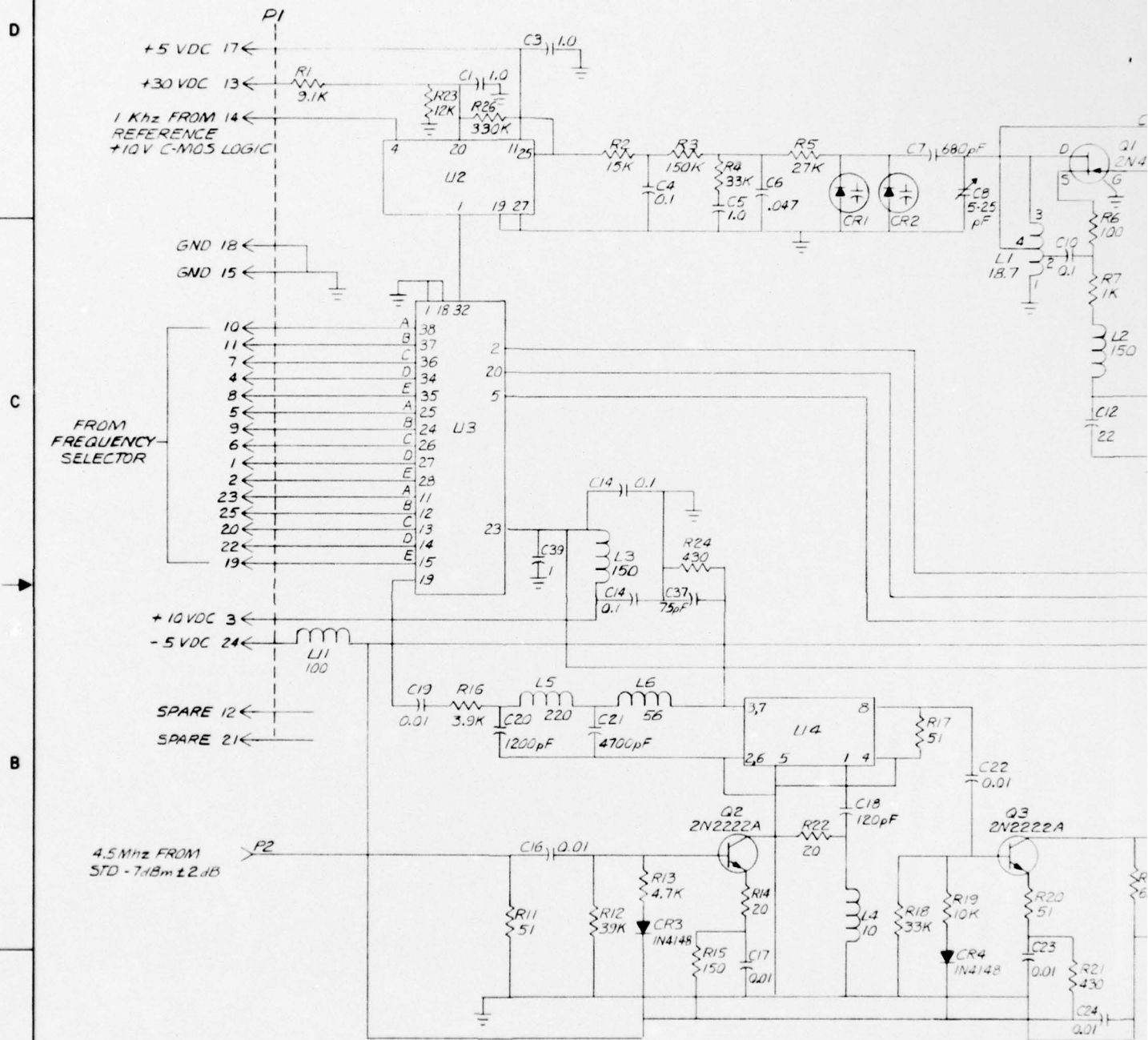
UNIT 1A1A13

FIND NO.	QTY REQD	CODE IDENT.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE		
PARTS LIST								
OTHERWISE SPECIFIED: UNITS ARE IN INCHES DECIMALS ANGLES			80045 DAA807-71-C-0319	U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703				
				SCHEMATIC DIAGRAM UP CONVERTER				
			ELECTRONICS COMMAND			SIZE CODE IDENT NO. C 80063 SM-C-745825		
			REVIEWED					
APPROVED								
DATE 13 MAY 1973			SCALE NONE			SHEET		

WHEN REFERRING TO THIS DRAWING STATE DRAWING NO., APPLICABLE ISSUE LETTER IF ANY, AND DATE

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NOTES:

1. COMPONENT VALUES ARE IN OHMS, MICROFARADS OR MICROHENRIES UNLESS OTHERWISE SPECIFIED.
2. PREFIX REF DESIGNATION OF PART WITH UNIT COMPLETE LOCATIONAL REF DESIGNATION.
3. INTEGRATED CIRCUIT U1: VCC (+10 VDC) = PIN 7
GND = PIN 7

4

3

2

1

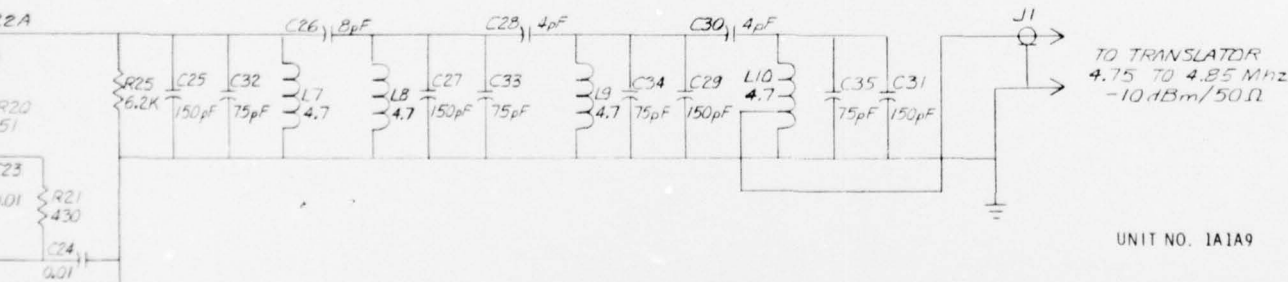
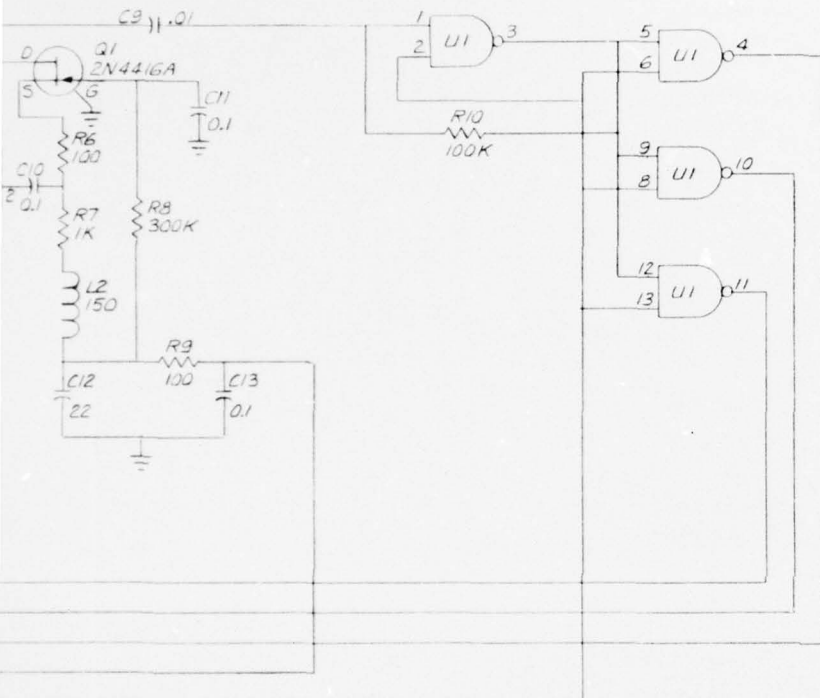
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
E		REDRAWN W/AD CHANGES, CN NONE J4	13 JAN 74	
F		C7 WAS 470 pF	3 JAN 74	
G		R26 WAS 130K	28 JUN 76	

D

C

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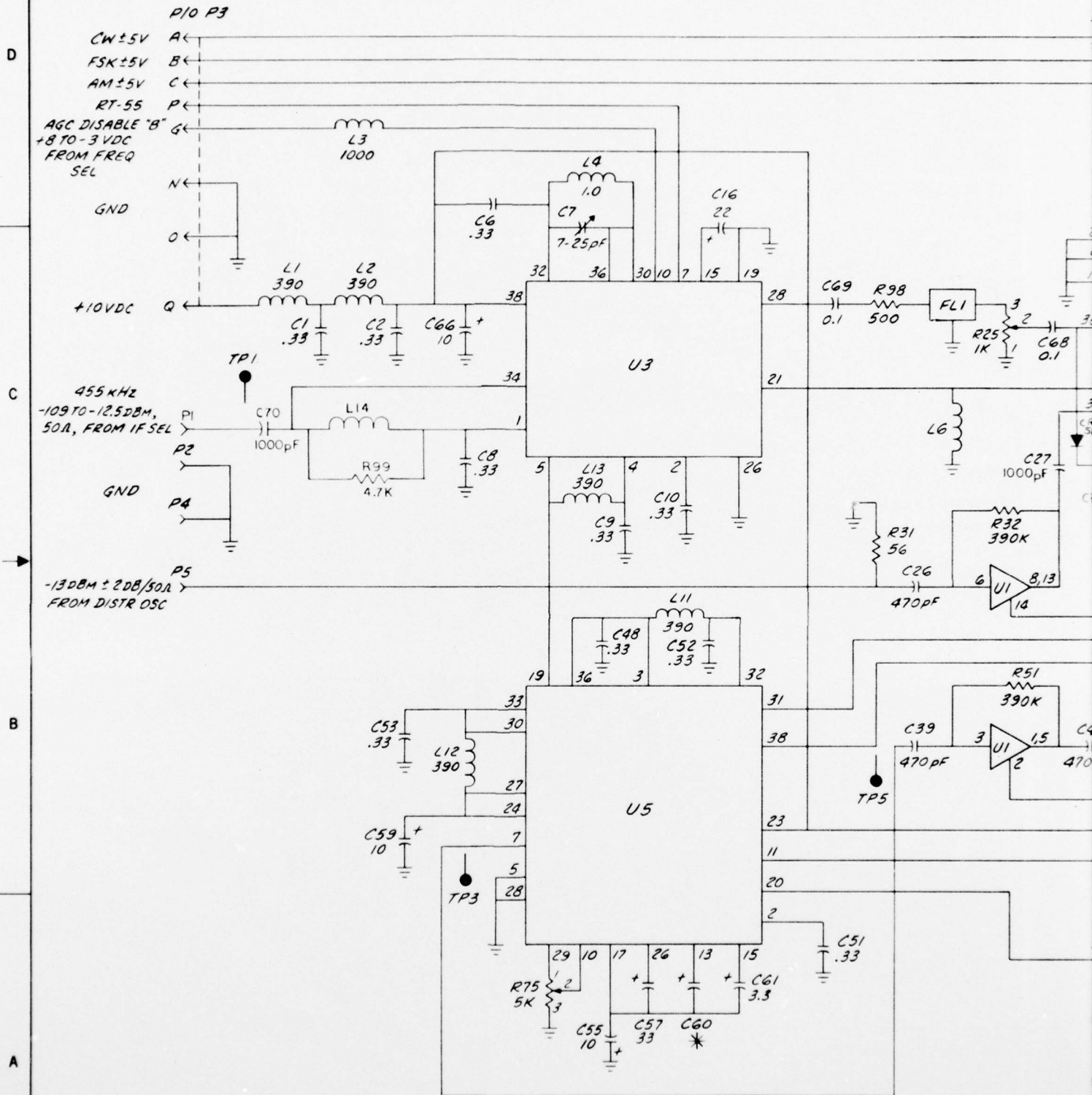
FIND NO.	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES				U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703		
MATERIAL:				SCHEMATIC DIAGRAM LOWER LOOP		
SM-D-745836 DLSMB-746367				SIZE CODE IDENT NO. D 80063 SM-D-745836		
NEXT ASSY USED ON				SCALE NONE SHEET		
APPLICATION				DATE 15 APR 1973		

WHEN REFERRING TO THIS DRAWING STATE DRAWING NO., APPLICABLE ISSUE LETTER IF ANY, AND DATE

2

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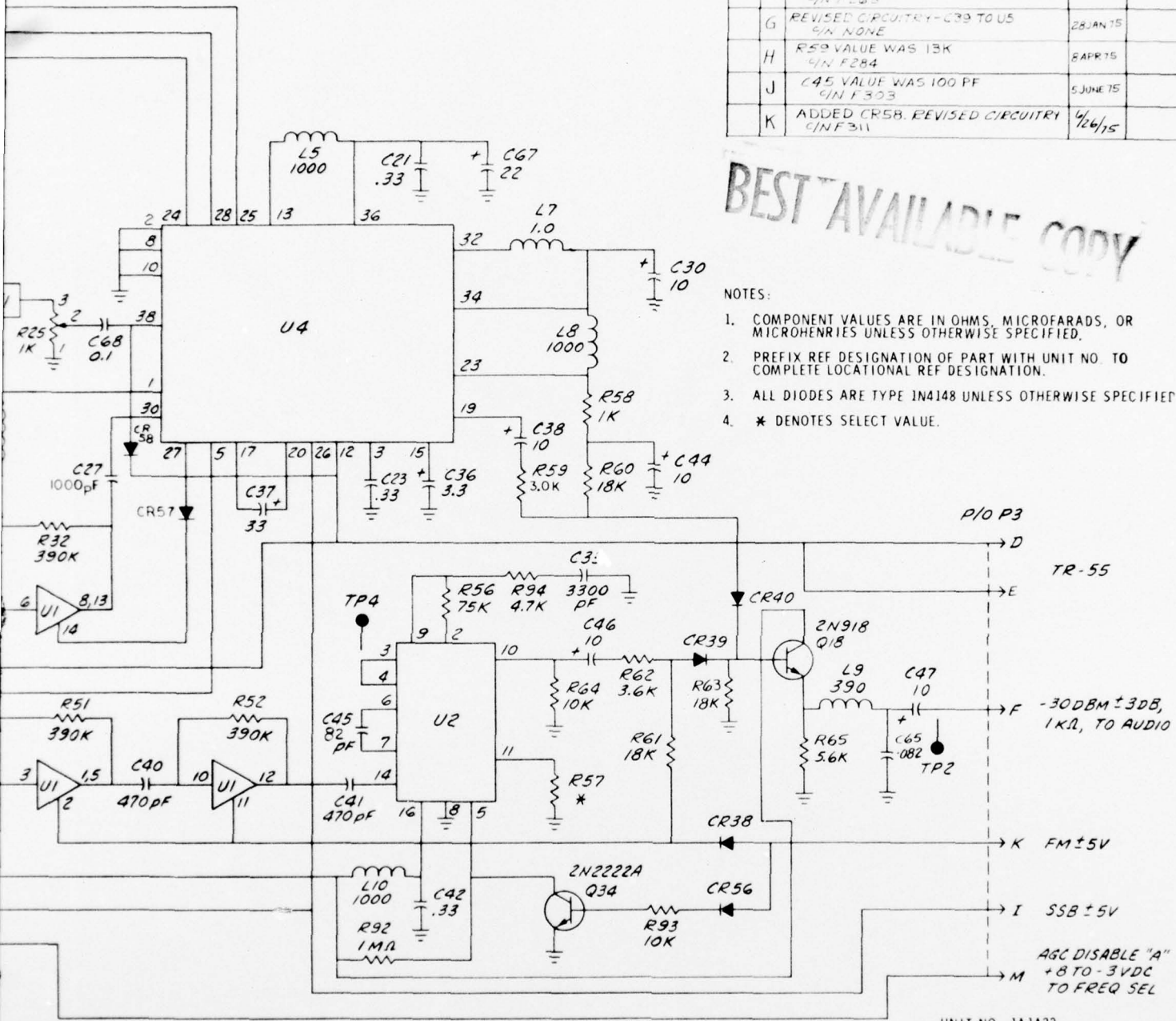


REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	E	REDRAWN W/O CHG. CN NONE. WME	18 JUN 74	
	F	DELETED R1C3, C4 T1, R29. VALUE OF C27 WAS 470PF, VALUE OF C45 WAS 82PF. ADDED CR57, C70, L14, R93. REVISED CIRCUITRY. C60 WAS 1.0 C/N F263	2 JAN 75	
	G	REVISED CIRCUITRY - C39 TO U5 C/N NONE	28 JAN 75	
	H	R59 VALUE WAS 13K C/N F284	8 APR 75	
	J	C45 VALUE WAS 100 PF C/N F303	5 JUNE 75	
	K	ADDED CR58. REVISED CIRCUITRY C/N F311	4/26/75	

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NOTES:

1. COMPONENT VALUES ARE IN OHMS, MICROFARADS, OR MICROHENRIES UNLESS OTHERWISE SPECIFIED.
2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REF DESIGNATION.
3. ALL DIODES ARE TYPE 1N4148 UNLESS OTHERWISE SPECIFIED.
4. * DENOTES SELECT VALUE.

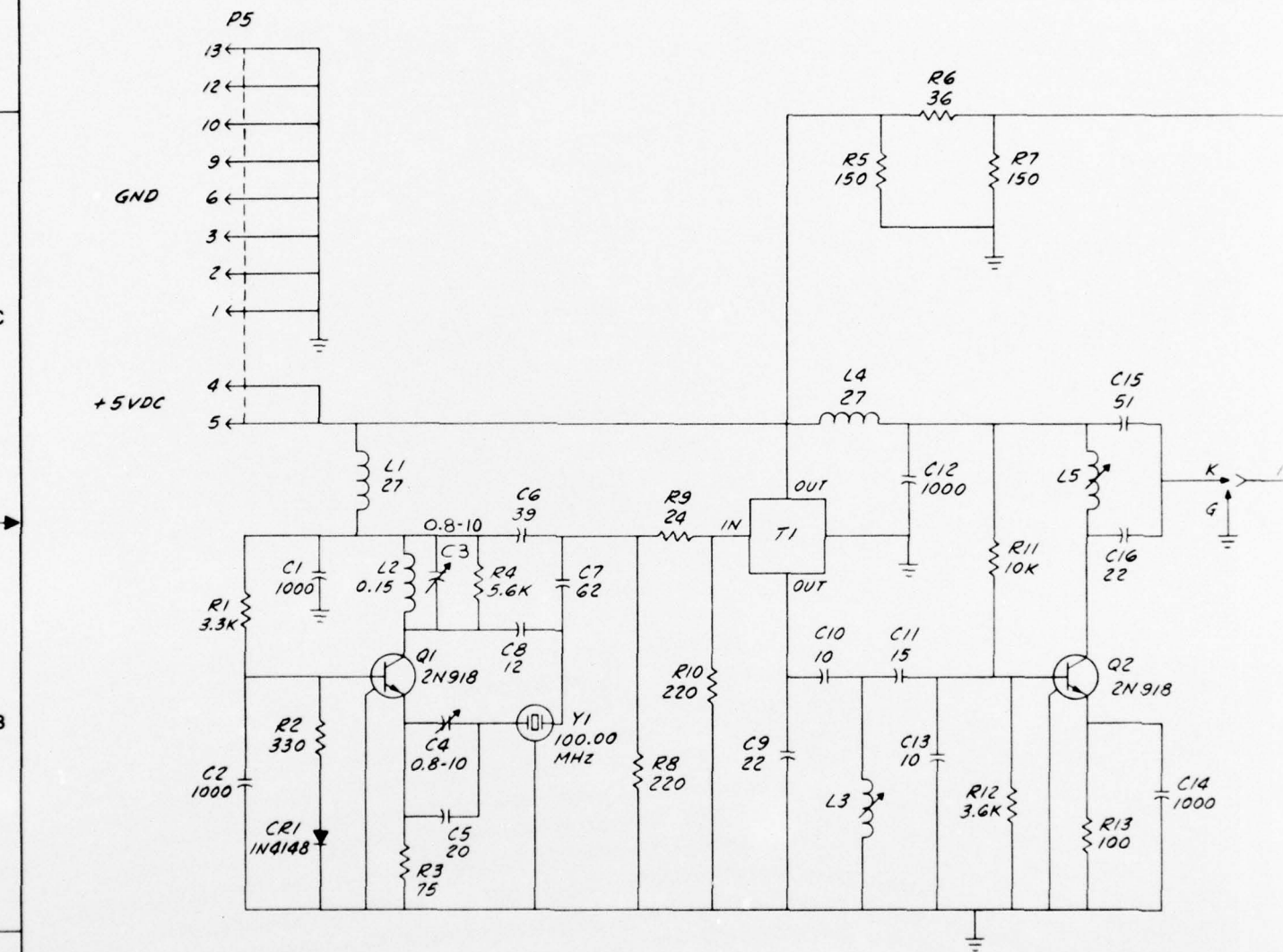


UNIT NO. 1A1A22

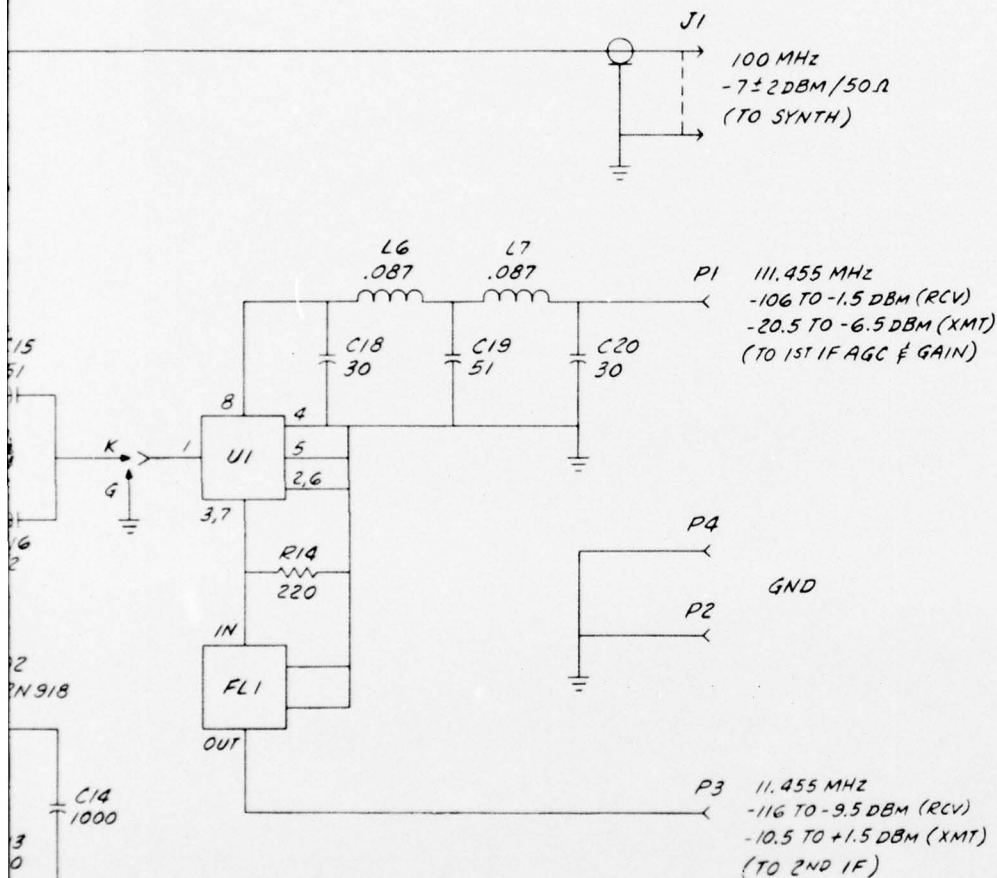
FIND NO	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES				U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703		
MATERIAL:				SCHEMATIC DIAGRAM, RECEIVER IF AND DETECTION		
SM-D-745611 DLSM-R 74-1.8				ELECTRONICS COMMAND		
NEXT ASSY USED ON				REVIEWED		
APPLICATION				APPROVED		
				DATE 14 MAY 1973		
				SCALE NONE		
				SHEET		

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	D	REDRAWN W/O CHG. CN NONE, WMF	13 JUN 74	
	E	DELETED C21, C22, C23, L8, L9. ADDED C3 CN-F 232	25 SEPT 74	



NOTES:

1. COMPONENT VALUES ARE IN OHMS, PICO FARADS, OR MICROHENRIES UNLESS OTHERWISE SPECIFIED.
2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REF DESIGNATION.

UNIT NO. 1A1A16

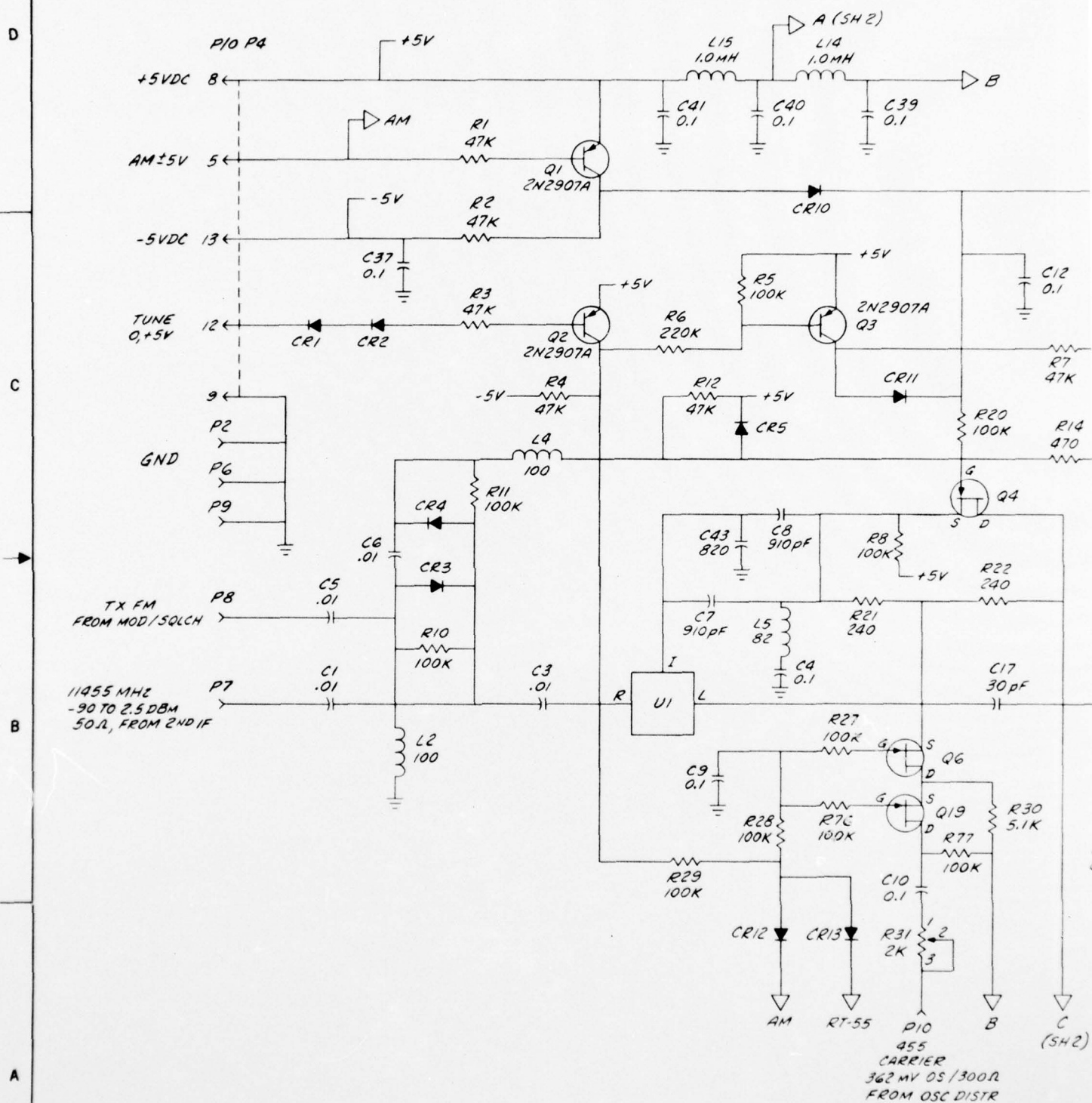
FIND NO.	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES			U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703			
MATERIAL:			80045 DAAB07-71-C-0319			
SM-D-745616 SM-B-746359			ELECTRONICS COMMAND			
NEXT ASSY USED ON			REVIEWED			
APPLICATION			APPROVED			
			DATE 14 MAY 1973			
			SIZE CODE IDENT NO. D 80063			
			SM-D-745846			
			SCALE NONE			
			SHEET			

WHEN REFERRING TO THIS DRAWING STATE DRAWING NO., APPLICABLE ISSUE LETTER IF ANY, AND DATE

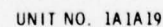
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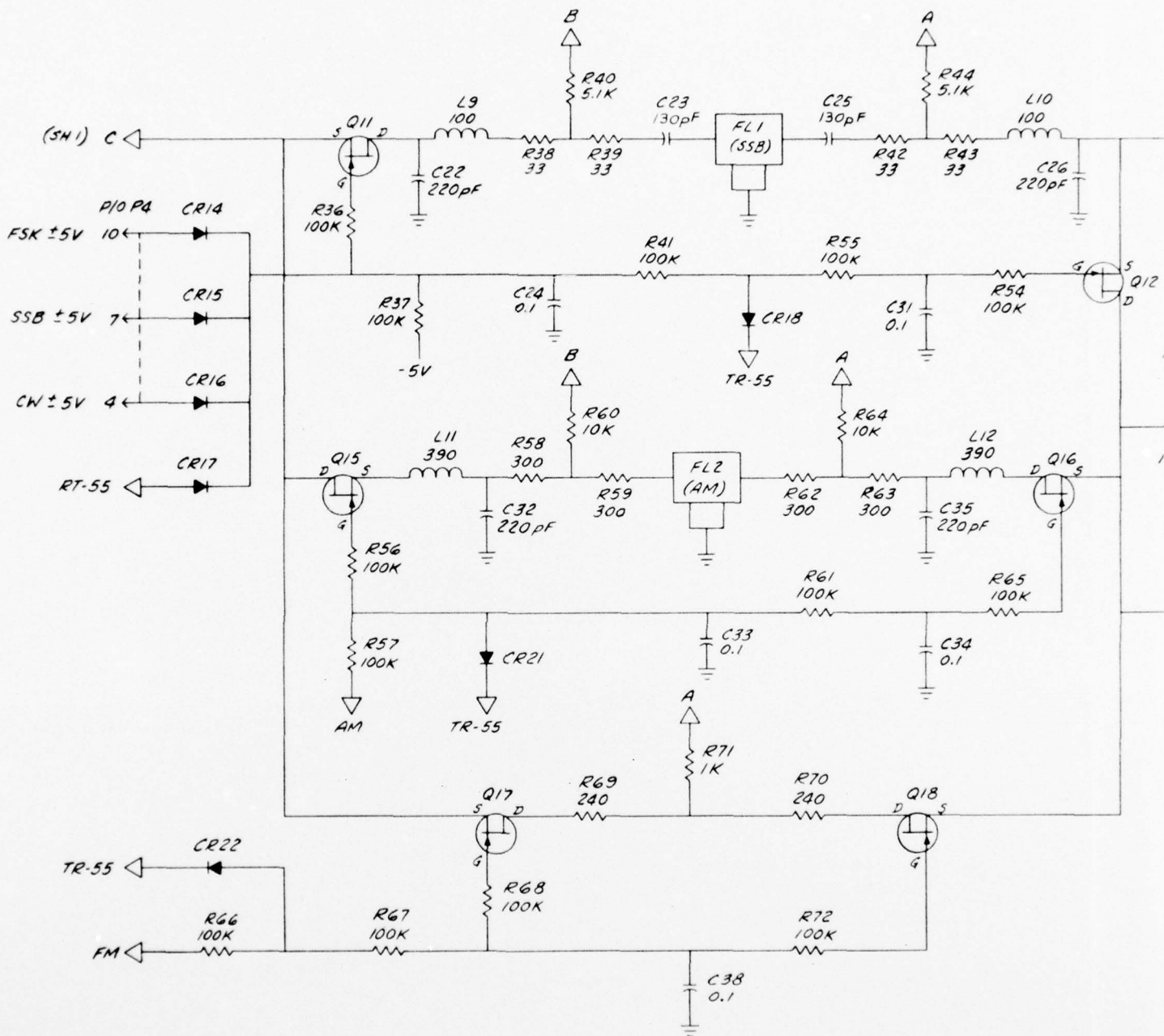
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	D	REDRAWN W/O CHG. CN NONE. WMF	10JUN78	
	E	NO CHANGE SEE HT2 9/INF298	5/28/15	

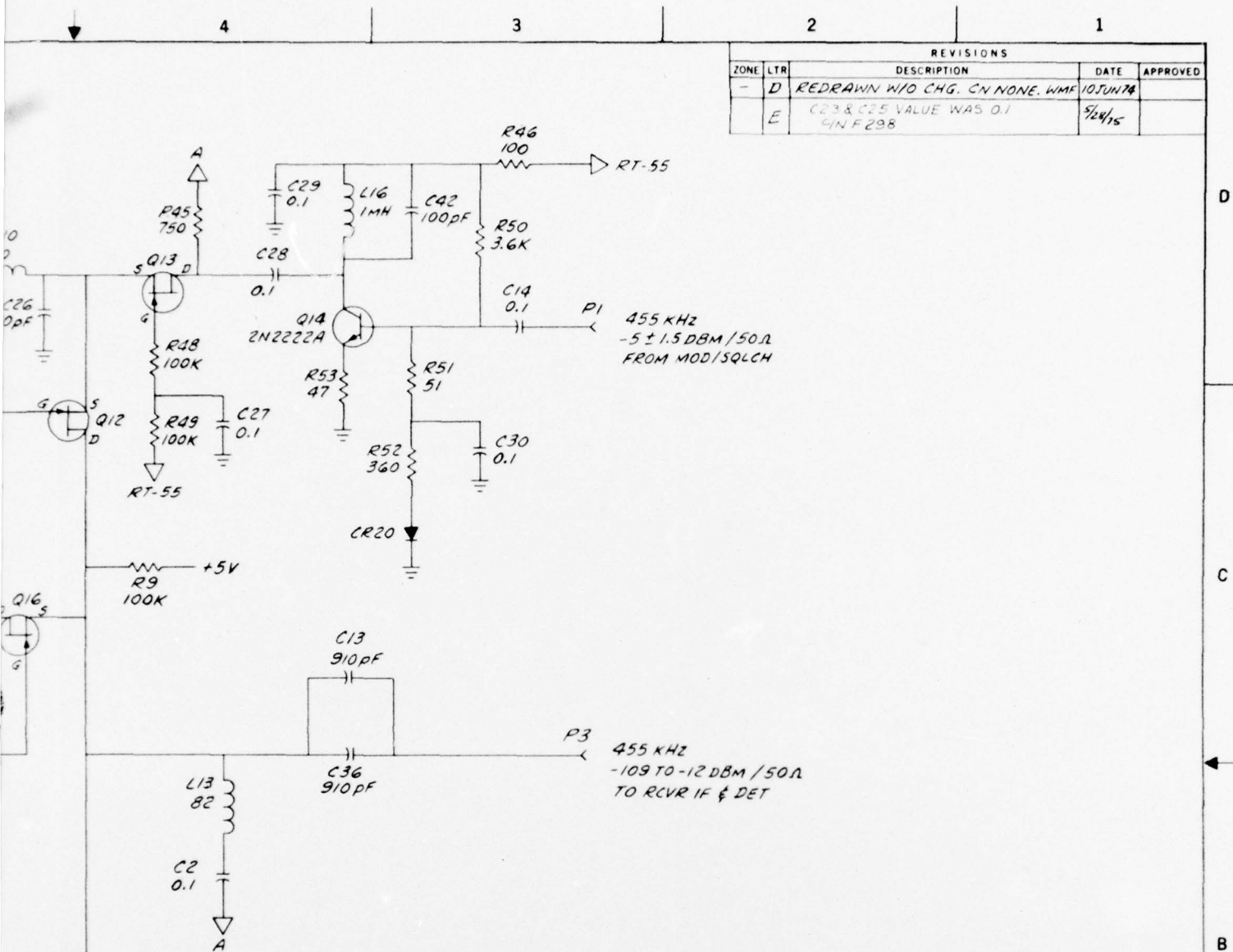


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FIND NO.	QTY REQD	CODE IDENT.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703				A		
ELECTRONICS COMMAND						
REVIEWED				SIZE CODE IDENT NO.		
APPROVED				D 80063		
DATE				SM-D-745848		
SCALE				SHEET 2		

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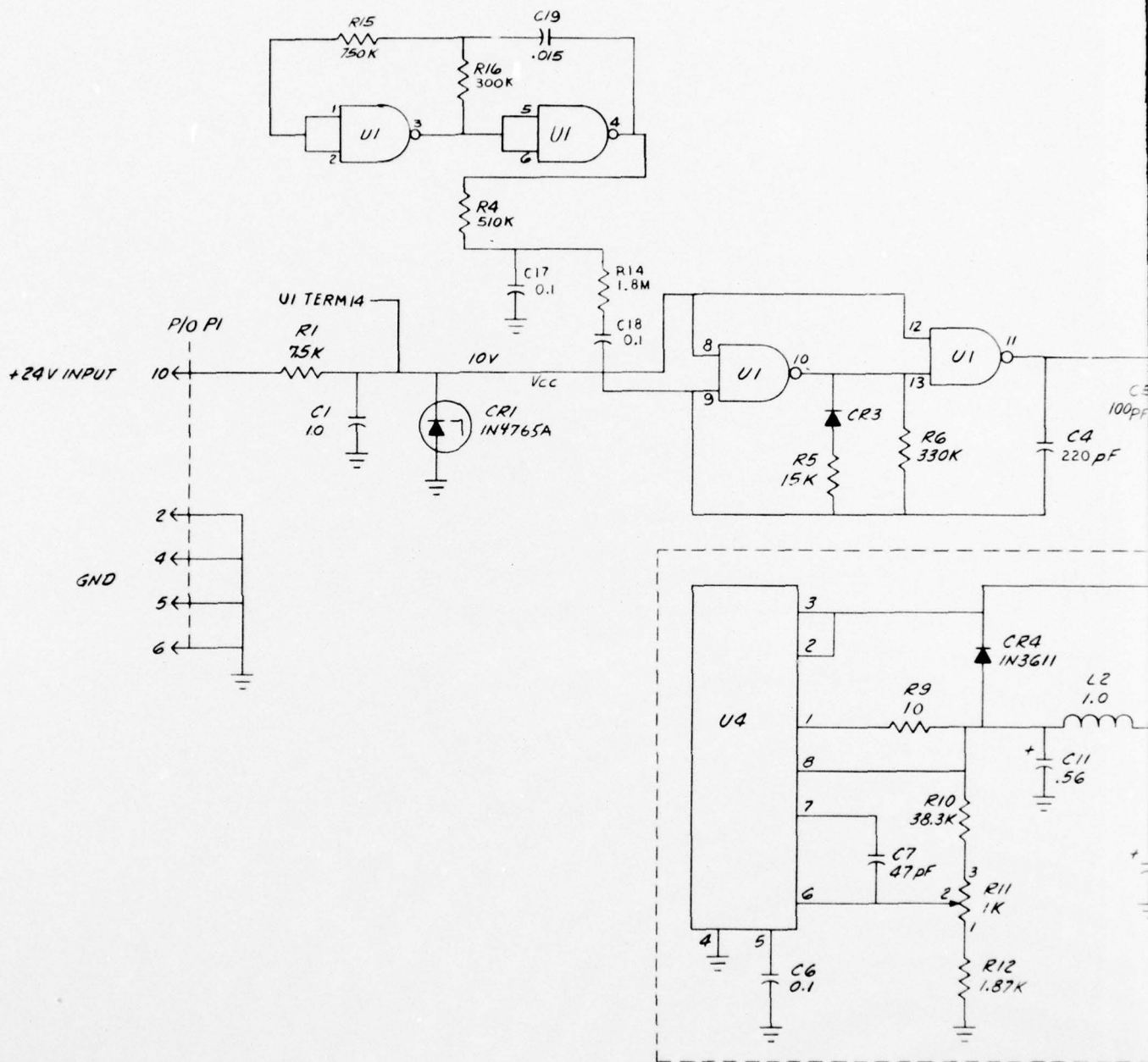
NOTE
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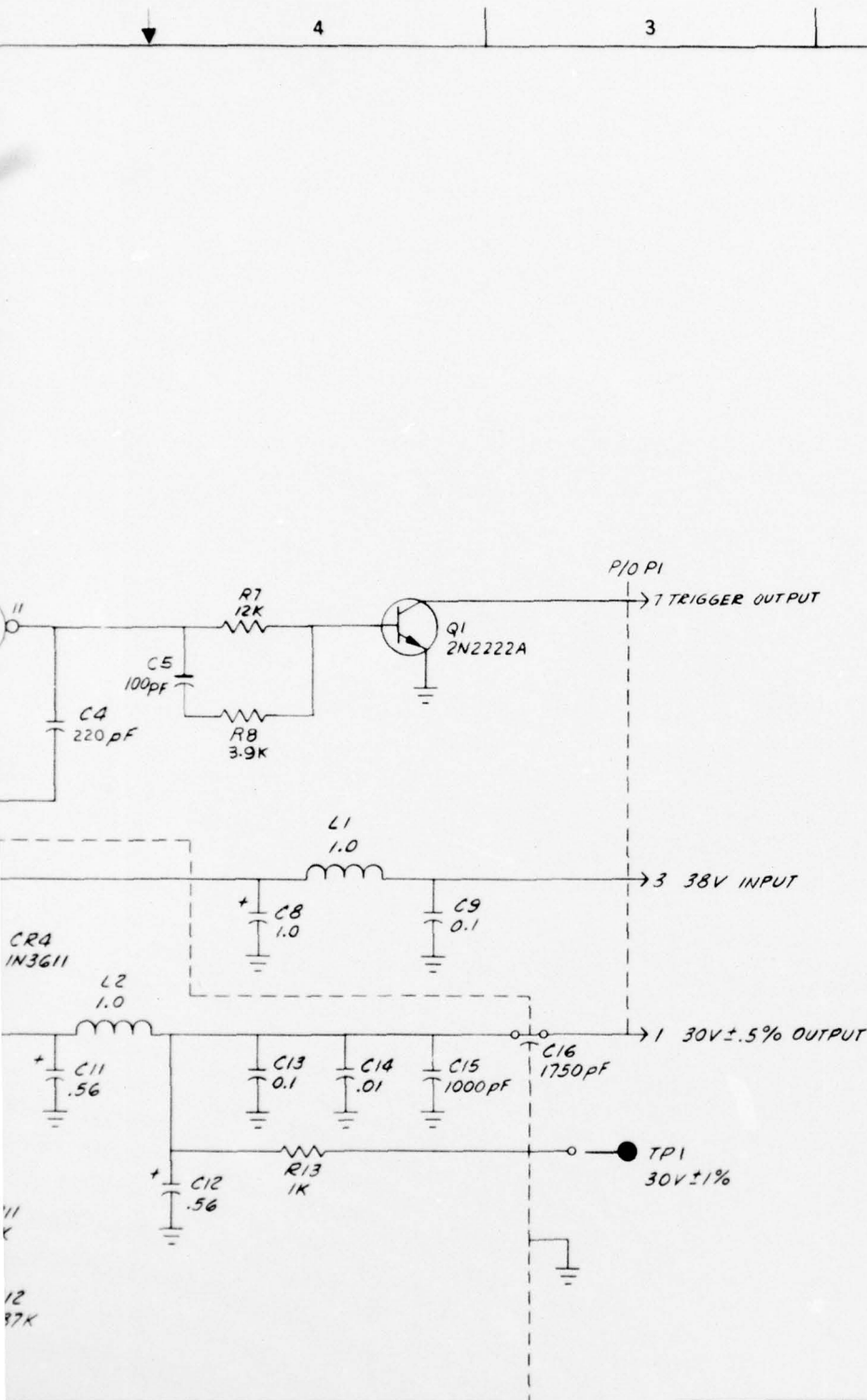
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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	C	REDRAWN W/O CHG. CN NONE. WMF	20 MAY 74	
	D	VALUE OF R4 WAS 10K, C4 VALUE WAS 100PF. DELETED U2, C3, R3, CR2, CR5, CR6. ADDED C17, C18, C19, R14, R15, R16. REVISED CIRCUITRY & NOTE 4 4/11/75	3 JAN 75	
	E	R9 VALUE WAS 36 4/11/75	14 FEB 75	
	F	DELETED R2, C2, U3. REVISED CIRCUITRY 4/11/75	4/11/75	
	G	VALUE OF R1 WAS 15K, R1 WAS IN 58A, VALUE OF C1 WAS .01	5/1/76	

NOTES:

1. COMPONENT VALUES ARE IN OHMS, MICROFARADS, OR MILLIHENRIES UNLESS OTHERWISE SPECIFIED.
2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REF DESIGNATION.
3. ALL DIODES ARE TYPE IN4148 UNLESS OTHERWISE SPECIFIED.
4. INTEGRATED CIRCUITS: Vcc (U1) = TERM NO. 14
GND(U1) = TERM NO. 7

UNIT NO. 1A1A3

FIND NO.	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES			U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703			
MATERIAL:			80045 DAAB07.71-C.0319			
SM-D-745755 DL-SM-B-746373			ELECTRONICS COMMAND			
NEXT ASSY USED ON			REVIEWED			
APPLICATION			APPROVED			
			DATE 15 APR 1973			
			SIZE CODE IDENT NO.			
			D 80063 SM-D-745855			
			SCALE NONE			
			SHEET			

WHEN REFERRING TO THIS DRAWING STATE DRAWING NO., APPLICABLE ISSUE LETTER IF ANY, AND DATE

8

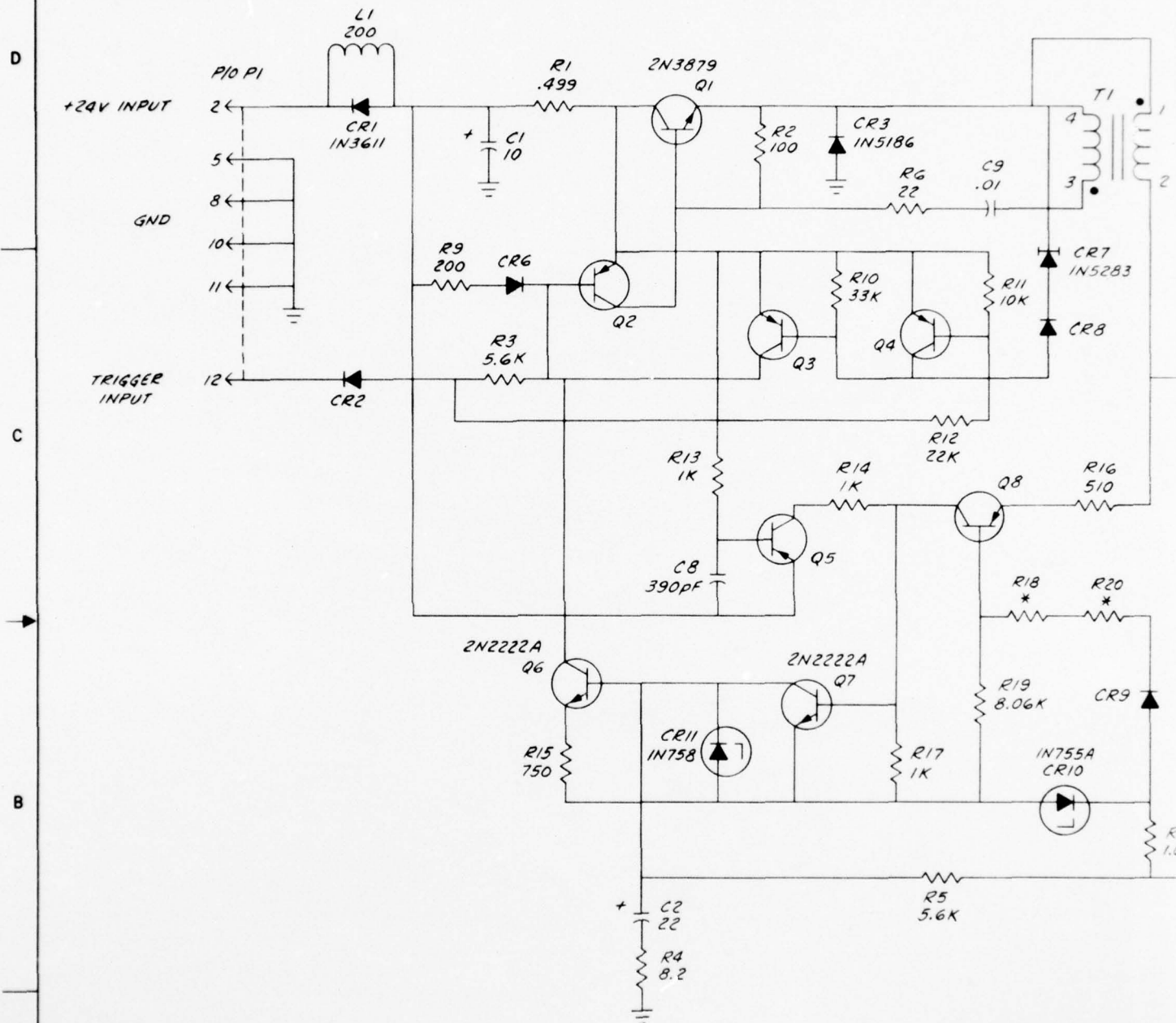
7

6

5

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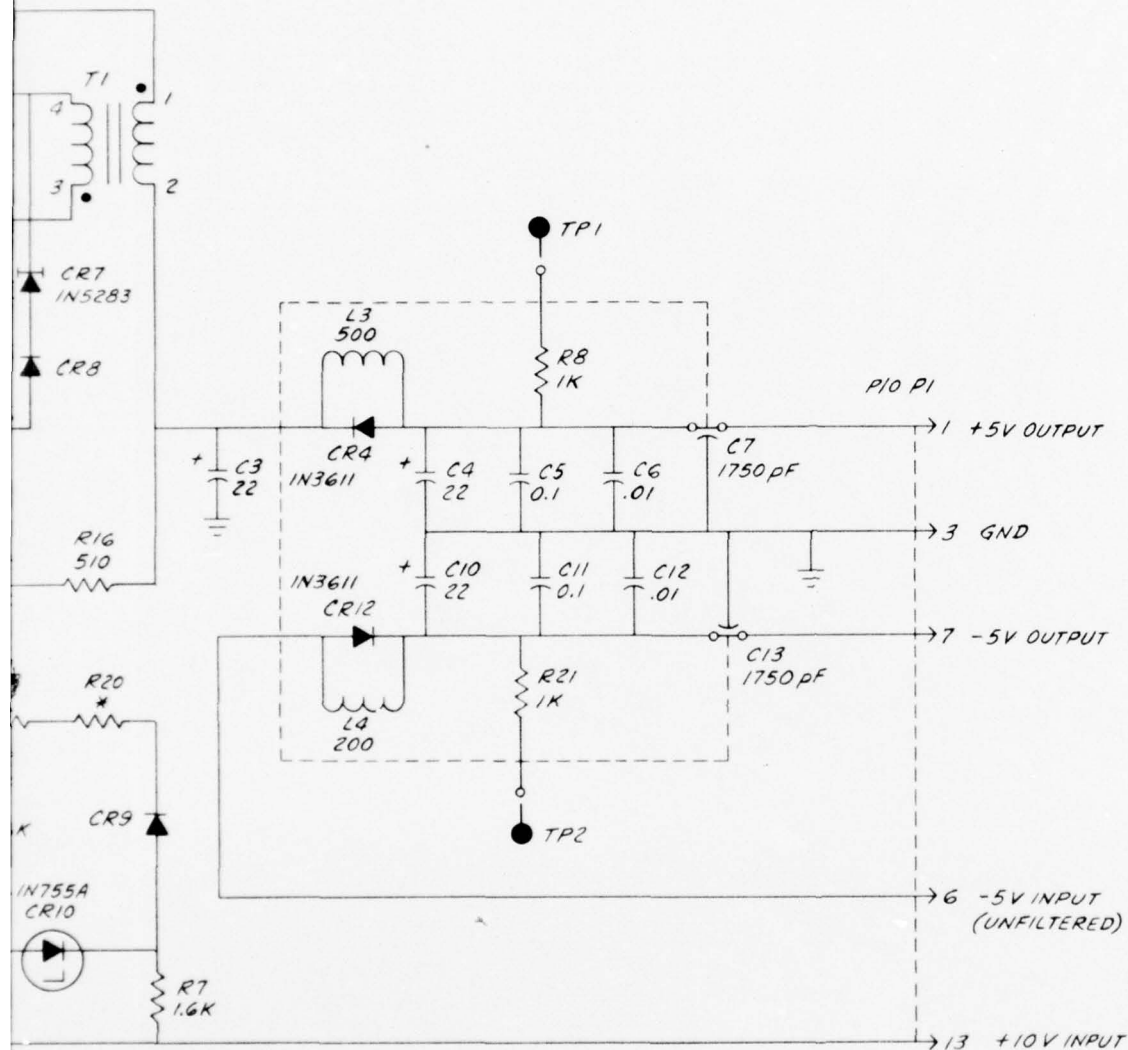
A

B

C

D

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	A	REDRAWN W/O CHG CN NONE WMF	28 MAY 74	



NOTES:

1. COMPONENT VALUES ARE IN OHMS, MICROFARADS, OR MICROHENRIES UNLESS OTHERWISE SPECIFIED.
2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REF DESIGNATION.
3. ALL TRANSISTORS ARE TYPE 2N2907A, ALL DIODES TYPE IN4148 UNLESS OTHERWISE SPECIFIED.
4. * DENOTES SELECT VALUE.

UNIT NO. 1A1A5

FIND NO.	QTY REQD.	CODE IDENT.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED:			U. S. ARMY ELECTRONICS COMMAND			
DIMENSIONS ARE IN INCHES			PROCUREMENT AND PRODUCTION DIRECTORATE			
TOLERANCES ON:			FORT MONMOUTH NEW JERSEY 07703			
FRACTIONS DECIMALS ANGLES						
MATERIAL			SCHEMATIC DIAGRAM, POWER SUPPLY, 5V REGULATOR			
SM-D-745757			ELECTRONICS COMMAND			
NEXT ASSY USED ON			REVIEWED			
APPLICATION			APPROVED			
			DATE 10 MAY 1973			
			SIZE CODE IDENT NO.			
			D 80063 SM-D-745857			
			SCALE NONE SHEET			

WHEN REFERRING TO THIS DRAWING STATE DRAWING NO., APPLICABLE ISSUE LETTER IF ANY, AND DATE

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NOTE

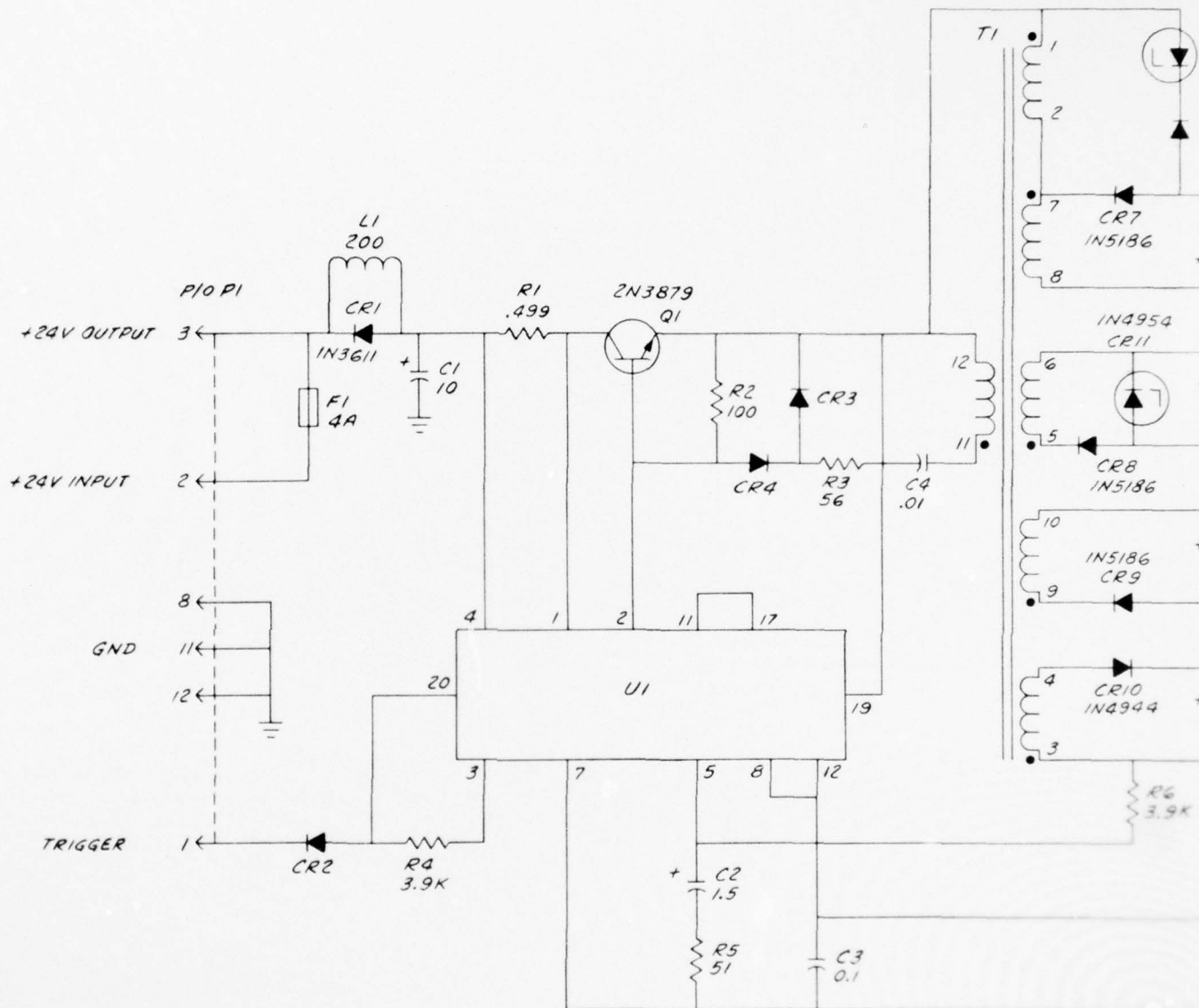
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CINCINNATI ELECTRONICS CORP OHIO

F/G 17/2.1

RADIO SET AN/PRC-70().(U)

FEB 77 C A BUCHER

DAAB07-71-C-0319

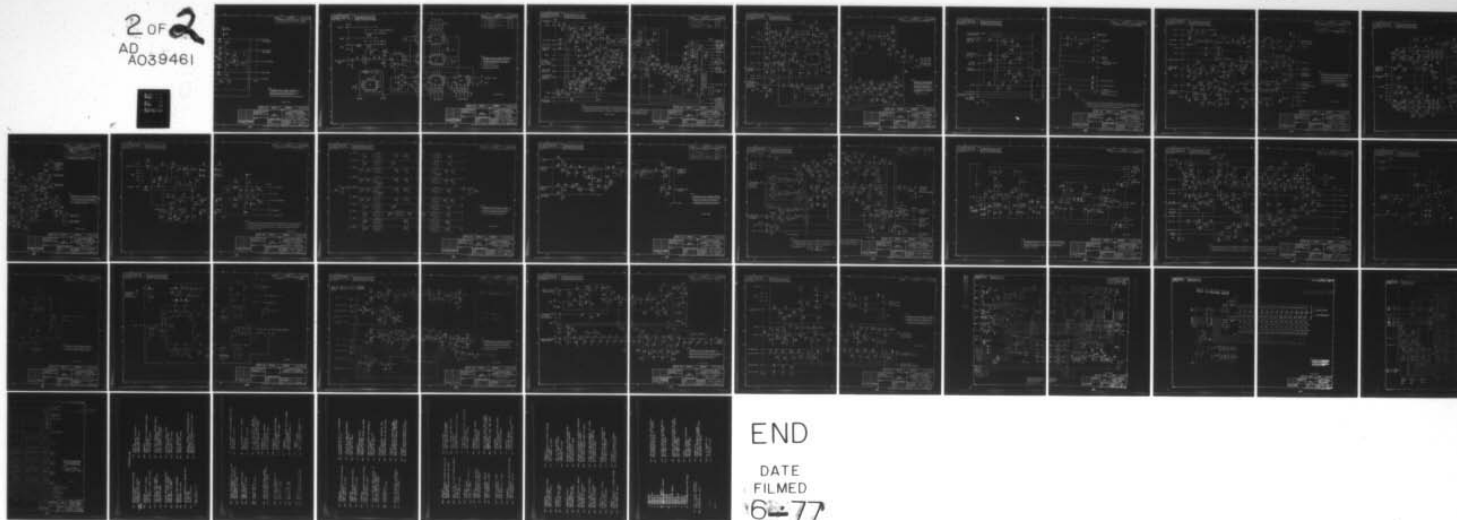
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80045-PRC-42/676

ECOM-71-0319-9

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2 OF 2
AD
A039461

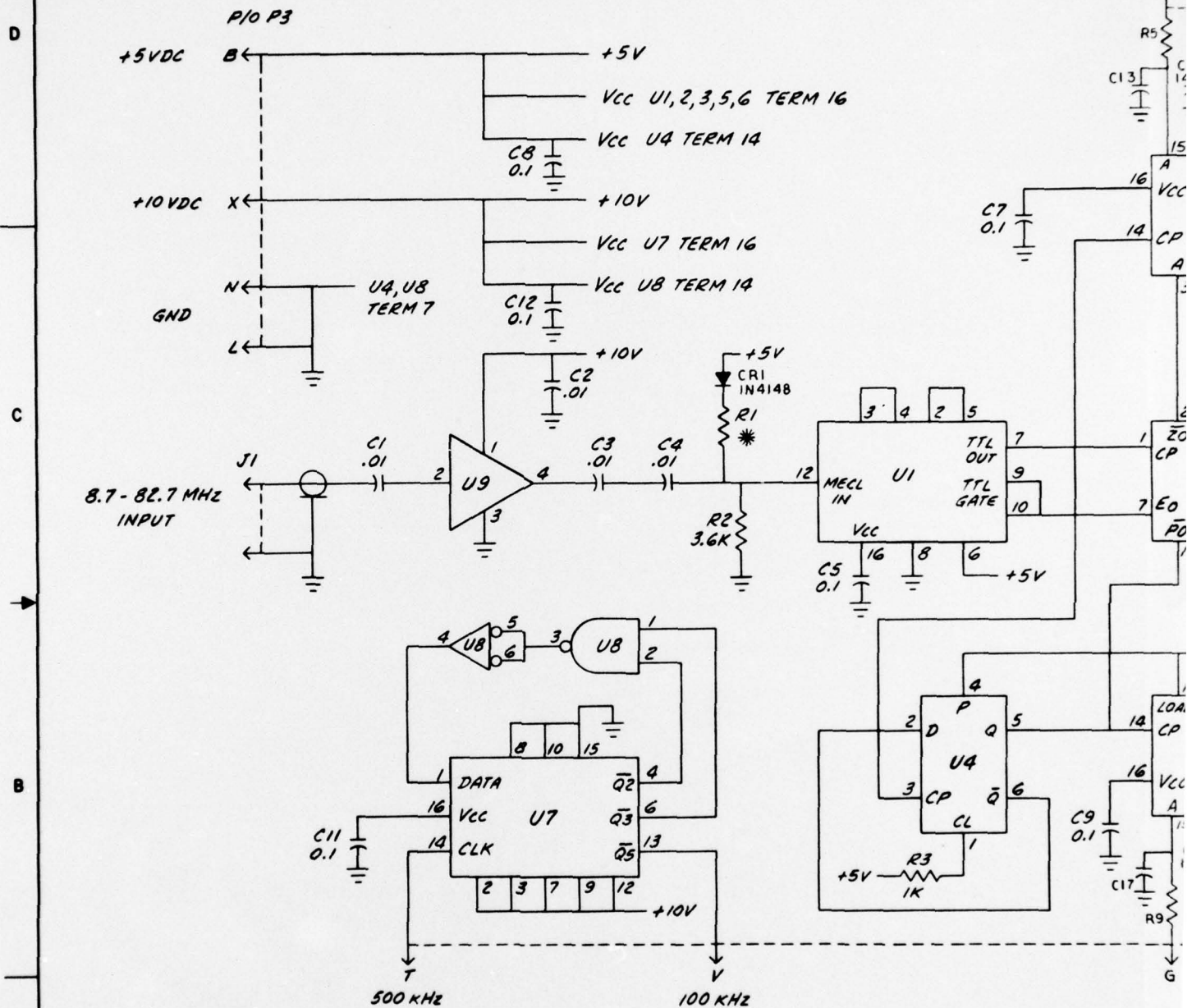


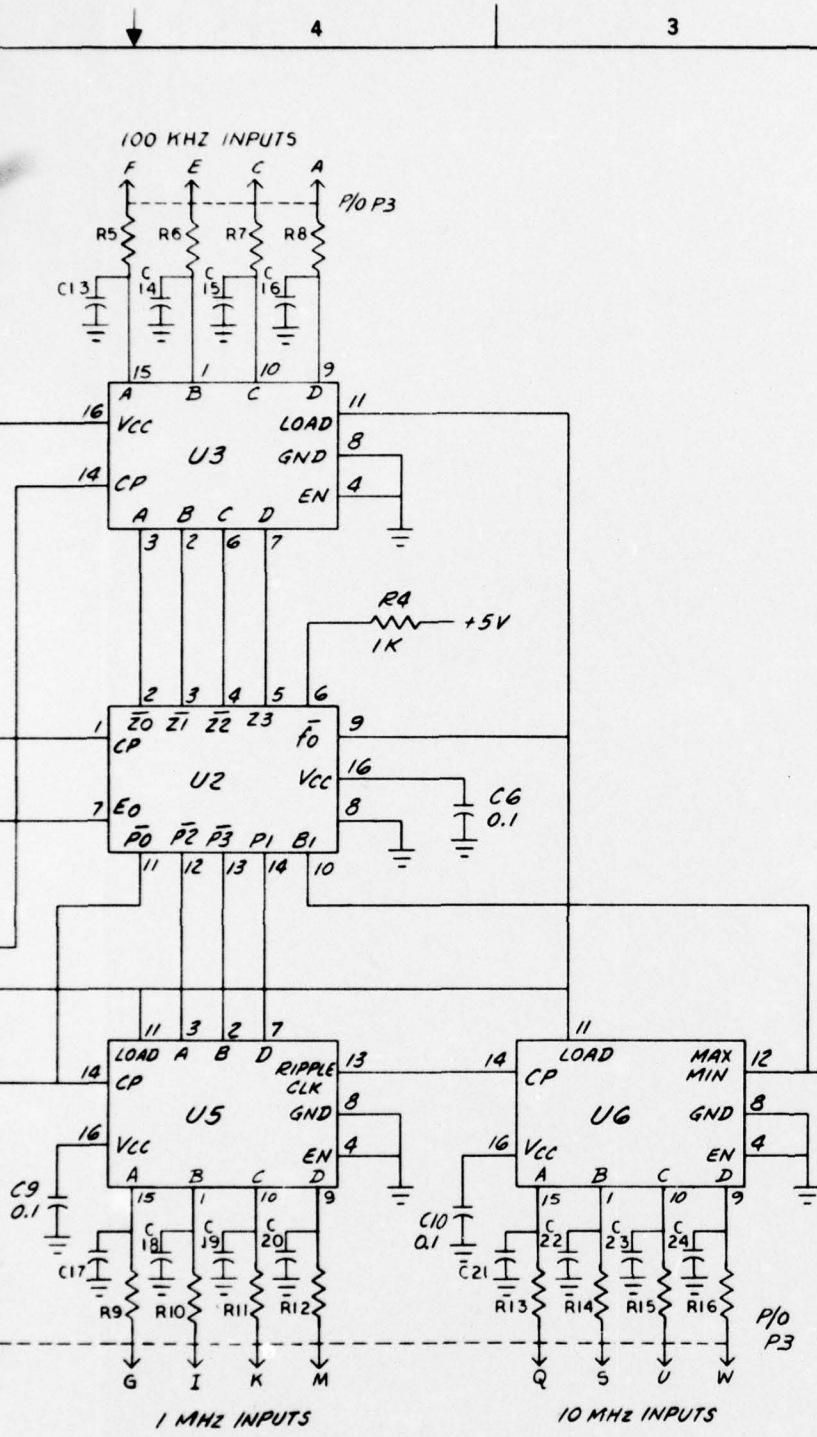
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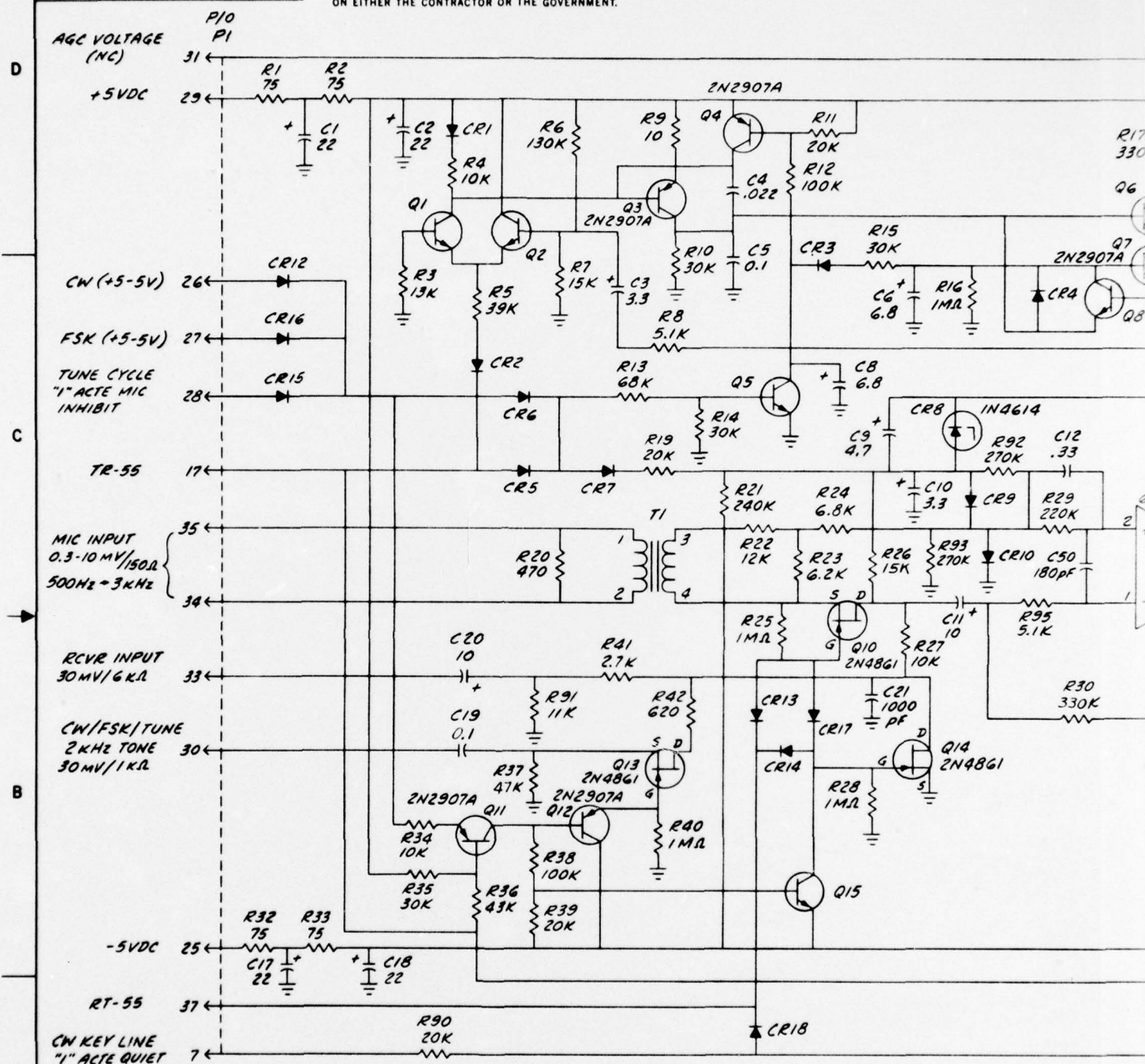
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	B	REDRAWN W/CHG. CN NONE. WMF	26 JUN 74	
	C	R1 VALUE WAS 1.3K SIN NONE	17 OCT 74	
	D	ADDED: R5-R16, C13-C24, NOTES 3&4 SIN F255	21 NOV 74	
	E	R1 VALUE WAS 1.1K. ADDED CRI ADDED NOTE 5 SIN F266	27 DEC 74	

- NOTES:
1. COMPONENT VALUES ARE IN OHMS, MICROFARADS, OR MICROHENRIES UNLESS OTHERWISE SPECIFIED.
 2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REF DESIGNATION.
 3. VALUE OF R5-R16 1K
 4. VALUE OF C13-C24 3900PF
 5. * DENOTES SELECT VALUE

UNIT NO. 1A1A7

FIND NO.	QTY REQD	CODE IDENT	PART NO OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES			U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703			
MATERIAL:			SCHEMATIC DIAGRAM, UPPER LOOP DIVIDER			
SM-D-745609 IN 948746380			80045 DAAB07-71-C-0319			
NEXT ASSY USED ON			ELECTRONICS COMMAND			
APPLICATION			REVIEWED			
			APPROVED			
			DATE 14 MAY 1973			
			SIZE CODE IDENT NO.			
			D 80063			
			SM-D-745865			
			SCALE NONE			
			SHEET			

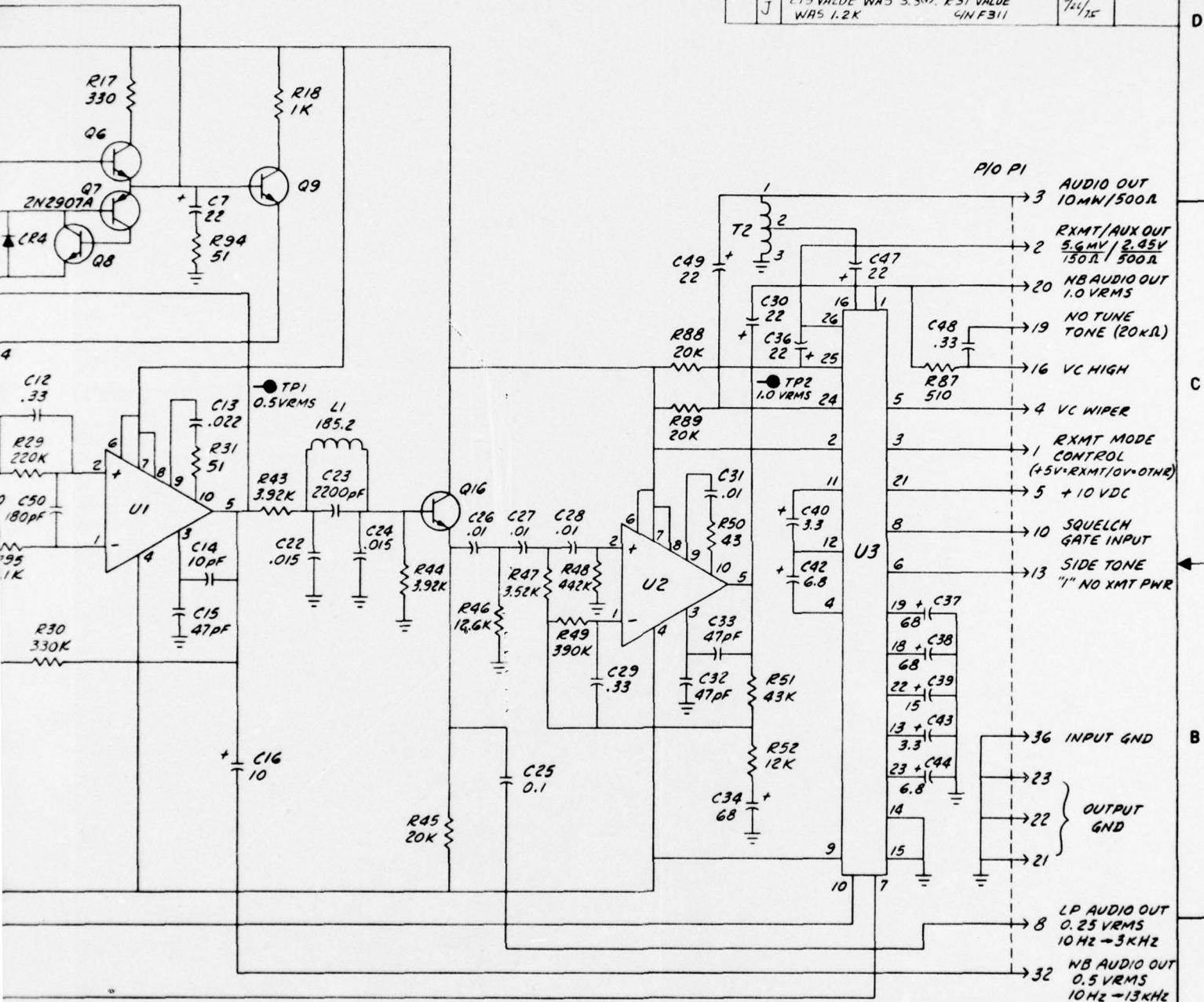
NOTE
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1. COMPONENT VALUES ARE IN OHMS, MICROFARADS, OR MILLIHENRIES UNLESS OTHERWISE SPECIFIED.
2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REFERENCE.
3. ALL TRANSISTORS ARE TYPE 2N2222A. ALL DIODES TYPE 1N4148 UNLESS OTHERWISE SPECIFIED.

UNIT NO. 1A1A23

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	F	REDRAWN W/O CHG. CN NONE WMF	18 MAY 76	
	G	R26 VALUE WAS 2.1K CIN NONE	18 NOV 76	
	H	R30 VALUE WAS 220K CIN F279	4 MAR 75	
	J	C19 VALUE WAS 3.3K. R37 VALUE WAS 1.2K CIN F311	6/24/75	



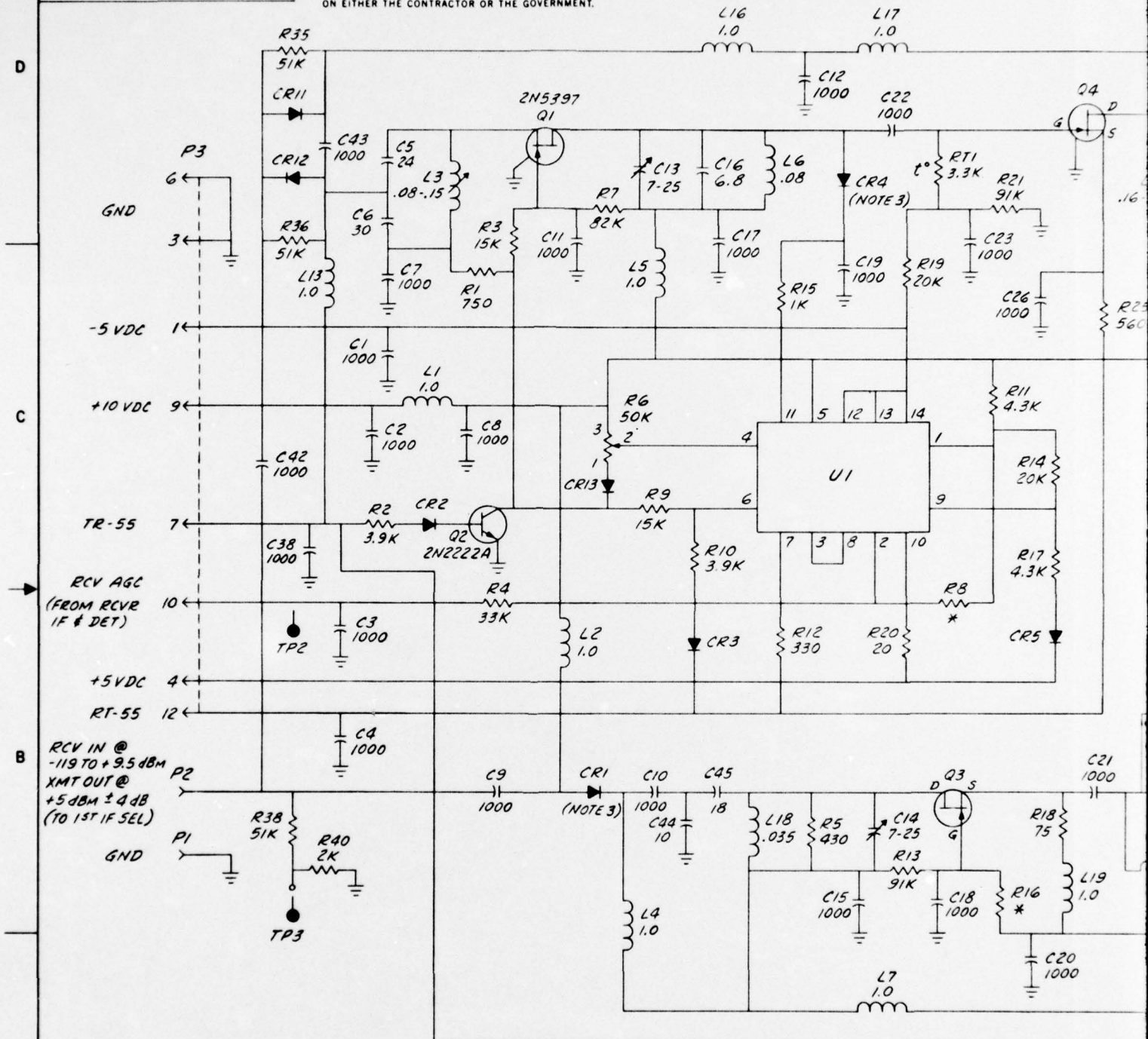
UNLESS OTHERWISE SPECIFIED.
 LOCALTIONAL REF DESIGNATION.
 UNLESS OTHERWISE SPECIFIED.

FIND NO.	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES			U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703			
MATERIAL:			SCHEMATIC DIAGRAM, AUDIO			
SM-D-745612 EX-SM-B-746369			ELECTRONICS COMMAND			
NEXT ASSY USED ON			REVIEWED			
APPLICATION			APPROVED			
			DATE 14 MAY 1973			
			SIZE CODE IDENT NO.			
			D 80063 SM-D-745867			
			SCALE NONE			
			SHEET			

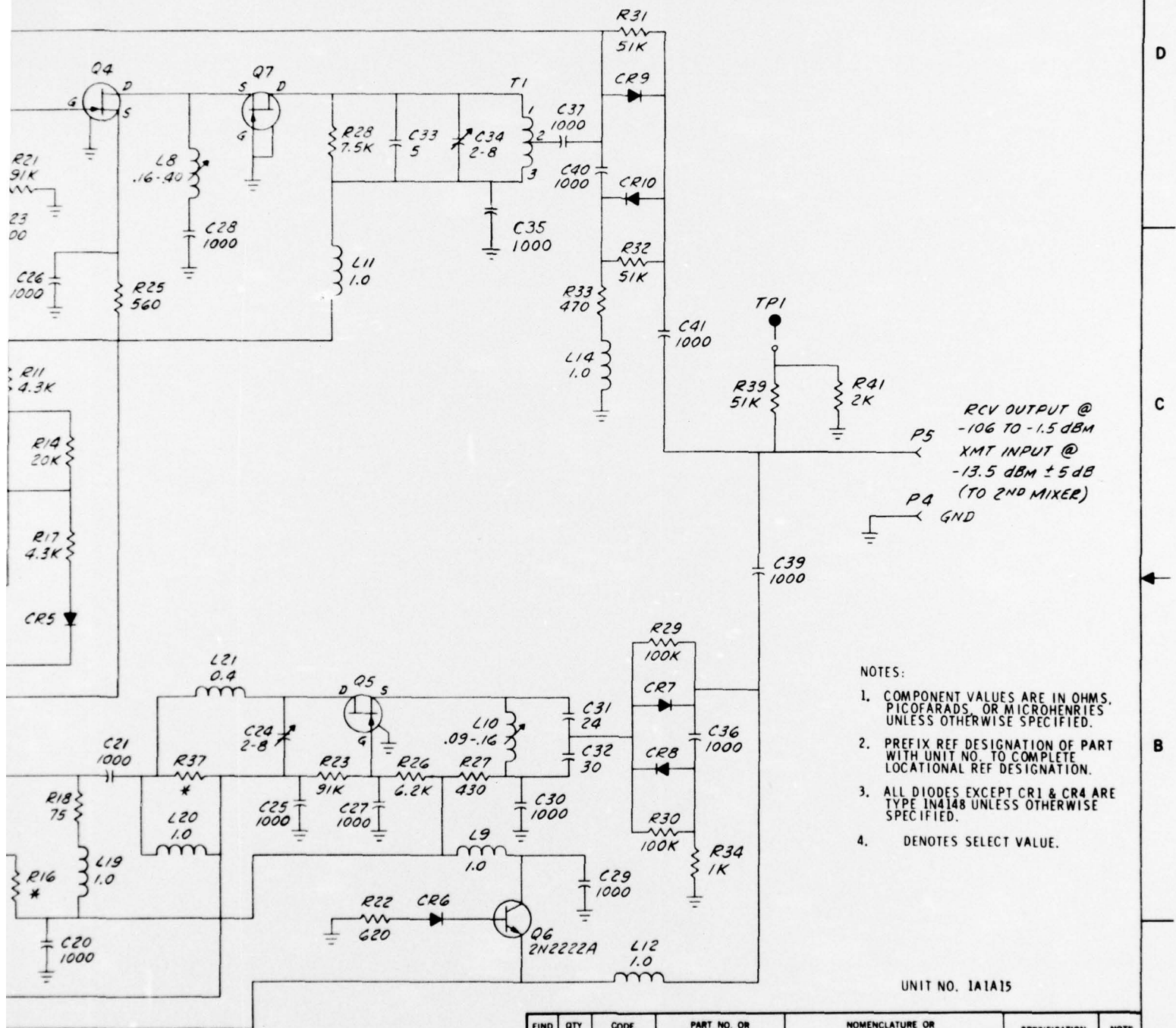
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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	C	REDRAWN W/O CHG. CN NONE. NMF	25 JUL 74	



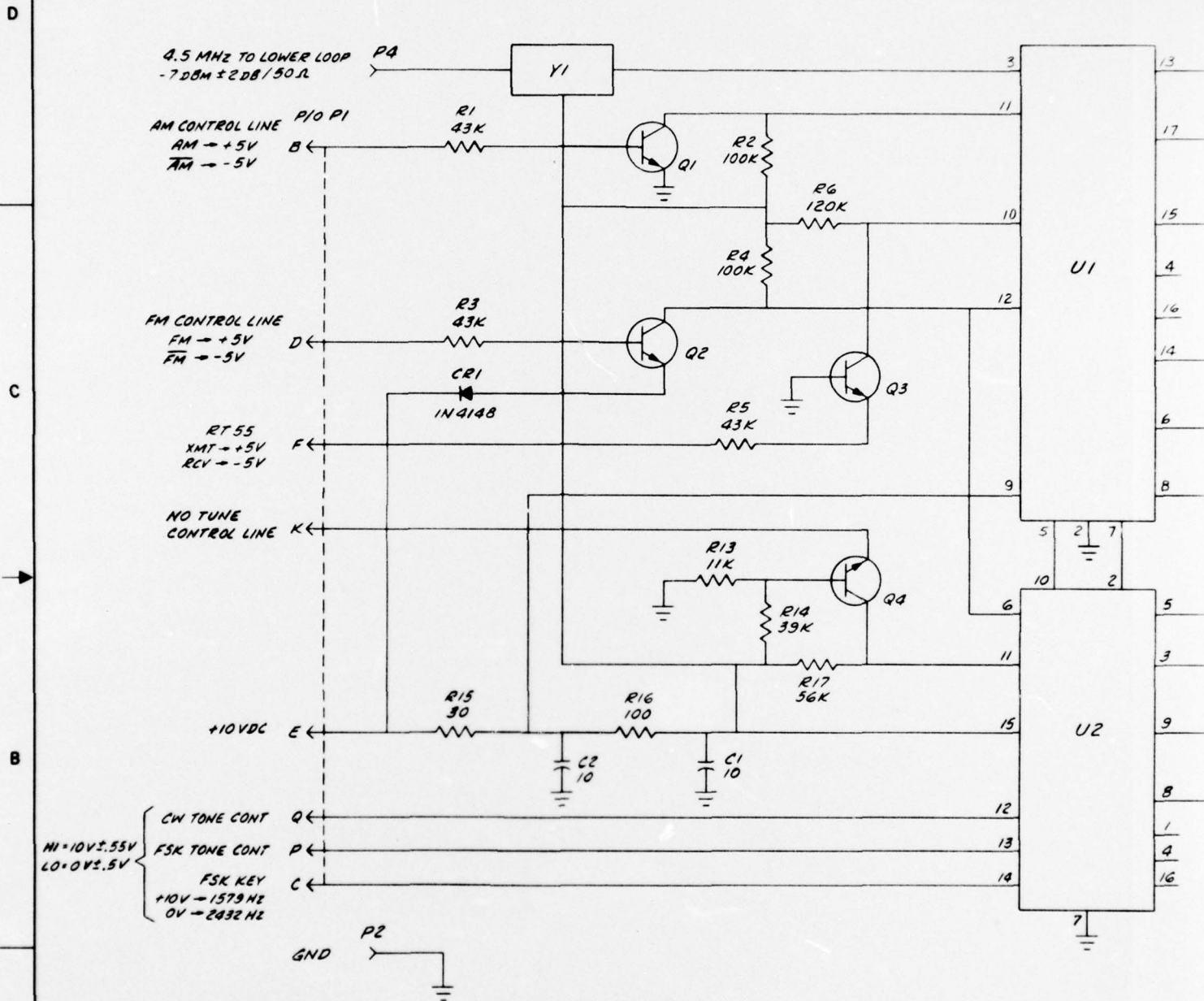
FIND NO.	QTY REQD	CODE IDENT.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
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UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES _____ _____ _____		80045 DAAB07-71.C-0319		U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703	
				SCHEMATIC DIAGRAM, FIRST IF AGC & GAIN	
MATERIAL: SM-D-745618 DLSM-8746361 NEXT ASSY USED ON		ELECTRONICS COMMAND REVIEWED APPROVED DATE 7 MAY 1973		SIZE CODE IDENT NO. D 80063	SM-D-745871
APPLICATION		DATE		SCALE NONE	SHEET

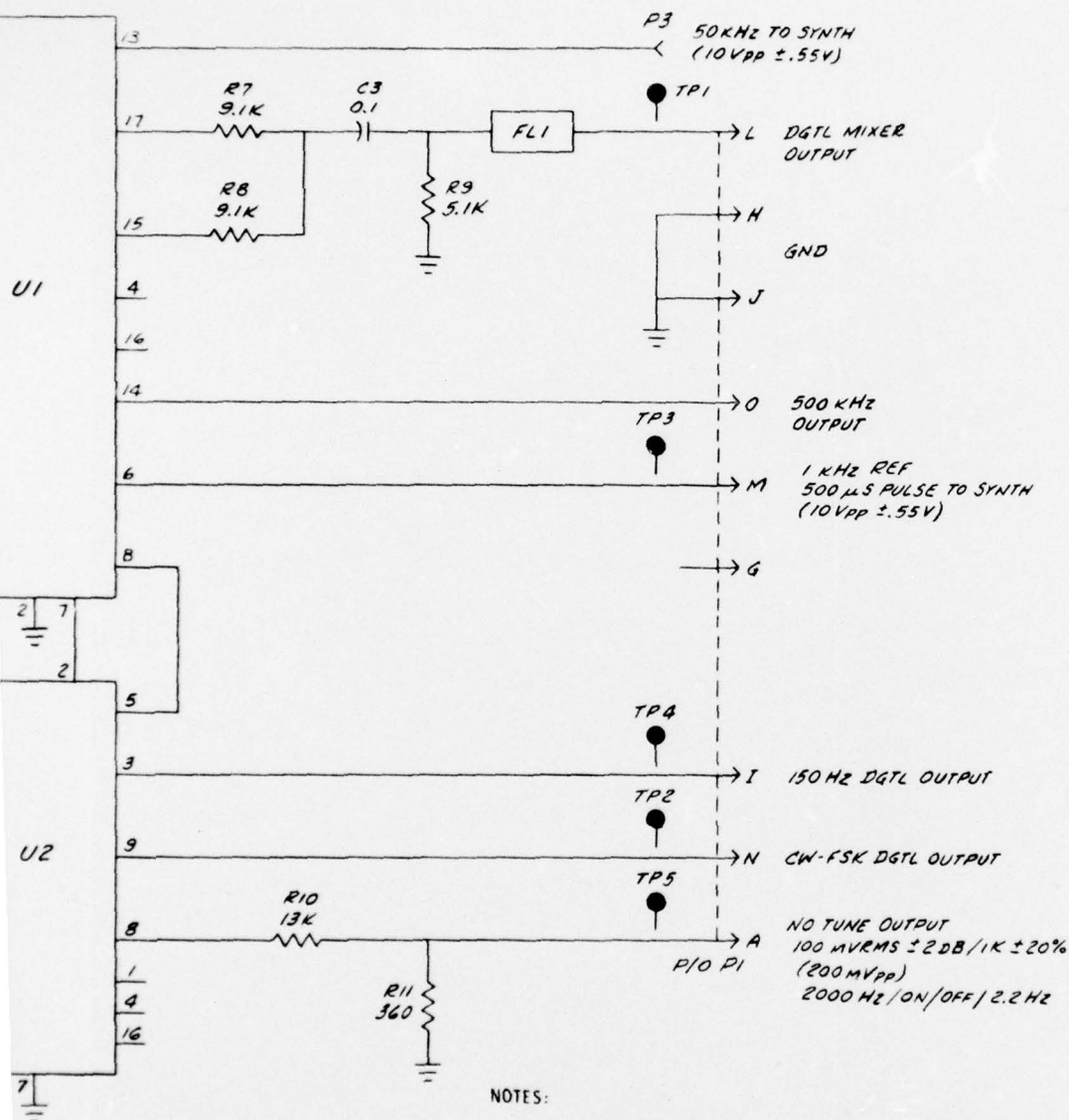
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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	F	REDRAWN W/O CHG. CN NONE WMF	9 APR 76	
	G	DELETED POWER SUPPLY SYNC TO PING	22 APR 76	



NOTES:

1. COMPONENT VALUES ARE IN OHMS, MICROFARADS, OR MICROHENRIES UNLESS OTHERWISE SPECIFIED
2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REF DESIGNATION.
3. ALL TRANSISTORS ARE TYPE 2N2222A UNLESS OTHERWISE SPECIFIED.

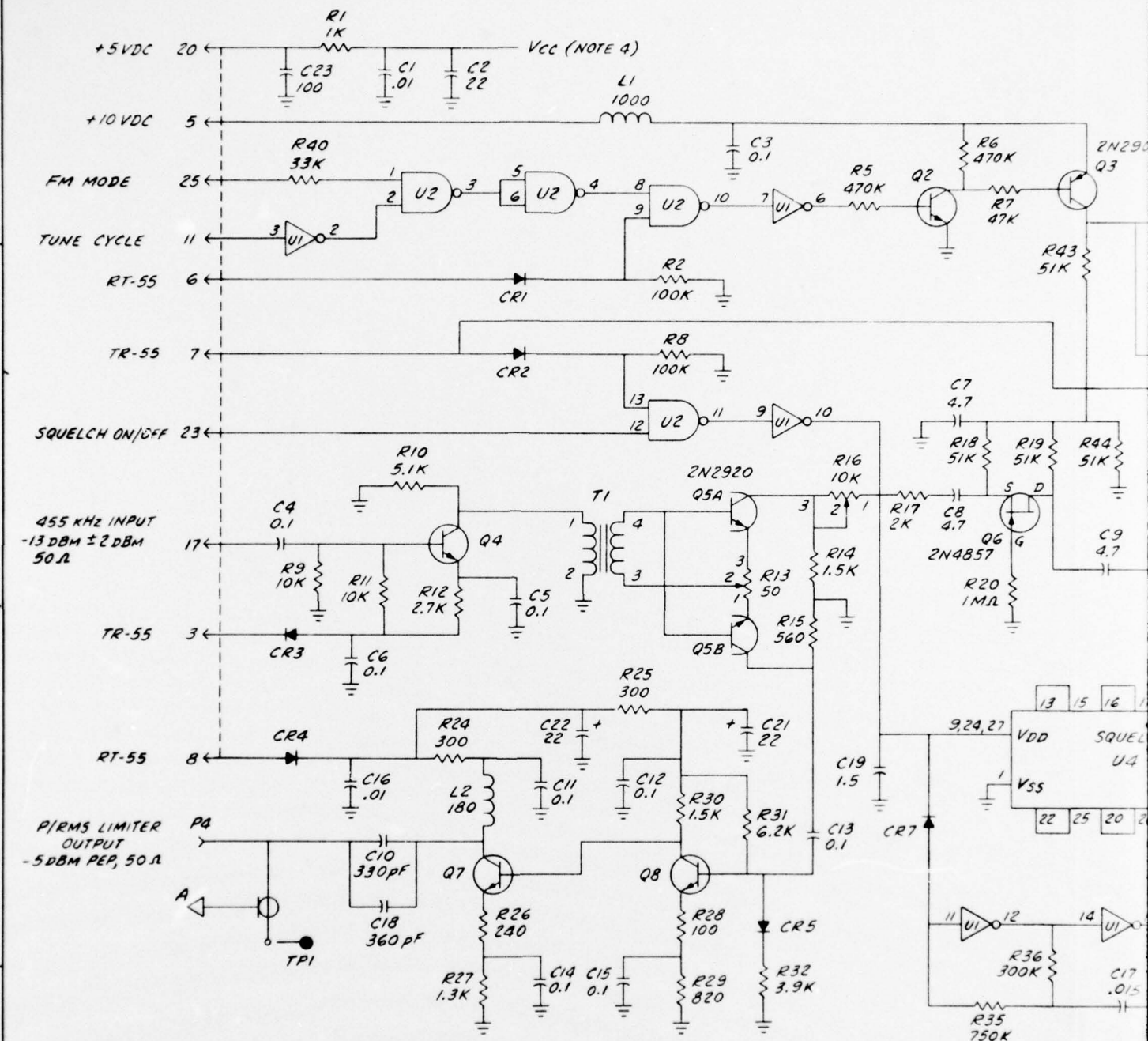
UNIT NO. 1A1A11

FIND NO	QTY REQD	CODE IDENT	PART NO OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED:			U. S. ARMY ELECTRONICS COMMAND			
DIMENSIONS ARE IN INCHES			PROCUREMENT AND PRODUCTION DIRECTORATE			
TOLERANCES ON:			FORT MONMOUTH NEW JERSEY 07703			
FRACTIONS DECIMALS ANGLES			SCHEMATIC DIAGRAM, OSCILLATOR DIGITAL DIVIDER			
MATERIAL:			ELECTRONICS COMMAND			
SM-D-745604 DSMB 746376			REVIEWED			
NEXT ASSY USED ON			APPROVED			
APPLICATION			DATE 14 MAY 1973			
			SIZE CODE IDENT NO			
			D 80063			
			SM-D-745880			
			SCALE NONE			
			SHEET			

WHEN REFERRING TO THIS DRAWING STATE DRAWING NO., APPLICABLE ISSUE LETTER IF ANY, AND DATE

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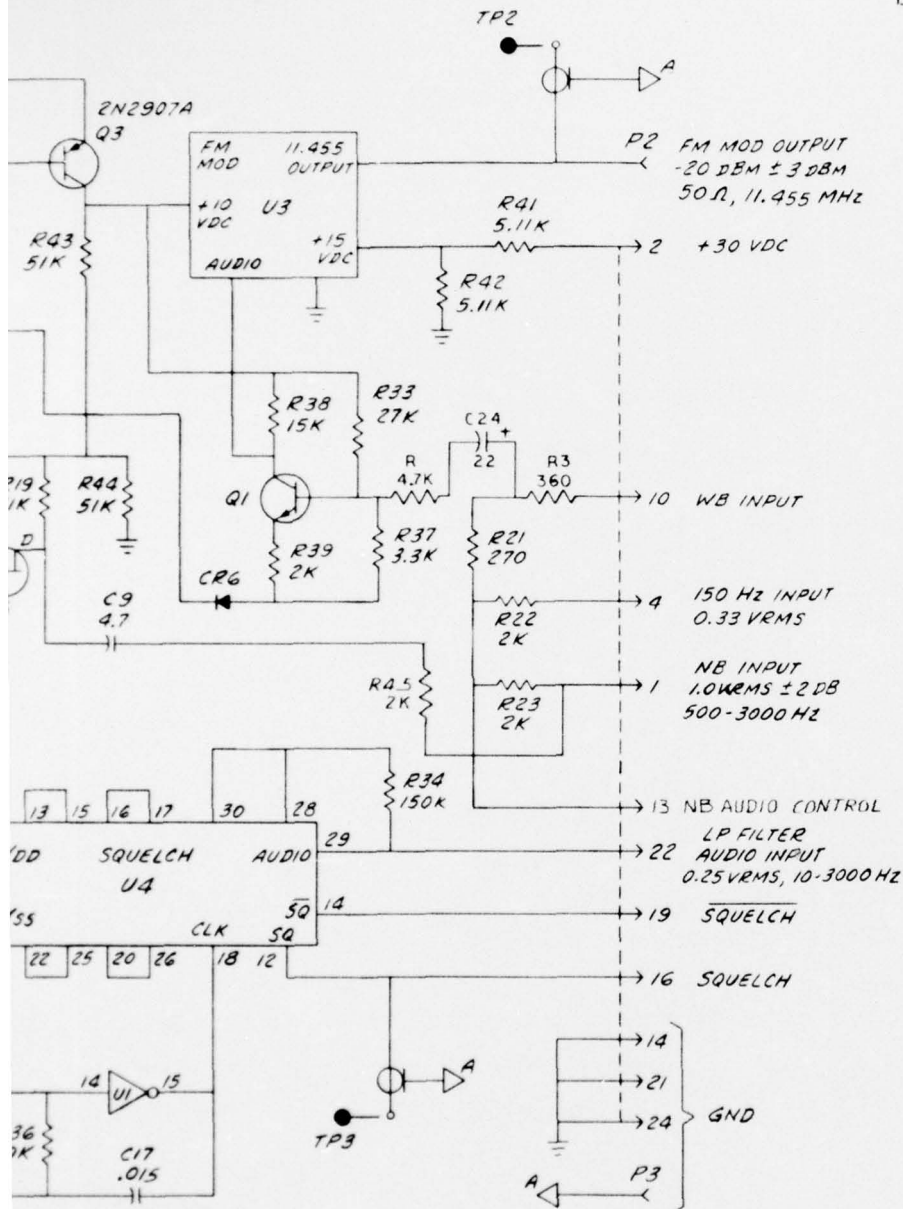
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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	E	REDRAWN W/O CHG. CN NONE W/MF	16 MAY 74	
	F	CIT VALUE WAS .01. ADDED C24 CIRCUITRY REVISED 4/15/74	16 OCT 74	
	G	ADDED R45 C/NF314	7/15/75	
	H	DELETED C20, C21 WAS CONNECTED TO U112	17 MAR 76	



NOTES:

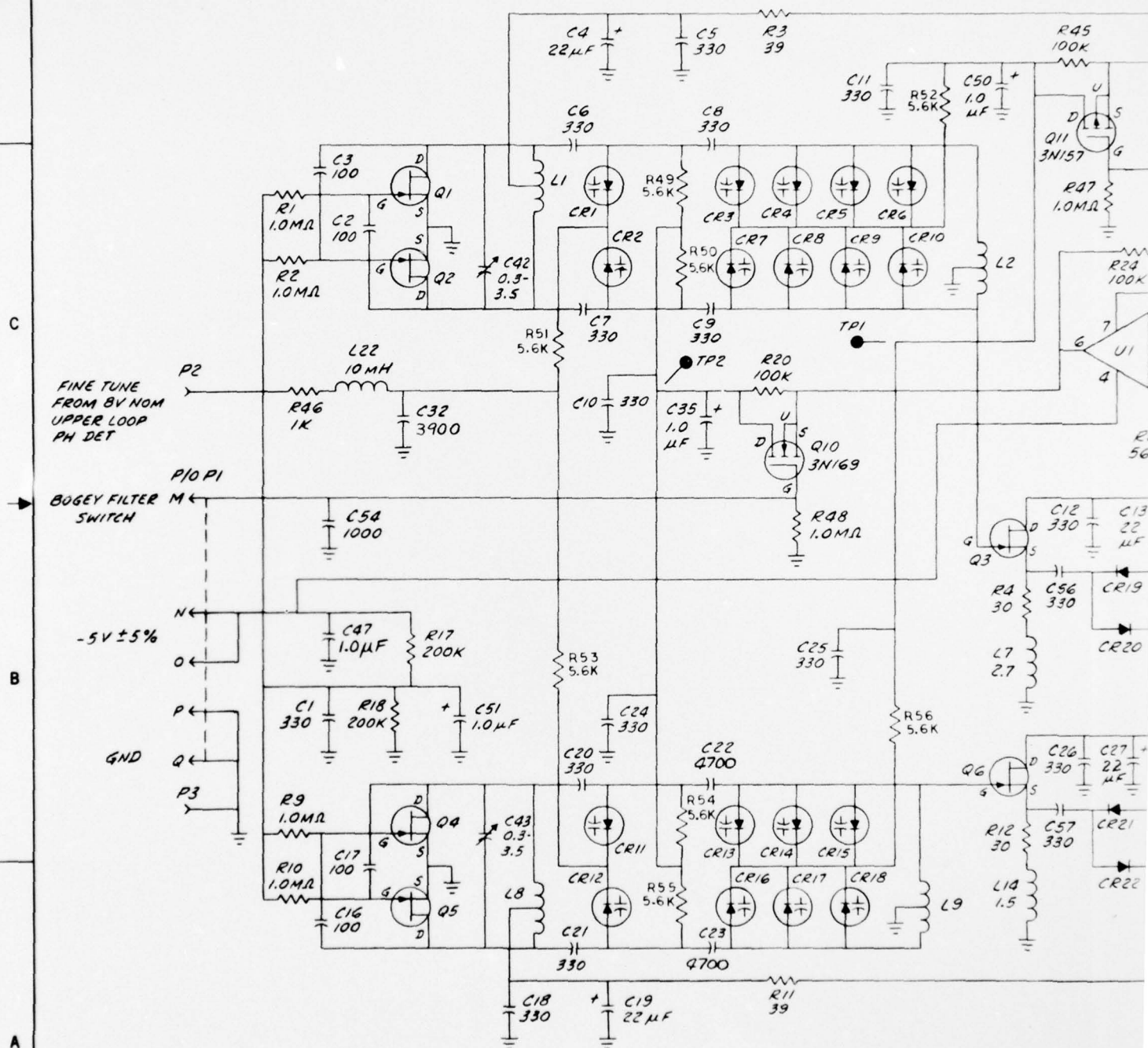
1. COMPONENT VALUES ARE IN OHMS, MICROFARADS, OR MICROHENRIES UNLESS OTHERWISE SPECIFIED.
2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REF DESIGNATION.
3. ALL TRANSISTORS ARE TYPE 2N2222A, ALL DIODES TYPE 1N4148 UNLESS OTHERWISE SPECIFIED.
4. INTEGRATED CIRCUITS: VCC (U1) - TERM NO. 1, 16
GND (U1) - TERM NO. 8, 5
(U2) - TERM NO. 7

UNIT NO. 1A1A21

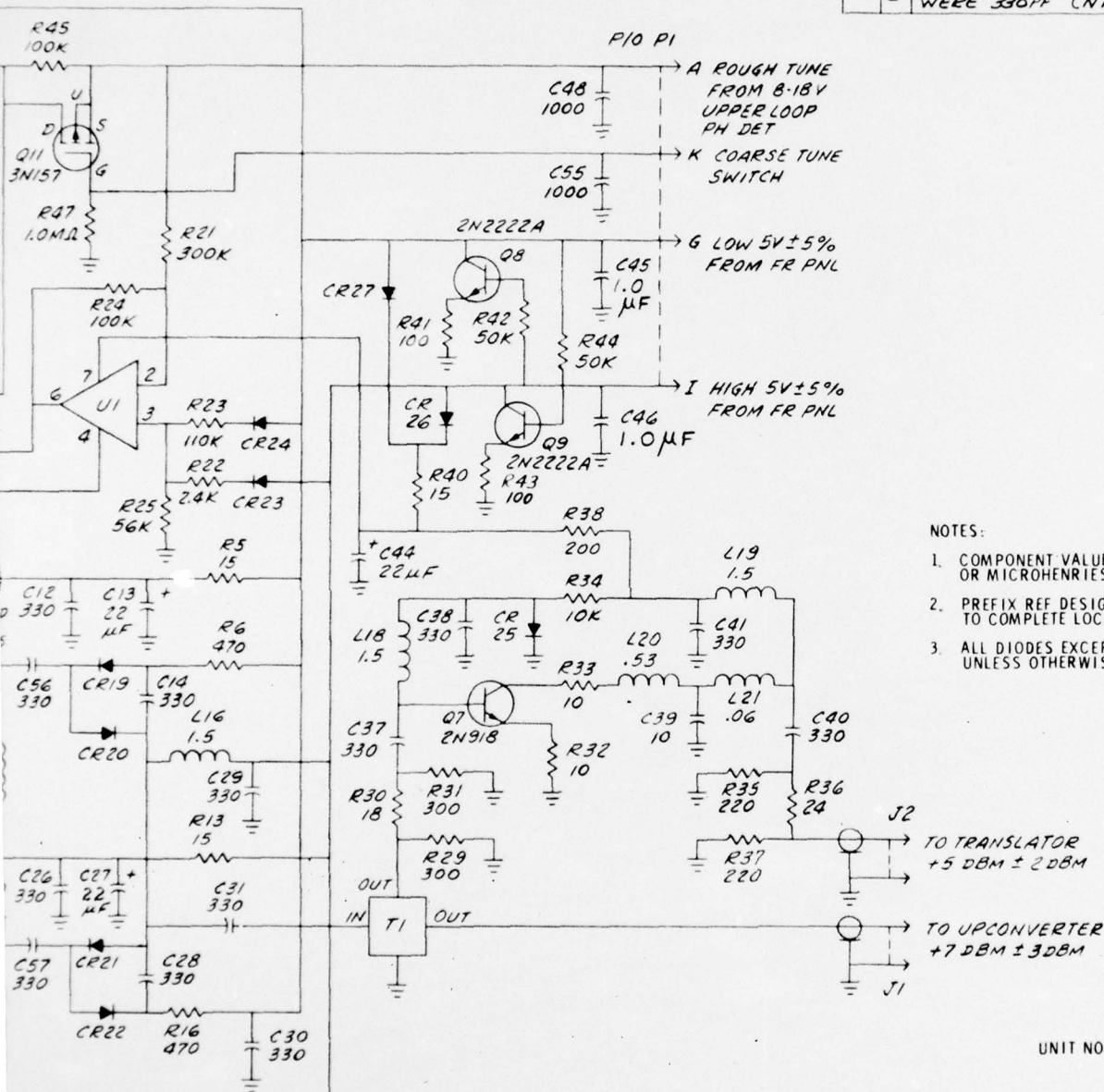
FIND NO.	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES			U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703			
MATERIAL:			SCHEMATIC DIAGRAM, MODULATOR/SQUELCH			
SM-D-745614			ELECTRONICS COMMAND			
NEXT ASSY USED ON			REVIEWED			
APPLICATION			APPROVED			
			DATE 15 APR 1973			
			SIZE CODE IDENT NO.			
			D 80063 SM-D-745883			
			SCALE NONE SHEET			

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
B		REDRAWN W/O CHG. CN NONE WME	2 MAY 74	
C		DELETED C34. VALUE C32 WAS 110. C45, C46 AND C47 WAS 1000 CN-F218	7-23-74	
D		DELETED L3, L4, L5, L6, L10, L11, L12 L13. ADDED R49, R50, C58, C59 CN-F211	3 FEB 75	
E		DELETED C58, C59; C22 AND C23 WERE 330PF CN-F320	2 SEP 75	



UNIT NO. 1A1A18

FIND NO.	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES				U.S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703		
MATERIAL:				SCHEMATIC DIAGRAM, PUMP VFO		
SM-D-745608 DLSM-B-746379				ELECTRONICS COMMAND		
NEXT ASSY USED ON				REVIEWED		
APPLICATION				APPROVED		
				DATE		
				SIZE CODE IDENT NO.		
				D 80063		
				SCALE NONE		
				SHEET		

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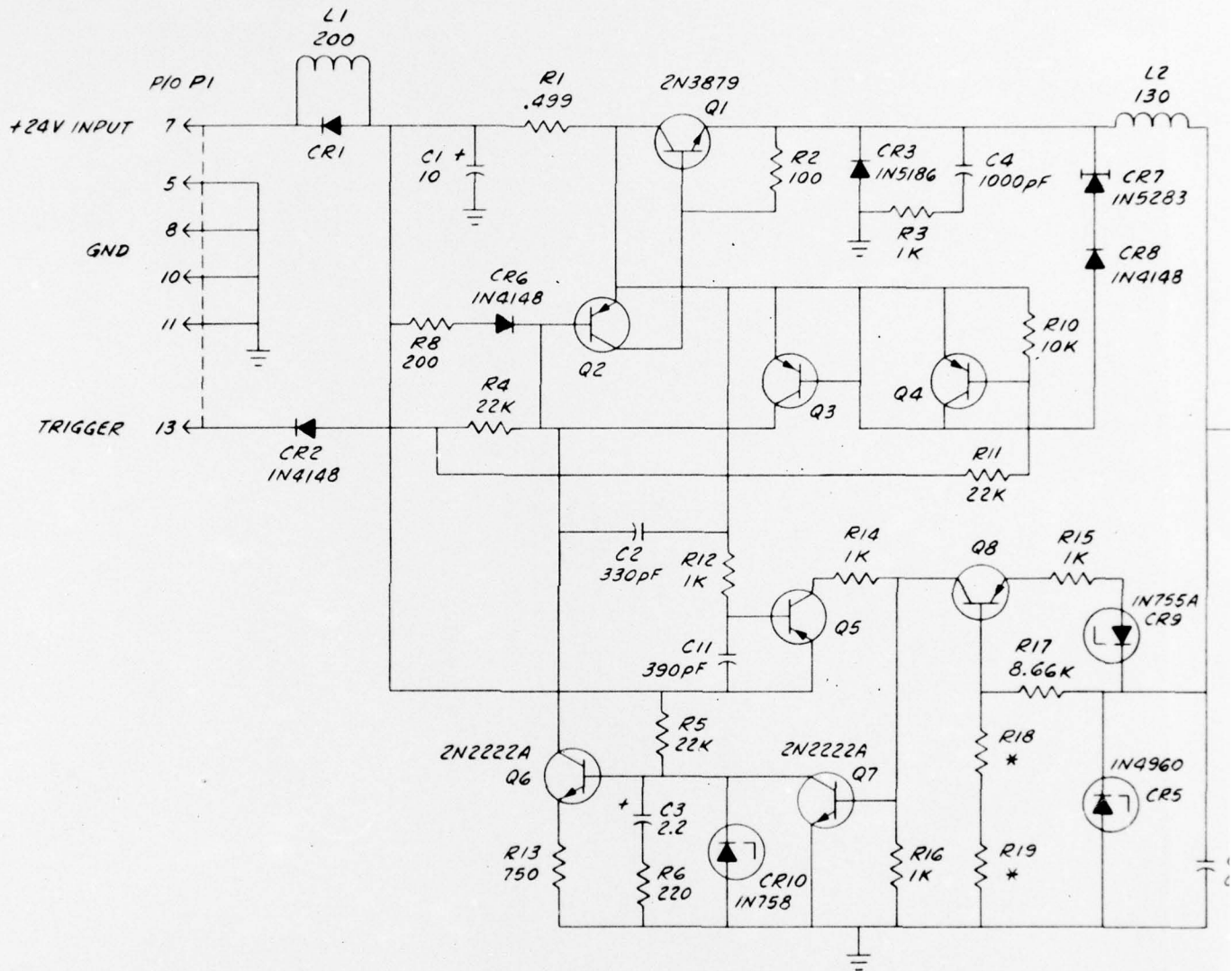
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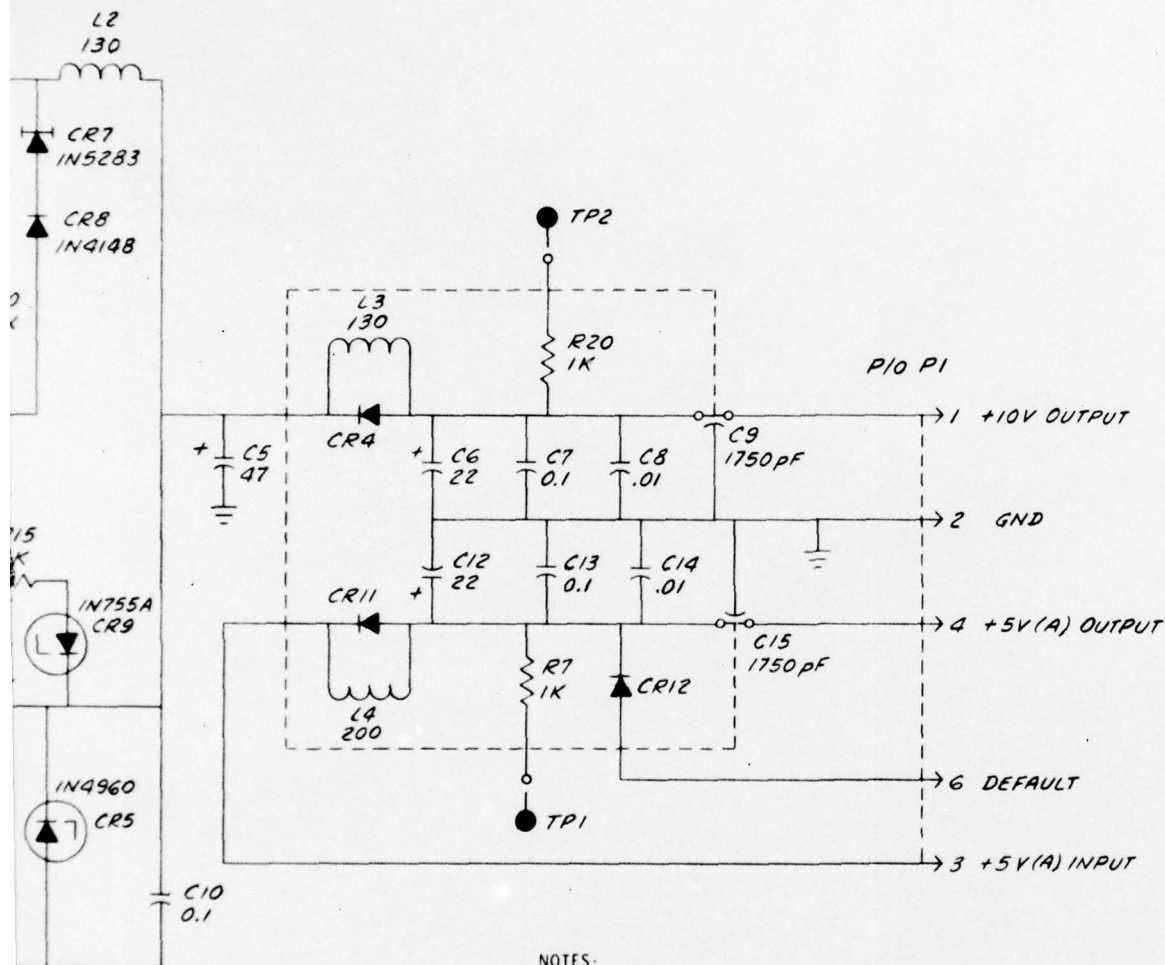
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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	A	REDRAWN W/O CHG. CN NONE WMF	21 MAY 74	
	B	DELETED R3	1 JAN 75	



NOTES:

1. COMPONENT VALUES ARE IN OHMS, MICROFARADS, OR MICROHENRIES UNLESS OTHERWISE SPECIFIED
2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REF DESIGNATION
3. ALL TRANSISTORS ARE TYPE 2N2907A, ALL DIODES TYPE 1N3611 UNLESS OTHERWISE SPECIFIED.
4. * DENOTES SELECT VALUE.

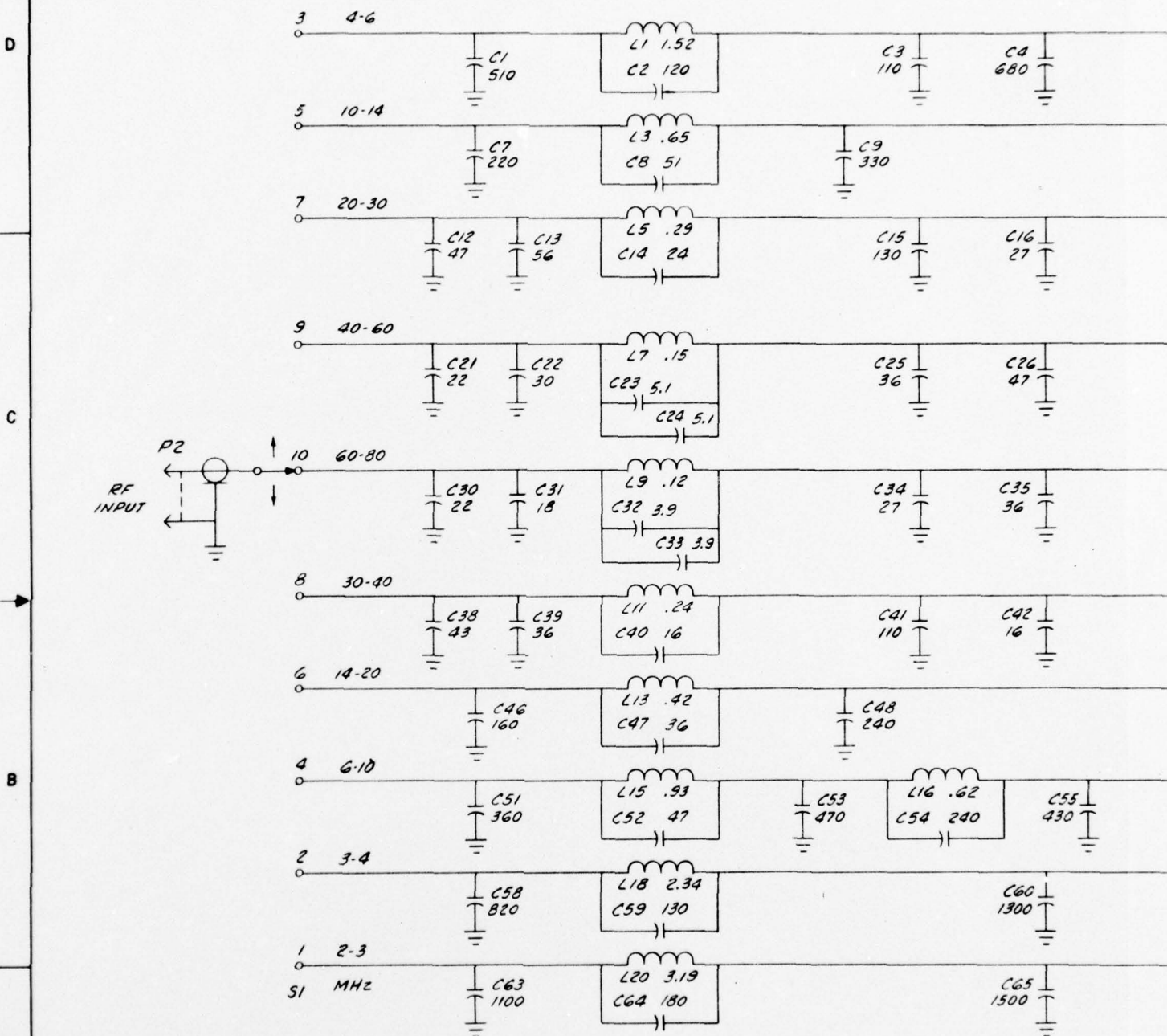
UNIT NO. 1A1A4

FIND NO.	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED:			U. S. ARMY ELECTRONICS COMMAND			
DIMENSIONS ARE IN INCHES			PROCUREMENT AND PRODUCTION DIRECTORATE			
TOLERANCES ON:			FORT MONMOUTH NEW JERSEY 07703			
FRACTIONS DECIMALS ANGLES						
MATERIAL:			SCHEMATIC DIAGRAM, POWER SUPPLY, 10V REGULATOR			
SM-D 745756 DLSM-B 746374			ELECTRONICS COMMAND			
NEXT ASSY USED ON			REVIEWED			
APPLICATION			APPROVED			
			DATE 15 JAN 75			
			SCALE NONE			
			SHEET			

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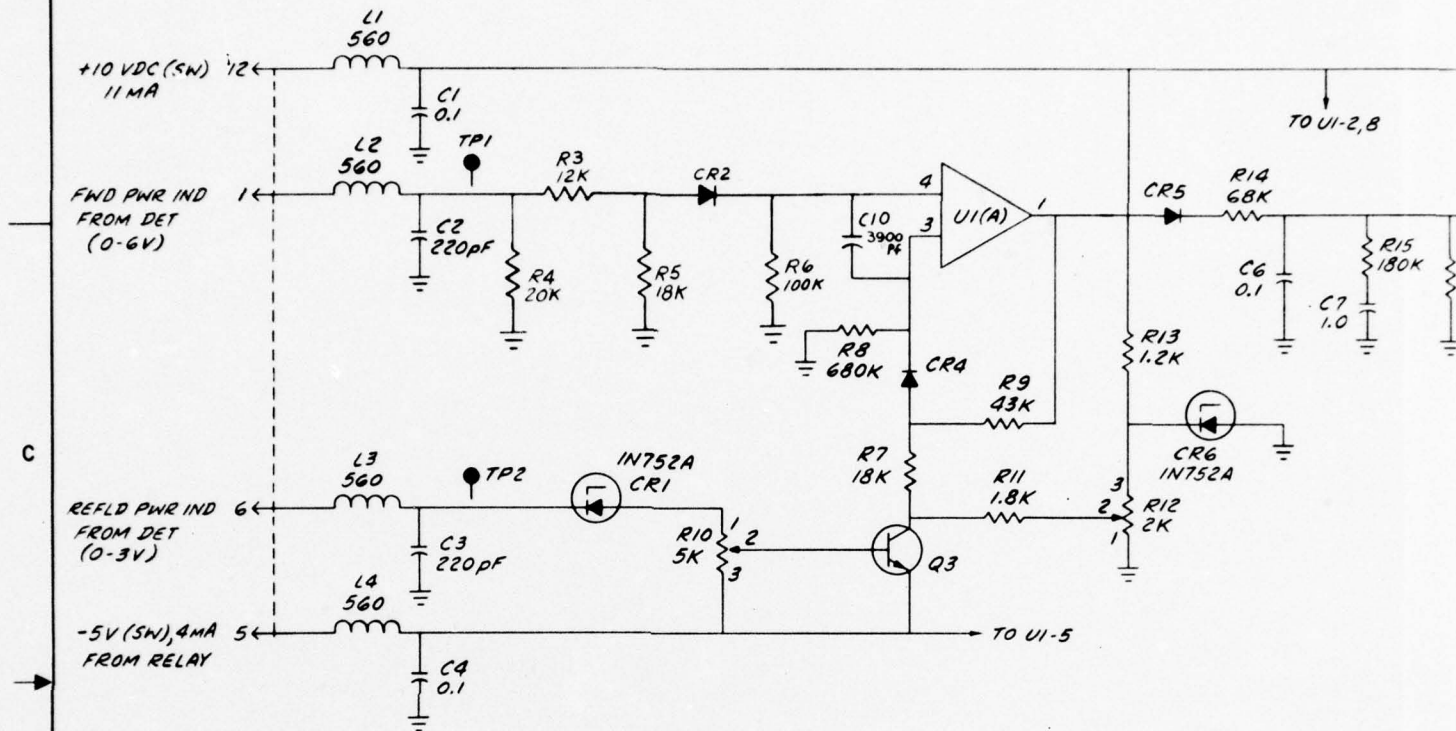
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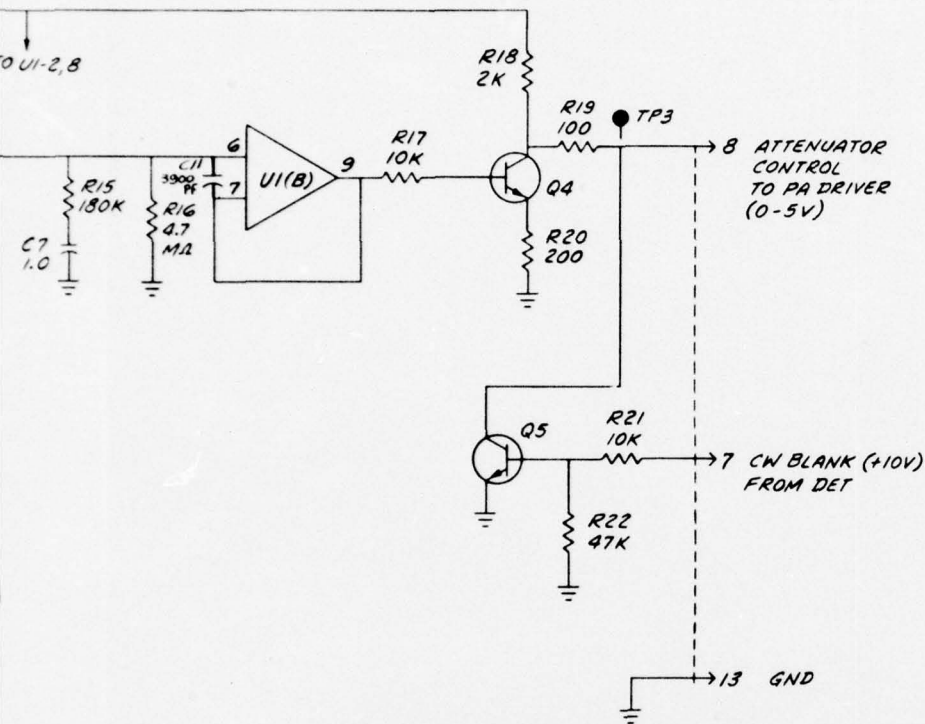
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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	D	REDRAWN W/O CHG. C/N NONE. WMM	31 MAY 74	
	E	DELETED R2, R7 & L5 ADDED C10 & C11 C/N F260	10 DEC 74	
	F	R3 VALUE WAS 20K C/N F273	11 FEB 75	
	G	DELETED R2 C/N F287	10 APR 75	
	H	REVISED WITH CHANGES C/N F302	6/17/75	



NOTES:

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 - PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REF DESIGNATION.
- ALL TRANSISTORS ARE TYPE 2N2222A. ALL DIODES TYPE 1N4148 UNLESS OTHERWISE SPECIFIED.

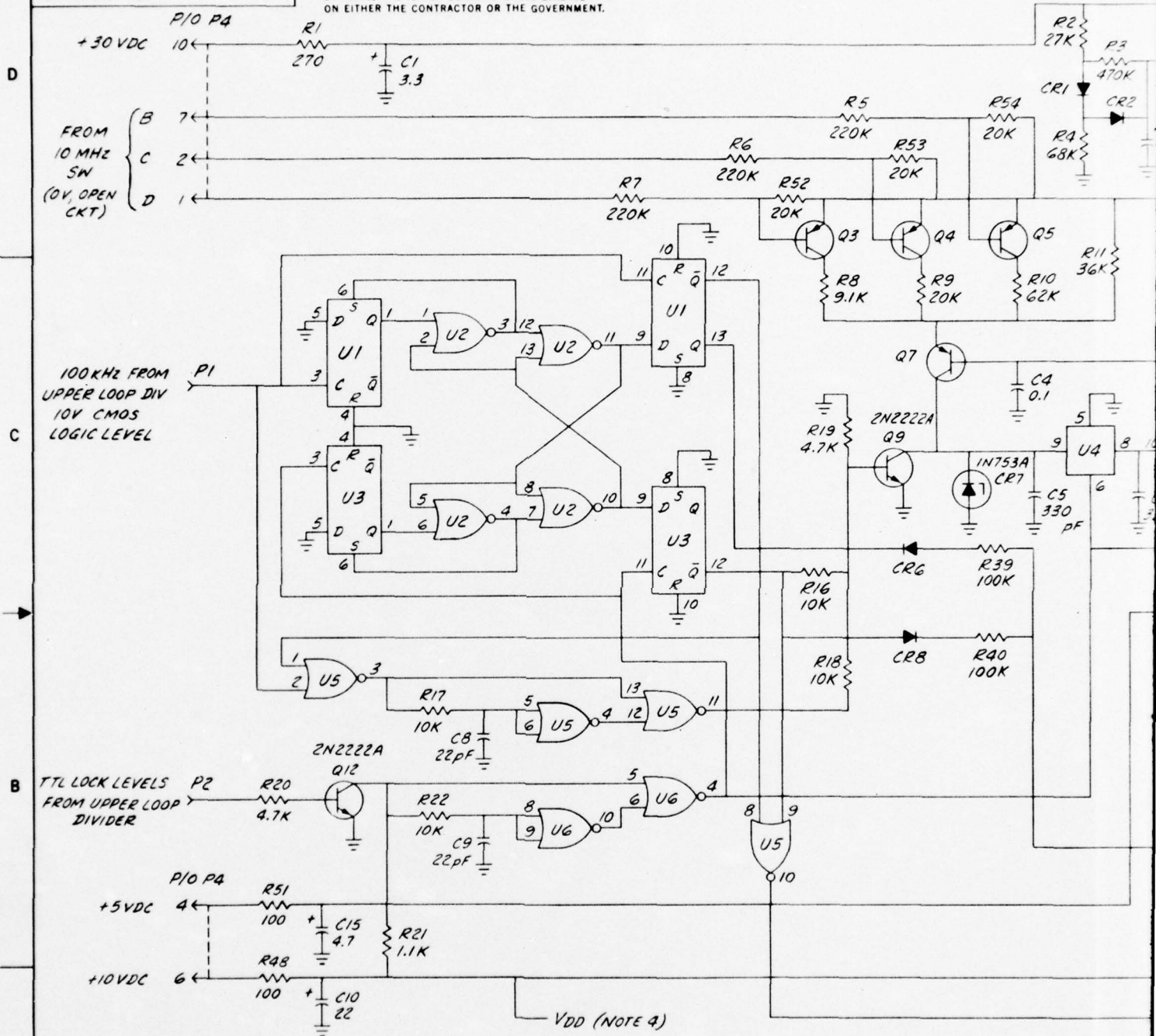
UNIT NO. 1A1A25

FIND NO.	QTY REQD	CODE IDENT.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES			U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703			
MATERIAL:			80045 DAAB07.71.C.0319			
SM-D-745627			ELECTRONICS COMMAND REVIEWED APPROVED DATE			
NEXT ASSY USED ON			SIZE CODE IDENT NO. D 80063 SM-D-745902			
APPLICATION			SCALE NONE SHEET			

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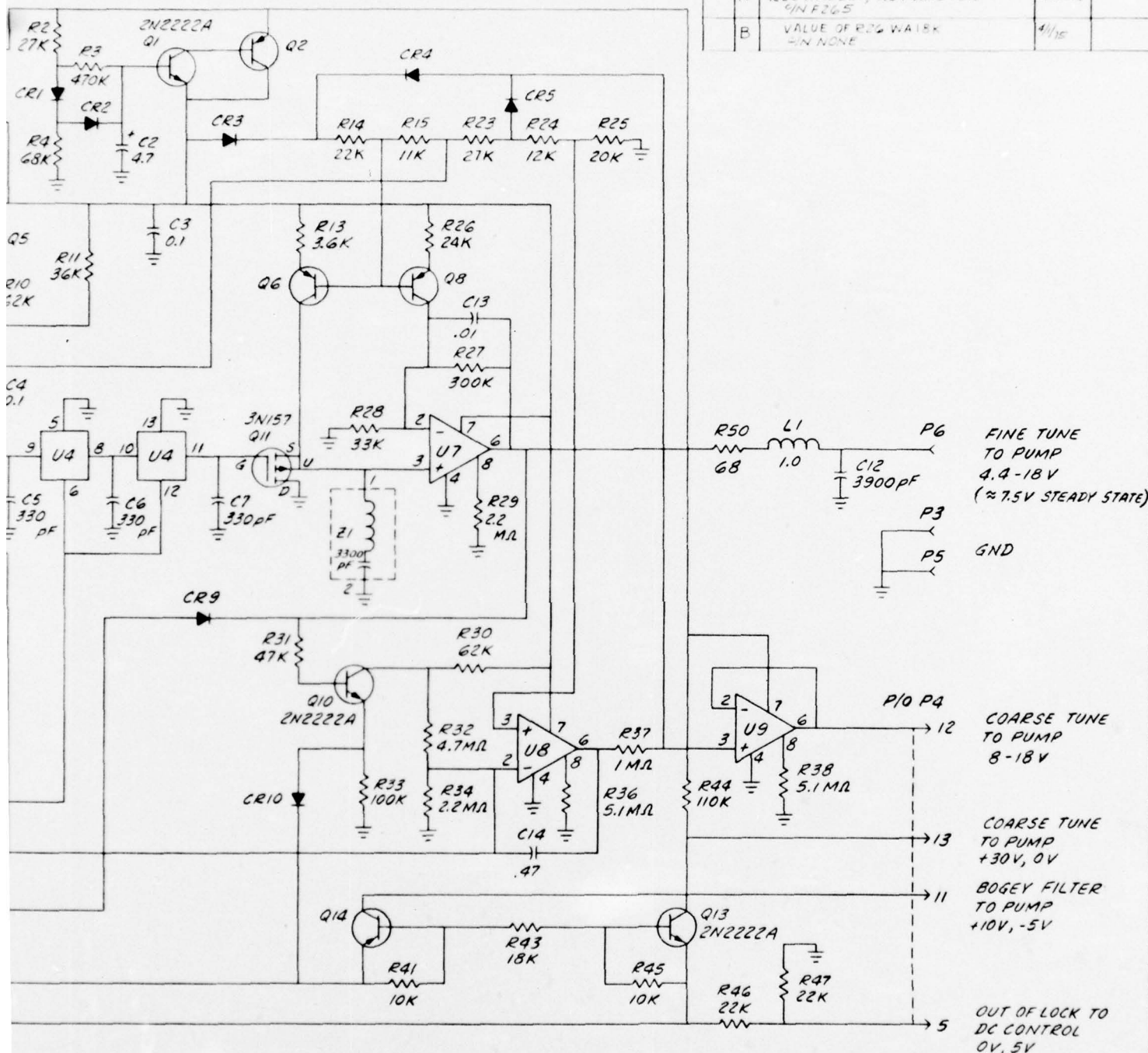
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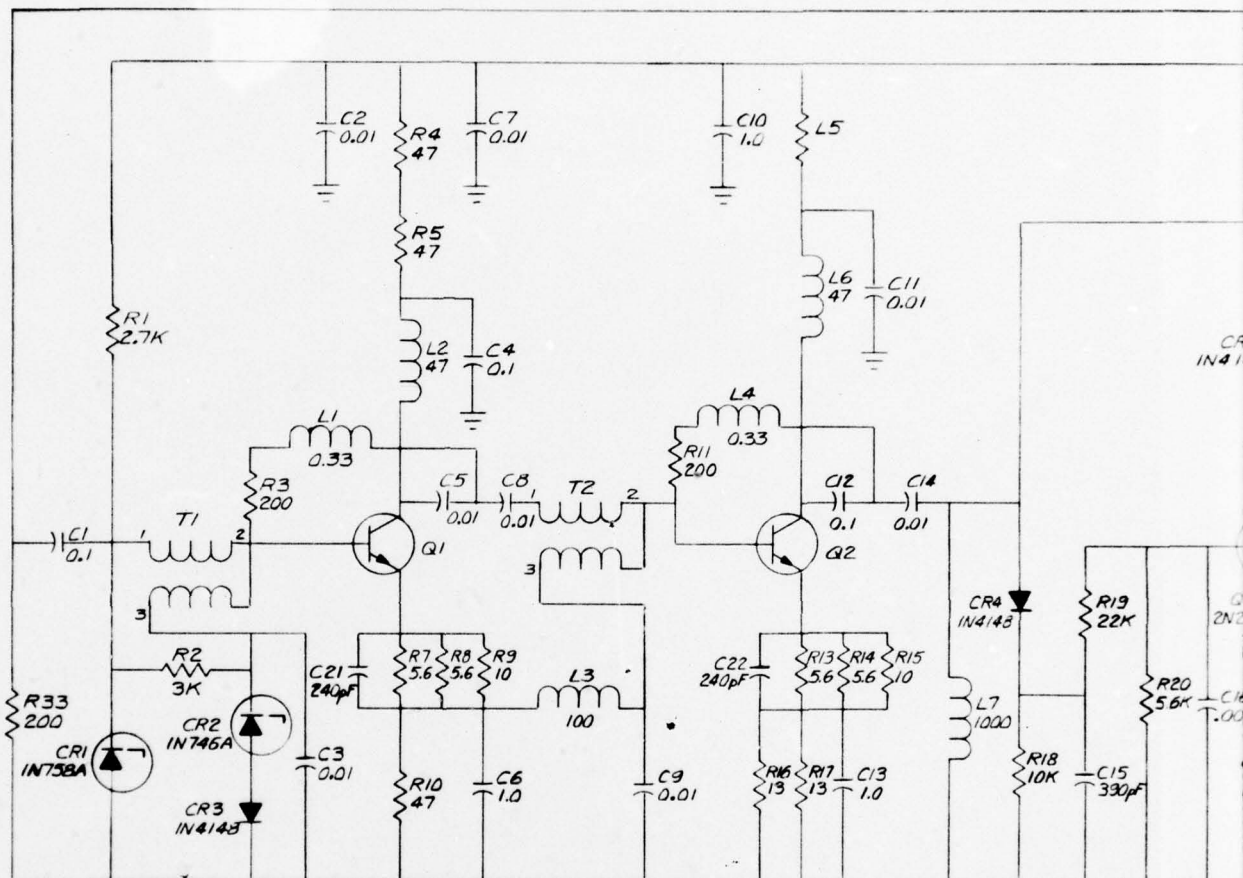
1. COMPONENT VALUES ARE IN OHMS, MICROFARADS, OR MILLIHENRIES UNLESS OTHERWISE SPECIFIED.
2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REF.
3. ALL TRANSISTORS ARE TYPE 2N2907A, ALL DIODES TYPE 1N4148 UNLESS OTHERWISE SPECIFIED.
4. INTEGRATED CIRCUITS:
 VDD (U1-U6) = TERM NO. 14
 GND (U1-U5) = TERM NO. 7
 (U6) = TERM NO. 1, 2, 7, 12, 13

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		DELETED R12 VALUE OF R14 WAS 1K R23 WAS 20K, R24 WAS 15K IN R265	2/10/74	
B		VALUE OF R26 WAS 18K -IN NONE	4/1/75	



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NOTES:

1. COMPONENT VALUES ARE IN OHMS, MICRO OR MICROHENRIES UNLESS OTHERWISE SPECIFIED.
2. PREFIX REF DESIGNATION OF PART WITH * TO COMPLETE LOCATIONAL REF DESIGNATION.
3. * DENOTES SELECT VALUE

4

3

2

1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
D		REDRAWN: W/ID CHANGES, ON NOVE JAS	9 JAN 74	

D

C

B

A

CR5
IN4148R21
10KR23
120KQ5
2N2907AR26
10R29
100C19
6.8R30
1KR31
16CR9
IN4148

P/O P5

7

8

P2

RF FROM
RT RELAY
(-7 TO -11 dBm)

20-32 VDC SW

RT RELAY

P1

GND

P3

P4

RF TO
DRIVER
(+24 ± 1.25 dBm)

P/O P5

1

4

RT-55

9

AGC TO
XMIT IF

10

11

TP1

12

GND

13

2

TR-55

5

R32
16CR10
IN4148C20
0.1

UNIT 1A1A12

R19
22KR20
56KC15
330pFQ3
2N2222AQ4
2N2222AR25
0.2KCR6
IN4148CR7
IN4148R27
12KR28
1MC17
10Q7A
1/2 2N2920R34
180Q7B
1/2 2N2920Q8
2N2907AQ6
2N2222A

IN OHMS, MICROFARADS,
S OTHERWISE SPECIFIED.
OF PART WITH UNIT NO
REF DESIGNATION.

FIND NO.	QTY REQD	CODE IDENT.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES			U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703			
MATERIAL:			80045 DAAB07-71-C-0319			
SM-D-745923			ELECTRONICS COMMAND			
NEXT ASSY USED ON			REVIEWED			
APPLICATION			APPROVED			
			DATE 10 MAY 74			
			SIZE CODE IDENT NO.			
			D 80063 SM-D-745923			
			SCALE NONE			
			SHEET			

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2

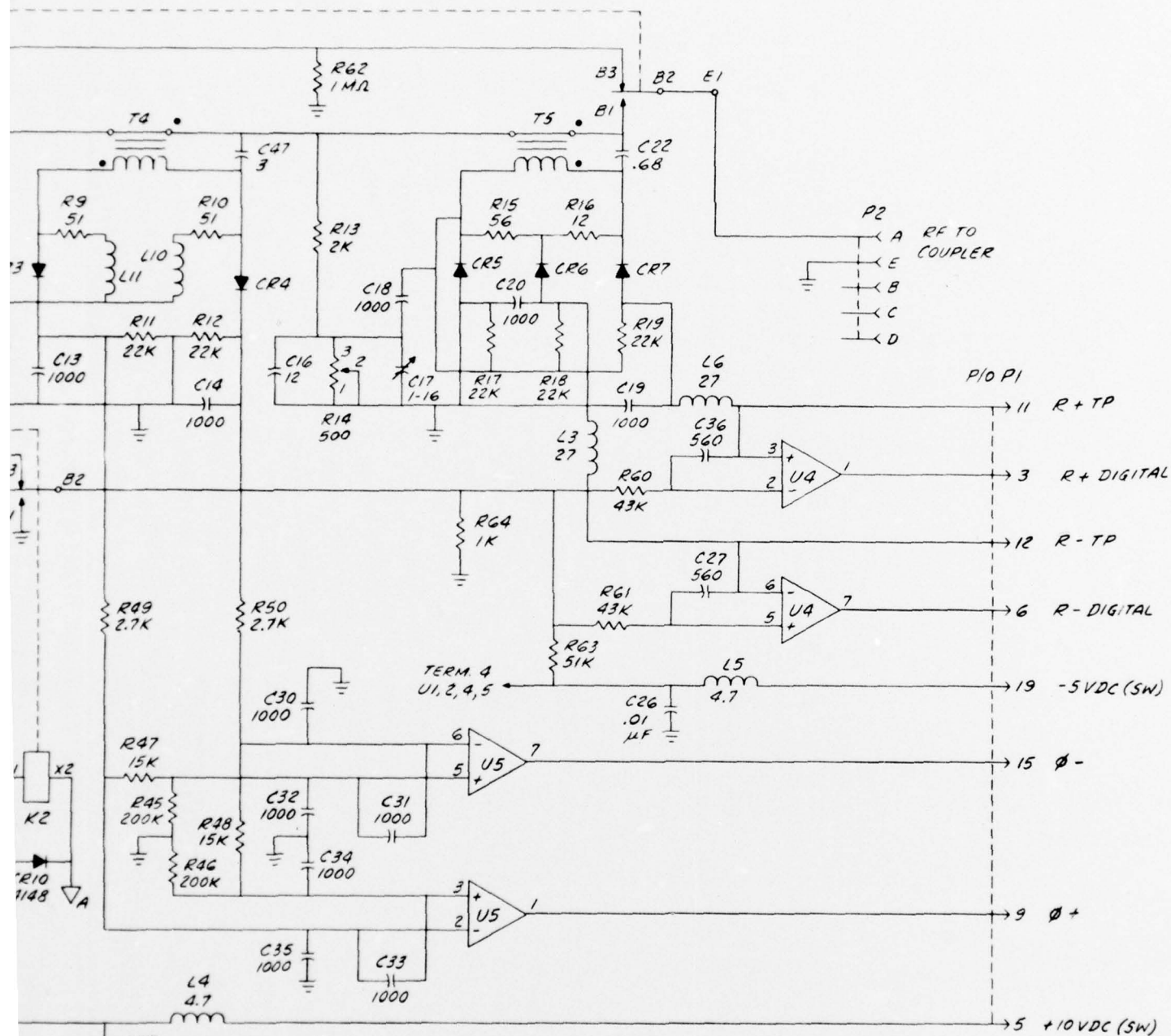
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2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REFERENCE.
3. ALL TRANSISTORS ARE TYPE 2N2222A, ALL DIODES TYPE 1N5711 UNLESS OTHERWISE SPECIFIED.

UNIT 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
-	C	REDRAWN W/O CHG. CN NONE. WMF	24 JUN 74	
	D	ADDED PIN 8 TUNE RLY 507 TNNONE	22 AUG 74	

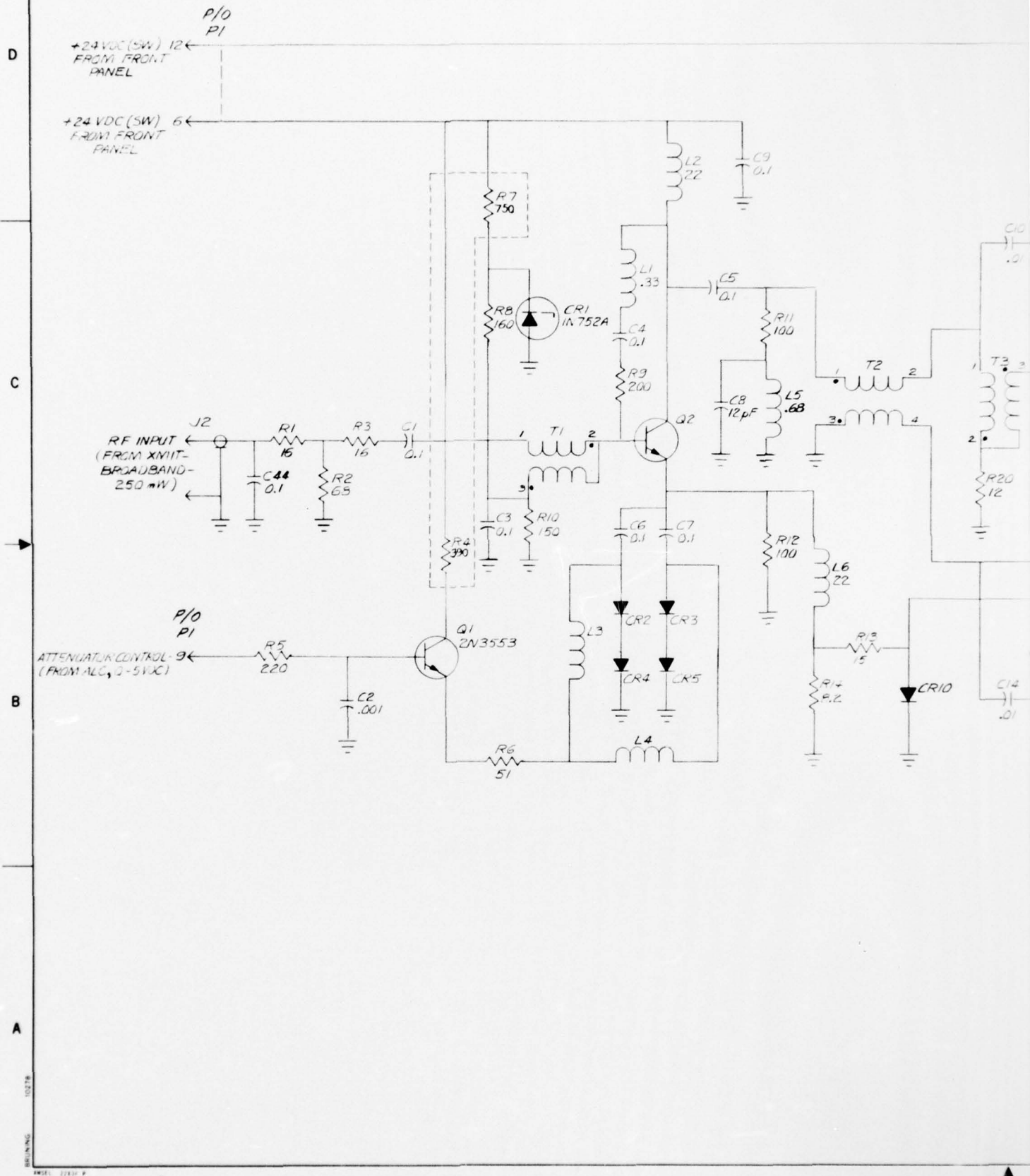


FIND NO.	QTY REQD	CODE IDENT.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTES
PARTS LIST						
OTHERWISE SPECIFIED:			U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703			
UNITS ARE IN INCHES ONES ON: DECIMALS ANGLES			SCHEMATIC DIAGRAM, DETECTOR			
80045 DAAB07-71.C-0319			SIZE CODE IDENT NO. D 80063			
ELECTRONICS COMMAND			SM-D-745935			
REVIEWED			DATE 15 APR 1973			
APPROVED			SCALE NONE			
DATE 15 APR 1973			SHEET			

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- B

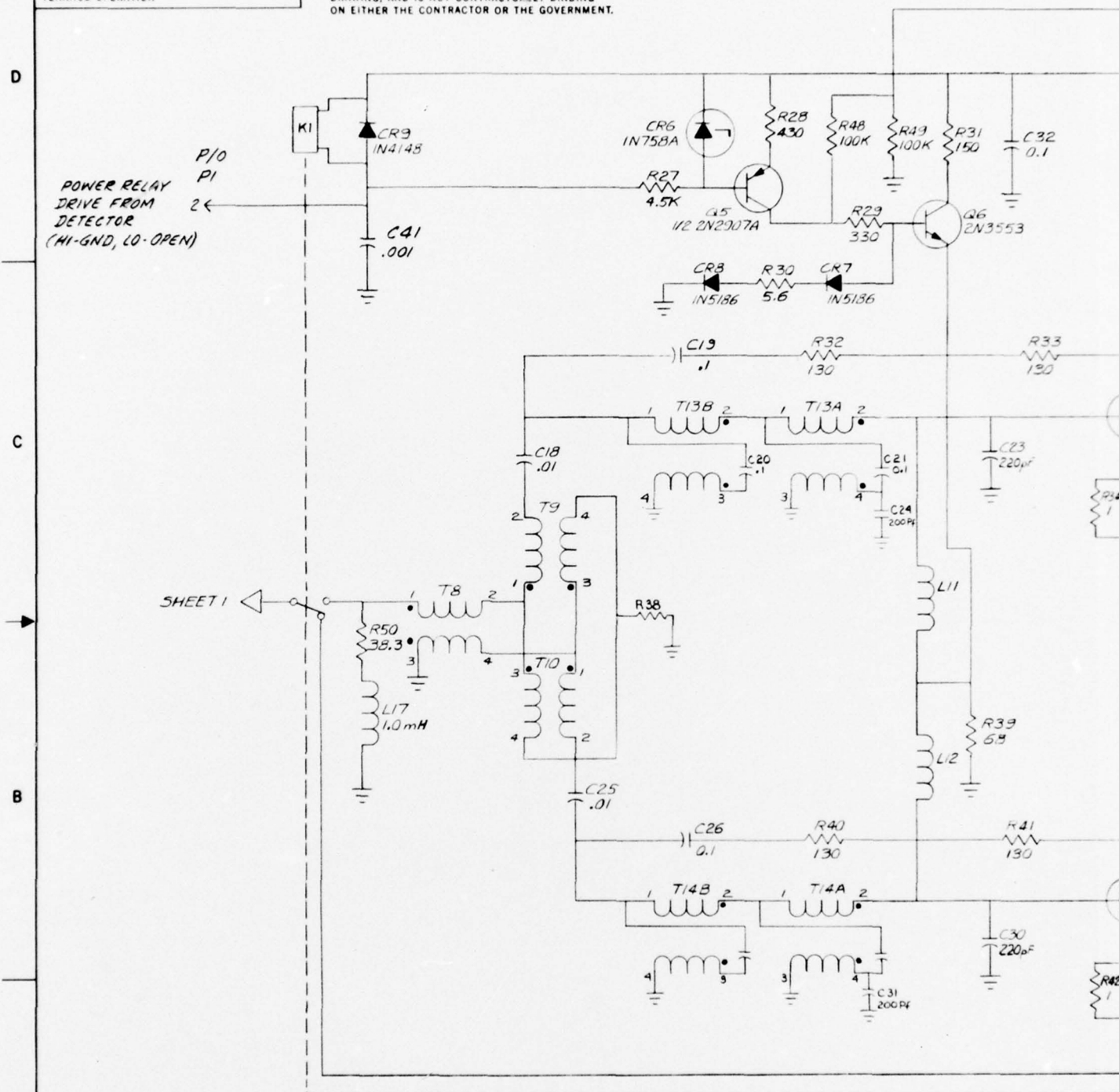
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2

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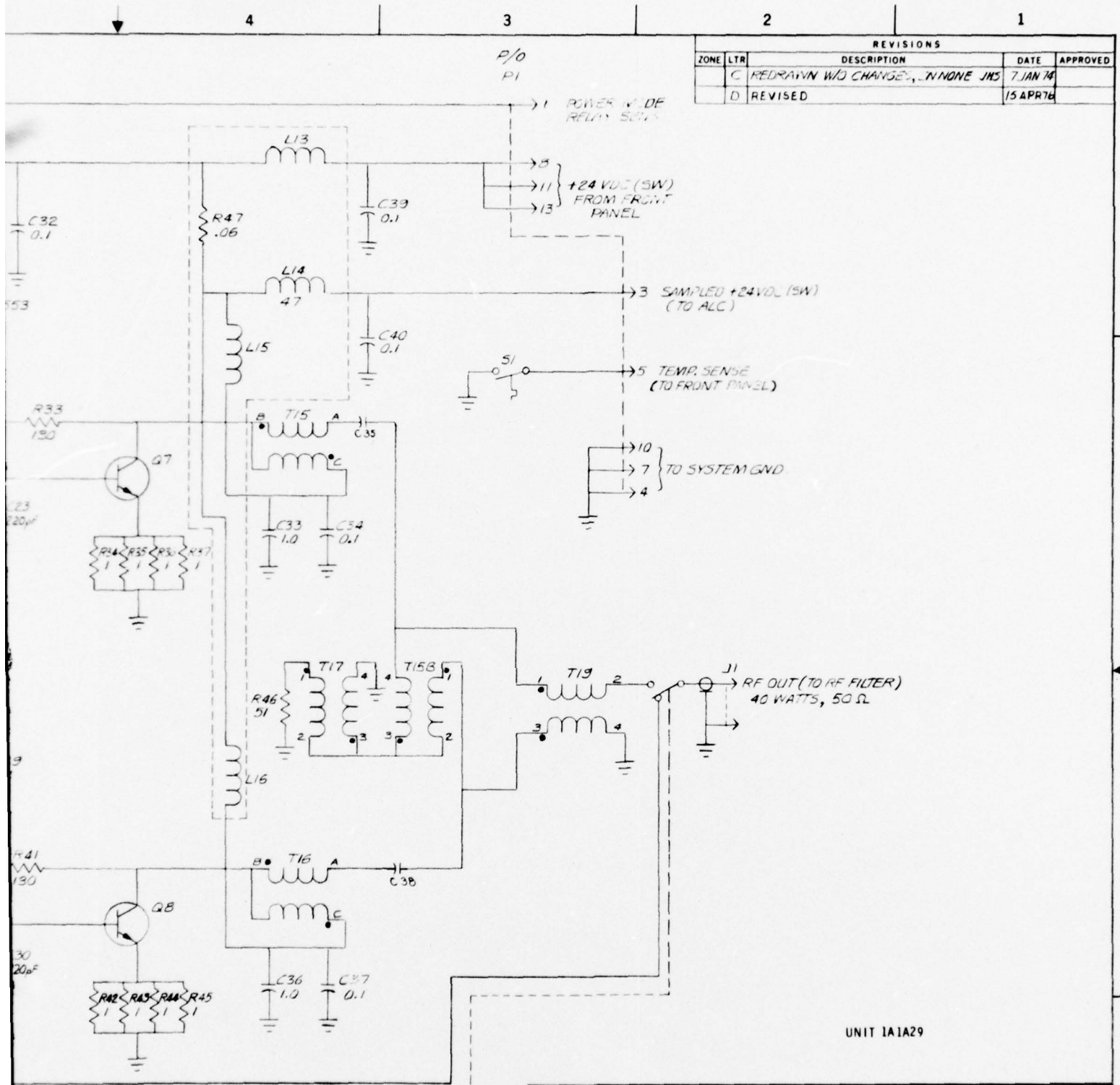
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10278
REV. 10-65



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
C		REDRAWN W/O CHANGES, N NONE JMS	7 JAN 74	
D		REVISED	15 APR 76	

FIND NO.	QTY REQD.	CODE IDENT.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
OTHERWISE SPECIFIED: UNITS ARE IN INCHES ANGLES ON ANGLES DECIMALS ANGLES			U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703			
			ELECTRONICS COMMAND			
REVIEWED			SIZE	CODE IDENT NO.	SM-D-745940	
APPROVED			D	80063		
DATE			SCALE		SHEET 2	

UNLESS OTHERWISE SPECIFIED	
DIMENSIONS ARE IN INCHES	
TOLERANCES ON:	
FRACTIONS	DECIMALS ANGLES
MATERIAL:	
NEXT ASSY	
USED ON	
APPLICATION	

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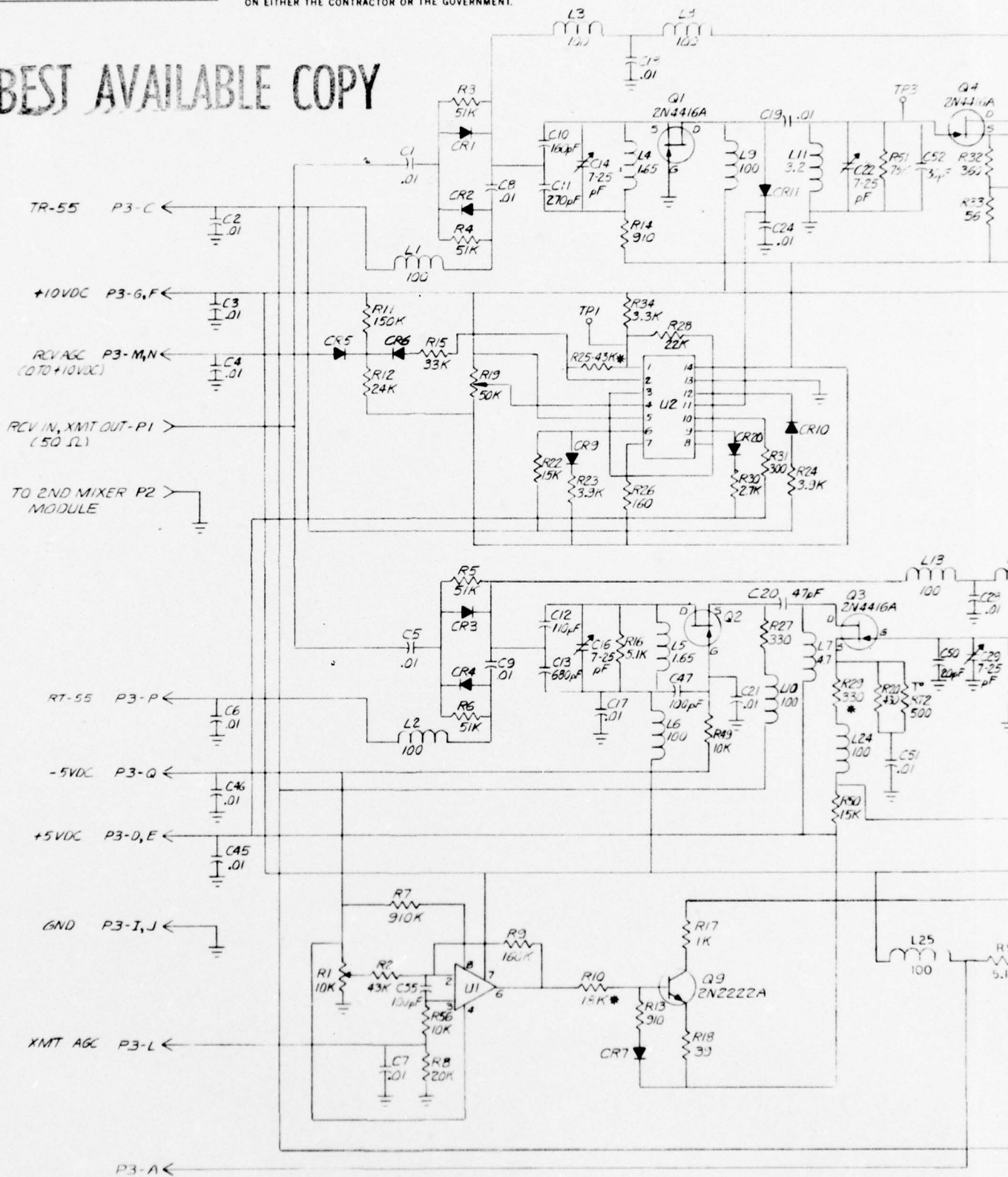
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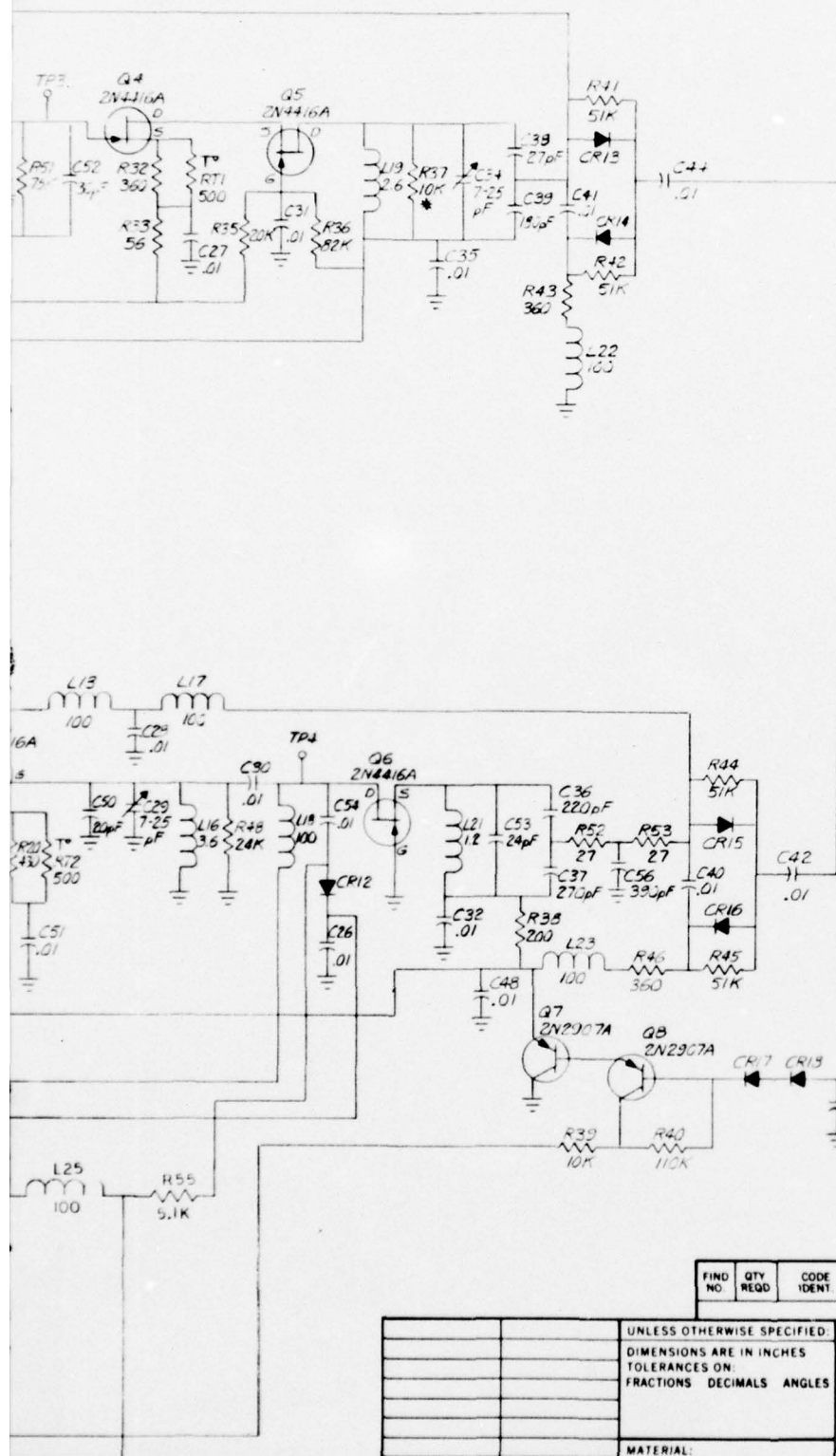
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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
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	H	DELETED R55, L24, L25 -N.F.22	5 FEB 75	
	J	ADDED R55, L24, L25 -N.F. NONE	12 FEB 75	

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< P5 REVR OUT
XMTR IN (50 Ω)

< P4 TO IF SELECTIVITY
MODULE

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2. PREFIX REF DESIGNATION OF PART WITH UNIT NO. TO COMPLETE LOCATIONAL REF DESIGNATION.
3. ALL DIODES ARE TYPE 1N4148 EXCEPT CR11 & CR12.
4. * DENOTES SELECT VALUE.

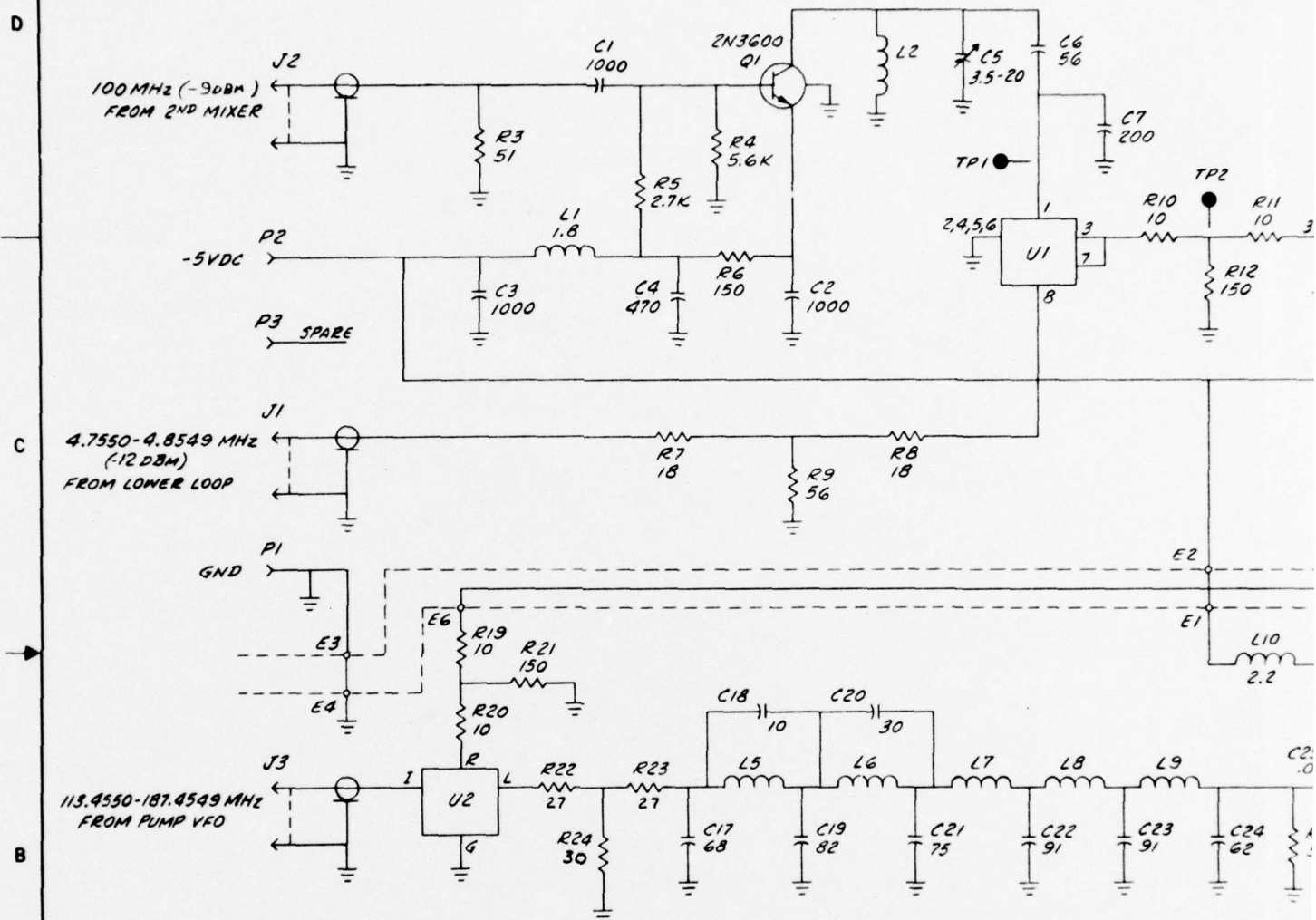
UNIT NO. 1A1A17

FIND NO.	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
80045 DAAB07.71-C-0319				U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703		
				SCHEMATIC DIAGRAM END IF MODULE		
ELECTRONICS COMMAND				SIZE CODE IDENT NO. D 80063	SM-D-745968	
REVIEWED APPROVED DATE 15 MAR 75				SCALE NONE	SHEET	

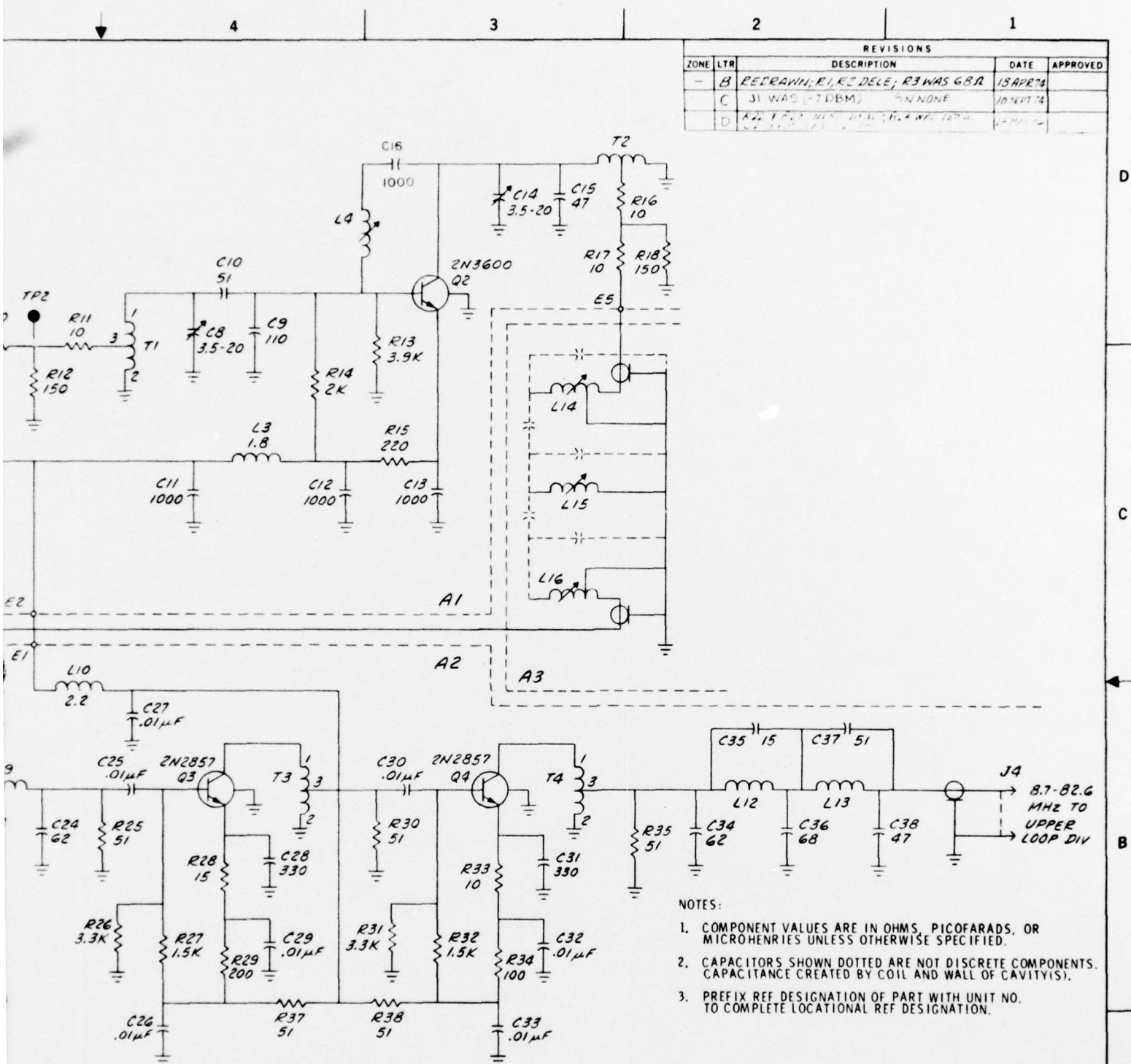
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R26
3.3K



UNIT NO. 1A1A6

FIND NO.	QTY REQD	CODE IDENT.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST						
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES				U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703		
80045 DAAB07-71.C-0319				SCHEMATIC DIAGRAM, TRANSLATOR		
ELECTRONICS COMMAND				SIZE CODE IDENT NO.		
REVIEWED				D 80063		
APPROVED				SM-D-745992		
DATE 10 APR 1973				SCALE NONE SHEET		
APPLICATION						

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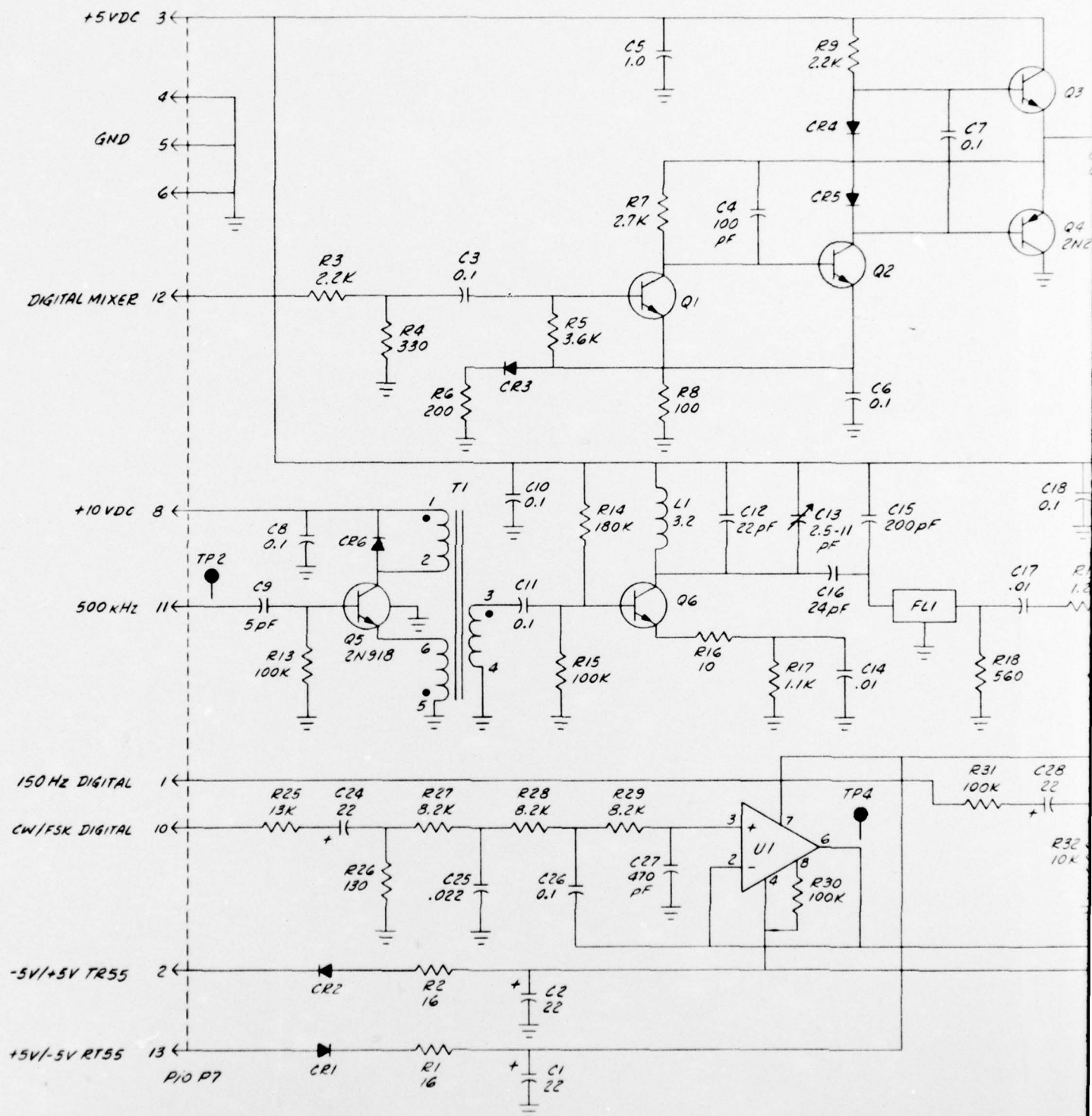
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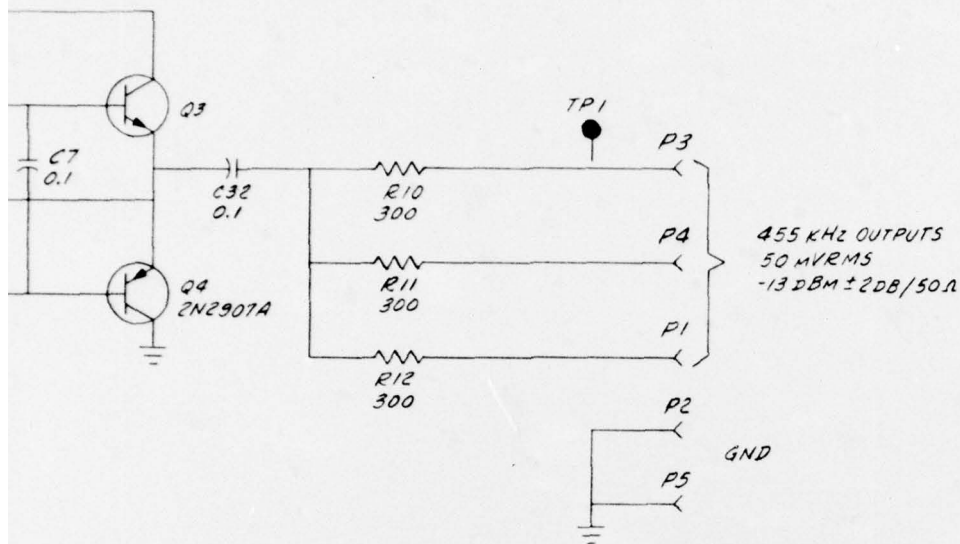
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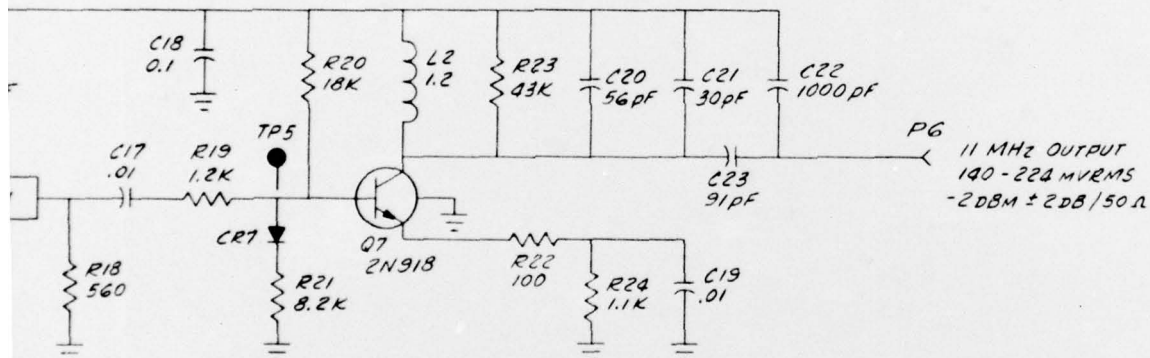
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REVISIONS			
ZONE	LTR	DESCRIPTION	DATE

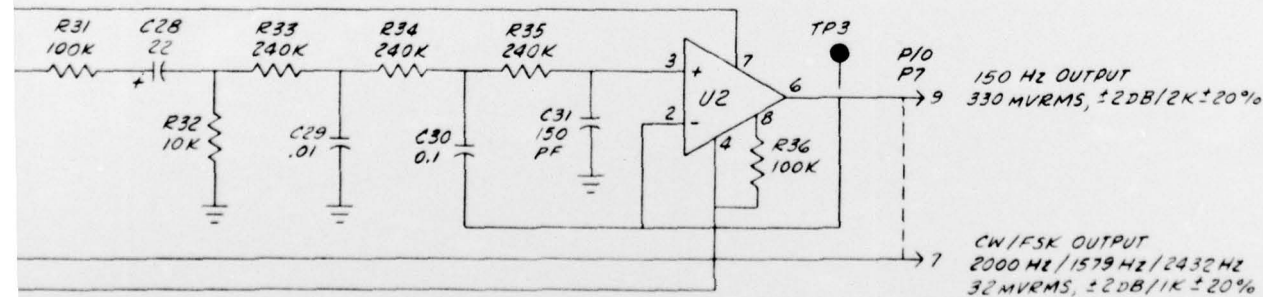


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3. ALL TRANSISTORS ARE TYPE 2N2222A, ALL DIODES TYPE 1N4148 UNLESS OTHERWISE SPECIFIED.



UNIT NO. 1A1A10



FIND NO.	QTY REQD	CODE IDENT	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	SPECIFICATION	NOTE
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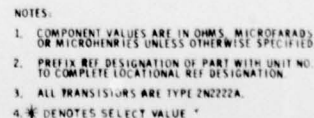
PARTS LIST

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES ON: FRACTIONS DECIMALS ANGLES		80045 DAAB07-71-C-0319		U. S. ARMY ELECTRONICS COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703	
		ELECTRONICS COMMAND		SCHEMATIC DIAGRAM, OSCILLATOR DISTRIBUTOR	
SM-D-746260	DAAB07-71-C-0319	REVIEWED	DATE	SIZE	CODE IDENT NO.
NEXT ASSY	USED ON	APPROVED		D	80063
APPLICATION				SCALE	NONE
				SHEET	

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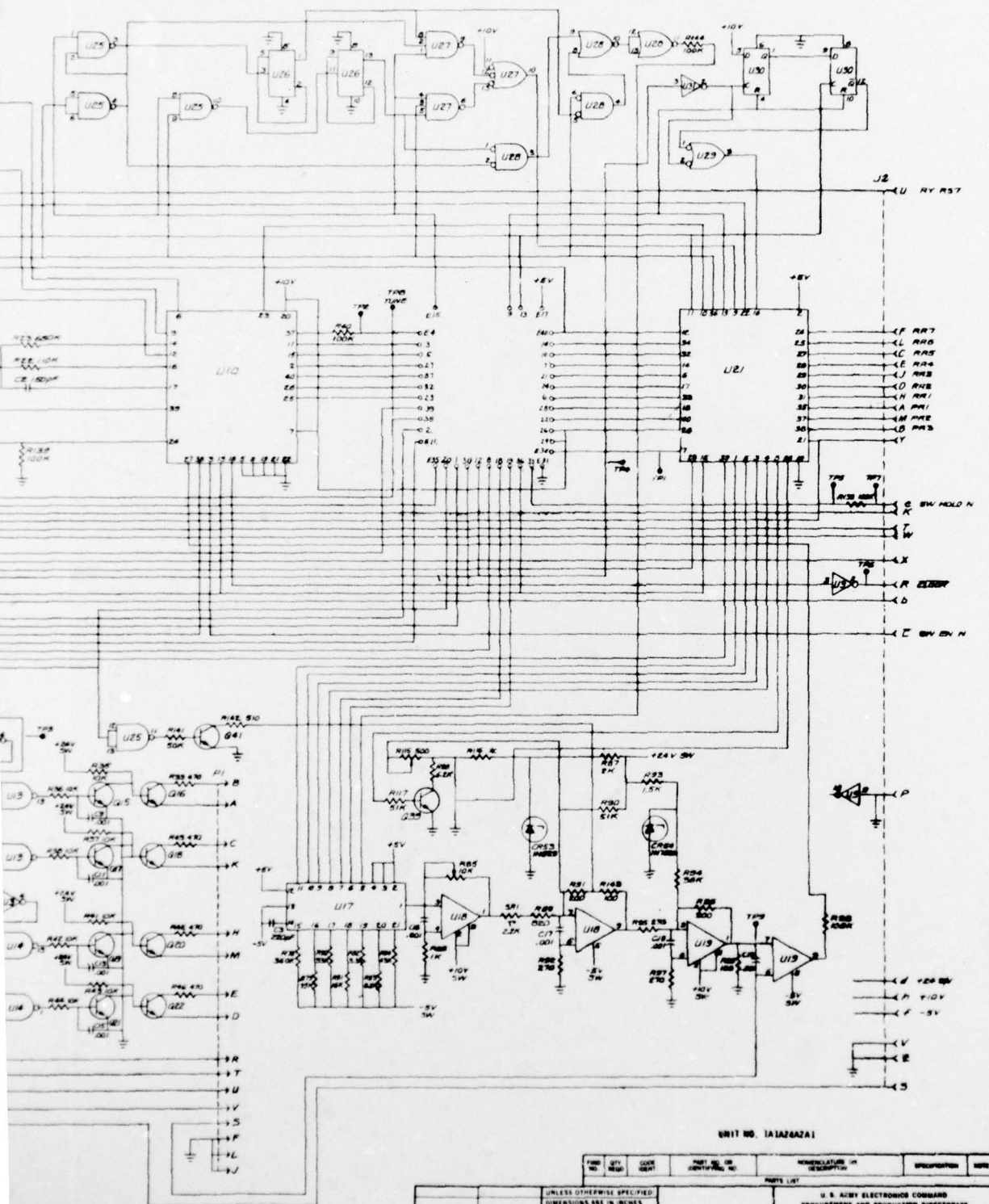
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REVISIONS			DATE	APPROVED
1	REVISED	NO CHANGES	10/1/56	
2	REVISED	NO CHANGES	10/1/56	
3	REVISED	NO CHANGES	10/1/56	
4	REVISED	NO CHANGES	10/1/56	
5	REVISED	NO CHANGES	10/1/56	
6	REVISED	NO CHANGES	10/1/56	
7	REVISED	NO CHANGES	10/1/56	
8	REVISED	NO CHANGES	10/1/56	
9	REVISED	NO CHANGES	10/1/56	
10	REVISED	NO CHANGES	10/1/56	



UNIT NO. 1A1A2A2A1

FORM NO. 100-10	REV. 10-1-56	CODE 100-10	THIS IS THE ONLY ONE TO BE USED	NON-CLASSIFIED OR DESCRIPTION	SPECIFICATION	NOTE
PARTS LIST			U. S. ARMY ELECTRONIC COMMAND PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH NEW JERSEY 07703			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES IN FRACTIONS DECIMALS ANGLES			SCHEMATIC DIAGRAM COUPLER LOGIC BOARD NO. 2-LOWER			
MATERIAL			ELECTRONICS COMMAND			
REVIEWED			DATE			
APPROVED			DATE			
APPLICATION			SCALE 1:1			

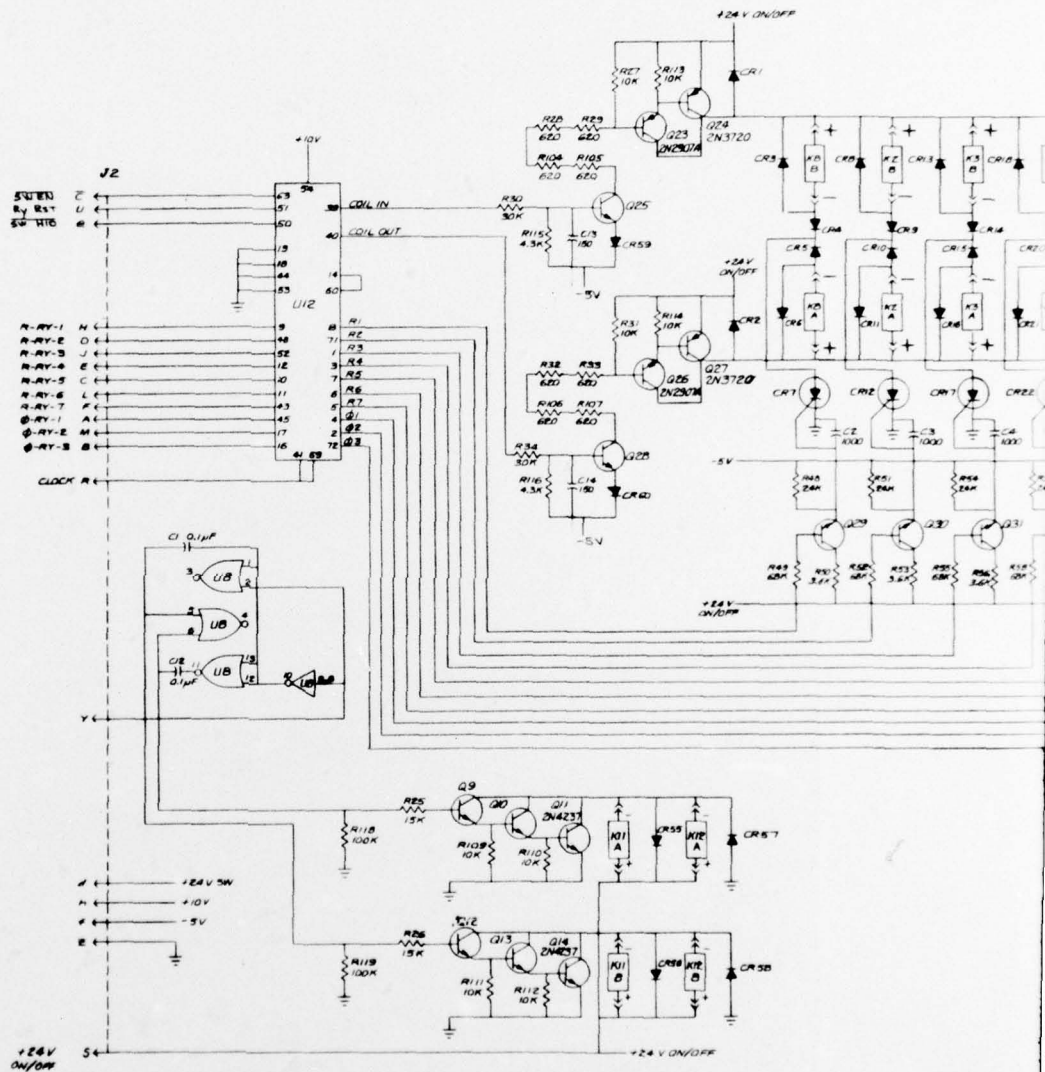
RES. MICROFARADS
UNLESS SPECIFIED
VNT WITH UNIT NO.
RESIGNATION
1222A

2

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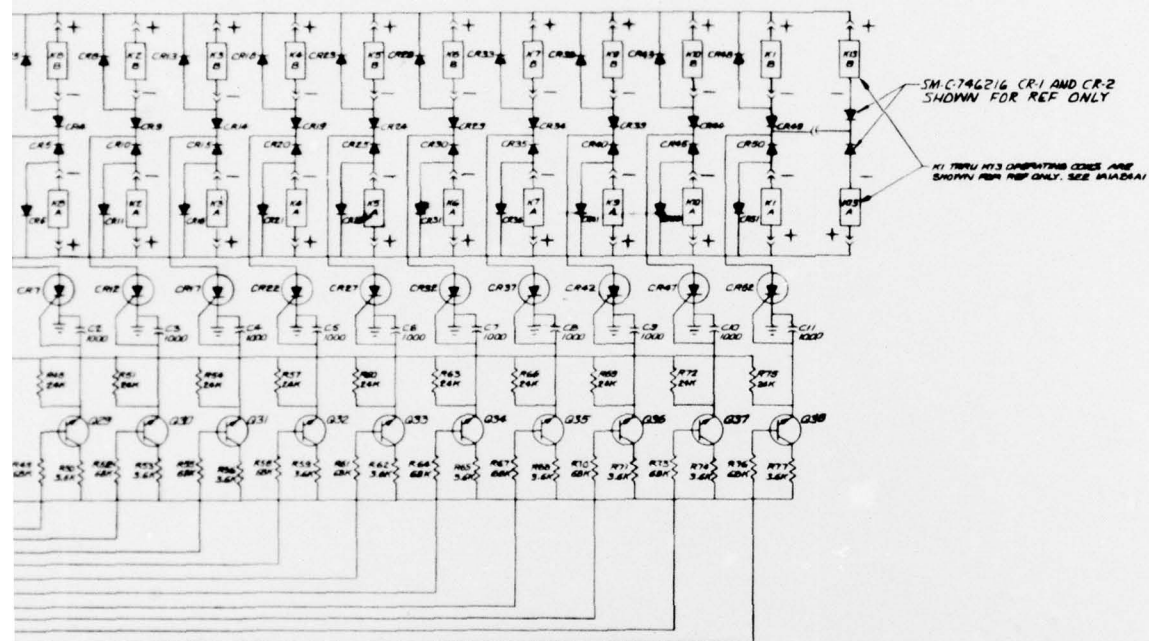
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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	C	REDRAWN WOODS ON PINE	10/1/50	

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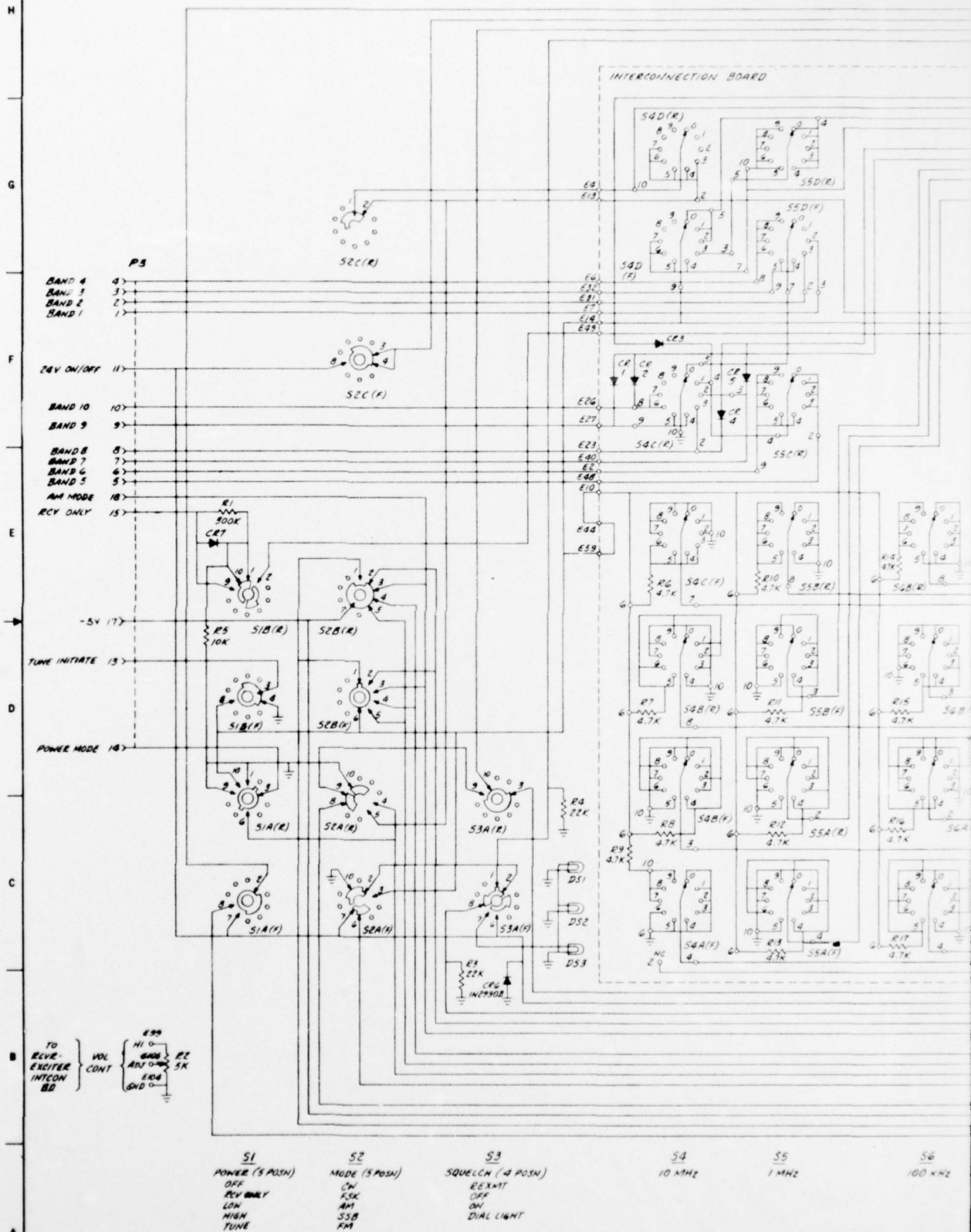
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 3. ALL TRANSISTORS ARE TYPE 2N5086 UNLESS OTHERWISE SPECIFIED.

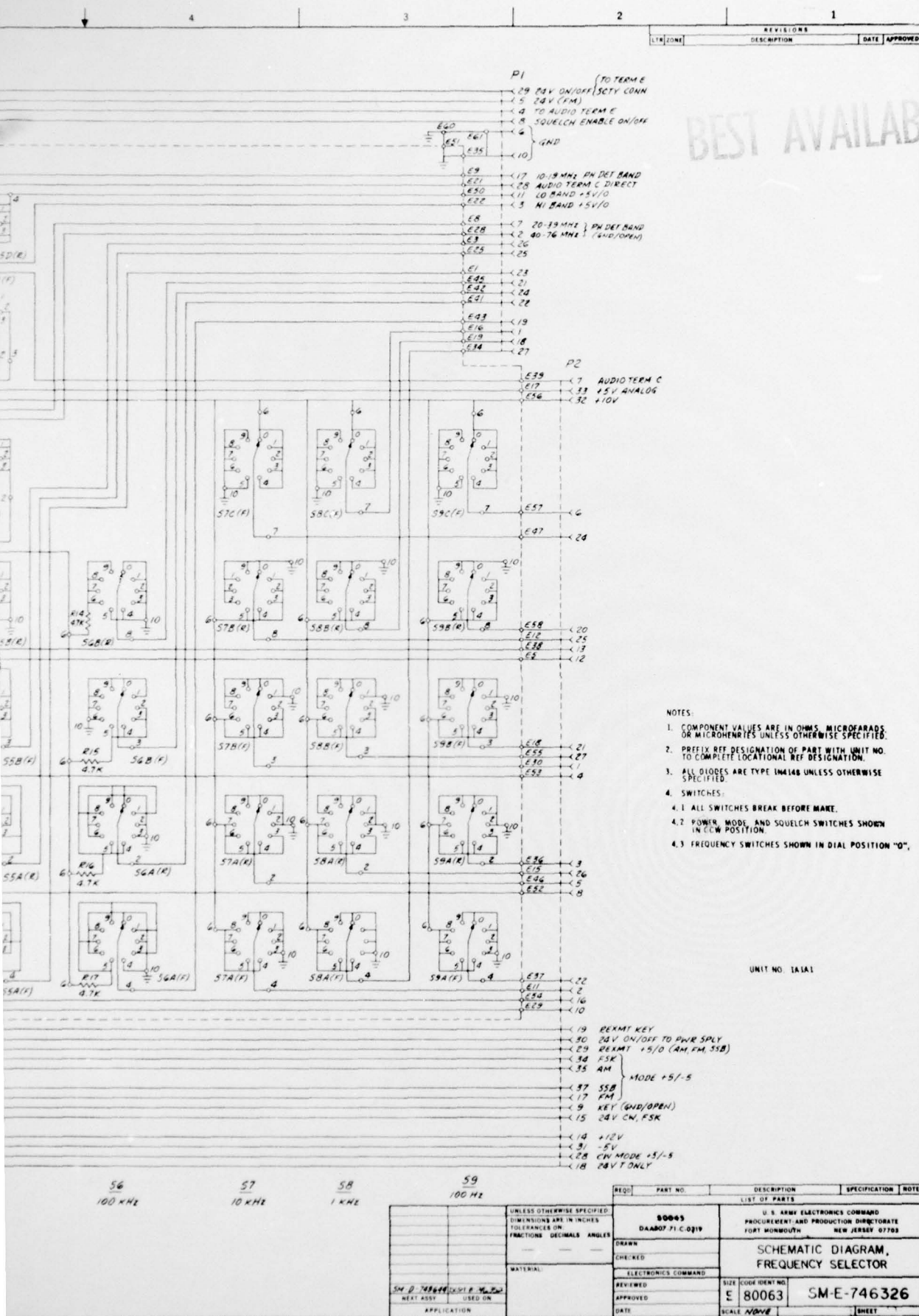
UNIT NO. 1A 1A24A2A2

PART NO		QTY	CODE	PART NO. OR IDENTIFYING NO.	ABBREVIATION OR DESCRIPTION	SPECIFICATIONS	NOTE
					PARTS LIST		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES				U.S. AIR ELECTRONICS COMPANY PROCUREMENT AND PRODUCTION DIRECTORATE FORT MONMOUTH, NEW JERSEY 07705 SCHEMATIC DIAGRAM COUPLER LOGIC BOARD NO. 1 - UPPER			
MATERIAL:				94000 94A007 JLC-2719 ELECTRONIC BOARD			
PREP. 745720 DESIG. 745720 NEXT ASST. DATE 8-1-63 USED ON				REVIEWED APPROVED DATE 15 MAY 1973 SIZE CODE IDENT. NO. E 80063 SM-E-746001 SCALE ANGLE			
APPLICATION							

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001		003	
307	NO ESO (ORT) L. G. HANSCOM AFB BEDFORD, MA 01731	417	COMMANDER US ARMY INTELLIGENCE CENTER & SCHOOL ATTN: ATSI-CO-MO FORT HUACHUCA, AZ 85613
001		002	
310	HQ, AFSS ATTN: EPFCEB MAIL STOP 105R RICHMOND-GERARD AFB, MO 64030	418	COMMANDER HQ FORT HUACHUCA ATTN: TECHNICAL REFERENCE DIV FORT HUACHUCA, AZ 85613
001		001	

419	COMMANDER US ARMY ELECTRONIC PROVING GROUND ATTN: STEEP-MT FORT HUACHUCA, AZ 85613	438	HQDA(DAMA-ARP/DR, F. D. VERDERAME) WASHINGTON, DC 20310
002	COMMANDER USASA TEST & EVALUATION CENTER ATTN: IAO-COR-T FORT HUACHUCA, AZ 85613	470	DIRECTOR OF COMBAT DEVELOPMENTS US ARMY ARMOR CENTER ATTN: ATZK-CD-MS FORT KNOX, KY 40121
420	COMMANDER USASA TEST & EVALUATION CENTER ATTN: IAO-COR-T FORT HUACHUCA, AZ 85613	002	COMMANDANT US ARMY ORDNANCE SCHOOL ATTN: ATSL-CD-OR ABERDEEN PROVING GROUND, MD 21005
001	COMMANDER USASA TEST & EVALUATION CENTER ATTN: IAO-COR-T FORT HUACHUCA, AZ 85613	475	CDR, HARRY DIAMOND LABORATORIES ATTN: LIBRARY 2800 POWDER MILL ROAD ADELPHI, MD 20783
421	COMMANDER HQ US ARMY COMMUNICATIONS COMMAND ATTN: CC-OPS-SM FORT HUACHUCA, AZ 85613	001	DIRECTOR US ARMY BALLISTIC RESEARCH LABS ATTN: DRXBR-LB ABERDEEN PROVING GROUND, MD 21005
001	CDR, US ARMY AIR MOBILITY R&D LAB ATTN: T. GOSSETT, BLDG 207-5 NASA AMES RESEARCH CENTER MOFFETT FIELD, CA 94035	477	DIRECTOR US ARMY BALLISTIC RESEARCH LABS ATTN: DRXBR-LB ABERDEEN PROVING GROUND, MD 21005
432	CDR, US ARMY AIR MOBILITY R&D LAB ATTN: T. GOSSETT, BLDG 207-5 NASA AMES RESEARCH CENTER MOFFETT FIELD, CA 94035	001	DIRECTOR US ARMY BALLISTIC RESEARCH LABS ATTN: DRXBR-CA (DR, L. VANDERKIEFT) ABERDEEN PROVING GROUND, MD 21005
001	HQDA(DAMO-TCE) WASHINGTON, DC 20310	478	DIRECTOR US ARMY BALLISTIC RESEARCH LABS ATTN: DRXBR-CA (DR, L. VANDERKIEFT) ABERDEEN PROVING GROUND, MD 21005
436	DEPUTY FOR SCIENCE & TECHNOLOGY OFFICE, ASSIST SEC ARMY (R&D) WASHINGTON, DC 20310	001	DIRECTOR US ARMY HUMAN ENGINEERING LABS ABERDEEN PROVING GROUND, MD 21005

482	DIRECTOR US ARMY MATERIEL SYSTEMS ANALYSTS ACTY ATTN: DRXSY-T	516	TRI-TAC OFFICE ATTN: CSS (DR, PRITCHARD) FORT MONMOUTH, NJ 07703
001	ABERDEEN PROVING GROUND, MD 21005	001	
507	CDR, US ARMY AVIATION SYSTEMS COMMAND ATTN: DRSAV-G PO BOX 209	531	CDR, US ARMY RESEARCH OFFICE ATTN: DRXRO-IP PO BOX 12211
001	ST. LOUIS, MO 63166	001	RESEARCH TRIANGLE PARK, NC 07709
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001	FORT MONMOUTH, NJ 07703	002	APD SEATTLE 98733
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516	PROJECT MANAGER, NAVCON ATTN: DRCPM-NC-TM BLDG 2539	542	COMMANDANT US ARMY FIELD ARTILLERY SCHOOL ATTN: ATSPA-CTD
001	FORT MONMOUTH, NJ 07703	002	FORT SILL, OK 73503
517	COMMANDER US ARMY SATELLITE COMMUNICATIONS AGCY ATTN: DRCPM-SC-3	548	COMMANDER FRANKFORD ARSENAL ATTN: PDS 64-4 (J. L. HELFRICH)
002	FORT MONMOUTH, NJ 07703	001	PHILADELPHIA, PA 19137

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1. The first part of the document is a list of names and their corresponding dates. The names are: "John Doe", "Jane Smith", "Bob Johnson", "Alice Brown", "Charlie White", "David Green", "Eve Black", "Frank Gray", "Grace Pink", "Henry Blue", "Ivy Yellow", "Jack Purple", "Karen Red", "Leo Orange", "Mia Silver", "Noah Gold", "Olivia Bronze", "Peter Copper", "Quinn Iron", "Rory Tin", "Sam Lead", "Tina Zinc", "Uma Nickel", "Victor Platinum", "Wendy Silver", "Xavier Gold", "Yara Bronze", "Zoe Copper". The dates are: "1990-01-01", "1990-02-01", "1990-03-01", "1990-04-01", "1990-05-01", "1990-06-01", "1990-07-01", "1990-08-01", "1990-09-01", "1990-10-01", "1990-11-01", "1990-12-01", "1991-01-01", "1991-02-01", "1991-03-01", "1991-04-01", "1991-05-01", "1991-06-01", "1991-07-01", "1991-08-01", "1991-09-01", "1991-10-01", "1991-11-01", "1991-12-01", "1992-01-01", "1992-02-01", "1992-03-01", "1992-04-01", "1992-05-01", "1992-06-01", "1992-07-01", "1992-08-01", "1992-09-01", "1992-10-01", "1992-11-01", "1992-12-01".

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