

CT SYSTEMS, INC.

INSTRUCTION MANUAL

MODEL 3000B

**COMMUNICATIONS
SERVICE MONITOR**

How to Use Measurements

Engineering Applications

Installation and Operation

Specifications

Appendix

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WARRANTY

1. CT Systems warrants all instruments against defects in material and workmanship for a period of one year after shipment. CT Systems agrees to repair or replace any assembly or component (except batteries) found to be defective under normal use during this period. CT Systems' obligation under this warranty is limited solely to repairing any such instrument which, in CT Systems' sole opinion, proves to be defective within the scope of the warranty when returned to the factory or to an authorized service center. This warranty may, at CT Systems' sole discretion, be void if the instrument ownership is changed during the warranty period.

CT Systems will assume all responsibility for UPS surface shipping charges for any warranty claims during the first thirty days from shipment date. After the first thirty days, CT Systems will assume responsibility for one way shipping charges, UPS surface, FOB customer's destination, during the warranty period. Should the customer desire an alternate method of shipping, he will be responsible for the difference between the UPS surface rate and the higher rate.

This warranty does not apply to any products repaired or altered by persons not authorized by CT Systems, or not in accordance with instructions furnished by CT Systems. If the instrument is defective as a result of misuse, improper repair, abnormal conditions or operations, repairs will be billed as per the CT Systems non-warranty program.

CT Systems assumes no responsibility for it's products being used in a hazardous or dangerous manner either alone or in conjunction with other equipment. CT Systems assumes no liability for secondary charges or consequential damages and, in any event, CT Systems' liability for breach of warranty shall not exceed the purchase price of the specific instrument shipped and against which a claim is made.

This warranty is in lieu of all other warranties, expressed or implied, and no representative or person is authorized to represent or assume for CT Systems any liability in connection with the sale of our products other than set forth herein.

WARRANTY PROGRAM

CT Systems further warrants each new instrument for an additional one year period at a subassembly level. This additional year warranty is limited to board replacement, exchange or repair at the sole discretion of CT Systems.

The customer **MUST** obtain a RETURN AUTHORIZATION NUMBER from the Customer Service Department. CT Systems accepts no liability for any instrument or subassembly returned to the factory without that number. Any correspondence regarding that instrument or subassembly should be referenced to that number.

MANUAL CHANGES

Due to special orders, continuing improvements in design and/or changes in documentation, some information relevant to this product may not have been included in the original printing of this manual. For that reason the rear of this manual has an addendum.

Information contained in the addendum supersedes information found elsewhere in the manual. Please check it to establish what changes, if any, have been made.

CONTENTS

SECTION 1 GENERAL INFORMATION

- 1.1 Introduction
- 1.2 Specifications

SECTION 2 PREPARATION FOR USE

- 2.1 Introduction
- 2.2 Unpacking and Inspection
- 2.3 Pre-turn On
- 2.4 Power Requirements
- 2.5 Environmental Considerations

SECTION 3 OPERATION

- 3.1 Introduction
- 3.2 Front Panel Description
- 3.4 Initial Turn-On
- 3.5 RF Generator with Single-Source FM
- 3.6 RF Sweep
- 3.7 RF Generate with Multiple Source FM
- 3.8 RF Generate with AM
- 3.9 SINAD Measurements
- 3.10 AC Voltmeter
- 3.11 RF Wattmeter
- 3.12 CRT FM/AM Measurements
- 3.13 Lissajous
- 3.14 Relative Signal Strength
- 3.15 Auto Calibration

SECTION 4 THEORY OF OPERATION

- 4.1 Overall
- 4.2 A10 Front Panel Board
- 4.3 A11 Frequency Control Board
- 4.4 A3 High Frequency Synthesizer
- 4.5 A2 Low Frequency Synthesizer
- 4.6 A1 Mixer Board
- 4.7 A4 IF Amplifier
- 4.8 A5 Audio Board
- 4.9 A7 Deflection Board
- 4.10 Miscellaneous Board

SECTION 5 MAINTENANCE

- 5.1 Introduction
- 5.2 Service and Maintenance Information
- 5.3 Performance Tests/Calibration
- 5.4 Troubleshooting

SECTION 6 REPLACEABLE PARTS

- 6.1 Introduction
- 6.2 Manufacturers Code
- *** Parts Lists

SECTION 7 SCHEMATICS

SECTION 1

GENERAL INFORMATION

1.1 INTRODUCTION

The Model 3000B is a compact, lightweight Service Monitor for testing FM and AM transceivers. Its low (25 lb) weight permits use in the field, powered by a vehicle battery.

The frequency range is 400 kHz to 1000 MHz in 100 Hz steps. An audio synthesizer permits generation of subaudible tones and timed tone bursts. In receive mode, an internal counter displays frequency error, modulation frequency, or received sub-audible tone frequency. RF voltage level is continuously variable from 0.03 μ VRMS to 316 mVRMS.

An internal CRT display shows modulation waveform and relative signal strength. A meter reads modulation, SINAD (using the internal 1 kHz tone source), audio input voltage, or RF power from 1 to 100 W. The internal load eliminates the possibility of damage from accidental keying.

The meter and CRT both display the same information, including SINAD, noise and distortion; however, only the meter indicates power, and only the CRT indicates relative signal strength.

1.2 SPECIFICATIONS

1.2.1 GENERATE MODE

1.2.1.1 FREQUENCY

Range	< 455 kHz to 999.999 MHz
Resolution	100 Hz
Display	7 lever/indicator switches
Accuracy	See Time Base

1.2.1.2 RF OUTPUT

Range	0.03 μ V to 316 mV (-137 to +3 dBm)
Accuracy	0.1 μ V to 300 μ V < 400 MHz \pm 2.5 dB > 400 MHz \pm 4.0 dB > 300 μ V \pm 5.0 dB
Attenuator	20 dB/step
Vernier	23 dB overlapping range
Leakage	< 0.03 μ V @ 0.3 μ V output level

REVERSE POWER PROTECTION

Type	Automatically switches to internal load at inputs > 200 mW
Power	Up to 100 W (10 seconds)
Alarm	Excessive energy triggers loud, shrill sound and front-panel indicator

SPECTRAL PURITY

Non-Harmonic	< -40 dBc within \pm 300 kHz bandwidth of selected carrier
Residual FM	< 100 Hz RMS (measured in a post-detection bandwidth of 0.1 to 3 kHz)

1.2.1.3 MODULATION

Displayed on METER and CRT DISPLAY

FM

Deviation	0 to \pm 18 kHz
Range	1.8, 6 and 18 kHz
Rate of Modulation	10 Hz to 10 kHz
External Impedance	> 600
Accuracy	\pm 10% of full scale
External Input	< 500 mVRMS for 5 kHz peak (nominal)

AM

Depth	0 to 90%
Distortion	< 10%
External Input	< 1 VRMS for 85%

1.2.2 RECEIVE MODE

1.2.2.1 FREQUENCY

Range	< 455 kHz to 999.9999 MHz
Resolution	100 Hz
Display	7 lever/indicator switches plus frequency error counter
Accuracy	See Time Base
Sensitivity	2 μ V for 10 dB SINAD
Bandwidth, 3 dB, nominal	
Narrow	< 15 kHz
Wide	< 100 kHz

1.2.2.2 MODULATION MEASUREMENT MODE

FM MODE

Deviation	0 to \pm 18 kHz
Ranges	1.8, 6 and 18 kHz
Accuracy (1 kHz frequency)	\pm 10% of full scale

	Display	METER and CRT	Input Connector	BNC (EXT VERT)
	FM Markers	± 600 Hz and ± 5 kHz	Display	METER and CRT
1.2.3	AM MODE		1.2.3.6	INTERNAL MODULATION SOURCES
	Depth	0 to 90%	Synthesizer	
	Ranges	1.8, 6 and 18% (X10)	Frequency	
	Accuracy at 30% (1 kHz rate)	$\pm 10\%$ of full scale	Range	10 to 9,999 Hz
	Display	METER and CRT	Resolution	1 Hz @ 1000 to 9,999 Hz (x1) 0.1 @ [100 to 999.9 Hz] (x.1) [30 to 99.9 Hz] (x.01)
1.2.3	INSTRUMENT FUNCTIONS		Accuracy	See Time Base
1.2.3.1	FREQUENCY COUNTER MODES		Display	4 digit lever/indicator switches
	Display	4 digit LCD, backlighted with a negative sign indicating a minus carrier freq. and no sign indicating a plus carrier freq.	Output	0 to 1 VRMS
	Accuracy	Time Base ± 1 count	Impedance	600 ohm (nominal)
	Frequency Error	$\pm (.01$ to 10 kHz) 10.0 Hz (< 455 kHz to 999.9999 kHz)	Fixed Source	
1.2.3.2	ZERO BEAT MODE (RCV)	Built-in speaker provides audible indication of frequency range	Frequency	1 kHz
1.2.3.3	INTERNAL SPEAKER	3-inch speaker with volume control	Accuracy	See Time Base
1.2.3.4	POWER METER MODE		Output	0 to 1 VRMS
	Meter Range	1 to 10 watts (x.1) 1 to 100 watts (x1)	Impedance	600 ohm (nominal)
	Accuracy	$\pm 10\%$ of full scale reading	Connector	BNC
1.2.3.5	DISTORTION ANALYZER MODE-SINAD		1.2.3.7	AC VOLTMETER
	Notch Frequency	1 kHz	Ranges	1.8, 6.0, and 18 V peak
	Range	3 to 20 dB	Accuracy	$\pm 10\%$ of full scale
	Accuracy	± 1 dB @ 12 dB	Input Impedance	100 kohm (nominal)
	Input Impedance	100 kohm (nominal)	Input Connector	BNC (EXT VERT)
			1.2.3.8	RELATIVE SIGNAL STRENGTH INDICATOR
			Frequency	< 455 kHz to 999.9999 MHz
			1.2.3.9	OSCILLOSCOPE
			Vertical	

Bandwidth, 3 dB	≥ 100 kHz
Ranges	1.8, 6.0 and 18 V peak, selectable
Accuracy	$\pm 5\%$ of full deflection
Deflection	12 divisions (.3V, 1V and 3V/DIV.) selectable
Input Impedance	100 kohm (nominal)
Input Connector	BNC (EXT VERT)

Horizontal

Sweep Range	10 divisions, 0.01, 0.1, 1.0, and 10 msec/division; selectable
CRT	3" dia., P31 phosphor
Controls	
Focus	Front panel controllable
Intensity	Front panel controllable

1.2.4 TIME BASE CHARACTERISTICS

Standard TCXO

Aging Rate	± 1 ppm/year
Temperature (0 to 50 °C)	± 0.5 ppm

1.2.5 GENERAL

Operating Temperature	0 to 50 °C
Power Requirements	115 VAC; $\pm 10\%$ 50 to 60 Hz $\pm 5\%$
Input DC	10.5 to 15.2 VDC, 6A
Dimensions	41.3 cm (16 1/4 in) (including handles) wide 18.3 cm (7-3/16 in) high 48.3 cm (19 in) (including rear feet) deep
Weight	14.5 kg (32 lb)

SECTION 2

PREPARATION FOR USE

2.1 INTRODUCTION

The Model 3000B is a rugged piece of precision test equipment designed for portability. Although it is quite commonly used as a laboratory instrument, it is also well suited for field use.

2.2 UNPACKING AND INSPECTION

When unpacking the Service Monitor, inspect the shipping container and instrument for shipping damage. Save the shipping carton and packing material for possible future use.

The instrument was inspected, given final operational and quality control tests, then carefully packaged for shipment, and should operate in accordance with Section 3 of this manual.

If the instrument received has been damaged in transit, notify the carrier and your CT Systems Customer Service representative. The representative will immediately arrange for either replacement or repair of your instrument without waiting for damage claim settlements.

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2.3 PRE-TURN ON

Before line power is applied, the METER should read zero. If it does not, insert a blade screwdriver into the opening below the METER and mechanically adjust it to zero.

2.4 POWER REQUIREMENTS

The instrument operates from selectable 103/117/220/240 VAC, 50/60 Hz primary power source at 60 VA. The

three conductor power cord provides a ground connection when it is connected to the proper outlet.

The instrument can also be operated from DC power. With the Inverter, the instrument requires 10.5 VDC to 15.2 VDC.

For use with other primary power sources, please consult the factory.

2.5 ENVIRONMENTAL CONSIDERATIONS

The instrument comes equipped with bottom and rear-panel feet (the rear-panel feet also serve as cord wraps).

These features, along with its small size and light weight, permit easy access to confined working spaces.

The instrument is designed to operate between 0° C and 50° C, and should be used in an area where air flow around the instrument is not restricted. Do not permit the ventilating ports to be blocked or restricted, and **never** operate the unit within its protective cloth cover accessory.

NOTE

Exceeding the upper or lower temperature limits for extended periods may not result in damage to the instrument but may cause degraded performance.

SECTION 3

OPERATION

3.1 INTRODUCTION

This section contains operating instructions for the Model 3000B Service Monitor. Included are descriptions of front and rear panels, and notes on use of features.

3.2 FRONT PANEL DESCRIPTION

Due to the number of controls, the front panel is divided into sections for description.

3.2.1 CRT

Refer to Figure 3-1.

- (1) CRT DISPLAY (with graticule and deviation scales of ± 1.8 , ± 6 , and ± 18 kHz or V, depending on parameter being measured) displays measurement information.
- (2) VERT POS, FOCUS, INTENSITY, and HORZ POS controls determine CRT DISPLAY trace characteristics. When the VERT POS control is pulled out, the vertical axis from the demodulation circuit is AC coupled. When the VERT POS control is pushed in, the vertical axis is DC coupled.
- (3) VERT GAIN control provides continuously variable control of vertical sensitivity. Scale is calibrated when control is fully cw (detent position).
- (4) HORZ/SWEEP RATE pushbutton switches select 10, 1, 0.1, or 0.01 msec/ division horizontal sweep rate. In RF SWEEP mode, the pushbuttons determine the RF sweep rate.
- (5) HORZ RATE control provides vernier control of horizontal sweep rate. Scale is calibrated when control is fully cw (detent position).
- (6) POWER switch applies AC power to the instrument. Non-luminous indicator provides visual on-off information.
- (7) FM CALIB pushbutton switches select a horizontal marker line at ± 5 kHz deviation level, a marker line at ± 0.6 kHz deviation level, or no marker lines (OFF).
- (8) SIG STRENGTH pushbutton switches provide an indication of signal strength when active. When the LOW pushbutton is pressed, a signal of approximately 100 mV will fill the display horizontally. Signals of lesser strength will partially fill the display proportional to the signal strength. (The left edge of the display is the zero signal level.) Minimum to maximum width requires approximately 90 dB change when HIGH is pressed.

3.2.2 FREQUENCY

Refer to Figure 3-2.

- (1) MONITOR FREQUENCY DISPLAY counts the frequency selected by the FREQ ERROR, MOD, and SUB-TONE pushbutton switches. Either the kHz or Hz lamp will be lit, indicating the unit of measurement.
- (2) FREQ ERROR pushbutton switch causes the MONITOR FREQUENCY DISPLAY to show the difference (in kHz) between the CARRIER FREQUENCY switch setting and the input frequency.

NOTE

A negative reading indicates the input frequency is less than the CARRIER FREQUENCY switch setting.

- (3) MOD FREQ pushbutton switch causes the MONITOR FREQUENCY DISPLAY to show the input modulation frequency (250 to 9999 Hz).
- (4) SUB-TONE/LISSAJOUS pushbutton switch causes the MONITOR FREQUENCY DISPLAY to show the input modulation frequency (60 to 250 Hz) and a Lissajous pattern on the CRT DISPLAY which indicates the sub-tone frequency compared to the internal audio synthesizer.
- (5) CARRIER FREQUENCY lever/ indicator switches select the output frequency in generate mode, and the input reference frequency in receive mode. (Resolution is 100 Hz.)

3.2.3 MODULATION

Refer to Figure 3-3.

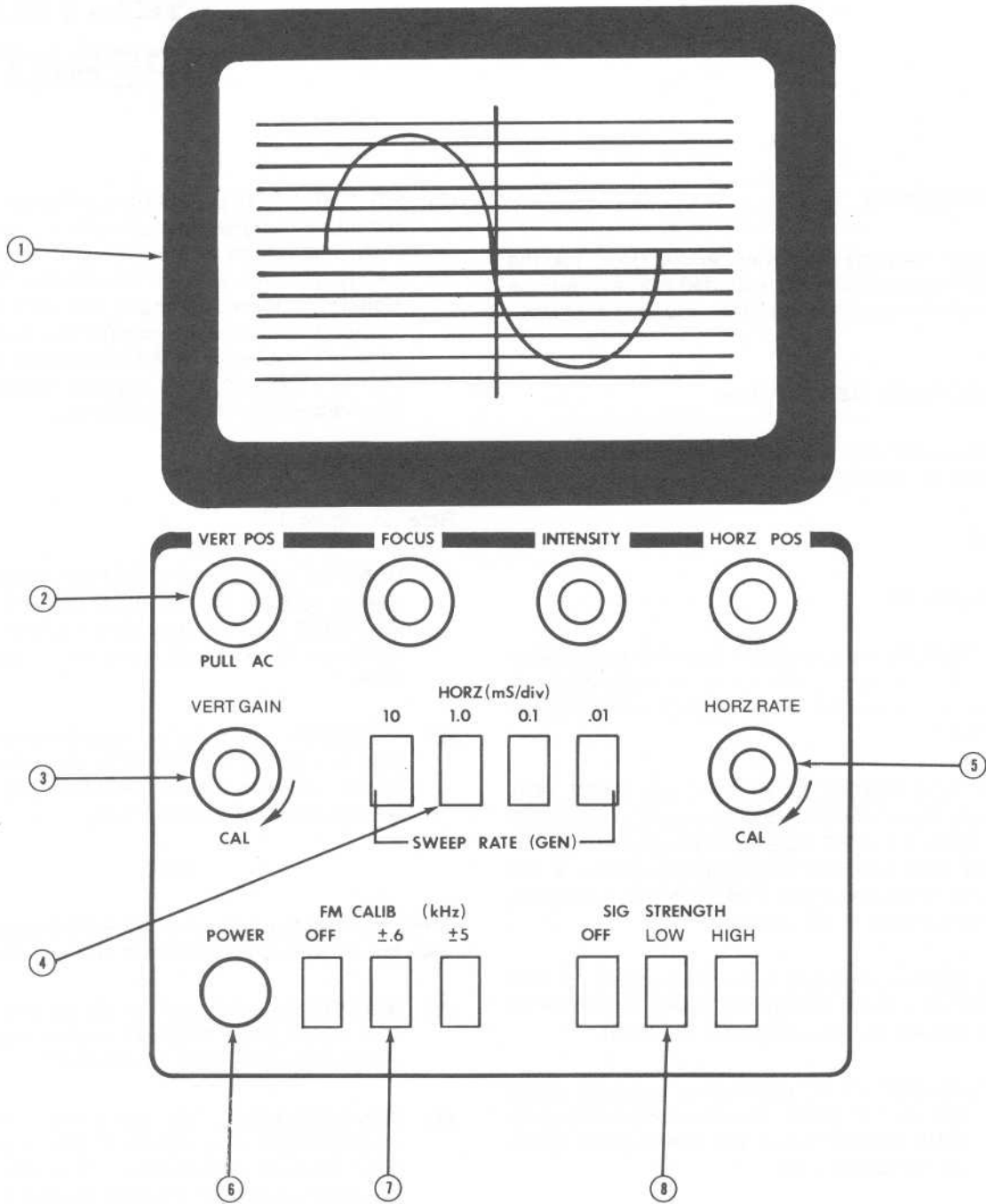


Figure 3-1. Front Panel - CRT

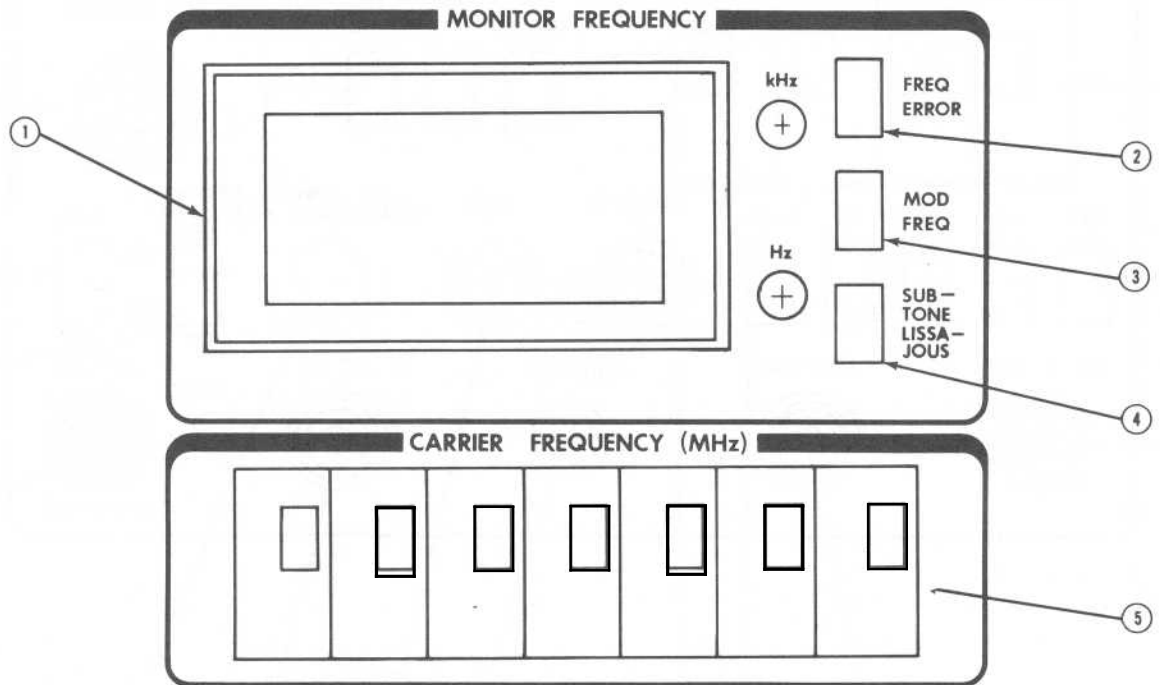


Figure 3-2. Front Panel — Monitor Frequency

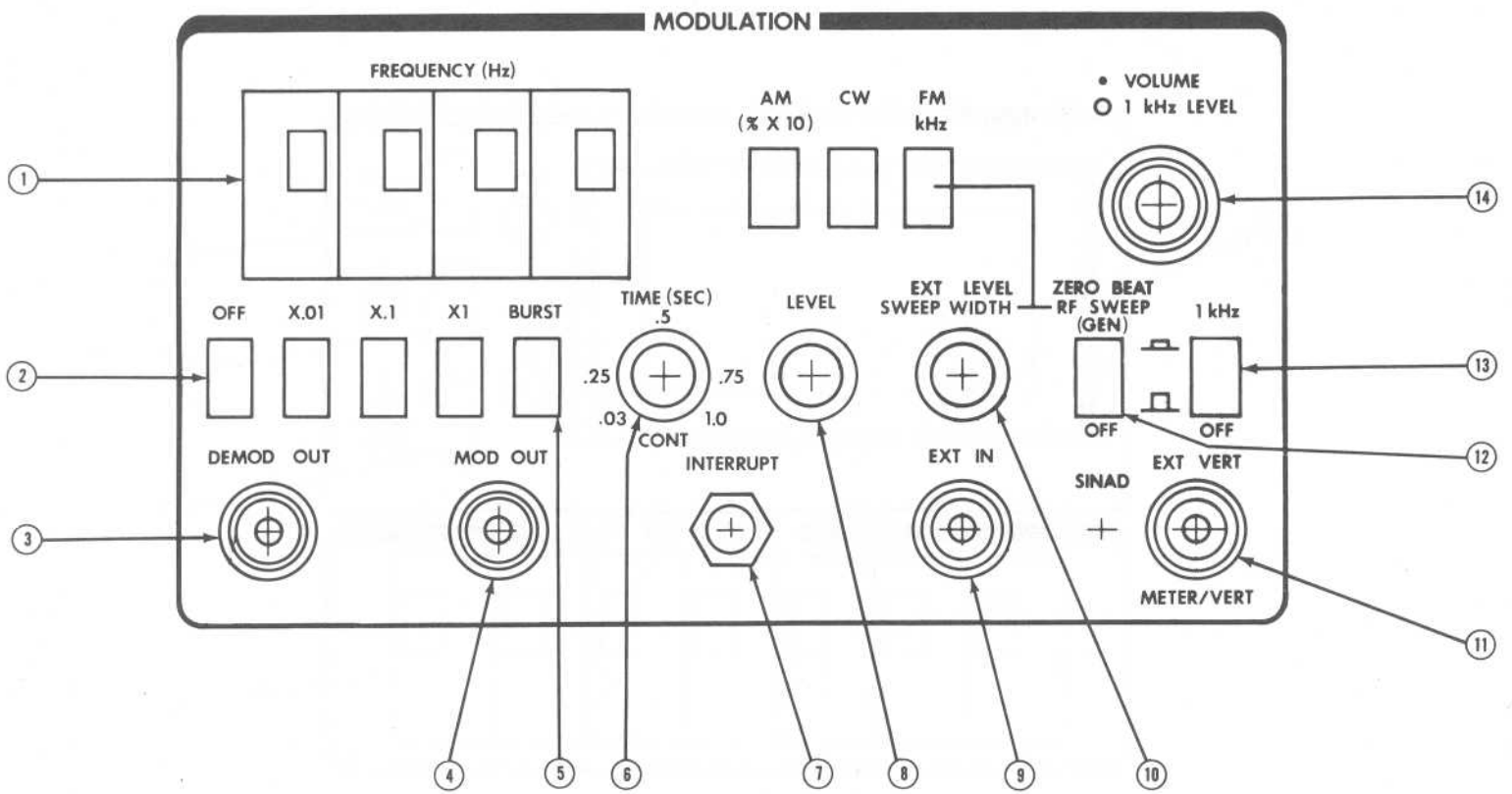


Figure 3-3. Front Panel — Modulation

- (1) MODULATION FREQUENCY lever/indicator switches select the synthesizer modulation frequency.

NOTE

Left-most digit can not be zero.

- (2) MODULATION FREQUENCY MULTIPLIER pushbutton switches select the the range of the MODULATION FREQUENCY switches as follows:

OFF -No modulation.

X.01 -Range is 10.00 to 99.99 Hz.

X.1 -Range is 100.0 to 999.9 Hz.

X1 -Range is 1000 to 9999 Hz.

The MODULATION FREQUENCY MULTIPLIER pushbuttons also determine the 0 phase for Lissajous display.

- (3) DEMOD OUT connector (BNC) provides output connection for the demodulated audio signal.
- (4) MOD OUT connector (BNC) provides output connection for all audio modulation (synthesizer, microphone, 1 kHz, and external).
- (5) BURST pushbutton switch activates a burst of synthesizer modulated signal, the frequency of which is set by the MODULATION FREQUENCY and MODULATION FREQUENCY MULTIPLIER switches, and the duration of which is set by the TIME control.
- (6) TIME control selects the length of the modulation burst activated by the BURST control. When the control is fully cw (detent position), modulation is continuous.
- (7) INTERRUPT connector (miniature phone jack) allows the interruption of the synthesizer modulation using external rotary dial equipment, thus providing a means for external modulation burst control.
- (8) LEVEL control sets the level of the synthesizer modulation.
- (9) EXT IN connector (BNC) provides input connection for an external modulating signal.
- (10) EXT LEVEL/SWEEP WIDTH control sets the level of the external modulation, and, in RF sweep mode, controls the sweep width from 0 to ± 18 kHz.
- (11) EXT VERT/METER/VERT connector (BNC) provides input connection to the audio voltmeter and CRT. The audio signal is displayed on the CRT DISPLAY while the voltage is displayed on both the CRT DISPLAY and METER. The SINAD lamp indicates a sufficient input level for measurement of volts and sinad.

- (12) ZERO BEAT/RF SWEEP pushbutton switch enables the RF sweep at the CRT display sweep rate in generate mode. In receive mode, the pushbutton outputs the beat frequency between the generated and received frequencies via the internal speaker.

- (13) 1 kHz pushbutton switch activates the internal 1 kHz generator.

- (14) VOLUME/1 KHZ LEVEL dual control sets the internal speaker volume (inner knob) and the level of the internal 1 kHz generator signal when the 1 kHz switch is pressed.

- (15) AM, CW, and FM pushbutton switches select the mode of modulation. (FM is selected for RF sweep.)

NOTE

In AM mode, the modulation depth is the METER reading X10.

3.2.4 METER/MODE

Refer to Figure 3-4.

- (1) METER indicates measurement of modulation, SINAD, voltage, and transmitter power.
- (2) VOLT pushbutton switch causes the METER and CRT DISPLAY to read the peak voltage at the EXT VERT connector.
- (3) SINAD/WATTS pushbutton causes the METER to read input power (watts) in receive mode. In generate mode, the pushbutton (for 1 kHz modulation) causes the METER to read the ratio (signal + noise + distortion)/ (noise + distortion) in dB.
- (4) MOD pushbutton switch causes the METER to read the modulation level in kHz deviation (FM), or % (AM).

NOTE

% AM is read on the scale selected by the METER RANGE switch, and is multiplied by 10 to obtain the correct value.

- (5) METER RANGE pushbutton switches select the METER and CRT DISPLAY scale to be read.
- (6) KHZ, % X10, dB, V, W indicator lamps indicate the unit of measurement for the METER reading.
- (7) GEN pushbutton switch selects the generate mode of operation.
- (8) DISC RESET pushbutton switch centers the discriminator bias in the IF section as an internal calibrator.

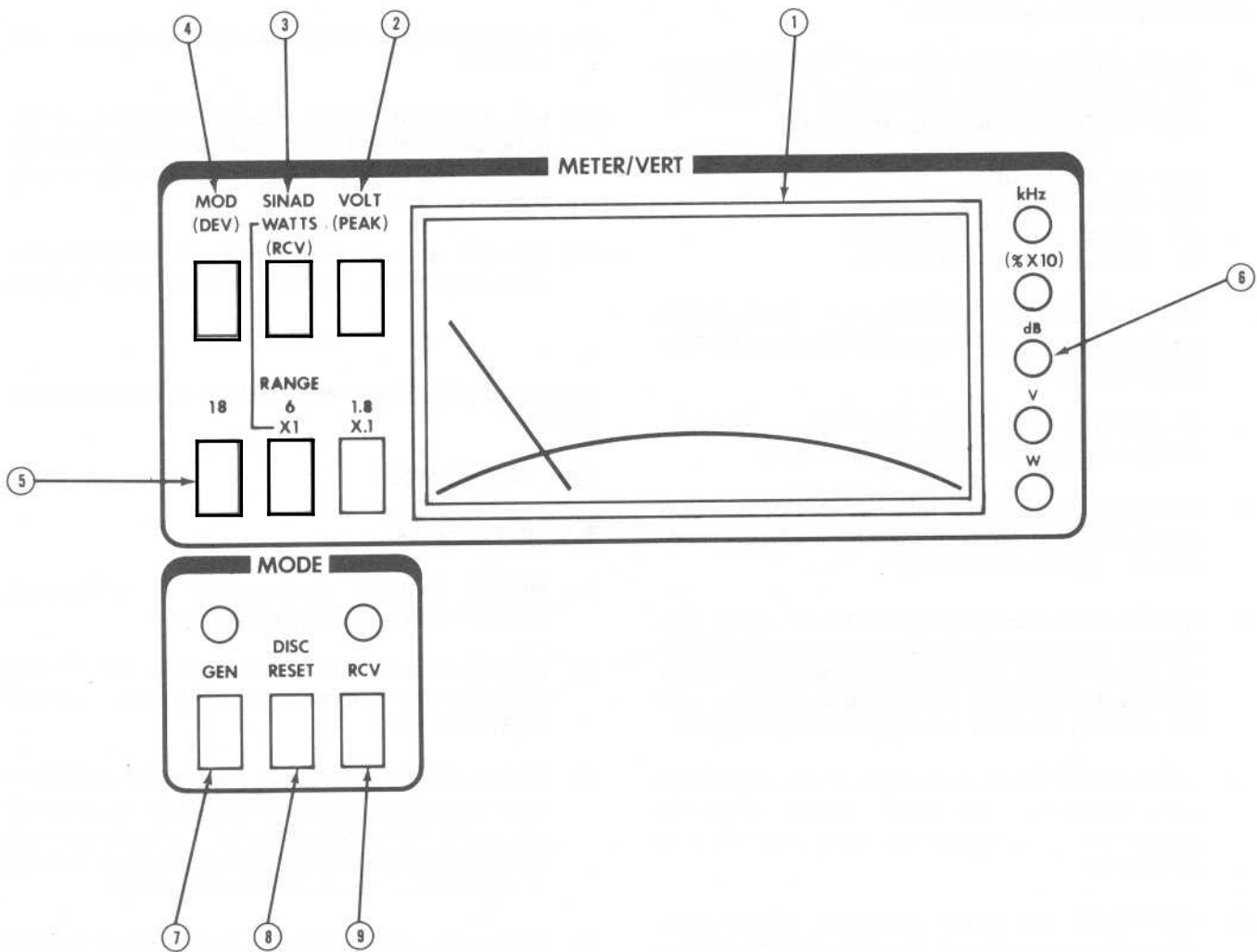


Figure 3-4. Front Panel — Meter/Vert

- (9) RCV pushbutton switch selects the receive mode of operation.

3.2.5 OUTPUT LEVEL/SQUELCH

Refer to Figure 3-5.

- (1) OUTPUT LEVEL control sets the instrument output level in generate mode. The dial is calibrated in VRMS and dB.
- (2) RF OFF pushbutton switch selects either continuous output (pushbutton not pressed), or output active only when "push-to-talk" switch of microphone connected to rear-panel MIC connector is activated.
- (3) OUTPUT LEVEL MULTIPLIER pushbutton switches select the multiplication factor for the OUTPUT LEVEL control dial indication.
- (4) μ V and mV pushbutton switches select the units of the OUTPUT LEVEL control dial indication.
- (5) BW NAR/WIDE pushbutton switch sets the IF bandwidth to < 15 kHz (NAR) or < 100 kHz (WIDE) in receive mode.
- (6) SIG LEVEL indicator lamp lights when the RF input signal level is greater than the SQUELCH control level setting.
- (7) SQUELCH control sets the threshold sensitivity in FM receive mode to eliminate unwanted noise. The RF input signal level must be greater than the SQUELCH control level setting for measurement to be made. The SQUELCH control has no function in AM receive mode.
- (8) LOAD OVERTEMP indicator lamp, when lit, indicates that the RF input power has exceeded 100 W for 10 seconds. An audible alarm tone is also output via the speaker.
- (9) RF IN/OUT connector (type N) provides connection for the RF output signal (in generate mode) and the RF input signal (in receive mode). The function of this connector is automatically switched from output to input when RF is applied from an external source.

3.3 INITIAL TURN-ON

Connect the rear-panel AC line cord to a suitable power outlet and press the front-panel POWER switch. The POWER switch indicator will change from black to orange, the METER will become illuminated, and lamps corresponding to whichever pushbuttons are pressed will light.

Service Monitors equipped with the standard TCXO time base will generate precision signals accurate to ± 0.5 ppm within a few seconds.

3.4 RF GENERATE CW OPERATION

Select CW generate mode by pressing the front-panel GEN and CW pushbuttons.

NOTE

The RF OFF pushbutton should be in its released position.

Set the CARRIER FREQUENCY switches for the desired frequency. Set the RF output for the desired level by pressing the appropriate μ V or mV pushbutton, the appropriate OUTPUT LEVEL MULTIPLIER pushbutton, and adjusting the OUTPUT LEVEL control.

For example, to generate an RF output of 0.3 μ VRMS at 152.0900 MHz, press the μ V and X.1 pushbuttons, set the OUTPUT LEVEL control to 3, and set the CARRIER FREQUENCY switches to 152.0900.

The OUTPUT LEVEL control is calibrated in both VRMS and dB. Refer to Table 3-1 for dial ranges in dBm for all OUTPUT LEVEL MULTIPLIER and μ V/mV switch settings. The "Low" column gives the minimum dial settings in dBm; the "High" column gives the maximum dial settings in dBm; the "0 dB" column gives the output levels in dBm for 0 dB on the OUTPUT LEVEL control dial.

The RF OFF pushbutton switch disconnects the RF output signal from the RF IN/OUT connector when pressed. A microphone (Shure 405K or equivalent) can then be connected to the rear panel MIC connector and the microphone "push-to-talk" switch used to "key" the RF output.

Table 3-1. dBm Level Calibration

Mult	Range	Low	0 dB	High
X.1	μ V	-137	-120	-117
X1	μ V	-117	-100	-97
X10	μ V	-97	-80	-77
X100	μ V	-77	-60	-57
X.1	mV	-77	-60	-57
X1	mV	-57	-40	-37
X10	mV	-37	-20	-17
X100	mV	-17	0	3

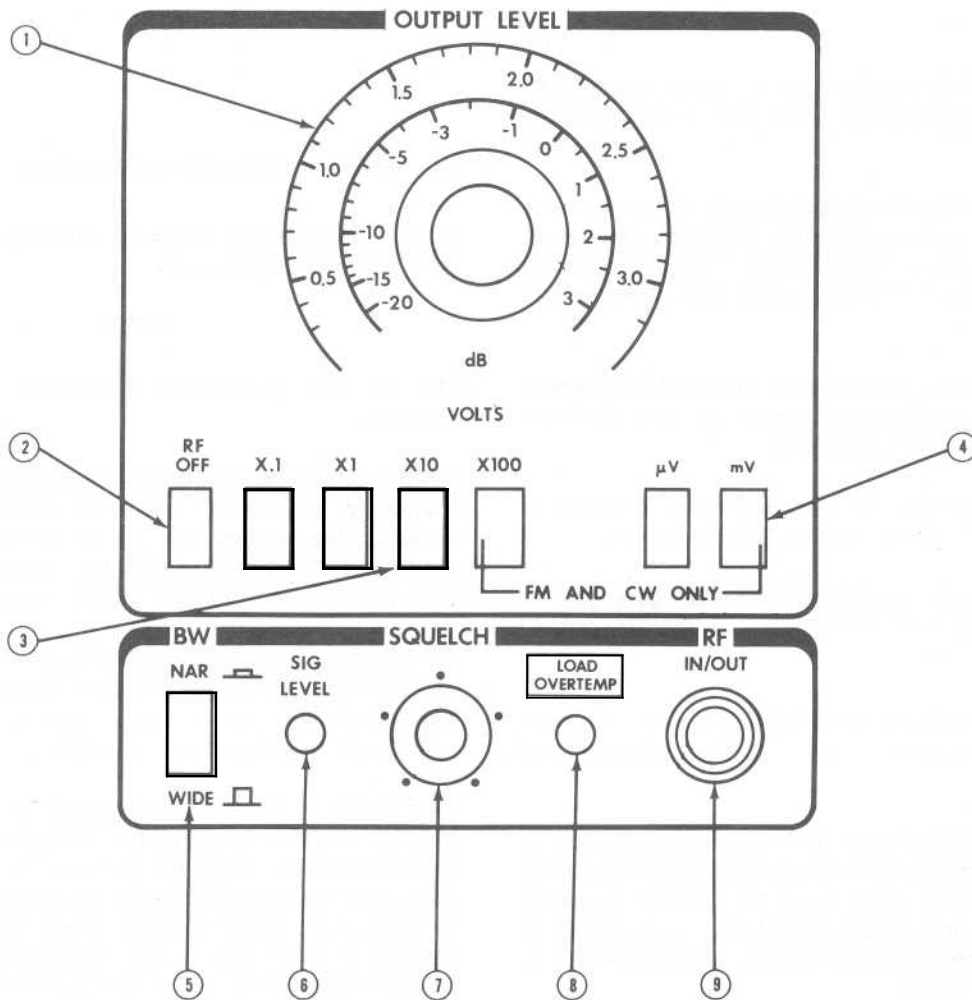


Figure 3-5. Output Level/Squelch

3.5 RF GENERATE WITH SINGLE-SOURCE FM

Select FM generate mode by pressing the front-panel GEN, MOD, and FM pushbutton switches. The kHz lamp will be lit.

To modulate using the internal synthesizer, set the desired modulation frequency via the MODULATION FREQUENCY and MODULATION FREQUENCY MULTIPLIER switches (up to 9999 Hz), and adjust the LEVEL control for the desired deviation (up to 18 kHz). For continuous modulation, the TIME control should be in its detented fully cw position. If a tone burst is desired, set the TIME control for the desired duration and press the BURST pushbutton.

For remote tone burst operation, connect a rotary-dial pulser to the INTERRUPT connector. The modulation will be disabled until the pulser enables it.

For example, to continuously modulate with a CTCSS tone of 131.8 Hz at 500 Hz deviation, set the MODULATION FREQUENCY switches to 1318, press the MODULATION FREQUENCY MULTIPLIER X.1 pushbutton, set the TIME control fully cw, press the METER RANGE 1.8 pushbutton, and adjust the LEVEL control for a 0.5 kHz METER reading.

If it is desired to turn off the modulation, but preserve the modulation settings for future use, press the OFF pushbutton.

For external FM, connect the modulating signal to the EXT IN connector and adjust the EXT LEVEL control for the desired deviation (as displayed on the METER). Disconnecting the external source disables the external FM while preserving the EXT LEVEL control setting.

FM with the internal 1 kHz modulation source is accomplished by pressing the 1 kHz pushbutton and adjusting the 1 kHz LEVEL control for the desired deviation (as displayed on the METER). Releasing the 1 kHz pushbutton disables the 1 kHz modulating signal and preserves the 1 kHz LEVEL control setting.

Voice modulation is accomplished by connecting a microphone (Shure 405K or equivalent) to the rear-panel MIC connector and speaking into it. If the RF OFF pushbutton is pressed, the microphone's "push-to-talk" switch will activate the RF output. FM deviation is internally limited to 5 kHz maximum.

3.6 RF SWEEP

The output carrier frequency may be swept over a 0 to 36 (0 to ± 18) kHz width at a sweep repetition interval of 0.01, 0.1, 1, or 10 msec.

To sweep the carrier frequency, set the instrument controls for RF generate single-source FM mode as described in Section 3.5. All internal modulation sources

should be inactive. Press the RF SWEEP/ZERO BEAT pushbutton. The sweep width is continuously adjustable via the SWEEP WIDTH/EXT LEVEL control, while the repetition rate is selected via the HORZ/SWEEP RATE pushbuttons.

3.7 RF GENERATE WITH MULTIPLE-SOURCE FM

Multiple-source FM is accomplished by setting up the modulation parameters for each modulation source individually, then simultaneously enabling them. Up to four modulation sources (MODULATION FREQUENCY SWITCHES, EXT IN connector, and 1 kHz pushbutton - each with its own LEVEL control - plus voice) can be superimposed on the RF carrier. The BURST and TIME controls, however, affect only the MODULATION FREQUENCY switch source.

3.8 RF GENERATE WITH AM

AM operation is accomplished in exactly the same manner as FM with the following exceptions:

Press the AM pushbutton instead of the FM pushbutton (the % X10 lamp will be lit).

In AM mode, the METER ranges are 18, 60, and 180% (specifications apply only to 90%).

The microphone circuitry is intended primarily for FM applications; therefore, AM is limited to approximately 16% peak.

3.9 SINAD MEASUREMENTS

Apply an RF carrier (sufficient to quiet the receiver) to the receiver under test. Modulate the RF carrier to 60% of its maximum rated FM deviation or to 30% AM (whichever applies) using the internal 1 kHz source. Connect the receiver's audio output to the EXT VERT connector. Press the VOLT pushbutton and adjust the receiver's volume control such that the METER reads the receiver's rated audio output level. Press the SINAD pushbutton (the dB lamp will be lit). Vary the CARRIER FREQUENCY switch setting to produce a minimum METER reading (this locates the center of the receiver's IF band), then adjust the OUTPUT LEVEL control such that the METER reads -12 dB (i.e., 12 dB SINAD sensitivity). Align the receiver's IF section for the optimum (minimum) reading.

NOTE

The SINAD reading is the net result of two conflicting requirements on IF alignments: sharp tuning for minimum receiver noise and wide tuning for minimum receiver distortion. Thus, IF alignment with a SINAD meter quickly optimizes these two requirements simultaneously by displaying a reading that results from both noise and distortion. The composite distortion signal may be viewed on the CRT display for analysis of the distortion source.

3.10 AC VOLTMETER

AC signals up to 18 Vpp and between 10 Hz and 100 kHz in frequency can be measured with the METER and CRT DISPLAY. Press the VOLT and appropriate METER RANGE pushbuttons and connect the signal to be measured to the EXT VERT connector. The voltage will be indicated on the METER, the signal will be displayed on the CRT DISPLAY, and may also be monitored aurally on the speaker.

3.11 RF WATT METER

RF power up to 100 W can be measured with the METER. Connect the RF source (for example, a transmitter) to the RF IN/OUT connector. When the RF source is enabled ('keyed'), the W lamp will light and the METER will read power on the watts scale.

NOTE

The internal 50 ohm load temperature alarm, consisting of the front-panel LOAD OVERTEMP indicator and the internal speaker aural alarm, will activate if the load overheats, typically after 100 W has been applied for longer than 10 seconds. If the warning signals become activated, the power applied at the RF IN/OUT connector must be interrupted (transmitter must be unkeyed) to prevent possible damage to the internal load. RF power applied to the RF IN/ OUT connector when the AC power is not on will be absorbed by the internal 50 ohm load, but the alarms will not be operative.

3.12 CRT FM/AM MEASUREMENTS

NOTE

Before making modulation measurements with the CRT, adjust the VERT POS control such that the trace is on the zero reference line. Adjust the HORZ POS control such that the trace is in the center of the screen. Adjust the INTENSITY and FOCUS controls for a sharp clear trace on the screen.

When the instrument is in receive mode and tuned to a transmitter signal, any modulation (FM or AM) can be observed and measured on the CRT display, depending on the setting of the VERT GAIN and HORZ RATE switches.

To measure FM deviation, press the FM pushbutton and set the HORZ switch to 1.0 msec/div. Press the 1.8, 6.0, or 18 kHz RANGE pushbutton, depending on the range of deviation being measured. Deviation can be measured directly on the CRT display graticule.

FM CALIB markers at ± 5 kHz or ± 0.6 kHz provide easy reading of peak deviation.

NOTE

With FM CALIB markers on, the display is time multiplexed, and therefore some decrease in display intensity and audio volume will be experienced.

To zero the trace while making measurements, press the DISC RESET button and adjust the VERT POS control.

If the received signal carrier is the same frequency as the CARRIER FREQUENCY switch setting, the CRT trace will be on the zero line of the graticule. If the input carrier frequency is above the CARRIER FREQUENCY switch frequency, the trace will be above the zero line. Calibration is set by the METER RANGE pushbuttons. The CRT display provides a convenient indication of frequency error, but the MONITOR FREQUENCY DISPLAY should be used for accurate measurements.

3.13 LISSAJOUS

The exact frequency of an external 10 to 9999 Hz CW signal or CW modulating signal on a carrier may be determined using the Lissajous function.

To use the Lissajous function, set the instrument controls for RF generate single-source FM mode (see Section 3.5). All internal modulation sources should be inactive. If the external signal is either an amplitude- or frequency-modulated carrier, connect the external signal to the RF IN/OUT connector. If the external signal is CW, connect the external CW signal to the EXT VERT connector. Press the RCV, MOD, and SUB-TONE/LISSAJOUS pushbuttons, and set the MODULATION FREQUENCY switches to the approximate frequency (if known) of the external CW signal. A rotating trace pattern will appear on the CRT DISPLAY. Adjust the LEVEL control such that the vertical and horizontal trace deflections on the CRT DISPLAY are approximately equal. Vary the MODULATION FREQUENCY switch setting while observing the CRT DISPLAY. As the MODULATION FREQUENCY switch setting approaches the frequency of the external CW signal, the rate of trace rotation will decrease. When the MODULATION FREQUENCY switch setting exactly matches the external CW frequency, the trace rotation will cease and a stable pattern will be displayed.

3.14 RELATIVE SIGNAL STRENGTH

When one of the SIG STRENGTH buttons is pressed, the length of the trace, starting at the left edge of the screen, will depend on the signal strength. That is, the stronger the signal, the farther the trace extends to the right. When the OFF button is pressed, the trace is full-width.

When the HIGH button is pressed, a full-width trace indicates a signal of approximately 100 mV; when the LOW button is pressed, a full-width trace indicates a signal of approximately 30 μ V. Dynamic range in the HIGH position is approximately 90 dB.

3.15 AUTO CALIBRATION

When the DISC RESET button is pressed, or when the SIG LEVEL lamp is not lit, the discriminator will be automatically zeroed, removing any long term drive that

has occurred. The MONITOR FREQUENCY DISPLAY will read zero. The vertical position of the CRT DISPLAY trace may be adjusted to zero using the VERT POS control.

SECTION 4

THEORY OF OPERATION

4.1 OVERALL

Refer to the block diagram, Figure 4-1. The RF phase-locked loop, on the A3 High-Frequency Synthesizer board, generates a frequency from 18 to 1021 MHz in 1 MHz steps. In generate mode, this is mixed with the output of the low-frequency PLL on board A2 to provide the output frequency. In receive mode, the low-frequency PLL operates from 17.0001 to 18.0000 MHz in 100 Hz steps. The result is an output frequency ranging from 0.4000 to 999.9999 MHz in 100 Hz steps.

In monitor (receive) mode, the output of the A3 high-frequency synthesizer is 22 MHz above the MHz digit of the front-panel frequency. This is mixed with the RF input, the difference being sent to the A4 IF board. The output of the low-frequency PLL now steps by 100 Hz from 16.7001 to 17.7000 MHz. When this is mixed with the 21 - 22 MHz output of the A1 Mixer board, the result is the constant 4.3 MHz second IF.

The second IF is mixed with 3.6 MHz to produce 700 kHz, which drives the FM discriminator, the AM detector, and the AGC. The 700 kHz is divided by 10 to drive the front-panel MONITOR FREQUENCY DISPLAY.

4.2 A10 FRONT PANEL BOARD

IC5 is a one-shot timer for the burst frequency. Grounding pin 2 starts the cycle; the length is controlled by the front-panel TIME control. The output pulse is returned via P1 pin 21. IC3 sums all the modulation sources (subtone, 1 kHz, external, and microphone). The output goes to IC6 pin 11, where it is sent on if RCV ("not receive") is high. This signal will be high (true) in generate mode.

R18, R19, and R24 form the meter range attenuator. IC1A filters out the chopping frequency when the display is in FM calibrate mode. This is the frequency that alternates the trace between the signal and the calibration lines. IC1B amplifies the signal by a factor of 2 in FM calibrate mode to compensate for the losses resulting from the chopping action.

S5A switches the audio signal in AM mode; S5B mutes the audio in CW mode; and S5C selects the proper LED.

The collector of Q2 controls the RF output of the A3 High-Frequency Synthesizer board by controlling the

power supplied to its VCO. When the OFF/MIC switch is set to MIC, the base of Q2 is grounded, turning Q2 and the RF on. When the RF OFF switch is set to OFF, the base is held at +15 V by R46, so the RF is off. Grounding the base via the push-to-talk line turns the RF on. In receive mode, GEN is high, allowing Q3 to turn on. This clamps the base of Q2 low, bypassing the OFF/MIC switch and the push-to-talk line.

4.3 A11 FREQUENCY CONTROL BOARD

The Frequency Control board reads the front-panel CARRIER FREQUENCY switches, adds offsets for transmit or receive, and time-multiplexes the frequency digits to the Frequency Synthesizer cards. It also counts the 70 kHz IF divided by 10, subtone, or modulation frequency to drive the front-panel MONITOR FREQUENCY DISPLAY.

The counter circuitry is shown on sheet 1 of the schematic. Sections of IC27, IC23, and IC28 select the input to be counted. R100 and C36 filter RF from the modulation frequency. IC21 and IC22 count the 100 Hz from the A5 board to produce a 1 second gate appearing at IC26 pin 26. IC33 is the four-decade counter. Pins 15 through 18 are the output digit bits. Pins 4 through 7 indicate which digit is enabled.

IC30 is a phase-locked loop which multiplies the subtone frequency by 10, allowing 0.1 Hz resolution with 1 second gate time. IC30 pin 4 is the VCO output. It is divided by 10 in IC31 to drive the phase comparator in IC30.

When the modulation or subtone frequencies are being counted, IC33 counts up. When frequency error is to be counted, a signal on P4 in 7 causes IC19 to set IC33 to count down. The 70 kHz signal from the 700 kHz IF is counted. Each time the counter reaches zero (after 10,000 counts) the divide-by-seven counter consisting of IC19A, IC34, and IC17 is advanced by 1. If the one-second gate expires just as IC33 reaches zero (70,000 counts), the counter will indicate zero error.

Since the IF is generated by high-side injection, a high input frequency with triple conversion will produce a low IF. Thus, if the input is 1 kHz above the switches, the count input will be 69 kHz, and the counter will count only 69,000 counts in one second. The effective starting count is 70,000, so the MONITOR FREQUENCY DISPLAY will indicate 1.00 kHz.

If the input frequency is low, the IF will be high. In this case, the seventh zero will be reached before the end of the gate time. IC27 will clock IC19B, switching the counter to count up. If the input is 1 kHz low, there will be 71,000 IF counts per second, and the counter will count up 1000 counts before the gate closes. IC32 causes the minus sign to be lit.

Sections of IC24 control decimal points and the minus sign. The back-plane drive signal (BP) is applied to both sides of the segment to be turned on. When the data line is low, the output of the exclusive-or gate is in phase with the BP frequency, so the segment is off. When the data line is high, the output is inverted, producing the alternating potential difference needed to drive the LCD segments.

Sheet 2 of the schematic shows the frequency-setting circuitry. IC1 free-runs at approximately 5 Hz. This low frequency, along with CMOS gates, minimizes switching-frequency interference in RF circuits.

The output of IC1 clocks IC2 and IC3, which form a binary counter. IC3 decodes the output of IC2 to produce four time slots, one for each of the three phase-locked loops in the instrument. (The fourth slot is not used.) Outputs of IC4 produce four subintervals, one for each of the four digits a PLL can accept. These signals are gated to produce pulses that select sections of the front-panel CARRIER FREQUENCY switches (S1A through S1G). For example, when the output of IC11 pin 4 is low, the closure of switches in S1G puts the binary-coded decimal (BCD) representation of the 100 Hz digit on the data bus, which is terminated by R40-R43. Diodes prevent interaction between switches.

IC18 is a programmable read-only memory (PROM). The BCD number from the selected switch forms part of the address for the PROM. The count from IC2/IC3 forms another part of the address, as does the REC signal from the Mother board. Each combination of bits addresses one memory location. The contents of that location represent the input digit to the PLL, with offset appropriate for generate or receive.

Outputs 0₀ to 0₃ are the BCD bits of the digit. Output 0₄ tells whether a carry is necessary to the next digit. If it is, IC16B stores the carry flag, which becomes part of the address for the next word.

For example, for a generate frequency of 396 MHz, an offset of 18 MHz is added for programming the A3 PLL. The MHz digit becomes $6 + 8 = 4$ with a carry. The 100 MHz digit becomes $3 + 1$ (carry) = 4. So the frequency sent to the synthesizers is 414 MHz.

Switches S2A through S2D for the audio synthesizer are scanned in similar fashion; however, no offsetting is required.

IC13 is a PROM which selects the appropriate frequency band. (Refer to Section 4.4 for band limits.) IC4 and IC15 latch the 100 MHz and 10 MHz digits respectively. IC16A latches the 1000 MHz digit, which can be only 0 or 1. The binary output of IC13 is decoded to decimal by IC17, which causes one of lines B1 through B6 to go low.

4.4 A3 HIGH-FREQUENCY SYNTHESIZER

The A3 High-Frequency Synthesizer board generates a frequency that ranges from 18 MHz to 1021 MHz in 1 MHz steps. The 3.6 MHz reference frequency is also generated on this board.

The heart of the high-frequency synthesizer is a voltage-controlled oscillator (VCO) adjustable between 240 and 505.5 MHz. This frequency is divided or multiplied to obtain the desired output. The VCO consists of Q2 and Q3. Emitter coupling is through the series resonance of voltage-variable capacitors CR1 and CR2, and L3. Q4 is a buffer.

There are two phase-locking paths to complete the loop. The divide-by-N loop locks the VCO to the required frequency. When it is locked, the sampling loop takes over. The sampling loop will lock only on an integral MHz frequency, but is less sensitive to noise than the divide-by-N loop.

The output of Q4 is applied to the input of bridge CR8 through CR11. The opposite corners of the bridge are driven by the output of ECL quad NOR gate IC14. The input to IC14 pin 14 is a 1 MHz square wave from the A6 card. The first two gates of IC14 square up the edges of the wave. The output of IC14 pin 8 is applied to pin 24, driving pin 2 low and pin 3 high, turning the bridge on. The input to pin 1 arrives after one gate delay, restoring the original condition. The result is that the bridge is turned on for a period equal to the gate delay, which is less than 1 nanosecond.

The current flowing through the bridge charges C42. If an integral number of RF cycles have passed since the last sampling pulse (that is, if the RF frequency is a multiple of 1 MHz), the sample will be taken at the same RF phase and the voltage on C42 will be constant; thus, the VCO frequency will be constant. If the frequency varies, the phase at sample time will vary, and so will the VCO control voltage. The design of the circuit is such that the resulting change in frequency will move the phase back toward lock.

IC13 buffers the bridge output and feeds part of the voltage back via R163. This bootstrapping varies the bridge bias as the output voltage changes, preventing the RF from cutting off the diodes and increasing the efficiency of the sampling. IC10 further buffers the control voltage. The feedback circuitry linearizes the frequency/voltage characteristic of the VCO. C37 and C38

limit the voltage swing to protect the voltage-variable capacitors.

The output of Q4 is also applied to the input of ECL divide-by-2 IC1. IC2 and parts of IC3 perform further divisions by 2. The high-frequency synthesizer operates in six bands, as shown in Table 4-1.

Table 4-1. High-Frequency Synthesizer Bands

GENERATE MODE

BAND	CARRIER FREQUENCY (MHz)	SYNTHESIZER OUTPUT (MHz)
1	0 to 11	18-29
2	12 to 41	30-59
3	42 to 101	60-119
4	102 to 231	120-249
5	232 to 481	250-499
6	482 to 999	500-1017

RECEIVE MODE

BAND	CARRIER FREQUENCY (MHz)	SYNTHESIZER OUTPUT (MHz)
1	0 to 7	22-29
2	8 to 37	30-59
3	38 to 97	60-119
4	98 to 227	120-249
5	228 to 477	250-499
6	478 to 999	500-1021

Band selection is done automatically on the A11 Frequency Control board. If band 5 is selected, the VCO output is sent directly to amplifiers Q8 and Q9, and to J1. On bands 1 through 4, sections of IC4, gated by control lines B1 through B4, select the appropriate subharmonic of the VCO frequency. The selected frequency is fed through PIN diode CR15 to Q8.

When the Frequency Control board selects band 6, PIN diodes CR16 and CR17 are shut off. CR20 and CR25 conduct, sending the VCO output to the doubler, T1 and CR21 through CR24. Q12 and Q13 amplify the doubled frequency.

The selected frequency (undoubled) is applied to the input of IC5, a divide-by-10 prescaler, and IC6, a divide-by-2. The divided-by-20 frequency is then applied to the input of IC9. This phase-locked loop receives its divisor one byte at a time from the Frequency Control board via pins 15 through 18. Each of pins 2 through 5 loads one of the bytes. The phase detector output on pin 12 is amplified by IC10A and IC10B.

When a new divisor is loaded into IC9 the loop is unlocked, and the lock output, pin 13, is low. SPDT

switch IC12 grounds the junction of R47 and R48, disabling the sampling loop. When the divide-by-N loop locks, the LOCK line goes high. IC12 switches so as to ground the junction of R41 and R42, disabling the divide-by-N loop and allowing the sampling loop to control the frequency. As long as frequency is constant, the divide-by-N loop will consider itself locked, even though it is not in control of the frequency.

The 3.6 MHz reference frequency is prescaled by IC9, which divides by 36. The 100 kHz result comes from pin 14 to IC7. This dual-D flip-flop compares the phase of the 100 kHz output of IC9 to the 100 kHz reference from the timebase on the A6 card. The output voltage is differentially amplified by IC11 to control the frequency of the VCO consisting of Q16, CR35, and L18. When band 6 is selected, IC6 divides the 3.6 MHz by 2. This is necessary because the main VCO frequency is doubled, and must change in 0.5 MHz steps.

4.5 A2 LOW FREQUENCY SYNTHESIZER

The low frequency synthesizer consists of two phase-locked loops, going from 6.60 to 7.89 MHz in 10 kHz steps and from 10.1001 to 10.1100 MHz in 100 Hz steps. The outputs are mixed to produce a frequency of from 16.7001 to 18.0000 MHz in 100 Hz steps.

Q1 and Q2 form the VCO for the low PLL. Q3 is a buffer, providing the input to IC3. PIN diodes CR8 and CR9 set the RF output level, which is controlled by the front-panel OUTPUT LEVEL control and by the AM modulating voltage. The combined level control voltage comes in via board pin 2.

Q10 switches in or out of the signal path a 20 dB pad between Q9 and Q11. This is controlled by the front-panel OUTPUT LEVEL range pushbuttons.

The output of the 10.1001 to 10.1100 MHz VCO (Q14 and Q15) is mixed by Q6 and Q18 with the 10 MHz output of the timebase generator on the A6 card. The difference, 100.1 to 110.0 kHz, is the input to IC6. The 3.6 MHz reference is divided by 100 before being divided by 36 and by 10 in IC6, yielding the 100 Hz reference frequency.

The FM modulating voltage comes in via board pin Z. Thermistor RT1 compensates for the temperature sensitivity of the modulator. The loop is designed to have a narrow bandwidth, so that it will not follow audio-frequency variations.

4.6 A1 MIXER BOARD

The Mixer board mixes the 18 to 1017 MHz signal from the A3 High-Frequency Synthesizer board with the 17 to 18 MHz signal from the A2 Low-Frequency Synthesizer board, to produce the generate output, 0.4 to 1000 MHz, or the receive 1st L.O., 22 to 1021 MHz. Most of the

output level control is performed on this board, along with the RF dummy load and its over-temperature circuitry.

The 17 to 18 MHz signal from the low-frequency synthesizer comes in J4. In receive mode (GEN high), Q21 routes the signal to the Mixer board to be the 2nd L.O. injection frequency.

In generate mode, the signal is switched as necessary through a series of 20 dB pads, controlled by the front-panel OUTPUT LEVEL MULTIPLIER pushbuttons. CR21 is turned off, so the signal goes from R103 to the mixer. The 18 to 1021 MHz from the High-Frequency Synthesizer board comes in J3, through IC7, IC8, and C33 to the high-level mixer input. The mixer output is routed along a series of PIN diode switched 20 dB pads to relays K3 and K4. K3 and K4 are normally energized, so the signal goes on to J1, the front-panel RF IN/OUT connector.

In receive mode, the incoming RF is mixed with the 18 to 1021 MHz signal. The difference signal is sent via CR21 and J1 to the A4 IF board, with CR22 biased off.

R78 and R80 form a voltage divider for the incoming RF. CR2 and CR3 detect the voltage, while the DC is buffered by IC4B. If the voltage rises above a threshold value (equivalent to about 200 mW), comparator IC4A turns Q14 off, de-energizing K3. This connects the RF input to dummy load R88, a 50 ohm 150 W resistor. R89 and C50 hold K4 closed momentarily, giving K3 time to transfer the RF to R88. This avoids requiring K4 to interrupt what may be a large current.

CR8, CR9, C10, and CR11 form a power limiter to keep the following attenuators from being damaged by the incoming RF during the brief interval before K3 de-energizes.

Switch IC2 sends to the METER whatever appears on board pin Z or P, as selected by the METER/MODE pushbuttons. When measuring power, the detected power level from IC4B turns off Q14 when the input power is greater than 200 mW, thus closing K3. The power read on the METER is selected by the WATTS X.1 and X1 pushbuttons on the A10 board. Q16 turns on the WATTS annunciator and, if in the generate mode, switches the instrument into the receive mode by grounding the cathode of CR1 on the A12 Mother board.

CR12 is physically close to R88. If R88 overheats, the voltage drop across CR12 decreases enough to raise the output of comparator IC3. This turns on the front-panel LOAD OVERTEMP annunciator, and turns off CR1. CR23 was turned off when Q14 was turned on by the RF input. These diodes had been disabling IC1; it now produces an audio tone through the speaker. When the transmitter is unkeyed, Q14 turns on, shutting off the alarm. The LOAD OVERTEMP annunciator continues to be active until R88 cools.

4.7 A4 IF AMPLIFIER

The IF Amplifier board amplifies the 21 to 22 MHz 1st IF, converts it to the 4.3 MHz 2nd IF and 700 kHz 3rd IF, and demodulates both AM and FM signals. It also produces the calibration lines on the CRT DISPLAY.

The 1st IF signal comes from the A1 Mixer board via J1. T1 is a balun which matches the input impedance of Q1. IC1 and IC2 are amplifiers with AGC which drive the mixer. The 16.7 to 17.7 MHz 2nd IF injection signal comes in to pin A to be amplified by Q2. Q3 and Q4 drive double-balanced mixer IC2, mixing the 4.3 MHz 2nd IF with the 3.6 MHz signal from the High-Frequency Synthesizer board to produce 700 kHz. The output of IC2 goes to a four-cascode cascade stage. Transistors Q14 through Q21 control the bandwidth. In the first stage, for example, when the WIDE line (pin Z) is low (narrow bandwidth), Q15 is off. The tank circuit consisting of L9 and C40 is at maximum Q, and so its minimum bandwidth. When WIDE is high, Q15 turns on, shunting the tank via R56, lowering the Q and increasing the bandwidth. This also decreases the gain, so Q14 shunts the emitter resistance to compensate.

The output of Q13 is applied to CR2 and CR3 for AM detection, while the audio is amplified by IC8. C68 filters the DC level for AGC amplifier IC3. The output of IC3 pin 1 controls the gain of IC1, while the output of pin 7 controls the resistance of PIN diode CR21 on the A1 Mixer board. To obtain the best signal/noise ratio, the attenuation by CR21 is delayed until the gain of IC1 has been reduced, thus allowing the maximum possible signal to reach IC1. (In generate mode, the GEN line turns CR21 off.)

The 700 kHz signal is also applied to IC17 via Q22. If the front-panel DISC RESET pushbutton is not pressed, the signal is applied to IC4, a one-shot frequency discriminator.

IC19 divides the output frequency by 10 to drive the MONITOR FREQUENCY DISPLAY.

To reduce temperature effects, the transistors of IC7 provide a precision voltage offset for the output of IC4. IC6 and the first section of IC13 filter out the 700 kHz component.

When the front-panel DISC RESET button is pressed, IC switch IC21 is turned on, biasing IC15 such that IC13 pin 1 is forced to zero by comparison with IC20 pin 3. At the same time, signals of 200 kHz and 500 kHz come from the A6 board timebase into board pins 6 and 7. These frequencies are mixed in IC18, filtered, and amplified by IC17. The resulting 700 kHz signal is fed via IC17 pins 1, 3, 4, and 6 to IC4. Thus, C80 charges to the voltage necessary to hold the discriminator output (IC13 pin 1) at zero with 700 kHz into the discriminator. The charge on C80 leaks off slowly, so that sustained receiver input results in a drift of approximately 20 Hz/minute. The

proper charge on C80 is re-established whenever the discriminator calibrate mode is enabled.

IC8 compares the AGC voltage with the voltage from the front-panel SQUELCH control. When the signal is strong enough, SIG is brought low. When SIG is high, that is when the receiver is squelched, Q24 gates IC12 pin 2 to put the discriminator into the calibrate mode. IC12 pin 1 is gated off when the instrument is in generate mode.

Calibration lines on the CRT DISPLAY are developed by IC9 and IC11. Positive and negative voltages from the A10 Front Panel board, selected by front-panel pushbuttons, come to board pins V and W. When CALIB (pin X) is high, IC5 free-runs to generate a chopping signal. The output of IC15 pin 15 toggles IC11 to switch between the + and - voltages. The output of IC14 pin 11, half the frequency of pin 15, toggles IC9 to switch between the output of IC11 and the FM audio. The result is a three-stage period: V+, V-, and audio. This is repeated across the CRT. When CALIB is low, IC9 selects the FM audio, unchopped.

The output of IC5 pin 1 blanks the CRT while the display is switched to avoid having vertical lines on the screen.

4.8 A5 AUDIO BOARD

The Audio board comprises the distortion analyzer for SINAD measurements, the audio-frequency synthesizer, the meter amplifier, and the circuitry that adjusts output level as frequency changes.

Audio comes in to controlled-gain amplifier IC1. CR1 rectifies the output, developing a DC voltage which is amplified by IC2A to control the resistance of Q1, which, in turn, controls the gain of IC1. This stabilizes the level at the input of IC2B, which, with IC3B, forms a 1 kHz notch filter. With the 1 kHz tone filtered out, what remains is distortion. This is amplified by IC3A to drive the METER. IC3A is quasi-logarithmic to produce a meter range of approximately 35 dB.

The 100 kHz signal from the A6 board timebase comes in via board pin H. It is divided by 100 to generate the 1 kHz tone, by 10 to generate a 100 Hz reference, and by 10 again to generate a 10 Hz reference for the audio phase-locked loop. Digits from the front-panel switches come to board pins V, W, X, and Y and are loaded into latches IC35, IC36, IC16, and IC17. These latches load on positive-going edges rather than negative, so the load pulse is the leading edge of the next pulse. IC31 through IC34 are the divide-by-N counter for the audio phase-locked loop. IC28 stretches the zero-count pulse from the divide chain to drive PLL IC15. The output of IC15 goes to the divide chain, and to IC12, IC13, and IC14. Each IC divides the frequency by 10; the output of one of them being selected in IC18 by the front-panel MODULATION FREQUENCY MULTIPLIER pushbuttons. The selected audio frequency is used as the reference input to phase-

detector IC20; the other input is the output of sinewave VCO IC19.

IC21 through IC27 form the flatness-control circuitry. The AM modulating voltage on board pin 9 is summed with a DC reference voltage in IC21B. IC21A and IC25 buffer this voltage. IC22 acts as an SPDT switch which selects either the voltage from IC21 pin 7 or the voltage at the junction of R77 and R78, thus attenuating the RF output level (via the level output voltage at board pin 4) by either 0 or 0.2 dB, respectively. IC23, IC24, IC26, and IC27 operate in the same manner to attenuate the RF output level by either 0 or 0.4, 0.8, 1.6, and 3.2 dB, respectively. The IC switches are controlled by outputs of PROM IC29. This memory, addressed by the 100 MHz CARRIER FREQUENCY switch, was programmed during factory calibration to produce flat RF output across the frequency range.

4.9 A7 DEFLECTION BOARD

The Deflection board generates the horizontal and vertical deflection signals for the CRT and separates the subtone from the audio for counting.

Vertical information (including FM calibration lines, if selected) is input to IC1 pin 5. The VERTICAL POSITION and GAIN control settings are input to IC1 pin 6. The output voltage is inverted by IC1A and drives push-pull amplifiers Q4 and Q6. Q5 and Q7 reduce the collector dissipation of Q4 and Q7, respectively. The signal also passes through IC9 and IC10, a low-pass filter cutting off at 270 Hz. The subtone output goes to the A11 Frequency Control board where it is multiplied by 10 and counted.

The METER drive comes in to board pin 17. It is amplified by IC6 and squared by Schmitt trigger IC3 to become the horizontal sync signal, triggering IC4.

Q12 is a current source charging a sweep timing capacitor on the A10 Front Panel board. IC8A amplifies the 0 to 10 V ramp to -10 to +10 V. When the ramp voltage reaches the level set by the SIG IN line, IC8 triggers auto-reset one-shot IC5A. The output of IC5A has been holding IC4 at clear, keeping Q2 off, which allows Q12 to charge the sweep timing capacitor. When IC5A is triggered, it unclears IC4. Q1 is turned on and discharges the capacitor. The output of IC8B also triggers hold-off one-shot IC5B. Until this one-shot times out, it holds IC4 and Q2 at clear, allowing the capacitor to discharge fully and return the trace to the left side of the screen.

When the hold-off times out, the next sync pulse sets IC4 and the sweep starts. If there is no input signal, IC4 will not be triggered. In this case, it will be cleared when IC5B times out, and the sweep will start regardless.

Q10 and Q11 form the blanking amplifier. If IC3 pin 3 is low, Q10 is on, Q11 is off, and the BLANK line is pulled high, cutting off the trace. If IC3 pin 3 is high, the

transistors reverse, and BLANK is grounded. The Q output of IC4 or the Z MOD input can activate blanking.

4.10 MISCELLANEOUS BOARDS

This section describes the A6 Low Voltage Power Supply, A8 High Voltage Power Supply, A9 Display, and A12 Mother boards.

The A6 Low Voltage Power Supply provides +5 V (from IC1), +15 V (from IC2), and -15 V (from IC3). Each regulator controls a series-regulating transistor, mounted on the rear panel. Q2 and Q3 are NPN, while Q1 is PNP, to allow the output voltage to be closer to the supply. R1, R6/R7, and R12/R52 are current limiters. When the current is too high, the increased voltage drop across the limiter shuts down the series transistor.

IC5 is a separate regulator for the 10 MHz temperature-compensated crystal oscillator (TCXO) timebase which establishes the frequency accuracy of the unit. Q3 buffers the timebase output, while IC6 divides the frequency by 10 to provide a 1 MHz reference. IC7 is connected as a divide-by-five counter followed by a divide-by-two. The output of the first stage provides a 200 kHz reference, while the output of the second stage provides a 100 kHz reference.

When band 6 is selected, IC8 divides the 1 MHz and 100 kHz frequencies by 2. This allows the synthesizer to take half-steps, which will be full steps when the frequency is doubled.

IC4, IC9, and IC10 encode the front-panel OUTPUT LEVEL MULTIPLIER pushbuttons to activate attenuators on the A1 Mixer board.

Q1, Q2, and IC13 limit and filter the microphone input to limit the deviation to 5 kHz.

The A8 High-Voltage Power Supply provides voltages for the CRT. IC1 controls series transistor Q2. The 15 V supply provides a reference to IC1 pin 3. R6 and R8 divide the 200 V at IC1 pin 2. R3 is a current limiter. If the current becomes too great, Q3 conducts, lowering base of Q2 and thus lowering the current. IC1 pin 6 becomes positive, turning off Q1. CR10 clamps the voltage to protect Q1.

CR5 through CR8 supply cathode and focusing voltages to the CRT. The voltage at the top of resistor string R19/R18/R17 is approximately -1200 V. This is controlled by shunting current through Q4. The +15 V provides a reference. The voltage at the junction of R28 and R30 is held at zero.

The A9 Display board contains display driver IC1, the LCD display, and LEDs indicating Hz or kHz. When P3 pin 8 is low, HZ annunciator CR1 conducts. When pin 8 is high, CR1 is off. Q1 turns on, causing KHZ annunciator CR2 to conduct.

The A12 Mother board provides most of the interconnections between boards. Q1 switches between generate and receive modes. When the instrument is in generate mode, activation of the WATTS line turns Q1 off, switching the instrument into receive mode.

The A10 board provides audio and ramp routing for automatic Lissajous and RF sweep functions.

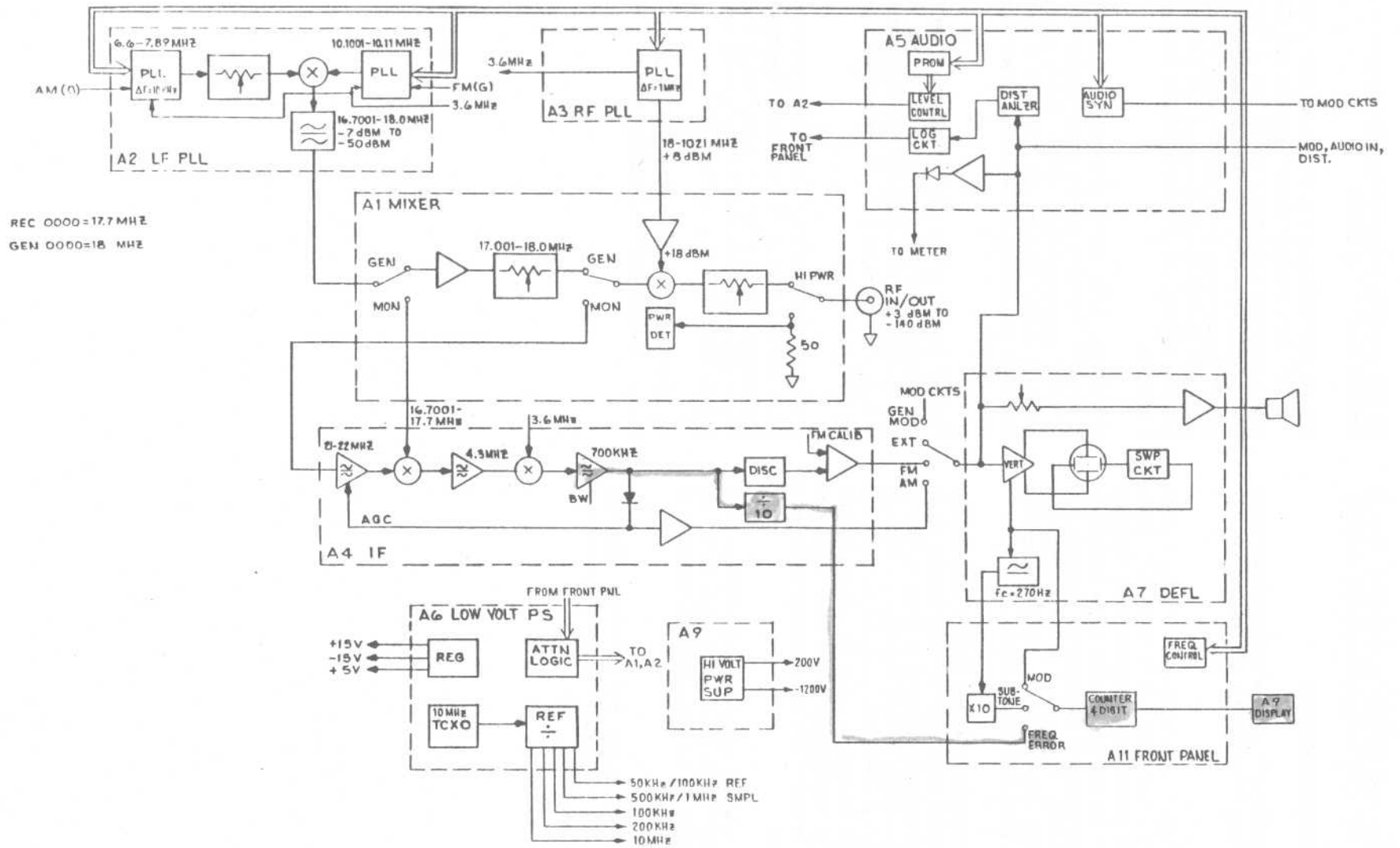


Figure 4-1. Block Diagram
4.7

SECTION 5

MAINTENANCE

5.1 INTRODUCTION

This section provides information for disassembling, testing, calibrating, and troubleshooting the Model 3000B Service Monitor. Measurements and adjustments will be facilitated by placing the instrument so that the front panel faces the user.

5.2 SERVICE AND MAINTENANCE INFORMATION

5.2.1 IN-FIELD SERVICE

The Model 3000B features modular PC board construction for convenient servicing. Should a problem arise, contact the Customer Service office for assistance (see Section 2.2). A replacement board will be shipped immediately. When you are satisfied the problem has been corrected, return the defective board.

5.2.2 DISASSEMBLY INFORMATION

WARNING

High voltages are used within this instrument. Before servicing, remove AC power from the instrument.

To remove the instrument top cover, remove the six screws (three on each side) securing the top cover and lift the cover off.

To remove the instrument bottom cover, invert the instrument, remove the six screws (three on each side) securing the bottom cover and lift the cover off.

To remove the high voltage shield, remove the top cover and then remove the seven screws securing the shield. Carefully lift the shield straight up.

Removal of the Front Panel assembly provides access to PC boards A9, A10, and A11, mounted on the front panel.

To remove the Front Panel assembly, remove the top and bottom covers. Stand the instrument on its rear feet. Remove the INTENSITY and FOCUS control knobs. Disconnect the three ribbon cable assemblies on the under side of the instrument. Disconnect the POWER switch harness. Disconnect 2 pin connector to Mother board, and 4 pin connector to Mother board (early versions). Disconnect coaxial cable W1 from the A1 board (SMB

connector). Remove the handle by unscrewing the two black knobs securing the handle to the chassis side rail. Remove the four screws (two each side) securing the front-panel brackets to the chassis side rail. Carefully lift the Front Panel assembly straight up from the instrument.

The top cover, bottom cover, high voltage shield, and Front Panel assembly are reinstalled by reversing the removal procedure.

5.2.3 PLUG-IN PC BOARD SERVICING

Refer to Figure 5-1.

To remove boards A1 through A4, remove the instrument top cover. Disconnect the connection coaxial cable(s), remove the phillips head screws securing the board to the card cage and pull (do not turn) the knurled knobs. Lift the board straight up from the instrument.

Before reinstalling a board, check the board's gold "fingers" and the Mother board (A12) edge connector. Carefully replace the board into its Mother board edge connector and reverse the removal procedure.

NOTE

Harness connectors are not keyed. Note the connector orientation before disconnecting.

3000B PERFORMANCE TEST

TABLE OF CONTENTS

5.3 PERFORMANCE TEST

5.3.1 INTRODUCTION

5.3.2 REQUIRED TEST EQUIPMENT

5.3.3 NOMENCLATURE AND TEST NOTES

5.3.4 TEST DEFINITION

I. VISUAL INSPECTION

A. External Hardware Inspection

II. VOLTAGE REQUIREMENT

A. Regulation

III. SYSTEM TIME BASE

A. Accuracy

IV. AUDIO SECTIONS

A. Voltmeter/Scope Calibration/Audio Section

B. SINAD

V. HIGH FREQUENCY SYNTHESIZER

A. Lock Requirements

VI. GENERATOR FUNCTIONS

A. Residual FM

B. FM Deviation Accuracy

C. FM External Mod. Input

D. AM Modulation Distortion

E. AM External Mod. Input

F. Microphone Operation

G. RFI Test

H. Special Purity (Non-Harmonic)

VII. RECEIVER

A. Sensitivity

B. Receiver Bandwidth

C. Offset

D. FM Markers

E. FM Deviation Accuracy

F. AM Modulation Accuracy

G. Relative Signal Strength Accuracy

VIII. POWER METER AND POWER PROTECTION FUNCTIONS

A. Reverse Power Protection

B. Load Overtemp Alarm

C. Power Meter Accuracy

IX. GENERATOR OUTPUT LEVEL

A. Output Level Accuracy

X. AC SCOPE COUPLING

XI. ZERO BEAT

5.3.5 PERFORMANCE TEST RECORD

5.3.6 DIAGRAMS

SECTION 5.3.1

3000B

PERFORMANCE TEST

5.3.1 INTRODUCTION

The purpose of the performance test in the following section is to verify that the Service Monitor meets its published specifications (Section 1.2) Individual performance tests consist of: the specification to be verified, the method of testing, a list of equipment required, and a detailed test procedure.

Critical specifications for each item of test equipment are listed in Section 5.3.2, Recommended Test Equipment. Except as detailed, settings of test equipment apply to performance test procedures. All other test equipment operating details are omitted.

The Service Monitor should have its bottom cover installed for the performance test. Before applying power to the Service Monitor, see Section 2 for details of electrical installation. The line voltage should be maintained at 115 or 230 volts, $\pm 10\%$, 50 to 60 Hz $\pm 5\%$ throughout the test. The performance test procedures are begun after a 15 minute minimum warmup of the Service Monitor in a $+20^{\circ}$ to $+30^{\circ}\text{C}$ ambient temperature range.

A copy of the Performance Test Record (PTR) is provided at the end of this section for convenience in recording the performance of the Service Monitor during performance tests. It can be filled out and used as a permanent record for incoming inspection, or it can be used as a guide for routing performance testing. The PTR lists the section, test, and specification limits. All tests refer to this record.

5.3.2 REQUIRED TEST EQUIPMENT

A. AT THE BENCH

The following equipment should be at unit technician's bench during the performance test procedure.

1. Standard Generator: A Wavetek Model 3010 referenced to 10 MHz house standard.
2. DVM: A Fluke Model 8010 or equivalent type DVM.

3. Variable frequency audio function generator: Wavetek Model 180/182 or equivalent.
4. Frequency Counter: Hewlett Packard Model 5383 or Mid State Model CM 1000 or equivalent referenced to 10 MHz house standard.
5. SINAD Test Set: Helper Instruments Model S101 and accompanying interconnect devices.
6. AC Line Monitor: VIZ or equivalent.
7. VARIAC and 240 V outlet.
8. RF Simulation box.
9. Standard Mobile Microphone.
10. Loop Probe (see Diagram 2).
11. Coaxial Termination 50 ohm (HP 908A) or equivalent.
12. Oscilloscope: Tektronix 2213 or equivalent.

B. TRANSPORTABLE EQUIPMENT

The following equipment should be available to the unit technician and remain in the area aboard a rolling transport device with appropriate cables.

1. Spectrum Analyzer: Hewlett Packard Model 8558.
2. Modulation Analyzer: Hewlett Packard Model 8901.
3. RF Power Source: RF power cart with VHF and UHF high and low power source and wattmeter.
4. Amplifier: Hewlett Packard Model 8447D (.1-1300 MHz, 26 dB), 2 needed.

5. Audio Analyzer: HP 8903A or equivalent.

C. PORTABLE EQUIPMENT

The following equipment should be in the unit test area, available for spot test and as a part of calibration.

1. VHF and UHF hand-held radio and cables.

D. PERMANENT LOCATION FINAL TEST EQUIPMENT

1. 3000B ATS

- a. Hewlett Packard Model 9816 Computer
- b. Hewlett Packard Model 82901M Disc Drive
- c. Hewlett Packard Model 2671G Printer
- d. Hewlett Packard Model 8568A Prog. Spectrum Analyzer
- e. Hewlett Packard Model 436A Power Meter
- f. Hewlett Packard Model 8447D Amplifier (.1-1300 MHz 26 dB)
- g. Hewlett Packard Model 8496A 110 dB attenuator (Cal'd DC-4 GHz)
- h. Marconi Model 2019 Signal Generator (programmable)
- i. DATA I/O Model 29A PROM PROGRAMMER (or equivalent)
- j. Comtest 3000B Software Verification Package

5.3.3 NOMENCLATURE AND TEST NOTES

1. "Standard Generator" refers to Wavetek Model 3010 referenced to 10 MHz house standard.
2. "Standard Counter" refers to frequency counter referenced to 10 MHz house standard.
3. "Unit" refers to 3000B under test.
4. On the data sheet, blanks are provided for recording data. Data from test must appear in blanks. The information following the blanks $\pm .01V$ indicate the tolerance.

The parenthesis preceeding the blanks: (5.00V) indicate perfect readings (not always shown).

Blanks followed by no reading indicate that no specification or tolerance is defined, therefore proper operation is indicated by placing a check mark in the blank.

5.3.4 TEST DEFINITION

I. VISUAL INSPECTION

A. External Hardware Inspection

1. Visual inspection should include "testing"

with a screwdriver, or other appropriate tool, of screws, nuts, or other tightened type of hardware that is suspected of being loose.

- a. Front panel and front panel hardware; check for cosmetic misfeatures such as marks or scratches visible from arms length. Check for properly tightened knob set screws and appearance of knobs and meter. Check for readable scope graticule. Check for feel of buttons. Check on PTR.

II. VOLTAGE REQUIREMENTS

A. Regulation

1. EQUIPMENT: Variac; AC line monitor. Set Variac to 104 VAC as read on AC line monitor.
 - a. Check that unit is in regulation* as indicated on unit oscilloscope. Check on PTR.
 - b. Set Variac to 126 VAC as read on AC line monitor. Check that unit is in regulation as indicated on unit oscilloscope. Check on PTR.

*Deregulation will show up on scope as wobble, spikes, or both. Become familiar with what is typical of well-regulated pattern and what is typical of poor regulation.

III. SYSTEM TIME BASE

A. Accuracy

1. EQUIPMENT: Standard generator, set to 852.35 MHz no mod, at 1 mV out. UNIT: 852.35 MHz, RCV, FM, BW NAR, MOD & FREQ ERROR Mode.
 - a. Cable 10 MHz out on rear panel to standard counter. Check that counter reads 10.000000 MHz ± 4 Hz. Record on PTR.
 - b. Cable standard generator output to unit RF IN/OUT jack. Check freq. error, as read on LCD counter ± 400 Hz. Record on PTR.
 - c. Change standard generator and unit to 52.35 MHz. Check error ± 20 Hz. Record on PTR.

IV. AUDIO SECTIONS

A. Voltmeter/Scope Calibration/Audio Section

1. EQUIPMENT: Function Generator, DVM. UNIT: Set to GEN mode; VOLT and 1.8 RANGE in METER/VERT section; MOD in monitor frequency section; FM; AUDIO SYNTHESIZER OFF; ZERO BEAT OFF and 1 kHz OFF in modulation section; FM Calibrate OFF, and SIGNAL STRENGTH OFF, in scope section. Set Function Generator to 100 kHz, 1.06 VRMS and cable to unit EXT VERT.

a. Check that meter indicates 1.5V peak \pm .075V. Record on PTR. Check that scope reads 1.5V peak \pm .075V. Record reading of scope on PTR.

2. EQUIPMENT: DVM set up for AC RMS, mV range. UNIT: Audio synthesizer in X1 and CONT MODE.

a. Cable MOD OUT to DVM. Adjust audio synthesizer level to read 200 mV on DVM. Remove cable from DVM and cable mod out to EXT VERT. Check that audio LED is lit. Check on PTR.

3. EQUIPMENT: Same as 2A. Set up same. UNIT: Change to RCV mode.

a. By changing audio synthesizer frequency, verify the following frequencies on the LCD counter \pm 1 Hz. 1) 1000 2) 2123 3) 3234 4) 4345 5) 5456 6) 6567 7) 7678 8) 8789 9) 9899 10) 9999. Record on PTR.

4. EQUIPMENT: Same as 3a. Set up same. UNIT: Audio synthesizer in X .1 range. Change to SUBTONE (synthesizer in .01 or .1 range respective to frequency) in monitor freq. section.

a. Cable MOD OUT to DVM with unit audio synthesizer to 100 Hz and adjust level to read 750 mV on DVM. Cable MOD OUT to EXT VERT. By changing audio synthesizer frequency verify the following frequencies on LCD counter \pm .1Hz. 1) 60 2) 71 3) 82 4) 93 5) 124 6) 145 7) 166 8) 187 9) 238. Record on PTR.

5. EQUIPMENT: Same as 4a. UNIT: Audio synth off, 1 kHz fixed on.

a. Cable MOD OUT to DVM. Switch to GEN mode. Check that full CW on 1 kHz fixed source pot yields $>$ 1.0 VRMS. Turn off 1 kHz fixed source and activate audio synthesizer X1 and check that full CW on audio

synthesizer pot yields $>$ 1.0 VRMS. Check on PTR.

6. EQUIPMENT: Unit only. UNIT: Turn off audio synthesizer. Activate 1 kHz fixed source, scope, X1 (ms/div).

a. Adjust 1 kHz level to obtain 6 kHz on range 18. Adjust VERT position so that peaks of audio sinewaves are lined up along center horizontal line of scope graticule. Make sure horizontal RATE is in CAL position. Adjust horizontal position so that 1 peak aligns with center vertical line. Check that each peak aligns with each mark along horizontal center line \pm 1 cycle. Check on PTR.

B. SINAD

1. EQUIPMENT: DVM, A BNC male to cable. UNIT: SINAD mode.

a. Cable MOD OUT to DVM. Adjust 1 kHz fixed source to 1 VRMS. Cable MOD OUT to EXT VERT. Check that meter reads less than -20dB. Record reading on PTR.

b. Cable MOD OUT to EXT VERT. Switch to MOD mode. Adjust 1 kHz level to obtain 10 kHz on unit meter (x18 range). Switch off 1 kHz source. Activate audio synthesizer in X1, 3333 Hz. Adjust synthesizer level to obtain 2.5 kHz on meter (x6 range). Switch on 1 kHz source. Switch to SINAD mode, and check for a meter reading of -12 dB (\pm 1dB). Record on PTR.

V. HIGH FREQUENCY SYNTHESIZER

A. Lock Requirements

1. UNIT only.

a. Verify lock by watching A3 LED (LED OFF indicates lock) at the following frequencies: (lock should occur within 3 seconds of frequency change).

11 to 101 MHz (in 10 MHz steps), 100 to 260 MHz (in 20 MHz steps), 260 to 500 MHz (in 30 MHz steps), 499 to 999 MHz (in 100 MHz steps). Check in GEN & REC. Check on PTR.

VI. GENERATOR FUNCTIONS

A. Residual FM

1. EQUIPMENT: Hewlett Packard mod analyzer. Set up mod analyzer as follows: 3 kHz LP filter and 300 Hz HP filter on, FM mod and average. UNIT: in GEN, MOD, 100 mV, CW.

- a. Cable RF IN/OUT to mod analyzer input. Set unit frequency to 452.35 MHz. At 100 mV level, read residual FM on mode analyzer. Should read less than 100 Hz. Record on PTR. Cable RF IN/OUT to mod analyzer input. Set unit frequency to 852.35 MHz. At 100 mV level read residual FM on mod analyzer. Should read less than 100 Hz. Record on PTR.

B. FM Deviation Accuracy

1. EQUIPMENT: Hewlett Packard mod analyzer. UNIT: Activate 1 kHz fixed source. Put in RANGE 6. Turn off audio synthesizer.

- a. Adjust 1 kHz level on front panel to read 5 kHz on meter and scope. Cable RF IN/OUT to mod analyzer input. Change mode analyzer to RM average. Check that mod analyzer reads 3.54 kHz average $\pm 10\%$ or .35 kHz. Record on PTR.

C. FM External Mod Input

1. EQUIPMENT: External variable audio source. DVM. UNIT: Turn off 1 kHz fixed source.

- a. With external audio source at approximately 1 kHz cable to EXT IN, adjust EXT LVL Pot full CW. Adjust level on external audio source to obtain a reading on the meter at 5 kHz. Remove cable from EXT IN and connect to DVM. Reading should be less than 500 mVRMS. Check on PTR.

D. AM Modulation Distortion

1. EQUIPMENT: Hewlett Packard Audio Analyzer and Hewlett Packard Modulation Analyzer. UNIT: Switch to AM. Remove external audio source and activate 1K fixed source, frequency 52.350 MHz. Unit output at X10 mV, 1.5 on DIAL (15 mV). Turn on 3 kHz LP filter; and 300 Hz HP filter on mod analyzer.

- a. Adjust 1 kHz fixed source level to obtain 90% modulation as read on modulation analyzer. See Diagram 1, check audio analyzer reads less than 10% distortion. Record on PTR.

- b. Repeat Step a., at 952.350 MHz. Record on PTR.

E. AM External Mod Input

1. EQUIPMENT: External audio source set for 1 kHz sinewave. DVM. UNIT: Turn off 1 kHz fixed source.

- a. Cable external audio source to EXT IN. Adjust EXT LVL pot full CW. Adjust external audio source level to obtain reading of 85% on the meter. Remove cable from EXT IN and connect to DVM. Reading should be less than 1.0V RMS. Check on PTR.

F. Microphone Operation

1. EQUIPMENT: Standard mobile microphone, VHF & UHF hand-held radios. UNIT: 1 kHz fixed source off, FM mode, RF/OFF button in.

- a. Insert standard mobile microphone into mic jack on rear panel. Cable RF IN/OUT to VHF radio antenna jack. Change unit frequency to VHF radio frequency. Depress standard microphone PTT switch and whistle into mic. Monitoring audio on VHF radio and observing mod on unit scope, check that mod is clean, and that when PTT is released generation ceases. Check on PTR.

G. RFITest

1. EQUIPMENT: Spectrum analyzer, wide-band amplifiers, coaxial termination 50 ohm, 50 ohm load, loop probe.

- a. Connect spectrum analyzer, wide band amplifiers and loop probe as shown in Diagram 3. Set spectrum analyzer with display line at a reference level of greater than -137 dBm \wedge . Set 3000B for .3 μ V RF out, with 10 MHz and RF IN/OUT jacks terminated into 50 ohm loads. At 252.350 MHz, set the spectrum analyzer:

- | | |
|-------------|---------|
| 1. Res. BW | 100 Hz* |
| 2. Video BW | 1 Hz* |
| 3. Span | 2 kHz* |
| 4. DB/DIV | 5 dB* |

* = Recommended setting

- b. Move the loop probe over the surfaces of the instrument with the two-turn loop at a one inch distance. The signal plus noise should be less than .03 μ V or (-137 dBm). Record the maximum reading on the PTR.
- c. Repeat steps a & b at 952.35 MHz. Record the maximum reading on the PTR.

^ This reading taken in a screen room which provides shielding from stray frequencies. The noise floor reading will vary if not taken in a protected environment.

H. Spectral Purity (Non-Harmonic)

1. EQUIPMENT: Spectrum Analyzer, wide-band amplifier (Stepd only)

- a. Connect spectrum analyzer and unit as shown in Diagram 4. Set 3000B for +3 dBm output at 52.35 MHz and set the spectrum analyzer:

- | | |
|-------------|----------|
| 1. Res. BW | 3 kHz* |
| 2. Video BW | 100 Hz* |
| 3. Span | 600 kHz* |
| 4. DB/DIV | 10 dB* |

*Recommended Settings

- b. Check for non-harmonic signals < -40 dBc within ± 300 kHz of the selected carrier frequency. Check on PTR.

- c. Repeat step a & b for the following frequencies. Check on PTR.

1. 152.35 MHz
2. 252.35 MHz
3. 352.35 MHz
4. 452.35 MHz
5. 552.35 MHz
6. 652.35 MHz
7. 752.35 MHz
8. 852.35 MHz
9. 952.35 MHz
10. 999.35 MHz

- d. Repeat step a through c with wide-band amplifier installed and 3000B set to -57 dBm. Check on PTR.

VII. RECEIVER (MONITOR MODE)

A. Sensitivity

1. EQUIPMENT: Sinadder test fixture; standard generator. UNIT: RCV mode, FM, BW NAR, SQUELCH open, RANGE 6 and MOD in meter/vert section, MOD in frequency section.

- a. With unit and standard generator at 152.35 MHz, cable standard generator to unit RF IN/OUT jack. Set standard generator to 2 μ V output level and 3 kHz deviation using 3010's internal 1 kHz source. Cable sinadder to speaker terminals of unit. Turn volume control to at least 3/4 volume level.

*Lower or raise generator output to achieve 10 dB on sinner meter. Read 10 dB SINAD sensitivity on standard generator's dial and meter. Record on PTR. Repeat process following * for 452.35 MHz and 852.35 MHz. Record on PTR.

B. Receiver Bandwidth

1. EQUIPMENT: Standard generator, oscilloscope. UNIT: BW NAR, FM, RANGE 18.

- a. Set standard generator, to 3 kHz deviation of the internal 1 kHz source. Connect standard generator output to unit input with 152.35 MHz frequency on both. Connect oscilloscope to DEMOD OUT on unit. Standard generator output level to -30 dB. Increase the 1 kHz deviation to a point where the sinewave starts to distort on the oscilloscope. Note deviation level on the standard generator. < 15 kHz, record on PTR.

- b. Repeat step a, except with unit in WIDE. < 100 kHz, record on PTR.

C. Offset

1. Remove Input from unit. Change to RANGE 18. Set SQUELCH to threshold.

- a. Press DISC/REST and zero scope trace, then press GEN. Offset should be ± 1 DIV of zero. Repeat for all 3 ranges (18, 6, 1.8). Check on PTR.

D. FM Markers

1. UNIT: Set to RCV, FM, BW NAR, RANGE 6 and MOD; SQUELCH, tight.

a. Activate 5 kHz markers. Check that markers indicate ± 5 kHz. Check on PTR.

b. Activate 600 Hz markers. Check that markers indicate ± 600 Hz at range 1.8. Check on PTR.

E. FM Deviation Accuracy

1. EQUIPMENT: Standard generator; HP mod analyzer. Turn on 3 kHz LP and 300 Hz HP filters, set to FM avg. UNIT: Set SQUELCH to threshold RANGE 6.

a. Set unit and standard generator to 452.35 MHz. Set standard generator output to 100 mV. Cable standard generator output to HP mod analyzer. Adjust standard generator deviation to read 3.54 kHz avg on mod analyzer. Cable standard generator output to unit RF IN/OUT jack. Check that unit meter and scope read 5 KHz $\pm 10\%$ of full scale. Record on PTR.

F. AM Modulation Accuracy

1. EQUIPMENT: Standard generator; HP modulation analyzer. UNIT: Change to AM mode, RANGE 6. 452.35 MHz, BW NAR.

a. Cable standard generator into mod analyzer. Activate standard generator internal audio. Set standard generator to 452.35 MHz 100 mV out. Adjust modulation to read 21.2% average. Cable standard generator output into unit RF IN/OUT jack. Change standard generator output to 10 mV. Check that unit reads 30% modulation, on unit meter and scope $\pm 10\%$ of full scale. Record on PTR.

G. Relative Signal Strength Accuracy

1. EQUIPMENT: Standard generator – no modulation set to 452.35 MHz. UNIT: FM mode, SQUELCH open, RANGE 6, 452.35 MHz.

a. Set standard generator to 30mv output. With SIGNAL STRENGTH, adjust horizontal position so that beginning of trace (left side) is aligned with the left edge of the scope graticule. Switch unit to LOW SIGNAL STRENGTH mode. Check that trace is at \approx full deflection. Check on PTR. Change standard

generator output to 100mv. Switch unit to HIGH SIGNAL STRENGTH mode. Check that trace is at \approx full deflection. Check on PTR.

VIII. POWER METER AND POWER FUNCTIONS

A. Reverse Power Protection

1. EQUIPMENT: RF simulation box. UNIT: Switch to GEN mode.

a. Cable RF simulation box to unit RF IN/OUT jack. Press activate button on RF simulation box and check that unit switches from GEN to RCV and WATTS mode (simulates 200 mW). Check on PTR.

B. Load Overtemp Alarm

1. EQUIPMENT: Power Cart

a. Key in VHF 100 watts. Check that load overtemp LED and alarm are activated ≥ 10 seconds. Check on PTR.

C. Power Meter Accuracy

1. EQUIPMENT: Power Cart. UNIT: Change to each power tx frequency.

a. Cable VHF (150 MHz) power into unit. Key in 25 watts. Check unit power meter accuracy $\pm 10\%$ of full scale. Change to VHF 100 watts. Check accuracy of unit wattmeter $\pm 10\%$ of full scale. Cable UHF (450 MHz) power into unit. Key in 10 watts and check accuracy of meter $\pm 10\%$ of full scale. Record on PTR.

IX. GENERATOR OUTPUT LEVEL

A. Output Level Accuracy

1. See ATS printout.

X. AC SCOPE COUPLING

1. EQUIPMENT: Standard generator, set to 152.35 MHz @ 1 mV. UNIT: RCV 152.35 MHz, FM FREQ ERROR, SQUELCH OPEN, RANGE 6.

a. Center scope trace on unit. Offset standard generator by 3 kHz. Pull AC coupling knob. Check that trace centers. Check on PTR.

XI. ZERO BEAT OPERATION

1. EQUIPMENT: Standard generator set to 452.35 MHz @ 1 mV. UNIT: RCV, FM, FREQ ERROR, MOD, ZERO BEAT. Set frequency to 452.35 MHz.

- a. Cable standard generator to unit RF IN/OUT jack. Offset frequency 5 kHz in 1 kHz steps. Check that scope indicates 1 kHz step changes and sine wave and tone are present. Check on PTR.

NOTE: On 3000B units, ZERO BEAT cannot be used in subtone or LISSAJOUS mode.

QUALITY CONTROL TESTING
COMPLETED.

Section 5.3.5

3000B

PERFORMANCE TEST RECORD

PERFORMANCE TEST RECORD

Serial # _____

Date # _____

Tech # _____

I. VISUAL INSPECTION

A. External Hardware Inspection

8 _____ 9 _____ 10 _____

1a. Front panel hardware & appearance _____

4a. Subtone filter response and frequency accuracy: 60 to 238 Hz \pm .1 Hz

II. VOLTAGE REQUIREMENTS

A. Regulation

1 _____ 2 _____ 3 _____

1a. Regulation (104VAC) _____

4 _____ 5 _____ 6 _____

1b. Regulation (126VAC) _____

7 _____ 8 _____ 9 _____

III. SYSTEM TIME BASE

A. TCXO Accuracy

5a. Audio sources max output fixed _____

1a. TXCO error 10.000000 MHz _____ \pm 4 Hz

Audio sources max output synth. _____

1b. RCV frequency error 852.35 MHz _____
 \pm 400 Hz

6a. Scope sweep rate adjusted _____

1c. RCV frequency error 52.35 MHz _____
 \pm 20 Hz

B. SINAD

1a. Notch Range _____ $<$ -20 dB

1b. Accuracy (-12 dB) _____ \pm 1 db

IV. AUDIO SECTIONS

A. Voltmeter/Scope Calibration Check

V. HIGH FREQUENCY SYNTHESIZER

A. Lock Requirements

1a. 1.5 V peak measurement meter (1.5V) _____
 \pm .075V

1a. A3 lock through range _____

1.5 V peak measurement scope (1.5V) _____
 \pm .075V

VI. GENERATOR FUNCTIONS

A. Residual FM

2a. Audio in LED w/200 mV _____

1a. Residual FM 450 MHz _____ $<$ 100 Hz

Residual FM 850 MHz _____ $<$ 100 Hz

3a. 1000 to 9999 Hz Audio Synthesizer \pm 1 Hz

B. FM Deviation Accuracy

1a. 5 kHz Generator deviation accuracy (3.5 kHz average) \pm .35 kHz (10%) 3.19 to 3.89

1 _____

2 _____ 3 _____ 4 _____

5 _____ 6 _____ 7 _____

C. FM External Mod. Input

1a. 5 kHz on meter less than 500 mV RMS _____

D. AM Modulation Distortion

1a. AM Distortion @ 52.35 MHz _____ < 10%

1b. AM Distortion @ 952.35 MHz _____ < 10%

E. AM External Modulation Input

1a. 85% Modulation less than 1.0 VRMS _____

F. Microphone Operation

1a. RF/OFF Operation _____

G. RFI Test

1. Leakage at 252.350 MHz ≤ -137 (.03 μ V)

Leakage at 952.350 MHz ≤ -137 (.03 μ V)

H. Spectral Purity

	(+ dBm)	(-57dBm)
1. 52.35MHz	_____	_____
2. 152.35MHz	_____	_____
3. 252.35MHz	_____	_____
4. 352.35MHz	_____	_____
5. 452.35MHz	_____	_____
6. 552.35MHz	_____	_____
7. 652.35MHz	_____	_____
8. 752.35MHz	_____	_____
9. 852.35MHz	_____	_____
10. 952.35MHz	_____	_____
11. 999.35MHz	_____	_____

B. Receiver Bandwidth

1a. Narrow band mod acceptance bandwidth
152.35 MHz _____ < 15 kHz

1b. Wide band mod acceptance bandwidth
152.35 MHz _____ < 100 kHz

C. Offset

1a. Disc. Reset on GEN offset (within 1 div
zero) _____

D. FM Markers

1a. FM 5 kHz marker (5 kHz) _____

1b. FM 600 Hz marker (600 Hz) _____

E. FM Deviation Accuracy

1a. FM 5 kHz accuracy adjustment (5 kHz) scope
_____ ± 500 Hz $\pm 10\%$

FM 5 kHz accuracy adjustment (5 kHz) meter
_____ ± 500 Hz $\pm 10\%$

F. AM Modulation Accuracy

1a. AM 30% modulation adjustment (30%) scope
_____ $\pm 10\%$

AM 30% modulation adjustment (30%) meter
_____ $\pm 10\%$

G. Relative Signal Strength Accuracy

1a. Low signal adjustment \approx full deflection

High signal adjustment \approx full deflection

VII. RECEIVER - MONITOR MODE

A. Sensitivity

1a. Narrow band sensitivity

152.35 MHz _____ $\leq 2 \mu$ V

452.35 MHz _____ $\leq 2 \mu$ V

852.35 MHz _____ $\leq 2 \mu$ V

VIII. POWER METER AND POWER PROTECTION FUNCTIONS

A. Reverse Power Protection

1a. 200 mW system switch _____

B. Load Overtemp Alarm

1a. VHF 100 watt alarm activation (≥ 10 sec.) _____

C. Power Meter Accuracy

1a. 25 watt VHF _____ $\pm 10\%$ full scale

100 watt VHF _____ $\pm 10\%$ full scale

10 watt UHF _____ $\pm 10\%$ full scale

XI. OUTPUT LEVEL ACCURACY

A. See ATSPrintout

X. AC SCOPE COUPLING

1a. Center W/Freq. Offset _____

XI. ZERO BEAT

1a. Sine wave and tone. _____

Section 5.3.6 3000B DIAGRAMS

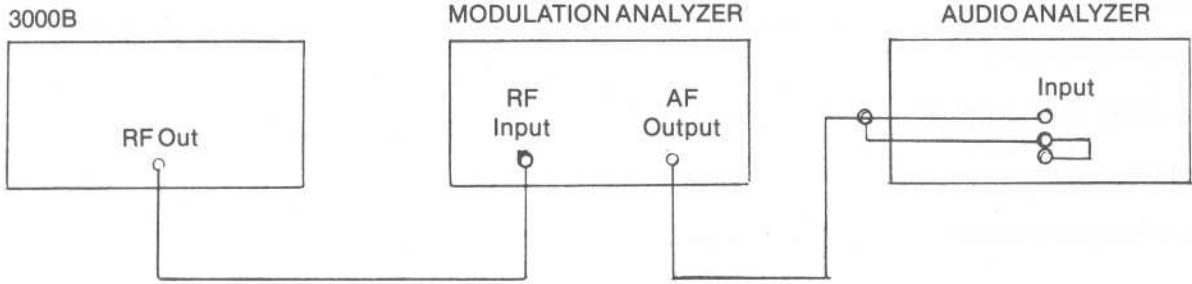


Diagram 1

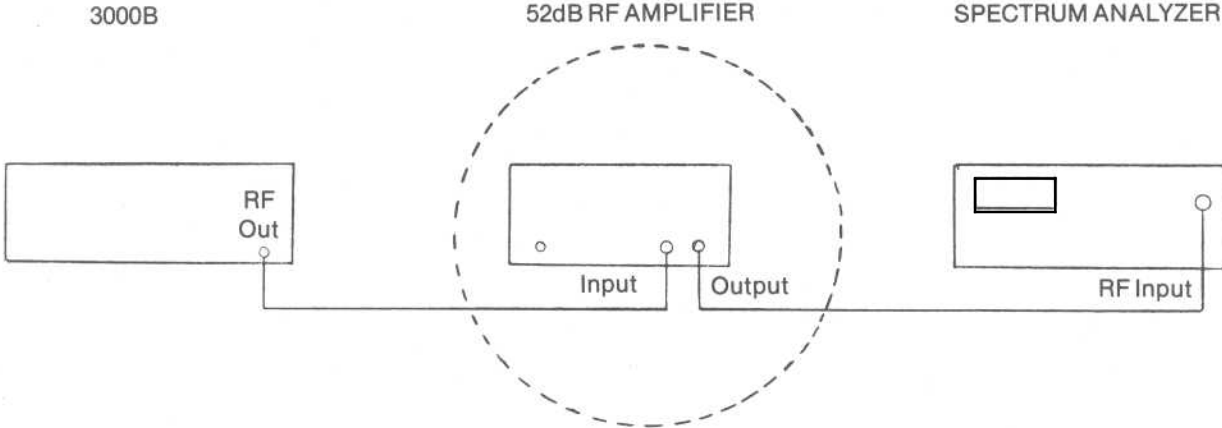


Diagram 4

Section 5.3.6

3000B

DIAGRAMS

1. Rexolite Rod: 1.25 in. dia. by 11 in.
2. Hole: 1.00 in. dia. by 0.80 in. deep.
3. Groove: 0.120 in. wide by 0.125 in. deep 1.00 in. from end of rod.
4. Coaxial Cable: (RG-174/U) 0.110" in. by 19.0 in. long. Strip shield for 7.0 in. and cut off shield to 1/4 in. length. Strip insulation from center conductor 1/4 in. Wind 2 turns of insulated center conductor in groove of rod. Solder shield to center conductor and insulate the solder joint.
5. Wind mylar tape around the two-turn loop and around the rod (three places).
6. BNC male connector.

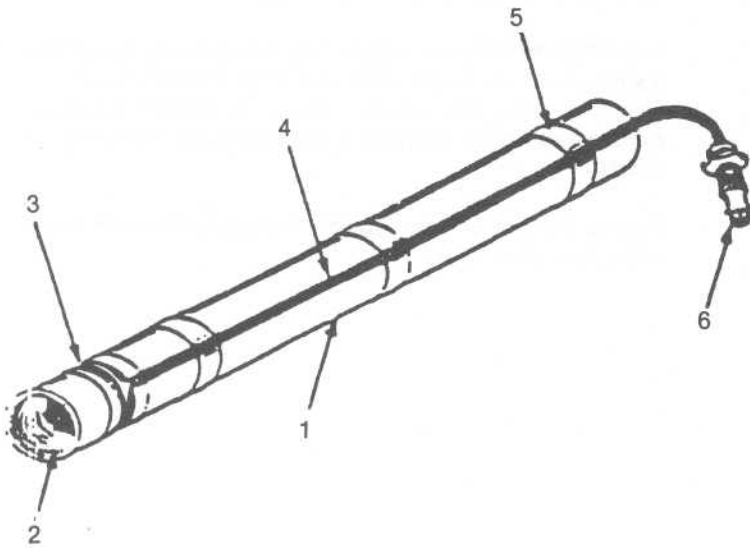


Diagram 2

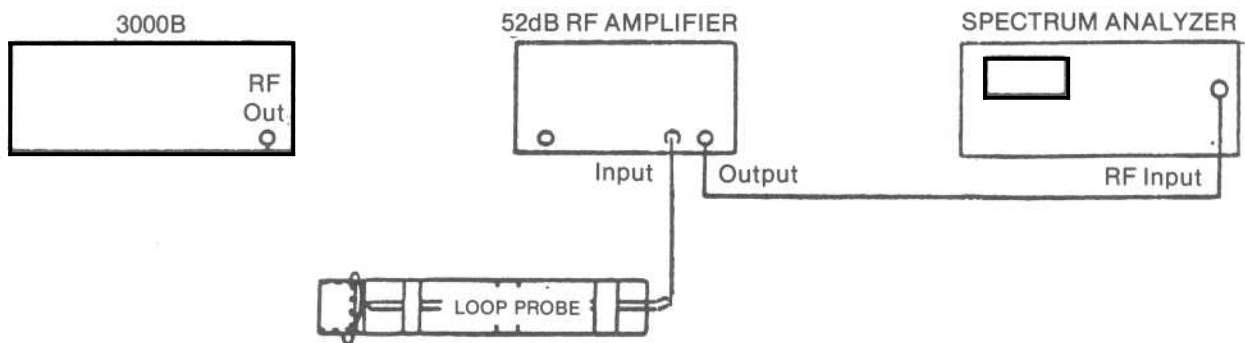


Diagram 3

5.4 TROUBLESHOOTING

Effective troubleshooting requires a thorough understanding of the block diagram and circuit description located in Section 4 of this manual; then the Performance Tests in Section 5 will aid in localizing the trouble symptom to a particular PC board. Once this has been accomplished, the board can be replaced, or repaired with aid of the proper schematic and parts layout diagram. In general, it is preferable to replace a defective PC board assembly.

Equipment troubles are frequently due simply to improper control settings; therefore, before engaging in a troubleshooting procedure, be sure front-panel controls are set in proper operating position. Refer to the operating instructions in Section 3 of this manual for a complete explanation of each control's function along with typical operating instructions.

After verifying that the trouble is not improper setting of the controls or test setup, make a thorough visual inspection of the instrument for such obvious defects as loose or missing screws, broken wires, defective sockets, loose RF cables, and burned or broken components.

After localizing the problem, voltage and resistance checks will help locate the defective component.

For troubleshooting purposes, it is permissible to operate the instrument with any of the plug-in PC boards or RF cables removed; however, the instrument should be turned off when removing or installing boards. If substitute boards are available, this provides an easy method of verifying if a suspected board is defective.

RF cables can be disconnected from the PC board connectors, and a power meter or spectrum analyzer connected directly to the connector for power level or frequency measurements. Fabrication of a short coax adapter cable, terminated in a mating SMB connector on the instrument end, will facilitate connection of test equipment.

A problem in a power supply may cause many symptoms pointing to other areas, and should be checked when the symptom does not clearly indicate a specific problem. Performance of the supplies is indicated in the Performance Tests.

Figures 5-3 and 5-4 give troubleshooting for the instrument in the flow chart form.

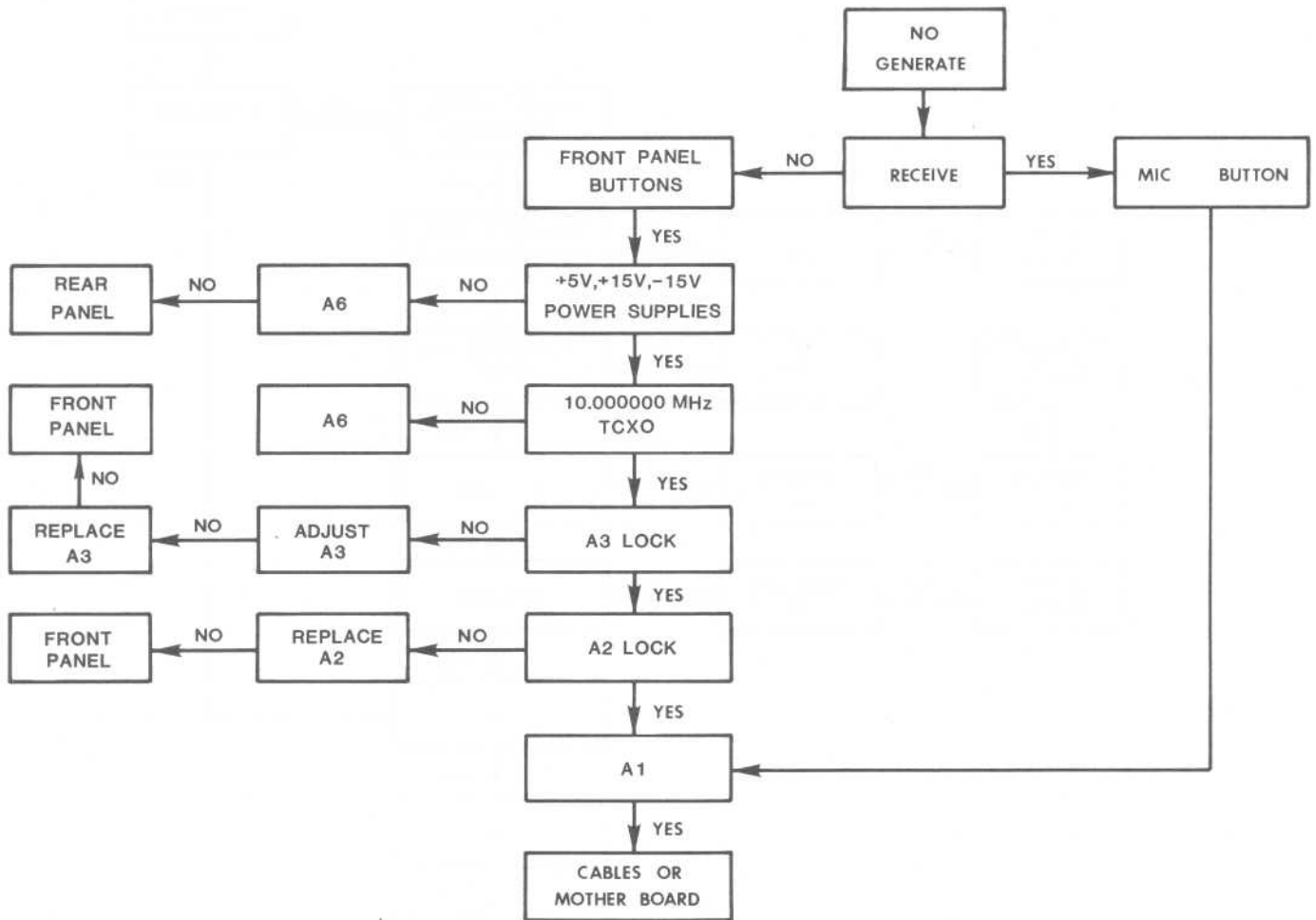


Figure 5-3. Troubleshooting — No Generate

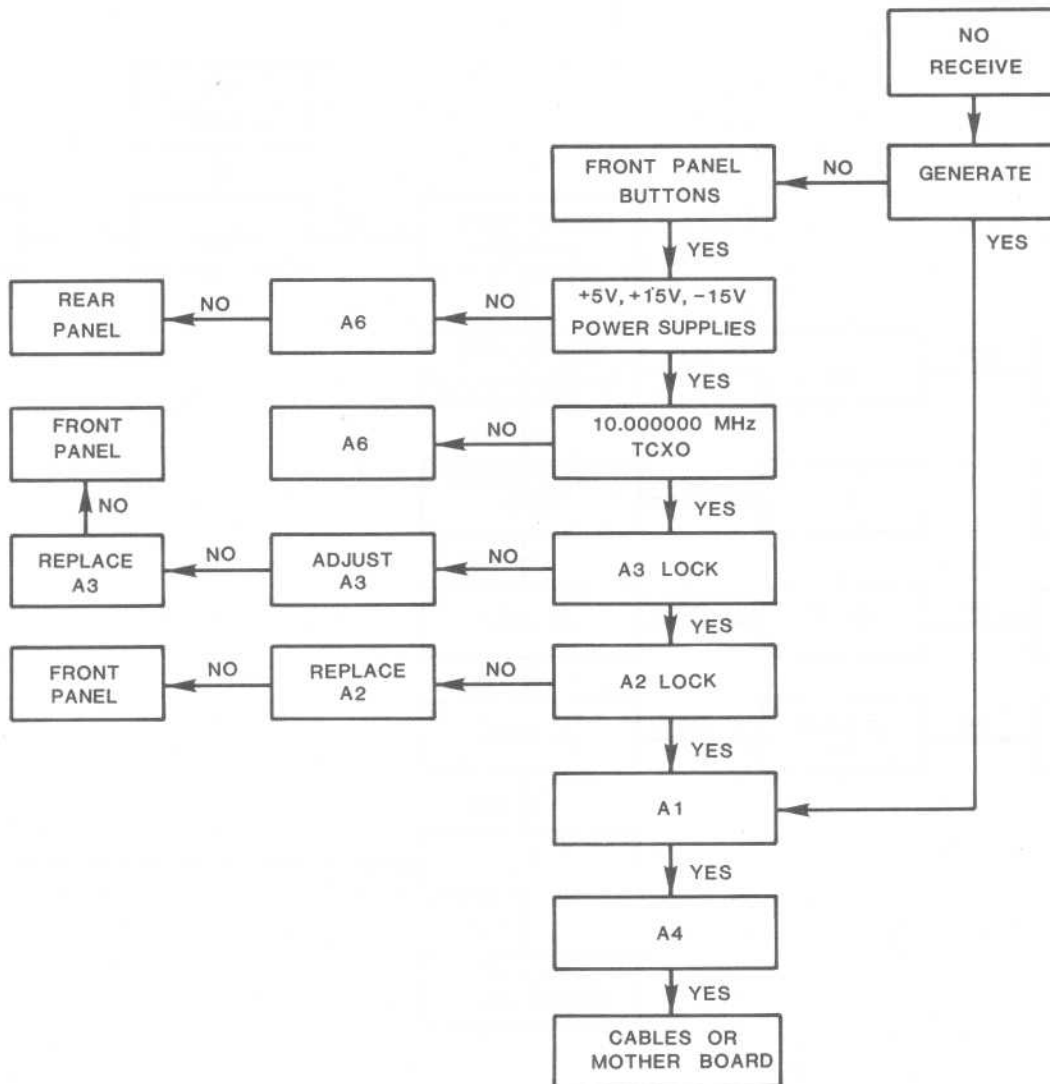


Figure 5-4. Troubleshooting — No Receive

SECTION 6

REPLACEABLE PARTS

6.1 INTRODUCTION

This section contains lists of all replaceable parts for the instrument.

For an assembly containing one or more subassemblies, the assembly list appears first, and is followed by the sub-assembly lists.

The lists appear in the following order:

PARTS LIST	ASSEMBLY
11010-70-0004	SCV MNTR, 3000B
11110-00-7002	A2
11110-00-7004	A4
11110-00-7005	A5
11110-00-7006	A6
11110-00-7007	A7B
11110-00-7008	A8
11110-70-0054	A3-1
11110-70-0071	A1-1B
11111-70-0002	Chassis
11110-00-7012	A12B
11219-70-0037	Harness, Fan/A12
11219-70-0045	Harness, A15/A12
11110-70-0094	A15
11118-70-0001	RF Assy, 110/220 VAC
11219-00-0402	XFMR Assy, 3000B
11219-70-0003	Line Cord Assy, 3000B
11118-70-0003	FP Assy, 3000B
11110-00-7009	A9
11110-00-7011	A11
11110-70-0074	A10B
11219-70-0025	Harness, 3000B-A10B
11110-70-0093	A14
11217-80-0097	Cable Assy, N, 12½"
11118-70-0004	Inverter Assy, 110B
11110-70-0011	Inverter BD, 110B
11219-70-0019	XFMR Assy, Inverter
11219-00-0176	Harness, 3000B-A, CRT
11219-70-0001	Harness, 3000B-D, MIC
11219-70-0002	Harness, 3000B, F/P Switch
11111-70-0003	Cabinet, 3000B
11217-80-0098	Cable Assy, 7½"
11219-70-0049	Fan Assy

6.2 MANUFACTURERS CODE

The following code is used on the parts list to identify the manufacturer.

ABBR.	NAME.....	CITY.....	ST	FSCM.	ABBR.	NAME.....	CITY.....	ST	FSCM.
A-B	ALLEN-BRADLEY	MILWAUKEE	WI	01121	BOKER	BOKER'S INC.	MINNEAPOLIS	MN	85446
A-D	ANALOG DEVICES	CAMBRIDGE	MA	24355	BORDN	BORDEN INC.	COLUMBUS	OH	32283
A-H	ARROW HART, INC.	KETTERING	OH	07858	BOU	BOURNS, INC.	RIVERSIDE	CA	80294
A-I	ALAN INDUSTRIES	COLUMBUS	IN	52750	BRAUN	BRAUN MFG CO	CHICAGO	IL	93785
A-M	AMERICAN MAGNETICS	CARTERVILLE	IL	12715	BREZ	BREEZE CORPORATIONS, INC.	UNION	NJ	08484
A-P	AMERICAN PLASTICRAFT CO.	CHICAGO	IL	53628	BSCAN	B-SCAN, INC.	PHILADELPHIA	PA	32198
ABAC	ABACUS PACKAGING CO.	CHICAGO	IL		BSHP	BISHOP GRAPHICS, INC.	WESTLAKE VILLAGE	CA	34730
ACEIN	ACE INDUSTRIAL HDWR.	CAMDEN	NJ		BUCK	BUCKEYE STAMPING CO.	COLUMBUS	OH	21604
ACI	ADVANCE COMPONENTS, INC.	CENTERBROOK	CT	28102	BUD	BUD RADIO, INC.	WILLOUGHBY	OH	71218
AEG-T	AEG-TELEFREN CORP.	SOMERVILLE	NJ	24972	BURND	BURNDY CORP.	NORWALK	CT	09922
AEP	APPLIED ENG PRODUCTS	NEW HAVEN	CT	19505	BUS	BUSSMAN MFG.	ST. LOUIS	MO	71400
AER	AVX CERAMICS	MYRTLE BEACH	SC	96095	BWC	BARON WIRE AND CABLE CORP.	CHICAGO	IL	72622
AERTK	AERTECH INDUSTRIES	SUNNYVALE	CA	21847	C-A	CIRCUIT ASSEMBLY CORP	COSTA MESA	CA	52072
AFE	ACCESSORIES FOR ELECTRONICS	BALDWIN	NY		C-D	CORNELL DUBILIER ELECT DIV	NEWARK	NJ	14655
AHAM	AHAM COMPANY	AZUSA	CA	53894	C-E	CLINTON ELECTRONICS	ROCKFORD	IL	54972
AIN	ALPHA INDUSTRIES, INC.	WOBURN	MA	17540	C-H	CUTLER-HAMMER, INC.	MILWAUKEE	WI	55841
ALC	ALCO ELECTRONICS PRODUCTS	NORTH ANDOVER	ME	95146	C-I	COMPONENTS, INC.	BIDDEFORD	ME	17554
ALLPL	ALL PLASTICS, INC.	INDIANAPOLIS	IN		C-J	TRW/CINCH	ELK GROVE VILLAGE	IL	71785
ALMPT	ALPHA METALS, INC	JERSEY CITY	NJ	96613	C-K	C & K COMPONENTS, INC.	WATERTOWN	MA	09353
AMATH	AMATOM ELEC HDWE CO	NEW HAVEN	CT		C-L	CENTRALAB DIV.	MILWAUKEE	WI	71590
AMD	ADVANCED MICRO DEVICES INC.	SUNNYVALE	CA	34335	C-M	C-M			
AMELC	AMERICAN ELECTRIC CORDSETS	BENSENVILLE	IL	0	C-W	C-W INDUSTRIES	WARMINSTER	PA	79727
AMP	AMP, INC.	HARRISBURG	PA	00779	CAE	CAPAR COMPONENTS CORP	MELVILLE	NY	
ANSLY	ANSLEY ELECTRONICS LTD	DOWNSVILLE, ONT., CANADA	**		CAI	CUSTOM ACCESSORIES, INC.	SKOKIE	IL	XXXXX
ANZAC	ADAMS-RUSSELL, ANZAC DIV	BURLINGTON	MA		CAM	CAMBION	CAMBRIDGE	MA	71279
AFL	AMPHENOL CONNECTOR SYSTEMS	BROADVIEW	IL	74868	CAR	CARLING ELECTRIC, INC.	WEST HARTFORD	CT	73559
APP	A-P PRODUCTS	PAINESVILLE	OH	0	CBLWV	CABLEWAVE SYSTEMS, INC.	NORTH HAVEN	CT	16733
APX	AMPEREX ELECTRONIC CORP.	SLATERSVILLE	RI	25403	CBRDM	CARBORUNDUM INSUL DIV	NIAGARA FALLS	NY	
ARC	ARCO ELECTRIC PRODUCTS	SHELBYVILLE	IN	24652	CCM	CORCON, INC.	LIBERTYVILLE	IL	05245
ARIES	ARIES ELECTRONICS CORP.	FRENCHTOWN	NJ		CDC	COMPONENT DEVELOPMENT CORP.	CARSON	CA	XXXXX
ARN	ARNOLD ENGINEERING CO.	NARENGO	IL	95566	CECO	CENTRAL COIL CO.	BRAZIL	IN	XXXXX
AROMT	AROMAT CORP.	ELK GROVE VILLAGE	IL		CFI	CIRCUIT FUNCTIONS INC.	NEWBURY PK	CA	32499
ARW-M	ARROW-M CORP	CARSON	CA		CGW	CORNING GLASS WORKS	CORNING	NY	24546
ASBAG	ASSOCIATED BAG CO.	MILWAUKEE	WI		CHE	CHERRY ELECTRICAL PRODUCTS	WAUKEGAN	IL	01963
ASC	ASSOCIATED SPRING	BRISTOL	CT	92830	CHEMP	CHEMPLAST, INC.	WAYNE	NJ	0
ASE	AIRCO SPEER ELECTRONICS	ST. MARYS	PA	06560	CHLAR	CHARLES LARSON CO.	STERLING	IL	
ASM	ACCURATE SCREW MACHINE CO	NUTLEY	NJ	51506	CHOM	CHOMERICS INC.	WOBURN	MA	18565
ASTID	ASTRO INDUSTRIES	DAYTON	OH	29365	CHRY	CHRYSLER CORP.	DETROIT	MI	12204
AT/IN	ATLANTIC INDIA RUBBER CO	CHICAGO	IL	70485	CIMCO	CIMCO WIRE AND CABLE INC.	ALLENDALE	NJ	XXXXX
ATC	AMERICAN TECHNICAL CERAMICS	HUNTINGTON STATN	NY	29990	CINOX	CINOX CORP	CINCINNATI	OH	58997
ATR	ATR COIL CO.	BLOOMINGTON	IN	XXXXX	CKI	CTS KNIGHTS, INC.	SANDWICH	IL	75378
AUGAT	AUGAT, INC.	ATTLEBORO	MA	91506	CLA	CLAIREX CORP.	MT. VERNON	NY	03911
AULT	AULT INC.	MINNEAPOLIS	MN	14310	CLAR	CLAROSTAT MFG. CO	DOVER	NH	12697
AUTCP	AUTOMATION CORP.	PECKVILLE	PA		CLCFT	COILCRAFT	CARY	IL	
AVDEL	AVDEL FASTENER SYS.	PARSIPPANY	NJ	19738	CLFRM	COILFORM	GENEVA	IL	20254
AVT	AVANTEK, INC.	SANTA CLARA	CA	24539					
AWC	ALPHA WIRE	ELIZABETH	NJ	92194					
B-T	BEK-TEK, INC.	READING	PA	XXXXX					
B-W	BARKER & WILLIAMSON	BRISTOL	PA	05690					

ABBR.	NAME.....	CITY.....	ST	FSCN.	ABBR.	NAME.....	CITY.....	ST	FSCN.
CLFX	COLE-FLEX CORP.	BABYLON	NY	56352	ELC-I	ELECTRA	CUMBERLAND	IN	
CLMRK	CALMARK CORP	SAN GABRIEL	CA	52094	ELCO	ELCO INDUSTRIES	ROCKFORD	IL	83486
CNLC	CAMLOC FASTENER	PARAMUS	NJ		ELDRE	ELDRE COMPONENTS, INC	ROCHESTER	NY	19648
CNCRD	CONCORD ELEX	NEW YORK	NY	18310	ELEXP	ELECT EXPEDITERS	MILWAUKEE	WI	
CNTRN	CENTURION	****	**		ELFX	ELECTRO-FLEX HEAT INC.	BLOOMFIELD	CT	02728
COL	COLLIER SEMICONDUCTORS INC	DALLAS	TX		ELHDW	ELECTRONIC HARD	FARMINGDALE	NY	
COORS	COORS PORCELAIN CO	GOLDEN	CO		ELNA	ELNA	CARSON	CA	
CPKG	CREATIVE PKG DIV	INDIANAPOLIS	IN	46203	EM-CH	EMERSON & CUMING, INC	CANTON	MA	
CPLRD	COMPLETE-READING ELEC.CO.	DALLAS	TX	02358	EMRON			S	0
CRDWL	CARDWELL CONDENSER CORP	LINDENHURST	NY	88356	ENTHN	ENTHON INC.	NEW HAVEN	CT	02258
CRMLY	CERMALLOY	WEST CONSHOHOCKEN	PA		EPITK	EPITEK ELECTRONICS	KANATA,ONT,CANADA	**	37907
CRTR	CORE-TRONICS	ORANGE	NJ	29324	EPOXT	EPOXY TECHNOLOGY, INC.	BILLERICA	MA	33246
CSDC	CONDITIONING SEMICNDR DVS	WAYNE	NJ		ETC	ELECTRONIC TRANSISTOR CORP.	FLUSHING	NY	12045
CTC	COMMUNICATIONS XISTOR CORP	SAN CARLOS	CA		ETP	ERIE TECHNOLOGICAL PRODUCTS	ERIE	PA	72982
CTS	CHICAGO TELEPHONE SYSTEMS	CHICAGO	IL	71450					
CTS-E	CTS OF ELKHART	ELKHART	IN	71450	EVRDY	EVEREADY	NEW YORK	NY	
CTS-F	C.T.S. OF FAIRBERRY	FAIRBERRY	IL	71450	EXAR	EXAR INTEGRATED SYSTEMS	SUNNYVALE	CA	52063
CTS-K	CTS OF KEENE	PASO ROBLES	CA	11237	EZLOK	E-Z LOK	GARDENIA	CA	
CTSBR	CTS OF BERNE	BERNE	IN	11236	F-K	THERMWELL PRODUCTS, INC.	FRAMINGHAM	MA	XXXXX
CTSBV	CTS OF BROWNSVILLE	BROWNSVILLE	TX	34263	F-S	FEDERAL SCREW	CHICAGO	IL	73734
CW/AL	C.W./ALPHA	SOUTHAMPTON	PA		FAN	FANCOURT & CO.	GREENSBORO	NC	XXXXX
DAL	DALE TECHNOLOGY CORP.	HARTSDALE	NY	XXXXX	FASTX	FASTEX DIV., ILL. TOOL WORKS	DES PLAINES	IL	0
DATEL	DATEL SYSTEMS, INC.	MANSFIELD	MA	50721	FCD	FAIRCHILD	MOUNTAIN VIEW	CA	07263
DAV	HARRY DAVIES HOLDING CO.	CHICAGO	IL	72512	FCI	FILM CAPACITORS, INC.	PAS SALC	NJ	00686
DAYTN	DAYTON ELECTRIC CO.	CHICAGO	IL	16327	FJTSU	FUJITSU AMERICA, INC.	LAKE BLUFF	IL	
DEL	DELEVAN DIV.	EAST AURORA	NY	XXXXX	FNWL	FENWAL	FRAMINGHAM	MA	15801
DEN	DENNISON MFG. CO.	FRAMINGHAM	MA	16956	FRDKS	FREDERICKS CO.	HUNTINGDON VALLEY	PA	
DEW	DEWIRE FABRICATING CORP.	LOWELL	MA	13161	FRK	FRAKO	FRANKFORT, GER.	**	XXXXX
DGTRN	DIGITRAN CO.	PASADENA	CA		FRTE	FAIR RITE PRODUCTS CORP.	WALLKILL	NY	34899
DILEC	DILECTRON	MONROVIA	CA	0	FRXC	FERROXCUBE DIVISION	SAUGERTIES	NY	02114
DIO	DIODES, INC.	CHATSORTH	CA	12060	FUT	FUTABA			
DIXON	DIXON INDUSTRIES INC.	BRISTOL	RI	04813	G-E	GENERAL ELECTRIC	INDIANAPOLIS	IN	24446
DK-WR	DAKO-WARE	CHICAGO	IL		G-H	GRAYHILL, INC.	LA GRANGE	IL	81073
DLGHT	DIALIGHT	BROOKLYN	NY	72619	G-I	GEN'L INSTRUMENT SEMICNDR	HICKSVILLE	NY	14963
DLI	DIELECTRIC LABORATORIES INC	CAZENVIA	NY	55153	G-T	GRAND TRANSFORMERS	GRAND HAVEN	MI	02459
DLTEM	DELTA ELECTRONICS MFG CO	BEVERLY	MA	00795	GAL	GALILEO ELECTRO-OPTICS	STURBRIDGE	MD	28719
DM-GY	DINCO-GRAY	CENTERVILLE	OH	80813	GATES	GATES ENERGY PROD.	DENVER	CO	57053
DNTCH	DONTECH, INC.				GBN	GILBERT ENGINEERING CO., INC	PHOENIX	AZ	82316
DRA	DRAKE MANUFACTURING CO.	HARWOOD HEIGHTS	IL	71744	GCE	GC ELECTRONICS	ROCKFORD	IL	80112
DRMYR	DORMEYER	ROCKVILLE	IN	73662	GHZ	GHZ DEVICES, INC.	CHELMSFORD	MA	
DUPNT	E.I. DUPONT DENEMOURS & CO	WILMINGTON	DE		GLOBE	GLOBE	MILWAUKEE	WI	
DYNR	DYNEER CORP.	CHATSWORTH	CA		GNATR	GENERAL ATRONICS CORP.	PHILADELPHIA	PA	07407
E-C	ELECTRONIC CRYSTALS	KANSAS CITY	MO	18853	GOU	GOULD, INC.	ST. PAUL	MN	55857
E-I	ELECTRICAL INDUSTRIES, INC.	MURRAY HILL	NJ	20093	GRIES	GRIES REPRODUCER	NEW ROCHELLE	NY	05673
E-M	ELECTRA/MIDLAND CORP.	MINERAL WELLS	TX	XXXXX	GRIP	GRIPMASTER CO.	MARLBORO	NJ	XXXXX
EATON	EATON CORP.	SUNNYVALE	CA	34657	GRVCO	GROVE COMPANY	DAYTON	OH	
EBY	EBY COMPANY	PHILADELPHIA	PA	72825	GUDL	GUEBROD BROS. SILK CO.	CHICAGO	IL	XXXXX
ECKDT	ECKARDT LABORATORIES	ORANGE	CA		GWDA	GOWANDA ELEX CORP	GOWANDA	NY	
ECMC	ELECTRI-CORD MFG. CO. INC.	WESTFIELD	PA	XXXXX	H-P	HEWLETT-PACKARD	INDIANAPOLIS	IN	28480
EDAC	EDAC, INC.	DON MILLS, ONT., CANADA	**	31781	HARTW	HARTWELL CORP.	PLACENTIA	CA	0
EECO	EECO, INC.	SANTA ANA	CA	97525	HDMLD	DAVIES H HOLDING	CHICAGO	IL	
					HEL	HELIPOT	ANAHEIM	CA	XXXXX

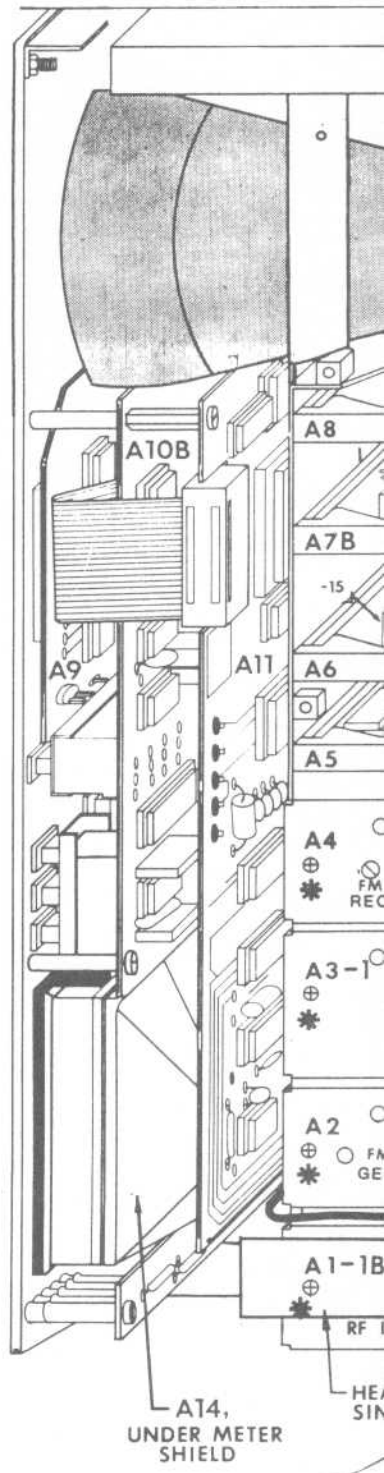
ABBR.	NAME.....	CITY.....	ST	FSCN.	ABBR.	NAME.....	CITY.....	ST	FSCN.
HEY	HEYMAN MFG. CO.	WAUKESHA	WI	20520	KIN	KINGS ELECTRONICS	TUCKAHOE	NY	91836
HGHS	HUGHES SOLID-STATE PROD	NEWPORT BEACH	CA		KMYO	KAMAYA OHM	JAPAN	**	
HHS	HERMAN H. SMITH, INC.	BROOKLYN	NY	83330	KRYST	KRYSTINEL	PATERSON	NJ	29251
HI-G	HI-6 INC	WINDSOR LOCKS	CT	02289	KSTR	KESTER SOLDER DIV.	CHICAGO	IL	09185
HIT	HITACHI AMERICA, LTD.	SAN FRANCISCO	CA	XXXXX	KSW	KSW ELECTRONICS	BURLINGTON	MA	52673
IHLN	HANLIN	LAKE MILLS	WI	12617	KUL	KULKA ELECTRIC CORP.	MT. VERNON	NY	75382
HOLGW	HOLLINGSWORTH SLDRLS TERM.	POTTSTOWN	PA	14726	KYCRA	KYOCERA INTERNATIONAL	SAN DIEGO	CA	
HOLUB	HOLUB DISTRIBUTING CO.	NEWPORT	KY	XXXXX	LAMB	LAMB INDUSTRIES, INC.	PORTLAND	OR	
HSD	HARRIS CORP. SEMICDR. DIV.	MELBOURNE	FL	27410	LAURN	LAUREN MFG CO.	NEW PHILADELPHIA	OH	56329
HUD	HUDSON TOOL & DIE CO.	NEWARK	NJ	02875	LEYSE	LEYSE ALUMINUM CO.	KEWANEE	WI	20218
HY/PL	HYDRO PLASTICS INC.	GEORGETOWN	KY	XXXXX	LIT	LITTELFUSE, INC.	DES PLAINES	IL	75915
HYSOL	HYSOL CORP	INDUSTRY	CA	12405	LNHST	LINEMASTER SWITCH CORP.	WOODSTOCK	CT	97918
HYSYS	HYBRID SYSTEMS	BEDFORD	MA	33256	LOCTT	LOCTITE CORP.	NEWINGTON	CT	05972
HYT	HYTRONICS	PINELLAS PARK	FL	29525	LRC	LRC ELECTRONICS, INC.	HORNELL	NY	16157
IBNCO	INDIANA BOLT AND NUT CO.	INDIANAPOLIS	IN		LSI	LUMINESCENT SYSTEMS, INC	LEBANON	NH	16157
ICI	ILLINOIS CAPACITOR INC.	NORTON GROVE	IL	74840	LTRNX	LITRONIX	CUPERTINO	CA	50579
ICO-R	ICO-RALLY	PALO ALTO	CA		M-A	MICROWAVE ASSOCIATES	BURLINGTON	MA	96341
IDC	INTL DIODE CORP.	HARRISON	NJ	16068	M-D	MILLER DIAL & NAMEPLATE CO.	EL MONTE	CA	74072
IEE	INDUSTRIAL ELECTRONIC ENG	NORTH HOLLYWOOD	CA	05464	M-E	MEPCO ELECTRA, INC.	MORRISTOWN	NJ	19701
IERC	INT'L ELEC. RESEARCH CORP.	BURBANK	CA	98978	M-O	ILLUMINATED PRODUCTS INC.	SANTA ANA	CA	XXXXX
INDCP	INDUCTIVE COMPONENTS	HAUPPAUGE	NY	25159	M-P	MICRO PLASTICS INC.	CHATSWORTH	CA	31223
INDEC	INDUSTRIAL ELECTRONIC HDWR.	NEW YORK	NY	97913	MAL	MALLORY CONTROLS CO.	FRANKFORT	IN	90201
INDGL	INDIANA GENERAL	KEASBEY	NJ	72656	MAND	MANDEX	CHICAGO	IL	98278
INLOK	INTERLOK/WM J PURDY CO.	BURLINGAME	CA	55951	MARG	J. & J. MARQUARDT	TUTTLINGEN, GER.	**	XXXXX
INT	INTERSIL, INC.	CUPERTINO	CA	32293	MCHTL	MICROMETALS, INC	ANAHEIM	CA	12856
INTEL	INTEL CORP	SANTA CLARA	CA	34649	MCREL	MICRO ELEX LTD	HONG KONG	**	
INWEB	INTERNATIONAL WEBBING	WHITEHALL	PA	32860	MD-AM	MID AMERICA	CHICAGO	IL	
IRC	INTERNATIONAL RESISTANCE CO	PHILADELPHIA	PA	75042	MDC	MAIDA DEVELOPMENT CO.	HAMPTON	VA	91984
IREC	INT'L RECTIFIER CORP.	LOS ANGELES	CA	81483	MDLRS	MIDLAND ROSS	CINCINNATI	OH	57951
ISTMP	ISOTEMP RESEARCH, INC.	CHARLOTTESVILLE	VA	31785	MOTC	MODUTEC	NORWALK	CT	32171
ITRON	ISE ELECTRONICS	ISE, JAPAN	**	0	MFLCO	MAURICE FRANKLIN LOUVER CO.	PROVIDENCE	RI	
ITT	INT'L TELEPHONE & TELEGRAPH	W. PALM BEACH	FL	XXXXX	MILN	MILLEN MFG. CO.	NEW YORK	NY	XXXXX
JAMES	JAMES ELECTRONICS	CHICAGO	IL	12749	MILSP	MILITARY SPECIFICATION	WASHINGTON	DC	81349
JAN	JAN HARDWARE MFG. CO.	LONG ISLAND CITY	NY	99813	MIN-C	MINI-CIRCUITS	BROOKLYN	NY	15542
JEF	JEFFERS	DUBOIS	PA	97469	MINIS	MINI SYSTEMS	NORTH ATTLEBORO	MA	50316
JEFWC	JEFFERSON WIRE AND CABLE	WORCHESTER	MA	07883	MINOR	MINOR RUBBER CO.	BLOOMFIELD	NJ	76385
JEW	JEWELL ELECTRICAL INST	MANCHESTER	NH		MITEK	MITEK	LEXINGTON	MA	0
JFD	JFD ELECTRONICS	BROOKLYN	NY	73899	MJRJW	J.W. MILLER	COMPTON	CA	96804
JFW	JFW INDUSTRIES	BEECH GROVE	IN	56532	MHM	3M COMPANY	ST. PAUL	MN	
JHSN	JOHANSON MFG. CORP.	BOONTON	NJ	91293	MNO	MONSANTO COMM. PROD. DIV.	PALO ALTO	CA	50522
JON	E.F. JOHNSON CO.	WASECA	MN	74970	MOL	MOLEX PRODUCTS	LISLE	IL	27264
JUDD	JUDD WIRE DIV. ECC	TURNERS FALLS	MA	12703	MORAD	MORGAN ADHESIVES	STOW	OH	17452
K-L	KERRIGAN LEWIS MFG.	CHICAGO	IL	73920	MOSTK	MOSTK CORP.	CARROLLTON	TX	50088
K-S	K & S ENGINEERING CO.	CHICAGO	IL	22376	MOT	MOTOROLA SEMI. PROD. DIV.	INDIANAPOLIS	IN	04713
KDI-P	KDI-PYROFILM CORP.	WHIPPANY	NJ	03888	MOUS	MOUSER ELECTRONICS	LAKEVILLE	CA	50811
KEENE	KEENE CORP.	NEWARK	DE	52869	MRM	M. ROSS HASON	INDIANAPOLIS	IN	
KEM	KENTRON ELECTRON PRODUCTS	NEWBURYPORT	MA	92703	MRO	MICRO SWITCH DIV.	FREEMONT	IL	91929
KEY	KEYSTONE ELECTRONIC CORP.	NEW YORK	NY	91833	MRRUB	MARION RUBBER PROD.	INDIANAPOLIS	IN	
KID	KIDCO, INC.	MEDFORD	NJ	12126	MSN	MICROSONICS DIV.	WEYNOUTH	MA	11869
					MSP	MICRO SEMICONDUCTOR CORP.	SANTA ANA	CA	14552

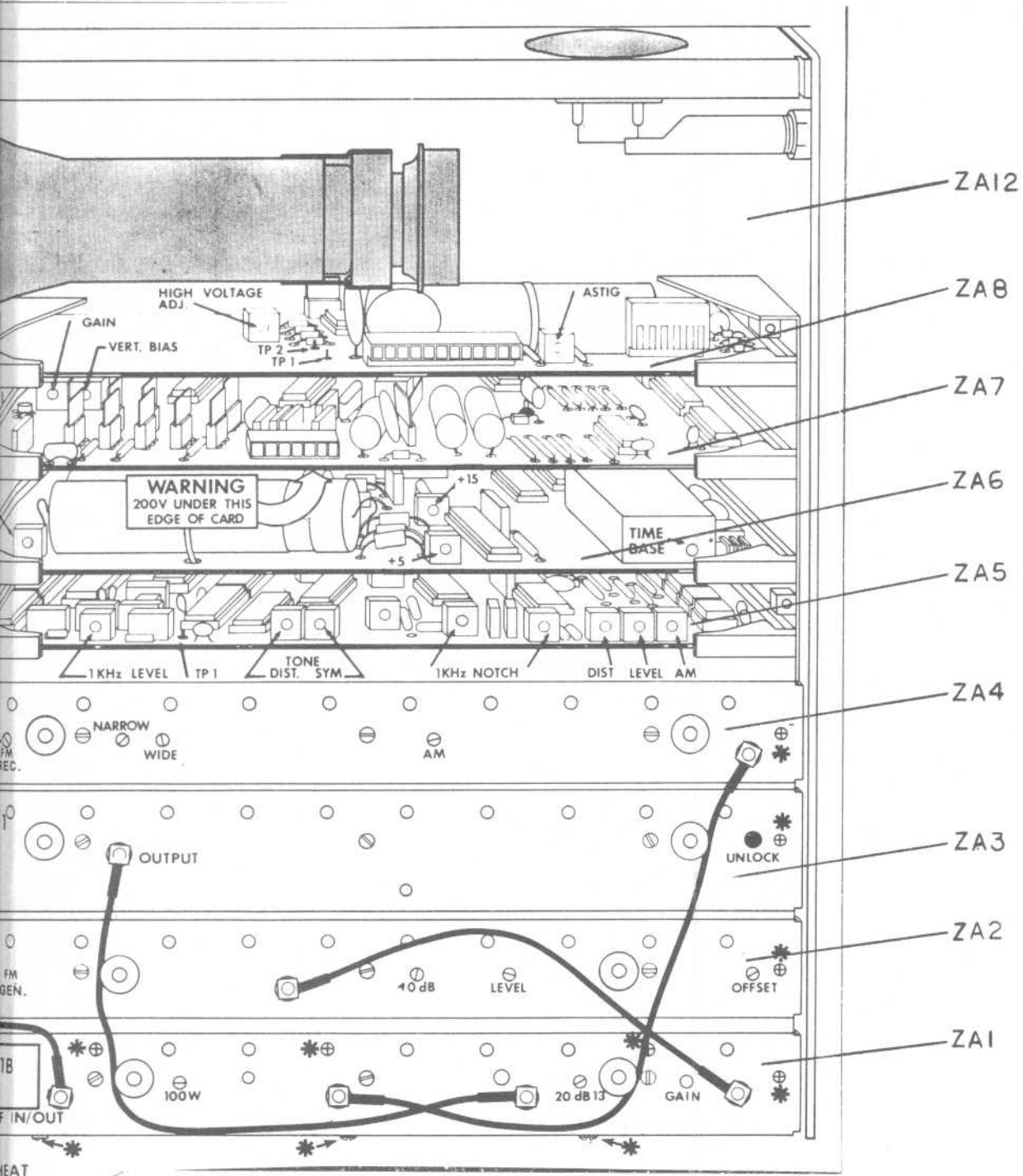
ABBR.	NAME.....	CITY.....	ST	FSCN.	ABBR.	NAME.....	CITY.....	ST	FSCN.
MULSO	MULTICORE SOLDERS LTD.	WESTBURY	NY	03051	PNI	PRECISION MONOLITHICS INC.	SANTA CLARA	CA	06665
MURA	MURA	WESTBURY	NY	32539	PNSNC	PANASONIC			
MURGA	MURATA-GEORGIA	MARIETTA	GA	51406	POLPH	POLYPHASE INSTR.CO	BRIDGEPORT	PA	98330
MWS	MAGNET WIRE SUPPLY CO.	CHATSWORTH	CA	51668	POM	POMONA ELECTRONICS CO.,INC	POMONA	CA	05276
MWS-P	MWS PRECISION WIRE INDUS	WESTLAKE VILLAGE	CA		PREH	PREI VERT,NBH	GERMANY	**	
MYERS	MYERS SPRING CO.	LOGANSPORT	IN	91956	PRND	PYRAMID INDUSTRIES, INC.	PHOENIX	AZ	XXXXX
N-T	NATIONAL TEL-TRONICS	LAREDO	TX	XXXXX	PRRES	PRECISION RESISTIVE PRDTS	MEDIAPOLIS	IA	
NAT	NATIONAL SEMICONDUCTOR CORP	SANTA CLARA	CA	27014	PRSLK	PRESTO-LOCK	GARFIELD	NJ	77386
NCC	NATIONAL CERAMIC CO	TRENTON	NJ	76626	PRSN	PRECISION TUBE CO., INC	NORTH WALES	PA	82413
NCSVC	NATL COM SERV.	WILLOW GROVE	PA		PTN	PENN TRAN CORP.	BELLEFONT	PA	XXXXX
NEC	NIPPON ELECTRIC CO.	TOKYO, JAPAN	**	18324	PWRMT	POWER-MATE CORP.	HACKENSACK	NJ	
NEL	NATIONAL ENGINEERING LABS	INDIANAPOLIS	IN	XXXXX	PYRO	PYROFILM CORP.	WHIPPANY	NY	XXXXX
NEMCO	NEMCO METALS, INC	MANVILLE	RI		PYTT	PYTTRONICS INDUSTRIES, INC.	HONTGOMERYVILLE	PA	31924
NEW	NEWARK ELECTRONICS	INDIANAPOLIS	IN	XXXXX	Q-C	QUALITY COMPONENTS	ST. MARYS	PA	95121
NHWC	NEW HAVEN WIRE & CABLE	NEW HAVEN	IN	XXXXX	R-E	ROBISON ELECTRONICS	SAN LUIS OBISPO	CA	
NICHN	NICHICON (AMERICA) CORP.	SCHAUMBURG	IL	55680	R-H	ROBINSON-NUGENT	NEW ALBANY	IN	0
NMB	NMB CORP.	ARLINGTON HEIGHTS	IL	60005	R-OHM	R-OHM	IRVINE	CA	57668
NMC	MAGNUM MICROWAVE CORP.	SUNNYVALE	CA	59277	RAF	RAF ELECTRONIC HDWE	STRAFFORD	CT	
NPC	NUCLEONIC PRODUCTS CO.	CANOGA PARK	CA	0	RAWST	RAW STOCK	****	**	
NRTLK	NORTHLAKE ENG, INC	ANTIOCH	IL	50638	RAY	RAYTHEON	INDIANAPOLIS	IN	49956
NYLO	NYLOMATIC	MORRISVILLE	PA	XXXXX	RAYVC	RAY-O-VAC/DV	MADISON	WI	
O-G	OPTI-GAGE INC.	DAYTON	OH	XXXXX	RBRCT	RUBBERCRAFT	****	**	
O-S	OHNI SPECTRA INC.	FARMINGTON	MI	16179	RCA	RCA	CAMDEN	NJ	02735
OAK	OAK INDUSTRIES INC.	CRYSTAL LAKE	IL	76854	RCHLK	RICHLOK CORP	CHICAGO	IL	
OHM	OHMITE MFG. CO.	SKOKIE	IL	44655	REL	RELIANCE MICA CO.	BROOKLYN	NY	08530
OMEGA	OMEGA WIRE & CABLE	HARLEYSVILLE	PA	XXXXX	RGNCY	REGENCY ELECTRONICS, INC.	INDIANAPOLIS	IN	
OPTO	OPTO ELECTRONICS INC	FT LAUDERDALE	FL		RGR	ROGERS CORP.	CHANDLER	AZ	31745
OPTRN	OPTRON INC.	CARROLLTON	TX	XXXXX	RICH	RICHCO PLASTIC CO.	CHICAGO	IL	06915
P-B	POTTER AND BRUMFIELD	PRINCETON	IN	77342	RICHM	RICHARDS METAL PRODUCTS	WOLCOTT	CT	19076
P-C	POWER COMPONENTS	WOODLAND HILLS	CA	XXXXX	RMC	RADIO MATERIALS CORP.	CHICAGO	IL	82560
P-K	PARKER KALON CORP.	CLIFTON	NJ	XXXXX	RHF	RHF PRODUCTS INC.	BATAVIA	IL	XXXXX
P-T	PENN TUBE PLASTICS CO.	CLIFTON HEIGHTS	PA	0	ROCKW	ROCKWELL INTL.	ANAHEIM	CA	33085
P-U	PROJECTS UNLIMITED INC.	DAYTON	OH	XXXXX	ROGAN	ROGAN CORP.	NORTHBROOK	IL	86797
POLPH	POLYPHASE INSTR. CO.	BRIDGEPORT	PA	0	ROTRN	ROTRON INC.	WOODSTOCK	NY	82877
PACTC	PACTEC DIV.	PHILADELPHIA	PA		RPBLC	REPUBLIC ELECTRONICS CORP	PATTERSON	NJ	
PAH	PANOTOR DIV.	BURLINGAME	CA	23936	RSSLL	RUSSELL	OCEANSIDE	NY	24324
PAND	PANDUIT CORP.	TINLEY PARK	IL	06383	RTNA	ROSENTHAL TECHNIK,N.A.	PROVIDENCE	RI	
PARA	PARAMETRIC INDUSTRIES	NORTHFIELD	IL	XXXXX	S-C	SPECIALTY CONNECTOR	INDIANAPOLIS	IN	24931
PCC	PANEL COMPONENTS CORP.	BERKELEY	CA	00000	S-G	STANDARD GRIGSBY	AURORA	IL	82104
PEC	PACIFIC ELECTRICORD CO.	GARDENA	CA	80126	S-I	SWITCHCRAFT, INC.	CHICAGO	IL	82389
PEN	PENN ENGRG & MANUF CO.	DANBORO	PA		S-S	SERVICE SUPPLY	INDIANAPOLIS	IN	XXXXX
PFZR	PFIZER, INC.	NEW YORK	NY	86491	S-T	SARKES TARZIAN	BLOOMINGTON	IN	51589
PHC	PHILADELPHIA HANDLE CO.	CAMDEN	NJ	XXXXX	SAE	STANFORD APPLIED ENG	SANTA CLARA	CA	
PHILP	PHILPOTT RUBBER CO.	CLEVELAND	OH	86510	SAGE	SAGE LABORATORIES, INC.	NATIC	MA	
PIC	PIHER INTERNATIONAL CORP.	ARLINGTON HEIGHTS	IL	54869	SAYRO	SAYROSA ENGINEERS LTD.	ALTON, HANTS, U.K	**	04180
PIEZO	PIEZO TECHNOLOGIES, INC.	ORLANDO	FL		SCBE	SCANBE DIVISION	EL MONTE	CA	18677
PLI	PRECISION LAMP, INC.	MT. VIEW	CA	48451	SCC	STACKPOLE CARBON CO.	ST. MARYS	PA	78488
PLSSY	PLESSEY ENG.	SCHILLER PARK	IL	55112	SCX	SILICONIX INC.	SANTA CLARA	CA	17856
PLSTI	PLASTIC TECHNIQUES, INC	NEW BOSTON	NH		SEAST	SEASTROM MFG. CO.	GLENDALE	CA	86928
PLYCL	POLYCLAD LAMINATES	SOUTHFIELD	MI		SECR	SECOR INC.	WESTWOOD	NJ	0
PMCL	PERMACEL DIV.	NEW BRUNSWICK	NJ	99742					

ABBR.	NAME.....	CITY.....	ST	FSCM.	ABBR.	NAME.....	CITY.....	ST	FSCM.
SEL	SEALCTRO CORP.	MAHARONECK	NY	98291	TFI	T&F INDUSTRIES DIV.	ROLLING MEADOWS	IL	58933
SEM	SENTECH	NEWBURY PARK	CA	14099	THR	THERMALLOY CO.	DALLAS	TX	13103
SEMTX	SENTEX	DAYTON	OH	0	TIMES	TIMES WIRE AND CABLE	CINCINNATI	OH	XXXXX
SENST	SENSOTEC INC	COLUMBUS	OH	51518	TIN	TINNERMAN PRODUCTS, INC.	CLEVELAND	OH	78553
SGM	SIGMA INSTRUMENTS	BRAINTREE	MA	72421	TKN	TECHNICAL WIRE	CRAWFORD	NJ	XXXXX
SGS-A	SGS-ATES COMP ELET SPA	AGRATE BRIANZE, ITALY	**		TLNC	TELONIC ALTAIR	LAGUNA BEACH	CA	04423
SHAM	SHAMROCK PLASTICS & RUBBER	INDIANAPOLIS	IN	XXXXX	TLNBY	TLNBY	****	**	
SHDW	I.E.E. SCHADOW	EDEN PRAIRIE	MN		TOKO	TOKO AMERICA	SKOKIE	IL	
SHKMN	SHACKMAN INSTRUMENTS	CHESHAM, ENGLAND	**	0	TORCO	TOR CORP.	VAN NUYS	CA	XXXXX
SHURE	SHURE BROS, INC.	EVANSTON	IL		TR-UT	TRIAD-UTRAD DIV.	HUNTINGTON	IN	0
SIEM	SIEMENS	ISELIN	NJ	25088	TRIXX	TRIONYX INDUSTRIES	INDIANAPOLIS	IN	
SIG	SIGNETICS CORPORATION	SUNNYVALE	CA	18324	TRNSN	TRANSENE CO., INC.	ROWLEY	MA	53796
SIGPT	SIGMA PLASTRONICS	DEARBORN	MI		TRU	WALDES TRUARC	LONG ISLAND CITY	NY	79136
SINCR	SINCLAIR & RUSH, INC.	ST. LOUIS	MO	15819	TRW	TRW CAPACITOR DIV.	OGALLALA	NB	84411
SKDRV	STOCK DRIVE PROD. DIV.	NEW HYDE PARK	NY		TSHBA	TOSHIBA AMERICA INC	WAYNE	NJ	00000
SLCGN	SILICON GENERAL INC	GARDEN GROVE	CA	34333	TUSNX	TUSDNIX, INC.	TUCSON	AZ	59660
SLT	SOLITRON/MICROWAVE DIV.	PORT SALERNO	FL	95077	TVL	TEL-VISION LABS	WAUCONDA	IL	0
SNTC	SAITEC INC.	NEW ALBANY	IN	55322	TWAY	TWAY COMPANY	INDIANAPOLIS	IN	0
SNSTK	SENSOR TECHNOLOGY CO	SEATTLE	WA		TYTON	TYTON CORP.	MILWAUKEE	WI	
SOART	STATE OF THE ART, INC	STATE COLLEGE	PA	56235	U-C	UNIVERSAL COMPONENTS	LOS ANGELES	CA	82933
SOURU	SOURIAU	VAN NUYS	CA		ULSP	UNDERWRITERS LAB. SPEC.	CHICAGO	IL	0
SOUTH	SOUTHCO FASTENERS	LESTER	PA	94222	UNCAR	UNION CARBIDE COMPONENTS	GREENVILLE	SC	57185
SPE	SPECTROL	DAYTON	OH	02111	UNCHM	UNITED CHEMI-COM			
SPEC	SPECTRUM CONTROL, INC.	FAIRVIEW	PA	33095	UNIC	UNICORP	ORANGE	NJ	04729
SPPRD	SPECIALTY PRODUCTS	INDIANAPOLIS	IN		UNIT	UNITRODE CORP.	WATERTOWN	MA	12969
SPR	SPRAGUE ELECTRIC CO.	INDIANAPOLIS	IN	56289	USECO	USECO DIV.	VAN NUYS	CA	88245
SPRTX	SUPERTEX INC.	CUPERTINO	CA	0	UTK	UNITRACK DIV.	UPPER DARBY	PA	XXXXX
SPST	SPECTRA-STRIP	GARDEN GROVE	CA	08261	VAC	VACTEC INC.	MARYLAND HEIGHTS	MO	18178
SPY	SPYRAFLO INC	PEACHTREE CITY	GA		VACO	VACO PRODUCTS CO.	NORTHBROOK	IL	79061
SSS	SOLID STATE SCIENTIFIC	MONTGOMERYVILLE	PA	31019	VAR	VARADYNE CAPACITOR DIV.	SANTA MONICA	CA	26654
STC	SILICON TRANSISTOR CORP	CHELMSFORD	MA		VARIL	VARI-L CO.	DENVER	CO	05375
STDPS	STANDARD PRESSED STEEL	JENKINTOWN	PA	03680	VARO	VARO SEMICONDUCTOR INC	GARLAND	TX	
STI	SEMICONDR TECHNOLOGY INC	STUART	FL		VCTRN	VECTRON LABORATORIES, INC.	NORWALK	CT	27802
STKFS	STAKE FASTENERS	SOUTH EL MONTE	CA		VELCR	VELCRO USA INC	NEW YORK	NY	11153
STR	STETTNER TRUSH CO.	CAZENOVIA	NY	52763	VIC	VICTOREEN INC	CLEVELAND	OH	
STSA	STEEL SALES	INDIANAPOLIS	IN	XXXXX	VISCH	VISUAL COMM	PLAYA DEL REY	CA	56769
SULL	SULLINS ELECTRONICS CORP	SAN MARCOS	CA		VLIER	VLIER ENGINEERING CORP.	BURBANK	CA	01226
SXNBG	SAXONBURG CERAMICS	SAXONBURG	PA		VLTRX	VOLTREX	****	**	
SYL	GTE SYLVANIA	WALTHAM	MA	94131	VONGT	VONNEGUT HARDWARE	INDIANAPOLIS	IN	XXXXX
SYN	SYNTRONIC INSTRUMENTS	ADDISON	IL	99409	VRN	VERNITRON CORP.	GREAT NECK	NY	XXXXX
SYNTC	SYNTAC CORP.	CLEVELAND	OH		VSSNC	VIEWSONICS, INC.	SYOSSET	NY	59108
SYNTK	SYNERTEK	**	*		VTRHN	VITRANDN, INC.	BRIDGEPORT	CT	95275
SYS	SYSCOM INTERNATIONAL, INC.	SOUTH BEND	IN	32436	W-E	WELLS ELECTRONICS	SOUTH BEND	IN	14329
T-B	THOMAS & BETTS	RARITAN	NJ	59730	W-I	WAVETEK INDIANA, INC.	BEECH GROVE	IN	34280
T-I	TEXAS INSTRUMENTS	DALLAS	TX	01295	WAG	WAGNER ELECTRIC CORP.	ST. LOUIS	MO	63477
TAPP	TAPE PRODUCTS, INC	****	**		WBSH	WABASH RELAY & ELECT.	WABASH	IN	18542
TCPL	TACONIC PLASTIC	PETERSBURG	NY	59688	WECK	WECESSER CO., INC.	CHICAGO	IL	95987
TEK	TEKTRONIX	INDIANAPOLIS	IN	80009	WHBRY	W.H.BRADY INDL PRDS DIV	MILWAUKEE	WI	
TEKA	TEKA PRODUCTS INC.	COLLEGE POINT	NY	58050	WHTHN	WHITMAN	CINCINNATI	OH	
TEKNT	TECKNIT	CRANFORD	NJ		WKFLD	WAKEFIELD ENGINEERING	WAKEFIELD	MA	05820
TELE	TELETYPE CORP.	ELK GROVE VILLAGE	IL	XXXXX	WALDM	WALDON	CHICAGO	IL	92219
TELYR	TELEDYNE RELAYS	HAWTHORNE	CA	11532	WMBG	W.M. BERG	ROCKAWAY	NY	
					WNSL	WEINSCHEL ENGINEERING	GAITHERSBURG	MD	93459

ABBR.	NAME.....	CITY.....	ST	FSCN.
WNZLR	WINZLER MFG	CHICAGO	IL	09109
WRC	WIRE RESEARCH CORP	SANTA ANA	CA	
WSD	WAVETEK	SAN DIEGO	CA	23338
WSTN	WESTON COMPONENTS	ARCHBALD	PA	94075
ZEN	ZENITH RADIO CORP.	CHICAGO	IL	67177
ZERO	ZERO MANUFACTURING CO.	BURBANK	CA	98376
ZIE	ZIERICK MFG. CORP.	MOUNT KISCO	NY	79963
ZPT	ZIPPERTUBING, CO.	LOS ANGELES	CA	07240

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
ZA2	IF PLL BD, A2	11110-00-7002	4J835	11110-00-7002	1
ZA4	IF AMP BD, A4	11110-00-7004	4J835	11110-00-7004	1
ZA5	AUDIO BD, A5	11110-00-7005	4J835	11110-00-7005	1
ZA6	LV PWR SUPPLY BD, A6	11110-00-7006	4J835	11110-00-7006	1
ZA7	DEFL AMP BD, A7B	11110-00-7007	4J835	11110-00-7007	1
ZA8	HV PWR SUPPLY BD, A8	11110-00-7008	4J835	11110-00-7008	1
ZA3	FREQ SYN BD, A3-1	11110-70-0054	4J835	11110-70-0054	1
ZA1	MIXER BD, A1-1B	11110-70-0071	4J835	11110-70-0071	1
ZA12	CHASSIS-3000B	11111-70-0002	4J835	11111-70-0002	1
ZA13	CABINET, 3000B	11111-70-0003	4J835	11111-70-0003	1
3000B MA	MANUAL, 3000B	16510-00-0096	4J835	16510-00-0096	1





TOP VIEW
3000B SERVICE MONITOR

NOTE:
SEE ASSEMBLY 11111-70-0003
FOR ZA13 CABINET ASSY.

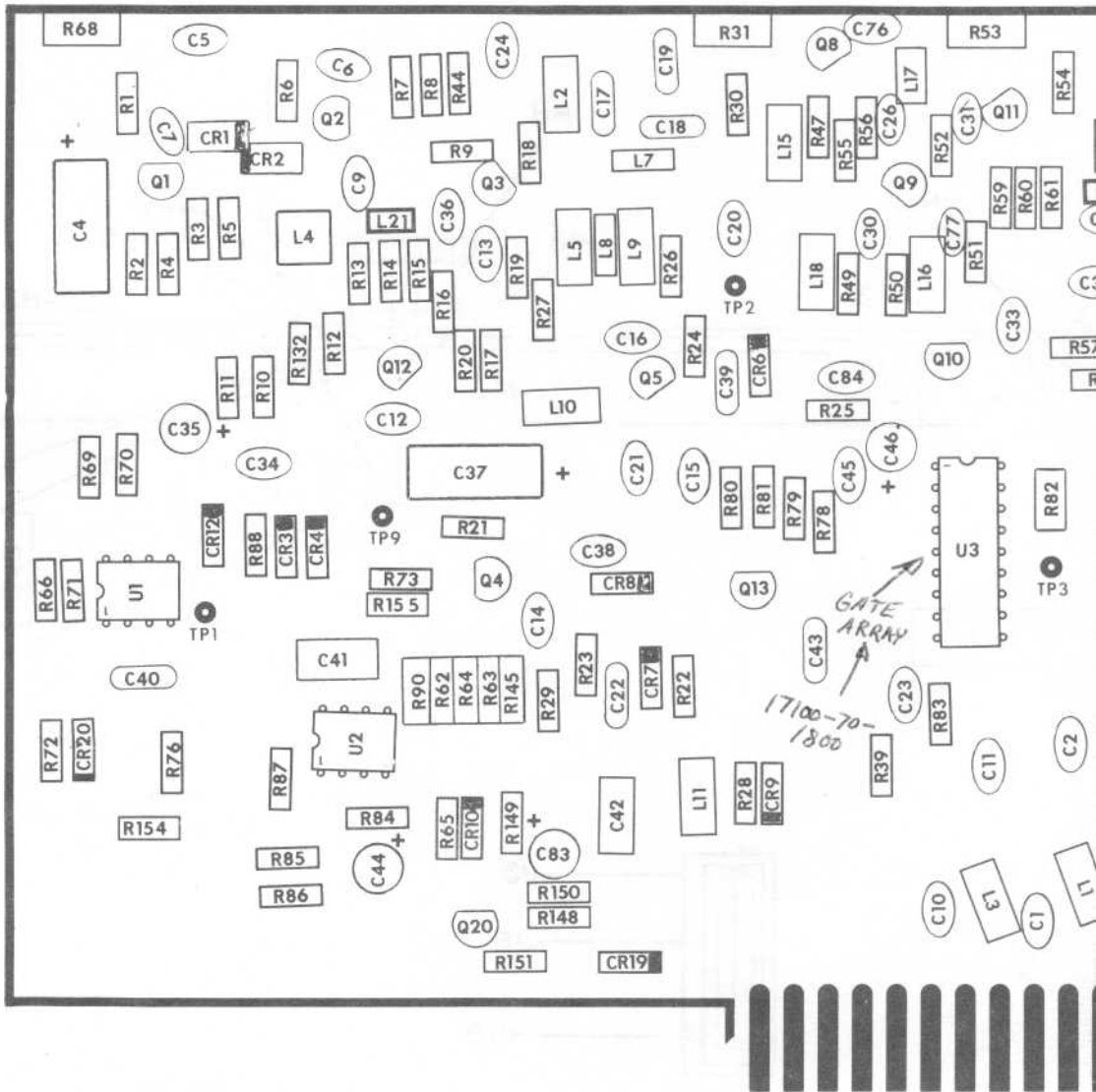
3000B SVC. MONITOR
11010-70-0004

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
MP2	GROUND STRAP	11417-01-0220	4J835	11417-01-0220	1
MP1	COVER, A2	11417-60-0250	4J835	11417-60-0250	1
C59, C74	CAP, DISC, 1KV, .001UF	5GAD10	56289	11510-10-1102	2
C15, C34	CAP, DISC, 1KV, .002UF	5GAD20	56289	11510-10-1202	2
C70	CAP, MON, 50V, 1UF	3420-050-E105M	96095	11510-11-3105	1
C39	CAP, MON, 50V, 10PF	RA50-100DA	51406	11510-11-8100	1
C72	CAP, DISC, 25V, .1UF	UK25-104	71590	11510-14-1104	1
C1, C2, C3, C5, C6, C7, C9, C10, C11, C12, C13, C14, C16, C20, C21, C23, C24, C26, C27, C28, C29, C30, C31, C32, C33, C36, C38, C45, C47, C49, C50, C51, C52, C54, C60, C61, C63, C64, C76, C77, C84, C88	CAP, DISC, .05UF	UK25-503	71590	11510-14-1503	42
C48	CAP, ELEC, 25V, 100UF	TE1211	56289	11510-20-4101	1
C44, C46, C55, C62	CAP, TANT, 20V, 10UF	196D106X9020JA1	56289	11510-25-2100	4
C35, C73, C83	CAP, TANT, 35V, 1UF	196D105X9035HA1	56289	11510-25-3109	3
C65, C66	CAP, TANT, 35V, 4.7UF	196D475X9035JA1	56289	11510-25-3479	2
C4, C37	CAP, ELEC, 16V, 470UF	500D477M016DD2	56289	11510-25-8471	2
C68, C69	CAP, TANT, 20V, 47UF	196D476X9020PE4	56289	11510-26-4470	2
C58	CAP, COMP, 500V, 6.8PF	QC-6.8PF	95121	11510-40-0689	1
C90	CAP, COMP, 500V, 4.7PF	MC-4.7PF	95121	11510-40-1479	1
C57, C79, C81	CAP, MICA, 500V, 100PF	DM15-101J	81349	11510-50-0101	3
C75	CAP, MICA, 500V, 120PF	DM15-121J	81349	11510-50-0121	1
C43, C56	CAP, MICA, 500V, 180PF	DM15-181J	81349	11510-50-0181	2
C80	CAP, MICA, 500V, 27PF	CM05ED270J03	81349	11510-50-0270	1
C22, C53	CAP, MICA, 500V, 330PF	DM15-331J	81349	11510-50-0331	2
C19	CAP, MICA, 500V, 39PF	CM05ED390J03	81349	11510-50-0390	1
C40	CAP, MICA, 500V, 47PF	CM05ED470J03	81349	11510-50-0470	1
C25, C78	CAP, MICA, 500V, 56PF	CM05ED560J03	81349	11510-50-0560	2
C17	CAP, MICA, 500V, 68PF	DM15-680J	81349	11510-50-0680	1
C82	CAP, MICA, 500V, 82PF	CM05ED820J03	81349	11510-50-0820	1
C18	CAP, MICA, 500V, 18PF	CM05CD180J03	81349	11510-50-8180	1
C41	CAP, FILM, 100V, .33UF	160/.33/10/100/E	55112	11510-60-7334	1
C42, C71	CAP, FILM, .1UF	225P10491WD3	56289	11510-61-7104	2
C89	10/60PF VARIABLE CAP	300305610	52763	11510-71-0600	1
PCBA2	DS PCB, REV H, A2 3000B	11717-00-0027	4J835	11717-00-0027	1
L21	CHOKE, COATED, 2.2UH	08N2R2	97469	11810-03-0229	1
L22	CHOKE, COATED, .39UH	08NR39	97469	11810-03-0398	1
L23	CHOKE, COATED, 3.9UH	08N3R9	97469	11810-03-0399	1
L1, L3, L6	CHOKE	VK20010/3B	02114	11810-09-0001	3
L7, L8	CHOKE, MOLDED, 6.8UH	1025-40	99800	11810-10-0689	2
L2, L5, L9, L10, L11, L12, L15, L16, L17, L18	CHOKE, MOLDED, 82UH	1537-72	99800	11810-10-0820	10
L4, L13, L14	COIL, VAR, 1.01/1.18UH N3	11811-00-0006	4J835	11811-00-0006	3

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
L19, L20	COIL, VAR, 0.47 UH, N6	11811-00-0007	4J835	11811-00-0007	2
J1	CONN, RF, STR. JACK, RA	2009-1511-000	19505	12110-08-0006	1
J2, J3	IC SOCKET, 18-PIN	C841802	01295	12112-00-0022	2
H19	SOLDERTAB	38-211	73734	12112-03-0009	1
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9	TESTPOINTS	39-211	73734	12112-19-0005	9
H1, H2, H3	BRACKET, RT. ANGLE	612	91833	12810-09-0019	3
HS1, HS2	HEATSINK	6011B	13103	12810-11-0017	2
H4, H5, H6	L, NUT, 4-40 1/4 X .076	9040	73734	12810-15-0009	3
H7, H8	NUT, KNURLED	1316C	83330	12810-16-0022	2
H9, H10	SCW, PPH, 10-32 X 3/8 STAINLESS	23084	73734	12810-23-0057	2
H11, H12, H13, H14, H15, H16	SEMS, 4-40 X 1/4, PPH INT	12810-23-0085	4J835	12810-23-0085	6
H17, H18	I, LW, 1/4 X .408 X .018 HW102-000	30-120	73734	12810-28-0001	2
MX1	MIXER, DBL. BAL.	SBL-1-DBL	15542	13010-54-0004	1
R31, R68	POT, 1K	3386W-1-102	80294	14610-02-0102	2
R119	POT, 10K	3386W-1-103	80294	14610-02-0103	1
R53	POT, 5K	3386W-1-502	80294	14610-02-0502	1
R1, R43	RES, C, 1/4W, 5% 100	RCR07G101JS	81349	14700-15-1000	2
R120, R148, R152, R16, R21, R39, R49, R59, R65	RES, C, 1/4W, 5%, 1K	RCR07G102JS	81349	14700-15-1001	9
R126, R17, R37, R69, R86	RES, C, 1/4W 5%, 10K	RCR07G103JS	81349	14700-15-1002	5
R130, R131, R32, R44	RES, C, 1/4W, 5%, 100K	RCR07G104JS	81349	14700-15-1003	4
R100	RES, C, 1/4W, 5%, 1.1K	RCR07G112JS	81349	14700-15-1101	1
R54, R78	RES, C, 1/4W, 5%, 120	RCR07G121JS	81349	14700-15-1200	2
R60, R79	RES, C, 1/4W, 5%, 1.2K	RCR07G122JS	81349	14700-15-1201	2
R111, R113, R115, R24	RES, C, 1/4W, 5%, 12K	RCR07G123JS	81349	14700-15-1202	4
R71	RES, C, 1/4W, 5%, 120K	RCR07G124JS	81349	14700-15-1203	1
R70	RES, C, 1/4W, 5%, 13K	RCR07G133JS	81349	14700-15-1302	1
R9, R15, R151, R28, R47	RES, C, 1/4W, 5%, 150	RCR07G151JS	81349	14700-15-1500	5
R132, R153, R57	RES, C, 1/4W, 5%, 1.5K	RCR07G152JS	81349	14700-15-1501	3
R102, R103	RES, C, 1/4W, 5%, 15K	RCR07G153JS	81349	14700-15-1502	2
R127	RES, C, 1/4W, 5%, 150K	RCR07G154JS	81349	14700-15-1503	1
R64	RES, C, 1/4W, 5%, 1.8K	RCR07G182JS	81349	14700-15-1801	1
R42, R96	RES, C, 1/4W, 5%, 18K	RCR07G183JS	81349	14700-15-1802	2
R109	RES, C, 1/4W, 5%, 18	RCR07G180JS	81349	14700-15-1809	1
R110, R116	RES, C, 1/4W, 5%, 220	RCR07G221JS	81349	14700-15-2200	2
R128, R33, R36, R62, R90, R93	RES, C, 1/4W, 5%, 2.2K	RCR07G222JS	81349	14700-15-2201	6
R4, R11, R12, R92, R97	RES, C, 1/4W, 5%, 22K	RCR07G223JS	81349	14700-15-2202	5
R10, R87	RES, C, 1/4W, 5%, 220K	RCR07G224JS	81349	14700-15-2203	2
R88	RES, C, 1/4W, 5%, 2.4K	RCR07G242JS	81349	14700-15-2401	1
R7, R107, R108, R94	RES, C, 1/4W, 5%, 270	RCR07G271JS	81349	14700-15-2700	4

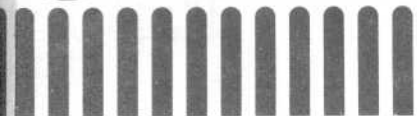
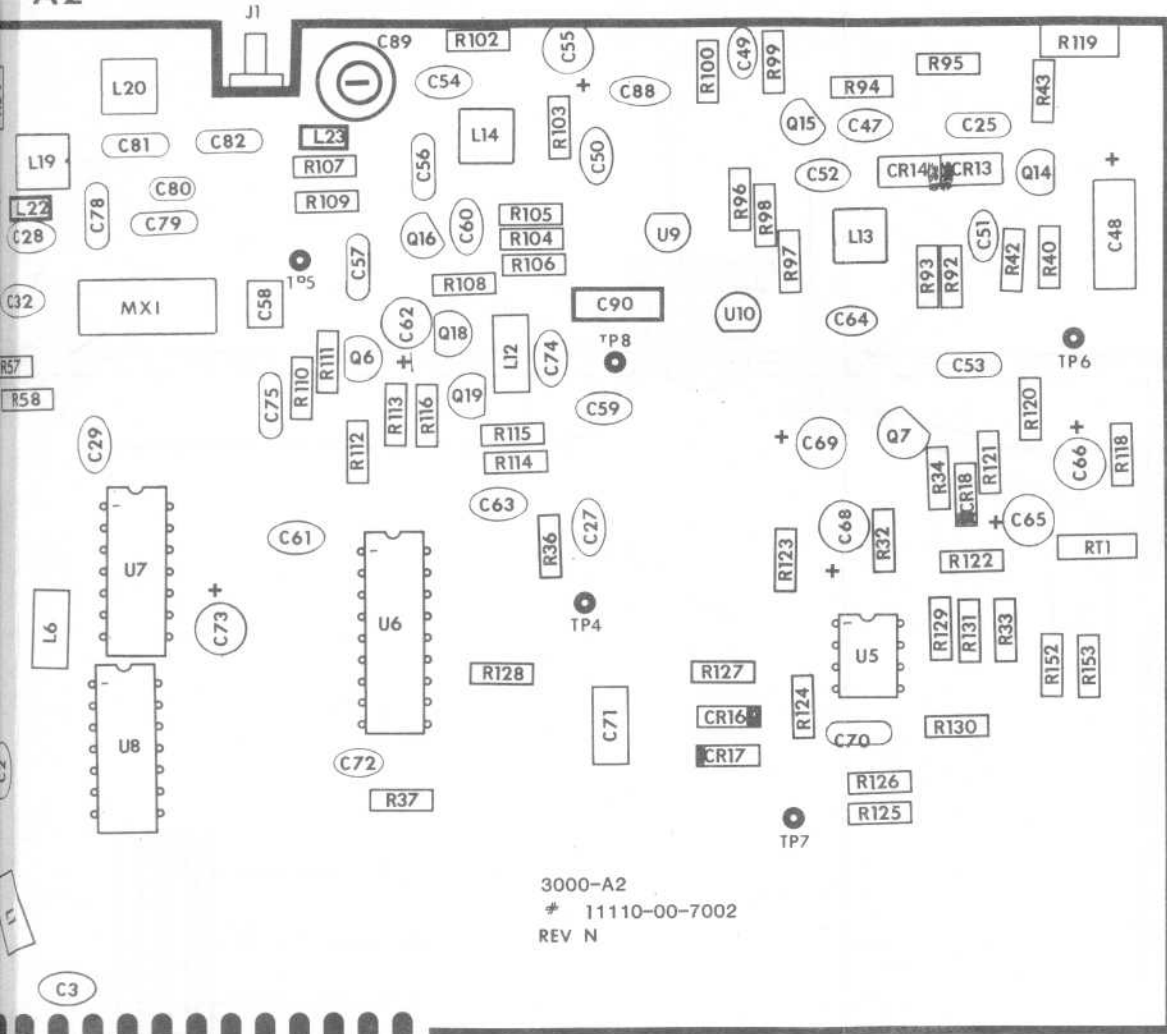
REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
R22, R83, R84	RES, C, 1/4W, 5%, 2.7K	RCR07G272JS	81349	14700-15-2701	3
R63	RES, C, 1/4W, 5%, 27K	RCR07G273JS	81349	14700-15-2702	1
R8, R106	RES, C, 1/4W, 5%, 330	RCR07G331JS	81349	14700-15-3300	2
R154, R155	RES, C, 1/4W, 5%, 3.3M	RCR07G335JS	81349	14700-15-3304	2
R61	RES, C, 1/4W, 5%, 33	RCR07G330JS	81349	14700-15-3309	1
R30, R80	RES, C, 1/4W, 5%, 390	RCR07G391JS	81349	14700-15-3900	2
R29, R81	RES, C, 1/4W, 5%, 3.9K	RCR07G392JS	81349	14700-15-3901	2
R25	RES, C, 1/4W, 5%, 39K	RCR07G393JS	81349	14700-15-3902	1
R6, R19, R95	RES, C, 1/4W, 5%, 470	RCR07G471JS	81349	14700-15-4700	3
R118, R122, R123, R40, R56, R62, R98	RES, C, 1/4W, 5%, 4.7K	RCR07G472JS	81349	14700-15-4701	7
R125, R66, R85	RES, C, 1/4W, 5%, 51K	RCR07G513JS	81349	14700-15-5102	3
R23	RES, C, 1/4W, 5%, 51	RCR07G510JS	81349	14700-15-5109	1
R114, R150, R20, R26, R27, R50	RES, C, 1/4W, 5%, 560	RCR07G561JS	81349	14700-15-5600	6
R5, R121, R145, R58	RES, C, 1/4W, 5%, 5.6K	RCR07G562JS	81349	14700-15-5601	4
R124	RES, C, 1/4W, 5%, 56K	RCR07G563JS	81349	14700-15-5602	1
R112, R14, R18	RES, C, 1/4W, 5%, 680	RCR07G681JS	81349	14700-15-6800	3
R34	RES, C, 1/4W, 5%, 6.8K	RCR07G682JS	81349	14700-15-6801	1
R3, R129, R13	RES, C, 1/4W, 5%, 68K	RCR07G683JS	81349	14700-15-6802	3
R2, R105, R149, R55	RES, C, 1/4W, 5%, 820	RCR07G821JS	81349	14700-15-8200	4
R104	RES, C, 1/4W, 5%, 8.2K	RCR07G822JS	81349	14700-15-8201	1
R99	RES, C, 1/4W, 5%, 82	RCR07G820JS	81349	14700-15-8209	1
R52	RES, C, 1/4W, 5%, 9.1K	RCR07G912JS	81349	14700-15-9101	1
R76	RES, MF, 1/8W, 1%, 100	RN55D1000FM	81349	14701-03-1000	1
R72, R73	RES, MF, 1/8W, 1%, 100K	RN55D1003FM	81349	14701-03-1003	2
R51	RES, MF, 1/8W, 1%, 110	RN55D1100FM	81349	14701-03-1100	1
CR10	DIODE, ZENER, 9.1V	1N5239	80131	14801-01-5239	1
CR1, CR2, CR13, CR14	DIODE, VARACTOR	MV2308	04713	14803-02-0012	4
CR8, CR9	DIODE, VARACTOR	1N5767	80131	14803-02-0018	2
CR3, CR4, CR7, CR12, CR16, CR17, CR18, CR19	DIODE, SIGNAL	1N914	80131	14807-01-0914	8
CR6, CR20	DIODE, SIGNAL	HSCH1001	28480	14807-01-6263	2
Q8, Q9	TRANSISTOR	PN2222	27014	14901-02-2220	2
Q1, Q2, Q3, Q5, Q11, Q16, Q14, Q15	TRANSISTOR	2N3563	80131	14901-03-5630	8
Q4, Q10, Q13, Q20	TRANSISTOR	PN4121-18	27014	14901-04-1210	4
Q12	TRANSISTOR	PN4356-5	27014	14901-04-3560	1
Q6, Q7, Q18, Q19	TRANSISTOR	PN4275	27014	14902-04-2750	4
RT1	THRMSTR, 1K	CA31J1	15801	15310-00-0006	1
U2	OP AMP	LF351N	27014	17000-00-8100	1
U1, U5	DUAL OP AMP	TL082CP	01295	17000-00-8200	2
U9	VOLTAGE REG, 12	LM78L12ACZ	27014	17000-78-1220	1
U10	VOLT REG, -12	LM79L12ACZ	27014	17000-79-1210	1

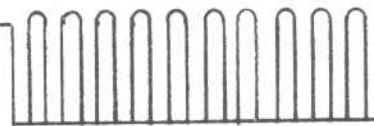
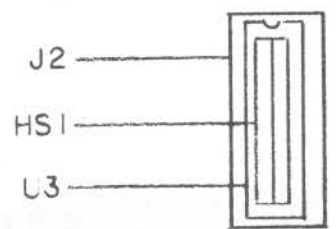
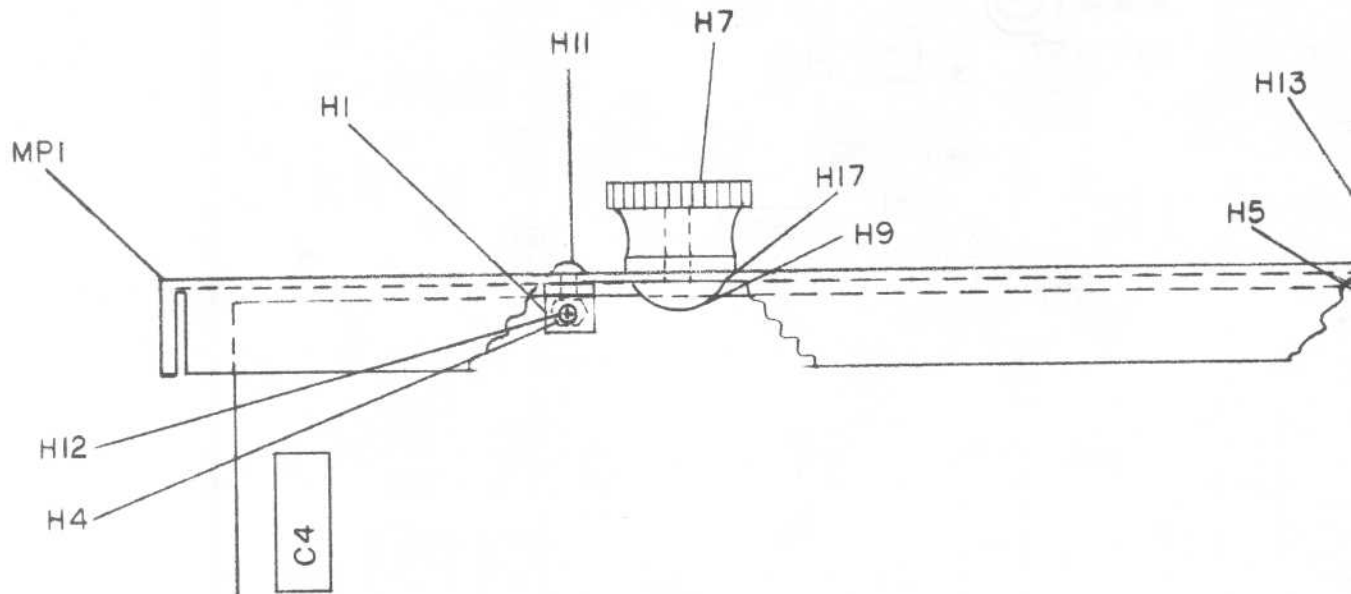
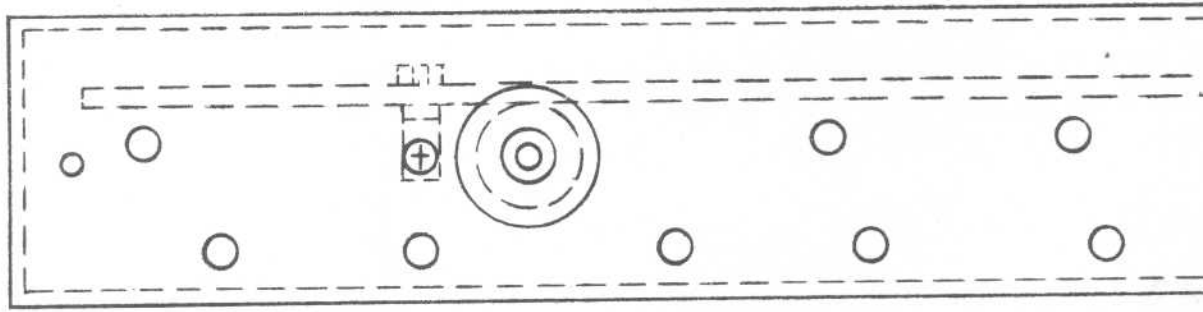
REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
U3, U6	GATE ARRAY SS	17100-70-1800	4J835	17100-70-1800	2
U7, U8	DECADE COUNTER	DM74LS90N	27014	18000-74-9011	2
CT SYSTEMS PARTS LIST	TITLE IF PLL BD, A2	ASSEMBLY NO. 11110-00-7002	REV. N	PAGE 6.12	



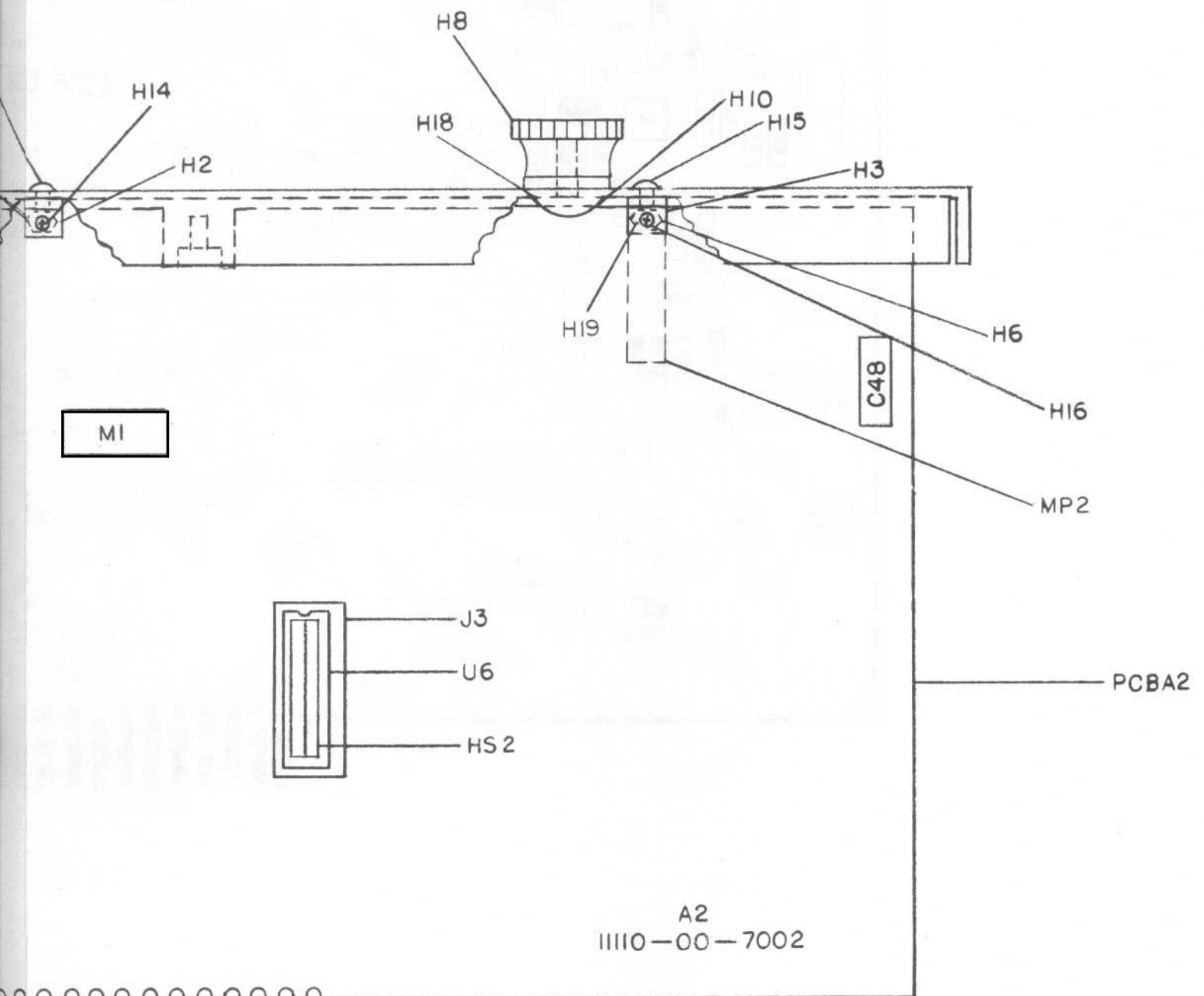
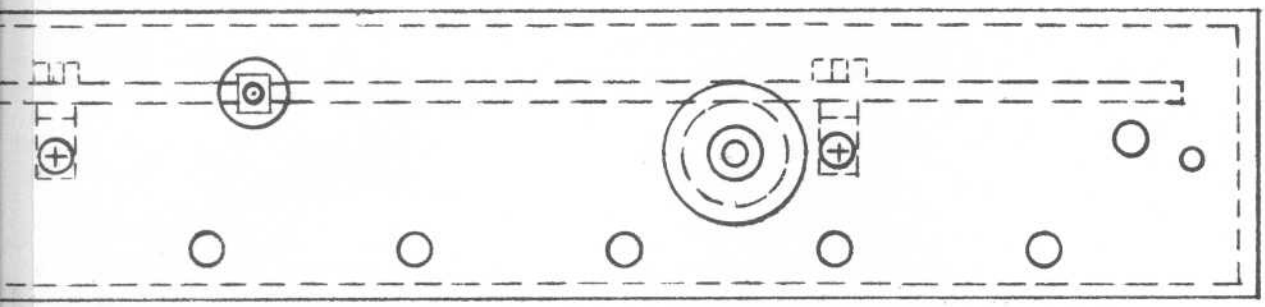
17100-70-1800
GATE ARRAY

A2





A2



A2
11110-00-7002

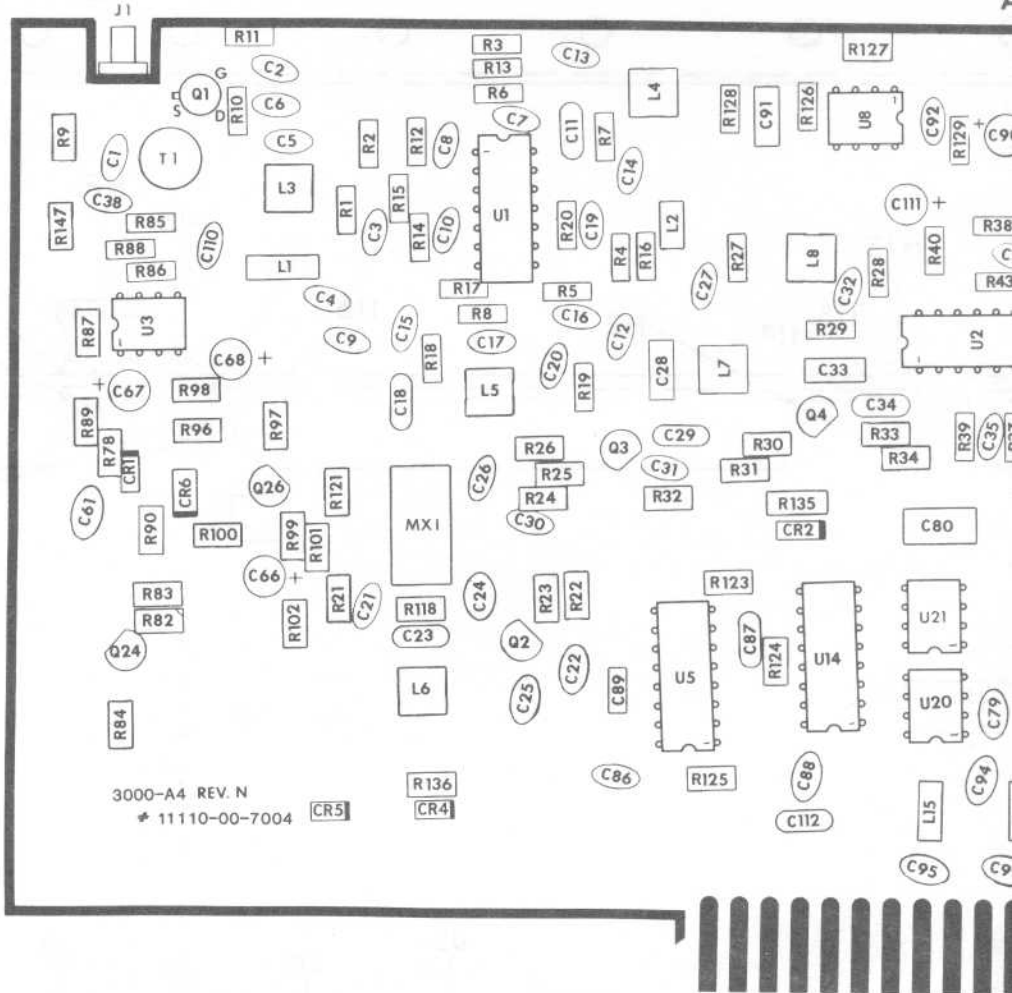
IF PLL BD, A2
11110-00-7002
SHT. 2 OF 2

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
T1	XFMR, BIFILAR	11210-43-0011	4J835	11210-43-0011	1
MP1	COVER, A4	11417-60-0180	4J835	11417-60-0180	1
C69	CAP, DISC, 1KV, .001 UF	5GAD10	56289	11510-10-1102	1
C40, C42, C49, C54	CAP, DISC, 1KV, 330PF	10TCU-T33	56289	11510-10-3331	4
C1, C2, C3, C4, C7, C8, C9, C10, C101, C104, C106, C110, C12, C13, C14, C15, C16, C19, C20, C21, C22, C25, C38, C78, C79, C81, C86, C88, C94, C95, C96, C97, C98, C99	CAP, DISC, .01UF	UK25-103	71590	11510-14-1103	34
C100, C109, C26, C27, C30, C31 C32, C35, C36, C61, C76, C84	CAP, DISC, .05UF	UK25-503	71590	11510-14-1503	12
C103	CAP, MON, 50V, .22UF	C330C224M5U1CA	57185	11510-14-6224	1
C66, C73, C75, C82, C83, C85, C90	CAP, TANT, 20V, 10UF	196D106X9020JA1	56289	11510-25-2100	7
C108, C111, C37, C39, C41, C43, C44, C45, C46, C47, C48, C50, C51, C52, C53, C55, C56, C57, C58, C59, C60, C67, C68, C77, C93	CAP, TANT, 35V, 1UF	196D105X9035HA1	56289	11510-25-3109	25
C102	CAP, ELEC, 16V, 470UF	500D477M016DD2	56289	11510-25-8471	1
C5, C11	CAP, MICA, 500V, 100PF	DM15-101J	81349	11510-50-0101	2
C113, C23, C34	CAP, MICA, 500V, 120PF	DM15-121J	81349	11510-50-0121	3
C6	CAP, MICA, 500V, 15PF	DM15-150J	81349	11510-50-0150	1
C92	CAP, MICA, 500V, 150PF	CM05FD151J03	81349	11510-50-0151	1
C72	CAP, MICA, 500V, 180PF	DM15-181J	81349	11510-50-0181	1
C112	CAP, MICA, 500V, 220PF	DM15-221J	81349	11510-50-0221	1
C71	CAP, MICA, 500V, 27PF	CM05ED270J03	81349	11510-50-0270	1
C65	CAP, MICA, 500V, 270PF	DM15-271J	81349	11510-50-0271	1
C70	CAP, MICA, 500V, 330PF	DM15-331J	81349	11510-50-0331	1
C24	CAP, MICA, 500V, 39PF	CM05ED390J03	81349	11510-50-0390	1
C87	CAP, MICA, 500V, 470PF	DM15-471J	81349	11510-50-0471	1
C105, C74	CAP, MICA, 500V, 560PF	DM15-561J	81349	11510-50-0561	2
C107	CAP, MICA, 500V, 68PF	DM15-680J	81349	11510-50-0680	1
C17, C29	CAP, MICA, 500V, 82PF	CM05ED820J03	81349	11510-50-0820	2
C114, C115, C116, C117	CAP, MICA, 100V, 250PF	ADM10CA251J	24652	11510-50-5251	4
C18, C64	CAP, MICA, 500V, 18PF	CM05CD180J03	81349	11510-50-8180	2
C62	CAP, FILM, 100V, .33UF	160/.33/10/100/E	55112	11510-60-7334	1
C28, C33, C89	CAP, FILM, .0012UF	225P12291WD3	56289	11510-61-7122	3
C91	CAP, FILM, .0018UF	225P18291WD3	56289	11510-61-7182	1
C63	CAP, FILM, .0056UF	225P56291WD3	56289	11510-61-7562	1
C80	CAP, FILM, .82UF	160/.82.10/100/H	55112	11510-62-2824	1
PCBA4	DS PCB, REV J, A4, 3000B	11717-00-0028	4J835	11717-00-0028	1
L13, L15, L16, L17	CHOKE	VK20010/3B	02114	11810-09-0001	4
L1, L2	CHOKE, MOLDED, 39UH	1025-58	99800	11810-10-0390	2
L9, L10, L11, L12, L14	COIL, VAR, 76/109UH, N2	11811-00-0005	4J835	11811-00-0005	5
L7, L8	COIL, VAR, 1.01/1.18UH, N3	11811-00-0006	4J835	11811-00-0006	2

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
L3, L4, L5, L6	COIL, VAR, 0.47UH, N6	11811-00-0007	4J835	11811-00-0007	4
J1	CONN, RF, STR. JACK, RA	2009-1511-000	19505	12110-08-0006	1
J2, J3, J4,	IC SKT, 8 PIN	DILB-8P-108	09922	12112-00-0007	3
J5, J6, J7, J8, J9	IC SKT, 14PIN	C931402	01295	12112-00-0011	5
H1, H2, H3	BRACKET, RT. ANGLE	612	91833	12810-09-0019	3
H4, H5, H6	L, NUT, 40-40 1/4 X .076	9040	73734	12810-15-0009	3
H7, H8	NUT, KNURLED	1316C	83330	12810-16-0022	2
H9, H10	SCW, PPH, 10-32 X 3/8 STAINLESS	23084	73734	12810-23-0057	2
H11, H12, H13, H14, H15, H16	SEMS, 4-40 X 1/4, PPHINT	12810-23-0085	4J835	12810-23-0085	6
H17, H18	I, LW, 1/4 X .408 X .018 HW102-000	30-120	73734	12810-28-0001	2
MX1	MIXER, DBL. BAL.	SBL-1-DBL	15542	13010-54-0004	1
R111	POT, 1K	3386W-1-102	80294	14610-02-0102	1
R127, R64	POT, 10K	3386W-1-103	80294	14610-02-0103	2
R92	POT, 100K	3386W-1-104	80294	14610-02-0104	1
R65	POT, 5K	3386W-1-502	80294	14610-02-0502	1
R119, R43	RES, C, 1/4W, 5%, 100	RCR07G101JS	81349	14700-15-1000	2
R7, R115, R118, R131, R14, R42, R20, R21, R33, R36, R38, R40	RES, C, 1/4W, 5%, 1K	RCR07G102JS	81349	14700-15-1001	12
R107, R113, R123, R140, R141, R88, R98	RES, C, 1/4W, 5%, 10K	RCR07G103JS	81349	14700-15-1002	7
R149, R15	RES, C, 1/4W, 5%, 100K	RCR07G104JS	81349	14700-15-1003	2
R148	RES, C, 1/4W, 5%, 1M	RCR07G105JS	81349	14700-15-1004	1
R134	RES, C, 1/4W, 5%, 120	RCR07G121JS	81349	14700-15-1200	1
R11, R25, R31	RES, C, 1/4W, 5%, 1.2K	RCR07G122JS	81349	14700-15-1201	3
R139	RES, C, 1/4W, 5%, 12K	RCR07G123JS	81349	14700-15-1202	1
R9, R99	RES, C, 1/4W, 5%, 1.5K	RCR07G152JS	81349	14700-15-1501	2
R12, R122, R16	RES, C, 1/4W, 5%, 15K	RCR07G153JS	81349	14700-15-1502	3
R120, R138	RES, C, 1/4W, 5%, 150K	RCR07G154JS	81349	14700-15-1503	2
R86	RES, C, 1/4W, 5%, 18K	RCR07G183JS	81349	14700-15-1802	1
R100, R101, R102, R126, R23, R37, R90	RES, C, 1/4W, 5%, 2.2K	RCR07G222JS	81349	14700-15-2201	7
R124, R132	RES, C, 1/4W, 5%, 22K	RCR07G223JS	81349	14700-15-2202	2
R135, R91	RES, C, 1/4W, 5%, 220K	RCR07G224JS	81349	14700-15-2203	2
R142	RES, C, 1/4W, 5%, 2.2M	RCR07G225JS	81349	14700-15-2204	1
R87	RES, C, 1/4W, 5%, 24K	RCR07G243JS	81349	14700-15-2402	1
R3, R5, R147	RES, C, 1/4W, 5%, 270	RCR07G271JS	81349	14700-15-2700	3
R112, R117, R136, R56, R59, R63, R66	RES, C, 1/4W, 5%, 2.7K	RCR07G272JS	81349	14700-15-2701	7
R2, R4, R144, R145, R19, R93	RES, C, 1/4W, 5%, 27K	RCR07G273JS	81349	14700-15-2702	6
R26, R30	RES, C, 1/4W, 5%, 27	RCR07G270JS	81349	14700-15-2709	2
R96	RES, C, 1/4W, 5%, 300K	RCR07G304JS	81349	14700-15-3003	1
CT SYSTEMS PARTS LIST	TITLE IF AMP BD, A4	ASSEMBLY NO. 11110-00-7004	REV. N	PAGE 6.14	

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
R6, R8, R106, R108, R13, R143, R17, R18, R45, R47, R49, R51	RES, C, 1/4W, 5%, 3.3K	RCR07G332JS	81349	14700-15-3301	12
R10, R116, R129, R34, R35, R85, R97	RES, C, 1/4W, 5%, 33K	RCR07G333JS	81349	14700-15-3302	7
R29, R69, R70, R71, R72, R73, R74, R75, R76	RES, C, 1/4W, 5%, 3.9K	RCR07G392JS	81349	14700-15-3901	9
R146, R52, R55, R62	RES, C, 1/4W, 5%, 39K	RCR07G393JS	81349	14700-15-3902	4
R151	RES, C, 1/4W, 5%, 39	RCR07G390JS	81349	14700-15-3909	1
R133, R27, R28, R54, R57, R60, R84	RES, C, 1/4W, 5%, 4.7K	RCR07G472JS	81349	14700-15-4701	7
R121	RES, C, 1/4W, 5%, 470K	RCR07G474JS	81349	14700-15-4703	1
R137	RES, C, 1/4W, 5%, 4.7M	RCR07G475JS	81349	14700-15-4704	1
R22, R39	RES, C, 1/4W, 5%, 51	RCR07G510JS	81349	14700-15-5109	2
R24, R32, R82, R89	RES, C, 1/4W, 5%, 5.6K	RCR07G562JS	81349	14700-15-5601	4
R44, R46, R48, R50	RES, C, 1/4W, 5%, 56K	RCR07G563JS	81349	14700-15-5602	4
R68	RES, C, 1/4W, 5%, 680	RCR07G681JS	81349	14700-15-6800	1
R41	RES, C, 1/4W, 5%, 6.8K	RCR07G682JS	81349	14700-15-6801	1
R78	RES, C, 1/4W, 5%, 68	RCR07G680JS	81349	14700-15-6809	1
R109	RES, C, 1/4W, 5%, 7.5K	RCR07G752JS	81349	14700-15-7501	1
R1, R53, R58, R61	RES, C, 1/4W, 5%, 820	RCR07G821JS	81349	14700-15-8200	4
R125, R128, R67, R83	RES, C, 1/4W, 5%, 8.2K	RCR07G822JS	81349	14700-15-8201	4
R105, R79, R81, R94, R95	RES, MF, 1/8W, 1%, 10K	RN55D1002FM	81349	14701-03-1002	5
R77, R80	RES, MF, 1/8W, 1%, 1M	RN55D1004FM	81349	14701-03-1004	2
R110	RES, MF, 1/8W, 1%, 1.82K	RN55D1821FM	81349	14701-03-1821	1
R114	RES, MF, 1/8W, 1%, 35.7K	RN55D3572FM	81349	14701-03-3572	1
R104	RES, MF, 1/8W, 1%, 61.9K	RN55D6192FM	81349	14701-03-6192	1
R103	RES, MF, 1/8W, 1%, 69.8K	RN55D6982FM	81349	14701-03-6982	1
CR1, CR4, CR5, CR7, CR8, CR10	DIODE, SIGNAL	1N914	80131	14807-01-0914	6
CR2, CR3, CR6, CR9	DIODE, SIGNAL	HSCH1001	28480	14807-01-6263	4
Q2, Q3, Q4	TRANSISTOR	2N3563	80131	14901-03-5630	3
Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13	TRANSISTOR	2N3565	80131	14901-03-5650	9
Q24, Q26	TRANSISTOR	PN4121-18	27014	14901-04-1210	2
Q1	JFET, N-CHANNEL, STATIC SENSITIVE	2N4416	80131	14901-04-4160	1
Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q21, Q22	TRANSISTOR	PN4275	27014	14902-04-2750	9
U10	OP AMP	LF351N	27014	17000-00-8100	1
U3, U6, U8, U13, U20	DUAL OP AMP	TL082CP	01295	17000-00-8200	5
U9, U11, U21	SPDT, ANALOG SWITCH, STATIC SENSITIVE	TL607CP	01295	17000-06-0700	3
U2	BAL MOD/DEMODO	LM1496N	27014	17000-07-9600	1
U1	TRANSISTOR ARRAY	LM3054N	27014	17000-30-5400	1
U7	TRANSISTOR ARRAY	LM3086N	27014	17000-30-8600	1
U15	OP AMP, BIMOS, STATIC SENSITIVE	CA3140E	02735	17000-31-4001	1

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFG PART NO	MFG/FCSM	PART NUMBER	QTY
U16	VOLT REG, +5V	MA78L05AWC	07263	17000-78-0501	1
U18	QUADEXCL. OR GATE, STATIC SENSITIVE	MC14070B	04713	18000-40-3010	1
U12, U17	QUAD 2-IN NAND, STAT. SENS.	MM74C00N	27014	18000-74-0011	2
U14	DUAL J-K FLIP-FLOP, STATIC SENSITIVE	MM74C76N	27014	18000-74-7611	1
U19	DECADE COUNTER, STATIC SENSITIVE	MM74C90N	27014	18000-74-9010	1
U4	MONOST MVBTR	DM74121N	27014	18007-41-2100	1
U5	DUAL MONOST MVBTR	DM74123N	27014	18007-41-2300	1



3000-A4 REV. N

★ 11110-00-7004

CR5

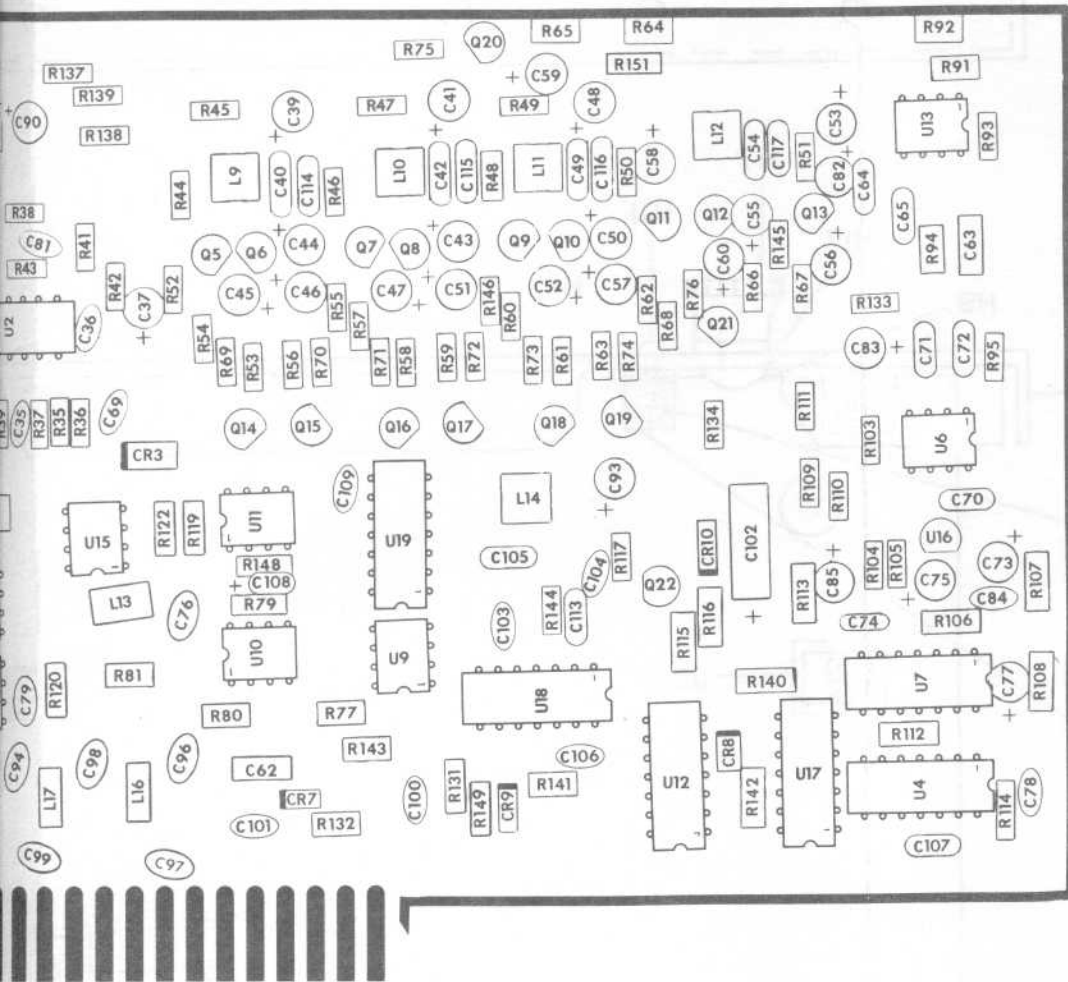
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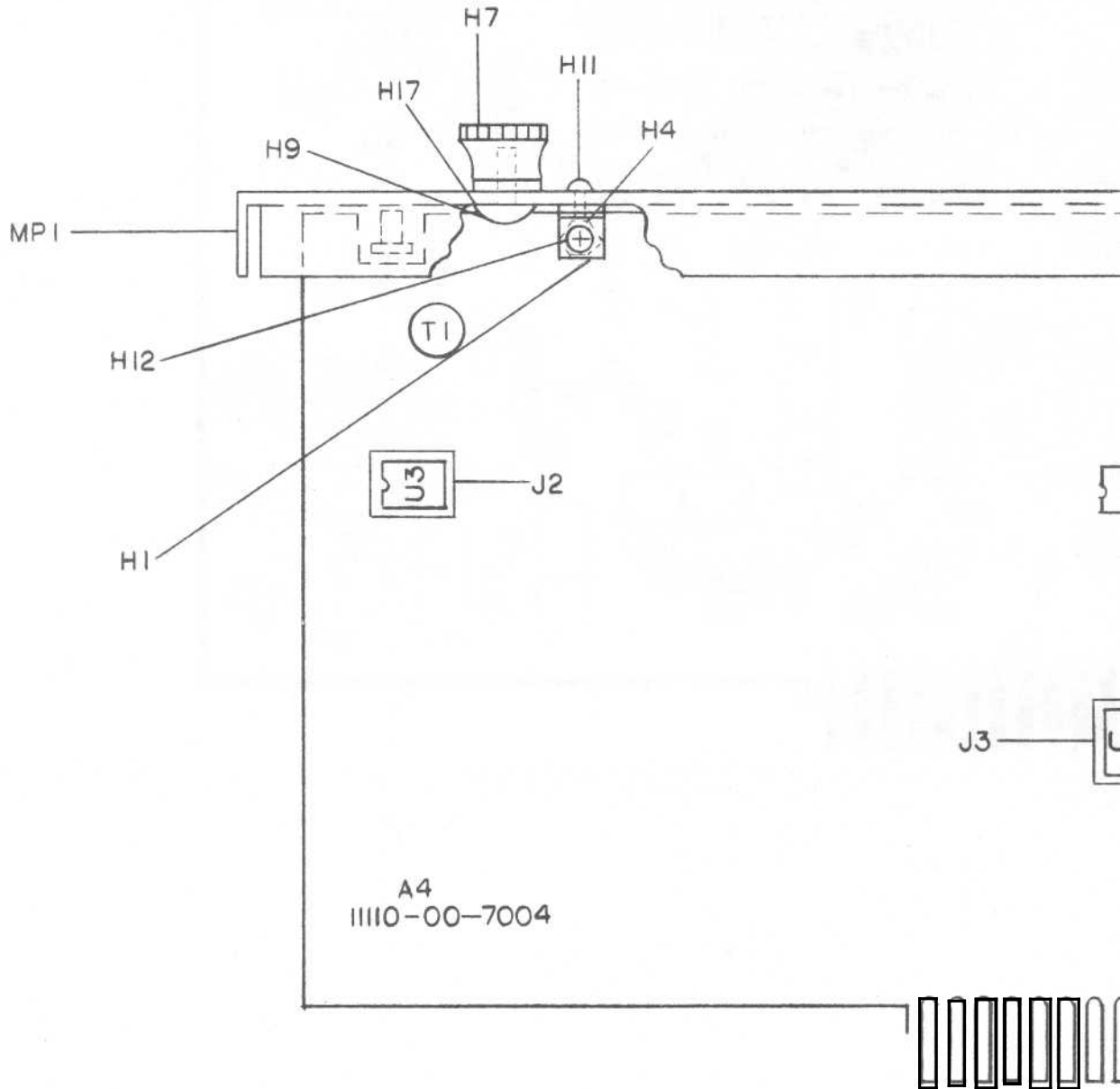
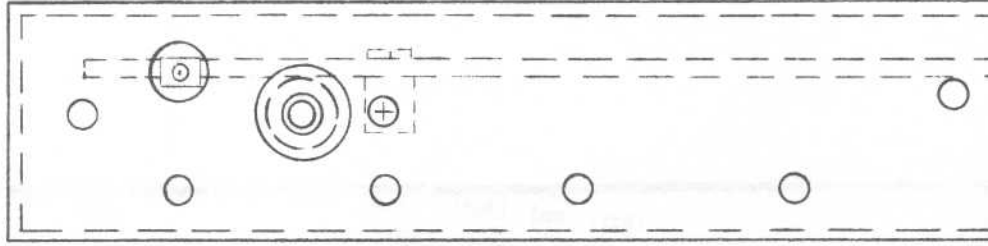
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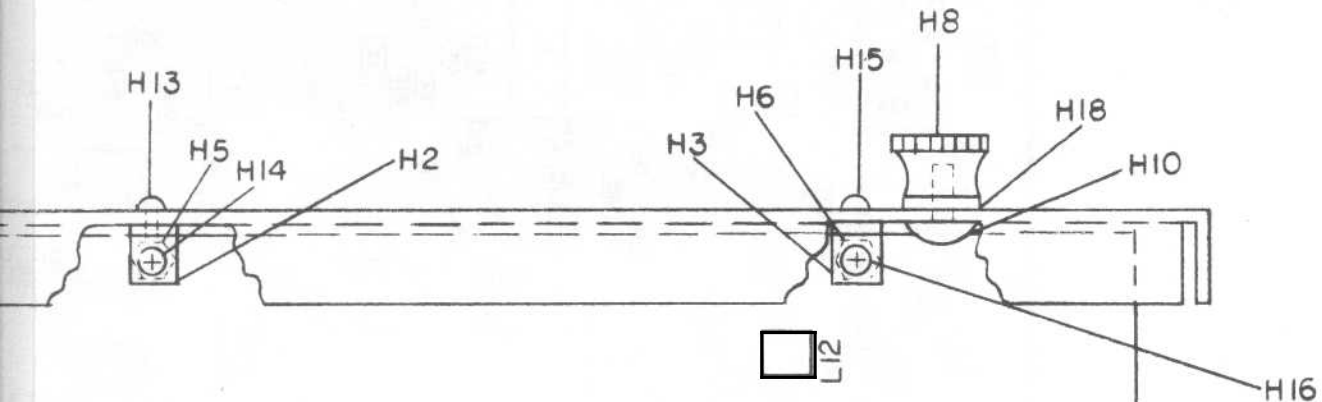
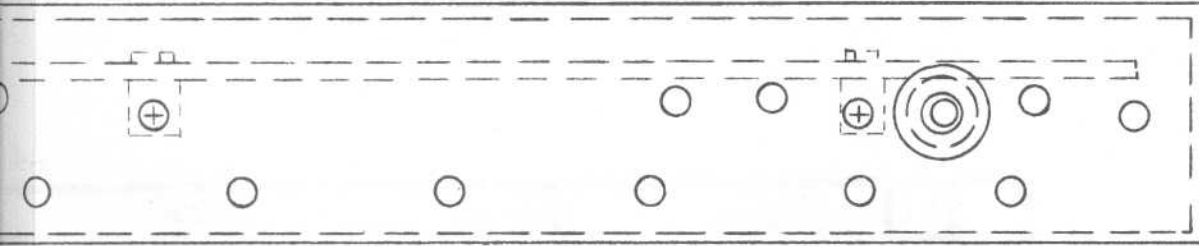
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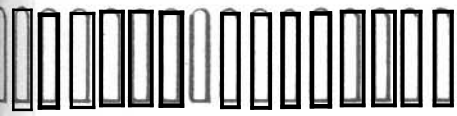
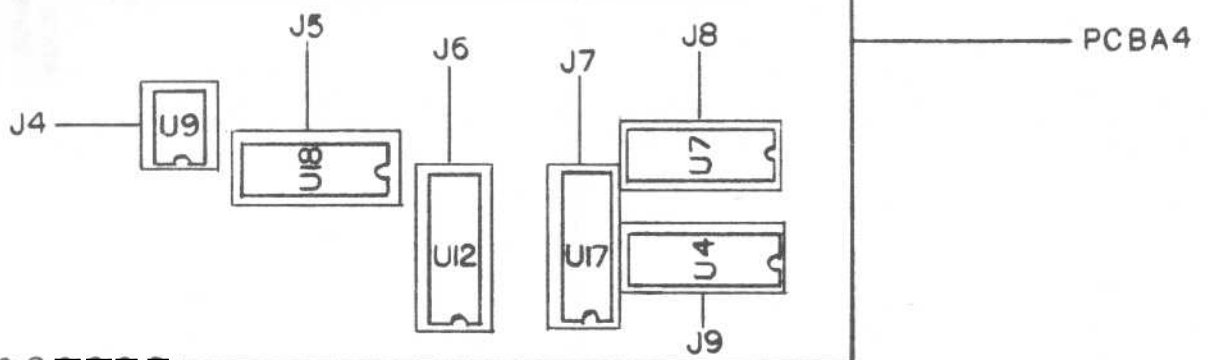


A4



U2

U21

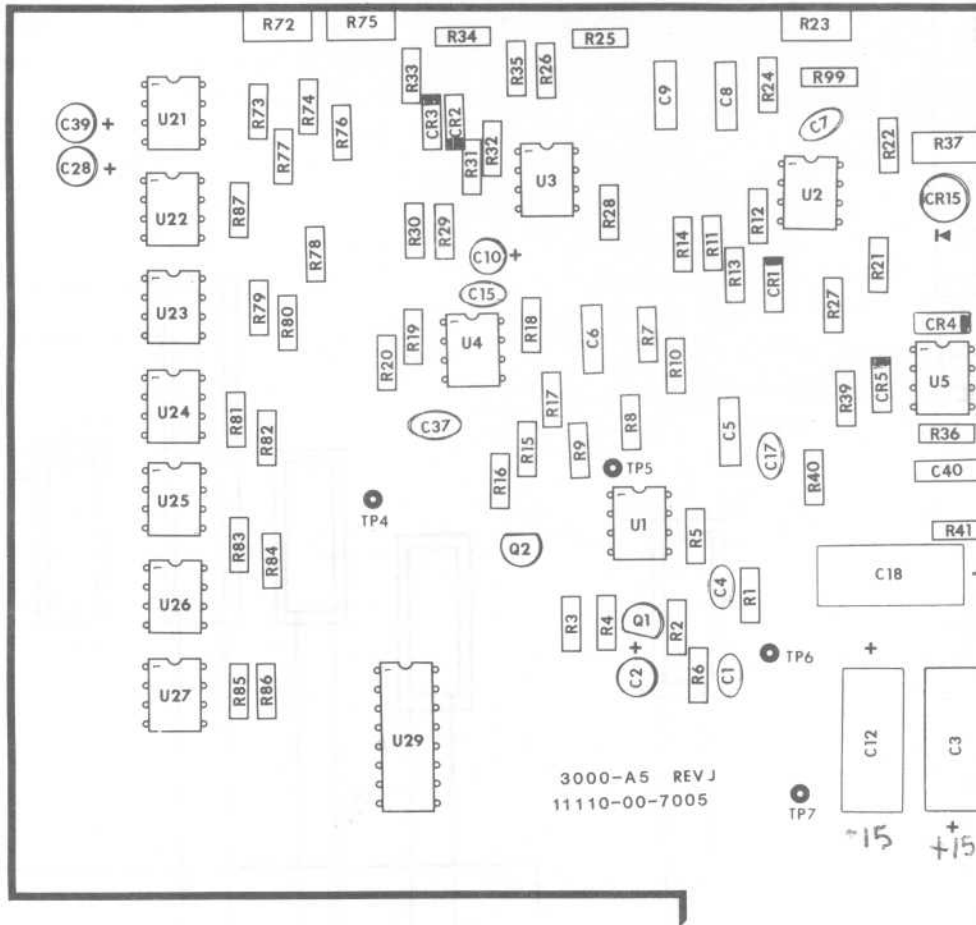


IF AMPLIFIER BD., A4
11110-00-7004
SHT. 2 OF 2

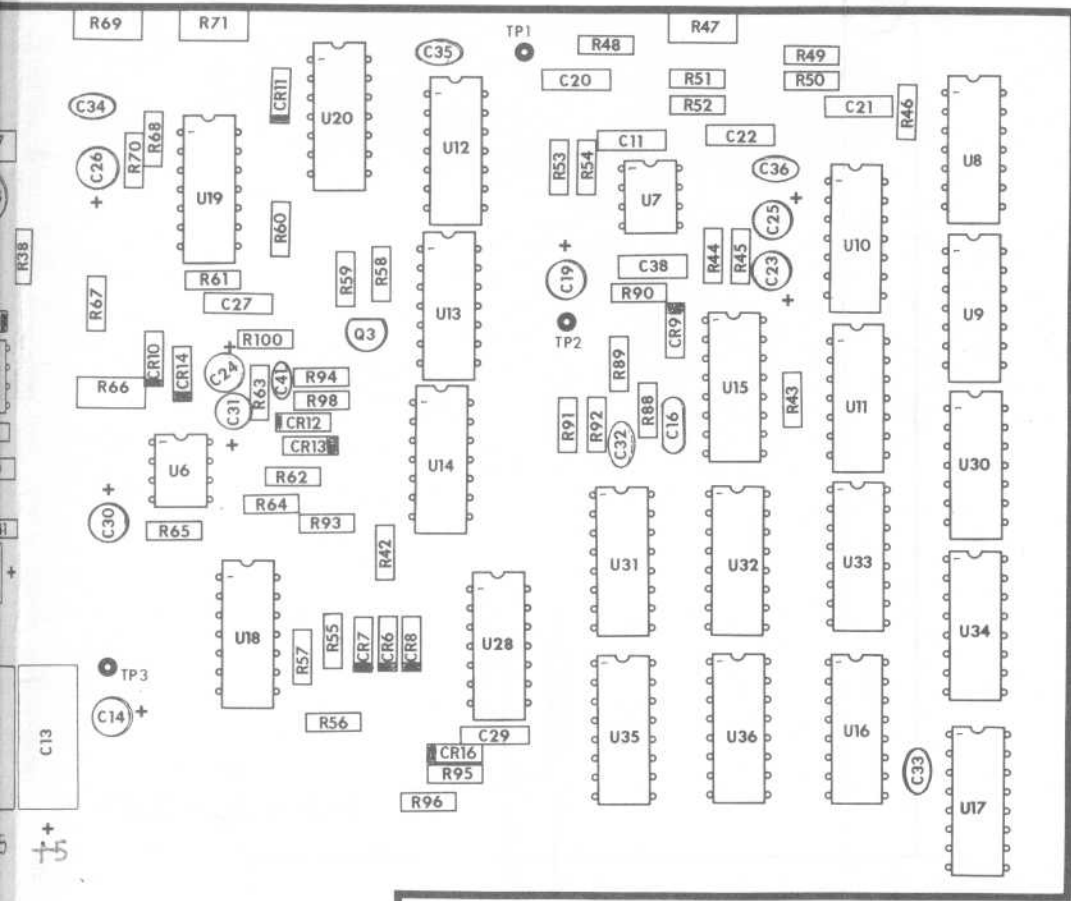
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C41	CAP, CER, 25V, .022UF	HY-525	56289	11510-11-9223	1
C8, C9	CAP, MON, 50V, .01UF	SR305A153JAA	96095	11510-13-2153	2
C1, C4, C32, C33, C34, C35, C36	CAP, DISC, .01UF	UK25-103	71590	11510-14-1103	7
C7, C15, C17, C37	CAP, DISC, .05UF	UK25-503	71590	11510-14-1503	4
C2, C19, C23, C24, C25, C28, C30, C31, C39	CAP, TANT, 20V, 10UF	196D106X9020JA1	56289	11510-25-2100	9
C10, C14, C26	CAP, TANT, 35V, 1UF	196D105X9035HA1	56289	11510-25-3109	3
C3, C12, C13, C18	CAP, ELEC, 16V, 100UF	500D107M016CB2	56289	11510-25-8102	4
C16	CAP, MICA, 500V, 470PF	DM15-471J	81349	11510-50-0471	1
C11, C20, C21, C22	CAP, FILM, 400V, .01UF	167/01/5/400/B	55112	11510-61-2103	4
C29	CAP, FILM, .1UF	225P10491WD3	56289	11510-61-7104	1
C40	CAP, FILM, .0012UF	225P12291WD3	56289	11510-61-7122	1
C27	CAP, FILM, .0022UF	225P22291WD3	56289	11510-61-7222	1
C5, C6, C38	CAP, FILM, .22UF	225P22491XD3	56289	11510-62-1224	3
PCBA5	DS PCB, REV J, A5, 3000B	11717-00-0016	4J835	11717-00-0016	1
J1	IC SKT, 8 PIN	DILB-8P-108	09922	12112-00-0007	1
J2, J3	IC SKT, 14 PIN	C931402	01295	12112-00-0011	2
J4, J5, J6, J7, J8, J9	IC SKT, 16 PIN.	DILB-16P-108	09922	12112-00-0012	6
TP1, TP2, TP3, TP4, TP5, TP6, TP7	TESTPOINTS	39-211	73734	12112-19-0005	7
H1, H2	CARD EJECTOR	5020-EJECTOR	13103	12810-12-0071	2
R37, R69	POT, 1K	3386W-1-102	80294	14610-02-0102	2
R34, R47	POT, 10K	3386W-1-103	80294	14610-02-0103	2
R66, R71, R75	POT, 100K	3386W-1-104	80294	14610-02-0104	3
R23, R25	POT, 5K	3386W-1-502	80294	14610-02-0502	2
R72	POT, 50K	3386W-1-503	80294	14610-02-0503	1
R2, R15, R16, R17, R42, R49, R55, R56, R57, R58, R59, R68, R70, R94	RES, C, 1/4W, 5%, 10K	RCR07G103JS	81349	14700-15-1002	14
R8, R11, R67, R87, R88, R89, R96	RES, C, 1/4W, 5%, 100K	RCR07G104JS	81349	14700-15-1003	7
R1, R6, R7, R100, R12, R40	RES, C, 1/4W, 5%, 1M	RCR07G105JS	81349	14700-15-1004	6
R92	RES, C, 1/4W, 5%, 12K	RCR07G123JS	81349	14700-15-1202	1
R63, R65	RES, C, 1/4W, 5%, 15K	RCR07G153JS	81349	14700-15-1502	2
R4, R20, R95	RES, C, 1/4W, 5%, 18K	RCR07G183JS	81349	14700-15-1802	3
R9	RES, C, 1/4W, 5%, 1.8M	RCR07G185JS	81349	14700-15-1804	1
R5, R48	RES, C, 1/4W, 5%, 2.2K	RCR07G222JS	81349	14700-15-2201	2
R44	RES, C, 1/4W, 5%, 22K	RCR07G223JS	81349	14700-15-2202	1
R93	RES, C, 1/4W, 5%, 220K	RCR07G224JS	81349	14700-15-2203	1
R38	RES, C, 1/4W, 5%, 2.4K	RCR07G242JS	81349	14700-15-2401	1
R41	RES, C, 1/4W, 5%, 300	RCR07G301JS	81349	14700-15-3000	1
R39	RES, C, 1/4W, 5%, 33K	RCR07G333JS	81349	14700-15-3302	1
R36	RES, C, 1/4W, 5%, 390	RCR07G391JS	81349	14700-15-3900	1
R3	RES, C, 1/4W, 5%, 3.9K	RCR07G392JS	81349	14700-15-3901	1
R19	RES, C, 1/4W, 5%, 39K	RCR07G393JS	81349	14700-15-3902	1
CT SYSTEMS PARTS LIST	TITLE AUDIO BD, A5	ASSEMBLY NO. 11110-00-7005	REV. J	PAGE 6.18	

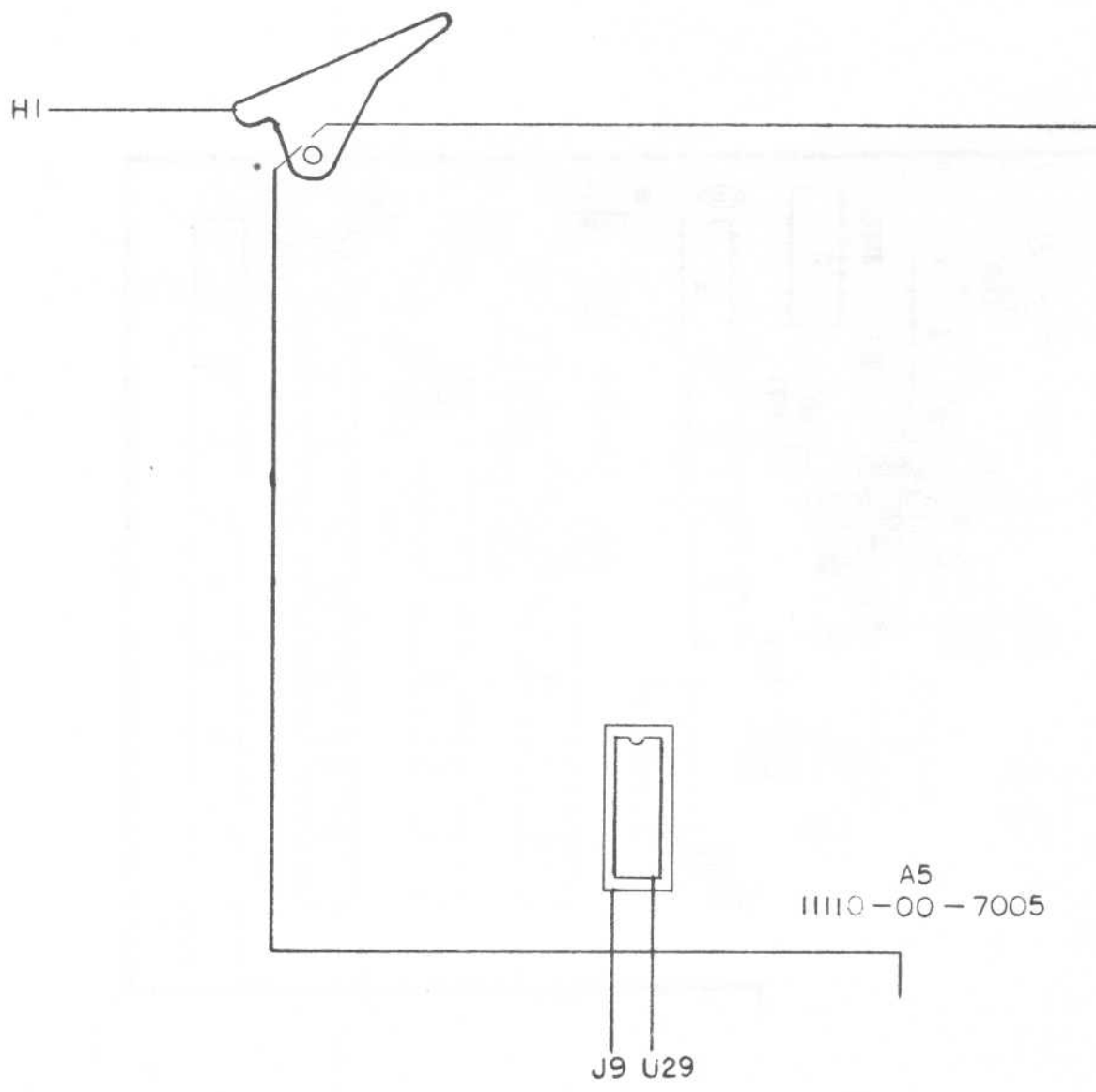
REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
R62,R64	RES,C,1/4W,5%,390K	RCR07G394JS	81349	14700-15-3903	2
R43,R60,R61	RES,C,1/4W,5%,4.7K	RCR07G472JS	81349	14700-15-4701	3
R18	RES,C,1/4W,5%,47K	RCR07G473JS	81349	14700-15-4702	1
R46	RES,C,1/4W,5%,5.1K	RCR07G512JS	81349	14700-15-5101	1
R91	RES,C,1/4W,5%,51K	RCR07G513JS	81349	14700-15-5102	1
R10	RES,C,1/4W,5%,5.6K	RCR07G562JS	81349	14700-15-5601	1
R98	RES,C,1/4W,5%,56K	RCR07G563JS	81349	14700-15-5602	1
R74	RES,C,1/4W,5%,560K	RCR07G564JS	81349	14700-15-5603	1
R90	RES,C,1/4W,5%,68K	RCR07G683JS	81349	14700-15-6802	1
R45,R73	RES,C,1/4W,5%,8.2K	RCR07G822JS	81349	14700-15-8201	2
R76	RES,C,1/4W,5%,91K	RCR07G913JS	81349	14700-15-9102	1
R27,R29,R30,R84	RES,MF,1/8W,1%,10K	RN55D1002FM	81349	14701-03-1002	4
R22,R53,R54	RES,MF,1/8W,1%,100K	RN55D1003FM	81349	14701-03-1003	3
R80,R31	RES,MF,1/8W,1%,11.8K	RN55D1182FM	81349	14701-03-1182	2
R32	RES,MF,1/8W,1%,118K	RN55D1183FM	81349	14701-03-1183	1
R85	RES,MF,1/8W,1%,15.4K	RN55D1542FM	81349	14701-03-1542	1
R83	RES,MF,1/8W,1%,1.69K	RN55D1691FM	81349	14701-03-1691	1
R99	RES,MF,1/8W,1%,2K	RN55D2001FM	81349	14701-03-2001	1
R52	RES,MF,1/8W,1%,2.15K	RN55D2151FM	81349	14701-03-2151	1
R77	RES,MF,1/8W,1%,226	RN55D2260FM	81349	14701-03-2260	1
R86	RES,MF,1/8W,1%,34.8K	RN55D3482FM	81349	14701-03-3482	1
R13	RES,MF,1/8W,1%,35.7K	RN55D3572FM	81349	14701-03-3572	1
R50	RES,MF,1/8W,1%,39.2K	RN55D3922FM	81349	14701-03-3922	1
R81	RES,MF,1/8W,1%,4.42K	RN55D4421FM	81349	14701-03-4421	1
R79	RES,MF,1/8W,1%,453	RN55D4530FM	81349	14701-03-4530	1
R82	RES,MF,1/8W,1%,45.3K	RN55D4532FM	81349	14701-03-4532	1
R33	RES,MF,1/8W,1%,4.75K	RN55D4751FM	81349	14701-03-4751	1
R21	RES,MF,1/8W,1%,49.9K	RN55D4992FM	81349	14701-03-4992	1
R51	RES,MF,1/8W,1%,61.9K	RN55D6192FM	81349	14701-03-6192	1
R14	RES,MF,1/8W,1%,665K	RN55D6653FM	81349	14701-03-6653	1
R35	RES,MF,1/8W,1%,825	RN55D8250FM	81349	14701-03-8250	1
R24,R26,R28	RES,MF,1/8W,1%,8.25K	RN55D8251FM	81349	14701-03-8251	3
R78	RES,MF,1/8W,1%,9.76K	RN55D9761FM	81349	14701-03-9761	1
CR2,CR3	DIODE,RECT,800V	1N4006	14963	14806-01-4006	2
CR1,CR4,CR5,CR6,CR7,CR8, CR9,CR10,CR11,CR12,CR13, CR14,CR16	DIODE,SIGNAL	1N914	80131	14807-01-0914	13
CR15	LED,YL,T-1-3/4	HLMP-3400	28480	14810-02-0011	1
Q1	TRANSISTOR	PN4091	27014	14901-04-0910	1
Q2,Q3	TRANSISTOR	PN4275	27014	14902-04-2750	2
U1,U2,U3,U4,U5,U6,U7,U21,U25	DUAL OP AMP	TL082CP	01295	17000-00-8200	9
U22,U23,U24,U26,U27	SPDT ANALOG SW,SS	TL607CP	01295	17000-06-0700	5
U19	WAVEFORM GEN,SS	ICL8038CCJD	32293	17000-80-3800	1
CT SYSTEMS PARTS LIST	TITLE AUDIO BD, A5	ASSEMBLY NO. 11110-00-7005	REV. J	PAGE 6.19	

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
U15	PLL, SS	CD4046BE	02735	18000-40-4612	1
U18	QUAD, 2-IN, NAND, SS	MM74C00N	27014	18000-74-0011	1
U30	QUAD, POS, OR	SN74LS32N	01295	18000-74-3210	1
U20	DUAL FF,SS	MM74C74N	27014	18000-74-7410	1
U8, U9, U10, U11, U12, U13, U14	DECADE CNTR, SS	MM74C90N	27014	18000-74-9010	7
U28	MONOST MVBTR	DM74121N	27014	18007-41-2100	1
U16, U17, U35, U36	HEX FF, SS	MM74C174N	27014	18007-41-7411	4
U31, U32, U33, U34	DUAL BCD, UP/DN CTR, SS	DM74LS192N	27014	18007-41-9210	4
U29	PROM, LVL FROM:18007-42-8800	18410-70-0001	4J835	18410-70-0001	1
CT SYSTEMS PARTS LIST	TITLE AUDIO BD, A5	ASSEMBLY NO. 11110-00-7005	REV. J	PAGE 6.20	

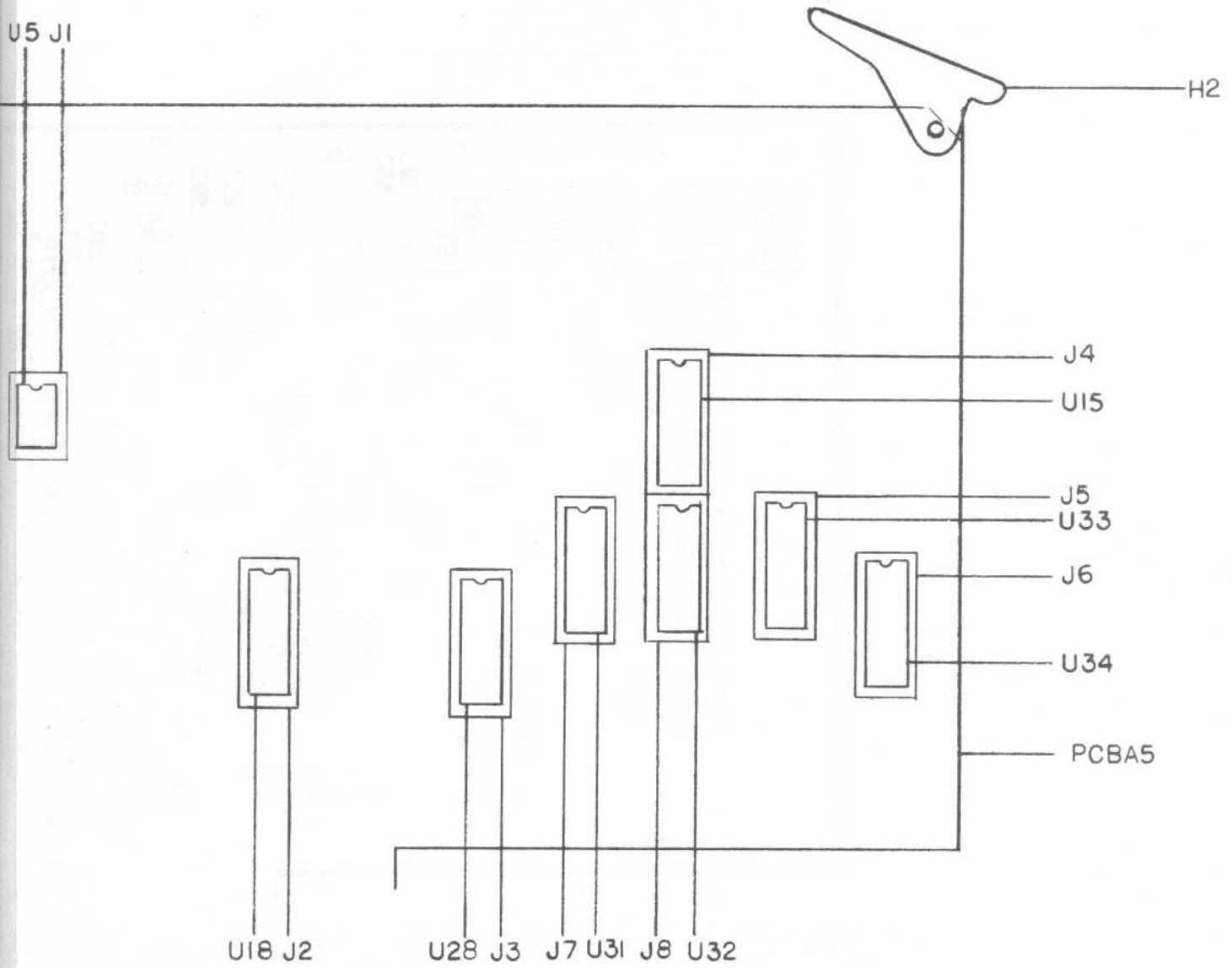


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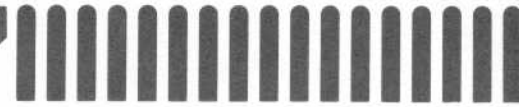
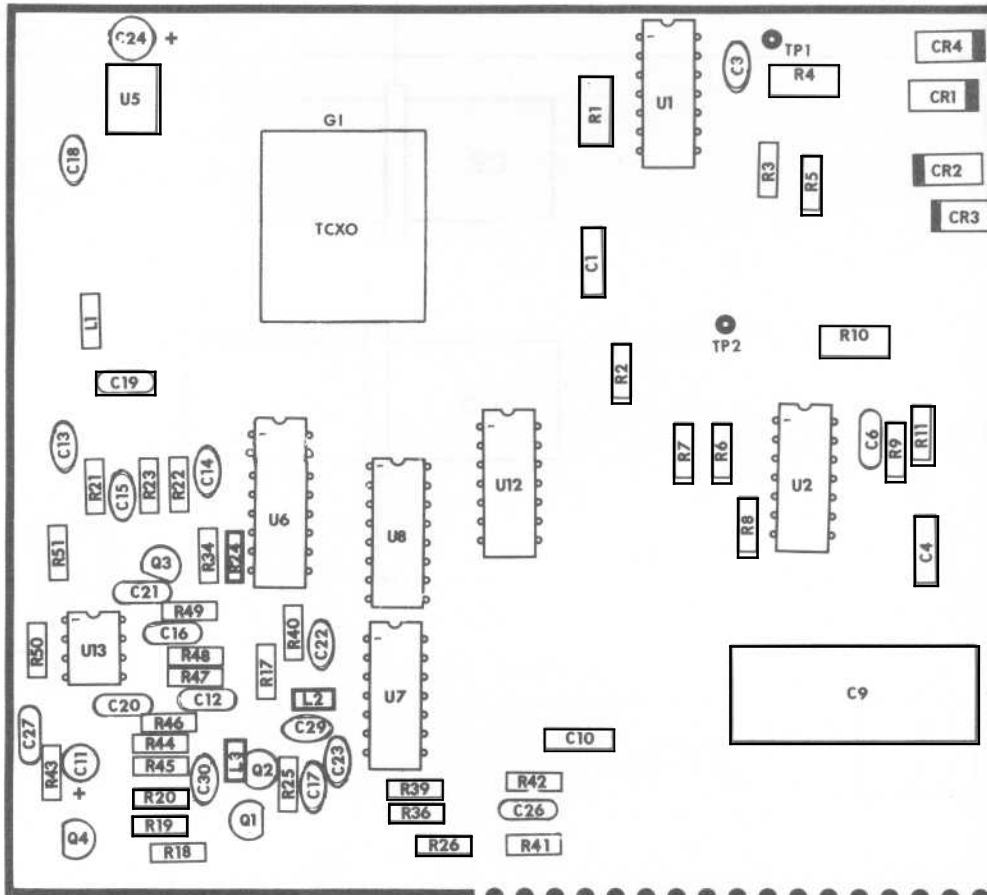
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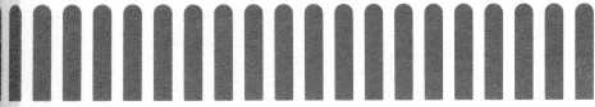
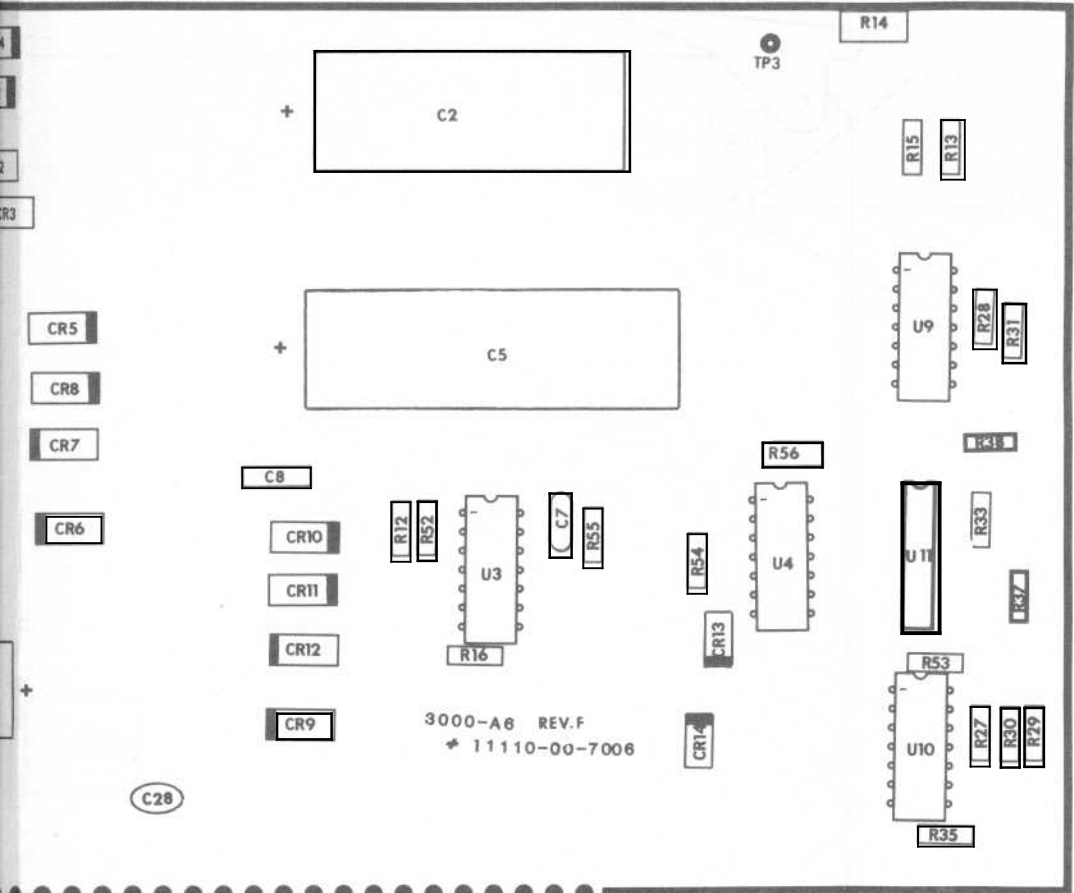


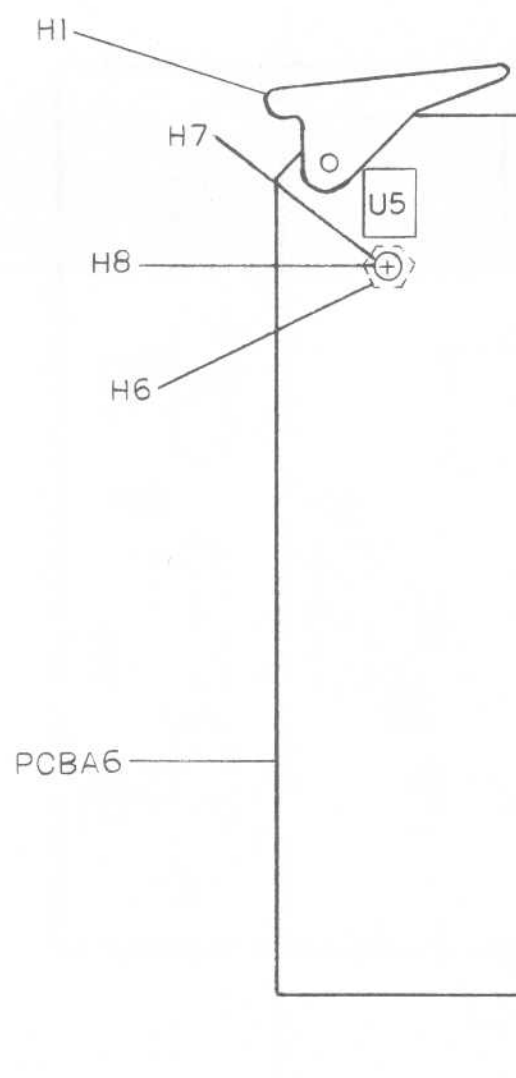
AUDIO BD., A5
11110-00-7005
SHT. 2 OF 2

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
C27	CAP, DISC, 50V, .47UF	1C20Z5U474Z050B	56289	11510-11-2478	1
C26	CAP, MON, 50V, 15PF	C315C150J5G5CA	57185	11510-11-8150	1
C29, C30	CAP, MON, 50V, 82PF	C315C829D2G5CA	57185	11510-11-8820	2
C28	CAP, DISC, 80/20, .1MF	M-12-1-80/20	82560	11510-12-2104	1
C3, C17, C22, C23	CAP, DISC, .01UF	UK25-103	71590	11510-14-1103	4
C13, C14, C15, C18	CAP, DISC, .05UF	UK25-503	71590	11510-14-1503	4
C11, C24	CAP, TANT, 35V, 1UF	196D105X9035HA1	56289	11510-25-3109	2
C9	CAP, ELEC, 25V, 2200UF	39D228G025HP4	56289	11510-25-7222	1
C5	CAP, ELEC, 25V, 4000UF	TCG4024025L3C	90201	11510-25-8402	1
C2	CAP, ELEC, 15V, 8000UF	TCG8024015N2L	90201	11510-25-9802	1
C19	CAP, MICA, 500V, 100PF	DM15-101J	81349	11510-50-0101	1
C12, C16, C20, C21	CAP, MICA, 500V, .001UF	DM15-102J	81349	11510-50-0102	4
C6, C7	CAP, MICA, 500V, 470PF	DM15-471J	81349	11510-50-0471	2
C1, C4, C8, C10	CAP, FILM, .1UF	225P10491WD3	56289	11510-61-7104	4
PCBA6	DS, PCB, REV, F, 3000B-A6	11717-00-0030	4J835	11717-00-0030	1
L2, L3	CHOKE 1UH	08N1R0	97469	11810-03-0010	2
L1	CHOKE MOLDED, 6.8 UH	1025-40	99800	11810-10-0689	1
J1, J2, J3	IC, SKT, 14P1N	C931402	01295	12112-00-0011	3
TP1, TP2, TP3	TESTPOINTS	39-211	73734	12112-19-0005	3
G1	TCXO, 10MHZ	TCXO50-17A	31785	12311-00-0007	1
H3, H4, H5	CABLE, TIE, 5-1/2	T18I	53421	12810-00-0016	3
H1, H2	CARD EJECTOR	5020-EJECTOR	13103	12810-12-0071	2
H6	NUT, 4-40X1/4, NP	8003NP	73734	12810-14-4104	1
H7	LO, WASHER, INT, 4	1331NP	73734	12810-24-4000	1
H8	SCW, PPH, 4-40X1/4	19022NP	73734	12810-55-4104	1
R10, R14	POT, 1K	3386W-1-102	80294	14610-02-0102	2
R4	POT, 500	3386W-1-501	80294	14610-02-0501	1
R26	RES, C, 1/4W, 5%, 100	RCR07G101JS	81349	14700-15-1000	1
R37, R38	RES, C, 1/4W, 5%, 10K	RCR07G103JS	81349	14700-15-1002	2
R23	RES, C, 1/4W, 5%, 120	RCR07G121JS	81349	14700-15-1200	1
R2	RES, C, 1/4W, 5%, 150	RCR07G151JS	81349	14700-15-1500	1
R39	RES, C, 1/4W, 5%, 1.5K	RCR07G152JS	81349	14700-15-1501	1
R22	RES, C, 1/4W, 5%, 1.8K	RCR07G182JS	81349	14700-15-1801	1
R25	RES, C, 1/4W, 5%, 220	RCR07G221JS	81349	14700-15-2200	1
R56	RES, C, 1/4W, 5%, 2.2K	RCR07G222JS	81349	14700-15-2201	1
R55	RES, C, 1/4W, 5%, 270	RCR07G271JS	81349	14700-15-2700	1
R24, R42	RES, C, 1/4W, 5%, 330	RCR07G331JS	81349	14700-15-3300	2
R21	RES, C, 1/4W, 5%, 3.9K	RCR07G392JS	81349	14700-15-3901	1
R27, R28, R29, R30, R31, R33 R35, R53, R54	RES, C, 1/4W, 5%, 4.7K	RCR07G472JS	81349	14700-15-4701	9
R17, R43	RES, C, 1/4W, 5%, 47K	RCR07G473JS	81349	14700-15-4702	2

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGFR PART NO	MFGFR/FCSM	PART NUMBER	QTY
R36	RES, C, 1/4W, 5%, 47	RCR07G470JS	81349	14700-15-4709	1
R40, R41	RES, C, 1/4W, 5%, 560	RCR07G561JS	81349	14700-15-5600	2
R3	RES, C, 1/4W, 5%, 750	RCR07G751JS	81349	14700-15-7500	1
R6, R7, R12, R52	RES, C, 1/2W, 5%, 1	RCR20G1ROJS	81349	14700-25-1008	4
R44	RES, MF, 1/8W, 1%, 10K	RN55D1002FM	81349	14701-03-1002	1
R50, R51	RES, MF, 1/8W, 1%, 100K	RN55D1003FM	81349	14701-03-1003	2
R45	RES, MF, 1/8W, 1%, 1.1K	RN55D1101FM	81349	14701-03-1101	1
R47	RES, MF, 1/8W, 1%, 133K	RN55D1333FM	81349	14701-03-1333	1
R8, R16	RES, MF, 1/8W, 1%, 1.96K	RN55D1961FM	81349	14701-03-1961	2
R48	RES, MF, 1/8W, 1%, 205K	RN55D2053FM	81349	14701-03-2053	1
R49	RES, MF, 1/8W, 1%, 2.15K	RN55D2151FM	81349	14701-03-2151	1
R5	RES, MF, 1/8W, 1%, 2.21K	RN55D2211FM	81349	14701-03-2211	1
R11, R15	RES, MF, 1/8W, 1%, 3.48K	RN55D3481FM	81349	14701-03-3481	2
R9, R13	RES, MF, 1/8W, 1%, 3.83K	RN55D3831FM	81349	14701-03-3831	2
R46	RES, MF, 1/8W, 1%, 39.2K	RN55D3922FM	81349	14701-03-3922	1
R18, R19	RES, MF, 1/8W, 1%, 499	RN55D4990FM	81349	14701-03-4990	2
R20	RES, MF, 1/8W, 1%, 75K	RN55D7502FM	81349	14701-03-7502	1
R1	RES, WW, 1W, 5%, .18	BWH.18-5%	75042	14702-35-1807	1
CR9, CR10, CR11, CR12	DIODE	MR501	04713	14806-02-0007	4
CR13, CR14	DIODE, SIGNAL	HSCH1001	28480	14807-01-6263	2
CR1, CR2, CR3, CR4	DIODE SCHOTTKY STATIC SENSITIVE	1N5820	04713	14809-01-5820	4
CR5, CR6, CR7, CR8	DIODE SCHOTTKY STATIC SENSITIVE	1N5822	04713	14809-01-5822	4
Q1, Q4	TRANSISTOR	PN2222	27014	14901-02-2220	2
Q2	TRANSISTOR	2N3563	80131	14901-03-5630	1
Q3	TRANSISTOR	PN4121-18	27014	14901-04-1210	1
U13	OP AMP	LF351N	27014	17000-00-8100	1
U1, U2, U3	VOLTAGE REGULATOR	LM723CN	27014	17000-07-2300	3
U5	PO VOLTAGE REG.	UA7805UC	07263	17000-78-0523	1
U12	QUAD POS NAND STATIC SENSITIVE	SN74LS00N	01295	18000-74-0010	1
U9, U10, U11	QUAD POS NAND STATIC SENSITIVE	SN74LS01N	01295	18000-74-0110	3
U4	IC, DIGITAL-TTL STATIC SENSITIVE	DM74LS12N	27014	18000-74-1210	1
U8	DUAL J-K FLIP-FLOP	DM74LS76AN	27014	18000-74-7610	1
U7	DECADE, COUNTER	MM74C90N	27014	18000-74-9010	1
U6	DECADE COUNTER	DM74LS90N	27014	18000-74-9011	1
CT SYSTEMS PARTS LIST	TITLE LV PWR SUPPLY, A6	ASSEMBLY NO. 11110-00-7006	REV. F	PAGE 6.22	

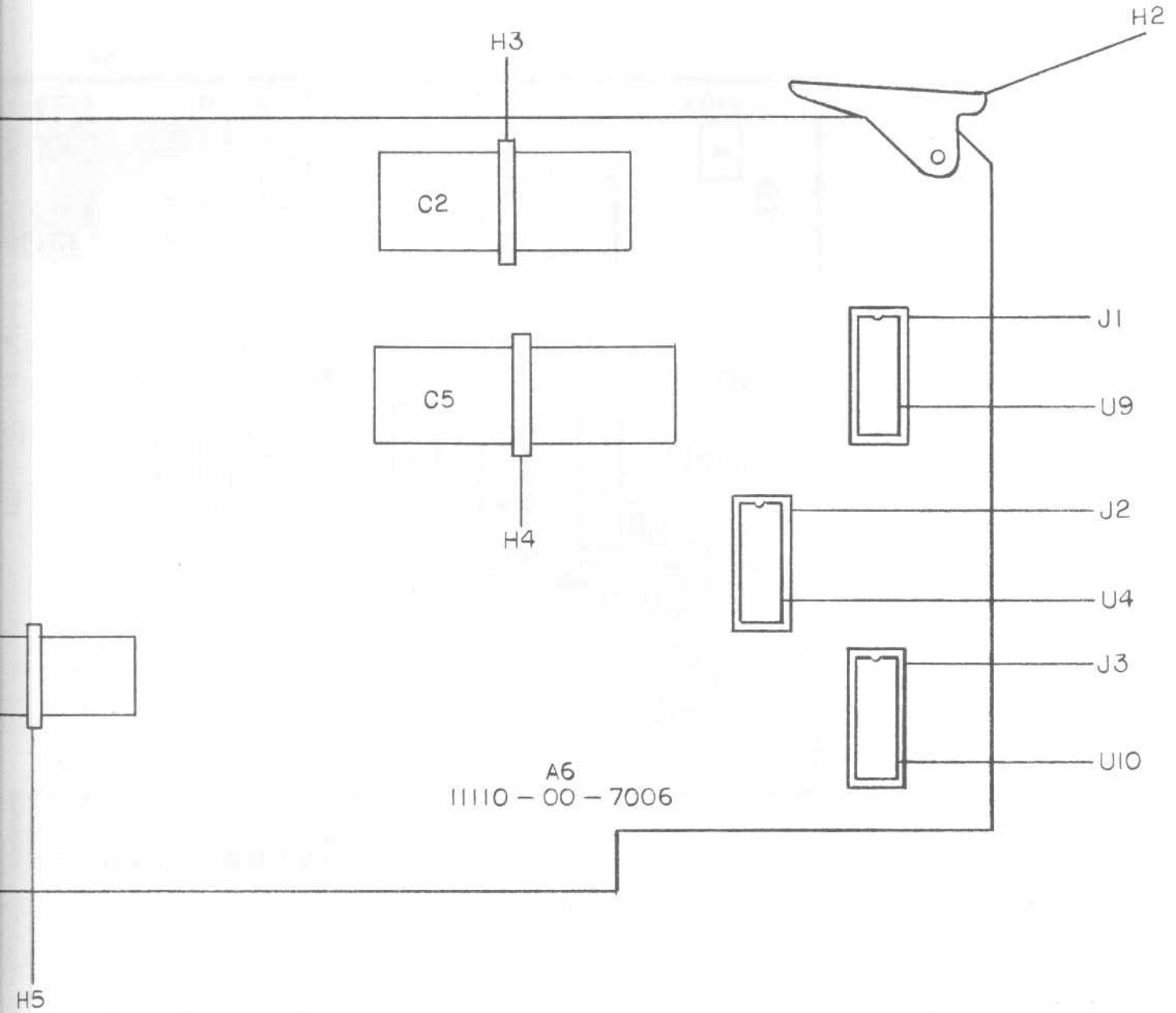






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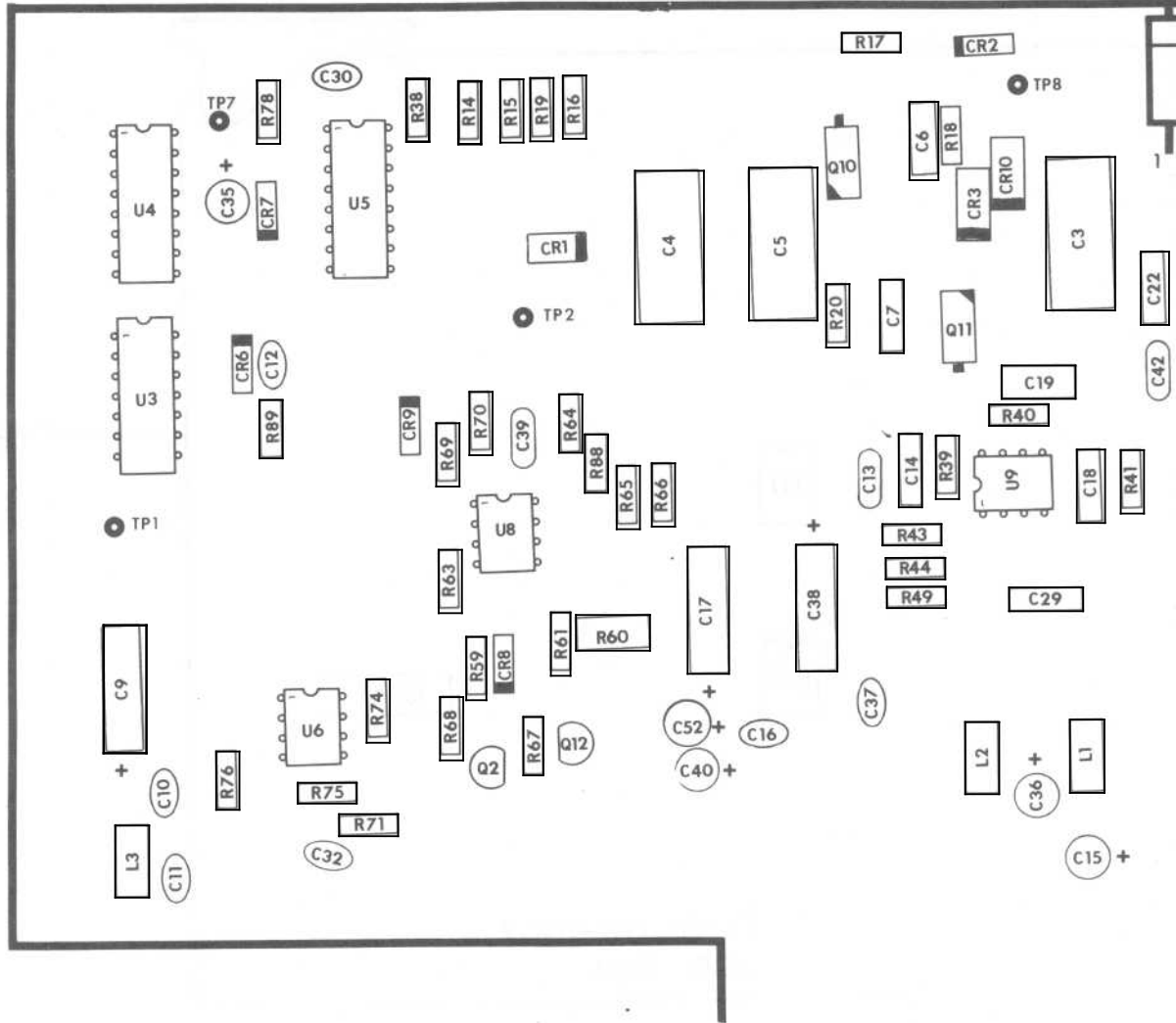
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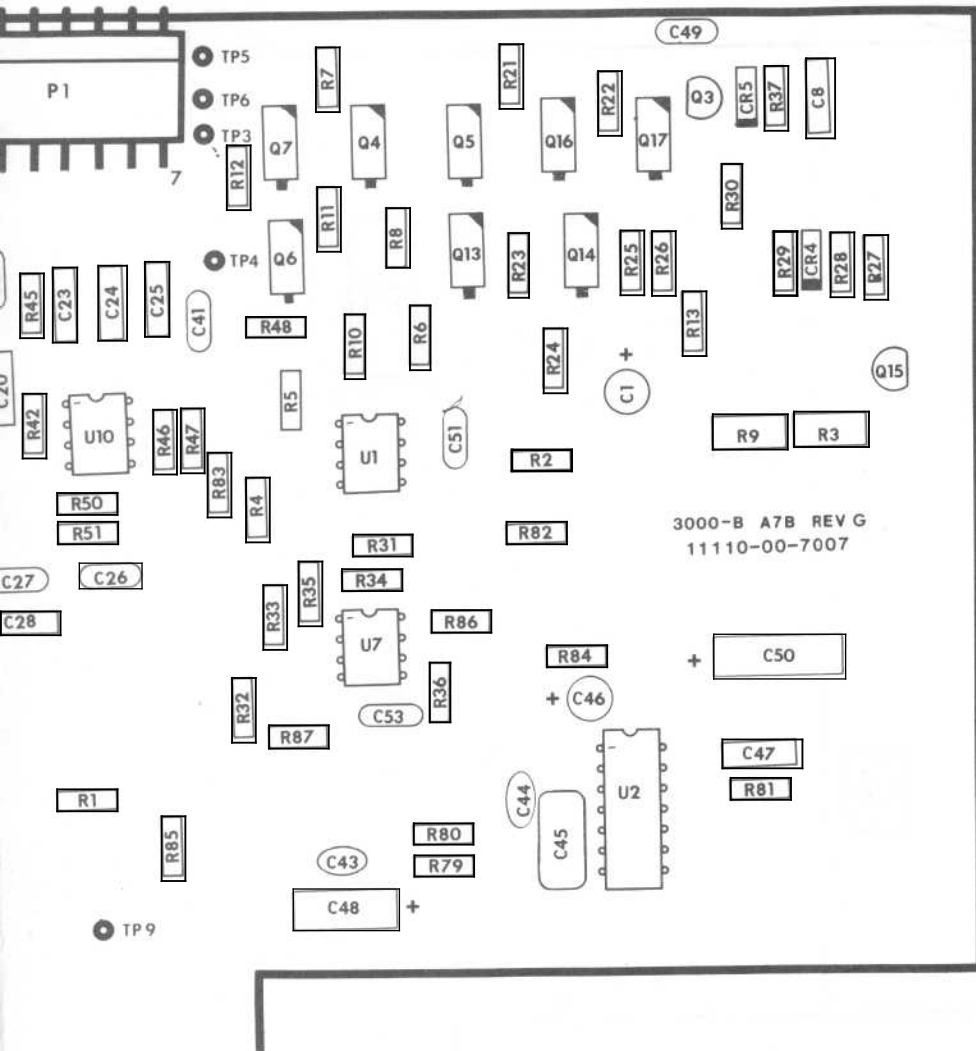
LV POWER SUPPLY BD., A6
11110-00-7006
SHT. 2 OF 2

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFG PART NO	MFGR/FCSM	PART NUMBER	QTY
C53	CAP, MONO, 50V, 1UF	3420-050-E105M	96095	11510-11-3105	1
C6	CAP, DISC, 3KV, .01UF	DD30-103	71590	11510-14-0103	1
C10, C11, C12, C16, C30, C32, C37, C43, C44	CAP, DISC, .01UF	UK25-103	71590	11510-14-1103	9
C3, C4, C5	CAP, DISC, .22UF	4PS-P22	56289	11510-14-3224	3
C9, C17, C38, C50	CAP,ELEC, 25V, 100UF	TE1211	56289	11510-20-4101	4
C35, C40, C46, C52	CAP, TANT, 20V, 10UF	196D106X9020JA1	56289	11510-25-2100	4
C1, C15, C36	CAP, TANT, 35V, 1UF	196D105X9035HA1	56289	11510-25-3109	3
C48	CAP, ELEC, 16V, 470UF	500D477M016DD2	56289	11510-25-8471	1
C42	CAP, MICA, 500V, 120PF	DM15-121J	81349	11510-50-0121	1
C21	CAP, MICA, 500V, 150PF	CM05FD151J03	81349	11510-50-0151	1
C41	CAP, MICA, 500V, 220PF	DM15-221J	81349	11510-50-0221	1
C26	CAP, MICA, 500V, 330PF	DM15-331J	81349	11510-50-0331	1
C27	CAP, MICA, 500V, 390PF	DM15-391J	81349	11510-50-0391	1
C13	CAP, MICA, 500V, 560PF	DM15-561J	81349	11510-50-0561	1
C39	CAP, MICA, 500V, 10PF	CM05CD100D03	81349	11510-50-8100	1
C49, C51	CAP, MICA, 500V, 12PF	CM05CD120J03	81349	11510-50-8120	2
C8, C47	CAP, FILM, .1UF	225P10491WD3	56289	11510-61-7104	2
C19, C24	CAP, FILM, .0012UF	225P12291WD3	56289	11510-61-7122	2
C23	CAP, FILM, .012UF	225P12391WD3	56289	11510-61-7123	1
C18	CAP, FILM, .022UF	225P22391WD3	56289	11510-61-7223	1
C7, C20, C25, C28	CAP, FILM, .0027UF	225P27291WD3	56289	11510-61-7272	4
C22, C29	CAP, FILM, .0047UF	225P47291WD3	56289	11510-61-7472	2
C45	CAP, FILM, .047UF	225P47391WD3	56289	11510-61-7473	1
C14	CAP, FILM, .0082UF	225P82291WD3	56289	11510-61-7822	1
PCBA7B	DS PCB, REV F, A7B 3000B	11717-00-0031	4J835	11717-00-0031	1
L1, L2, L3	CHOKE	VK20010/3B	02114	11810-09-0001	3
P1	CONN, MOLEX	09-66-1071	27264	12112-08-0033	1
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9	TESTPOINTS	39-211	73734	12112-19-0005	9
H1, H2	CARD EJECTOR	5020-EJECTOR	13103	12810-12-0071	2
R3, R9	POT, 10K	3386W-1-103	80294	14610-02-0103	2
R60	POT, 5K	3386W-1-502	80294	14610-02-0502	1
R37, R68, R74	RES, C, 1/4W, 5%, 1K	RCR07G102JS	81349	14700-15-1001	3
R33	RES, C, 1/4W, 5%, 10K	RCR07G103JS	81349	14700-15-1002	1
R15	RES, C, 1/4W, 5%, 100K	RCR07G104JS	81349	14700-15-1003	1
R82	RES, C, 1/4W, 5%, 1M	RCR07G105JS	81349	14700-15-1004	1
R67	RES, C, 1/4W, 5%, 12K	RCR07G123JS	81349	14700-15-1202	1
R31	RES, C, 1/4W, 5%, 120K	RCR07G124JS	81349	14700-15-1283	1
R14	RES, C, 1/4W, 5%, 15K	RCR07G153JS	81349	14700-15-1502	1
R23, R25	RES, C, 1/4W, 5%, 150K	RCR07G154JS	81349	14700-15-1503	2
R89	RES, C, 1/4W, 5%, 1.8K	RCR07G182JS	81349	14700-15-1801	1
R2, R16, R30	RES, C, 1/4W, 5%, 18K	RCR07G183JS	81349	14700-15-1802	3
CT SYSTEMS PARTS LIST	TITLE DEFL AMP BD, A7B	ASSEMBLY NO. 11110-00-7007	REV. G	PAGE 6.23	

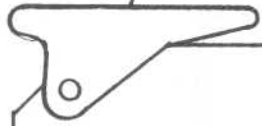
REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGFR PART NO	MFGFR/FCSM	PART NUMBER	QTY
R19	RES, C, 1/4W, 5%, 180K	RCR07G184JS	81349	14700-15-1803	1
R76	RES, C, 1/4W, 5%, 2K	RCR07G202JS	81349	14700-15-2001	1
R36	RES, C, 1/4W, 5%, 220	RCR07G221JS	81349	14700-15-2200	1
R20, R64	RES, C, 1/4W, 5%, 2.2K	RCR07G222JS	81349	14700-15-2201	2
R88	RES, C, 1/4W, 5%, 220K	RCR07G224JS	81349	14700-15-2203	1
R1, R59	RES, C, 1/4W, 5%, 2.7K	RCR07G272JS	81349	14700-15-2701	2
R85	RES, C, 1/4W, 5%, 27K	RCR07G273JS	81349	14700-15-2702	1
R71	RES, C, 1/4W, 5%, 270K	RCR07G274JS	81349	14700-15-2703	1
R81, R84	RES, C, 1/4W, 5%, 2.7	RCR07G2R7JS	81349	14700-15-2708	2
R6, R10	RES, C, 1/4W, 5%, 3.3K	RCR07G332JS	81349	14700-15-3301	2
R61	RES, C, 1/4W, 5%, 3.9K	RCR07G392JS	81349	14700-15-3901	1
R38	RES, C, 1/4W, 5%, 39K	RCR07G393JS	81349	14700-15-3902	1
R17	RES, C, 1/4W, 5%, 390K	RCR07G394JS	81349	14700-15-3903	1
R79, R83	RES, C, 1/4W, 5%, 470	RCR07G471JS	81349	14700-15-4700	2
R78	RES, C, 1/4W, 5%, 47K	RCR07G473JS	81349	14700-15-4702	1
R35	RES, C, 1/4W, 5%, 470K	RCR07G474JS	81349	14700-15-4703	1
R18	RES, C, 1/4W, 5%, 51	RCR07G510JS	81349	14700-15-5109	1
R13	RES, C, 1/4W, 5%, 5.6K	RCR07G562JS	81349	14700-15-5601	1
R32, R80	RES, C, 1/4W, 5%, 56K	RCR07G563JS	81349	14700-15-5602	2
R75	RES, C, 1/4W, 5%, 560K	RCR07G564JS	81349	14700-15-5603	1
R86	RES, C, 1/4W, 5%, 6.2K	RCR07G622JS	81349	14700-15-6201	1
R7, R8, R11, R12, R21, R22	RES, C, 1/4W, 5%, 68K	RCR07G683JS	81349	14700-15-6802	6
R87	RES, C, 1/4W, 5%, 8.2K	RCR07G822JS	81349	14700-15-8201	1
R34	RES, C, 1/4W, 5%, 8.2K	RCR07G823JS	81349	14700-15-8202	1
R24, R26	RES, C, 1/4W, 5%, 9.1K	RCR07G912JS	81349	14700-15-9101	2
R29	RES, MF, 1/8W, 1%, 1K	RN55D1001FM	81349	14701-03-1001	1
R4, R5, R66, R70,	RES, MF, 1/8W, 1%, 10K	RN55D1002FM	81349	14701-03-1002	4
R40	RES, MF, 1/8W, 1%, 105K	RN55D1053FM	81349	14701-03-1053	1
R39	RES, MF, 1/8W, 1%, 133K	RN55D1333FM	81349	14701-03-1333	1
R50	RES, MF, 1/8W, 1%, 140K	RN55D1403FM	81349	14701-03-1403	1
R63	RES, MF, 1/8W, 1%, 15K	RN55D1502FM	81349	14701-03-1502	1
R43	RES, MF, 1/8W, 1%, 182K	RN55D1823FM	81349	14701-03-1823	1
R42	RES, MF, 1/8W, 1%, 191K	RN55D1913FM	81349	14701-03-1913	1
R47	RES, MF, 1/8W, 1%, 237K	RN55D2373FM	81349	14701-03-2373	1
R27	RES, MF, 1/8W, 1%, 24.9K	RN55D2492FM	81349	14701-03-2492	1
R69	RES, MF, 1/8W, 1%, 30.1K	RN55D3012FM	81349	14701-03-3012	1
R46	RES, MF, 1/8W, 1%, 348K	RN55D3483FM	81349	14701-03-3483	1
R48	RES, MF, 1/8W, 1%, 357K	RN55D3573FM	81349	14701-03-3573	1
R44	RES, MF, 1/8W, 1%, 511K	RN55D5113FM	81349	14701-03-5113	1
R41	RES, MF, 1/8W, 1%, 52.3K	RN55D5232FM	81349	14701-03-5232	1
R28, R65	RES, MF, 1/8W, 1%, 6.19K	RN55D6191FM	81349	14701-03-6191	2
R51	RES, MF, 1/8W, 1%, 69.8K	RN55D6982FM	81349	14701-03-6982	1
CT SYSTEMS PARTS LIST	TITLE DEFL AMP BD, A7B	ASSEMBLY NO. 11110-00-7007	REV. G	PAGE 8.24	

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
R49	RES, MF, 1/8W, 1%, 80.6K	RN55D8062FM	81349	14701-03-8062	1
R45	RES, MF, 1/8W, 1%, 866K	RN55D8663FM	81349	14701-03-8663	1
CR1	DIODE, ZENER, 9.1V	1N5239	80131	14801-01-5239	1
CR2	DIODE, ZENER, 75V	1N5267	80131	14801-01-5267	1
CR3, CR10	DIODE, RECT, 400V	1N4004	80131	14806-01-4004	2
CR4, CR5, CR6, CR7, CR8, CR9	DIODE, SIGNAL	1N914	80131	14807-01-0914	6
Q15	TRANSISTOR	2N3565	80131	14901-03-5650	1
Q3, Q12	TRANSISTOR	PN4121-18	27014	14901-04-1210	2
Q10	TRANSISTOR	2N6556	27014	14901-06-5560	1
Q4, Q5, Q6, Q7, Q11, Q13, Q14, Q16, Q17	TRANSISTOR	2N6557	04713	14901-06-5570	9
Q2	TRANSISTOR	PN4275	27014	14902-04-2750	1
U1, U8	DUAL OP AMP	TL082CP	01295	17000-00-8200	2
U2	POWER AMP, AUDIO	LM380N	27014	17000-03-8001	1
U6	OP AMP, BIMOS, SS	CA3140E	02735	17000-31-4001	1
U7, U9, U10	OP AMP	N5741CV	18324	17000-57-4100	3
U4	DUAL J-K FF, SS	DM74LS76AN	27014	18000-74-7610	1
U5	DUAL MONOST MVBTR	DM74123N	27014	18007-41-2300	1
U3	QUAD POS NAND, SCHMT, SS	SN74LS132N	01295	18007-41-3210	1
CT SYSTEMS PARTS LIST	TITLE DEFL AMP BD, A7B	ASSEMBLY NO. 11110-00-7007		REV. G	PAGE 6.25





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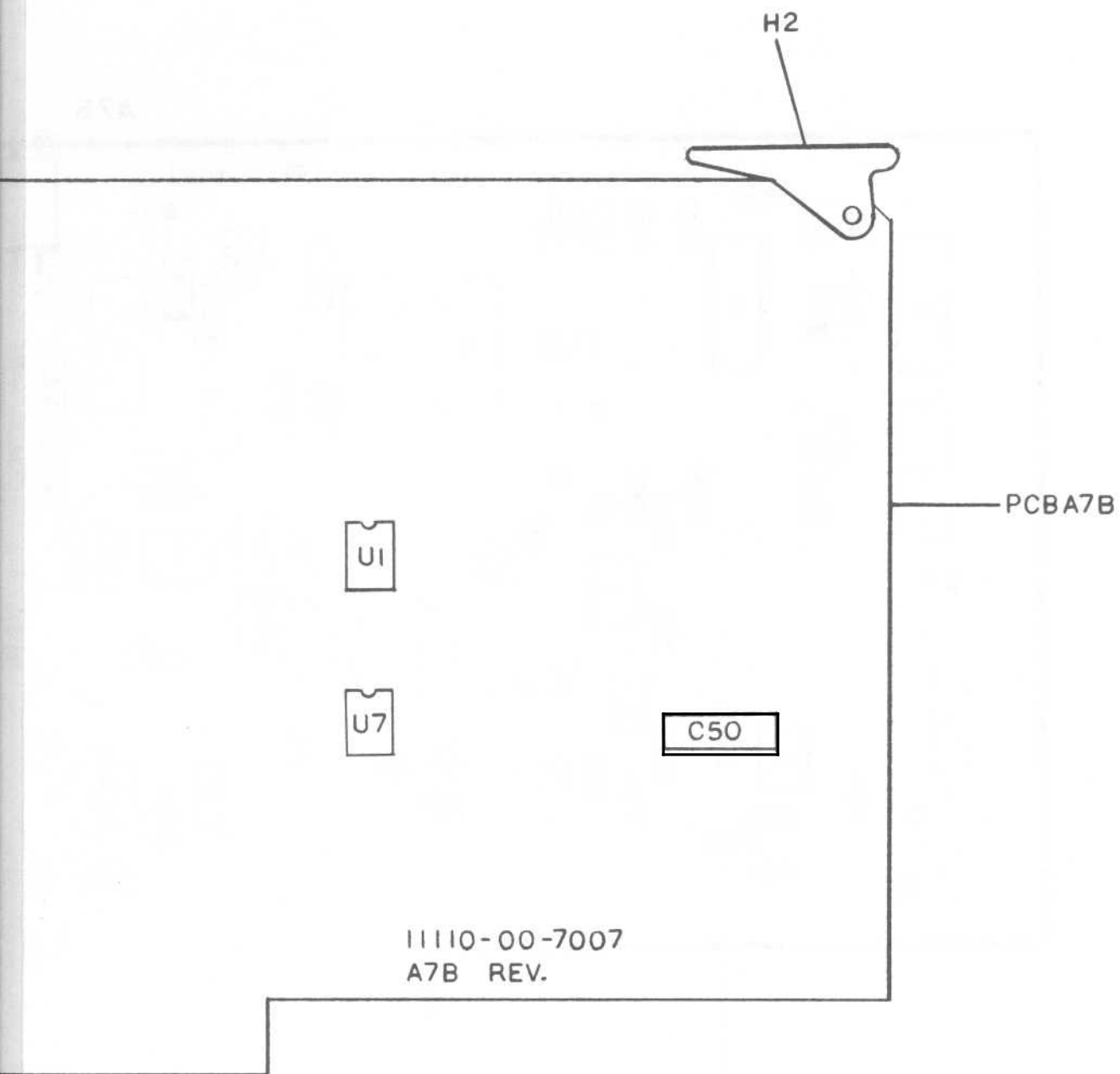


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U4

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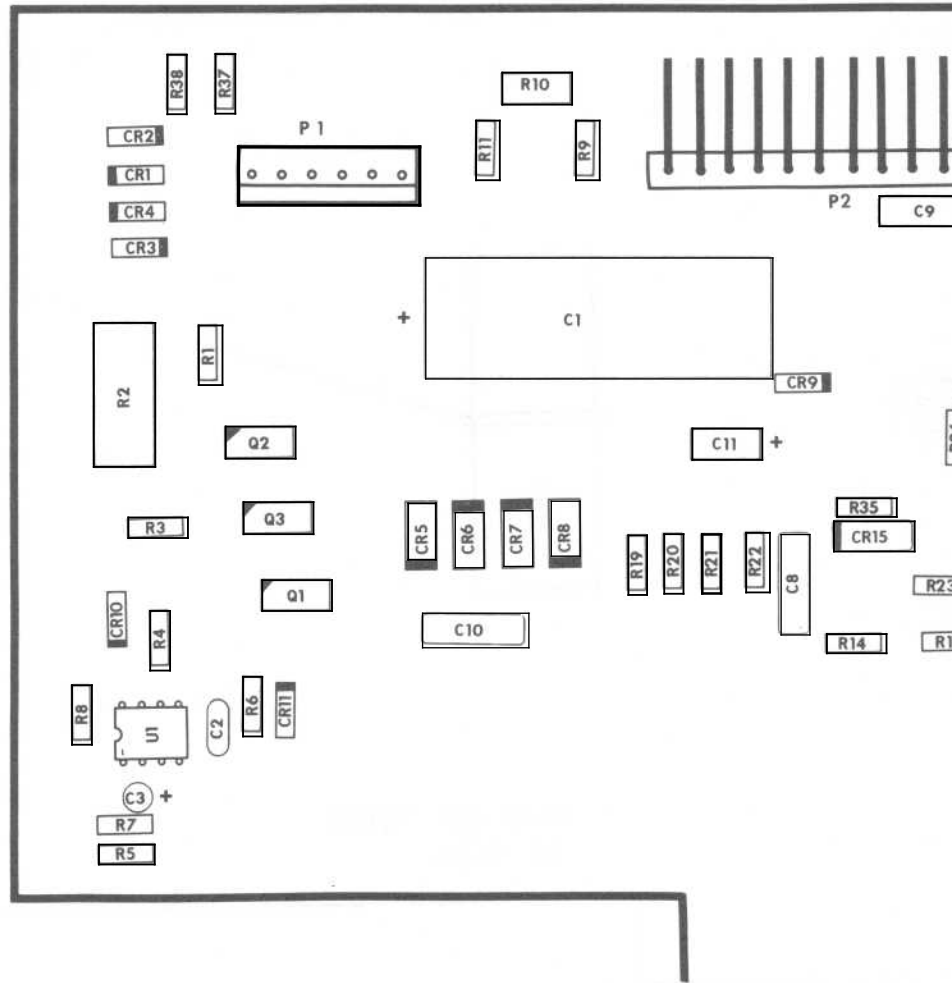
U6



11110-00-7007
A7B REV.

DEFLECTION AMPL. BD., A7B
11110-00-7007
SHT. 2 OF 2

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGFR PART NO	MFGFR/FCSM	PART NUMBER	QTY
C4,C6,C8,C9,C10	CAP,DISC,3KV,.01UF	DD30-103	71590	11510-14-0103	5
C5	CAP,DISC,2KV,.25UF	LQ20254Y	52763	11510-14-2254	1
C3	CAP,TANT,20V,10UF	196D106X9020JA1	56289	11510-25-2100	1
C1	CAP,ELEC,300V,120UF	39D127F300HS4	56289	11510-25-5121	1
C11	CAP,ELEC,16V,470UF	500D477M016DD2	56289	11510-25-8471	1
C2	CAP,MICA,500V,220PF	DM15-221J	81349	11510-50-0221	1
C7	CAP,FILM,.0047UF	225P47291WD3	56289	11510-61-7472	1
PCBA8	DS PCB,REV.E,A8,3000B	11717-00-0032	4J835	11717-00-0032	1
P1	PLUG, 6-PIN KONEKTON	09-65-1061	27264	12112-05-0002	1
P2	CONN,MOLEX	09-66-1121	27264	12112-08-0036	1
TP1,TP2	TESTPOINTS	39-211	73734	12112-19-0005	2
H3,H4	CABLE TIE, 5-1/2	T18I	53421	12810-00-0016	2
H1,H2	CARD EJECTOR	5020-EJECTOR	13103	12810-12-0071	2
R31	POT,10K	3386W-1-103	80294	14610-02-0103	1
R10	POT,100K	3386W-1-104	80294	14610-02-0104	1
R32	RES,C,1/4W,5%,10K	RCR07G103JS	81349	14700-15-1002	1
R14,R15,R16,R17,R18	RES,C,1/4W,5%,1M	RCR07G105JS	81349	14700-15-1004	5
R34	RES,C,1/4W,5%,120	RCR07G121JS	81349	14700-15-1200	1
R9,R11	RES,C,1/4W,5%,180K	RCR07G184JS	81349	14700-15-1803	2
R3	RES,C,1/4W,5%,18	RCR07G180JS	81349	14700-15-1809	1
R4,R29	RES,C,1/4W,5%,2.2K	RCR07G222JS	81349	14700-15-2201	2
R35	RES,C,1/4W,5%,22M	RCR07G226JS	81349	14700-15-2205	1
R30	RES,C,1/4W,5%,24K	RCR07G243JS	81349	14700-15-2402	1
R33	RES,C,1/4W,5%,33K	RCR07G333JS	81349	14700-15-3302	1
R37, R38, R22	RES,C,1/4W,5%,470K	RCR07G474JS	81349	14700-15-4703	3
R12,R13	RES, C, 1/4W, 5%, 4.7M	RCR07G475JS	81349	14700-15-4704	2
R1	RES, C, 1/2W, 5%, 820	RCR20G821JS	81349	14700-25-8200	1
R2	RES,C,2W,5%,22K	RCR42G223JS	81349	14700-45-2202	1
R8	RES,MF,1/8W,1%,10K	RN55D1002FM	81349	14701-03-1002	1
R19	RES,MF,1/8W,1%,169K	RN55D1693FM	81349	14701-03-1693	1
R5,R7,R20	RES,MF,1/8W,1%,19.6K	RN55D1962FM	81349	14701-03-1962	3
R6	RES,MF,1/8W,1%,255K	RN55D2553FM	81349	14701-03-2553	1
R21	RES,MF,1/8W,1%,392K	RN55D3923FM	81349	14701-03-3923	1
R23,R24,R25,R26,R27,R28	RES, MF, 1/4W, 1%, 261K	RN60D2613FM	81349	14701-13-2613	6
CR16	DIODE,VARACTOR	V275LA10	24446	14803-02-0017	1
CR9	DIODE,RECT,400V	1N4004	80131	14806-01-4004	1
CR1,CR2,CR3,CR4,CR11	DIODE,RECT,800V	1N4006	14963	14806-01-4006	5
CR5,CR6,CR7,CR8,CR15	DIODE,RECT,7000V	G7F-7KV-10MA-150NS	28719	14806-02-0070	5
CR10,CR12,CR13,CR14	DIODE,SIGNAL	1N914	80131	14807-01-0914	4
Q1,Q2,Q3,Q4	TRANSISTOR	2N6559	04713	14901-06-5590	4
U1,U2	OP AMP	N5741CV	18324	17000-57-4100	2

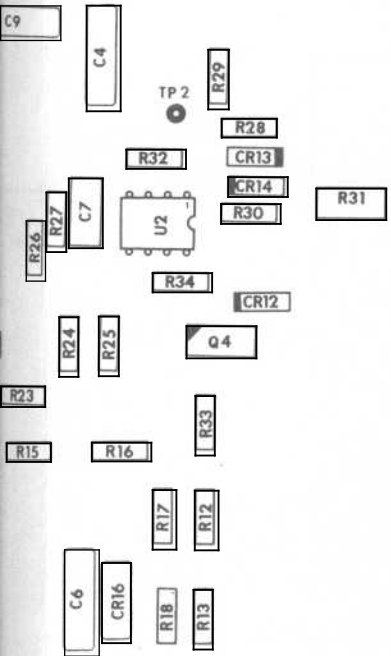


A8



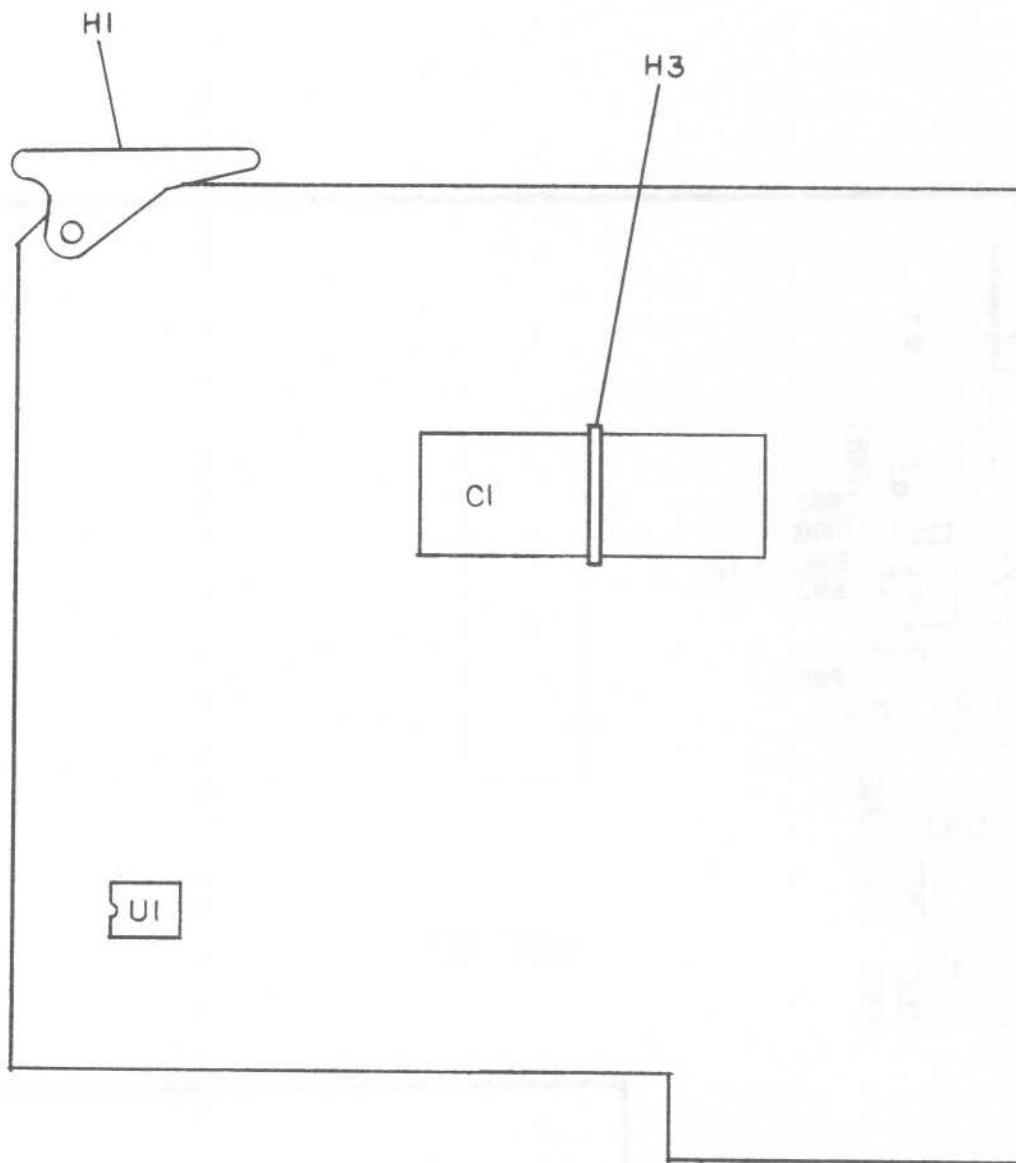
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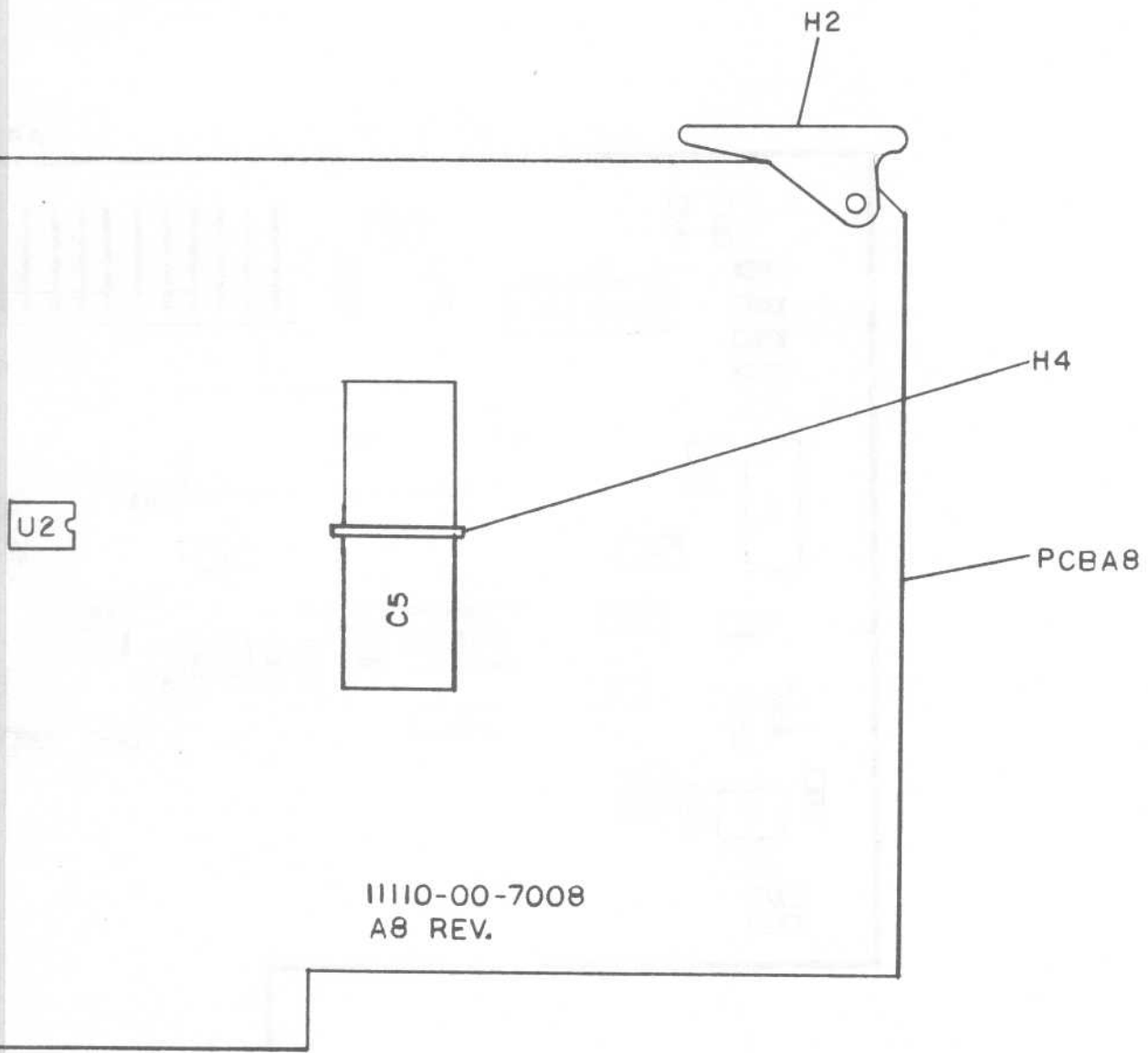
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3000-A8 REV. D
11110-00-7008







11110-00-7008
A8 REV.

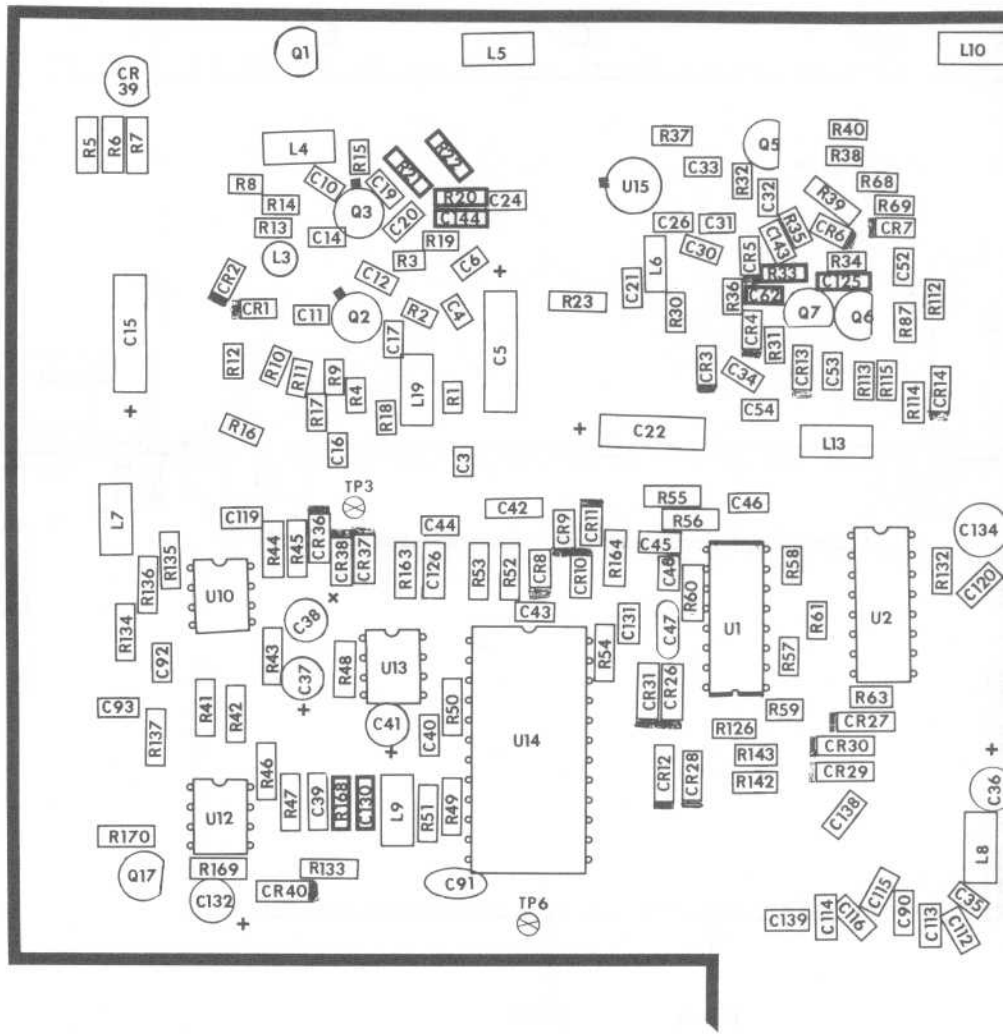
HV POWER SUPPLY BD., A8
11110-00-7008
SHT. 2 OF 2

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
L6, L14	FERRITE CHOKE, 5 TURN FROM: 11813-00-0007	11210-30-0002	4J835	11210-30-0002	2
T1	XFMR, BIFILAR	11210-43-0011	4J835	11210-43-0011	1
MP5, MP6	BOX, LOWER	11417-30-0300	4J835	11417-30-0300	2
MP1, MP2, MP3, MP4	COVER, BOX	11417-30-0310	4J835	11417-30-0310	4
MP7	COVER, A3	11417-60-0160	4J835	11417-60-0160	1
MP8, MP9	BOX, UPPER	11417-60-0550	4J835	11417-60-0550	2
C47, C129	CAP, MON, 50V, .1UF	C320C104M5U1CA	57185	11510-11-3104	2
C144	CAP, MON, 50V, 10PF	RA50-100DA	51406	11510-11-8100	1
C146, C147, C148, C149,	CAP, MON, 50V, .001UF	RPE122C0G102J50M	51406	11510-11-8102	4
C59, C63, C77	CAP, MON, 50V, 120PF	C315C121J2G5CA	57185	11510-11-8121	3
C123, C125, C30, C62	CAP, MON, 50V, 15PF	C315C150J5G5CA	57185	11510-11-8150	4
C48	CAP, MON, 50V, 3.9PF	RA50-3R9CA	51406	11510-11-8399	1
C111, C120, C121, C122, C124	CAP, MON, 50V, 6.8PF	C315C689J2G5CA	57185	11510-11-8689	5
C143	CAP, MON, 50V, 8.2PF	C315C829D2G5CA	57185	11510-11-8829	1
C91	CAP, DISC, .05UF	UK25-503	71590	11510-14-1503	1
C1, C7, C8, C138, C140, C21, C27 C29, C33, C40, C52, C53, C54, C55, C56, C57, C64, C67, C78, C80, C86, C92, C93, C35, C34 C87, C89	CAP, MON, 50V, .01UF	CW15C103K	71590	11510-14-4103	27
C3, C4, C6, C10, C11, C112, C113 C114, C115, C116, C119, C12, C126, C131, C139, C14, C16, C19 C20, C24, C26, C31, C32, C43, C44, C45, C46, C60, C61, C65, C69, C70, C83, C90, C68	CAP, MON, 100V, 470PF	CW15A471M	71590	11510-14-5471	35
C130, C17	CAP, MON, 50V, .22UF	C330C224M5U1CA	57185	11510-14-6224	2
C132, C136, C41, C96, C2, C36	CAP, TANT, 20V, 10UF	196D106X9020JA1	56289	11510-25-2100	6
C134, C37, C38	CAP, TANT, 35V, 1UF	196D105X9035HA1	56289	11510-25-3109	3
C9	CAP, ELEC, 16V, 100UF	500D107M016CB2	56289	11510-25-8102	1
C5, C15, C22	CAP, ELEC, 16V, 470UF	500D477M016CB2	56289	11510-25-8471	3
C95	CAP, MICA, 500V, .001UF	DM15-102J	81349	11510-50-0102	1
C104	CAP, MICA, 500V, 15PF	DM15-150J	81349	11510-50-0150	1
C94	CAP, MICA, 500V, 330PF	DM15-331J	81349	11510-50-0331	1
C50, C51	CAP, MICA, 500V, 50PF	DM15-500J	81349	11510-50-0500	2
C42	CAP, MICA, 500V, 10PF	CM05CD100D03	81349	11510-50-8100	1
C39	CAP, FILM, .15UF	225P15491XD3	56289	11510-62-1154	1
PCBA3-1	DS PCB, REV B, A3-1, 3000B	11717-00-0054	4J835	11717-00-0054	1
L1, L2, L4, L5, L7, L8, L9, L10, L13 L15, L16, L19	CHOKE	VK20010/3B	02114	11810-09-0001	12
L11, L21, L23	CHOKE, MOLDED, 100 UH	1025-68	99800	11810-10-0101	3
L22	CHOKE, MOLDED, 39 UH	1025-58	99800	11810-10-0390	1
L3	COIL, AIR, 2T (20GA)	11815-00-0066	4J835	11815-00-0066	1
L12	COIL, AIR, 2T (30GA)	11815-00-0067	4J835	11815-00-0067	1
J1	CONN, RF, STR.JACK, RA	2009-1511-000	19505	12110-08-0006	1
J2, J3, J4	IC, SKT, 8 PIN	DILB-8P-108	09922	12112-00-0007	3
J7	IC, SKT, 16 PIN	DILB-16P-108	09922	12112-00-0012	1
CT SYSTEMS PARTS LIST	TITLE FREQ SYN BD, A3-1	ASSEMBLY NO. 11110-70-0054	REV. M	PAGE 6.27	

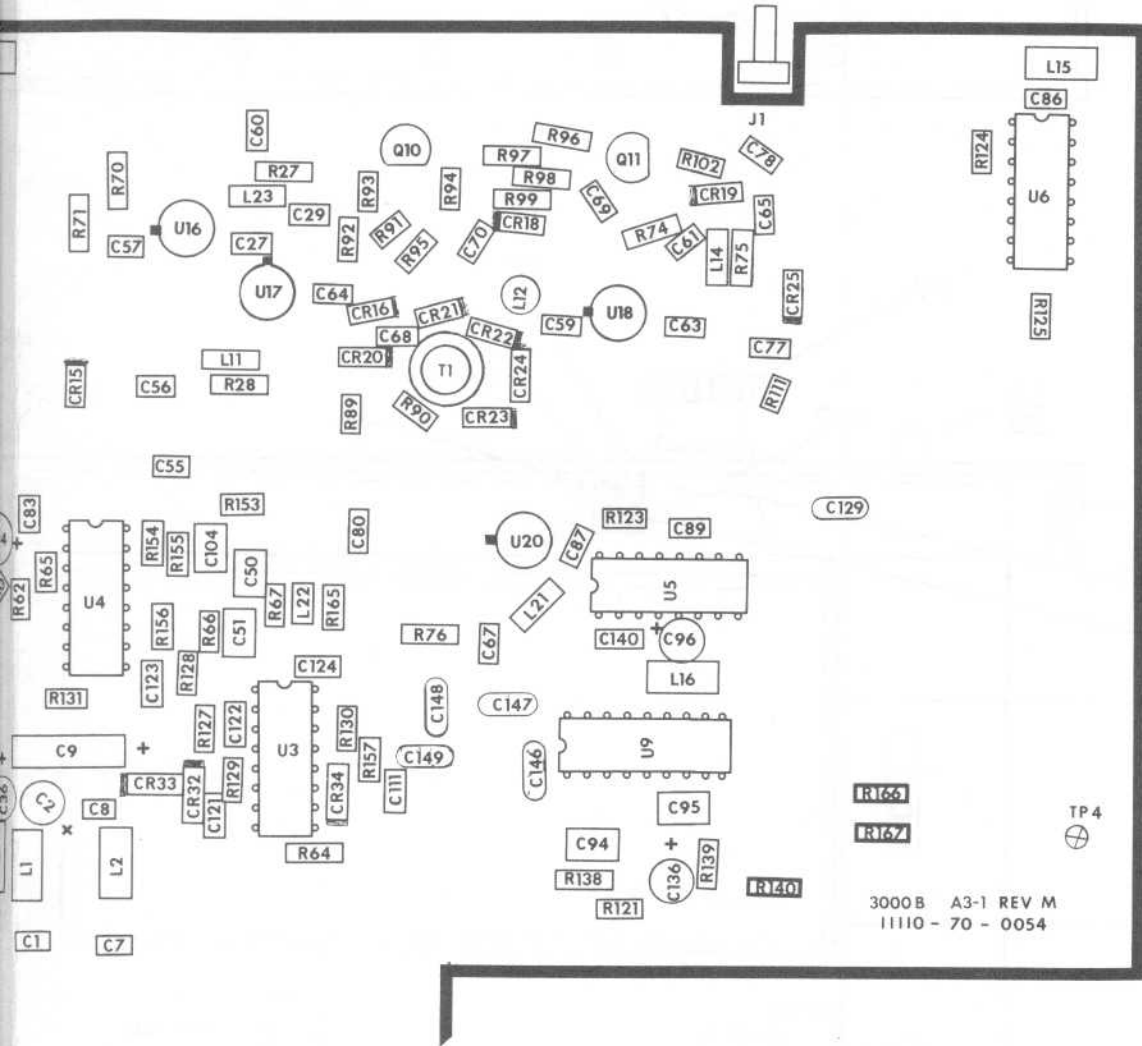
REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGFR PART NO	MFGFR/FCSM	PART NUMBER	QTY
J8	IC, SOCKET, 18-PIN	C841802	01295	12112-00-0022	1
TP3, TP4, TP6	TESTPOINTS	39-211	73734	12112-19-0005	3
H1, H2, H3	BRACKET, RT. ANGLE	612	91833	12810-09-0019	3
HS1	HEATSINK	6011B	13103	12810-11-0017	1
HS2	HEAT SINK, DIP	6012B	13103	12810-11-0032	1
HS3	HEAT SINK, 24-PIN DIP	6085B	13103	12810-11-0033	1
H4, H5, H6	L, NUT, 4-40 1/4X.076	9040	73734	12810-15-0009	3
H7, H8	NUT, KNURLED	1316C	83330	12810-16-0022	2
H9, H10	SCW, PPH, 10-32X3/8 STAINLESS	23084	73734	12810-23-0057	2
H11, H12, H13, H14, H15, H16	SEMS, 4-40 X 1/4, PPH	12810-23-0085	4J835	12810-23-0085	6
H17, H18	I, LW, 1/4X.408X.018	30-120	73734	12810-28-0001	2
R163	POT, 500	3386W-1-501	80294	14610-02-0501	1
R21, R22	RES, C, 1/8W, 5%, 150	RCR05G151JS	81349	14700-05-1500	2
R114, R87	RES, C, 1/8W, 5%, 2.2K	RCR05G222JS	81349	14700-05-2201	2
R34, R33	RES, C, 1/8W, 5%, 27	RCR05G270JS	81349	14700-05-2709	2
R35	RES, C, 1/8W, 5%, 33	RCR05G330JS	81349	14700-05-3309	1
R20	RES, C, 1/8W, 5%, 39	RCR05G390JS	81349	14700-05-3909	1
R2, R164	RES, C, 1/4W, 5%, 100	RCR07G101JS	81349	14700-15-1000	2
R36, R47	RES, C, 1/4W, 5%, 1K	RCR07G102JS	81349	14700-15-1001	2
R133, R136, R37, R38, R40, R91, R93	RES, C, 1/4W, 5%, 10K	RCR07G103JS	81349	14700-15-1002	7
R41, R54	RES, C, 1/4W, 5%, 100K	RCR07G104JS	81349	14700-15-1003	2
R57	RES, C, 1/4W, 5%, 1.2K	RCR07G122JS	81349	14700-15-1201	1
R98	RES, C, 1/4W, 5%, 12K	RCR07G123JS	81349	14700-15-1202	1
R7, R102, R92, R96	RES, C, 1/4W, 5%, 1.5K	RCR07G152JS	81349	14700-15-1501	4
R135, R16, R94	RES, C, 1/4W, 5%, 15K	RCR07G153JS	81349	14700-15-1502	3
R170	RES, C, 1/4W, 5%, 180	RCR07G181JS	81349	14700-15-1800	1
R126, R143, R59, R99, R142	RES, C, 1/4W, 5%, 1.8K	RCR07G182JS	81349	14700-15-1801	5
R95	RES, C, 1/4W, 5%, 220	RCR07G221JS	81349	14700-15-2200	1
R112, R113, R115, R32, R39, R68	RES, C, 1/4W, 5%, 2.2K	RCR07G222JS	81349	14700-15-2201	6
R168	RES, C, 1/4W, 5%, 220K	RCR07G224JS	81349	14700-15-2203	1
R50, R52, R53, R60, R61, R89, R51	RES, C, 1/4W, 5%, 270	RCR07G271JS	81349	14700-15-2700	7
R138, R44, R70, R71	RES, C, 1/4W, 5%, 2.7K	RCR07G272JS	81349	14700-15-2701	4
R3	RES, C, 1/4W, 5%, 27	RCR07G270JS	81349	14700-15-2709	1
R134	RES, C, 1/4W, 5%, 30K	RCR07G303JS	81349	14700-15-3002	1
R15	RES, C, 1/4W, 5%, 330	RCR07G331JS	81349	14700-15-3300	1
R121, R139, R58, R97	RES, C, 1/4W, 5%, 3.3K	RCR07G332JS	81349	14700-15-3301	4
R137	RES, C, 1/4W, 5%, 330K	RCR07G334JS	81349	14700-15-3303	1
R9	RES, C, 1/4W, 5%, 390	RCR07G391JS	81349	14700-15-3900	1
R169	RES, C, 1/4W, 5%, 3.9K	RCR07G392JS	81349	14700-15-3901	1
R10, R14, R48	RES, C, 1/4W, 5%, 39K	RCR07G393JS	81349	14700-15-3902	3

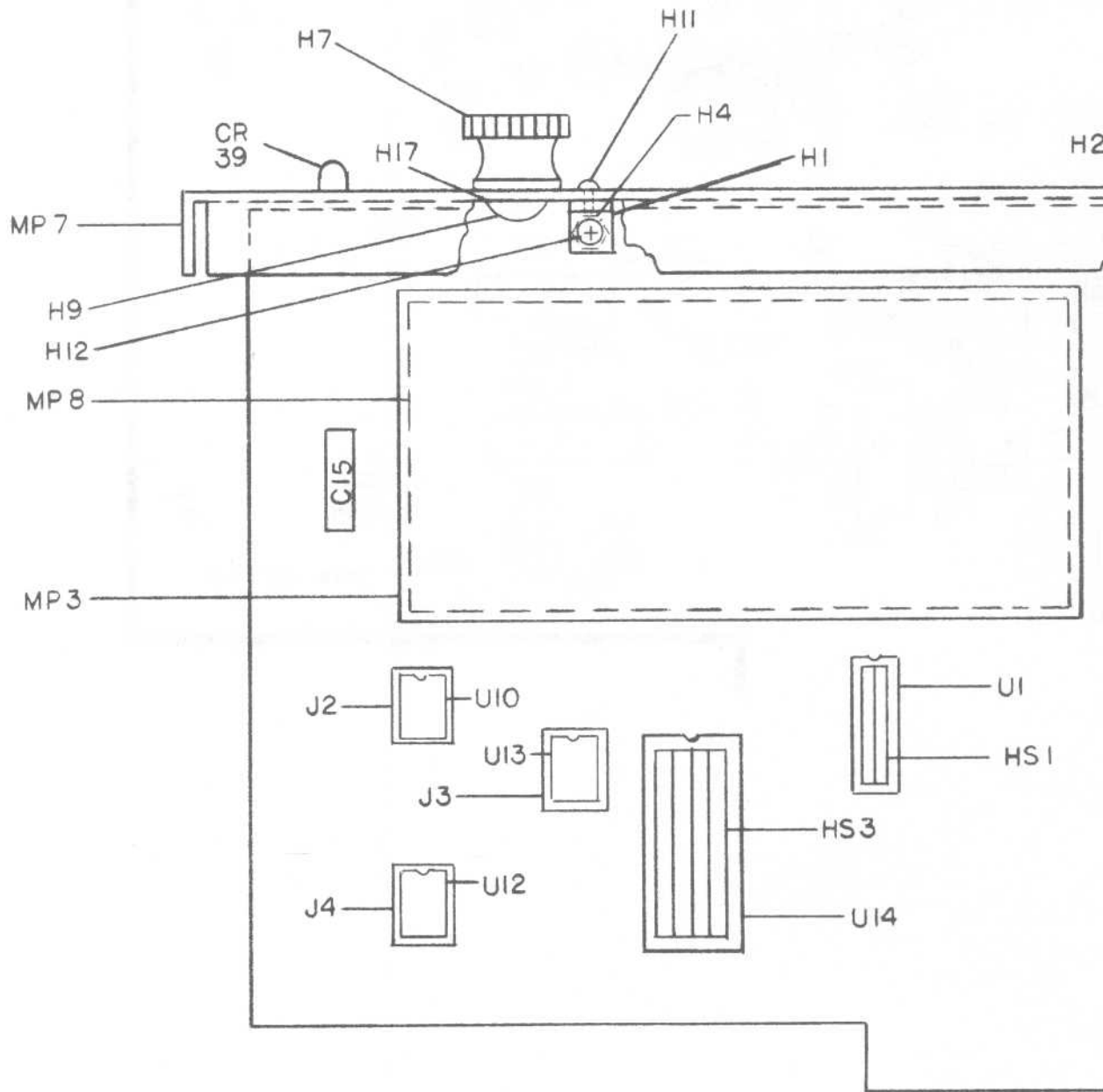
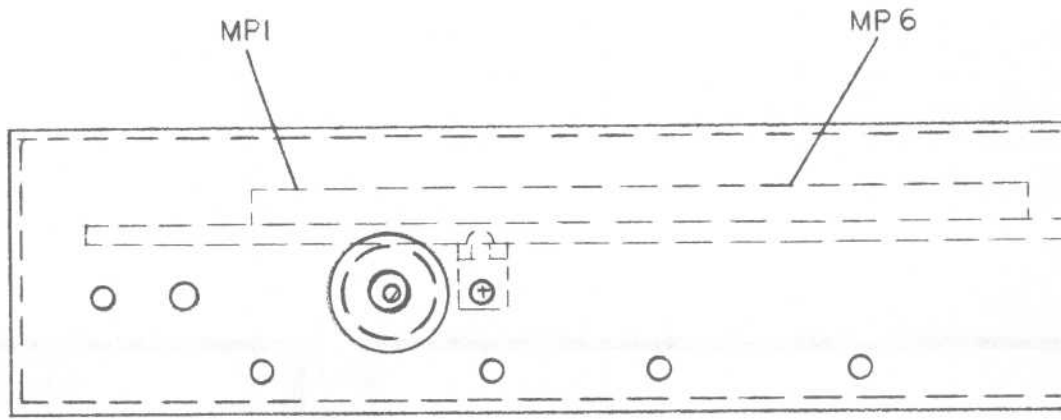
REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
R4	RES,C,1/4W,5%,39	RCR07G390JS	81349	14700-15-3909	1
R111,R124,R132,R64,R90	RES,C,1/4W,5%,470	RCR07G471JS	81349	14700-15-4700	5
R11,R12,R13,R127,R130,R131 R154,R55,R62,R63,R65	RES,C,1/4W,5%,4.7K	RCR07G472JS	81349	14700-15-4701	11
R18	RES,C,1/4W,5%,47K	RCR07G473JS	81349	14700-15-4702	1
R1	RES,C,1/4W,5%,47	RCR07G470JS	81349	14700-15-4709	1
R56	RES,C,1/4W,5%,51	RCR07G510JS	81349	14700-15-5109	1
R165,R49,R69	RES,C,1/4W,5%,560	RCR07G561JS	81349	14700-15-5600	3
R17,R43	RES,C,1/4W,5%,56K	RCR07G563JS	81349	14700-15-5602	2
R153	RES,C,1/4W,5%,62	RCR07G620JS	81349	14700-15-6209	1
R128,R129,R156,R157,R31	RES,C,1/4W,5%,680	RCR07G681JS	81349	14700-15-6800	5
R45	RES,C,1/4W,5%,6.8K	RCR07G682JS	81349	14700-15-6801	1
R123,R155,R19,R66,R67	RES,C,1/4W,5%,68	RCR07G680JS	81349	14700-15-6809	5
R6,R125,R30	RES,C,1/4W,5%,820	RCR07G821JS	81349	14700-15-8200	3
R42,R46	RES,C,1/4W,5%,82K	RCR07G823JS	81349	14700-15-8202	2
R5,R8,R140	RES,C,1/4W,5%,82	RCR07G820JS	81349	14700-15-8209	3
R28	RES,MF,1/8W,1%,22.1	RN55D2211FM	81349	14701-03-2219	1
R23,R75	RES,MF,1/8W,1%,48.7	RN55D4871FM	81349	14701-03-4879	2
R27,R74,R76	RES,MF,1/8W,1%,84.5	RN55D8451FM	81349	14701-03-8459	3
CR37,CR38	DIODE,ZENER,9.1V	1N5239	80131	14801-01-5239	2
CR1,CR2	DIODE,VARACTOR	BB405B	25403	14803-02-0011	2
CR16,CR19	DIODE,VARACTOR	1N5767	80131	14803-02-0018	2
CR3,CR5,CR6,CR7,CR15,CR18 CR20,CR25	DIODE,PIN	MA4P3401	96341	14805-02-0006	8
CR4,CR12,CR13,CR26,CR27 CR28,CR29,CR30,CR31,CR32 CR33,CR34,CR36,CR40	DIODE,SIGNAL	1N914	80131	14807-01-0914	14
CR14,CR21,CR22,CR23,CR24	DIODE,SIGNAL	HSCH1001	28480	14807-01-6263	5
CR39	LED,YL,T-1-3/4	HLMP-3400	28480	14810-02-0011	1
CR8,CR9,CR10,CR11	DIODE,QUAD SET,SS	5082-2805	28480	14899-02-0002	1
Q1,Q11	TRANSISTOR	PN4356-5	27014	14901-04-3560	2
Q17	TRANSISTOR	2N4403	80131	14901-04-4030	1
Q2,Q3	TRANSISTOR	A400	25403	14902-00-4000	2
Q5,Q6,Q7,Q10	TRANSISTOR	PN4275	27014	14902-04-2750	4
U13	OP AMP	LF351N	27014	17000-00-8100	1
U10	DUAL OP AMP	TL082CP	01295	17000-00-8200	1
U15, U16, U17, U18, U20	WIDE-BAND AMP, HYBRID DC-1000 MHZ, 55MA	MWA320	04713	17000-03-2000	5
U12	SPDT ANALOG SWITCH, SS	TL607CP	01295	17000-06-0700	1
U9	GATE ARRAY, SS	17100-70-1800	4J835	17100-70-1800	1
U1,U2	FF,ECL,SS	F11C70DC	07263	18000-11-7000	2
U5	DIVIDE-BY-10,ECL,SS	11C90DC	07263	18000-11-9000	1
U4	QUAD 2-IN NOR,MOT	MC10102P-MOT	04713	18001-01-0201	1
U3	DUAL FF,ECL,SS	MC10231P-MOT	04713	18001-02-3100	1
CT SYSTEMS PARTS LIST	TITLE FREQ SYN BD, A3-1	ASSEMBLY NO. 11110-70-0054	REV. M	PAGE 6.29	

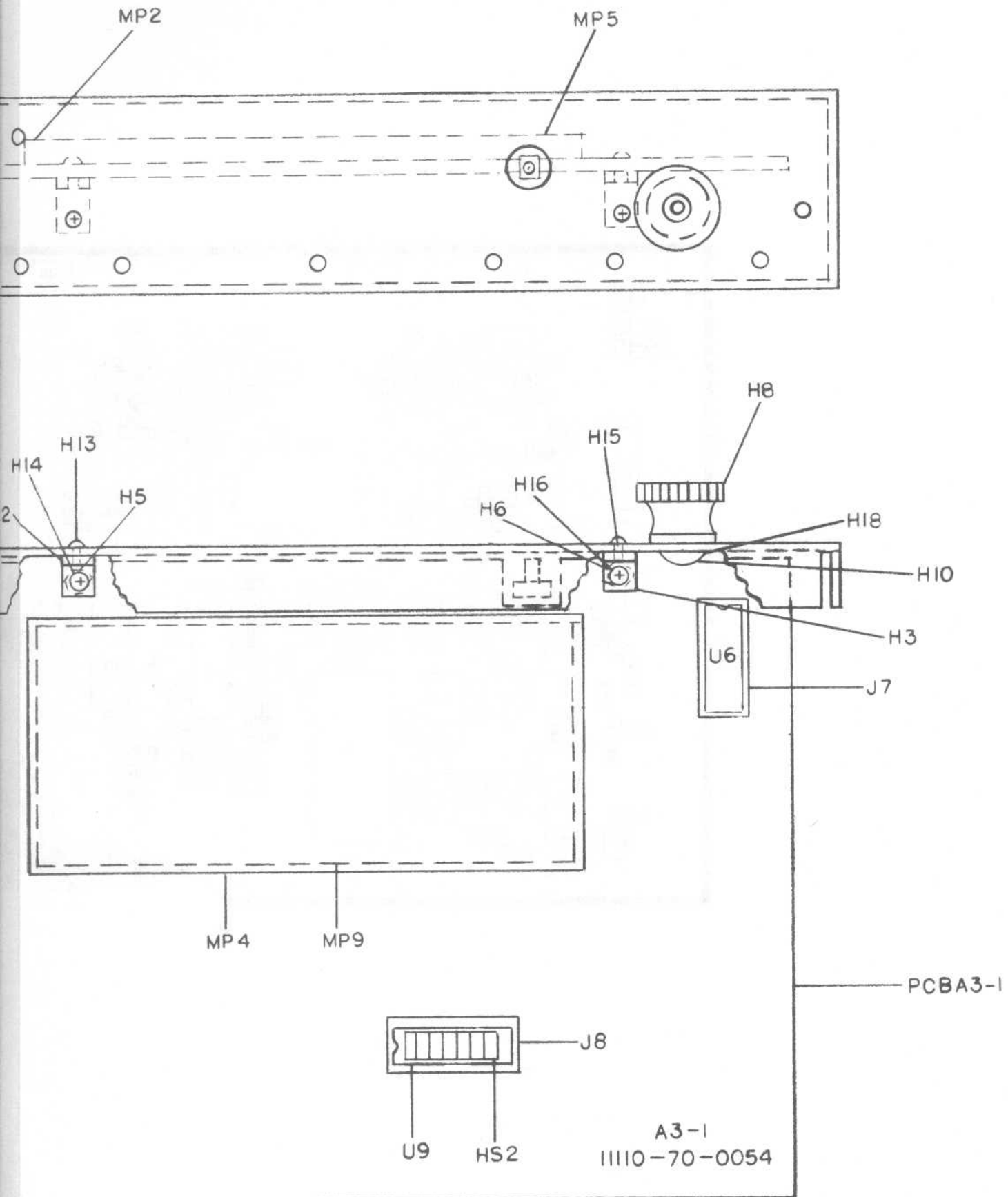
REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
U6	DUAL J-K FF	SN74S112N	01295	18007-41-1200	1
U14	QUAD NOR,ECL,SS	100102PCQR	07263	18010-01-0200	1
CT SYSTEMS PARTS LIST	TITLE FREQ SYN BD, A3-1	ASSEMBLY NO. 11110-70-0054	REV. M	PAGE 6.30	



A3-1







A3-1
 11110-70-0054

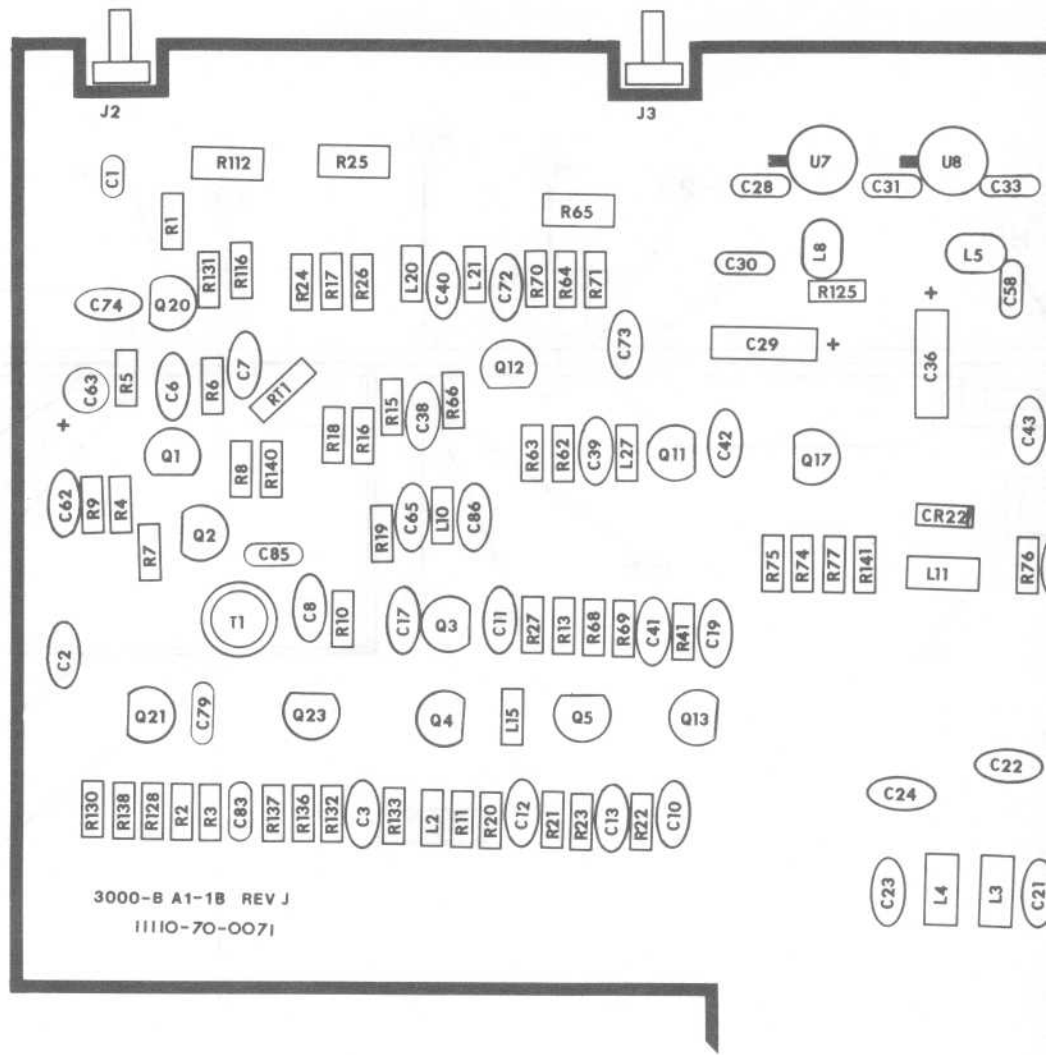
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 11110-70-0054

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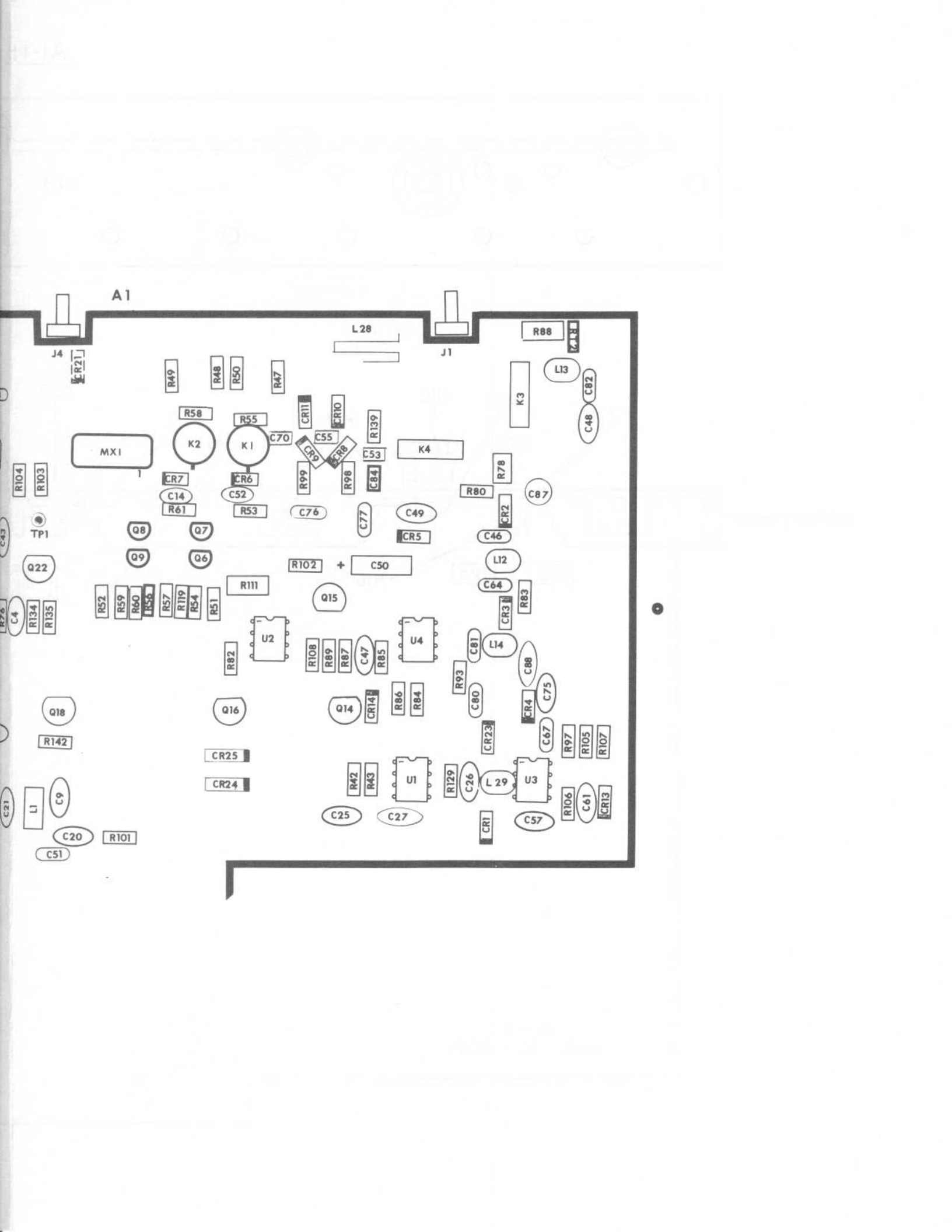
REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
L5, L8, L12, L13, L14, L29	FERRITE CHOKE 5 TURN FROM: 11813-00-0007	11210-30-0002	4J835	11210-30-0002	6
T1	XFMR, BIFILAR	11210-43-0011	4J835	11210-43-0011	1
MP1	SHIELD,	11417-01-0050	4J835	11417-01-0050	1
MP2	SHIELD CVR,	11417-01-0060	4J835	11417-01-0060	1
MP3	HEAT SINK	11417-01-0190	4J835	11417-01-0190	1
MP5	BRASS TUBE FROM: 13210-00-0085	11417-01-0240	4J835	11417-01-0240	1
MP4	COVER, A1-1B,	11417-60-0360	4J835	11417-60-0360	1
C53, C55, C70	CAP, CHIP, .1UF	51C1209-B104Z	32499	11510-00-3104	3
C88,	CAP, DISC, .001UF	5GAD10	56289	11510-10-1102	1
C83, C51,	CAP, MON, 50V, 1UF	3420-050-E105M	96095	11510-11-3105	2
C2, C3, C4, C6, C7, C8, C9, C10, C11, C12, C13, C17, C19, C20, C22, C23, C24, C25, C26, C27, C38, C39, C40, C41, C42, C43, C47, C48, C49, C57, C61, C62, C65, C72, C73, C74, C75, C86, C21	CAP, DISC, .01UF	UK25-103	71590	11510-14-1103	39
C28, C30, C31, C33, C58, C80, C81, C82, C14, C52	CAP, MON, 50V, .01UF	CW15C103K	71590	11510-14-4103	10
C46, C64, C67,	CAP, MON, 100V, 470PF	CW15A471M	71590	11510-14-5471	3
C76, C77,	CAP, MON, 50V, .22UF	C330C224M5U1CA	57185	11510-14-6224	2
C63,	CAP, TANT, 20V, 10UF	196D106X9020JA1	56289	11510-25-2100	1
C50,	CAP, ELEC, 16V, 100UF	500D107M016CB2	56289	11510-25-8102	1
C29, C36,	CAP, ELEC, 16V, 470UF	500D477M016DD2	56289	11510-25-8471	2
C84	CAP, COMP, 500V, 2.4PF	QC-2.4PF	95121	11510-40-0249	1
C85	CAP, MICA, 500V, 150PF	CM05FD151J03	81349	11510-50-0151	1
C79	CAP, MICA, 500V, 22PF	CM05ED220J03	81349	11510-50-0220	1
C1,	CAP, MICA, 500V, 300PF	DM15-301J	81349	11510-50-0301	1
C87,	CAP, VAR, 1-3PF	302504-121	52763	11510-70-8309	1
PCBA1-1B	DS, PCB, REV.E. A1-1B 3000B	11717-00-0071	4J835	11717-00-0071	1
L1, L3, L4, L11,	CHOKE	VK20010/38	02114	11810-09-0001	4
L2, L10, L15, L20, L21, L27,	CHOKE, MOLDED, 56 UH	1025-62	99800	11810-10-0560	6
J1, J2, J3, J4,	CONN, RF, STR, JACK, RA,	2009-1511-000	19505	12110-08-0006	4
H1, H2,	GROUND LUG, #4	1901	73734	12112-03-0001	2
H24,	SOLDER TAB	38-211	73734	12112-03-0009	1
TP1,	TESTPOINTS	39-211	73734	12112-19-0005	1
H3, H4, H5,	BRACKET, RT. ANGLE	612	91833	12810-09-0019	3
H6,	MIXER INSULATOR	14-047-01	15542	12810-11-0042	1
H7, H8, H9,	L, NUT, 4-40 1/4X.076	9040	73734	12810-15-0009	3
H10, H11,	NUT, KNURLED	1316C	83330	12810-16-0022	2
H12, H13,	SCW, PPH, 4-40X3/8, S/S	23024	73734	12810-23-0053	2
H14, H15,	SCW, PPH, 10-32X3/8	23084	73734	12810-23-0057	2
H16, H17, H18, H19, H20, H21,	SEMS, 4-40 X 1/4, PPH INT	12810-23-0085	4J835	12810-23-0085	6
H22, H23,	I, LW, 1/4X.408X.018	30-120	73734	12810-28-0001	2
MX1	MIXER	TFM-2H	15542	13010-54-0007	1
CT SYSTEMS PARTS LIST	TITLE MIXER BD, A1-1B	ASSEMBLY NO. 11110-70-0071	REV. J	PAGE 6.31	

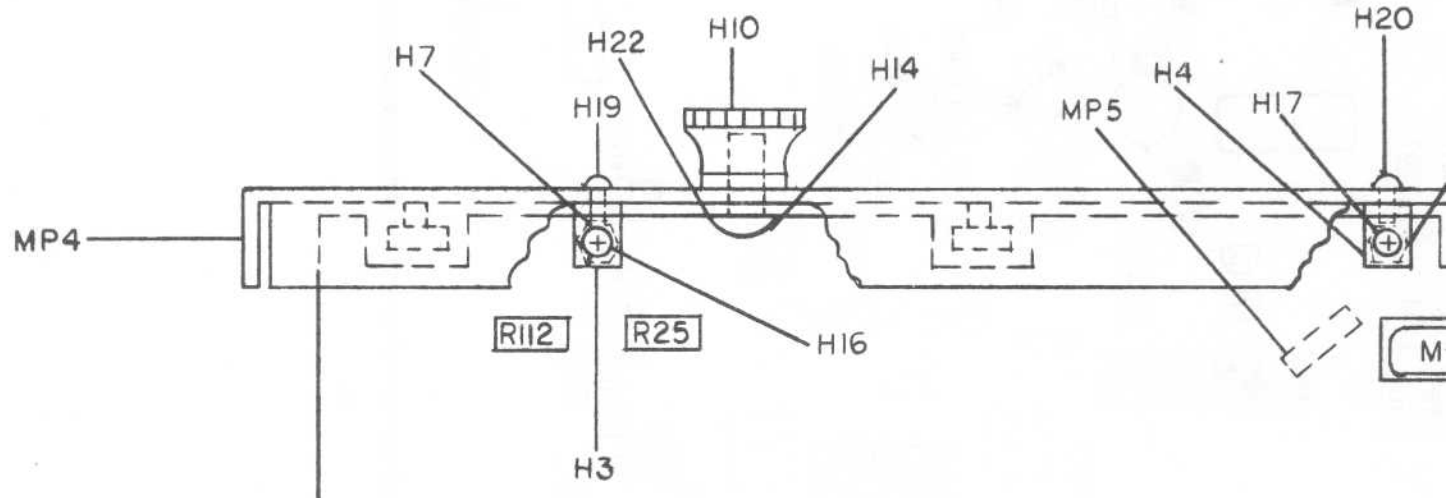
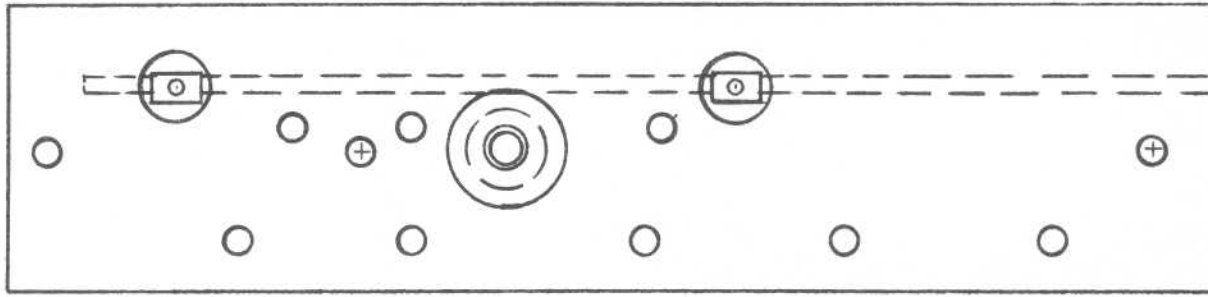
REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
K1, K2,	RELAY.DPDT	712-18	11532	14510-00-0008	2
K4,	RELAY, RF, N.O.	234-3-1	18542	14510-00-0016	1
K3,	RELAY, RF, N.C.	234-4-1	18542	14510-00-0017	1
R112, R25,	POT, 100	3386W-1-101	80294	14610-02-0101	2
R102, R65,	POT, 1K	3386W-1-102	80294	14610-02-0102	2
R111,	POT, 5K	3386W-1-502	80294	14610-02-0502	1
R80,	RES, C, 1/8W, 5%, 51	RCR05G510JS	81349	14700-05-5109	1
R26,	RES, C, 1/4W, 5%, 100	RCR07G101JS	81349	14700-15-1000	1
R107, R20, R52, R57, R68, R86,	RES, C, 1/4W, 5%, 1K	RCR07G102JS	81349	14700-15-1001	6
R4, R119, R129, R130, R141, R53, R59, R61,	RES, C, 1/4W, 5%, 10K	RCR07G103JS	81349	14700-15-1002	8
R76, R77,	RES, C, 1/4W, 5%, 120	RCR07G121JS	81349	14700-15-1200	2
R5, R7, R75,	RES, C, 1/4W, 5%, 1.2K	RCR07G122JS	81349	14700-15-1201	3
R85,	RS, C, 1/4W, 5%, 12K	RCR07G123JS	81349	14700-15-1202	1
R132, R135, R22,	RES, C, 1/4W, 5%, 1.5K	RCR07G152JS	81349	14700-15-1501	3
R136,	RES, C, 1/4W, 5%, 15K	RCR07G153JS	81349	14700-15-1502	1
R43, R84,	RES, C, 1/4W, 5%, 150K	RCR07G154JS	81349	14700-15-1503	2
R108,	RES, C, 1/4W, 5%, 1.8K	RCR07G182JS	81349	14700-15-1801	1
R137,	RES, C, 1/4W, 5%, 18K	RCR07G183JS	81349	14700-15-1802	1
R54, R60,	RES, C, 1/4W, 5%, 20K	RCR07G203JS	81349	14700-15-2002	2
R51, R56,	RES, C, 1/4W, 5%, 200K	RCR07G204JS	81349	14700-15-2003	2
R106,	RES, C, 1/4W, 5%, 220	RCR07G221JS	81349	14700-15-2200	1
R83,	RES, C, 1/4W, 5%, 220K	RCR07G224JS	81349	14700-15-2203	1
R8,	RES, C, 1/4W, 5%, 22	RCR07G220JS	81349	14700-15-2209	1
R64,	RES, C, 1/4W, 5%, 2.4K	RCR07G242JS	81349	14700-15-2401	1
R74,	RES, C, 1/4W, 5%, 2.7K	RCR07G272JS	81349	14700-15-2701	1
R105,	RES, C, 1/4W, 5%, 30K	RCR07G303JS	81349	14700-15-3002	1
R9, R70,	RES, C, 1/4W, 5%, 330	RCR07G331JS	81349	14700-15-3300	2
R134,	RES, C, 1/4W, 5%, 3.3K	RCR07G332JS	81349	14700-15-3301	1
R10, R103, R15,	RES, C, 1/4W, 5%, 33	RCR07G330JS	81349	14700-15-3309	3
R142	RES, C, 1/4W, 5%, 360	RCR07G361JS	81349	14700-15-3600	1
R2,	RES, C, 1/4W, 5%, 390	RCR07G391JS	81349	14700-15-3900	1
R82,	RES, C, 1/4W, 5%, 3.9K	RCR07G392JS	81349	14700-15-3901	1
R1,	RES, C, 1/4W, 5%, 39	RCR07G390JS	81349	14700-15-3909	1
R89	RES, C, 1/4W, 5%, 470	RCR07G471JS	81349	14700-15-4700	1
R13, R62	RES, C, 1/4W, 5%, 4.7K	RCR07G472JS	81349	14700-15-4701	2
R93	RES, C, 1/4W, 5%, 470K	RCR07G474JS	81349	14700-15-4703	1
R104, R116	RES, C, 1/4W, 5%, 47	RCR07G470JS	81349	14700-15-4709	2
R6,	RES, C, 1/4W, 5%, 5.1K	RCR07G512JS	81349	14700-15-5101	1
R131, R138	RES, C, 1/4W, 5%, 51	RCR07G510JS	81349	14700-15-5109	2
R21, R69	RES, C, 1/4W, 5%, 560	RCR07G561JS	81349	14700-15-5600	2
R3, R128, R133, R23, R41,	RES, C, 1/4W, 5%, 5.6K	RCR07G562JS	81349	14700-15-5601	5
R42,	RES, C, 1/4W, 5%, 56K	RCR07G563JS	81349	14700-15-5602	1
CT SYSTEMS PARTS LIST	TITLE MIXER BD, A1-1B	ASSEMBLY NO. 11110-70-0071	REV. J	PAGE 6.32	

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGFR PART NO	MFGFR/FCSM	PART NUMBER	QTY
R139	RES, C, 1/4W, 5%, 56	RCR07G560JS	81349	14700-15-5609	1
R71,	RES, C, 1/4W, 5%, 680	RCR07G681JS	81349	14700-15-6800	1
R87, R97,	RES, C, 1/4W, 5%, 6.8K	RCR07G682JS	81349	14700-15-6801	2
R11, R140, R66,	RES, C, 1/4W, 5%, 68	RCR07G680JS	81349	14700-15-6809	3
R101, R27, R63,	RES, C, 1/4W, 5%, 820	RCR07G821JS	81349	14700-15-8200	3
R16, R17,	RES, MF, 1/8W, 1%, 140	RN55D1400FM	81349	14701-03-1400	2
R98, R99	RES, MF, 1/8W, 1%, 14.7K	RN55D1472FM	81349	14701-03-1472	2
R19, R24,	RES, MF, 1/8W, 1%, 191	RN55D1910FM	81349	14701-03-1910	2
R125,	RES, MF, 1/8W, 1%, 48.7	RN55D4871FM	81349	14701-03-4879	1
R18,	RES, MF, 1/8W, 1%, 95.3	RN55D9531FM	81349	14701-03-9539	1
R78	RES, CHIP, 2W, 5%, 1K	2512CPX102K	56235	14711-45-1001	1
R55, R58,	RES, L-A, 1/4W, 1%, 247.5	PR8351-247.5	PRRES	14741-24-7508	2
R47, R48, R49, R50,	RES, L-A, 1/4W, 1%, 61.1	PR8351-61.1	PRRES	14741-61-1007	4
R88	50 OHM/150W LOAD	TG150-50	CTC	14799-00-0005	1
CR21, CR22	DIODE, VARACTOR	1N5767	80131	14803-02-0018	2
CR6, CR7,	DIODE	1N4004	80131	14806-01-4004	2
CR1, CR4, CR5, CR13, CR14, CR23, CR24, CR25,	DIODE, SIGNAL	1N914	80131	14807-01-0914	8
CR8, CR9, CR10, CR11,	DIODE, SIGNAL	1N4444	80131	14807-01-4444	4
CR2, CR3,	DIODE, SIGNAL	HSCH1001	28480	14807-01-6263	2
Q3, Q4, Q11, Q12, Q14, Q16, Q17,	TRANSISTOR	PN2222	27014	14901-02-2220	7
Q2, Q20, Q21,	TRANSISTOR	2N3563	80131	14901-03-5630	3
Q6, Q7, Q8, Q9	TRANSISTOR	2N3904	27014	14901-03-9040	4
Q1, Q5, Q13, Q23	TRANSISTOR	PN4121-18	27014	14901-04-1210	4
Q15	TRANSISTOR	2N4403	80131	14901-04-4030	1
Q18, Q22	TRANSISTOR	PN4275	27014	14902-04-2750	2
RT1	THRMSTR, 500	CA25J1	15801	15310-00-0005	1
RT2	THRMSTR, 1K	CA31J1	15801	15310-00-0006	1
U3	OP AMP	LF351N	27014	17000-00-8100	1
U4	DUAL OP AMP	TL082CP	01295	17000-00-8200	1
U7	WIDE-BAND AMP, HYBRID DC-1000 MHZ, 55 MA	MWA320	04713	17000-03-2000	1
U8	WIDE-BAND AMP, HYBRID DC-1000MHZ, 100MA	MWA330	04713	17000-03-3000	1
U1	TIMER	LM555CN	27014	17000-05-5500	1
U2	SPDT ANALOG SWITCH	TL607CP	01295	17000-06-0700	1



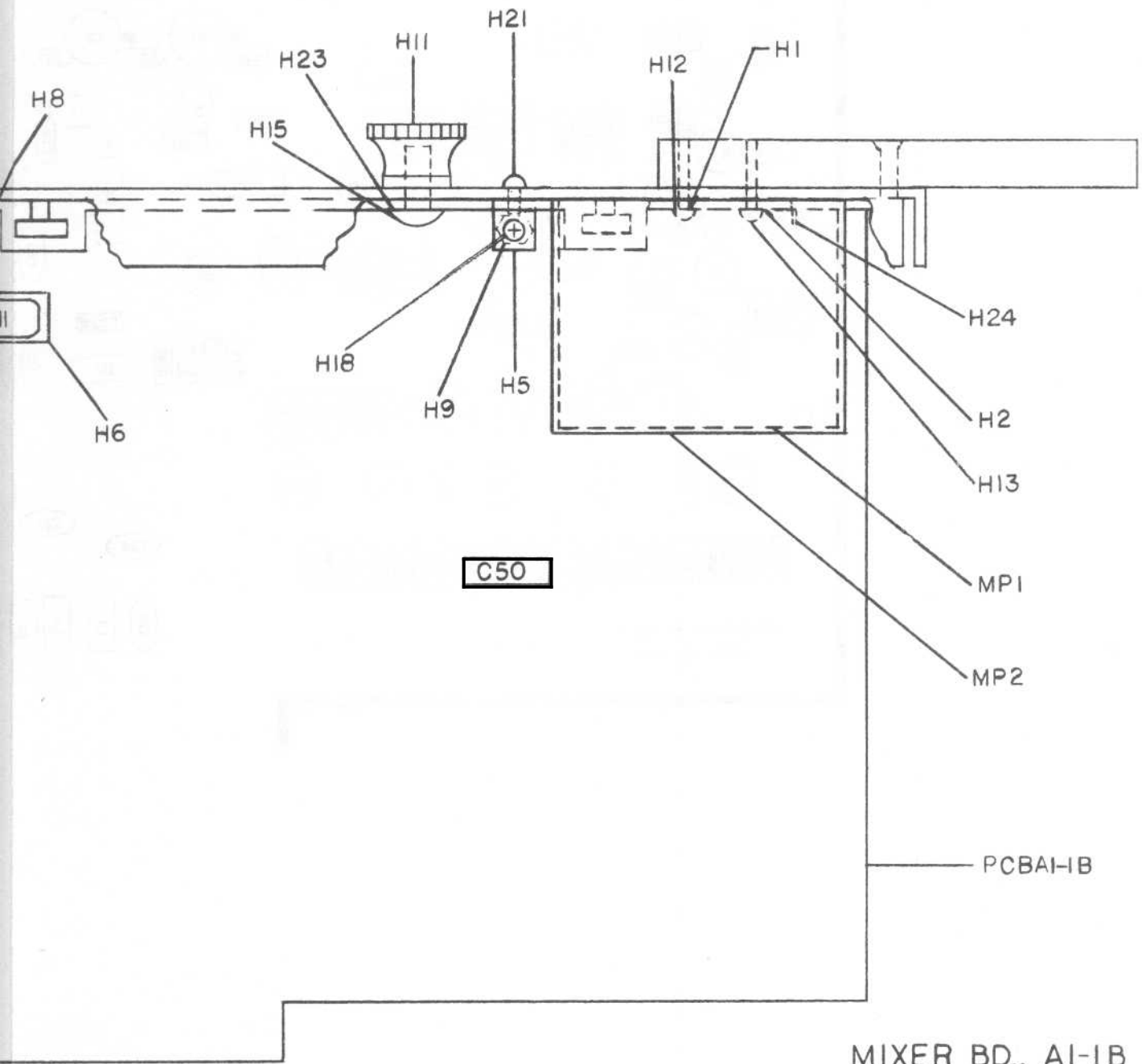
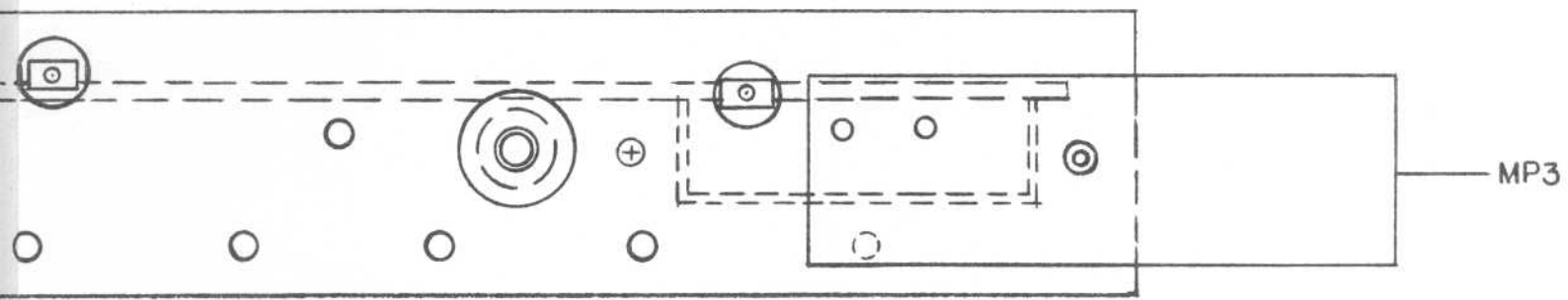
3000-B A1-1B REV J
 11110-70-0071





AI-1B
11110-70-0071

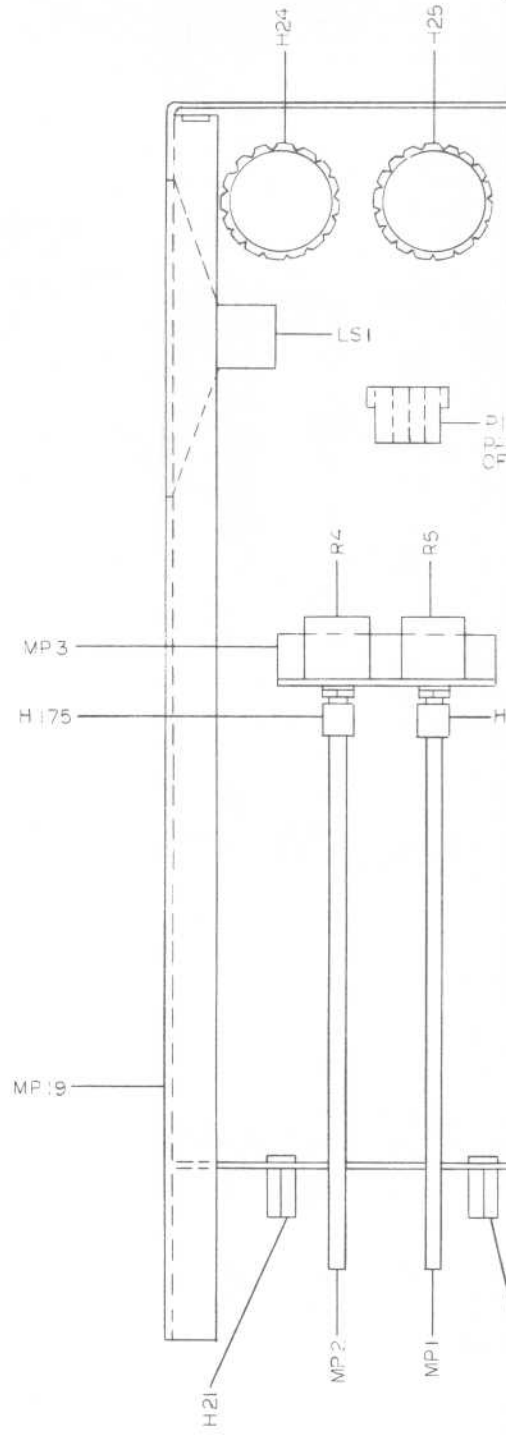
B



MIXER BD., AI-IB
11110-70-0071
SHT. 2 OF 2

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
ZA1	MOTHER BD, A12B	11110-00-7012	4J835	11110-00-7012	1
ZA3	3.6MHZ PLL BD, A15	11110-70-0094	4J835	11110-70-0094	1
ZA2	RP ASSY, 3000B	11118-70-0001	4J835	11118-70-0001	1
ZA5	FP ASSY, 3000B	11118-70-0003	4J835	11118-70-0003	1
ZA4	INVERTER ASSY, 110B	11118-70-0004	4J835	11118-70-0004	1
HH1	HRNSS, 3000B-A, CRT	11219-00-0176	4J835	11219-00-0176	1
HH2	HRNSS, 3000B-D, MIC	11219-70-0001	4J835	11219-70-0001	1
HH3	HRNSS, 3000B, F/P SWI	11219-70-0002	4J835	11219-70-0002	1
MP1, MP2	ROD, FIBERGLASS REF:13210-13-0001	11417-01-0020	4J835	11417-01-0020	2
MP3	BRACKET SUPP, 3000B	11417-30-0080	4J835	11417-30-0080	1
MP20	CRT GROMMET, 9 IN FROM:13210-06-0048	11417-30-0340	4J835	11417-30-0340	1
MP4, MP5, MP6, MP7, MP8, MP9	PARTITION #1	11417-60-0010	4J835	11417-60-0010	6
MP12	SHIELD, CRT	11417-60-0290	4J835	11417-60-0290	1
MP13	A1 PARTITION	11417-60-0330	4J835	11417-60-0330	1
MP 14, MP15	SIDE STRIP	11417-60-0570	4J835	11417-60-0570	2
MP16	BRACKET, CRT	11417-60-0590	4J835	11417-60-0590	1
MP17	COVER, CARD CAGE	11417-80-0130	4J835	11417-80-0130	1
MP18	CARD CAGE	11417-80-0140	4J835	11417-80-0140	1
MP19	CHASSIS	11417-80-0150	4J835	11417-80-0150	1
H1, H2, H3, H4, H5, H6, H7, H8, H9, H10, H11, H12, H13, H14, H15, H16	CARD GUIDE	1450F	31514	12112-16-0012	16
P1	PLUG	19-09-2042	27264	12113-26-0001	1
H60	DECAL, CAUTION HIGH VOLTAGE	12416-14-0001	4J835	12416-14-0001	1
H17, H18, H19	CBL CLMP, NON LKG, ADH, 1/4	KKC4	06915	12810-00-0002	3
H22, H23	CBL CLMP, 1/4	8957	83330	12810-00-0004	2
H20, H21	SPACER, HEX, 4-40X3/8	108303NP	73734	12810-02-4106	2
H24, H25	CAT GROMMET, 2-15/16 FROM:12810-10-0021	12810-10-0004	4J835	12810-10-0004	2
H26, H27	RUBBER GROMMET, 5/16	1656	73734	12810-10-0015	2
H28, H29, H30	MTG INSULATOR, TIP 32	601257911674	18565	12810-11-0007	3
H31, H32, H33 H34, H35, H36, H37	FOAM STRIP, 4-1/2 IN FROM:13210-99-0017	12810-12-0019	4J835	12810-12-0019	7
H48, H49, H50	NUT, 4-40X1/4, NP	8003NP	73734	12810-14-4104	3
H38, H39, H40, H41, H42, H43, H44, H45, H46, H47	KEPS NUT, 4-40	71500	73734	12810-16-0026	10
H51	KEPS NUT, 6-32	9225	73734	12810-16-0027	1
H52, H53, H54, H55, H56, H57, H58, H59	SCW, PFH, 4-40X5/16	22223	73734	12810-23-0052	8
H62, H63, H64, H65, H66, H67, H68, H69, H70, H71	SCW, PPH, 4-40X3/8	23024	73734	12810-23-0053	10
H72, H73	SCW, PPH, 4-40X1	23030	73734	12810-23-0055	2
H180, H181, H182, H183	SCW, PPH, 6-32X1/4	23042	73734	12810-23-0061	4
CT SYSTEMS PARTS LIST	TITLE CHASSIS, 3000B	ASSEMBLY NO. 11111-70-0002		REV. C	PAGE 6.34

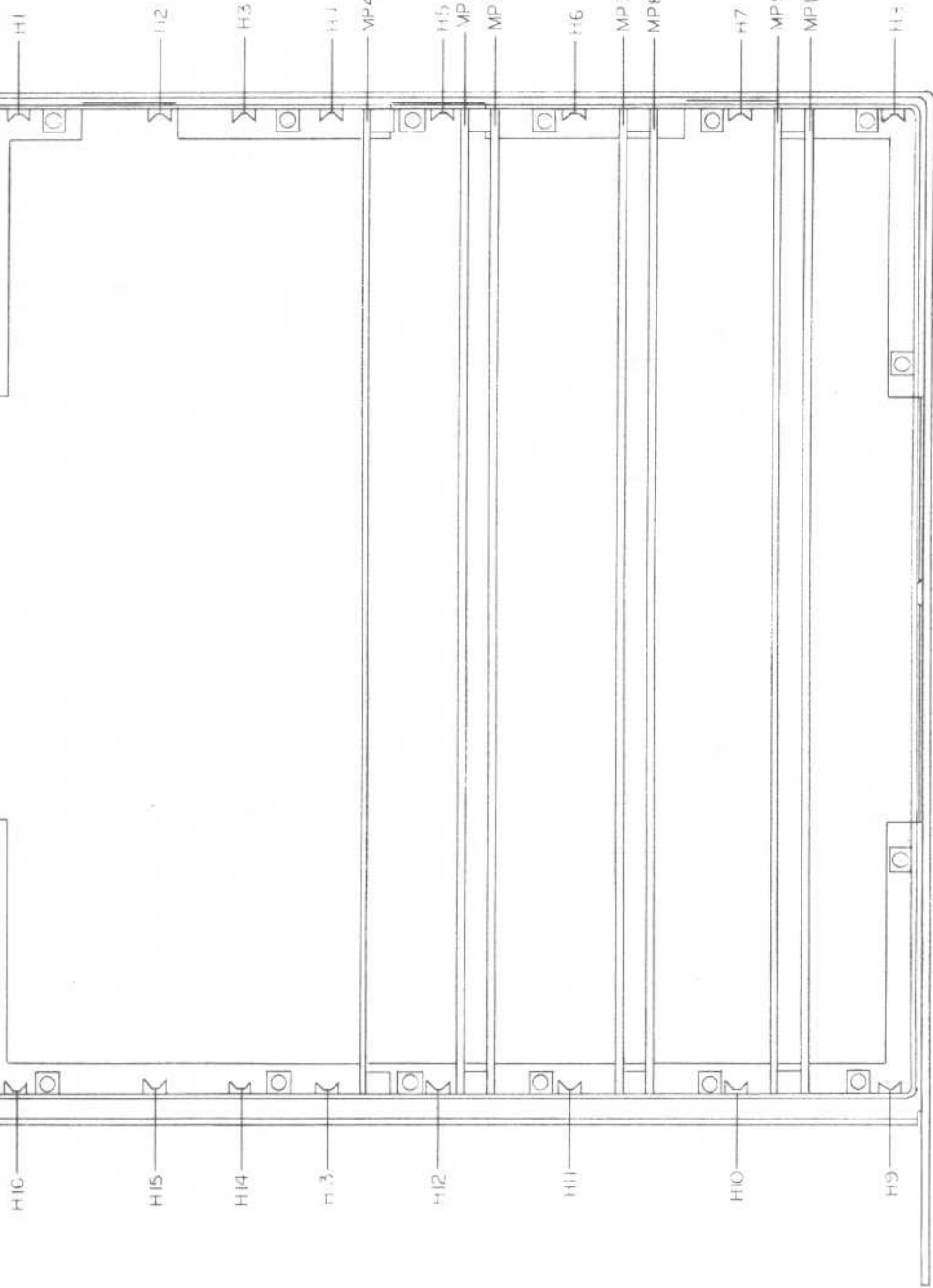
REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
H74, H75, H76, H77, H78, H79, H80, H81, H82, H83, H84	SEMS, 4-40X1/4, PPH, INT	12810-23-0085	4J835	12810-23-0085	11
H95, H96, H97, H98, H99, H100, H101, H102, H103, H104, H105, H106, H107, H108, H109, H110, H111, H112, H113, H114, H115, H116, H117, H118, H119, H120, H121, H122, H123, H124, H125, H126, H127, H128, H129, H130, H131, H132, H133, H134, H135, H136, H137, H138, H139, H140, H141, H142, H143, H144, H145, H146, H147, H148, H149, H150, H151, H152, H153, H154, H155, H85	SEMS, 4-40X3/8, PPH INT	12810-23-0086	4J835	12810-23-0086	62
H157, H158, H159 H160, H161, H162	SH WASHER	DF137A	02735	12810-27-0001	6
H168, H169, H170, H171	WASHER, FIBRE, #6	1471	73734	12810-28-0045	4
H174, H175	COUPLER	180	83330	12810-32-0005	2
H176, H177	SCW, PPH, 4-40X1/2	19026NP	73734	12810-55-4108	2
H178	SCW, PPH, 6-32X3/4	19048NP	73734	12810-55-6112	1
LS1	SPEAKER	30A05Z8	QUAM	13010-11-0005	1
R4, R5	PCT, LIN, 5M	91C1A-D16-B27	80294	14610-15-4505	2
Q4, Q5	TRANSISTOR, POWER	TIP-31	04713	14902-00-0311	2
Q8	TRANSISTOR, POWER	TIP-32	01295	14902-00-0320	1
V1	CRT, 3IN, W/P31 PHOS	3RP31A	RCDSN	15710-00-0021	1
CT SYSTEMS PARTS LIST	TITLE CHASSIS, 3000B	ASSEMBLY NO. 11111-70-0002	REV. C	PAGE 6.35	



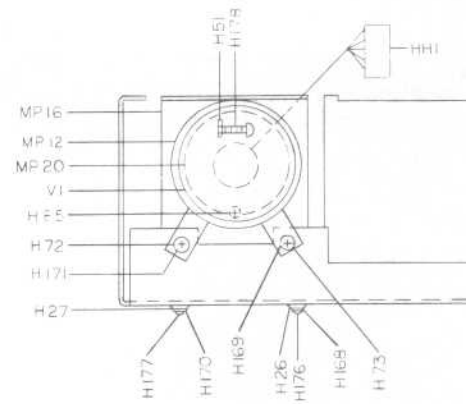
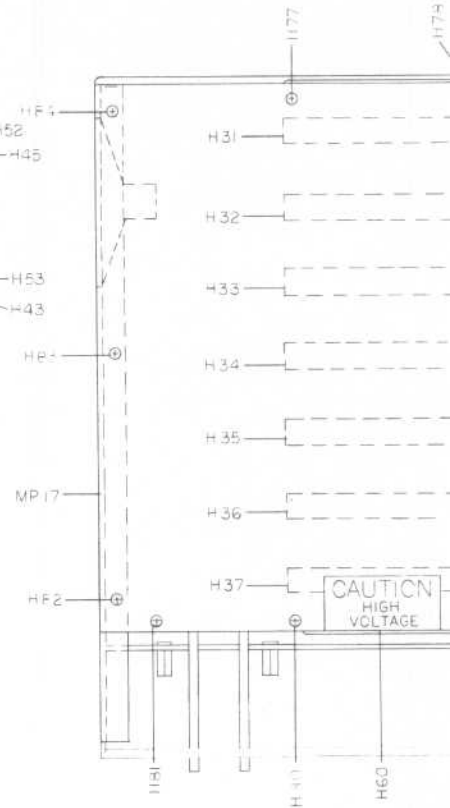
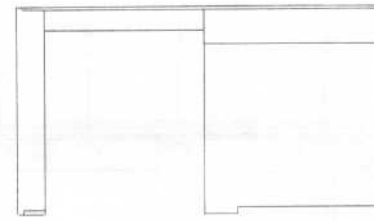
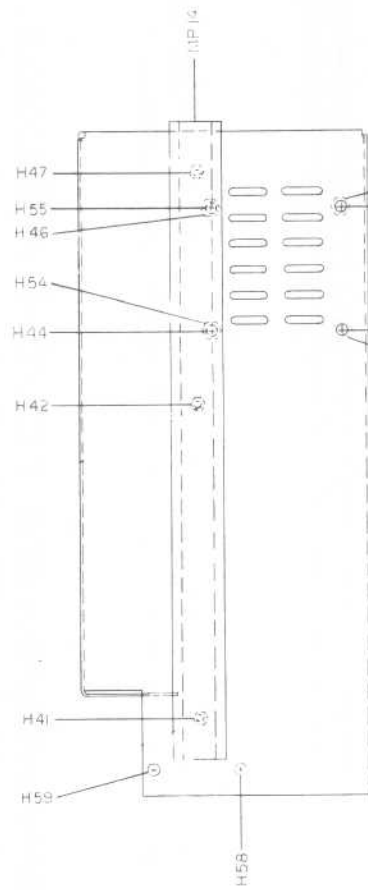
MP 18

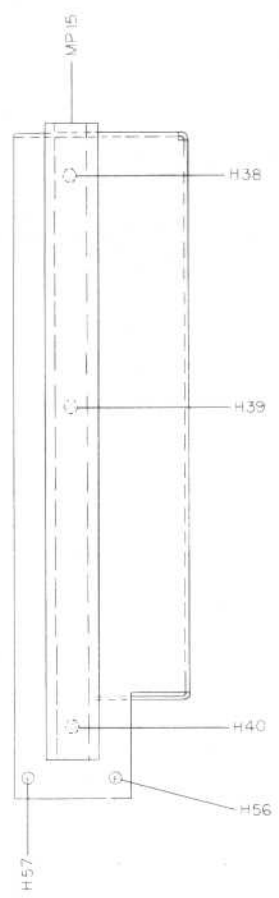
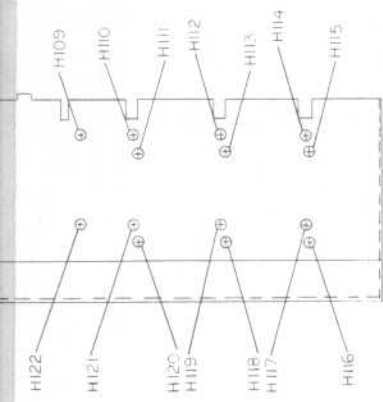
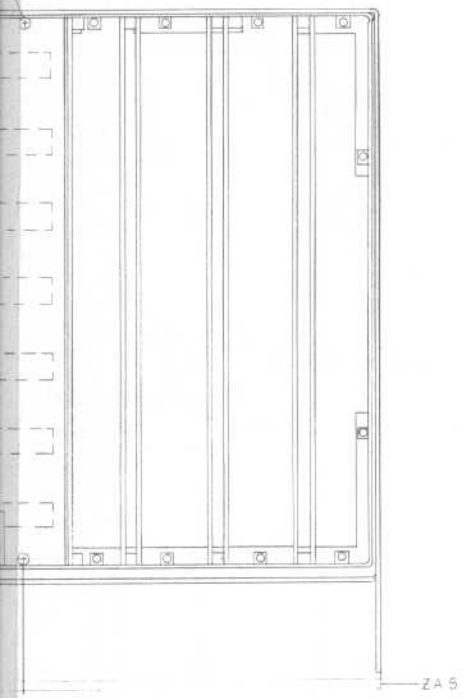
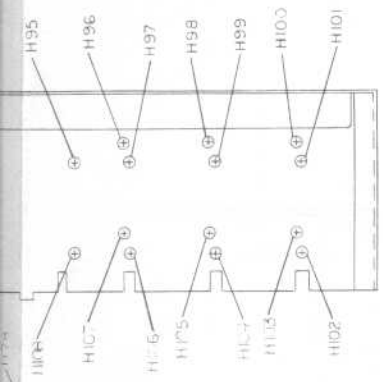
H13

H12

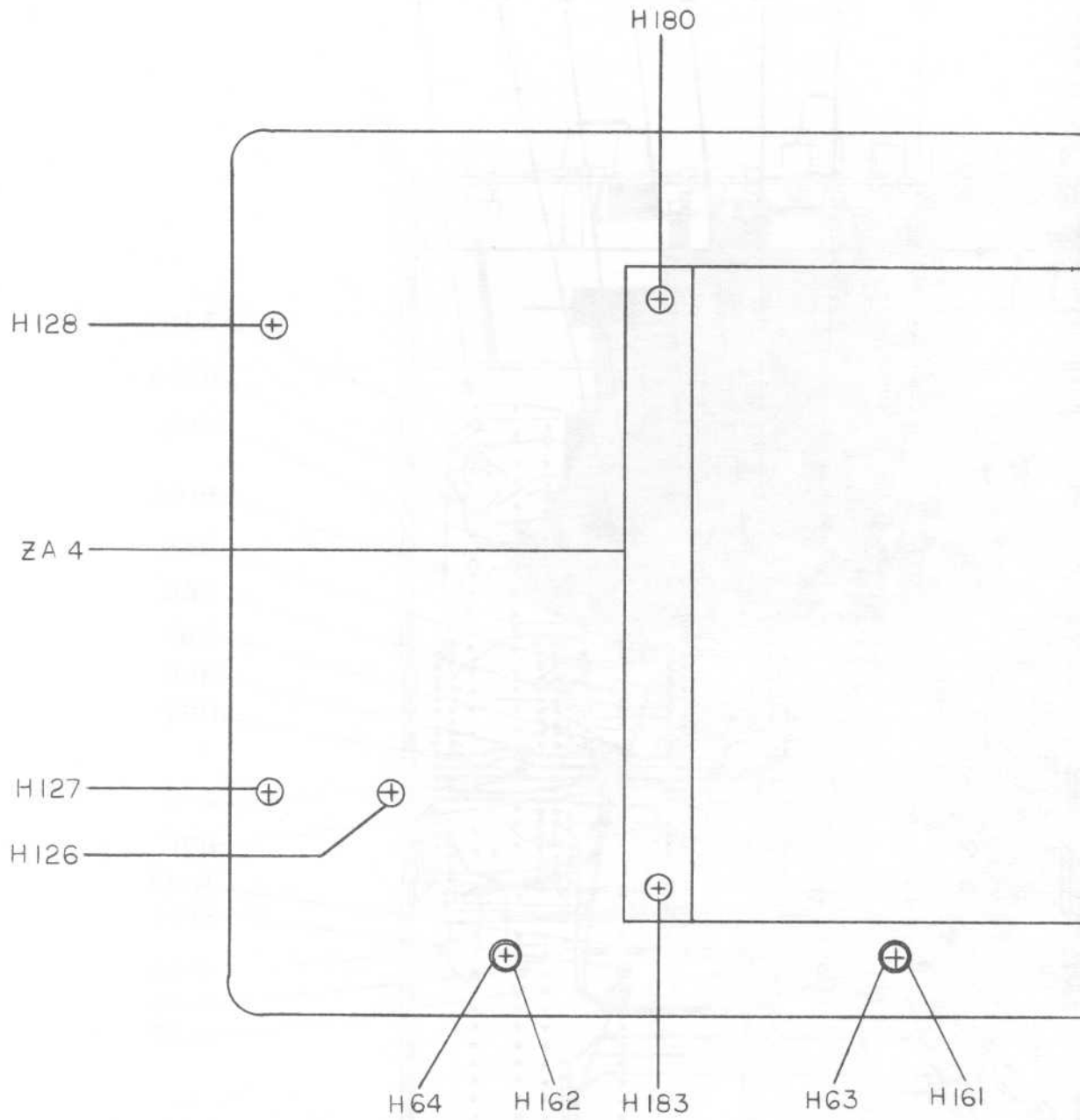


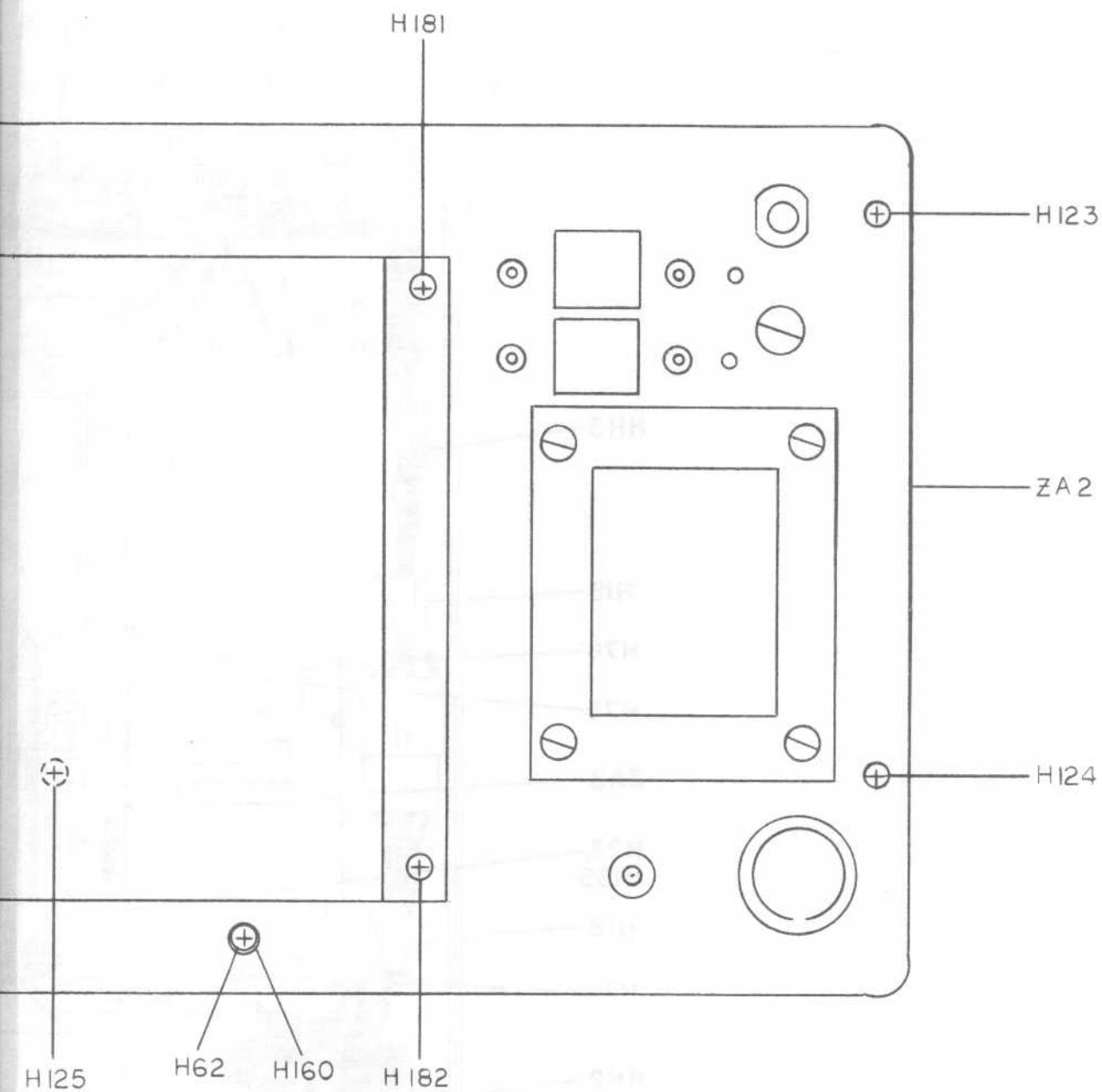
H20



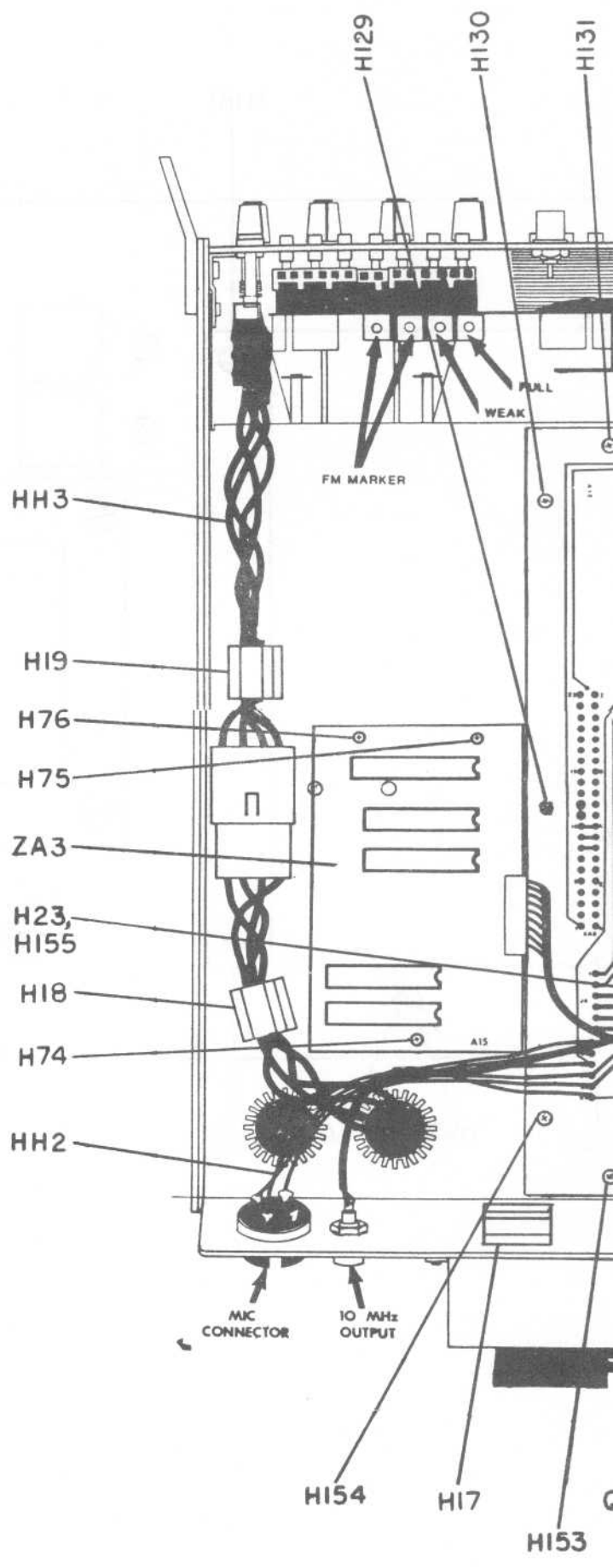


CHASSIS ASSY
 IIIII-70-002
 SHT. 2 OF 4





CHASSIS ASSY
11111-70-0002
SHT. 3 OF 4



H129

H130

H131

FULL

WEAK

FM MARKER

HH3

H19

H76

H75

ZA3

H23,
H155

H18

H74

HH2

MIC CONNECTOR

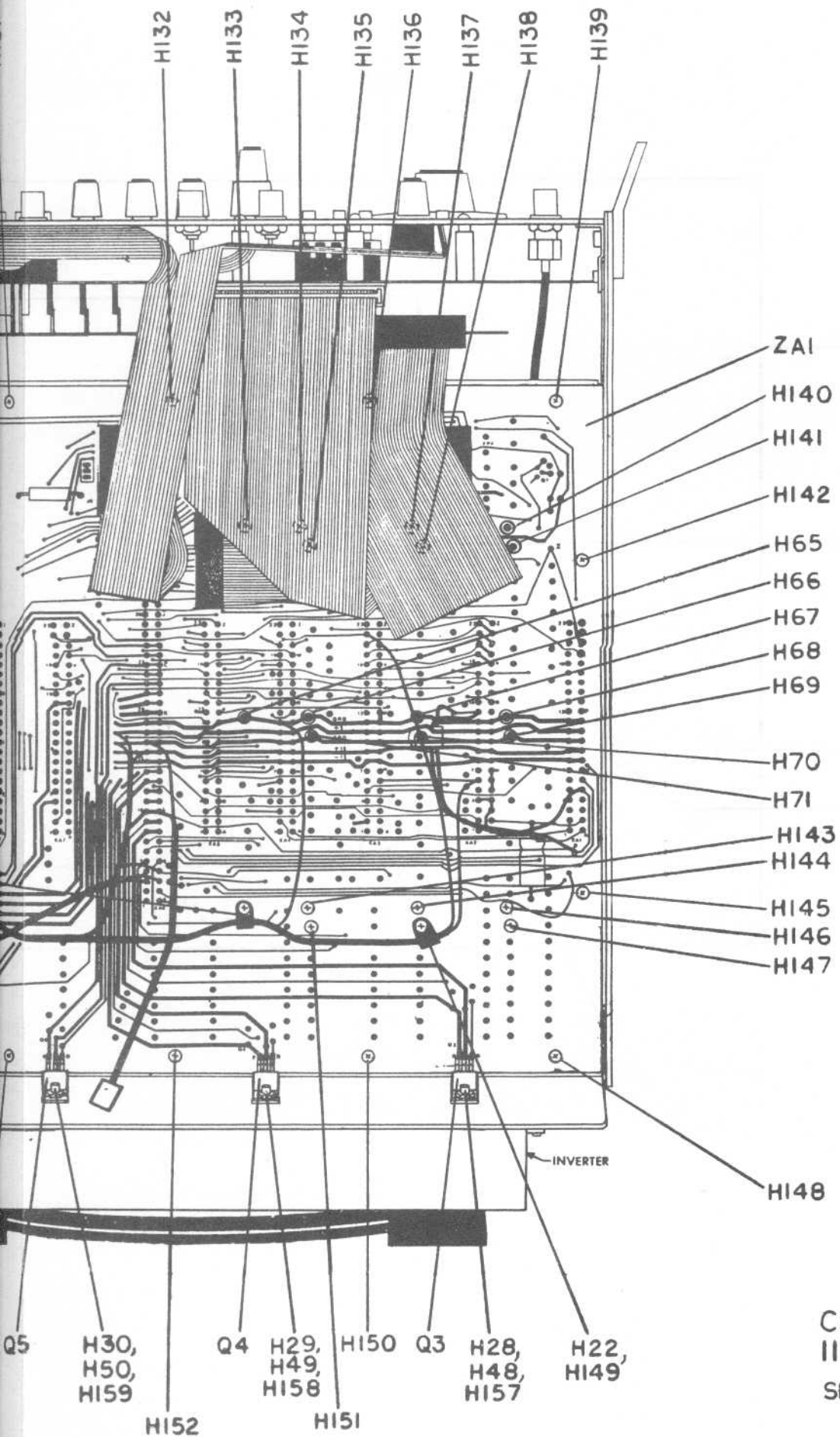
10 MHz OUTPUT

A15

H154

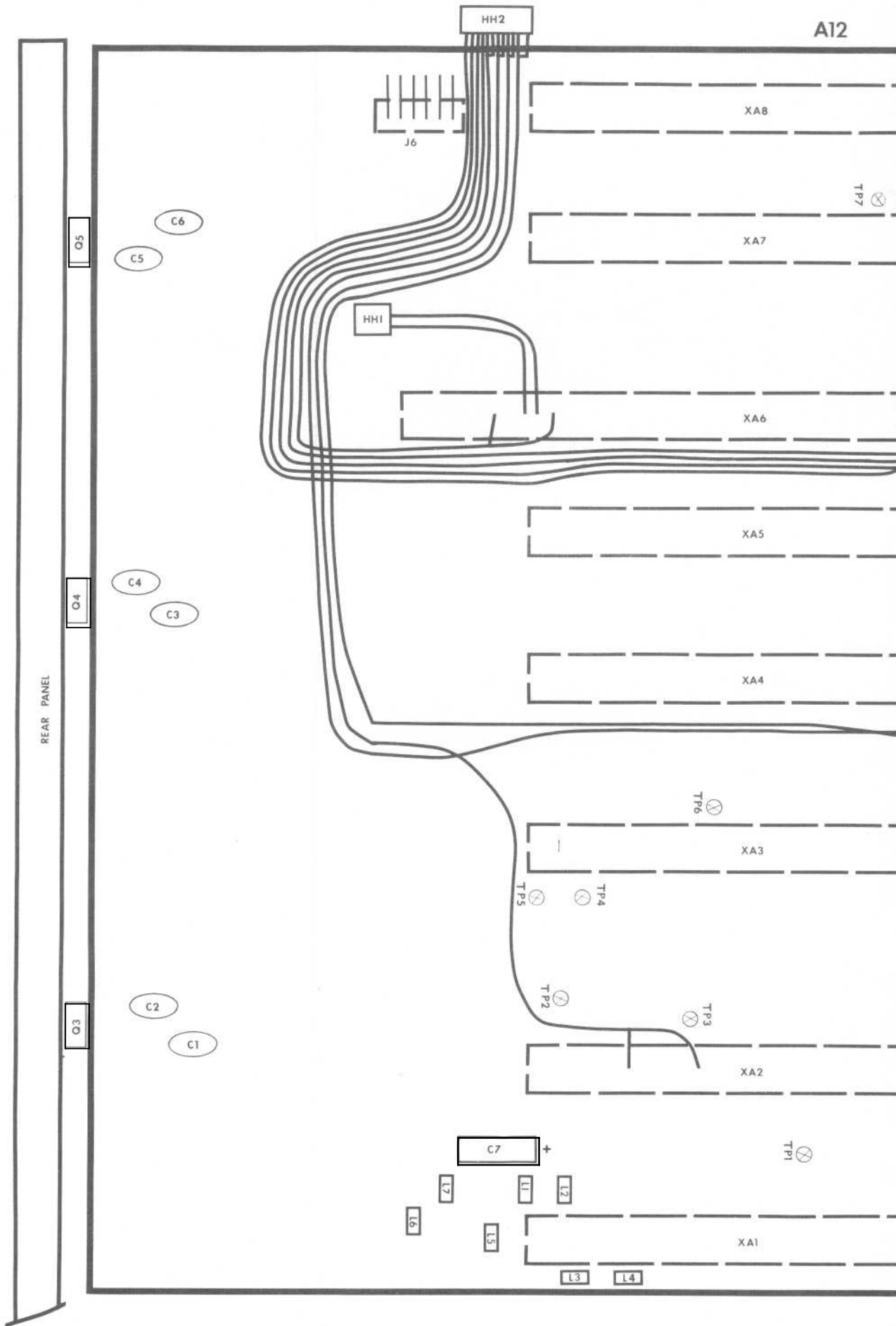
H17

H153

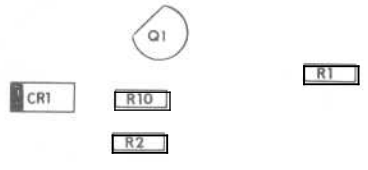
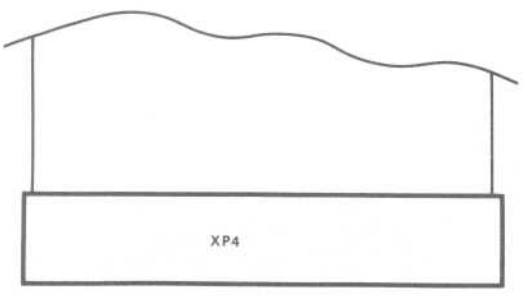
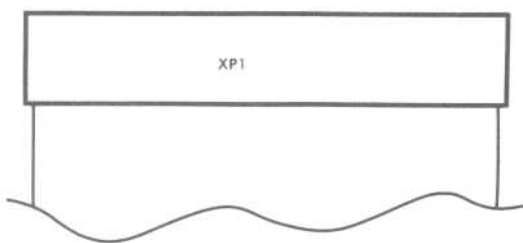
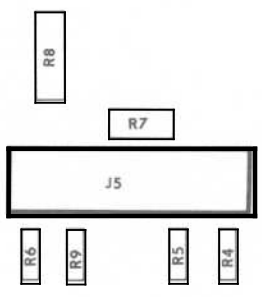


CHASSIS ASSY
 IIII-70-0002
 SHT. 4 OF 4

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
HH1	HRNSS, FAN/A12	11219-70-0037	4J835	11219-70-0037	1
HH2	HRNSS, A15/A12	11219-70-0045	4J835	11219-70-0045	1
C1, C2, C3, C4, C5, C6	CAP, DISC, .01UF	UK25-103	71590	11510-14-1103	6
C7	CAP, ELEC, 16V, 470UF	500D477M016DD2	56289	11510-25-8471	1
PCBA12B	DS PCB, A12B, REV. J	11717-00-0036	4J835	11717-00-0036	1
L1, L2, L3, L4, L5, L6, L7	TOROID CHOKE 10T	11810-05-0002	4J835	11810-05-0002	7
J6	CONNECTOR, MOLEX	09-66-1061	27264	12112-08-0032	1
J5	HEADER, 20 PIN	6092027	ANSLY	12112-08-0038	1
TP1, TP2, TP3, TP4, TP5, TP6, TP7	TESTPOINTS	39-211	73734	12112-19-0005	7
XA1, XA2, XA3, XA4, XA5, XA7, XA8	PC EDGE CONN, GOLD	530666-6	00779	12112-27-0010	7
XA6	PC EDGE CONN, 72-CKT	1-5306660	00779	12112-27-0011	1
R7	POT, 1K	3386W-1-102	80294	14610-02-0102	1
R1	RES, C, 1/4W, 5%, 10K	RCR07G103JS	81349	14700-15-1002	1
R6, R10	RES, C, 1/4W, 5%, 1.5K	RCR07G152JS	81349	14700-15-1501	2
R9	RES, C, 1/4W, 5%, 1.8K	RCR07G182JS	81349	14700-15-1801	1
R4, R5	RES, C, 1/4W, 5%, 18K	RCR07G183JS	81349	14700-15-1802	2
R2	RES, C, 1/4W, 5%, 470	RCR07G471JS	81349	14700-15-4700	1
R8	RSE, C, 1W, 5%, 33	RCR20G330JS	81349	14700-35-3309	1
CR1	DIODE, SCHOTTKY	1N5820	04713	14809-01-5820	1
Q1	TRANSISTOR	PN4275	27014	14902-04-2750	1
XP1	CABLE ASSY	16011-60-0024	4J835	16011-60-0024	1
XP4	CABLE ASSY	16011-60-0025	4J835	16011-60-0025	1
CT SYSTEMS PARTS LIST	TITLE MOTHER BD, A12B	ASSEMBLY NO. 11110-00-7012	REV. H	PAGE 6.36	



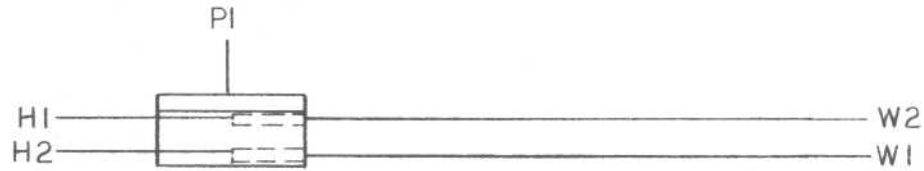
3000-A12 REV H
* 11110-00-7012



PCBA12B

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
P1	CONNECTOR, MOLEX	03-06-1023	27264	12113-03-0009	1
H1, H2	TERMINAL, FEMALE	02-06-1131	27264	12113-05-0001	2
W1	WIRE, 24GA, BK FROM:16012-12-4999	16012-12-4000		16012-12-4000	1
W2	WIRE, 24GA, RD FROM:16012-12-4999	16012-12-4222		16012-12-4222	1
CT SYSTEMS PARTS LIST		TITLE HRNSS, FAN/A12	ASSEMBLY NO. 11219-70-0037	REV. A	PAGE 6.37

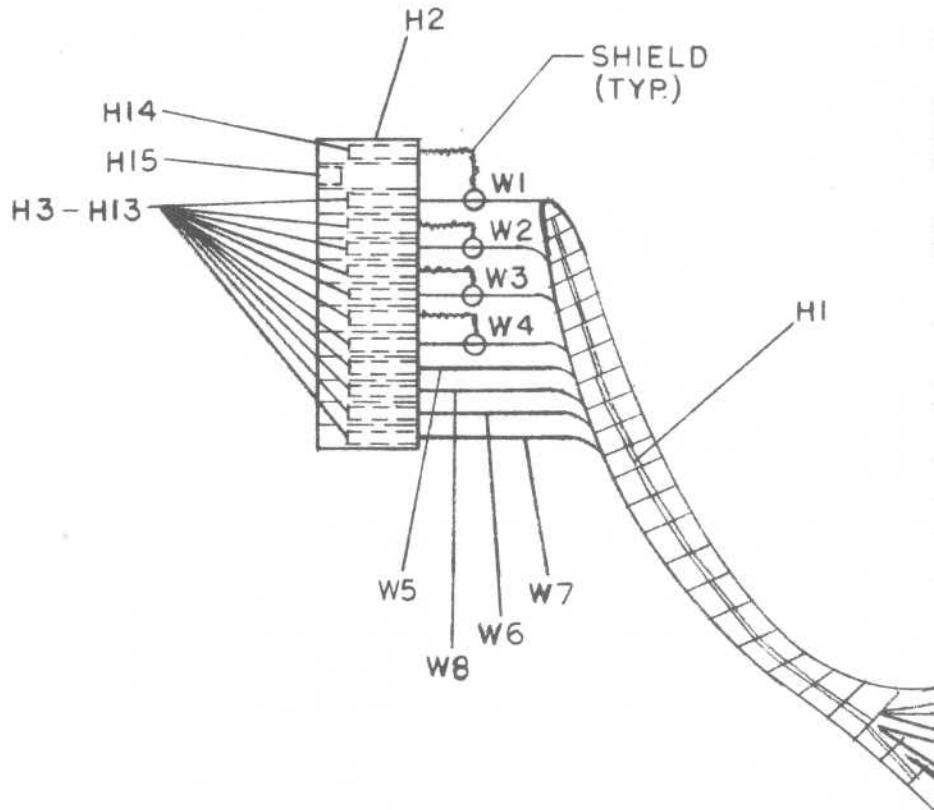
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ±1/64 .XX ±.01 ±30' .XXX ±.005		CONTRACT NO.		CT SYSTEMS INC.		
MATERIAL		APPROVALS	DATE			
FINISH		DRAWN J.D. CLUTINGER	10-28-85	HARNES, FAN ASSY/A12		
NEXT ASSY		CHECKED				
USED ON		RELEASED		SIZE A	CODE IDENT NO. 4J835	DRAWING NO. 11219-70-0037
APPLICATION		DO NOT SCALE DRAWING		SCALE	SHEET OF	

THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO THE INFORMATION IN THIS DOCUMENT IS NOT TO BE USED OR DUPLICATED IN ANY MANNER WITHOUT THE PRIOR APPROVAL IN WRITING OF

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
H1	CORD LACING, NY, BLK	21	GUDL	11610-07-0001	1
H2	HSG MINI-LATCH, 13PIN	65039-024	BERG	12113-10-0004	1
H3, H4, H5, H6, H7, H8, H9, H10, H11, H12, H13, H14	TERMINAL, MINI	47217	BERG	12113-20-0001	12
H15	POLARIZING PLUG	65307-001	BERG	12113-23-0001	1
W1, W2, W3, W4	CABLE RG 174/U (5000FT/SPLS)	8216	70903	16011-40-0008	4
W5	WIRE, 24GA, BLK FROM:16012-12-4999	16012-12-4000		16012-12-4000	1
W6	WIRE, 24GA, BRN FROM:16012-12-4999	16012-12-4111		16012-12-4111	1
W7	WIRE, 24GA, RED FROM:16012-12-4999	16012-12-4222		16012-12-4222	1
W8	WIRE, 24GA, GRN FROM:16012-12-4999	16012-12-4555		16012-12-4555	1
CT SYSTEMS PARTS LIST	TITLE HRNSS, A15/A12	ASSEMBLY NO. 11219-70-0045		REV. A	PAGE 6.38



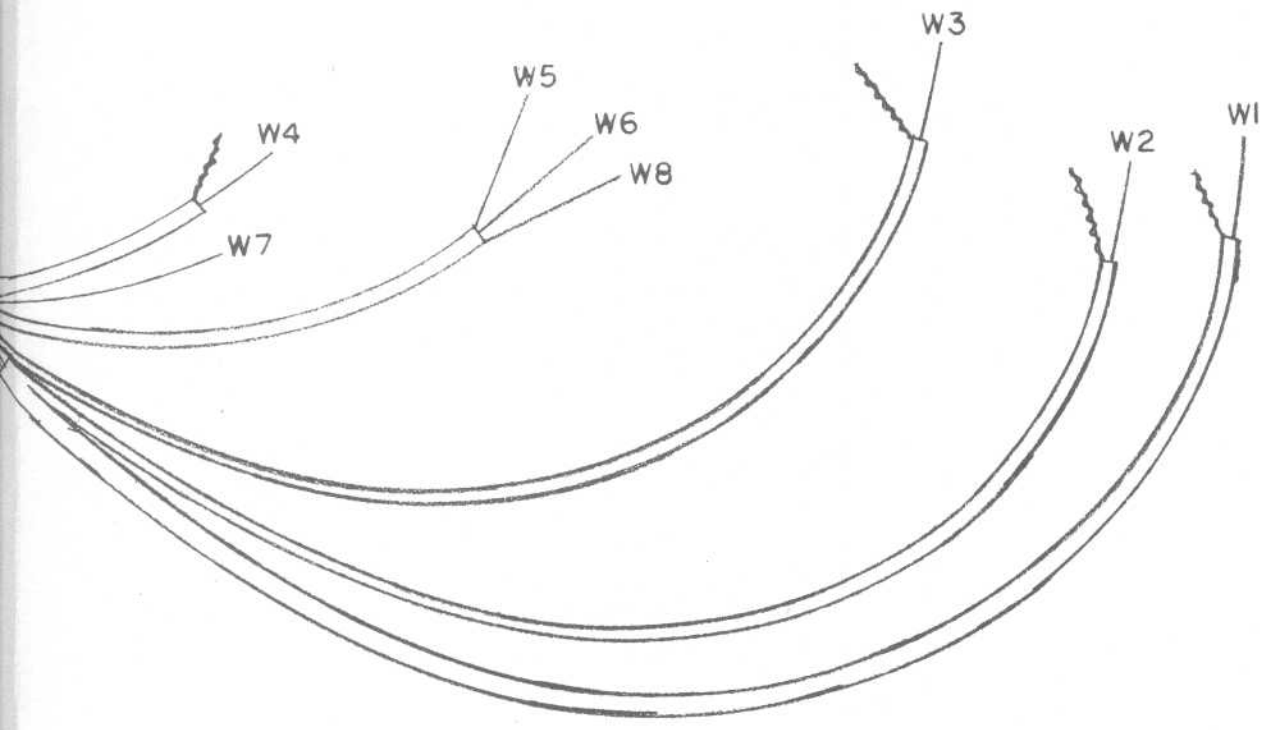
WIRE #	COLOR
1	RG-174
2	RG-174
3	RG-174
4	RG-174
5	BLACK
6	BROWN
7	RED
8	GREEN

NEXT ASSY	USED ON
APPLICATION	

2

1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

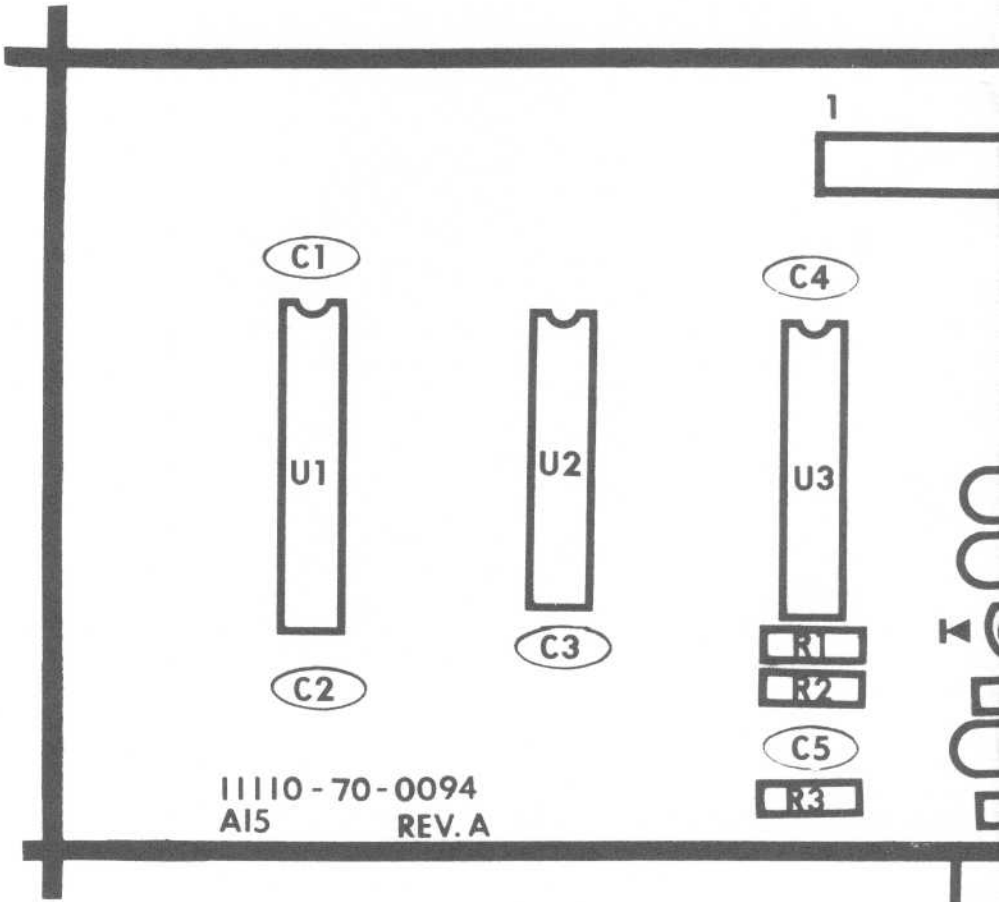


UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ±1/64 .XX ±.01 ±30° .XXX ±.005	CONTRACT NO.		CT SYSTEMS, INC.		
	APPROVALS	DATE			
MATERIAL	DRAWN D. NOELLER	10-29-86	A12/A15 HARNESS ASSY		
	CHECKED				
	RELEASED				
FINISH			SIZE B	CODE IDENT NO. 4J835	DRAWING NO. 11219-70-0045
	DO NOT SCALE DRAWING		SCALE 1:1		SHEET 1 OF 1

2

1

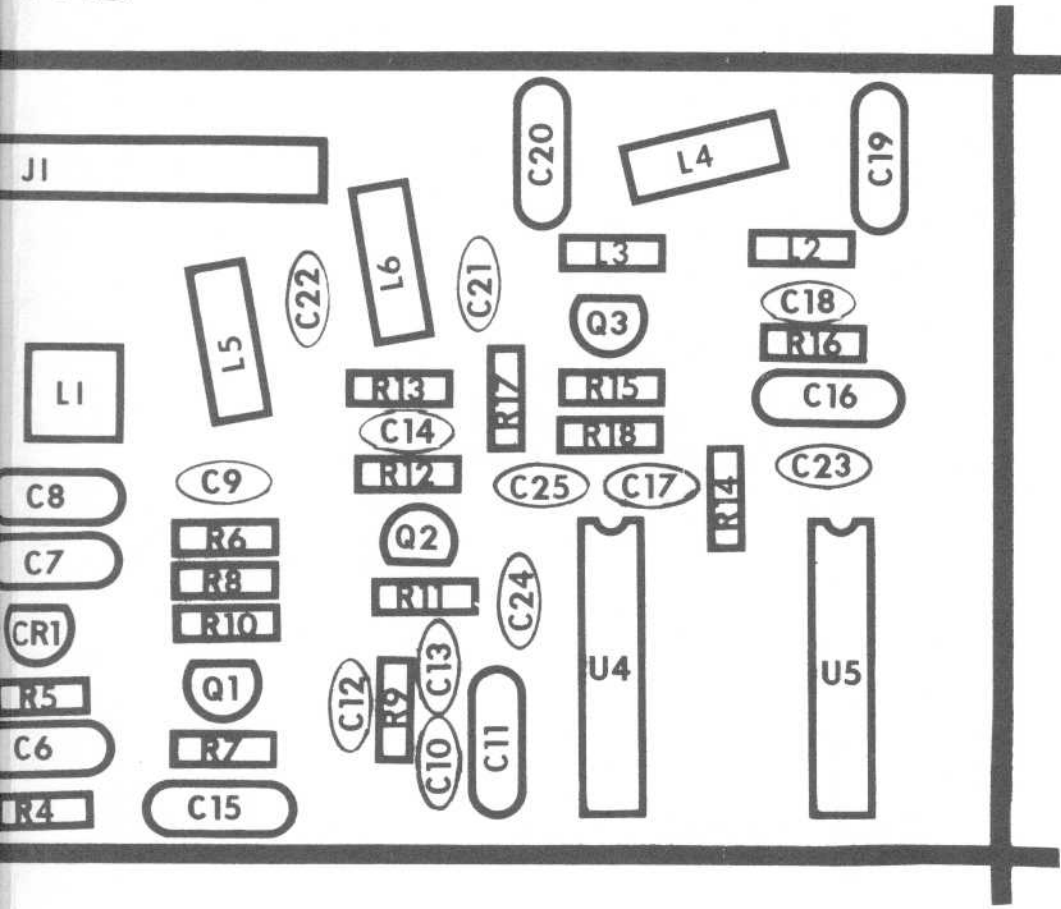
REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
C2	CAP, DISC, 1KV, 200PF	10TST20	56289	11510-10-1201	1
C13, C14, C17, C18	CAP, MON, 50V, .1UF	C320C104M5U1CA	57185	11510-11-3104	4
C1, C3, C4, C5, C21, C22, C23	CAP, MON, 50V, 1UF	3420-050-E105M	96095	11510-11-3105	7
C9, C12	CAP, DISC, .05UF	UK25-503	71590	11510-14-1503	2
C24, C25	CAP, MON, 50V, .01UF	CW15C103K	71590	11510-14-4103	2
C10	CAP, MONO, 470PF	CW15A471M	71590	11510-14-5471	1
C6, C8	CAP, MICA, 500V, .001UF	DM15-102J	81349	11510-50-0102	2
C16, C20	CAP, MICA, 120PF	DM15-121J	81349	11510-50-0121	2
C15	CAP, MICA, 270PF	DM15-271J	81349	11510-50-0271	1
C7, C19	CAP, MICA, 390PF	DM15-391J	81349	11510-50-0391	2
C11	CAP, MICA, 820PF	DM15-821J	81349	11510-50-0821	1
PCBA15	DS PCB, REV A, A15, 3000B	11717-00-0098	4J835	11717-00-0098	1
L4, L5, L6	CHOKE	VK20010/3B	02114	11810-09-0001	3
L2, L3	CHOKE, MOLDED, 4.7UH	1025-36	99800	11810-10-0479	2
L1	COIL, VAR, 2.15-2.9UH, N1	11811-00-0004	4J835	11811-00-0004	1
J1	HEADER, 13-PIN	65524-413	BERG	12112-08-0027	1
R14	RES, C, 1/4W, 5%, 100	RCR07G101JS	81349	14700-15-1000	1
R12, R16, R17, R18	RES, C, 1/4W, 5%, 1K	RCR07G102JS	81349	14700-15-1001	4
R8	RES, C, 1/4W, 5%, 10K	RCR07G103JS	81349	14700-15-1002	1
R9	RES, C, 1/4W, 5%, 1.2K	RCR07G122JS	81349	14700-15-1201	1
R11, R15	RES, C, 1/4W, 5%, 150K	RCR07G154JS	81349	14700-15-1503	2
R10	RES, C, 1/4W, 5%, 1.8K	RCR07G182JS	81349	14700-15-1801	1
R6	RES, C, 1/4W, 5%, 18K	RCR07G183JS	81349	14700-15-1802	1
R1, R13	RES, C, 1/4W, 5%, 2.2K	RCR07G222JS	81349	14700-15-2201	2
R4, R5	RES, C, 1/4W, 5%, 2.7K	RCR07G272JS	81349	14700-15-2701	2
R3	RES, C, 1/4W, 5%, 3.3K	RCR07G332JS	81349	14700-15-3301	1
R7	RES, C, 1/4W, 5%, 390	RCR07G391JS	81349	14700-15-3900	1
R2	RES, C, 1/4W, 5%, 9.1K	RCR07G912JS	81349	14700-15-9101	1
CR1	DIODE, VARACTOR	MV2308	04713	14803-02-0012	1
Q2, Q3	TRANSISTOR	2N3904	27014	14901-03-9040	2
Q1	TRANSISTOR	2N4121	27014	14901-04-1210	1
U3	PHASE DETECTOR, SS	11C44	07263	18000-11-4400	1
U4	QUAD, POS, NAND, SS	SN74LS00N	01295	18000-74-0010	1
U2, U5	DUAL D-FF, SS	SN74LS74AN	01295	18000-74-7411	2
U1	UP/DWN CNTR, SS	SN74LS169N	01295	18007-41-6910	1



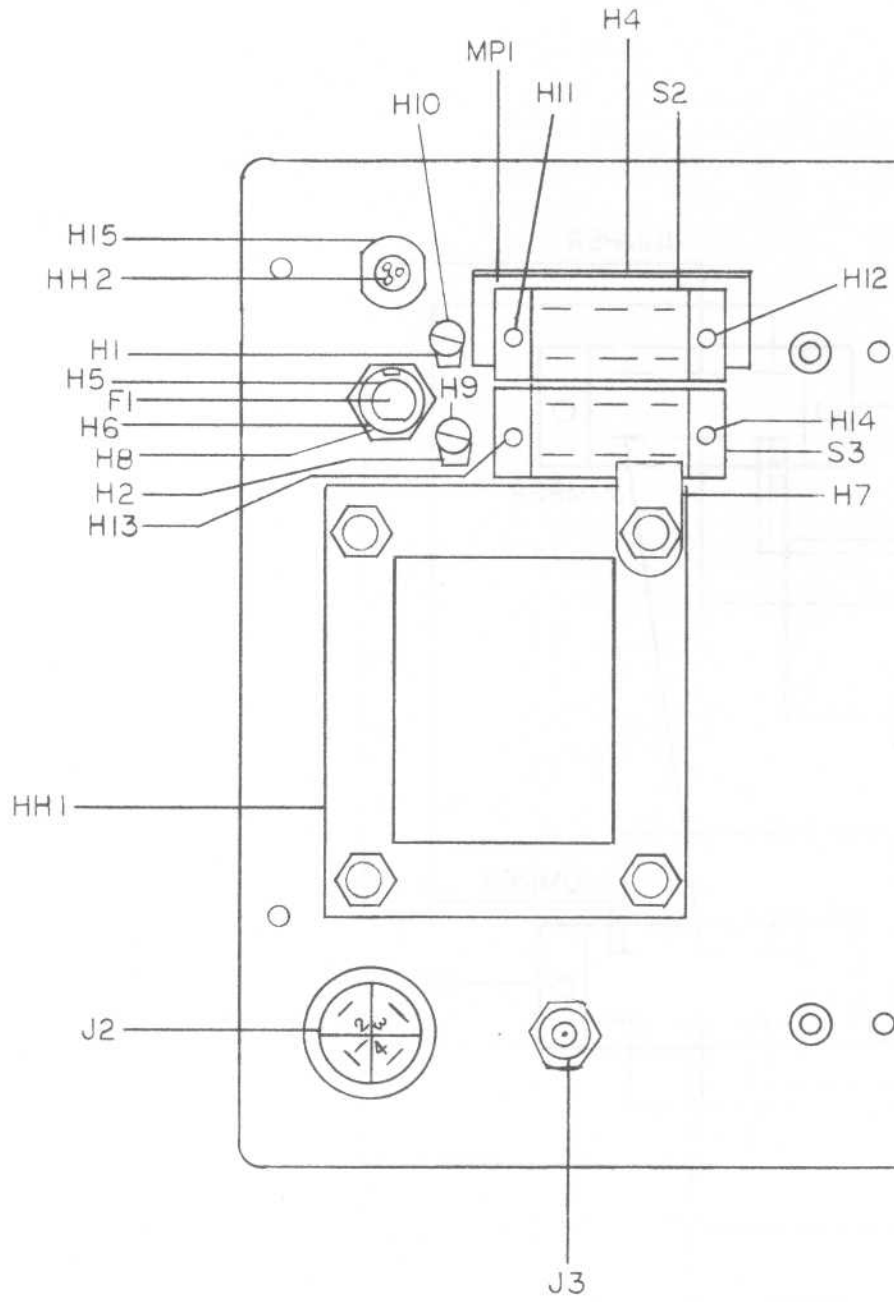
11110-70-0094
A15 REV. A

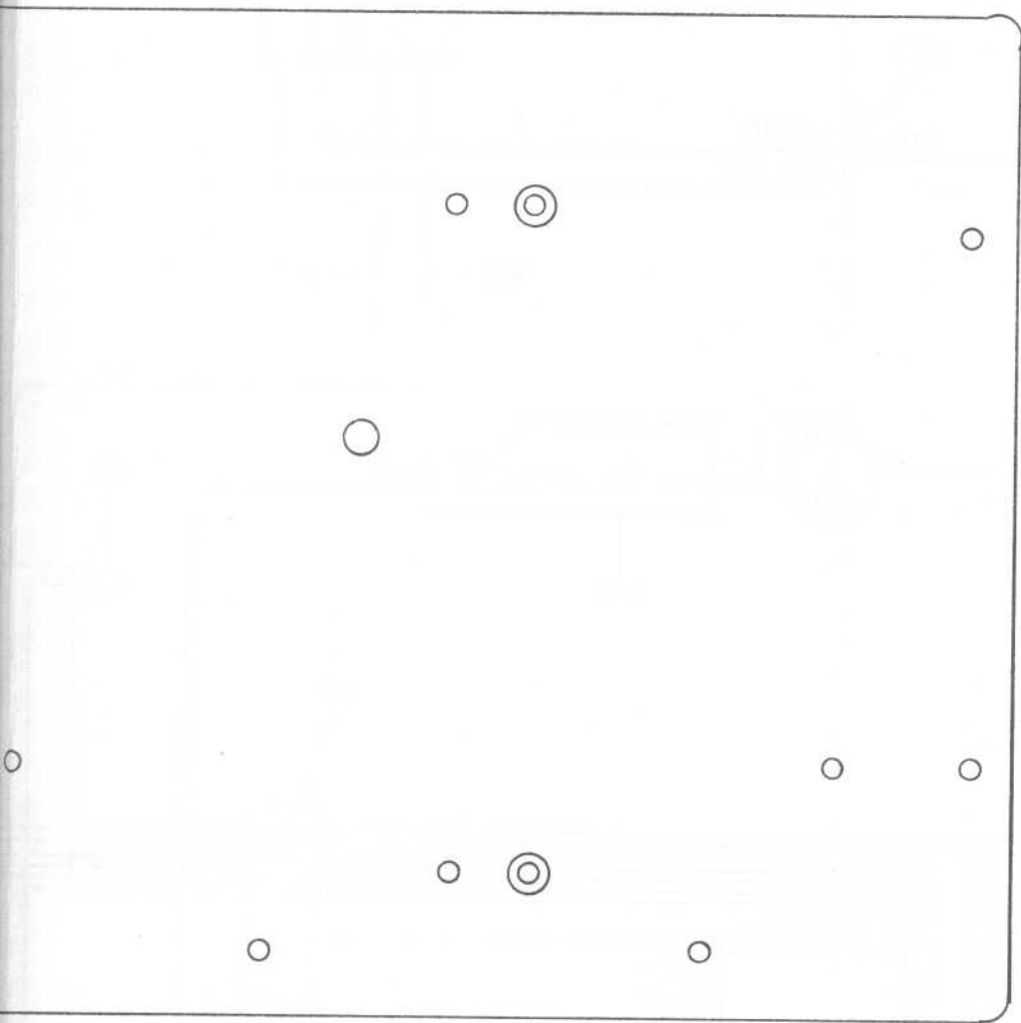
PCBA1

A 15

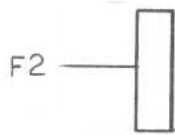


REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
HH1	XFMR ASSY, 3000B	11219-00-0402	4J835	11219-00-0402	1
HH2	LINE CORD ASSY, 3000B	11219-70-0003	4J835	11219-70-0003	1
MP1	LINE VOLTAGE SHIELD	11417-01-0040	4J835	11417-01-0040	1
MP2	REAR PANEL	11417-80-0270	4J835	11417-80-0270	1
C1, C2	CAP, DISC, 3KV, .01UF	DD30-103	71590	11510-14-0103	2
J3	CONN, BNC-F	KC19-152	91836	12110-01-1007	1
H1, H2	GROUND LUG, #6, INT	38-111	73734	12112-03-0003	2
J2	CONN, MIC, 4-PIN	91PC4F	74868	12112-11-0003	1
H17, H18	TERM, FEMALE	02-09-1118	27264	12113-09-0003	2
J1	RECEPTACLE, 4-PIN	19-09-1042	27264	12113-26-0002	1
H4	DECAL, WARNING	RPD41	4J835	12410-04-0299	1
F1	FUSE, SLO BLO, 1 AMP, 250V	MDL1	71400	12410-05-0005	1
H5	FUSE CARRIER, 3AG	031.1666	00000	12410-05-0009	1
H6	FUSEHOLDER, BODY	031.1673	00000	12410-05-0014	1
F2	FUSE, 1/2 AMP	313.500	75915	12410-05-0004	1
H19	DECAL, LINE VOL/FUSE	12417-14-0006	4J835	12417-14-0006	1
H20	DECAL, 10MHZ OUT	12417-14-0007	4J835	12417-14-0007	1
H7	CABLE CLAMP, 1/4	8957	83330	12810-00-0004	1
H8	SHIELD, FUSE HOLDER	331	83330	12810-12-0012	1
H11, H12, H13, H14	RIVET, AL, 1/8	PAD44ABS	EMHFG	12810-30-0027	4
H15	STR REL BUSH, .27X.50	1154BK	28520	12810-37-0011	1
H9, H10	SCW, PPH, 6-32X1/8	19040NP	73734	12810-55-6102	2
H16	FUSE ENV W/TAG WIRE	13010-10-0002	4J835	13010-10-0002	1
S2, S3	SWITCH, SLIDE, DPDT	4021.0521	MARQ	15105-00-0012	2
W1	WIRE, 22GA, UL1015BK	UL101520BK	81345	16013-12-2000	1
W2	WIRE, 22GA, UL1015WH	UL101520WH	81345	16013-12-2999	1





MP2



F2

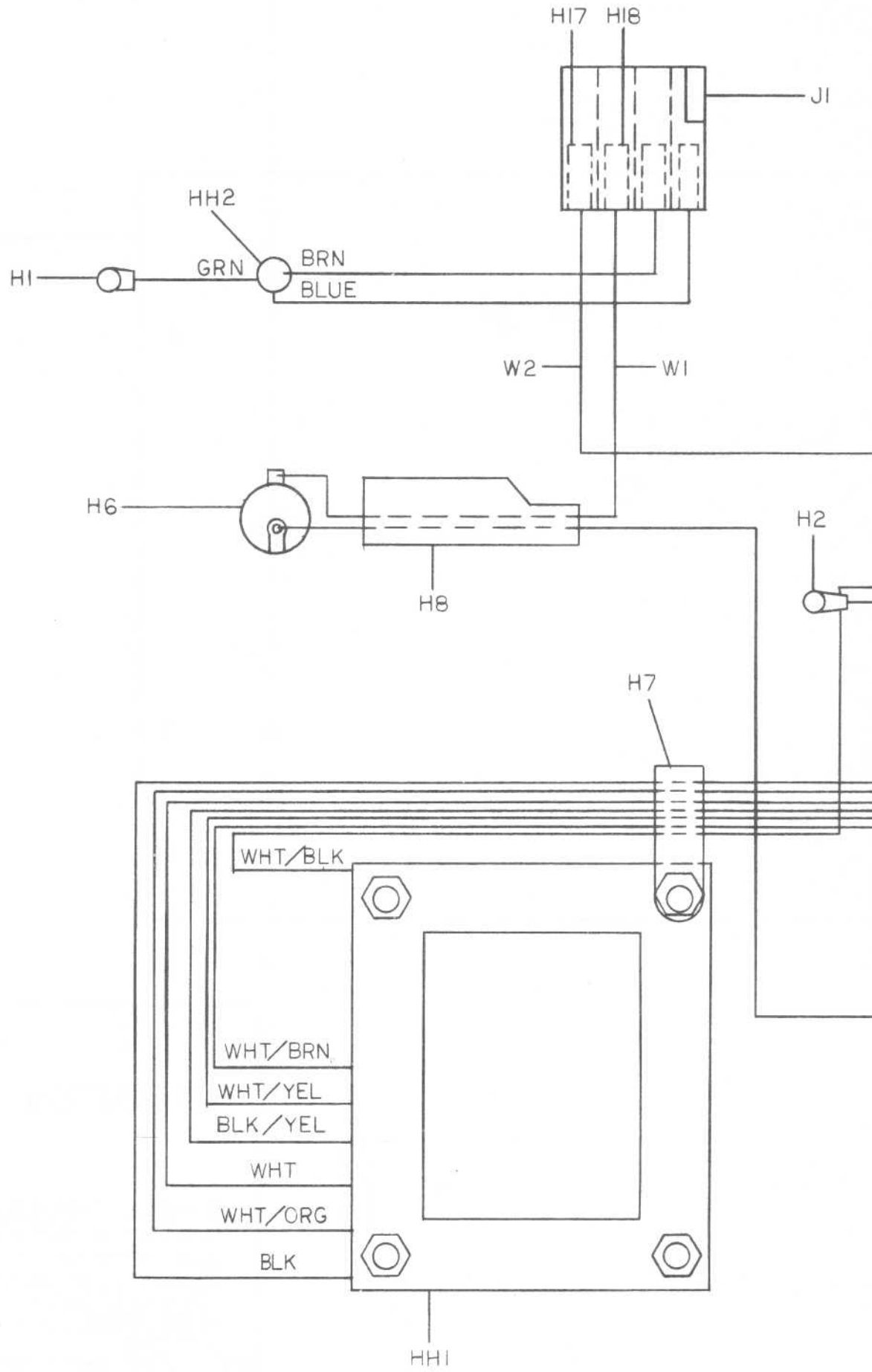
A rectangular warning label with a hole at the top center. The text inside reads: 'ATTENTION' followed by a warning message. The label is labeled 'H16' on its right side.

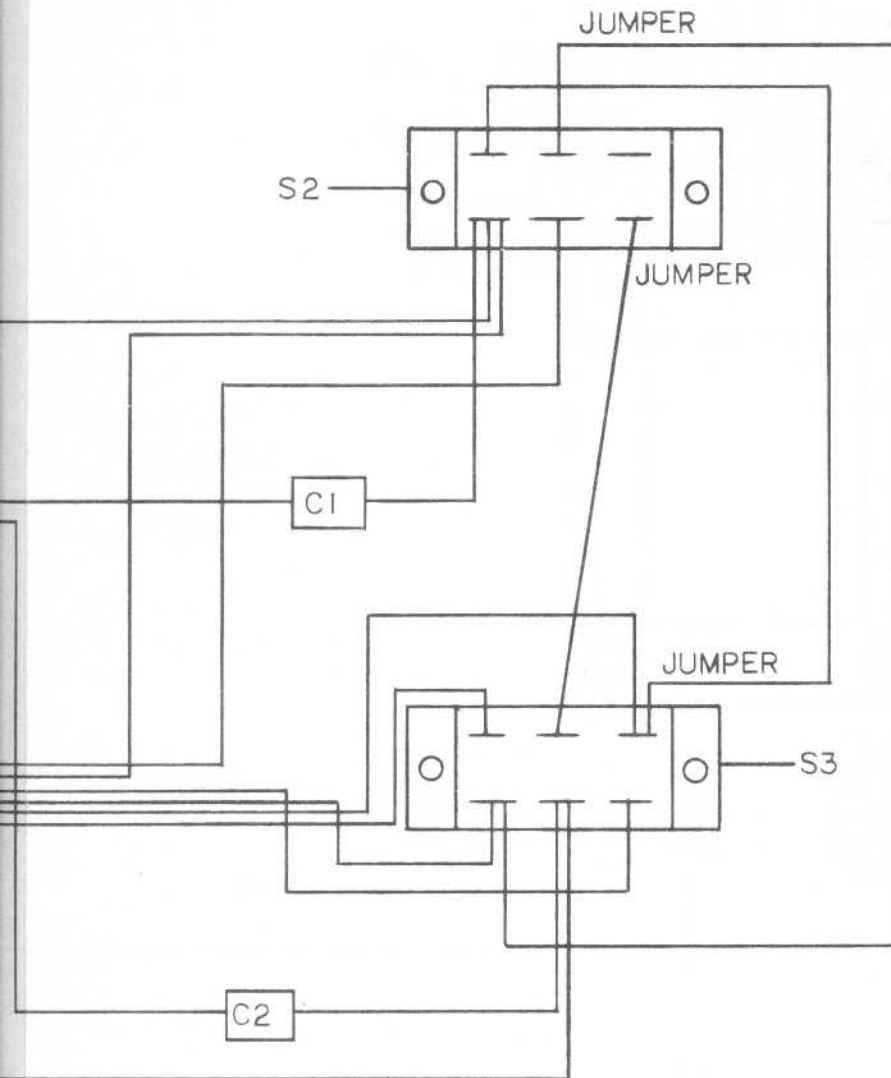
ATTENTION

WARNING: THIS INSTRUMENT IS SET FOR 115V OPERATION. FOR OPERATING AT OTHER VOLTAGES CHECK REAR PANEL INSTRUCTIONS.

H16
ATTACH TO
LINE CORD
OF UNIT.

RP ASSEMBLY
11118-70-0001
SHT. 1 OF 2

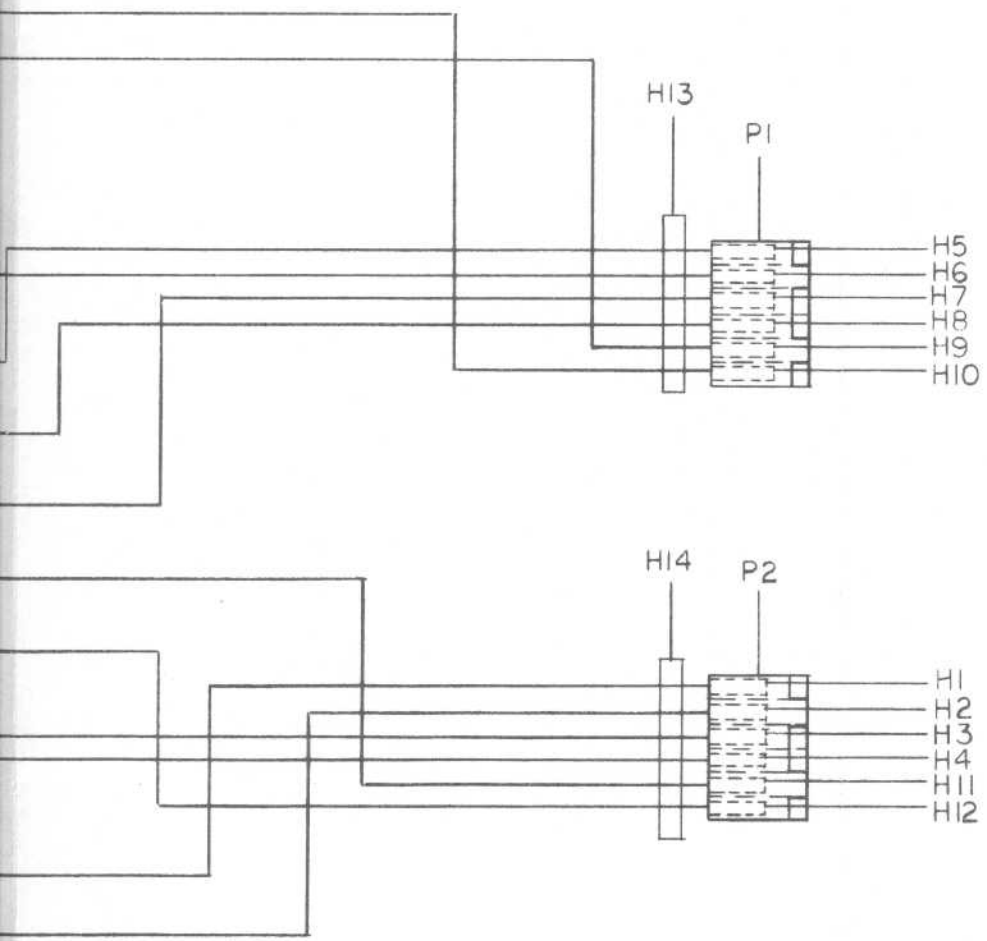




RP ASSEMBLY
11118-70-0001
SHT. 2 OF 2

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
P1, P2	CONN .6-PIN, KONEKTON	09-50-3061	27264	12113-06-0002	2
H1, H2, H3, H4,	PIN, TRIFURCATED	08-50-0185	27264	12113-07-0004	4
H5, H6, H7, H8, H9, H10, H11, H12	PIN, TRIFURCATED	08-50-0187	27264	12113-07-0005	8
H13, H14	CABLE TIE, 3-1/2	SSTIM-M	06383	12810-00-0001	2
T1,	TRANSFORMER	S141-103	50638	15610-00-0050	1
CT SYSTEMS PARTS LIST	TITLE XFMR ASSY, 3000B	ASSEMBLY NO. 11219-00-0402	REV. A	PAGE 6.41	

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:

FRACTIONS	DECIMALS	ANGLES
±	.XX ±	±
	.XXX ±	

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN JD CLUTINGER	10/27/86
CHECKED	

CT SYSTEMS INC.

XFMR ASSY, 3000B

SIZE	CODE IDENT NO.	DRAWING NO.
B	4J835	11219-00-0402

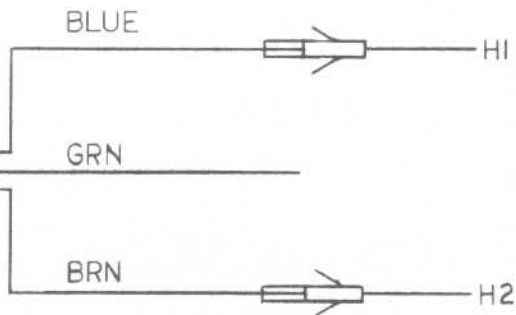
SCALE

SHEET 1 OF 1

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
H1, H2, P1,	TERM, FEMALE CORD SET, 18/3 SVT, 6FT MLD, CAP, UL-APPRV	02-09-1118 16011-80-0001	27264 4J835	12113-09-0003 16011-80-0001	2 1
CT SYSTEMS PARTS LIST	TITLE LINE CORD ASSY, 3000B	ASSEMBLY NO. 11219-70-0003	REV. C	PAGE 6.42	

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:

FRACTIONS	DECIMALS	ANGLES
±	.XX ±	±
	.XXX ±	

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS

DATE

DRAWN

JD CLUTINGER 10/27/86

CHECKED

CT SYSTEMS INC.

LINE CORD ASSY

SIZE

B

CODE IDENT NO.

4J835

DRAWING NO.

11219-70-0003

SCALE

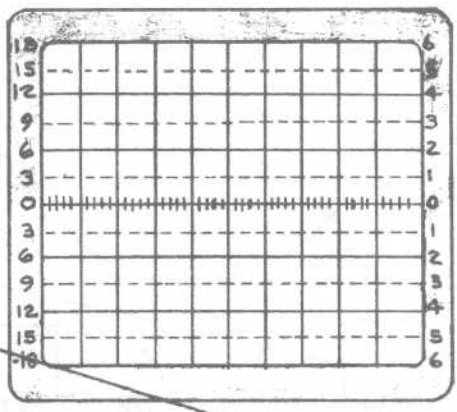
SHEET

OF

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
ZA1,	DISPLAY BD, A9	1110-00-7009	4J835	11110-00-7009	1
ZA2,	FREQ CTL BD, A11	11110-70-7011	4J835	11110-00-7011	1
ZA3,	FP BD, A10B	11110-70-0074	4J835	11110-70-0074	1
ZA4,	METER LIGHT BD, A14,	11110-70-0093	4J835	11110-70-0093	1
WA1,	CABLE ASSY, N,	11217-80-0097	4J835	11217-80-0097	1
MP1, MP2,	BRACKET, MTR MTNG	11417-01-0210	4J835	11417-01-0210	2
MP3,	FISHPAPER, METER	11417-30-0330	4J835	11417-30-0330	1
MP4,	BRACKET, PANEL	11417-60-0220	4J835	11417-60-0220	1
MP5,	BRACKET, PANEL	11417-60-0230	4J835	11417-60-0230	1
MP6,	PANEL, F, LEXAN	11417-80-0511	4J835	11417-80-0511	1
J1, J2, J4, J5,	CONN. BNC-F, 50, PANEL UG-1094/U	31-221	74868	12110-01-1022	4
H1, H2, H3,	SOLDER LUG	1497	83330	12112-03-0026	3
J3,	PHONE JACK	42A	82389	12112-12-0007	1
H4	KNOB, DUAL CONC, BOT,	SSN-50L/70C (F) (L) - 2LTGY/BK LN	21604	12410-01-0053	1
H5	KNOB, LT, GY, BK, LN, 2 IN CLR SKIRT SET SCREW AT BOT LIMIT	SSN-95TSL-2-2IN/BK LN	21604	12410-01-0054	1
H6, H8, H9, H10, H11, H12, H13, H14, H15, H16	KNOB	SSN-50L (F) (L)-1	21604	12410-01-0055	10
H7	KNOB, DUAL CONC, TOP	SSN-50L (L)-1-SHORT	21604	12410-01-0056	1
M1,	METER W/SCALE	2WMDMA001	32171	12410-06-0025	1
H17, H18, H19, H20, H21, H22,	CABLE TIE	SSTIM-M	06383	12810-00-0001	6
H126, H127,	4-40X13/16 HEX SPA	P329-M12-F05A-440	04729	12810-02-4113	2
H23, H24, H25, H26, H27, H28	6-32X1/4X3/4 HEX SPA	HHS-8252	83336	12810-05-0024	6
H29, H30, H31, H32,	BRKT, RT, ANGLE	612	91833	12810-09-0019	4
H33, H34, H35, H36,	NUT HEX, 4-40	8002A-NP	73734	12810-14-4100	4
H37, H38,	NUT, 4-40X1/4, NP	8003-NP	73734	12810-14-4104	2
H39, H40, H41, H42,	NUT, KEPS, 6-32	9225	73734	12810-16-0027	4
H43, H44, H45, H46, H47, H48, H49, H50, H51, H52, H53, H54, H55, H56, H57.	SCW, PPH, 6-32X3/8 S/S	23044	73734	12810-23-0058	15
H122, H123, H124, H125,	SCW, PPH, 4-40X1/4	23022	73734	12810-23-0064	4
H58, H59, H60, H61,	LK WSHR #4, EXT	1320	73734	12810-25-4000	4
H62, H63,	WASHER, FLAT, #4, NYL	LWNY-003NA	WHBRY	12810-28-0025	2
H64, H65, H66, H67, H68, H69, H70, H71, H72, H73, H74, H75, H76, H77, H78,	WASH, FLAT, NYL, .15ID	LWNY-008NA	WHBRY	12810-28-0037	15
R10,	POT, 10K, LIN	73A1G032R103M	01121	14610-15-0103	1
R2,	POT, LIN, 50K	73A1G032R503M	01121	14610-15-0503	1
R6,	POT, 10K, AUD	73A1G032R103R	01121	14610-15-2103	1
R7,	POT, 100K, AUD	73A1G032R104A	01121	14610-15-2104	1
R11,	POT, 5K, LIN	JA1G0405502UA	01121	14610-15-3502	1
R5,	POT, 1M, LIN	21M724	01121	14610-31-5105	1

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
R3,	POT SWITCH, 10K	22M493	01121	14610-31-6103	1
R4,	POT SWITCH, 50K	22M094	01121	14610-31-6503	1
R1,	POT SWITCH, 10K	11M141	01121	14610-31-7103	1
R8/R9	POT, DUAL 10K/1K	20M332	01121	14610-40-7103	1
S3,	POWER SWITCH	1XF17.5NE152UEEFA201	SHDW	15102-00-0008	1
H80, H81, H82, H83, H84, H85, H86, H87, H88, H90, H91, H92, H93, H94, H95, H96, H97, H98, H99, H100, H101, H102, H103, H104, H105, H106, H107, H108, H109, H110, H111, H112, H113, H114, H115, H116, H117, H89	BUTTON, WHITE	BKOR P2936	82389	15110-04-0015	38
H118, H119,	BUTTON, GREY	P2942	82389	15110-04-0016	2
HH2,	CABLE ASSY	16011-60-0026	4J835	16011-60-0026	1
HH3,	CABLE ASSY	16011-60-0027	4J835	16011-60-0027	1
CT SYSTEMS PARTS LIST	TITLE FP ASSY, 3000B	ASSEMBLY NO. 11118-70-0003	REV. C	PAGE 6.44	

CT SYSTEMS, INC.
3000B SERVICE MONITOR



H16

H15

H14

H13

H12

H117

H116

VERT POS FOCUS INTENSITY HORZ POS

PULL AC CAL
 VERT GAIN CAL
 HORZ RATE
 SWEEP RATE (GEN) CAL
 FM CALIB (kHz) SIG STRENGTH
 POWER OFF ± 6 ± 5 OFF LOW HIGH

S3

H115

H114

H113

H112

H111

H110

H109

H108

H11

H107

J5

H106

H105

H104

S2

S1

H80

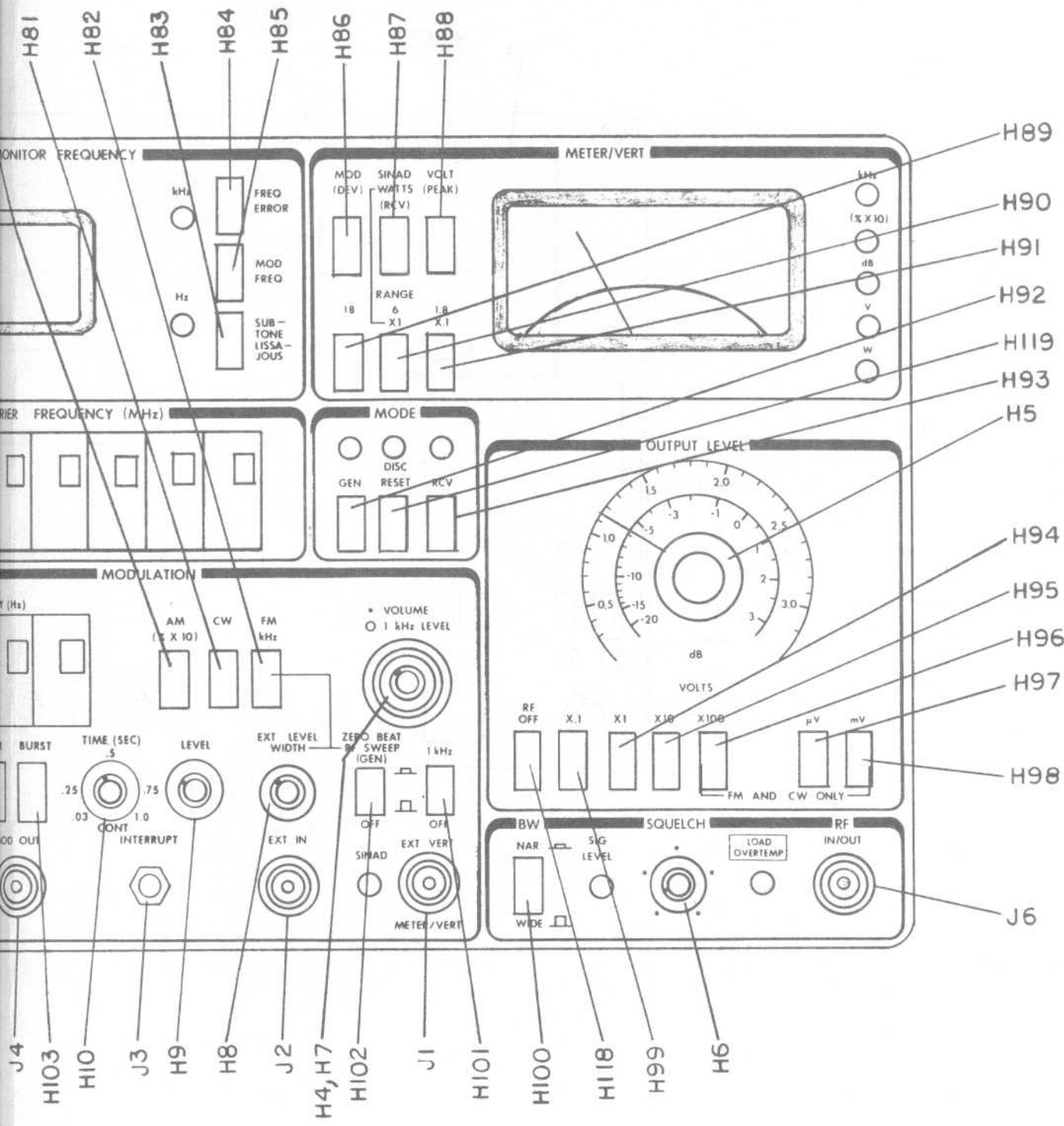
MON

CARRIER

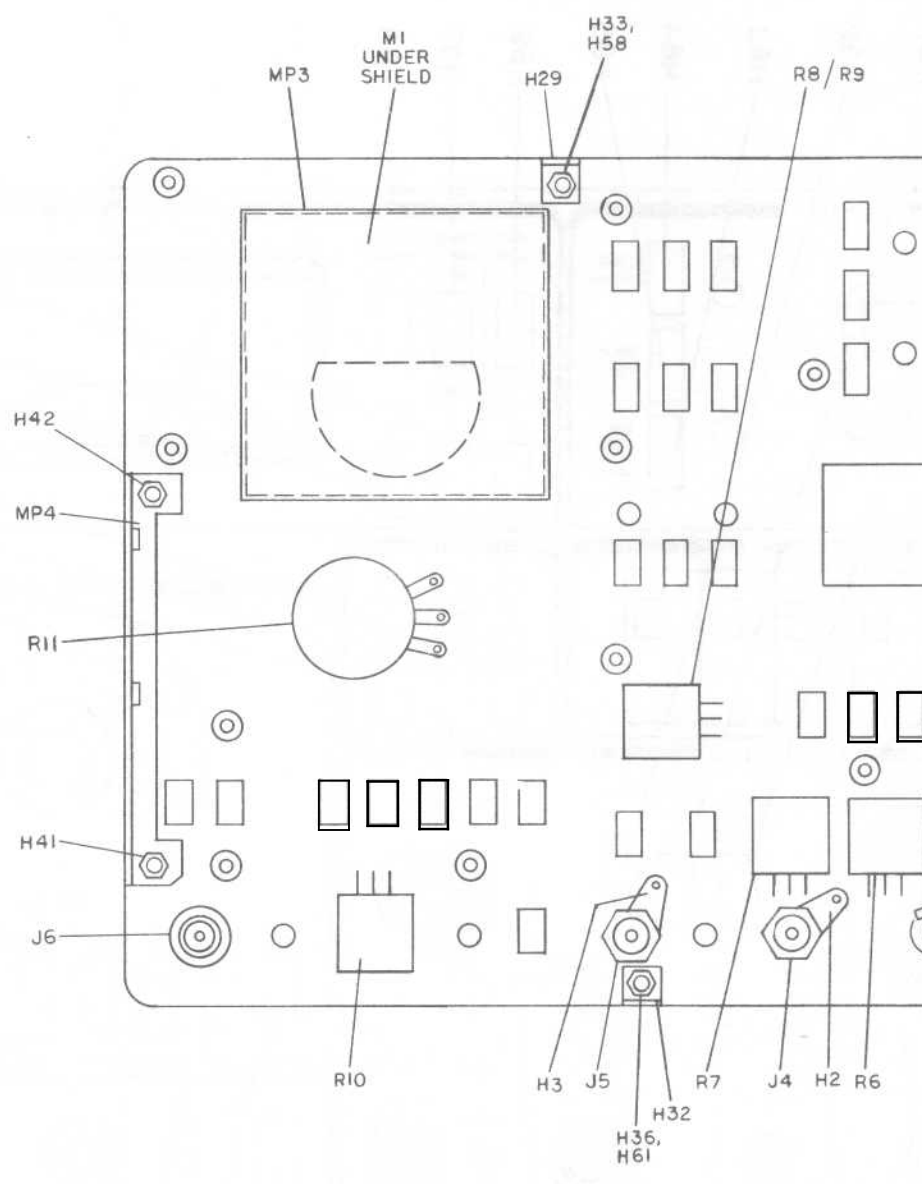
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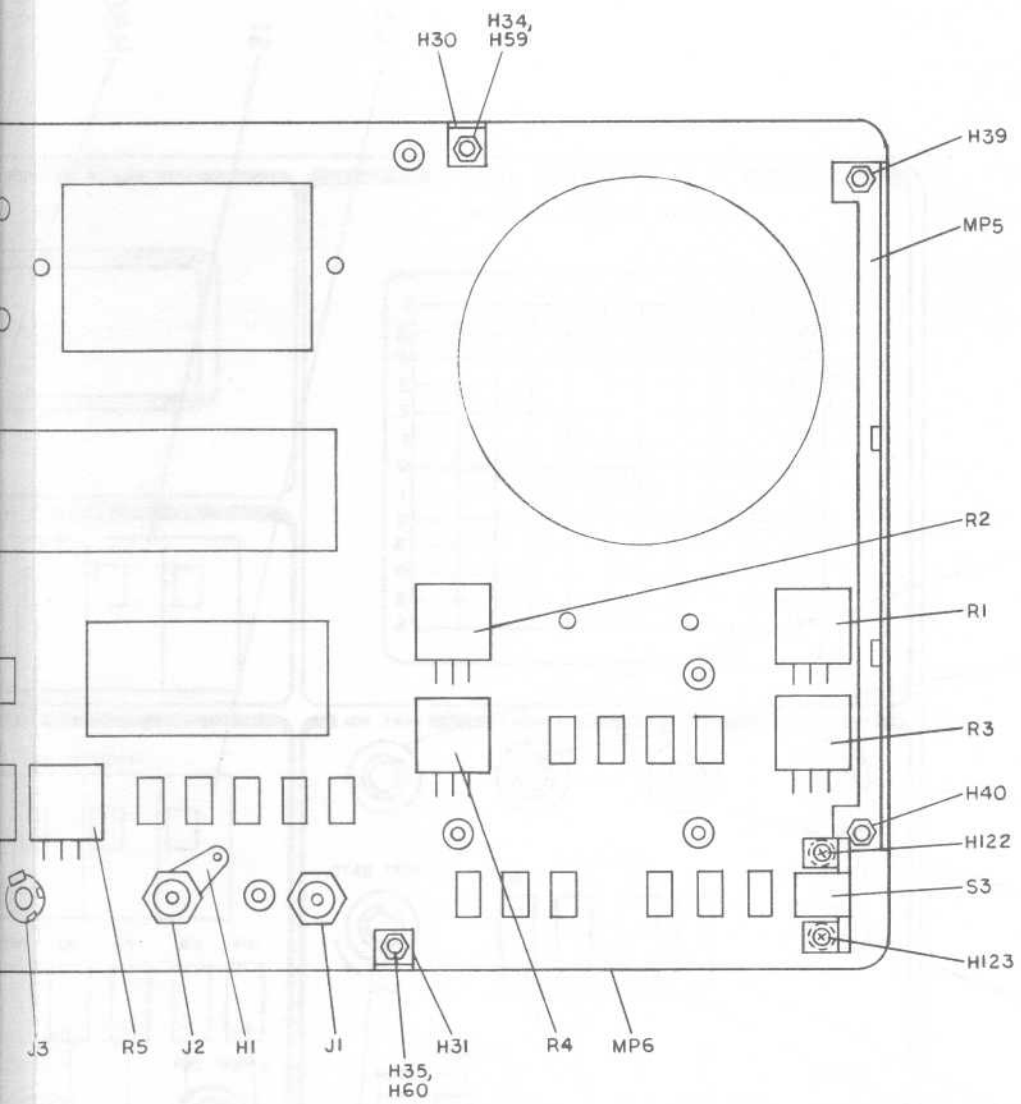
OFF X.01 X.1 X1

DEMOD OUT MOD

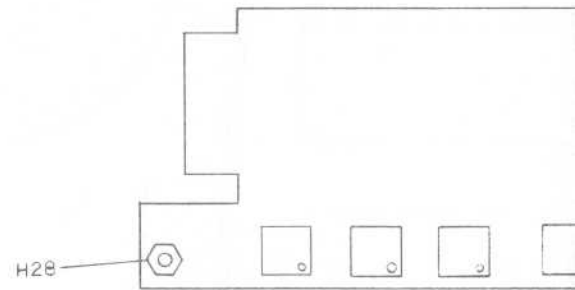
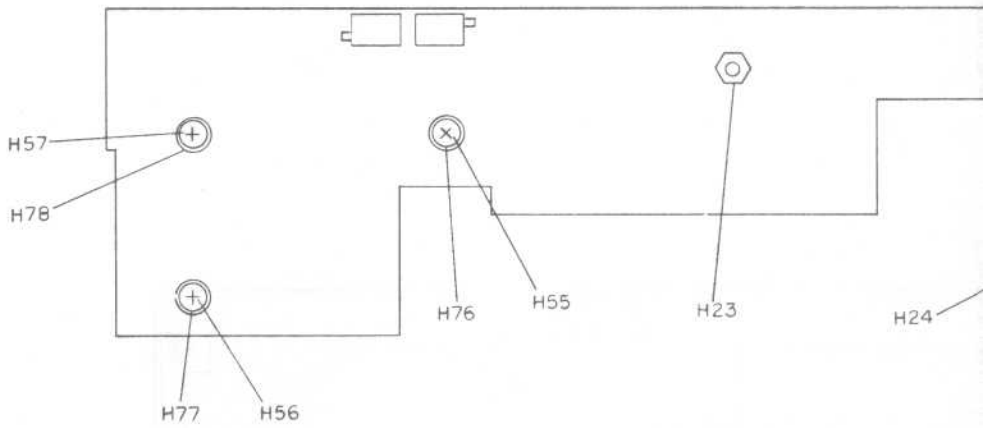


FRONT PANEL ASSY.
 11118-70-0003
 SHT. 1 OF 4

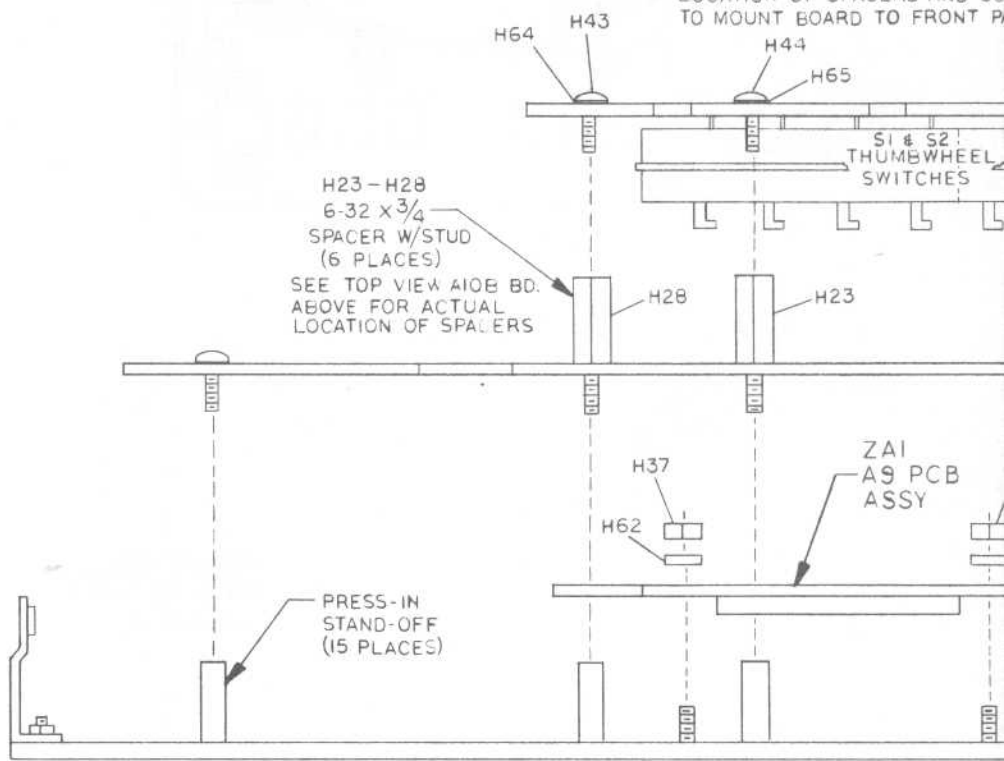




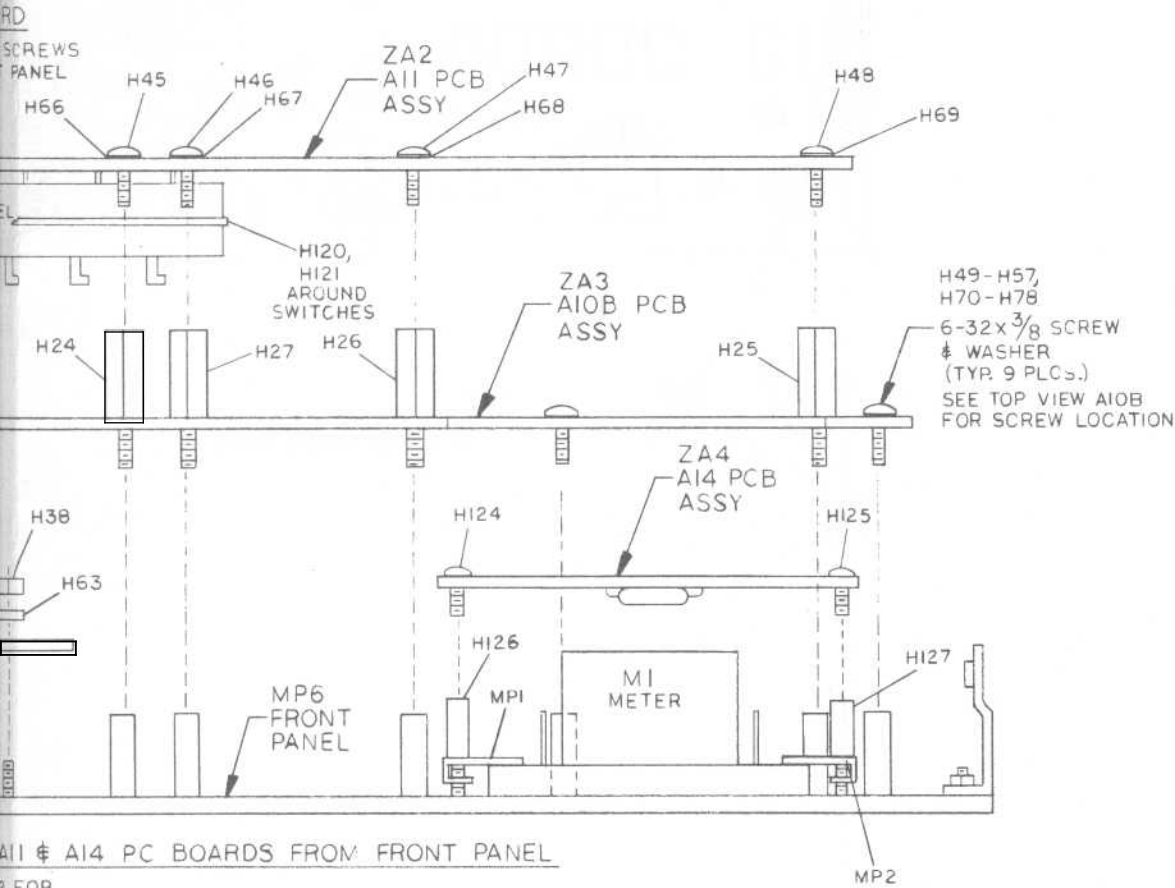
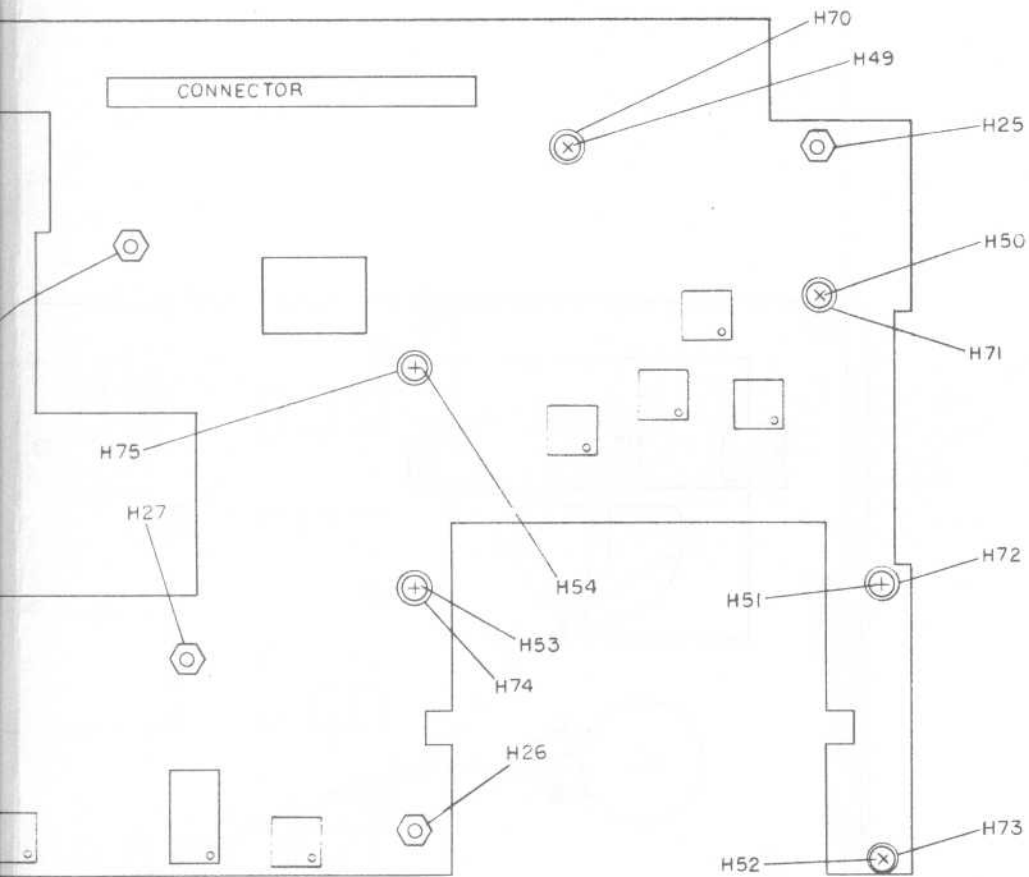
FRONT PANEL ASSY.
 11118-70-0003
 SHT. 2 OF 4



TOP VIEW A10B BOARD
 LOCATION OF SPACERS AND SCREWS
 TO MOUNT BOARD TO FRONT PANEL



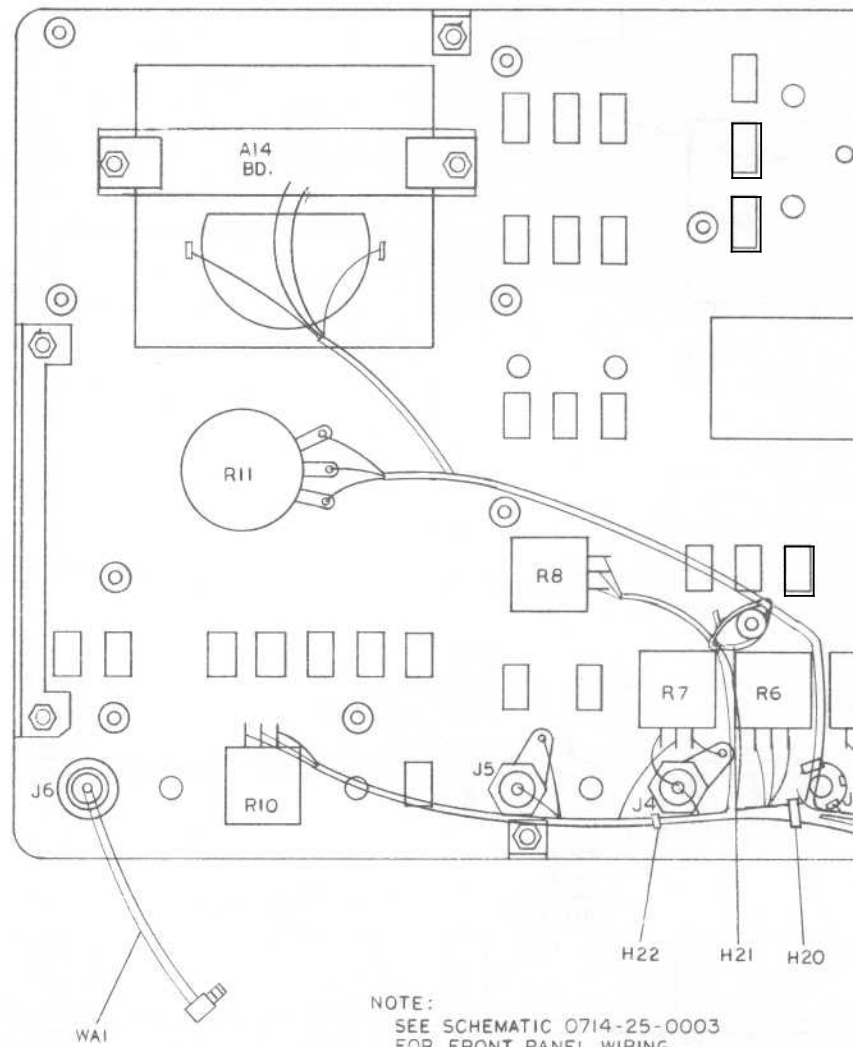
DISASSEMBLY INFORMATION FOR A9, A10B, A10C, A10D, A10E, A10F, A10G, A10H, A10I, A10J, A10K, A10L, A10M, A10N, A10O, A10P, A10Q, A10R, A10S, A10T, A10U, A10V, A10W, A10X, A10Y, A10Z
 SEE MANUAL SECTION 5.2.2 FOR
 DISASSEMBLY PROCEDURE



H49-H57,
H70-H78
6-32x³/₈ SCREW
& WASHER
(TYP. 9 PLCS.)
SEE TOP VIEW A10B
FOR SCREW LOCATION

A11 & A14 PC BOARDS FROM FRONT PANEL
2 FOR

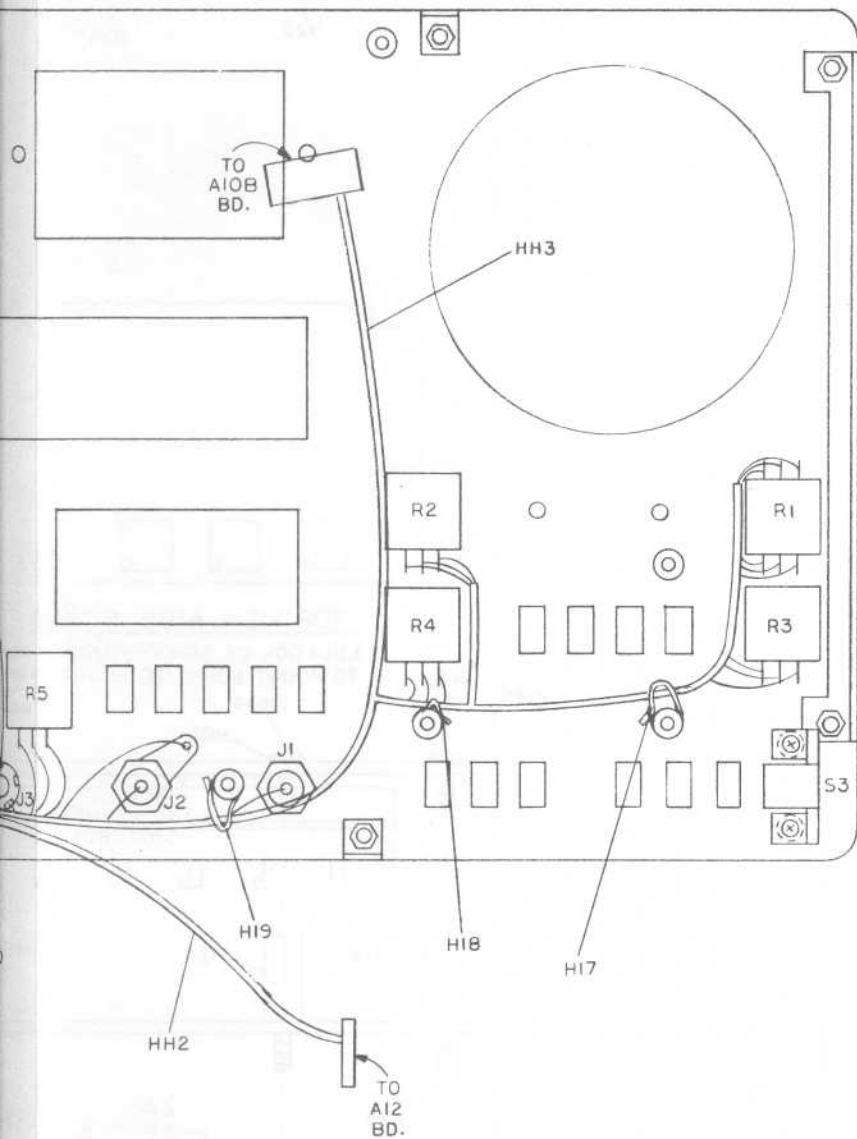
FRONT PANEL ASSY.
11118-70-0003
SHT. 3 OF 4



NOTE:
SEE SCHEMATIC 0714-25-0003
FOR FRONT PANEL WIRING



Digitally signed by
<http://www.aa4df.com>



FRONT PANEL ASSY
11118-70-0003
SHT. 4 OF 4

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
C1	CAP, MICA, 500V, 47PF	CM05ED470J03	81349	11510-50-0470	1
PCBA9	DS PCB, REV D, 3000B-A9,	11717-00-0033	4J835	11717-00-0033	1
J1,	IC SOCKET, 40-PIN	530018-2	00779	12112-00-0021	1
LS1	LAMP, ELEC-LUMIN	0431-1232	32890	12410-03-0007	1
DS1	DISPLAY, L.C., 5-DIGIT	LS024C-E	HIT	12410-03-0008	1
R1, R2	RES, C, 1/4W, 5%, 180	RCR07G181JS	81349	14700-15-1800	2
R3	RES, C, 1/4W, 5%, 3.9K	RCR07G392JS	81349	14700-15-3901	1
CR1, CR2	LED, YL, T-1-3/4	HLMP-3400	28480	14810-02-0011	2
Q1	TRANSISTOR	PN4275	27014	14902-04-2750	1
HH1,	CABLE ASSEMBLY	16011-60-0023	4J835	16011-60-0023	1
U1,	LCD DRIVER, SS	ICM7211IPL	32293	18000-72-1110	1
CT SYSTEMS PARTS LIST	TITLE DISPLAY BD, A9	ASSEMBLY NO. 11110-00-7009		REV. D	PAGE 6.45

R2

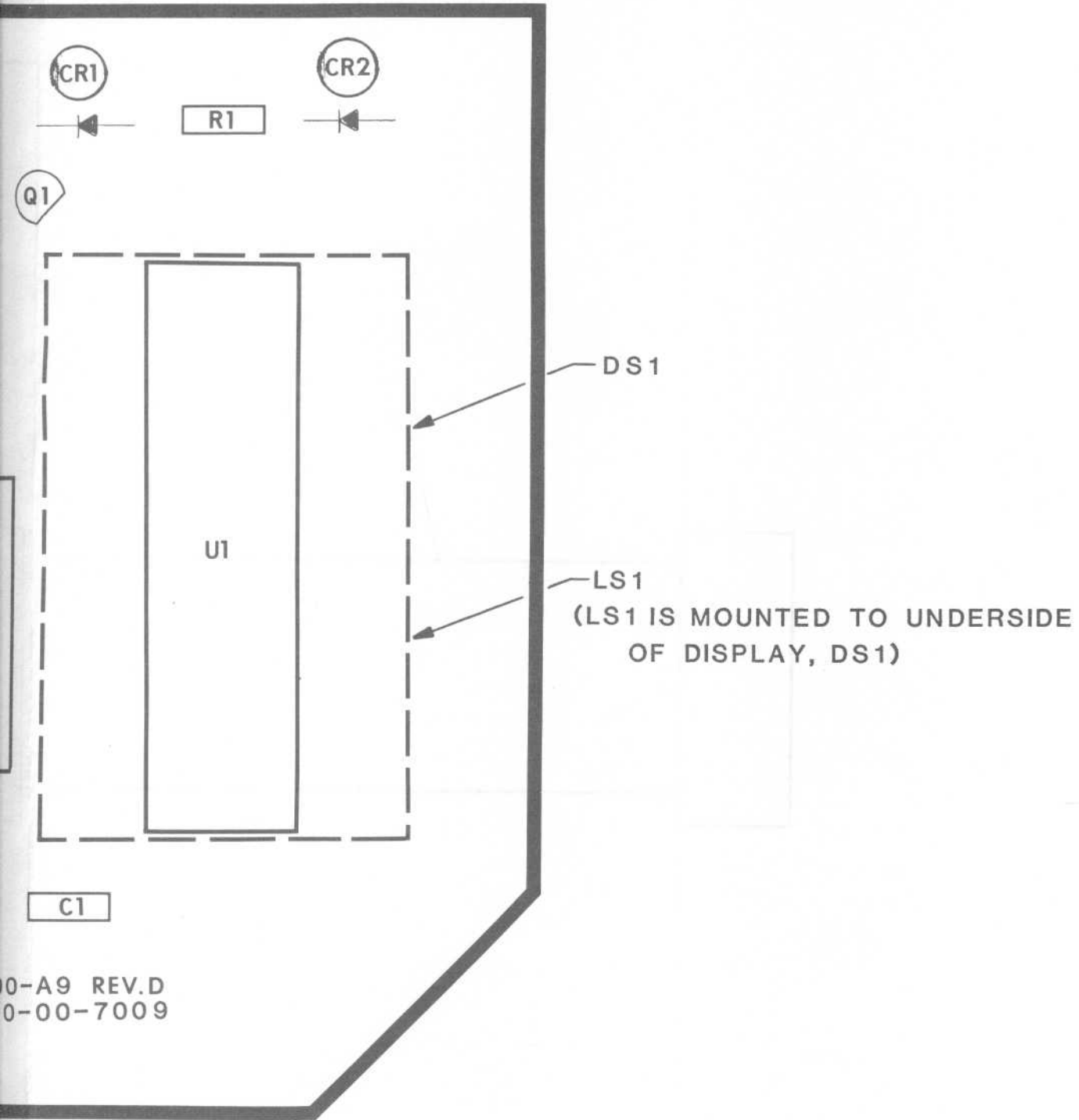
R3

P

P3

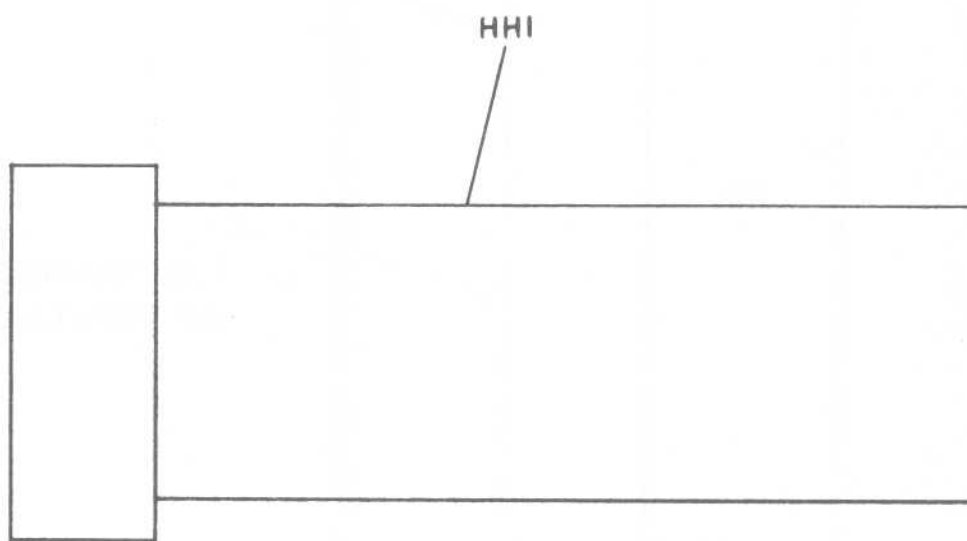
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A9

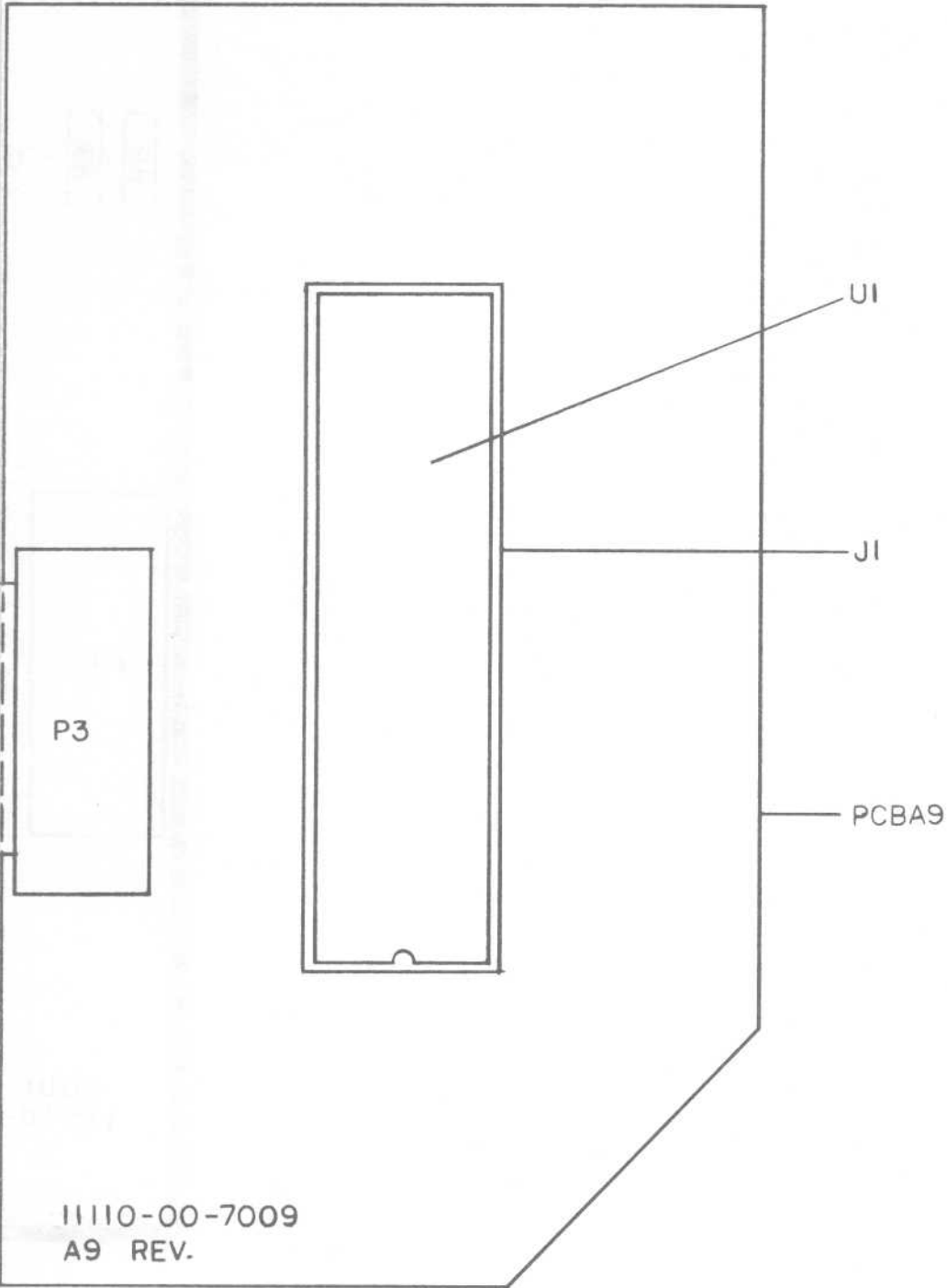


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0-00-7009

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A9

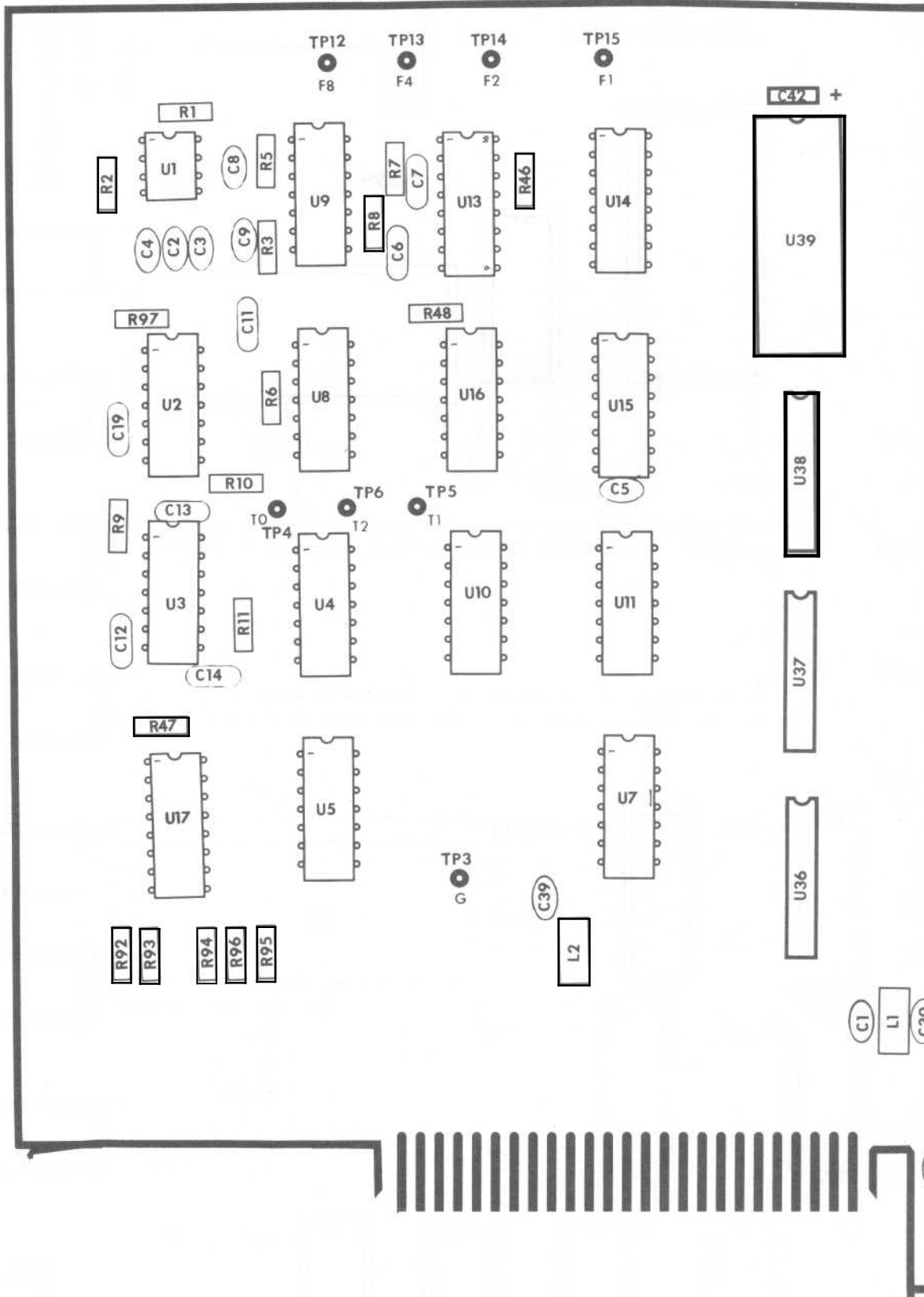


11110-00-7009
A9 REV.

DISPLAY BD., A9
11110-00-7009
SHT. 2 OF 2

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
C8, C9	CAP, DISC, 1KV, .001UF	5GAD10	56289	11510-10-1102	2
C36,	CAP, DISC, 1KV, .002UF	5GAD20	56289	11510-10-1202	1
C1, C2, C3, C4, C5, C16, C17, C18, C20, C21, C22, C27, C28, C29, C30, C39, C40, C41, C15	CAP, DISC, .01UF	UK25-103	71590	11510-14-1103	19
C23, C24, C25, C26, C31, C32, C35,	CAP, DISC, .05UF	UK25-503	71590	11510-14-1503	7
C42,	CAP, TANT, 25V, 10UF	T322C106M025AS	57185	11510-21-7100	1
C37	CAP, TANT, 35V, 1UF	196D105X9035HA1	56289	11510-25-3109	1
C7	CAP, MICA, 500V, 39PF	CM05ED390J03	81349	11510-50-0390	1
C6, C10, C11, C12, C13, C14, C19,	CAP, MICA, 500V, 470PF	DM15-471J	81349	11510-50-0471	7
C38,	CAP, MICA, 500V, 560PF	DM15-561J	81349	11510-50-0561	1
C33, C34,	CAP, FILM, .039UF	160/.039/K/400/D	55112	11510-61-1393	2
PCBA11	DS PCB, REV E, A-11, 3000B	11717-00-0035	4J835	11717-00-0035	1
L1, L2,	CHOKE	VK20010/3B	02114	11810-09-0001	2
J1, J2,	IC, SKT, 8 PIN	DILB-8P-108	09922	12112-00-0007	2
J3, J4, J5, J6, J7, J8, J9, J10, J11, J12, J13, J14, J15, J16, J17, J18, J19, J20, J21, J22, J23, J24, J25,	IC, SKT, 14 PIN	C931402	01295	12112-00-0011	23
J26, J27, J28, J29, J30, J31, J32, J33,	IC SKT, 16 PIN	DILB-16P-108	09922	12112-00-0012	8
J34, J35	IC SKT, 24 PIN	C932402	01295	12112-00-0013	2
J36, J37, J38	IC SKT, 20 PIN	C842002	01295	12112-00-0020	3
J39,	IC SKT, 28-PIN	C842802	01295	12112-00-0023	1
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15,	TESTPOINTS	39-211	73734	12112-19-0005	15
H120, H121	CABLE TIE	PLT3I	06383	12810-00-0017	2
R92, R93, R94, R95, R96,	RES, C, 1/4W, 5%, 100	RCR07G101JS	81349	14700-15-1000	5
R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R46, R47, R48, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R79, R82, R91,	RES, C, 1/4W, 5%, 10K	RCR07G103JS	81349	14700-15-1002	58
R84, R98,	RES, C, 1/4W, 5%, 100K	RCR07G104JS	81349	14700-15-1003	2
R100,	RES, C, 1/4W, 5%, 12K	RCR07G123JS	81349	14700-15-1202	1
R83,	RES, C, 1/4W, 5%, 120K	RCR07G124JS	81349	14700-15-1203	1
R85,	RES, C, 1/4W, 5%, 150K	RCR07G154JS	81349	14700-15-1503	1
R88,	RES, C, 1/4W, 5%, 1.8K	RCR07G182JS	81349	14700-15-1801	1
R73, R74, R75, R76	RES, C, 1/4W, 5%, 220	RCR07G221JS	81349	14700-15-2200	4
R2, R86, R99,	RES, C, 1/4W, 5%, 2.2M	RCR07G225JS	81349	14700-15-2204	3
CT SYSTEMS PARTS LIST	TITLE FREQ. CTL BD, A11	ASSEMBLY NO. 11110-00-7011	REV. J	PAGE 8.46	

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGFR PART NO	MFGR/FCSM	PART NUMBER	QTY
R81	RES, C, 1/4W, 5%, 33K	RCR07G333JS	81349	14700-15-3302	1
R78, R80,	RES, C, 1/4W, 5%, 3.9K	RCR07G392JS	81349	14700-15-3901	2
R3, R4, R5, R6, R7, R8, R10, R11, R44, R45, R87, R90,	RES, C, 1/4W, 5%, 39K	RCR07G393JS	81349	14700-15-3902	12
R1,	RES, C, 1/4W, 5%, 470	RCR07G471JS	81349	14700-15-4700	1
R49, R50, R51, R52,	RES, C, 1/4W, 5%, 680	RCR07G681JS	81349	14700-15-6800	4
R9, R97	RES, C, 1/4W, 5%, 8.2K	RCR07G822JS	81349	14700-15-8201	2
R89,	RES, C, 1/4W, 5%, 82K	RCR07G823JS	81349	14700-15-8202	1
CR45, CR46, CR47, CR48,	DIODE, SIGNAL	1N914	80131	14807-01-0914	4
CR1, CR2, CR3, CR4, CR5, CR6, CR7, CR8, CR9, CR10, CR11, CR12, CR13, CR14, CR15, CR16, CR17, CR18, CR19, CR20, CR21, CR22, CR23, CR24, CR25, CR26, CR27, CR28, CR29, CR30, CR31, CR32, CR33, CR34, CR35, CR36, CR37, CR38, CR39, CR40, CR41, CR42, CR43, CR44,	DIODE, SIGNAL	HSCH1001	28480	14807-01-6263	44
S1	SWITCH	N28-S111	07126	15101-00-0009	1
S2	SWITCH	N28-S115	07126	15101-00-0010	1
U29,	DUAL OP AMP	TL082CP	01295	17000-00-8200	1
U1,	TIMER	MC1455P1	04713	17000-14-5500	1
U24, U25,	QUAD EXCL. OR GATE STATIC SENSITIVE	MC14070B	04713	18000-40-3010	2
U30,	PHASE LKD. LOOP STATIC SENSITIVE	CD4046AE	02735	18000-40-4610	1
U33,	UP/DN CTR, 4 DIGIT STATIC SENSITIVE	ICM7217AIPL	32293	18000-72-1710	1
U23, U28, U35,	QUAD 2-IN NAND STAT. SENS.	MM74C00N	27014	18000-74-0011	3
U4, U8, U9,	QUAD 2-INP POS NOR STATIC SENSITIVE	DM74C02N	27014	18000-74-0211	3
U10, U11, U12,	HEX INVERTER STATIC SENSITIVE	SN74LS05N	01295	18000-74-0510	3
U5, U6, U7,	QUAD 2-INP PCS AND STATIC SENSITIVE	MM74C08N	27014	18000-74-0811	3
U26, U27	TRIPLE 3-INP NAND STATIC SENSITIVE	MM74C10N	27014	18000-74-1011	2
U2, U3, U16, U32	DUAL FLIP-FLOP STATIC SENSITIVE	MM74C74N	27014	18000-74-7410	4
U19, U22, U34,	DUAL J-K FLIP-FLOP STATIC SENSITIVE	MM74C76N	27014	18000-74-7611	3
U20, U21, U31,	DECADE COUNTER STATIC SENSITIVE	MM74C90N	27014	18000-74-9010	3
U17,	DEMULPLEXER STATIC SENSITIVE	DM74LS156N	27014	18007-41-5610	1
U14, U15,	HEX D-FLIP FLOP STATIC SENSITIVE	SN74LS174N	01295	18007-41-7410	2
U36, U37, U38,	OCTAL, D, FF, SS,	74LS377J	01295	18007-43-7710	3
U13,	PROM-3000B REF: 18000-42-8700	18410-00-0020	4J835	18410-00-0020	1
U18,	PROM-3000B REF: 18000-27-3200	18410-70-0002	4J835	18410-70-0002	1
U39,	PROM-3000B REF: 18000-27-3200	18410-70-0003	4J835	18410-70-0003	1



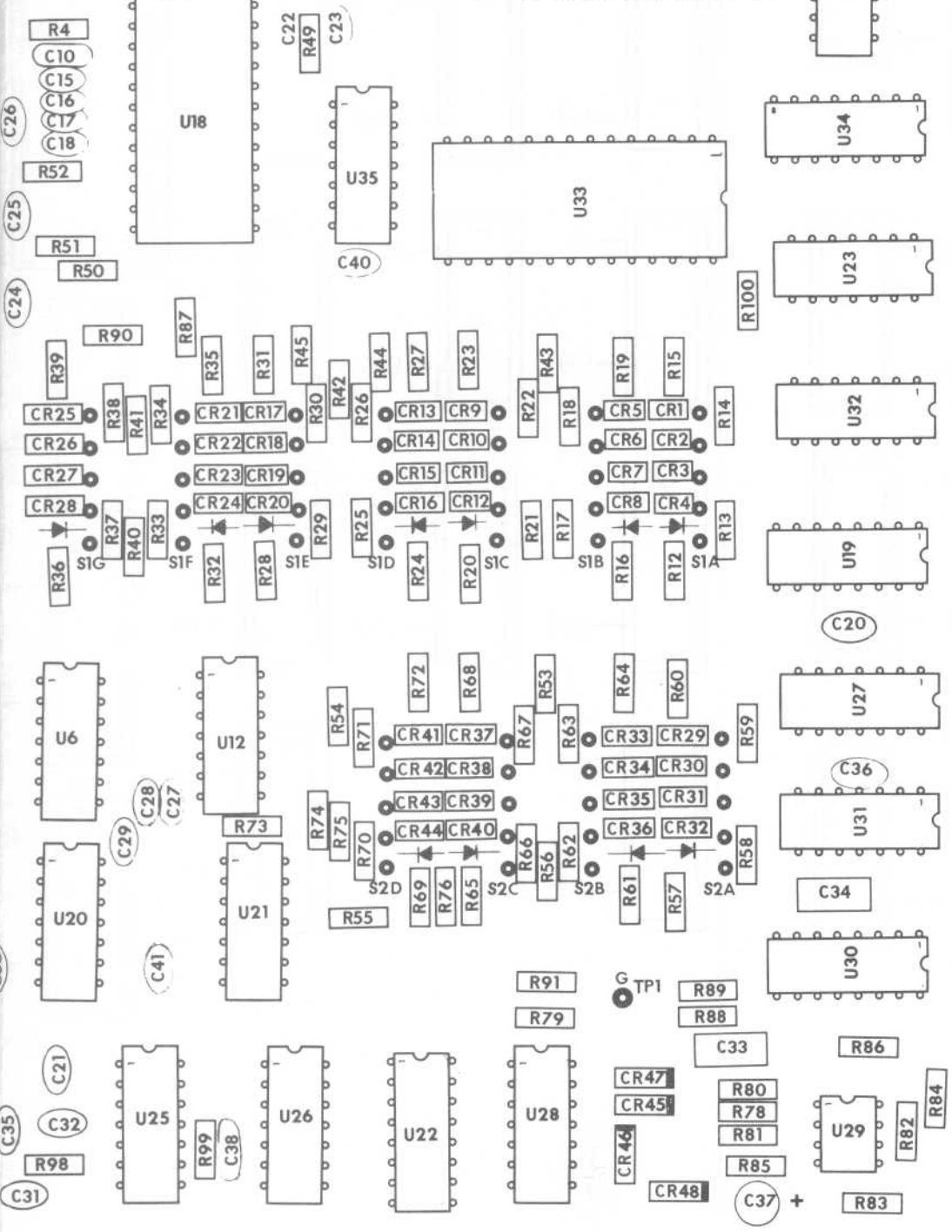
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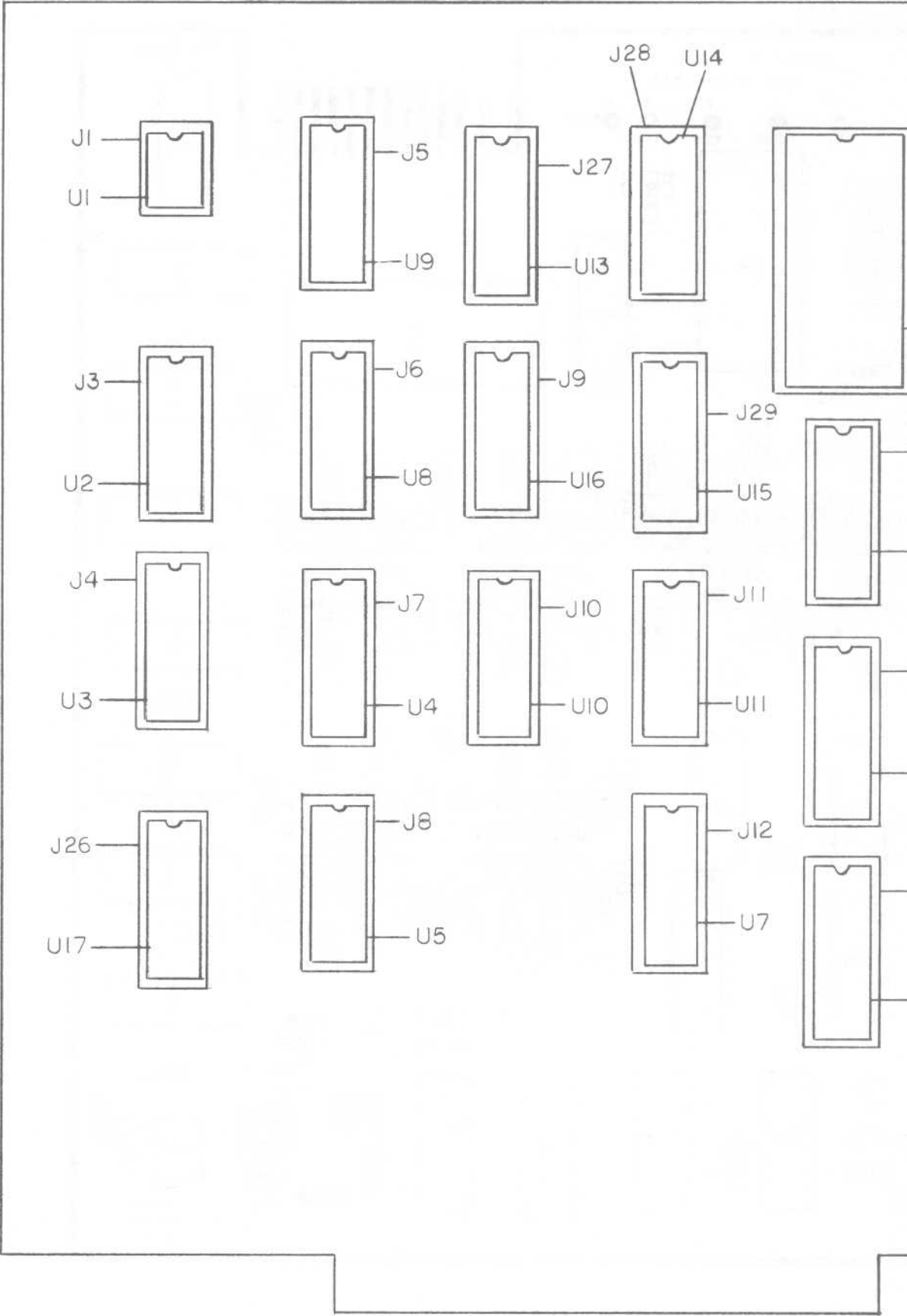
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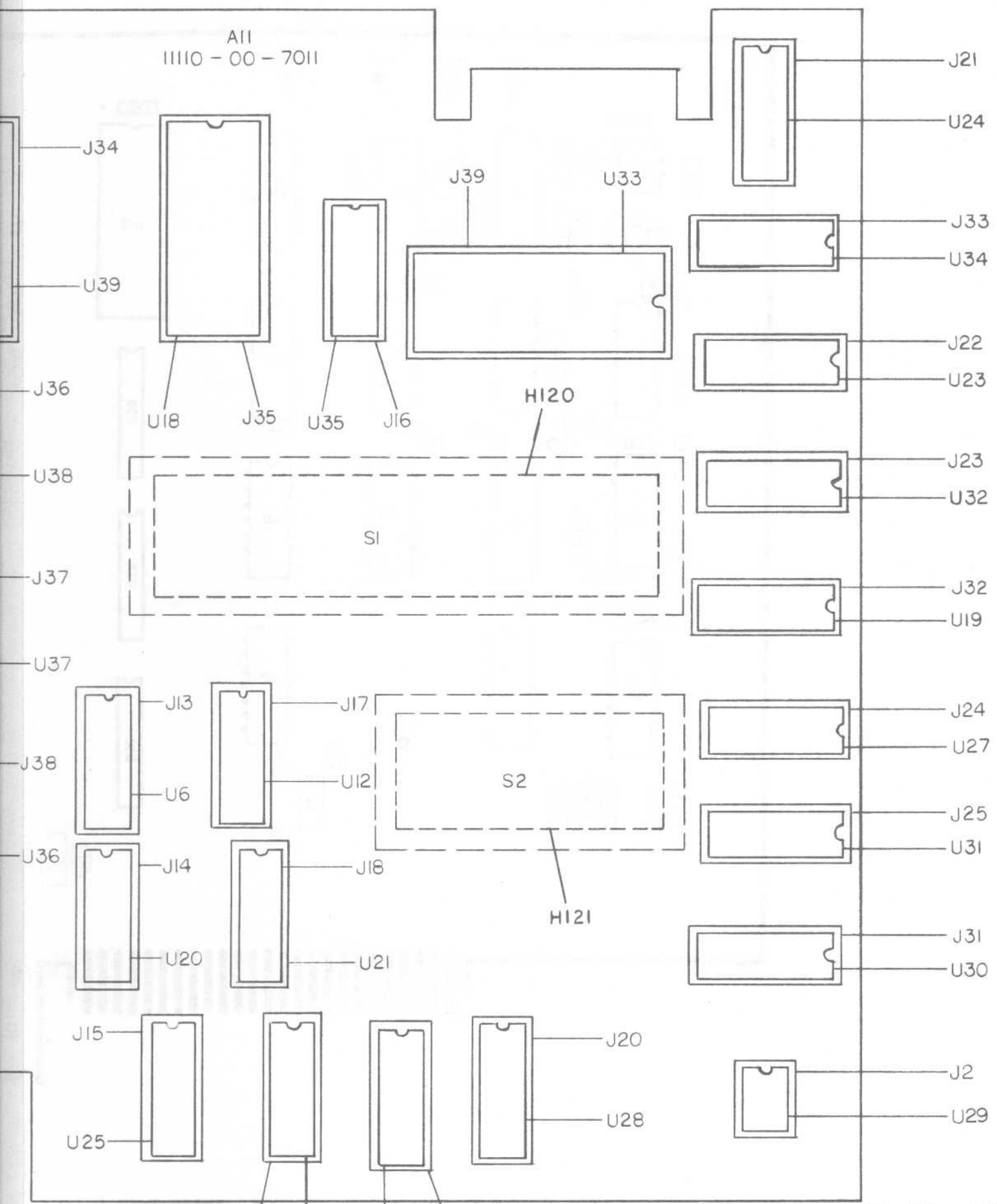
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G TP11
1 TP10
2 TP9
4 TP8
8 TP7



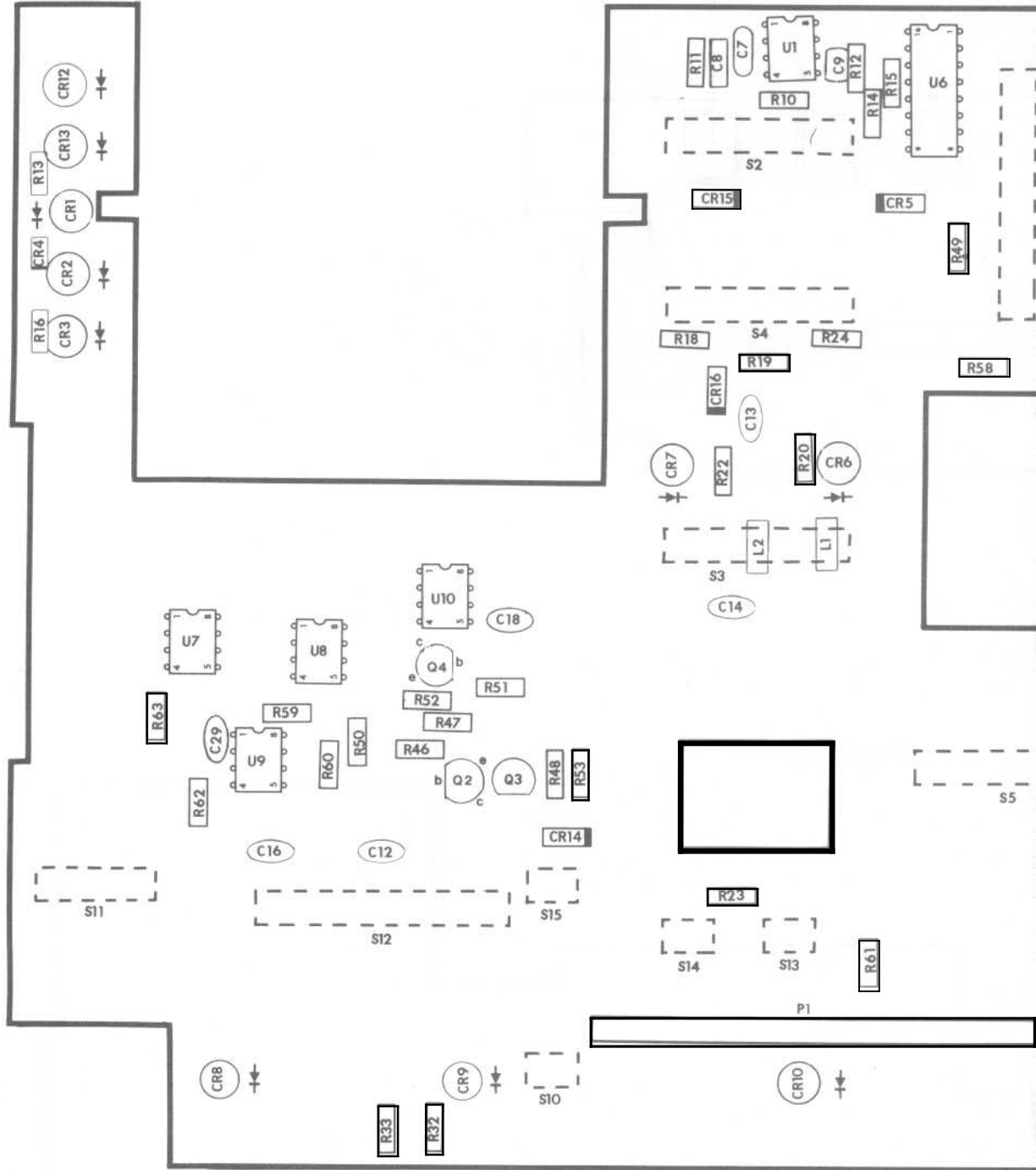


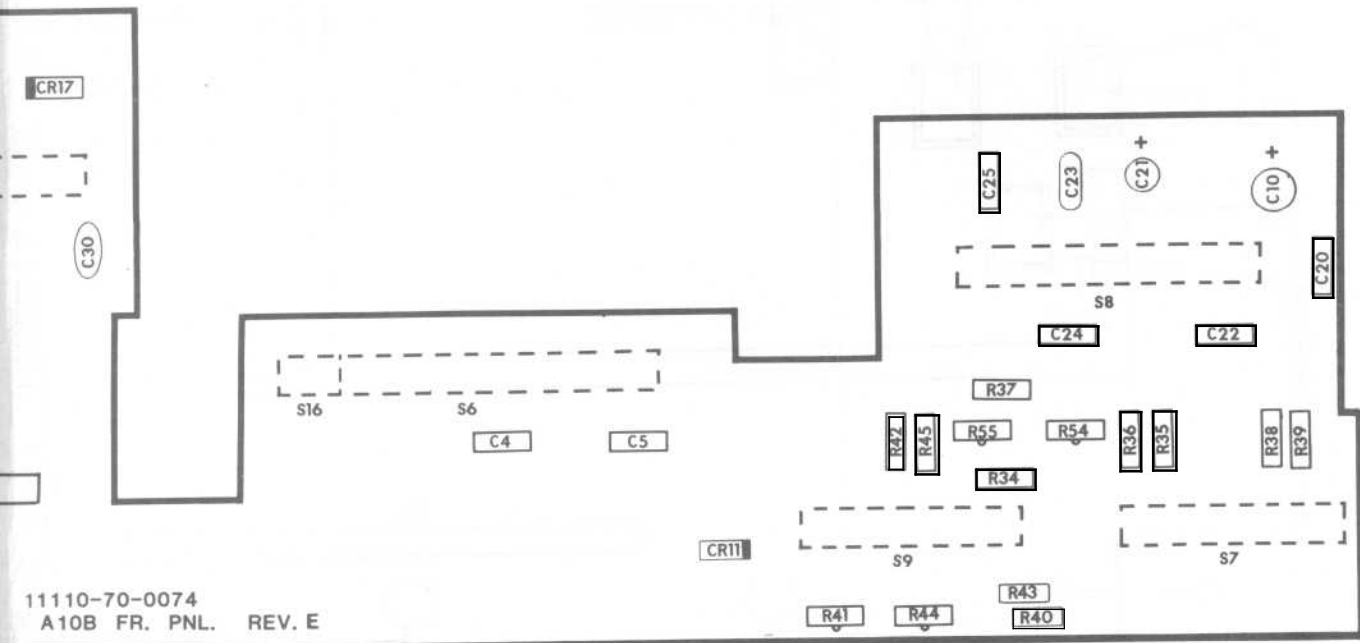
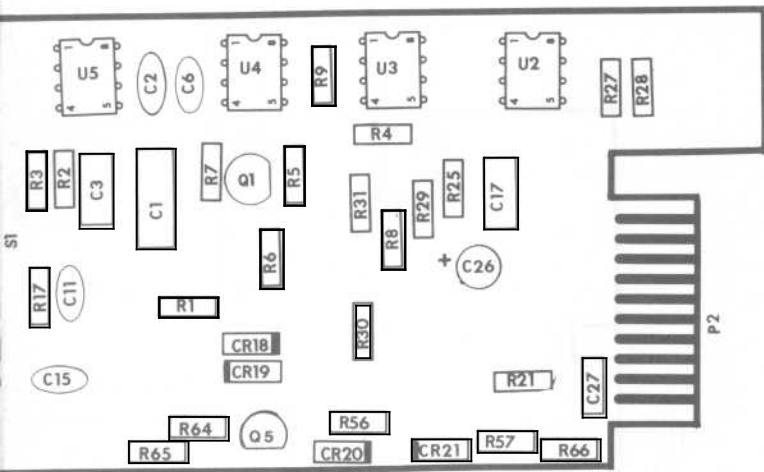
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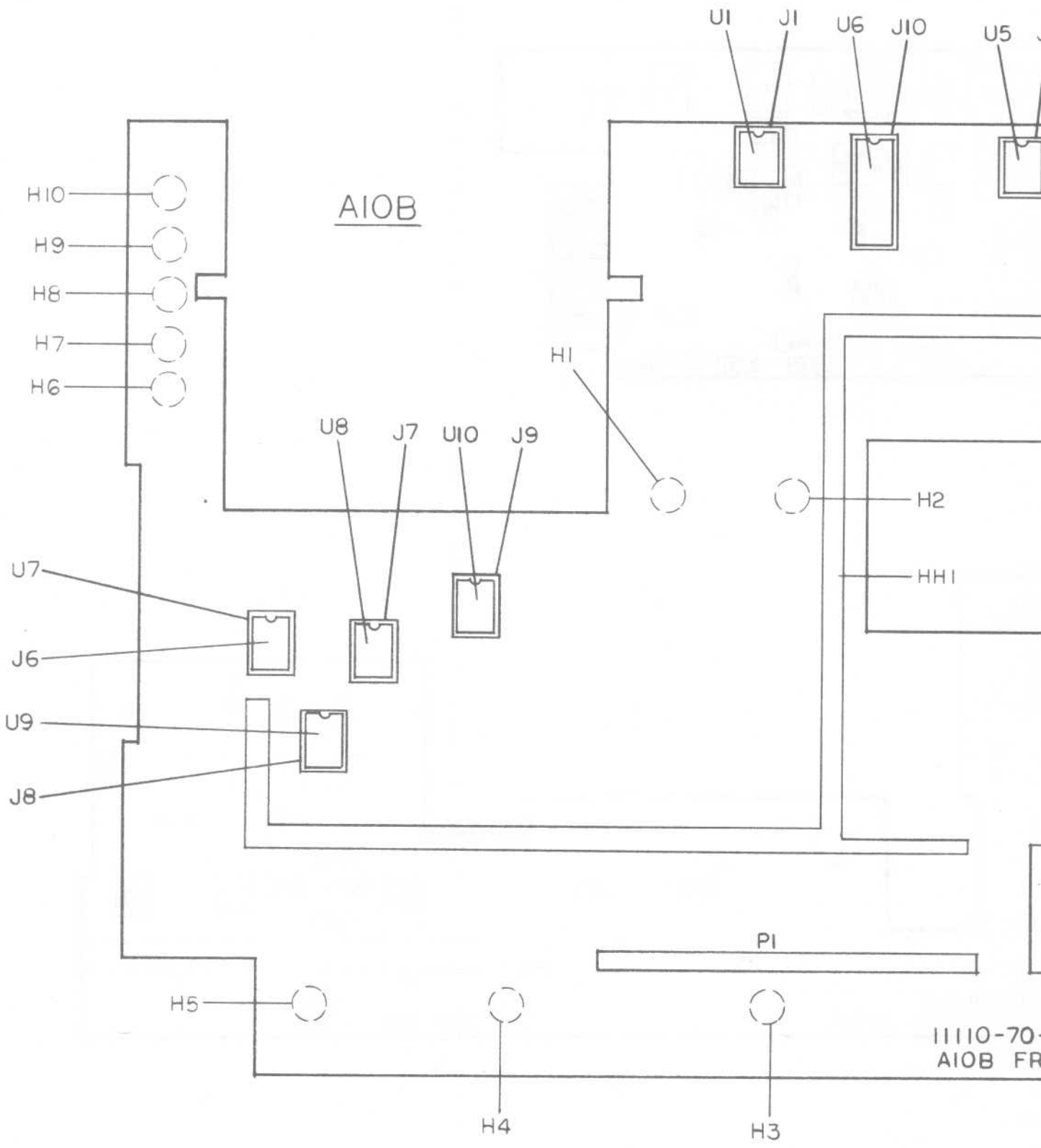
REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGFR PART NO	MFGFR/FCSM	PART NUMBER	QTY
HH1	HARNESS, 3000B-A10B	11219-70-0025	4J835	11219-70-0025	1
C27	CAP, MON, 50V, 1UF	3420-050-E105M	96095	11510-11-3105	1
C2, C6, C11, C12, C13, C14, C15, C16, C18, C29, C30	CAP, DISC, .05UF	UK25-503	71590	11510-14-1503	11
C26	CAP, TANT, 35V, 1UF	196D105X9035HA1	56289	11510-25-3109	1
C21	CAP, TANT, 35V, .47UF	196D474X9035HA1	56289	11510-25-3478	1
C10	CAP, TANT, 35V, 4.7UF	196D475X9035JA1	56289	11510-25-3479	1
C7	CAP, MICA, 500V, 680PF	DM19-681J	81349	11510-50-0681	1
C9	CAP, FILM, .0012UF	225P12291WD3	56289	11510-61-7122	1
C24	CAP, FILM, .0022UF	225P22291WD3	56289	11510-61-7222	1
C4, C22	CAP, FILM, .022UF	225P22391WD3	56289	11510-61-7223	2
C8	CAP, FILM, .0033UF	225P33291WD3	56289	11510-61-7332	1
C25	CAP, FILM, .0047UF	225P47291WD3	56289	11510-61-7472	1
C23	CAP, FILM, .047UF	225P47391WD3	56289	11510-61-7473	1
C3, C5, C20	CAP, FILM, .22UF	225P22491XD3	56289	11510-62-1224	3
C17	CAP, FILM, .33UF	225P33491XD3	56289	11510-62-1334	1
C1	CAP, FILM, .82UF	160/.82.10/100/H	55112	11510-62-2824	1
PCBA10B	DS PCB, REV. D 3000B-A10B	11717-00-0074	4J835	11717-00-0074	1
L1, L2	CHOKE	VK20010/3B	02114	11810-09-0001	2
J1, J2, J3, J4, J5, J6, J7, J8, J9	IC SOCKET, 8 PIN	DILB-8P-108	09922	12112-00-0007	9
J10	IC SOCKET, 16 PIN	DILB-16P-108	09922	12112-00-0012	1
P1	HEADER, 56 PIN MALE	609-5617	ANSLY	12112-08-0037	1
H1, H2, H3, H4, H5, H6, H7, H8, H9, H10	SPCR, NYL, .14ID, 11/16	13SP069	28480	12810-05-0028	10
R41, R44	POT, 500, 25T, VERT MTG	3299X-1-501	80294	14610-01-7501	2
R54, R55	POT, 5K	3386W-1-502	80294	14610-02-0502	2
R45	RES, C, 1/4W, 5%, 100	RCR07G101JS	81349	14700-15-1000	1
R5, R23, R58	RES, C, 1/4W, 5%, 1K	RCR07G102JS	81349	14700-15-1001	3
R7, R9, R17, R48, R50, R51, R52, R53, R57, R60, R61	RES, C, 1/4W, 5%, 10K	RCR07G103JS	81349	14700-15-1002	11
R25	RES, C, 1/4W, 5%, 1M	RCR07G105JS	81349	14700-15-1004	1
R46	RES, C, 1/4W, 5%, 1.5K	RCR07G152JS	81349	14700-15-1501	1
R13, R16, R20, R22, R32, R33, R42	RES, C, 1/4W, 5%, 180	RCR07G181JS	81349	14700-15-1800	7
R43, R49	RES, C, 1/4W, 5%, 2.4K	RCR07G242JS	81349	14700-15-2401	2
R3, R31, R47	RES, C, 1/4W, 5%, 3.3K	RCR07G332JS	81349	14700-15-3301	3
R59	RES, C, 1/4W, 5%, 39K	RCR07G393JS	81349	14700-15-3902	1
R6	RES, C, 1/4W, 5%, 4.7K	RCR07G472JS	81349	14700-15-4701	1
R21, R63	RES, C, 1/4W, 5%, 560	RCR07G561JS	81349	14700-15-5600	2
R4, R65	RES, C, 1/4W, 5%, 5.6K	RCR07G562JS	81349	14700-15-5601	2
R62	RES, C, 1/4W, 5%, 560K	RCR07G564JS	81349	14700-15-5603	1
R40	RES, C, 1/4W, 5%, 6.2K	RCR07G622JS	81349	14700-15-6201	1
R66	RES, C, 1/4W, 5%, 62K	RCR07G623JS	81349	14700-15-6202	1
R2	RES, C, 1/4W, 5%, 6.8K	RCR07G682JS	81349	14700-15-6801	1
CTSYSTEMS PARTS LIST	TITLE FP BD, A10B	ASSEMBLY NO. 11110-70-0074		REV. E	PAGE 6.48

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGFR PART NO	MFGFR/FCSM	PART NUMBER	QTY
R30	RES, C, 1/4W, 5%, 820	RCR07G821JS	81349	14700-15-8200	1
R8, R29, R56, R64	RES, C, 1/4W, 5%, 8.2K	RCR07G822JS	81349	14700-15-8201	4
R24	RES, MF, 1/8W, 1%, 100	RN55D1000FM	81349	14701-03-1000	1
R28	RES, MF, 1/8W, 1%, 10K	RN55D1002FM	81349	14701-03-1002	1
R19	RES, MF, 1/8W, 1%, 200	RN55D2000FM	81349	14701-03-2000	1
R36, R39	RES, MF, 1/8W, 1%, 2.32K	RN55D2321FM	81349	14701-03-2321	2
R1	RES, MF, 1/8W, 1%, 30.1K	RN55D3012FM	81349	14701-03-3012	1
R35, R38	RES, MF, 1/8W, 1%, 309	RN55D3090FM	81349	14701-03-3090	2
R14, R15	RES, MF, 1/8W, 1%, 49.9K	RN55D4992FM	81349	14701-03-4992	2
R34, R37	RES, MF, 1/8W, 1%, 56.2K	RN55D5622FM	81349	14701-03-5622	2
R18	RES, MF, 1/8W, 1%, 698	RN55D6980FM	81349	14701-03-6980	1
R10, R11	RES, MF, 1/8W, 1%, 8.25K	RN55D8251FM	81349	14701-03-8251	2
R27	RES, MF, 1/8W, 1%, 90.9K	RN55D9092FM	81349	14701-03-9092	1
R12	RES, MF, 1/8W, 1%, 9.76K	RN55D9761FM	81349	14701-03-9761	1
CR4, CR11, CR15	DIODE, SIGNAL	1N914	80131	14807-01-0914	3
CR5, CR14, CR16, CR17, CR18, CR19, CR20, CR21	DIODE, SIGNAL	HSCH1001	28480	14807-01-6263	8
CR1, CR2, CR6, CR7, CR9, CR10, CR12, CR13	LED, YL, T-1-3/4	HLMP-3400	28480	14810-02-0011	8
CR3, CR8	LED, RED, T-1-3/4	HLMP-3300	28480	14810-02-0012	2
Q5	TRANSISTOR	PN4121-18	27014	14901-04-1210	1
Q1, Q2	TRANSISTOR	PN4356-5	27014	14901-04-3560	2
Q3, Q4	TRANSISTOR	PN4275	27014	14902-04-2750	2
S10, S13, S14, S15	SWITCH, 1STA	15102-00-0009	4J835	15102-00-0009	4
S1	SWITCH, 3STA	15110-00-0028	4J835	15110-00-0028	1
S6, S8, S12	SWITCH, 4STA	15110-00-0029	4J835	15110-00-0029	3
S2, S3, S4, S5, S7, S9	SWITCH, 3STA	15110-00-0030	4J835	15110-00-0030	6
S11	SWITCH, 2STA	15110-00-0031	4J835	15110-00-0031	1
S16	SWITCH, 1STA, MOM.	15110-00-0032	4J835	15110-00-0032	1
U2, U9	OP AMP	LF351N	27014	17000-00-8100	2
U1, U3, U10	DUAL OP AMP	TL082CP	01295	17000-00-8200	3
U6	QUAD SPST SWITCH SS	DG308ACJ	17856	17000-03-0800	1
U4, U7, U8	SPDT ANALOG SWITCH SS	TL607CP	01295	17000-06-0700	3
U5	TIMER	MC1455P1	04713	17000-14-5500	1

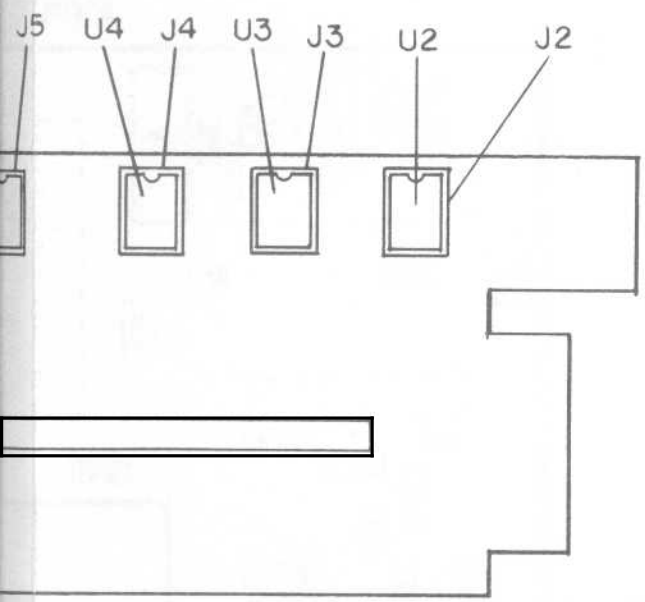




11110-70-0074
 A10B FR. PNL. REV. E



11110-70-
AIOB FR



PCBAIOB

0-0074
FR. PNL. REV.

FRONT PANEL BD., AIOB
11110-70-0074
SHT. 2 OF 2

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
W1	WIRE, PVC, 24GA, WH	MIL-W-16878D-B-24-WK	81349	16012-12-4999	1
CT SYSTEMS PARTS LIST	TITLE HARNESS, 3000B-A10B	ASSEMBLY NO. 11219-70-0025	REV. A	PAGE 6.50	

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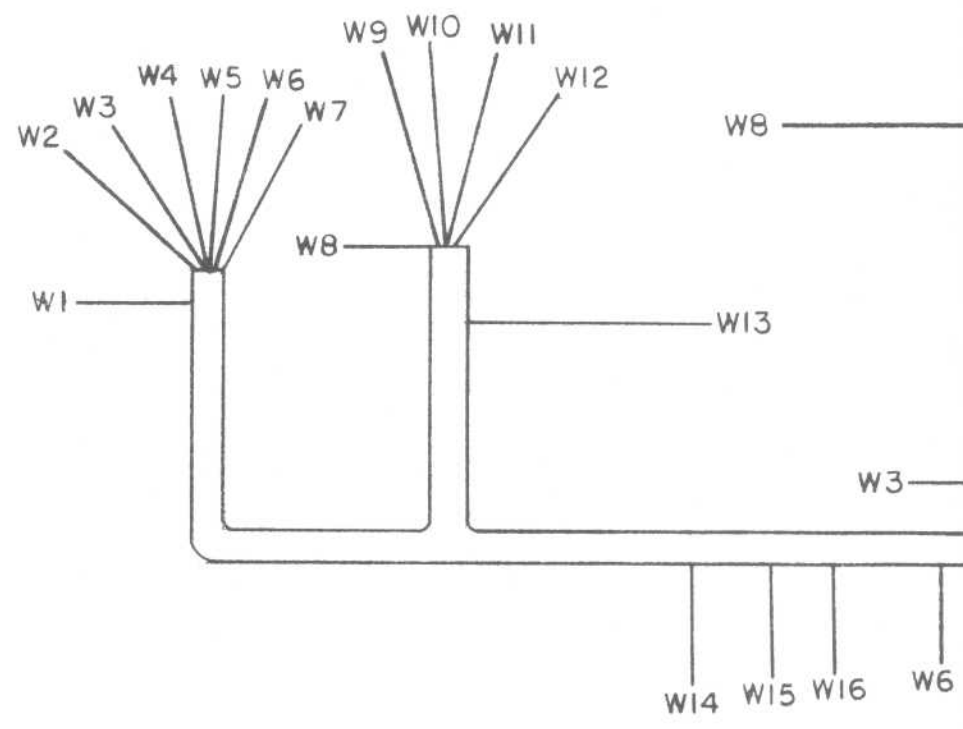
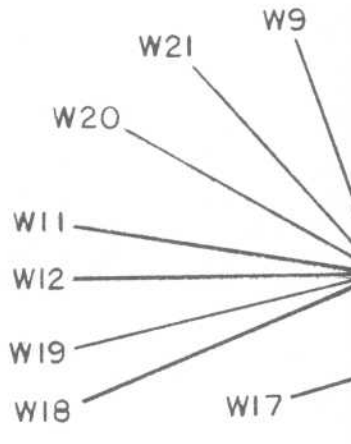
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D

C

B

A



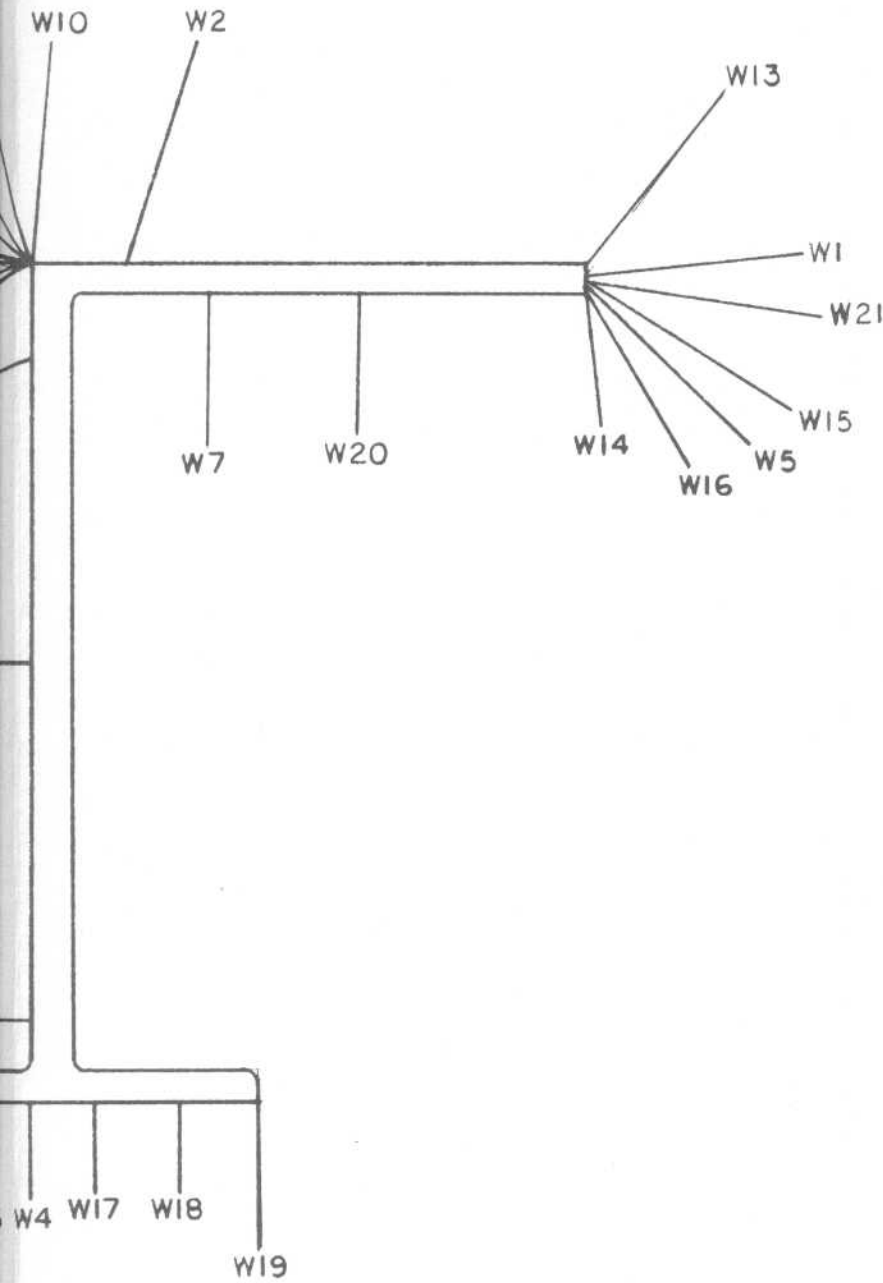
NEXT ASSY	USED ON
APPLICATION	

2

1

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED



WIRE #	COLOR
1	BLUE
2	YELLOW
3	GRAY
4	WHITE
5	ORANGE
6	BLACK
7	VIOLET
8	GRAY
9	VIOLET
10	GREEN
11	BLACK
12	RED
13	WHITE
14	GREEN
15	ORANGE
16	BROWN
17	BROWN
18	YELLOW
19	BLUE
20	BLUE
21	RED

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
±1/64 .XX ±.01 ±30'
.XXX ±.005

CONTRACT NO.	
APPROVALS	DATE
DRAWN D. NOELLER	10-25-86
CHECKED	
RELEASED	

CT SYSTEMS, INC.

AIOB HARNESS

3000B

MATERIAL

FINISH

SIZE B	CODE IDENT NO. 4J835	DRAWING NO. 11219-70-0025
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DO NOT SCALE DRAWING

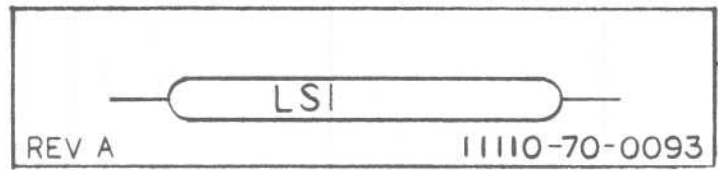
SCALE 1:1 SHEET 1 OF 1

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REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
PCBA14	DS PCB REV. A 3000B-A14	11717-00-0097	4J835	11717-00-0097	1
LS1	LAMP, 6V, PIGTAIL	PTL-20D/6	CORD	12410-02-0020	1
CT SYSTEMS PARTS LIST	TITLE METER LIGHT BD, A14	ASSEMBLY NO. 11110-70-0093	REV. A	PAGE 6.51	

A14



PCB A14

METER LIGHT BD., A14
11110-70-0093

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
MP1	BRASS TUBE FROM: 13210-00-0085	11417-01-0230	4J835	11417-01-0230	1
P1/J6	CONN, N,	25JS133-1	24931	12110-04-1010	1
J1	CONN, JACK, SMB	2005-1541-010	19505	12110-08-1006	1
W1	CABLE, CONF COAX 1000FT/SPLS	16011-40-0064	4J835	16011-40-0064	1
CT SYSTEMS PARTS LIST		TITLE CABLE ASSY, N, 12-1/2IN	ASSEMBLY NO. 11217-80-0097	REV. A	PAGE 6.52

4

3

J1

W1



J

3

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B

A

NEXT ASSY	USED ON
APPLICATION	

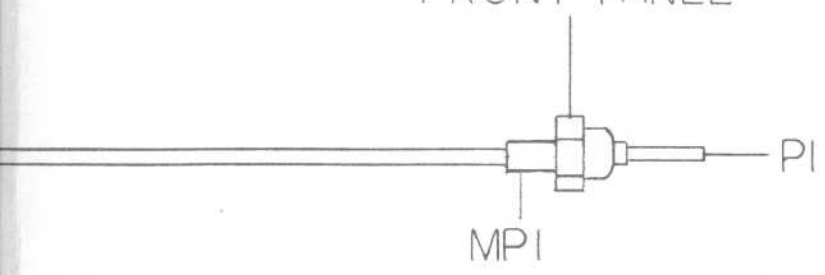
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REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED

REF J6
FRONT PANEL



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± 1/64 .XX ± .01 ± 30' .XXX ± .005
MATERIAL
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DO NOT SCALE DRAWING

CONTRACT NO.	
APPROVALS	DATE
DRAWN JD CLUTINGER	11/6/86
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RELEASED	

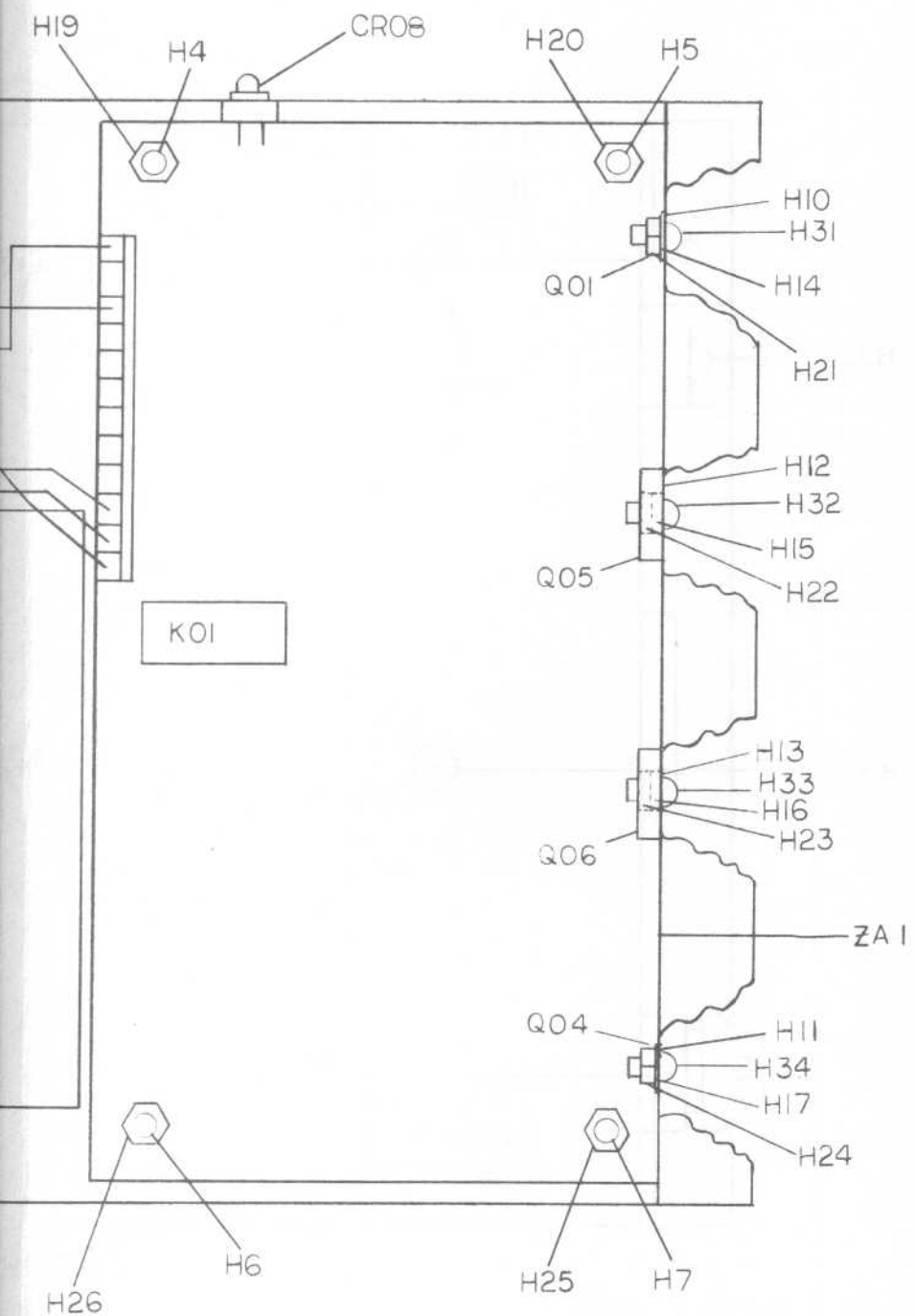
CT SYSTEMS INC.		
N 12.5IN CABLE ASSY.		
SIZE B	CODE IDENT NO. 4J835	DRAWING NO. 11217-80-0097
SCALE 1:1	SHEET 1 OF 1	

2

1

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
ZA1	INVERTER BD, 110B	11110-70-0011	4J835	11110-70-0011	1
HH1	XFMR ASSY, INVERTER	11219-70-0019	4J835	11219-70-0019	1
MP1	COVER, INV, 110B	11417-80-0390	4J835	11417-80-0390	1
H1	BARRIER STRIP	4696-2	75382	12112-17-0008	1
H2	OUTLET, 3 CKT	227	75382	12112-32-0009	1
F1	FUSE, 10AMP	312010	75915	12410-05-0020	1
H3	FUSE HOLDER	342022A	75915	12410-05-1014	1
H8, H9	CORD WRAP	PP40055	21604	12810-08-0008	2
H10, H11	INSULATOR, TIP32	60-12-5791-1674	18565	12810-11-0007	2
H12, H13	INSULATOR, TIP36	60-12-5792-1674	18565	12810-11-0008	2
H14, H17, H15, H16	SCW INSUL, 4-093	4-6	06915	12810-11-0030	4
H18	SHIELD, FUSE HOLDER	331	83330	12810-12-0012	1
H21, H22, H23, H24	NUT, 4-40X1/4, NP	8003-NP	73734	12810-14-4104	4
H27, H28, H29, H30	SCW, PFH, 4-40X5/16 S/S	22223	73734	12810-23-0052	4
H31, H32, H33, H34	SCW, PPH, 4-40X3/8	23024	73734	12810-23-0053	4
H35, H36	SCW, PPH, 6-32X3/4	23048	73734	12810-23-0081	2
H37, H38, H39, H40	SCW, PFH, 6-32X1/4 82 FL U/CUT, PSV S/S	1824NP	73734	12810-52-6104	4
CT SYSTEMS PARTS LIST	TITLE INVERTER ASSY, 110B	ASSEMBLY NO. 11118-70-0004	REV. F	PAGE 6.53	

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



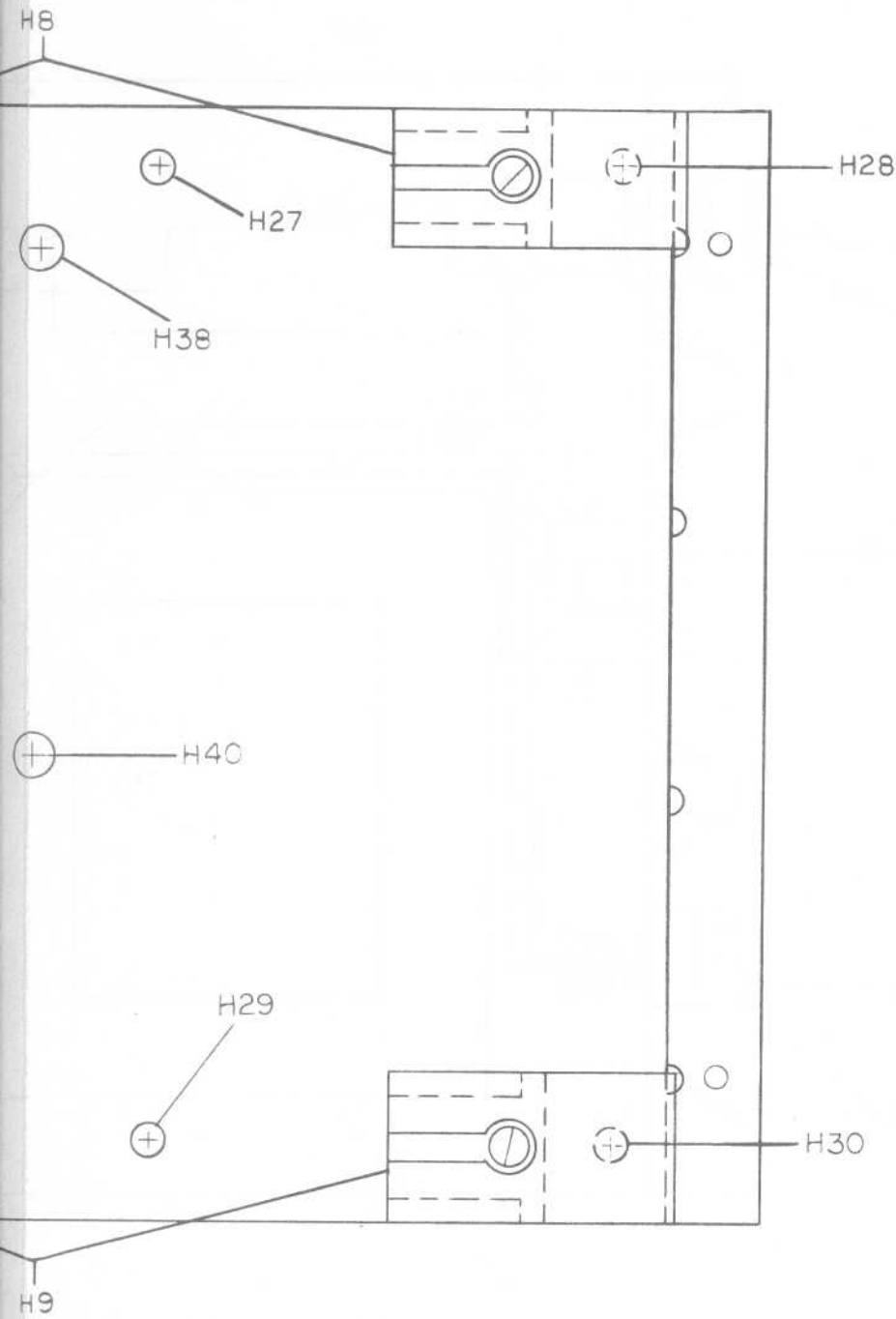
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES \pm .XX \pm \pm \pm .XXX \pm	CONTRACT NO.		CT SYSTEMS INC. INVERTER ASSY, 110B TOP VIEW	
	APPROVALS	DATE		
MATERIAL	DRAWN JD CLUTING 10/27/86		SIZE CODE IDENT NO. DRAWING NO. B 4J835 11118-70-0004	
FINISH	CHECKED			
DO NOT SCALE DRAWING	SCALE		SHEET 1 OF 2	

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REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:

FRACTIONS	DECIMALS	ANGLES
±	.XX ±	±
	.XXX ±	

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS

JL CLUTINGER

CHECKED

CT SYSTEMS INC.

INVERTER ASSY, IIO B
BOTTOM VIEW

SIZE

B

CODE IDENT NO.

4J835

DRAWING NO.

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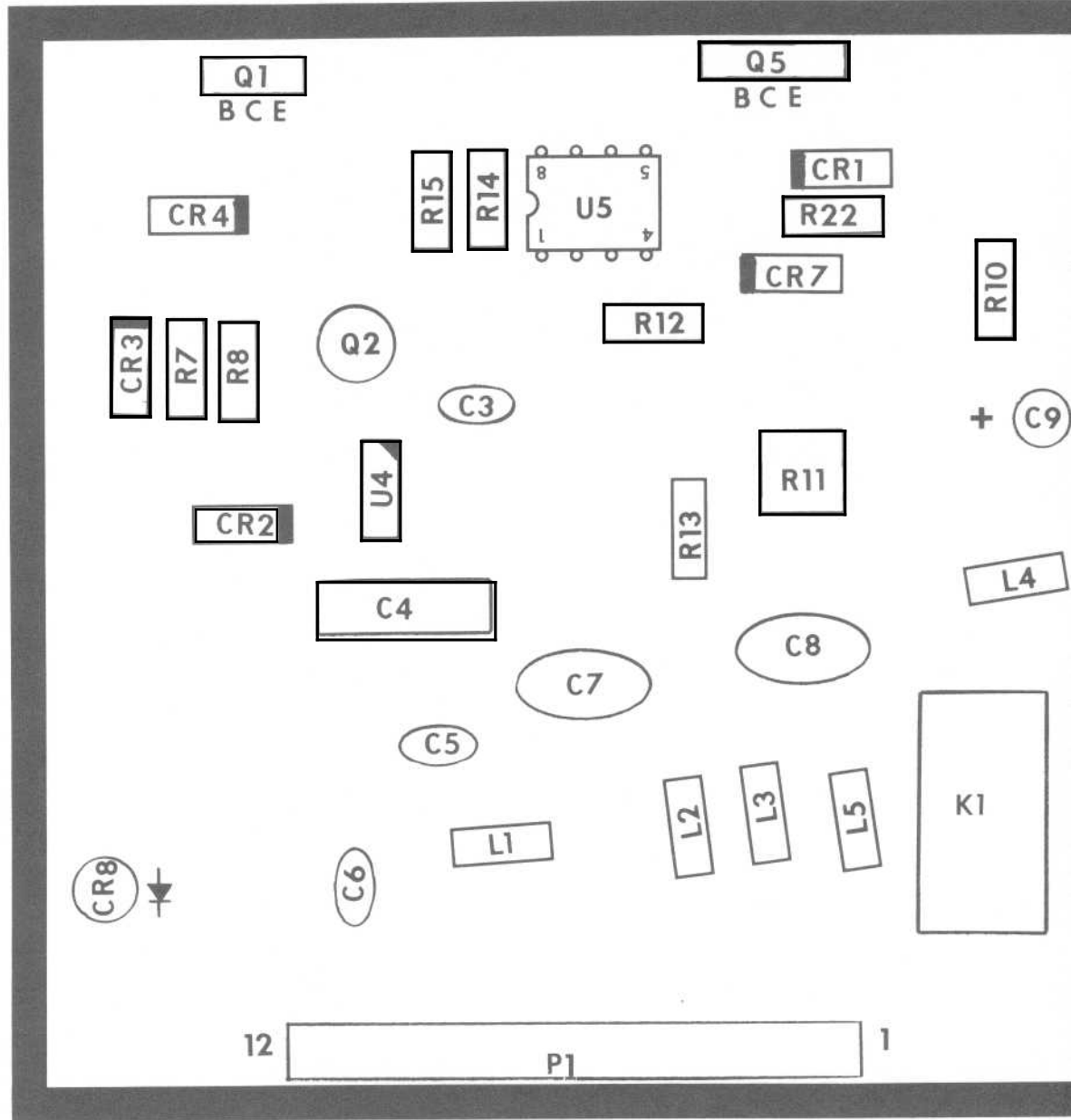
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SHEET 2 OF 2

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REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
C7, C8	CAP, DISC, 3KV, .01UF	DD30-103	71590	11510-14-0103	2
C3, C5, C6	CAP, DISC, .01UF	UK25-103	71590	11510-14-1103	3
C4	CAP, ELEC, 25V, 100UF	TE1211	56289	11510-20-4101	1
C2	CAP, ELEC, 50V, .47UF	173D474X9050V	56289	11510-21-9470	1
C9, C10	CAP, TANT, 20V, 10UF	196D106X9020JA1	56289	11510-25-2100	2
C1	CAP, FILM, .1UF	225P10491WD3	56289	11510-61-7104	1
PCBA110B	PCB, INVERTER, REV. F, 110B, 3000B	11717-00-0011	4J835	11717-00-0011	1
L1, L2, L3, L4, L5	CHOKE	VK20010/3B	02114	11810-09-0001	5
P1	HDR, STRT, 12-CKT	09-67-1123	27264	12112-07-0047	1
H4, H5, H6, H7	SPACER, HEX, #4	7200NP	91833	12810-05-0060	4
H19, H20, H25, H26	NUT, 4-40X1/4	8003-NP	73734	12810-14-4104	4
K1	RELAY	R-50-E2-Y1-12	77342	14510-00-0013	1
R11, R17	POT, 10K	3386W-1-103	80294	14610-02-0103	2
R6, R7, R22, R23	RES, C, 1/4W, 5%, 1K	RCR07G102JS	81349	14700-15-1001	4
R1, R14, R20	RES, C, 1/4W, 5%, 10K	RCR07G103JS	81349	14700-15-1002	3
R19	RES, C, 1/4W, 5%, 15K	RCR07G153JS	81349	14700-15-1502	1
R18	RES, C, 1/4W, 5%, 180	RCR07G181JS	81349	14700-15-1800	1
R13	RES, C, 1/4W, 5%, 18K	RCR07G183JS	81349	14700-15-1802	1
R12	RES, C, 1/4W, 5%, 220	RCR07G221JS	81349	14700-15-2200	1
R10, R16	RES, C, 1/4W, 5%, 22K	RCR07G223JS	81349	14700-15-2202	2
R21	RES, C, 1/4W, 5%, 390	RCR07G391JS	81349	14700-15-3900	1
R3, R5	RES, C, 1/4W, 5%, 4.7K	RCR07G472JS	81349	14700-15-4701	2
R2	RES, C, 1/4W, 5%, 47K	RCR07G473JS	81349	14700-15-4702	1
R15	RES, C, 1/4W, 5%, 47	RCR07G470JS	81349	14700-15-4709	1
R8, R9	RES, C, 1/2W, 5%, 1	RCR20G100JS	81349	14700-25-1008	2
CR1, CR2, CR3, CR4, CR5, CR6 CR7, CR9, CR10, CR11	DIODE, RECT, 400V	1N4004	80131	14806-01-4004	10
CR8	LED, RED, T-1-3/4	HLMP-3300	28480	14810-02-0012	1
Q7	TRANSISTOR	PN3568-18	27014	14901-04-9450	1
Q1, Q4	TRANSISTOR	TIP-32	01295	14902-00-0320	2
Q5, Q6	TRANSISTOR	TIP-35C	04713	14902-00-0350	2
Q2, Q3	TRANSISTOR	PN4275	27014	14902-04-2750	2
U4	VOLT REG, -5V	LM341P-5.0	27014	17000-03-4101	1
U5, U6	OP AMP, BIMOS, SS	CA3140E	02735	17000-31-4001	2
U3	IC, DIGITAL, TTL	SN74LS33N	01295	18000-74-3310	1
U2	DUAL J-K FF, SS	DM74LS76AN	27014	18000-74-7610	1
U1	DUAL MONOST MVTBR	DM74123N	27014	18007-41-2300	1
CTSYSTEMS PARTS LIST	TITLE INVERTER BD, 110B	ASSEMBLY NO. 11110-70-0011	REV. F	PAGE 6.54	

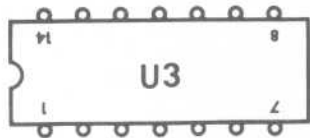


Q6
BCE

R23

Q4
BCE

R3



CR5

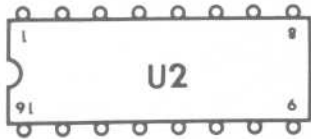
R5

Q3

R6

R9

CR6



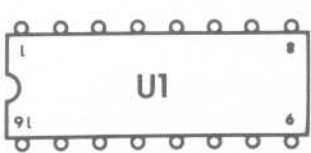
R16

+ C10

CR11

R1

C1



R21

Q7

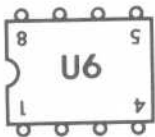
CR9

PCBA110B

R2



R17



R20

R18

CR10

R19

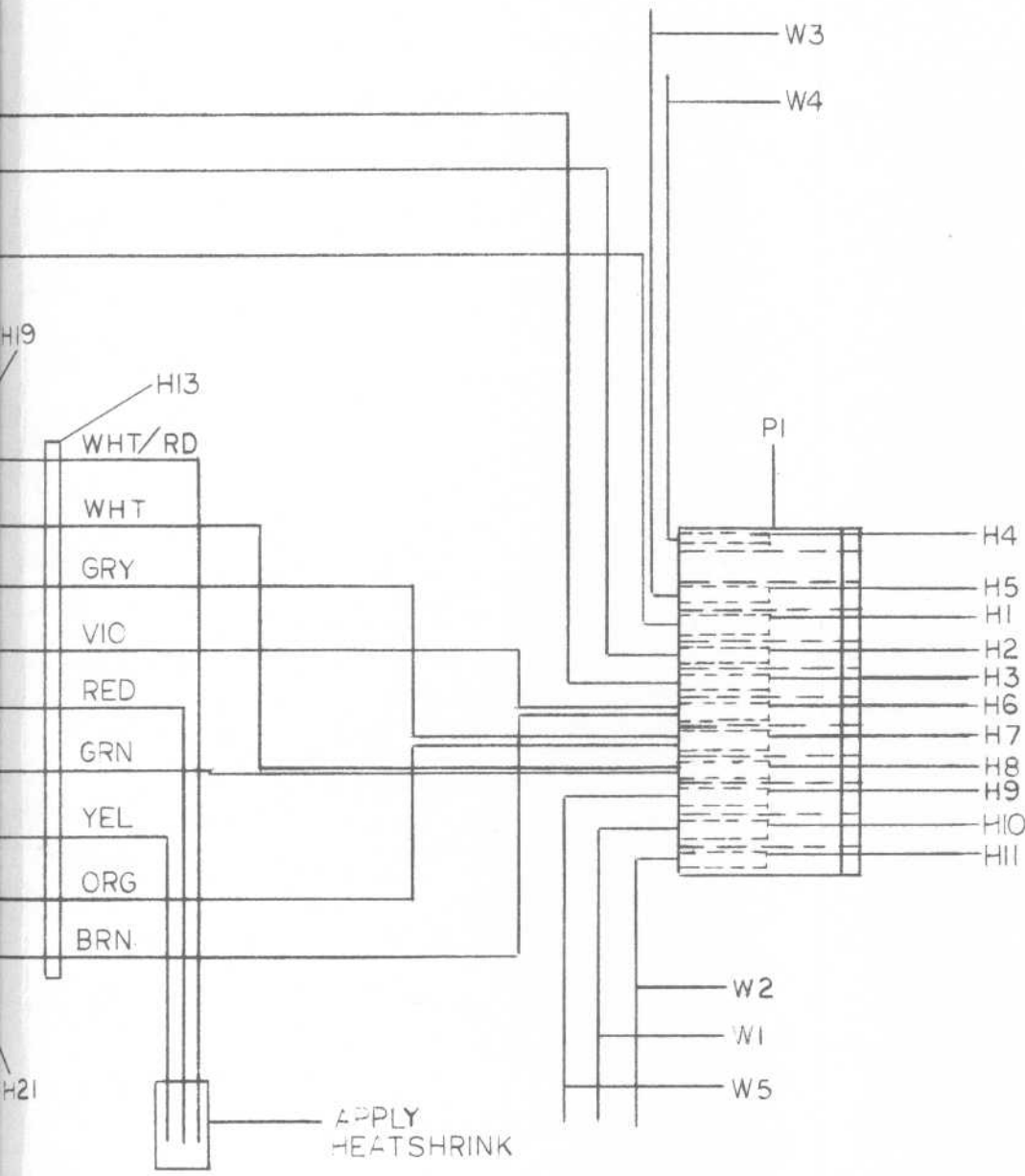
3000B INVERTER REV F

11110-70-0011

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
P1	CONNECTOR, MOLEX	09-50-7121	27264	12113-06-0025	1
H1, H2, H3	PIN, TRIFURCATED	08-50-0185	27264	12113-07-0004	3
H4, H5, H6, H7, H8, H9, H10, H11	PIN, TRIFURCATED	08-50-0187	27264	12113-07-0005	8
H12, H13	CABLE TIE, 3-1/2	SSTIM-M	06383	12810-00-0001	2
H14, H17, H15, H16	SPACER, HEX, 6-32X5/8	108325	73734	12810-02-6110	4
H18, H19, H20, H21	SCREW, RH, 6-32X1-1/2	16072	73734	12810-23-0068	4
H22, H23, H24, H25	LOCK WASHER #6, INT	1304ZP	73734	12810-24-6000	4
T1	TRANSFORMER	S141-106	50638	15610-00-0051	1
W1	WIRE, 24GA, GN FROM: 16012-12-4999	16012-12-4555		16012-12-4555	1
W2	WIRE, 18GA, BK FROM: 16012-31-8999	16012-31-8000		16012-31-8000	1
W3	WIRE, 18GA, RD FROM: 16012-31-8999	16012-31-8222		16012-31-8222	1
W4, W5	WIRE, 18GA, WHT	P3107-WHT	31924	16012-31-8999	2
CT SYSTEMS PARTS LIST		TITLE XFMR ASSY, INVERTER		ASSEMBLY NO. 11219-70-0019	
				REV. A	PAGE 6.55

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED

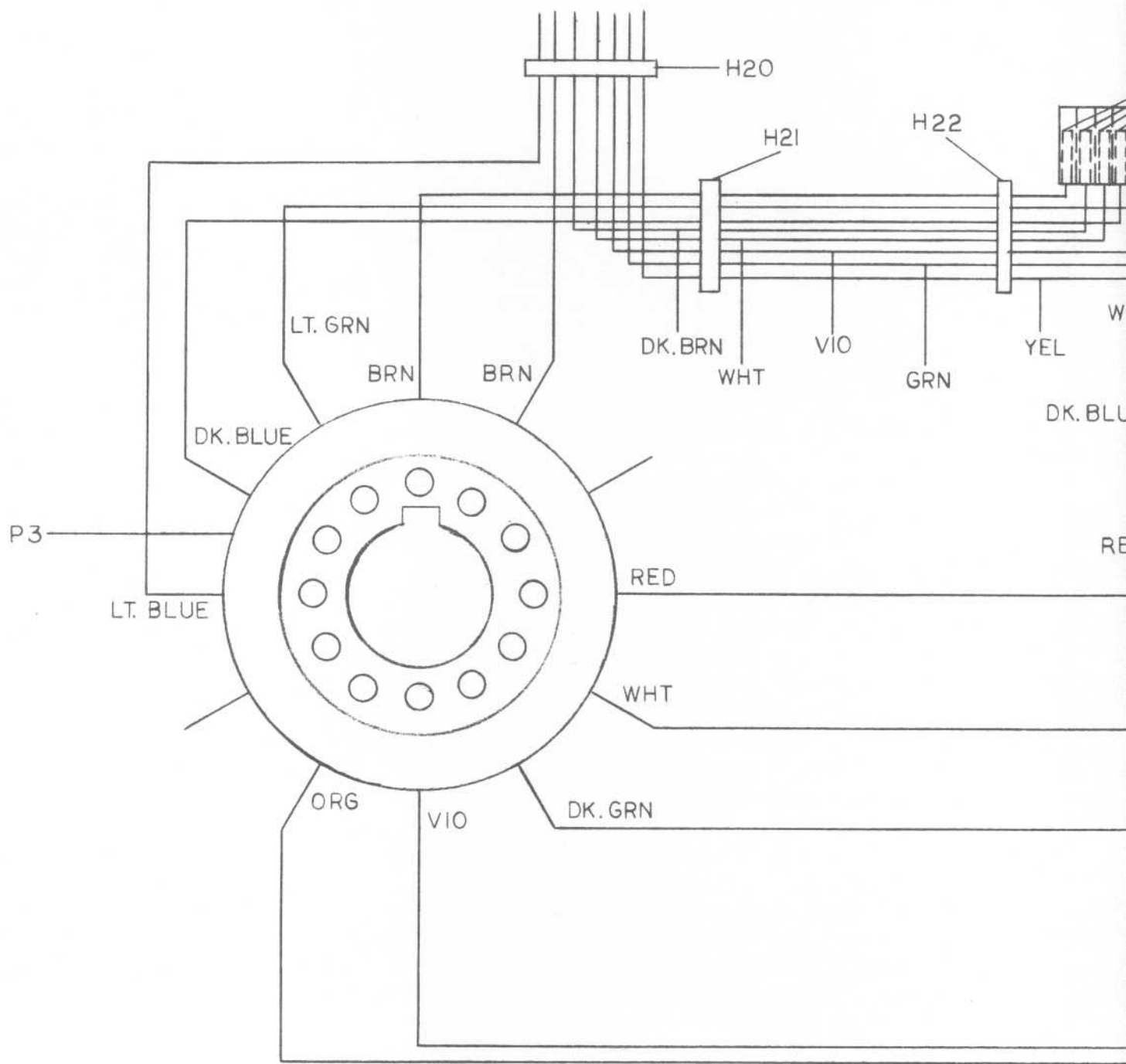


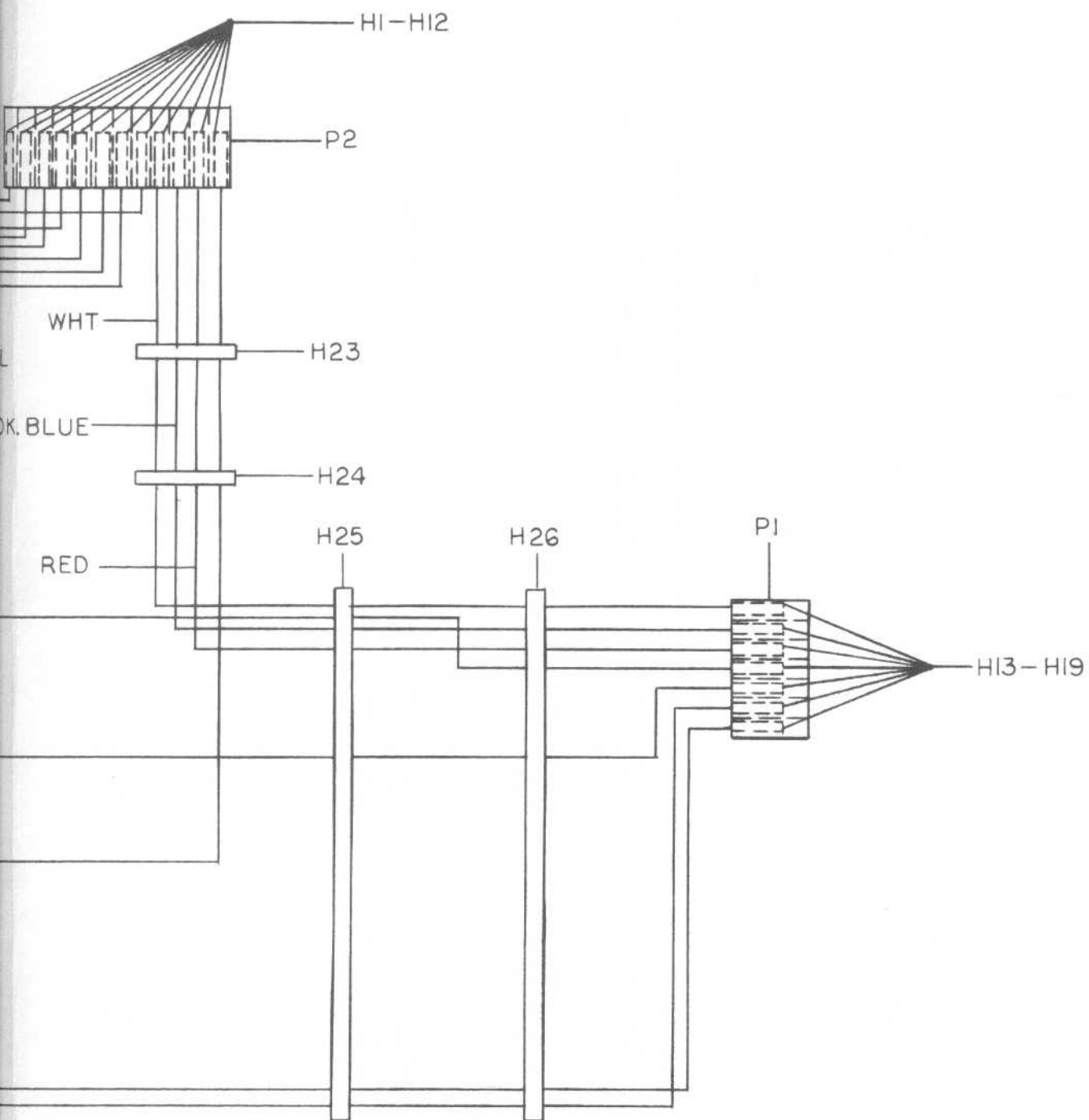
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± 1/64 .XX ± .01 ± 30' XXX ± .005	CONTRACT NO.	
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MATERIAL	DRAWN	JD CLUTINGER 10/24/86
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	RELEASED	
FINISH	THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO THE INFORMATION IN THIS DOCUMENT IS NOT TO BE USED OR DUPLICATED IN ANY MANNER WITHOUT THE PRIOR APPROVAL IN WRITING OF	
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CT SYSTEMS INC.	
XFMR ASSY, INVERTER	
SIZE	CODE IDENT NO.
B	4J835
DRAWING NO.	
11219 - 70 - 0019	
SCALE	SHEET 1 OF 1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± 1/64 .XX ± .01 ± 30' XXX ± .005	
CONTRACT NO.	
APPROVALS	DATE
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REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
P3	SOCKET, CRT	970710	72825	12112-00-0026	1
P1	CONN, MOLEX	09-50-7071	27264	12113-06-0023	1
P2	CONN, MOLEX	09-50-7121	27264	12113-06-0025	1
H1, H2, H3, H4, H5, H6, H7, H8 H9, H10, H11, H12, H13, H14, H15 H16, H17, H18, H19	PIN, TRIFURCATED	08-50-0187	27264	12113-07-0005	19
H20, H21, H22, H23, H24, H25 H26	CABLE TIE, 3-1/2	SSTIM-M	06383	12810-00-0001	7
CT SYSTEMS PARTS LIST	TITLE HARNESS, 3000B-A, CRT	ASSEMBLY NO. 11219-00-0176	REV. C	PAGE 6.56	





CRT HARNESS
11219-00-0176

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY	
H1	CORD, LACING, NY, BLK	21	GUDL	11610-07-0001	1	
W6	CABLE, RG174/U, 5000FT/SPLS	8216	70903	16011-40-0008	1	
W3	WIRE, 24GA, BK FROM: 16012-12-4999	16012-12-4000		16012-12-4000	1	
W2	WIRE, 24GA, YL FROM: 16012-12-4999	16012-12-4444		16012-12-4444	1	
W4	WIRE, 24GA, GN FROM: 16012-12-4999	16012-12-4555		16012-12-4555	1	
W5	WIRE, 24GA, VI FROM: 16012-12-4999	16012-12-4777		16012-12-4777	1	
W1	WIRE, PVC, 24GA, WH	MILW16878DB24WH	81349	16012-12-4999	1	
CT SYSTEMS PARTS LIST		TITLE HRNSS, 3000B-D, MIC		ASSEMBLY NO. 11219-70-0001	REV. P	PAGE 6.57

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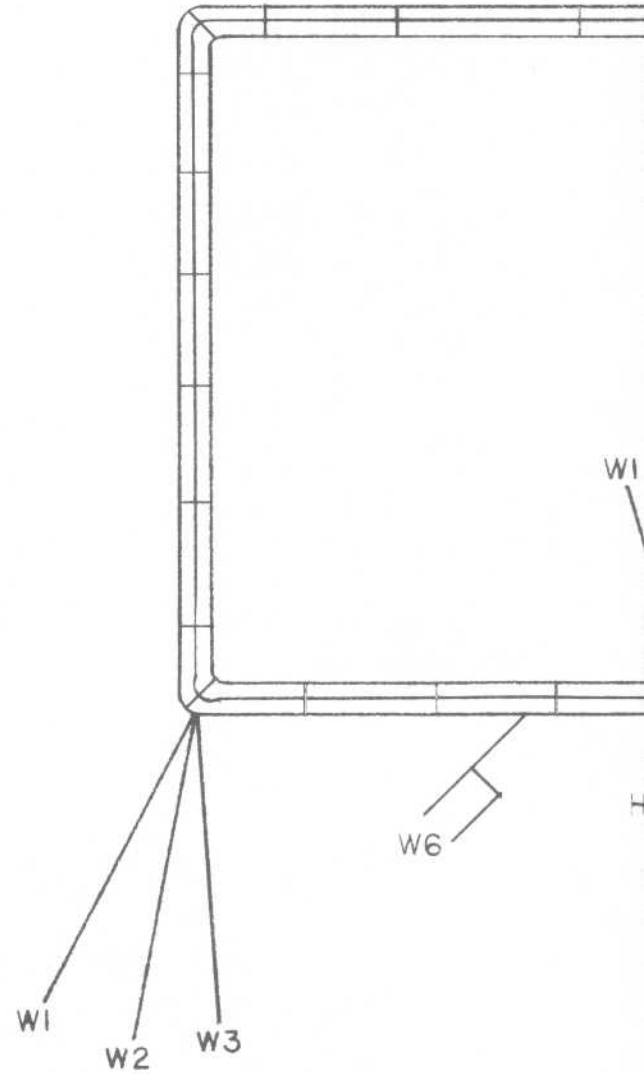
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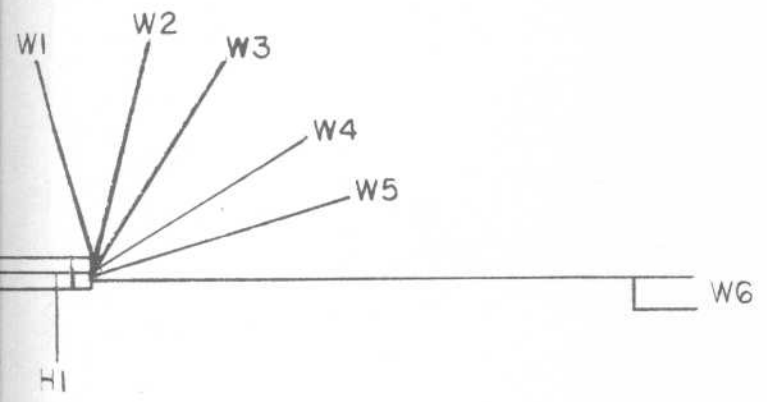
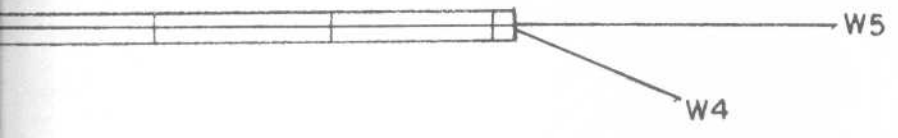


NEXT ASSY	USED ON
APPLICATION	

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REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



WIRE #	COLOR
1	WHITE
2	YELLOW
3	BLACK
4	GREEN
5	RED
6	COAX RG174

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
±1/64 .XX ±.01 ±30'
.XXX ±.005

MATERIAL

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CONTRACT NO. _____

APPROVALS	DATE
DRAWN D. NOELLER	10-26-86
CHECKED	
RELEASED	

CT SYSTEMS, INC.

MIC HARNESS

3000B

SIZE B	CODE IDENT NO. 4J835	DRAWING NO. 11219-70-0001
SCALE 1:1	SHEET 1 OF 1	

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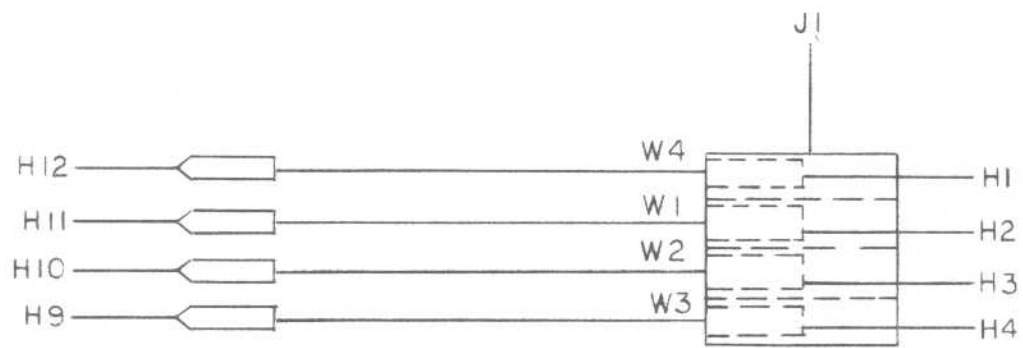
REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
H1, H2, H3, H4	TERM, FEMALE	02-09-1118	27264	12113-09-0003	4
H5, H6, H7, H8, H9, H10, H11, H12	TERM, MALE	02-09-2118	27264	12113-09-0004	8
P1	PLUG	19-09-2042	27264	12113-26-0001	1
J1	RECEPTACLE, 4 PIN	19-09-1042	27264	12113-26-0002	1
W1	WIRE, 18, BK FROM: 16012-31-8999	16012-31-8000		16012-31-8000	1
W2	WIRE, 18, BN FROM: 16012-31-8999	16012-31-8111		16012-31-8111	1
W3	WIRE, 18, BL FROM: 16012-31-8999	16012-31-8666		16012-31-8666	1
W4	WIRE, 18 GA, WHT	P3107-WHT	31924	16012-31-8999	1
CT SYSTEMS PARTS LIST	TITLE HRNSS, 3000B,F/P SWI	ASSEMBLY NO. 11219-70-0002	REV. C	PAGE 6.58	

D

C

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A



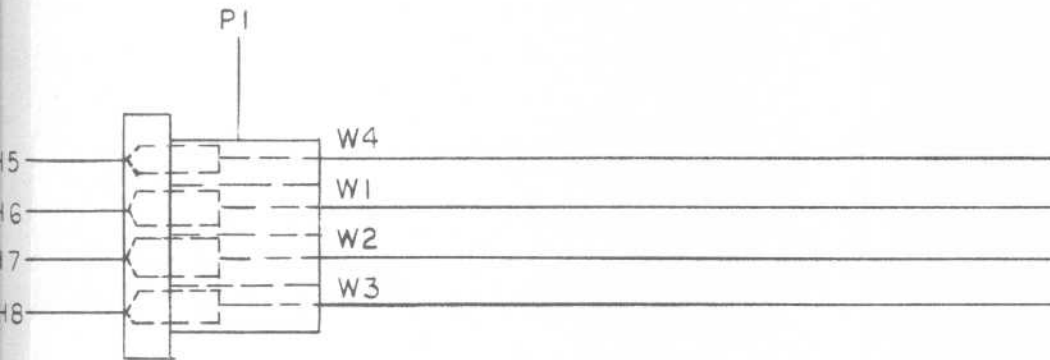
NEXT ASSY	USED ON
APPLICATION	

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REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED



UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
±1/64 .XX ±.01 ±30'
.XXX ±.005

CONTRACT NO.

APPROVALS	DATE
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DRAWN JD CLUTINGER	11/6/86
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MATERIAL

FINISH

CT SYSTEMS INC.

F/P SWITCH HARNESS

SIZE B	CODE IDENT NO. 4J835	DRAWING NO. 11219-70-0002
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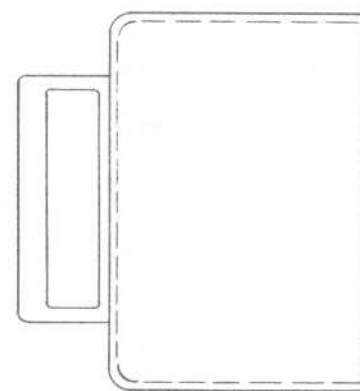
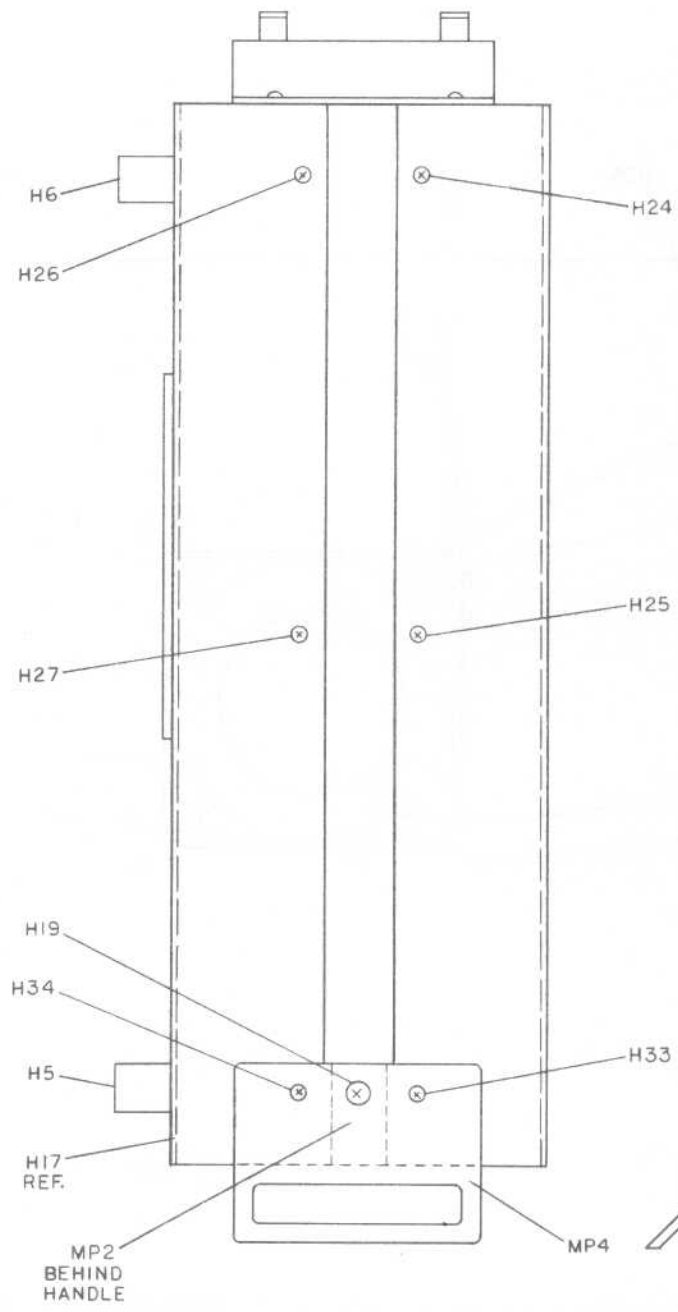
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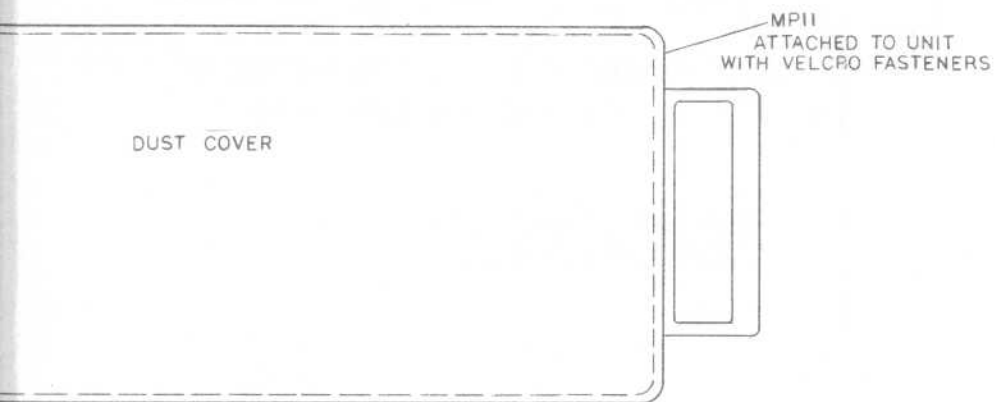
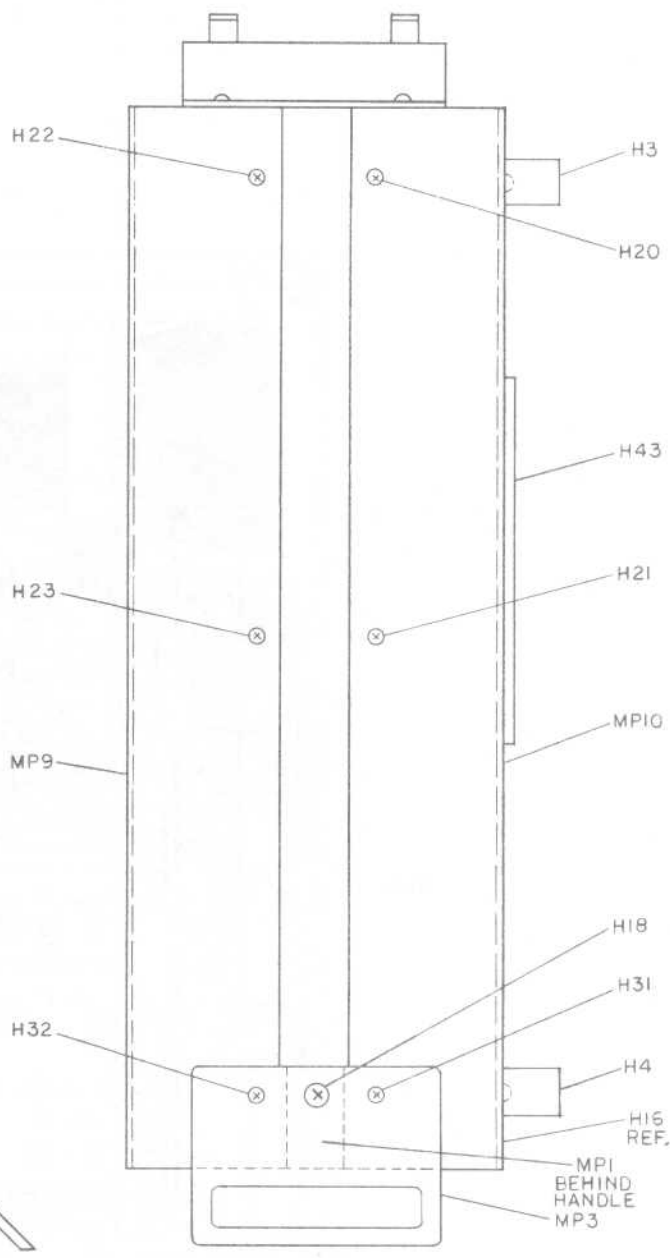
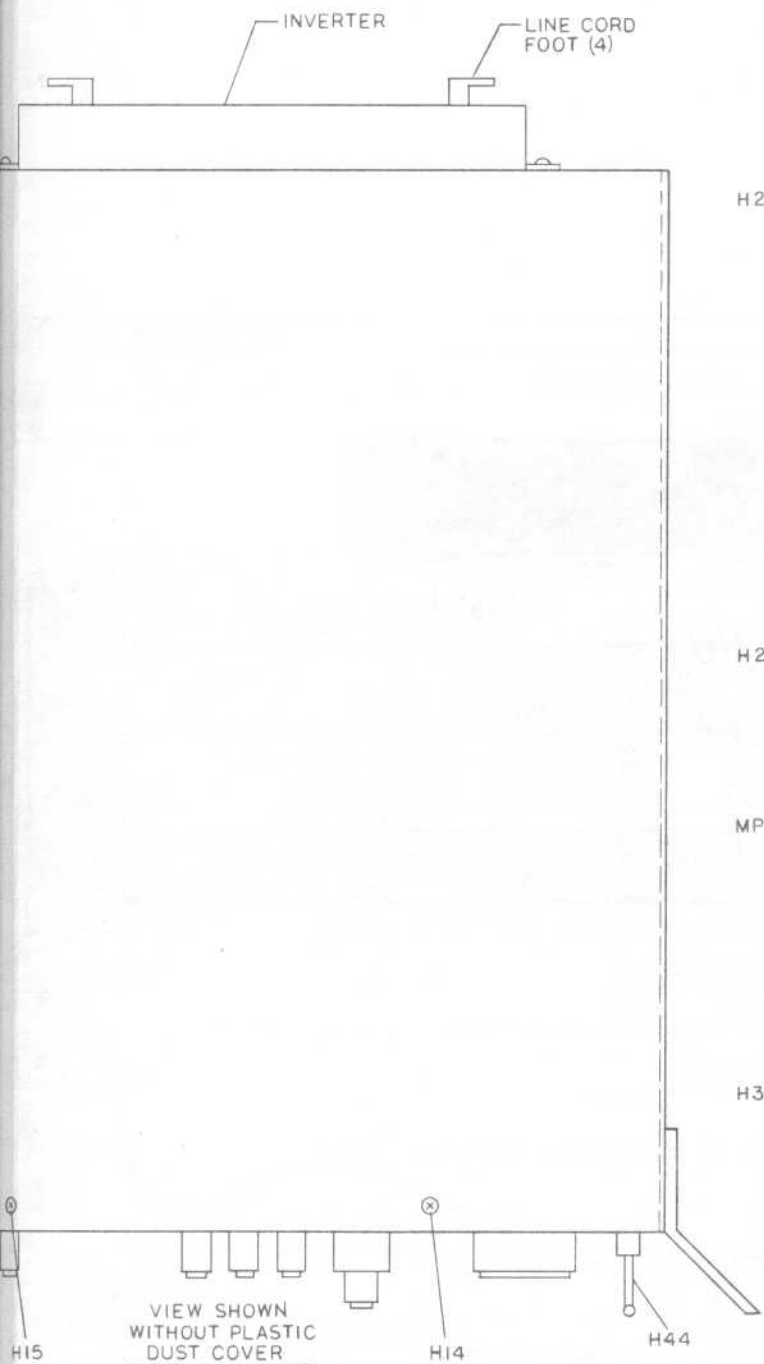
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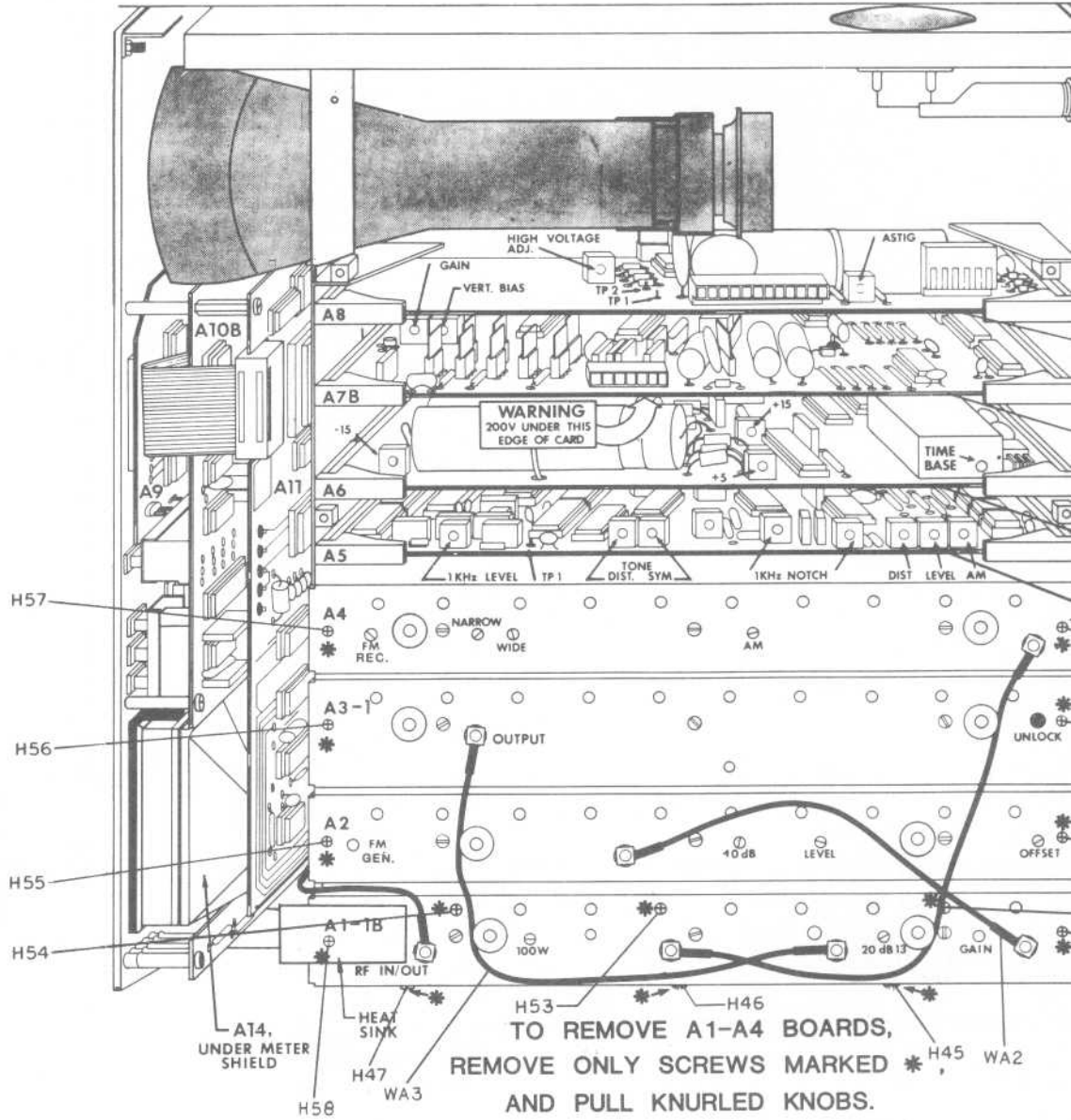
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REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGFR PART NO	MFGFR/FCSM	PART NUMBER	QTY
WA1, WA2, WA3	CABLE ASSY, 7 1/2IN	11217-80-0098	4J835	11217-80-0098	3
HH1	FAN ASSY	11219-70-0049	4J835	11219-70-0049	1
MP1, MP2	PLATE, HANDLE	11417-30-0320	4J835	11417-30-0320	2
MP12	GROMMET, FAN, 11 5/8 FROM: 13210-06-0048	11417-30-0350	4J835	11417-30-0350	1
MP3, MP4	HANDLE, CARRYING	11417-60-0560	4J835	11417-60-0560	2
MP5, MP6, MP7, MP8	FISHPAPER, PCB	11417-60-0580	4J835	11417-60-0580	4
MP9	COVER, TOP	11417-80-0370	4J835	11417-80-0370	1
MP10	COVER, BOTTOM	11417-80-0380	4J835	11417-80-0380	1
MP11	COVER, PLASTIC	11417-80-0520	4J835	11417-80-0520	1
H2	CABLE TIE, 3-1/2	SSTIM-M	06383	12810-00-0001	1
H3, H4, H5, H6	RUBBER FEET	2098W017	MRRUB	12810-08-0023	4
H7, H8, H9, H10	KEPSNUT, 10-32	9227	73734	12810-15-0008	4
H14, H15, H16, H17	SCW, PFH, 4-40X1/4	22222	73734	12810-23-0054	4
H45, H46, H47	SCW, P, 82F U CUT HD 4-40X1/4 S/S	12810-23-0083	4J835	12810-23-0083	3
H48, H49, H50, H51, H52, H53, H54, H55, H56, H57	SEMS, 4-40X1/4, PPH, INT	12810-23-0085	4J835	12810-23-0085	10
H18, H19	SCW, PPH, 1/4-20X3/8	19104NP	73734	12810-23-0109	2
H11, H28, H29, H30	SCW, PFH, 10-32X3/4 TYPE "23"	12810-23-0137	4J835	12810-23-0137	4
H20, H21, H22, H23, H24, H25, H26, H27	SCW, PFH, 6-32X1/4	18242NP	73734	12810-52-6104	8
H31, H32, H33, H34	SCW, PFH, 6-32X1/2	18246NP	73734	12810-52-6108	4
H35, H36, H37, H38	SCW, PPH, 10-32X3/4	19088NP	73734	12810-55-0112	4
H39, H40, H41, H42	SCW, PPH, 6-32X3/8, BK	19044BKOXIDE	73734	12810-65-6106	4
H58	SCW, PFH, 4-40X5/8, S/S	22227	73734	12810-70-4210	1
H43	FAN FILTER	TA450P/N31109	TORIN	13010-13-0007	1
H44	ANTENNA, N/WIRE	TH1SA	CNTRN	13010-16-0015	1

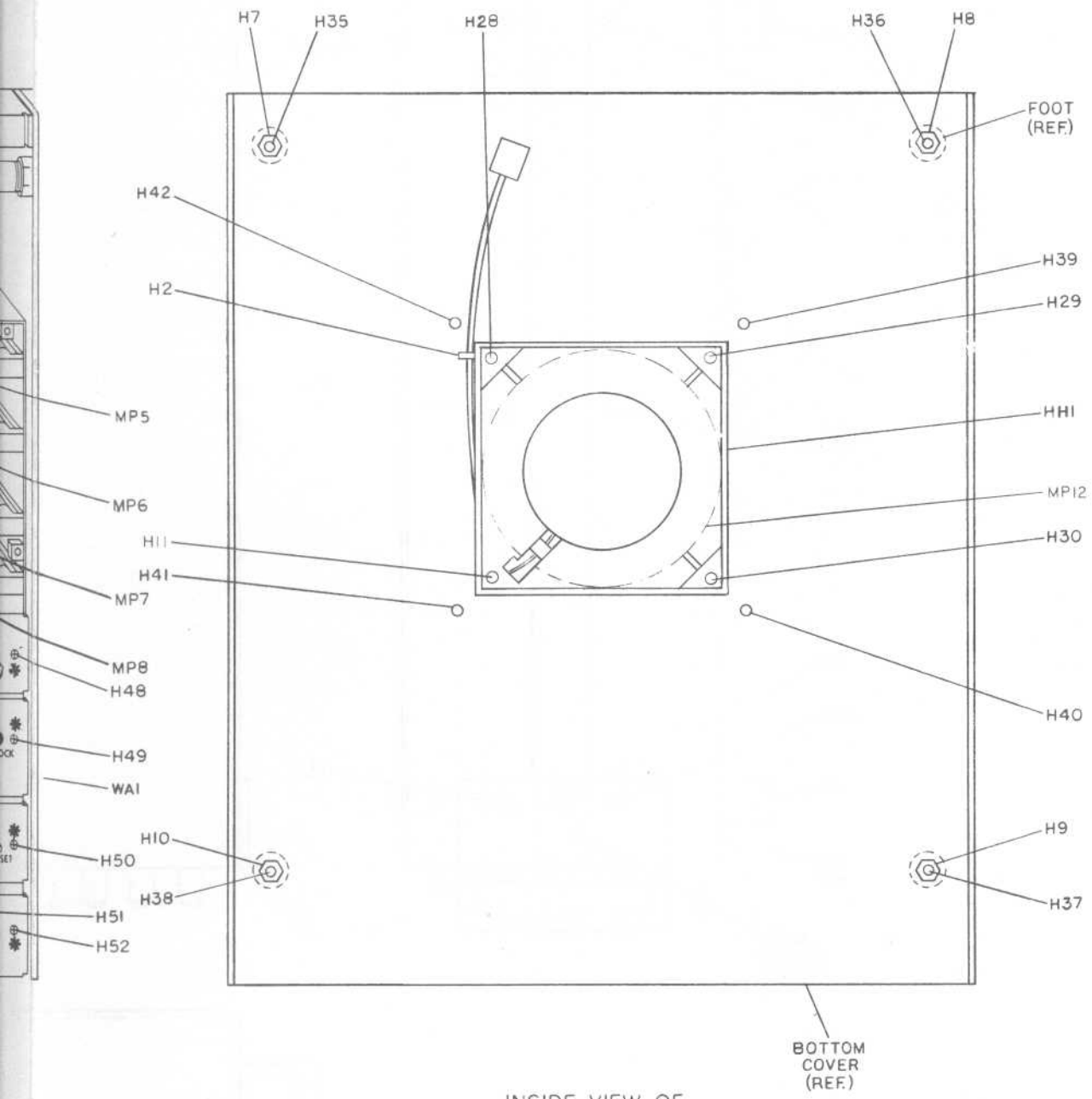




CABINET ASSY.
 11111-70-0003
 SHT. 1 OF 2



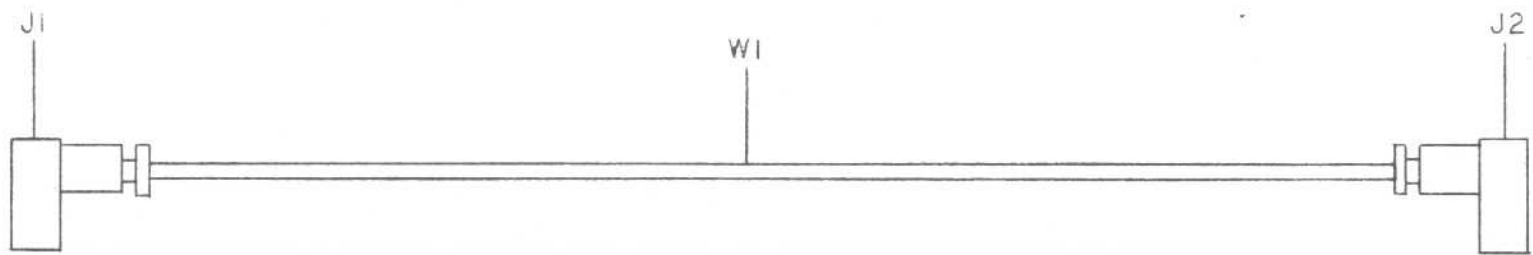
TOP VIEW OF UNIT WITH
 COVERS REMOVED



INSIDE VIEW OF
BOTTOM COVER

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY
J1, J2	CONN, JACK, SMB	2005-1541-010	19505	12110-08-1006	2
W1	CABLE, CONF COAX (1000FT/SPLS)	16011-40-0064	4J835	16011-40-0064	1

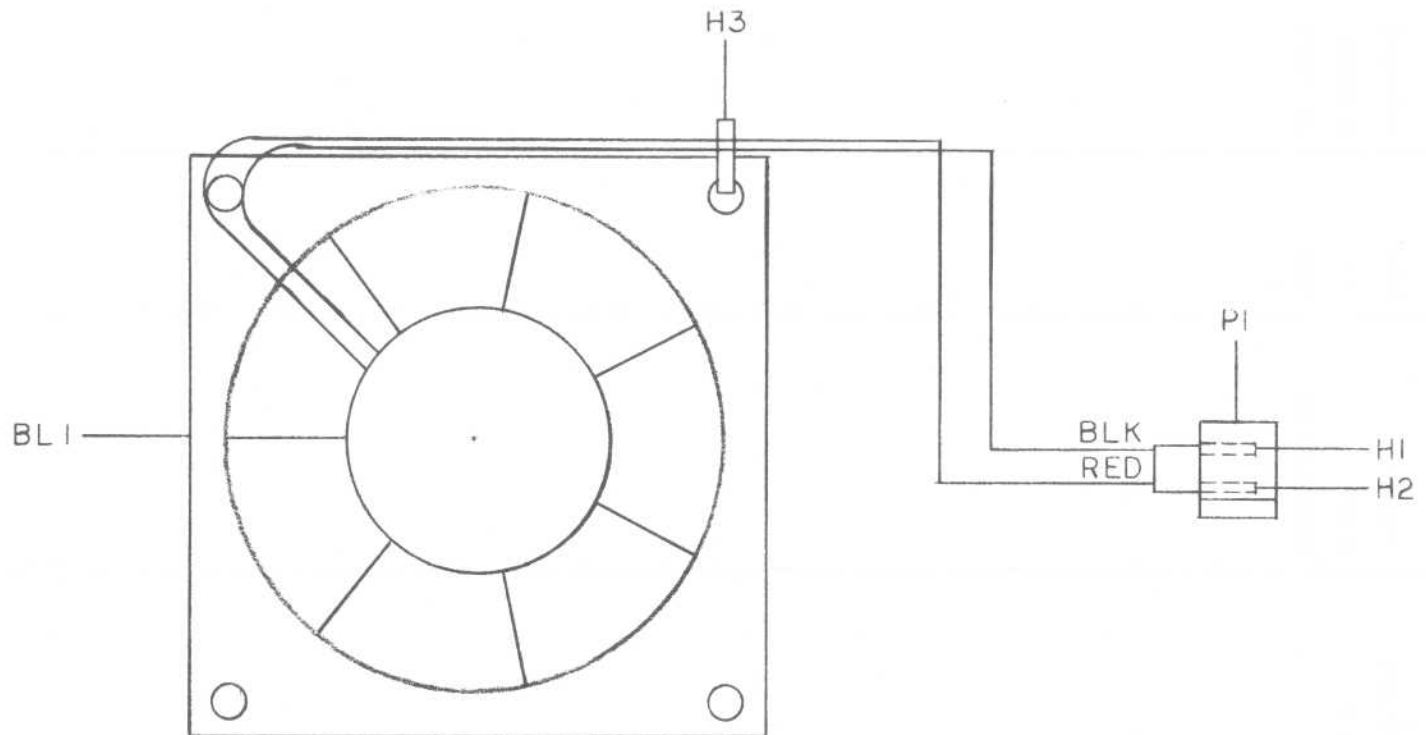
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		CT SYSTEMS INC.	
FRACTIONS DECIMALS ANGLES		APPROVALS	DATE		
±1/64	.XX ±.01	DRAWN J.D. CLUTINGER	10/28/86	CABLE, ASSY 7.5 IN	
	±30'				
MATERIAL		RELEASED		SIZE	
FINISH		THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO THE INFORMATION IN THIS DOCUMENT IS NOT TO BE USED OR DUPLICATED IN ANY MANNER WITHOUT THE PRIOR APPROVAL IN WRITING OF		CODE IDENT NO.	
NEXT ASSY	USED ON	A		4J835	
APPLICATION		DO NOT SCALE DRAWING		DRAWING NO.	
				11217-80-0098	
				SCALE	
				SHEET OF	

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG MFGR PART NO	MFGR/FCSM	PART NUMBER	QTY	
H1, H2	PLUG	03-06-2011	27264	12113-05-0003	2	
P1	CONNECTOR MOLEX	03-06-2023	27264	12113-04-0009	1	
H3	CABLE TIE, 3-1/2	SSTIM-M	06383	12810-00-0001	1	
BL1	FAN, 12VDC	D36-B10A-04W3-000	84411	13010-13-0016	1	
CT SYSTEMS PARTS LIST		TITLE FAN ASSY		ASSEMBLY NO. 11219-70-0049	REV. A	PAGE 6.61

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



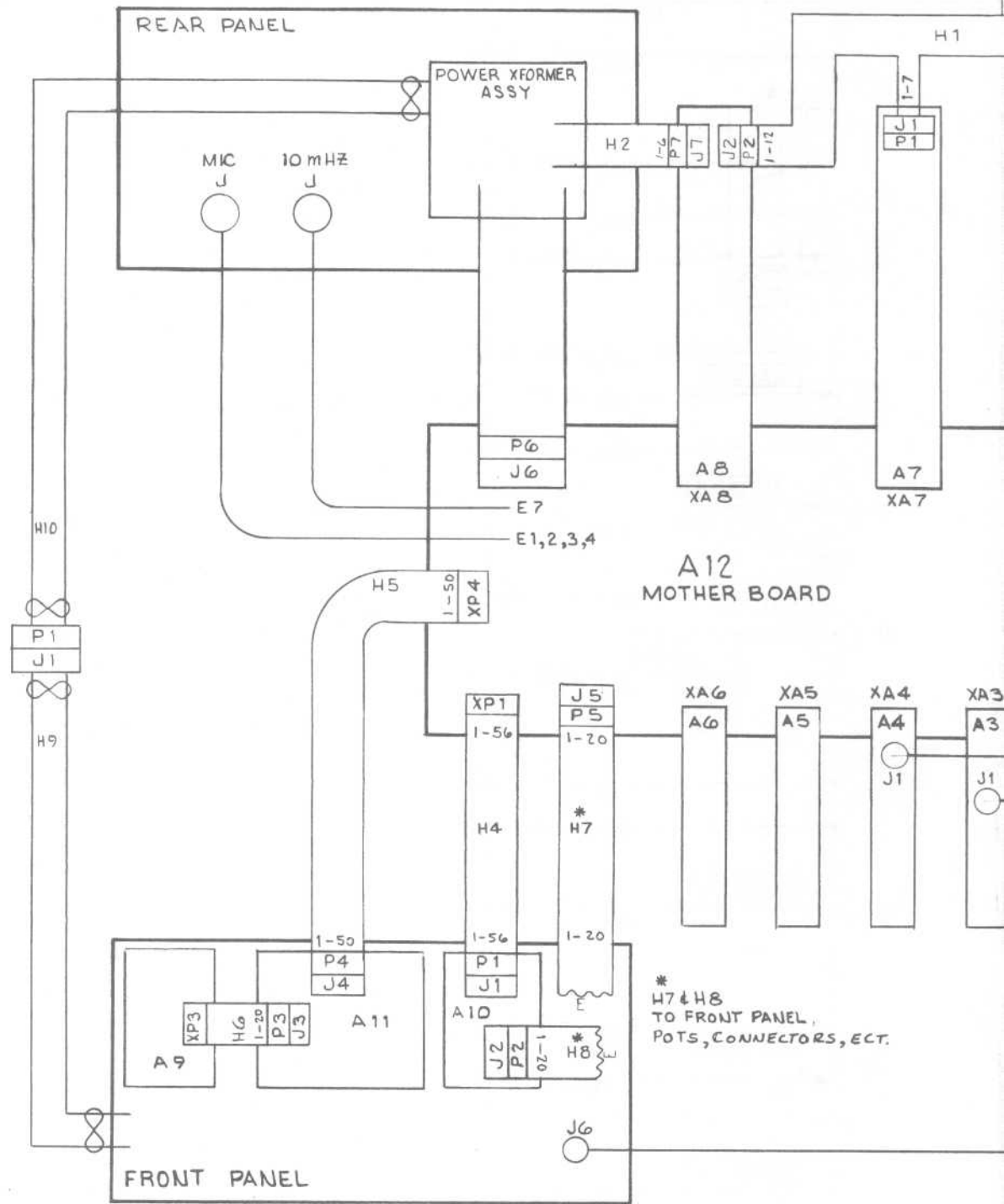
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ±1/64 .XX ±.01 ±30' .XXX ±.005		CONTRACT NO.		CT SYSTEMS INC.		
MATERIAL		APPROVALS	DATE			
FINISH		DRAWN J.D. CLUTINGER	10-28-86	FAN ASSY.		
NEXT ASSY		CHECKED				
USED ON		RELEASED		SIZE A	CODE IDENT NO. 4J835	DRAWING NO. 11219-70-0049
APPLICATION		DO NOT SCALE DRAWING		SCALE	SHEET	OF
		"THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO THE INFORMATION IN THIS DOCUMENT IS NOT TO BE USED OR DUPLICATED IN ANY MANNER WITHOUT THE PRIOR APPROVAL IN WRITING OF				

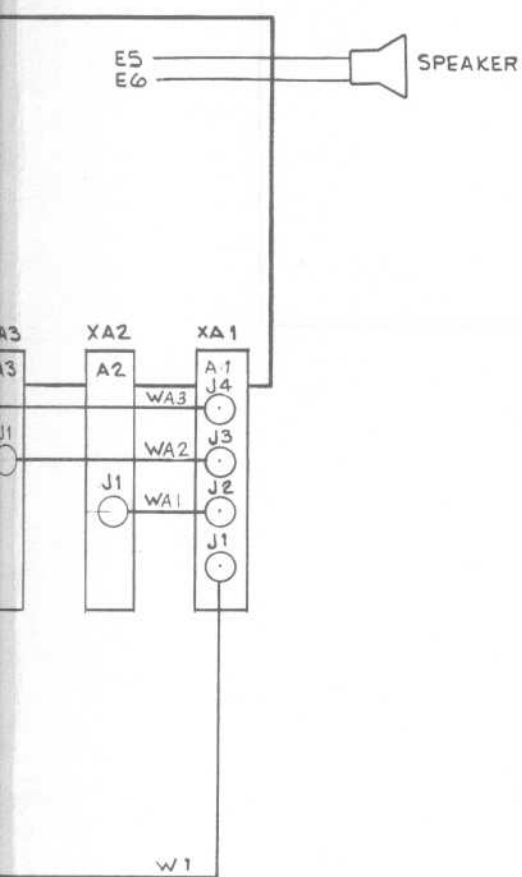
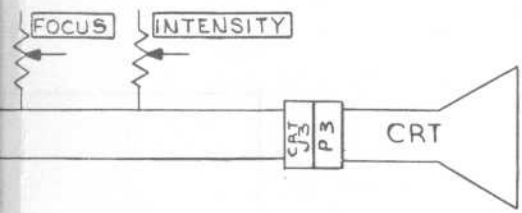
Section 7

SCHEMATICS

The schematics appear in the following order:

- Cable Diagram
- Front Panel Wiring
- Rear Panel Wiring
- CRT Interconnect Wiring
- A1-1B Mixer Bd
- A2 Low Frequency PLL
- A3-1 High Freq Synth Bd
- A4 IF Amplifier Bd
- A5 Audio Bd
- A6 Low Voltage PS Bd
- A7B Deflection Bd
- A8 High Voltage PS Bd
- A9 Display Bd
- A10B Front Panel Bd
- A11 Freq Control Bd (1 of 2)
- A11 Freq Control Bd (2 of 2)
- A12B Mother Bd
- A15 3.6 MHz PLL Bd
- Inverter

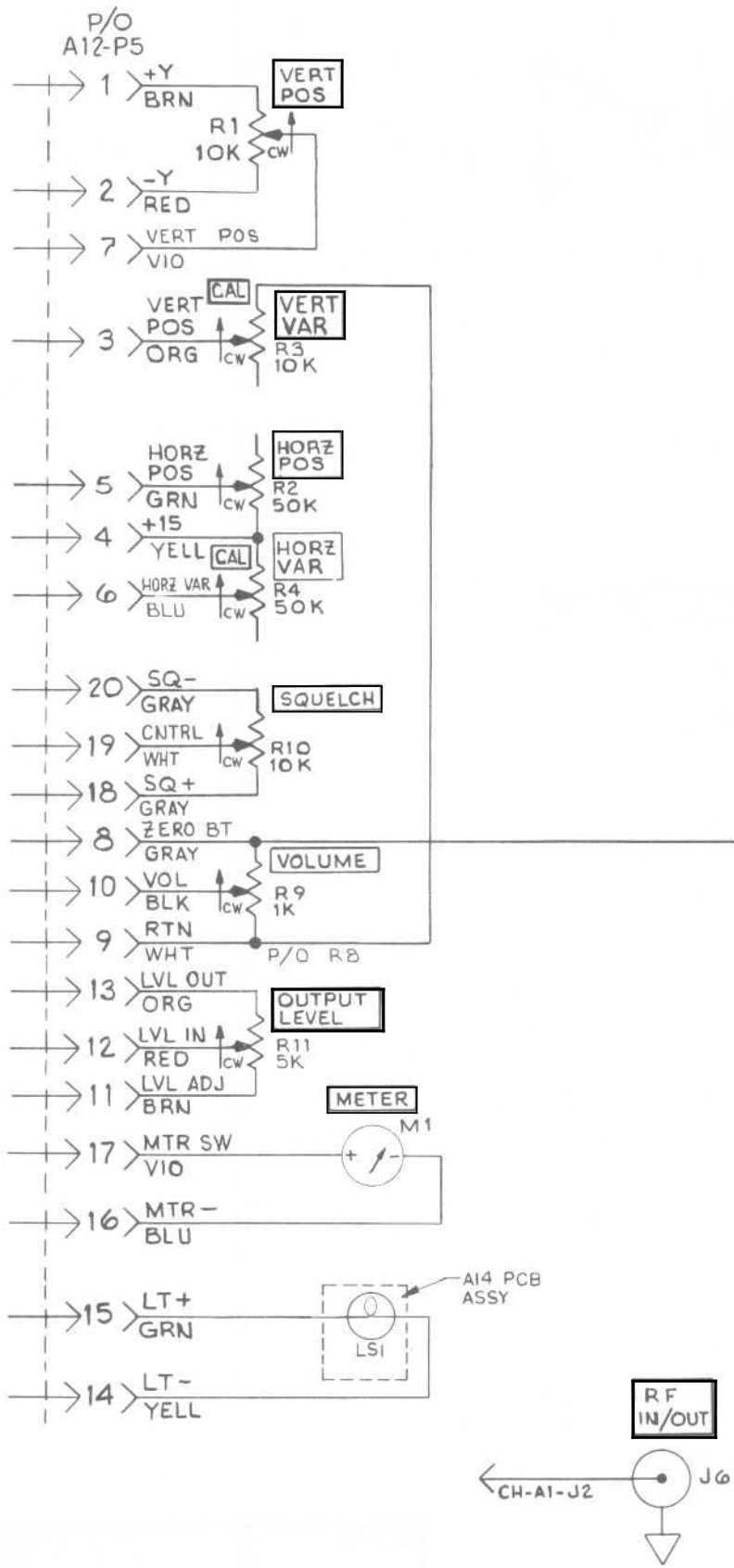




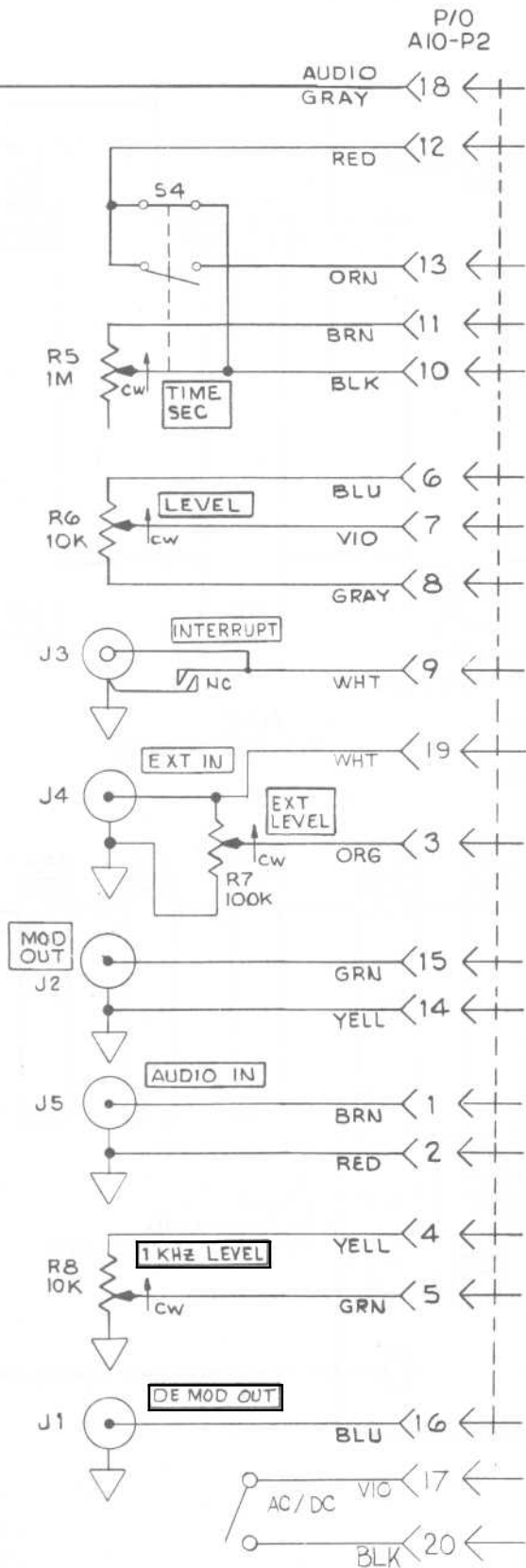
TOLERANCE:
 DECIMAL DIM. $\pm .005$
 FRACTIONAL DIM. $\pm 1/64$
 ANGLES $\pm 30'$
 UNLESS OTHERWISE SPECIFIED

NO.	DESCRIPTION	BY
	REVISION	

MATERIAL:	CT SYSTEMS INC.		
	3000B CABLE DIAGRAM		
FINISH:	DRAWN BY LTS	SCALE 1/1	DATE 1-17-82
	CHK'D R.W.	DATE 1-31-82	DRAWING NO. 10714-25-0001
ARTWORK #:	RELEASED BY	DATE	



P/O
A10-P2

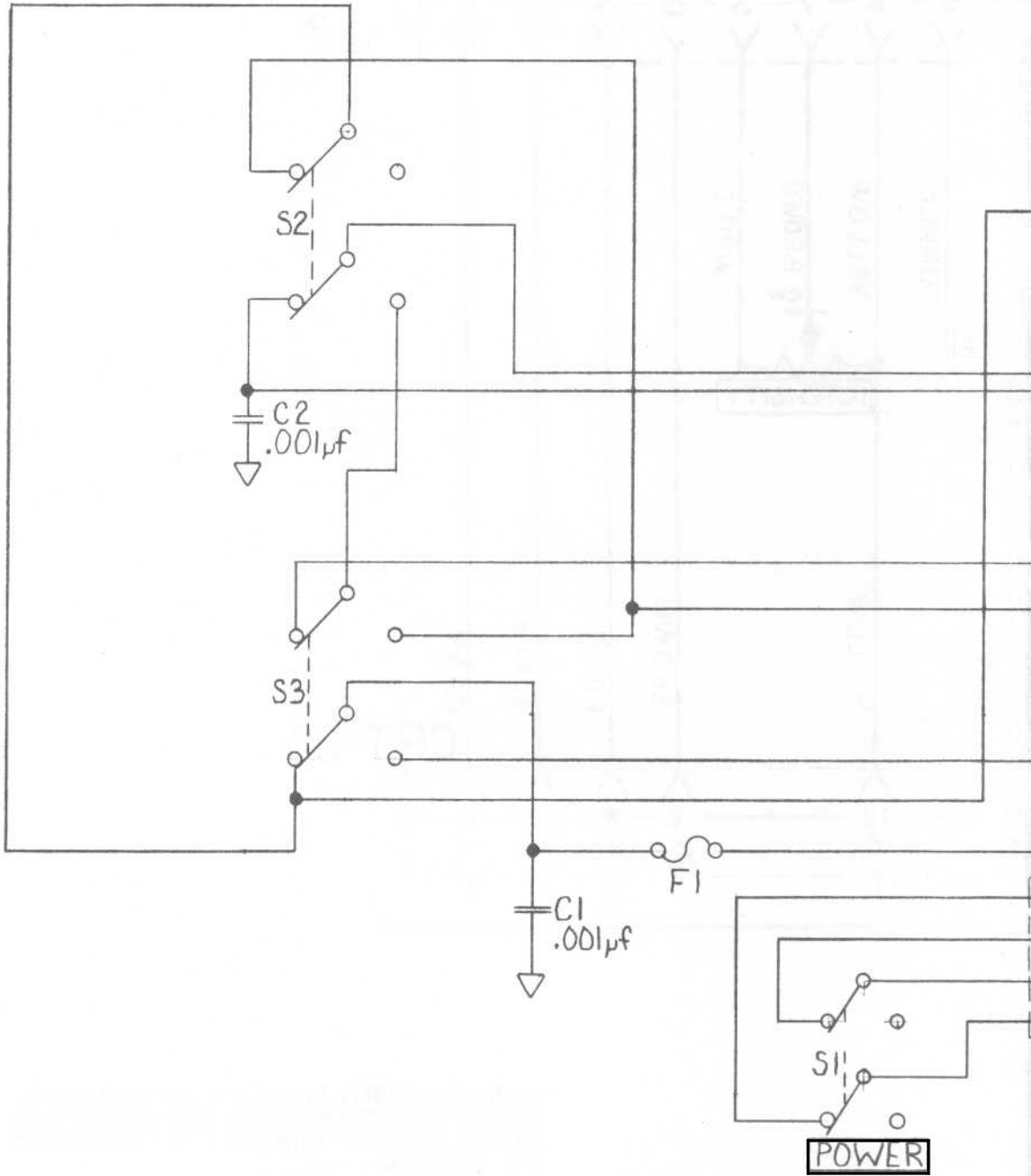


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TOLERANCE:
DECIMAL DIM. ± .005
FRACTIONAL DIM. ± 1/64
ANGLES ± 30'
UNLESS OTHERWISE SPECIFIED

4	REVISED	11-7-86	JDC
3	DCN F-1002	2-29-84	WP
2	ECN	12-7-82	DH
1	RELEASED	10-26-82	DH
NO.	DESCRIPTION	BY	
REVISION			

MATERIAL:			
FRONT PANEL WIRING			
FINISH:	DRAWN BY LTS	SCALE ~	DATE 1-8-82
ARTWORK #	CHK'D R.W.	DATE 1-31-82	DRAWING NO 10714-25-0003
	RELEASED BY	DATE	



NEXT ASSY	USED ON
APPLICATION	

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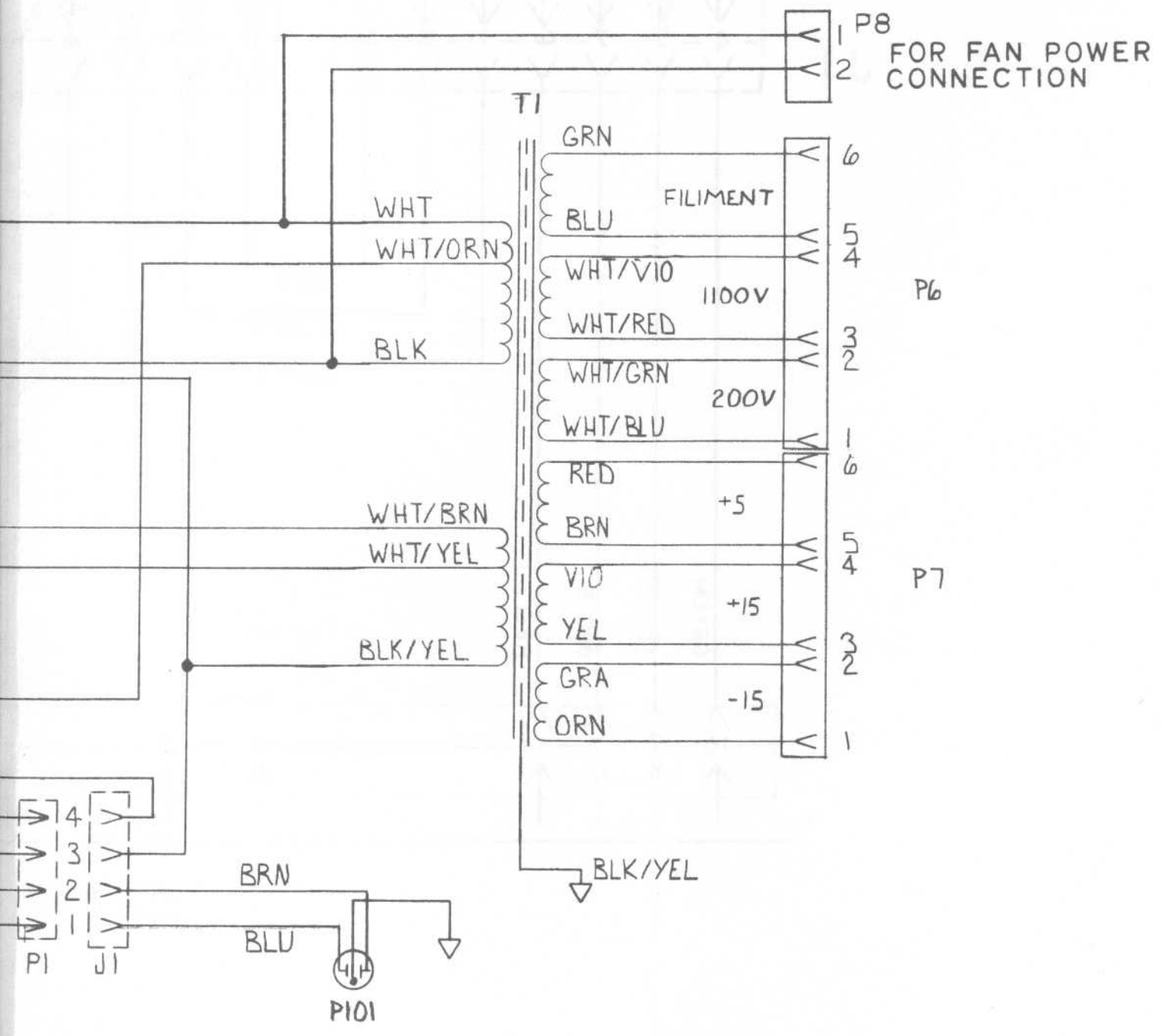
D

C

B

A

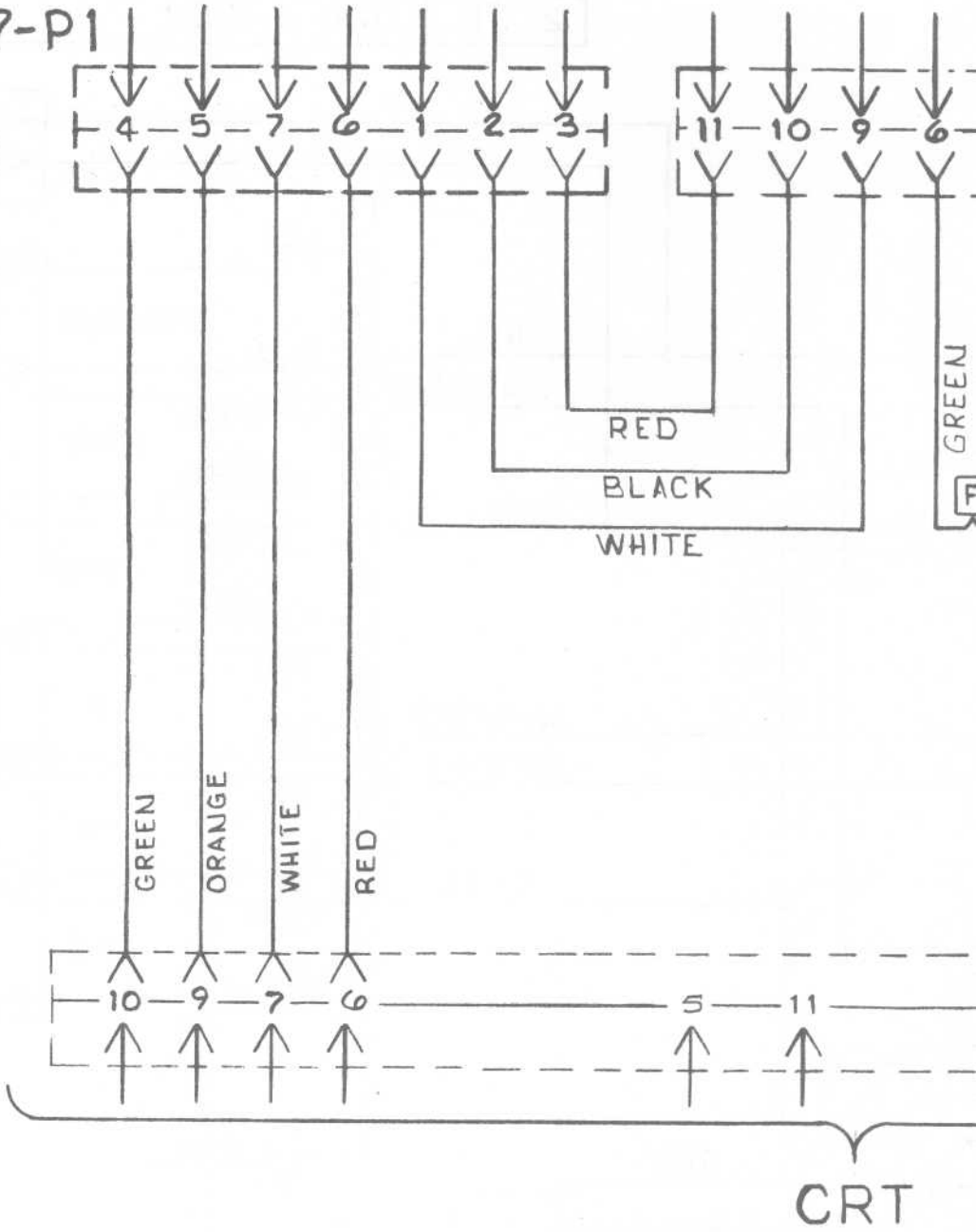
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
2	D	DCN F-1002	2-29-84	W, P,



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES $\pm \frac{XX}{XXX} \pm \pm$ $\pm .XXX \pm \pm$	CONTRACT NO.		CT SYSTEMS, INC.	
	APPROVALS	DATE		
MATERIAL	DRAWN Dale HedgsPeth	10/82	REAR PANEL SCHEMATIC	
FINISH	CHECKED		3000B	
DO NOT SCALE DRAWING	SIZE B	CODE IDENT NO. 4J835	DRAWING NO. 10714-15-0004	
	SCALE		SHEET / OF /	

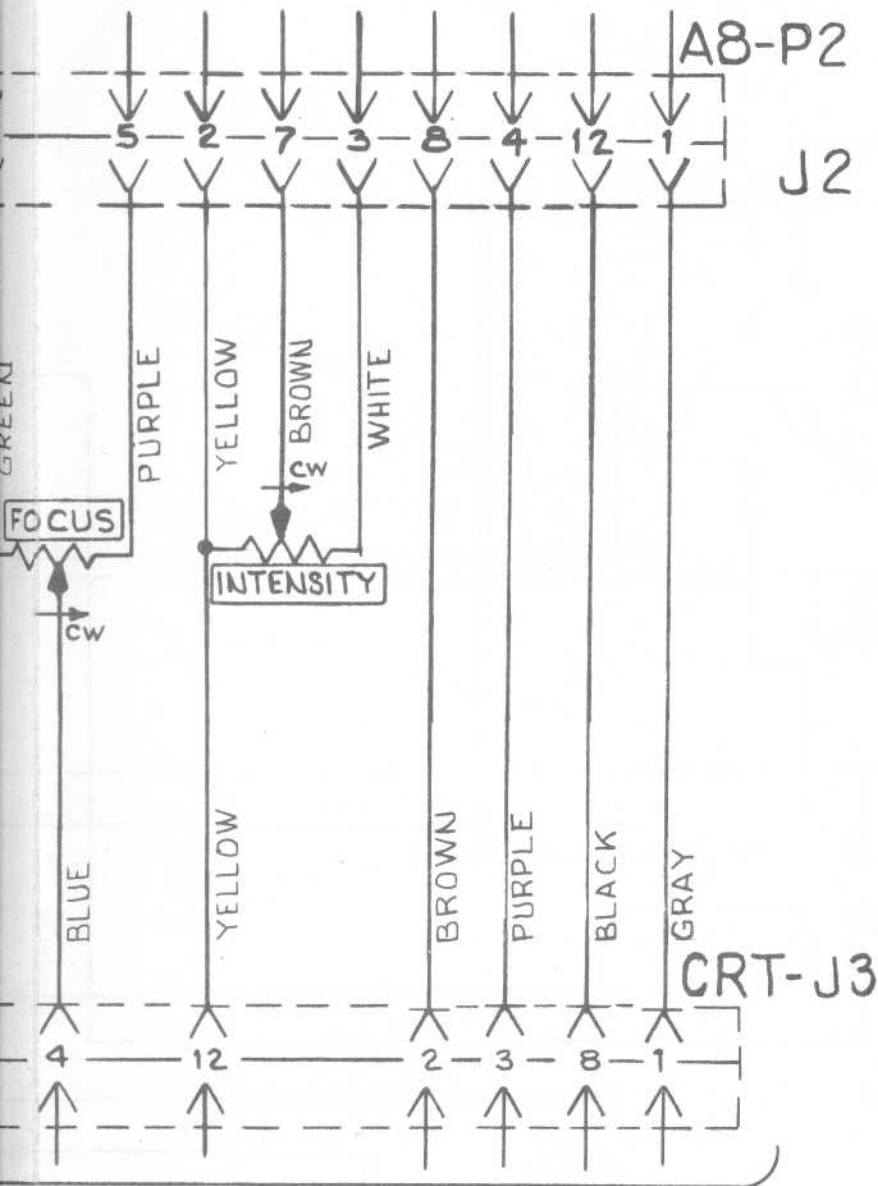
A7-P1

J1



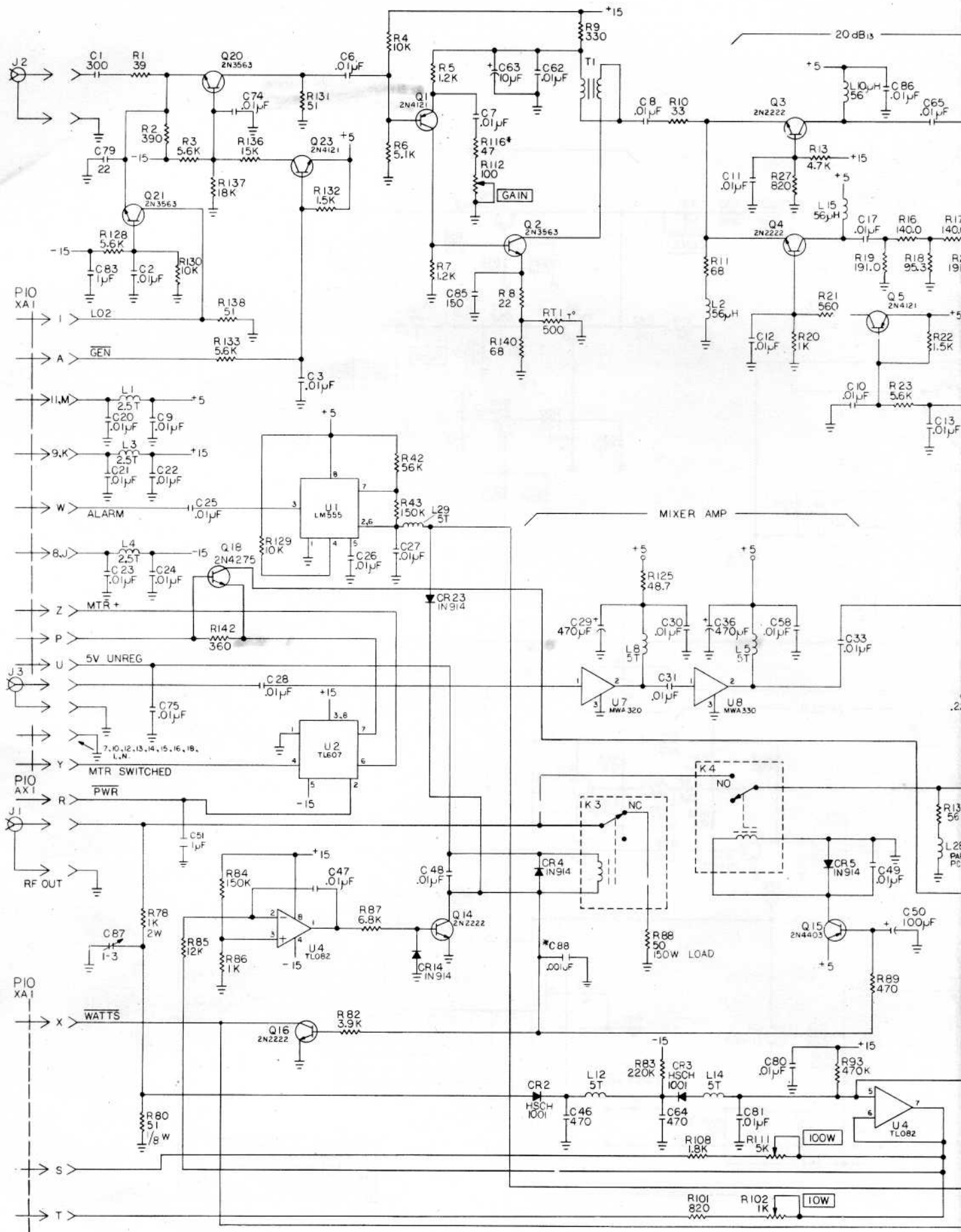
TOLERANCE:
DECIMAL DIM. $\pm .005$
FRACTIONAL DIM. $\pm 1/64$
ANGLES $\pm 30'$
UNLESS OTHERWISE
SPECIFIED

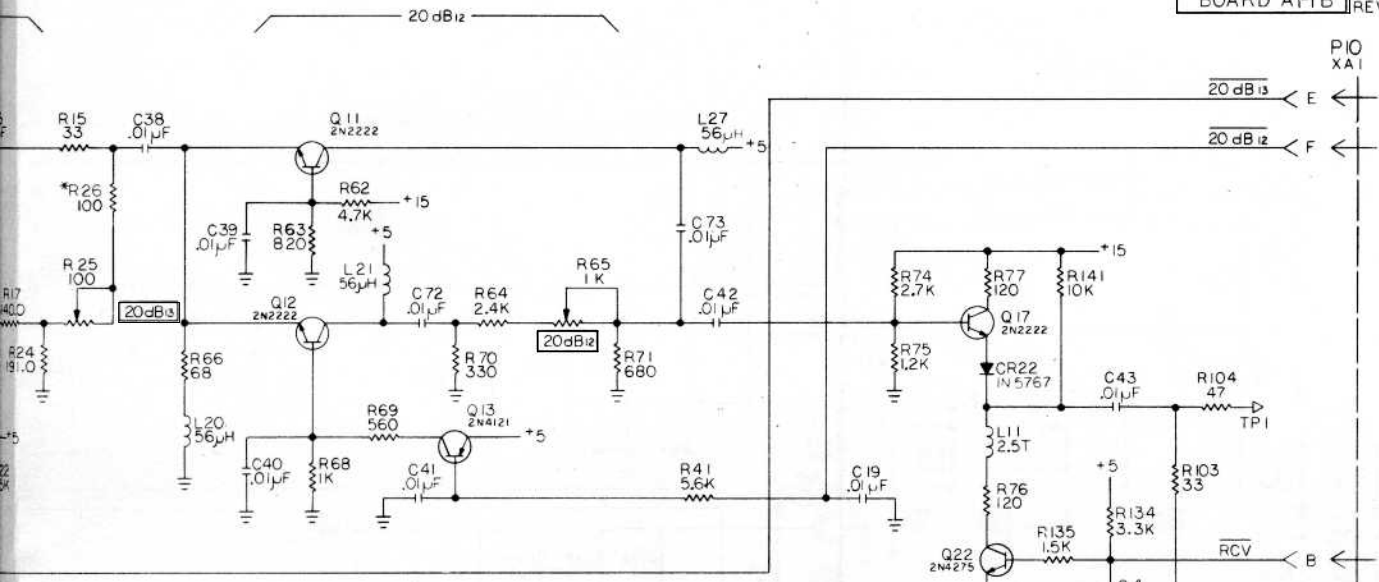
NO.



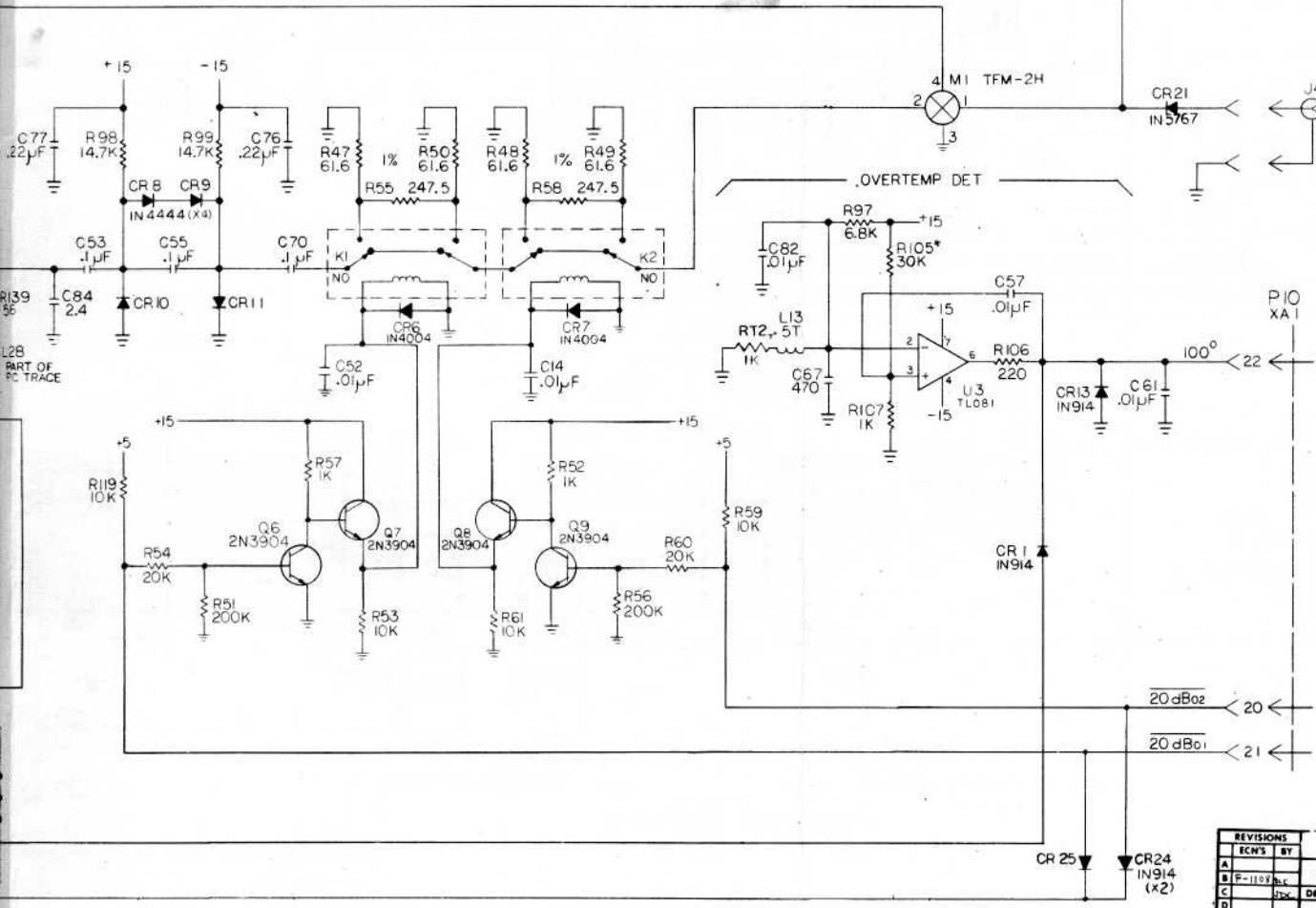
THIS DOCUMENT CONTAINS INFORMATION PROPRIETARY TO CT SYSM
 THE INFORMATION IN THIS DOCUMENT IS NOT TO BE USED OR DUPLICATED
 IN ANY MANNER WITHOUT THE PRIOR APPROVAL IN WRITING OF
 CT SYSTEMS, INC.

MATERIAL:		CT SYSTEMS, INC.		
CODE IDENT NO. 4J835				
FINISH:		CRT INTERCONNECT WIRING-H1 3000B		
DESCRIPTION	BY	DRAWN BY LTS	SCALE ~	DATE 1-12-82
		CHK'D R.W	DATE 1-31-82	DRAWING NO.
		RELEASED BY	DATE	10714-15-0002
REVISION		ARTWORK #		





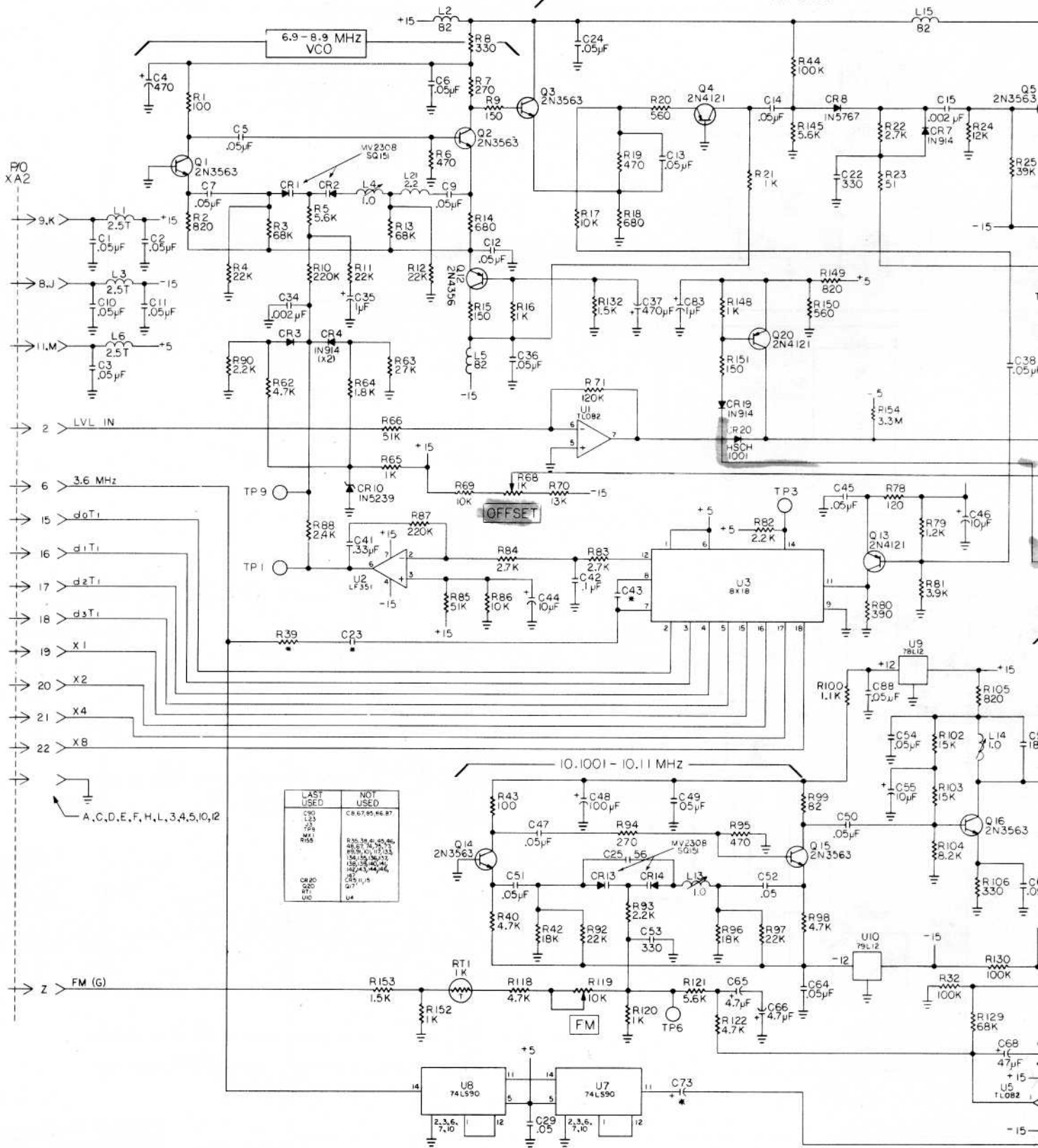
LAST USED	NOT USED
L29	L6, 7, 9, 16, 17, 18, 19, 22, 23, 24, 25, 26
T1 CR8	C8, 15, 16, 18, 32, 34, 35, 37, 44, 45, 54, 56, 59, 60, 66, 68, 69, 71, 76, 84
J4 MX1 K4 R142	R12, 14, 25, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 44, 45, 46, 67, 72, 73, 81, 90, 92, 94, 95, 96, 100, 109, 110, 113, 114, 115, 117, 118, 120, 121, 122, 123, 124, 126, 127, 79, 91
CR25 Q23 RT2 U8	CR2, 5, 6, 17, 18, 19, 20 Q10, 19 U5, 6



REVISIONS		CT SYSTEMS INC.		
REV	BY	DATE	NUMBER	
A	ICWS			
B	P-1102			
C	JJK			
D				
E	APP'D			

SCH MIXER BO A1-B
10714-40-0000

AM CKTS



P0
XA2

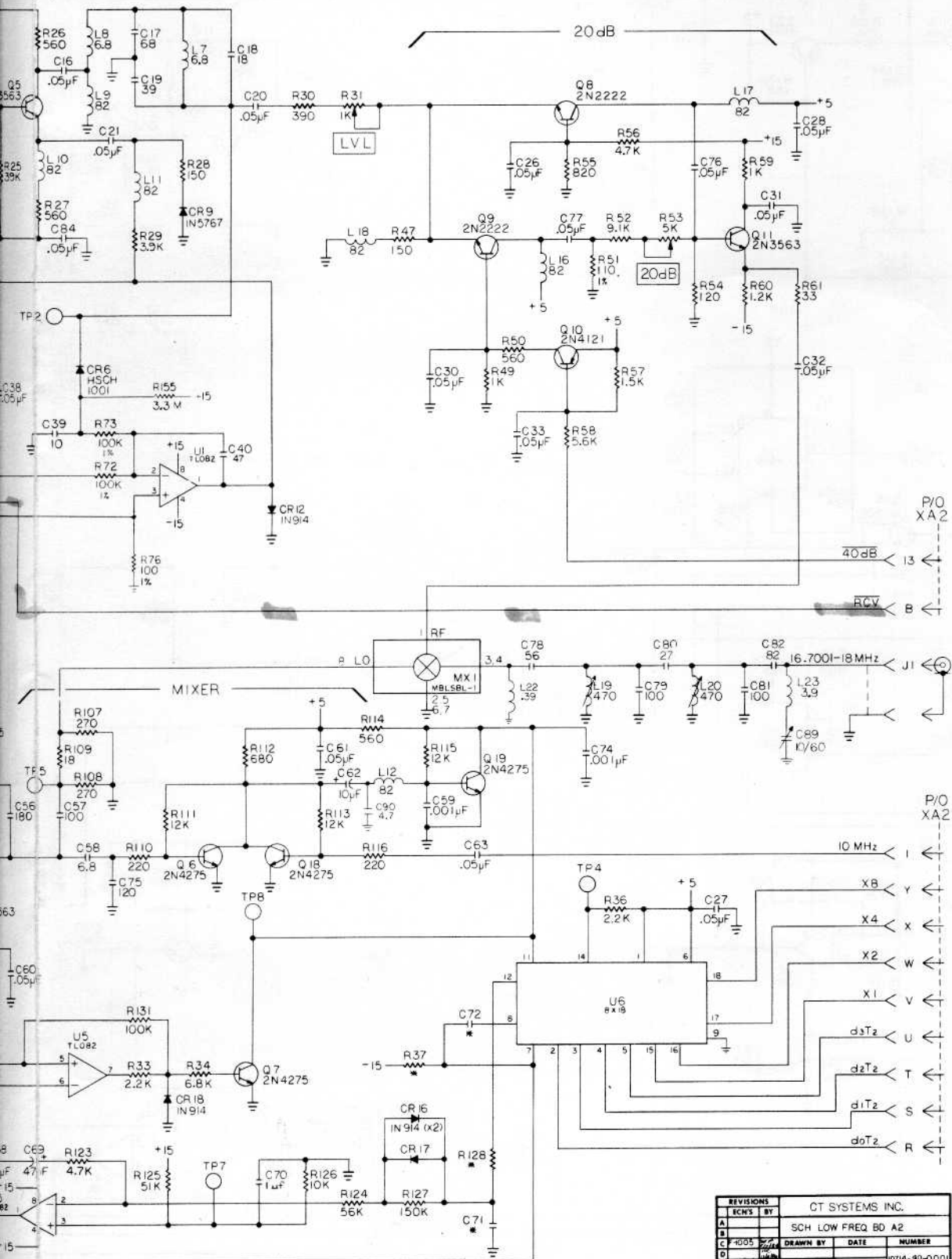
- 9.K
- 8.J
- 11.M
- 2 LVL IN
- 6 3.6 MHz
- 15 d0T1
- 16 d1T1
- 17 d2T1
- 18 d3T1
- 19 X1
- 20 X2
- 21 X4
- 22 XB
- A,C,D,E,F,H,L,3,4,5,10,12

LAST USED	NOT USED
C90	C6,C7,95,96,97
L23	
R55	R30,31,41,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,96,97,98,99,100
CR20	CR1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19
U10	U4

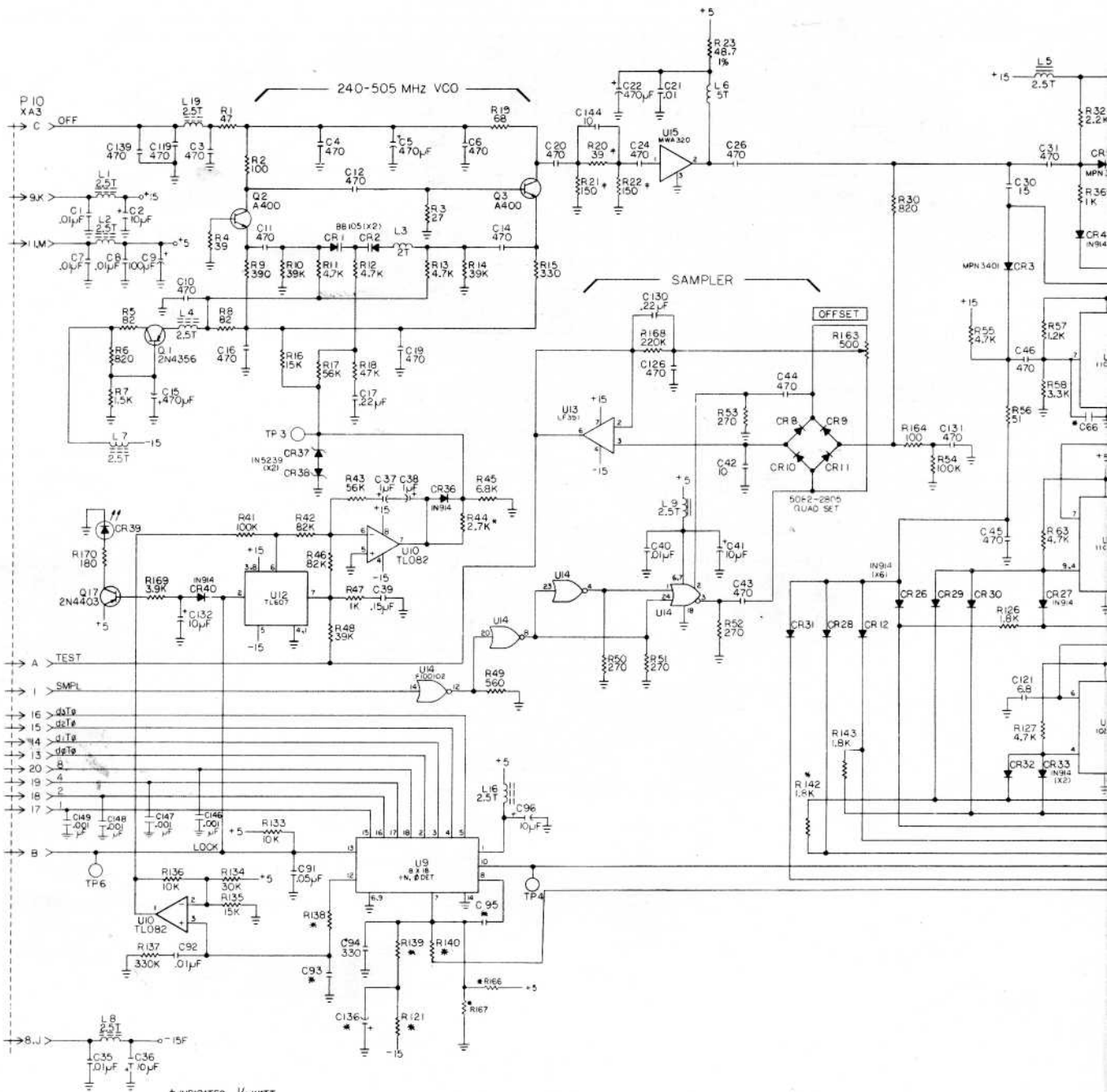
10.1001 - 10.11 MHz

Z FM (G)

LOW FREQUENCY PULL
BOARD A2 REV. D



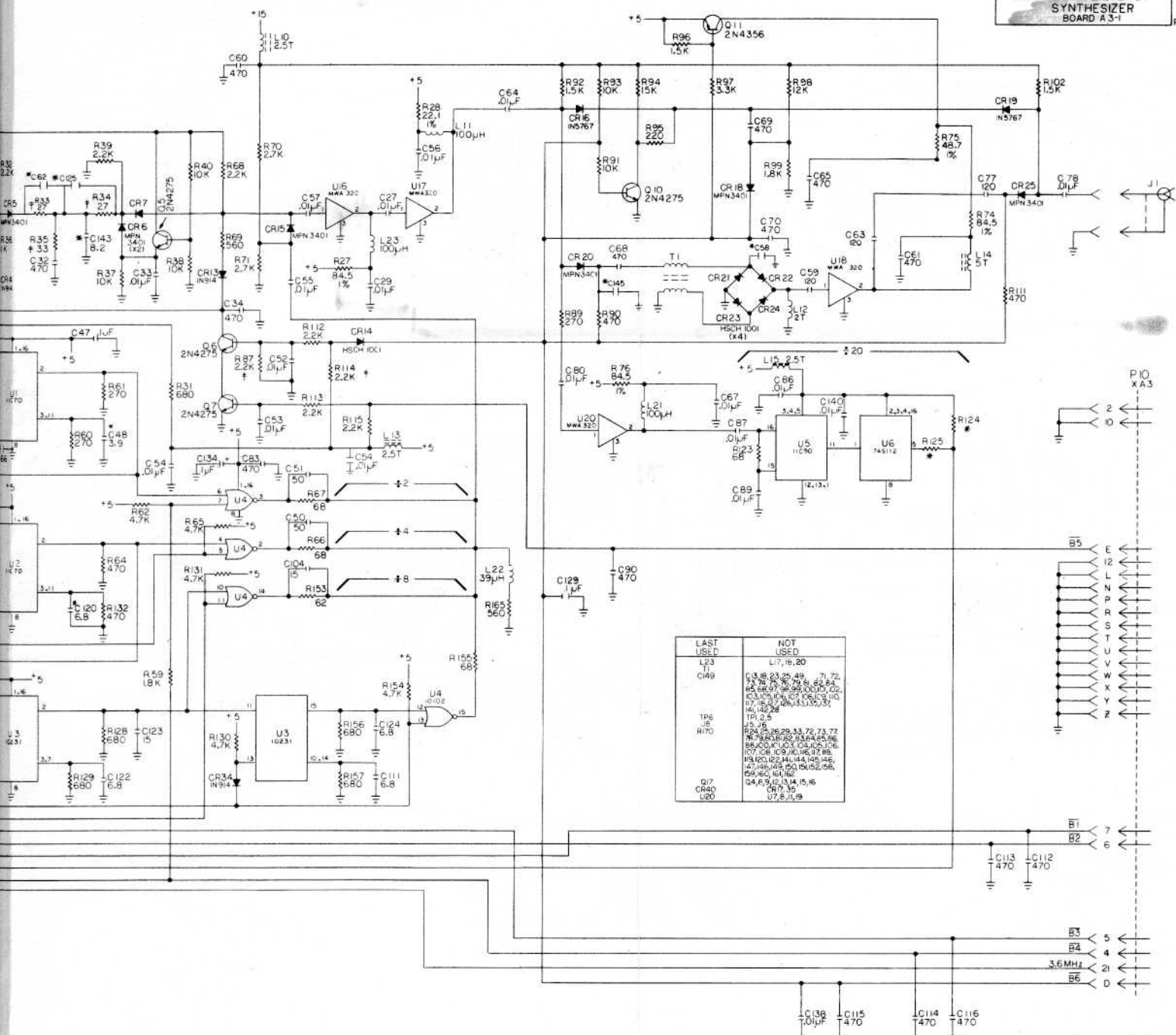
REVISIONS		CT SYSTEMS INC.	
A	REVISED BY	SCH LOW FREQ BD A2	
B		DRAWN BY	DATE
C	1005		NUMBER
D		APP'D	10714-90-0001



INDICATES 1/8 WATT
 NOTE: * INDICATES TECHNICIAN SELECTABLE COMPONENT

HIGH-FREQUENCY SYNTHESIZER BOARD A3-1

REV. D



LAST USED	NOT USED
L23	L17, 16, 20
CR9	C18, 8, 21, 25, 49, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142
TP6	TP1, 2, 5
J6	J1, 4, 5
R170	R1, 2, 3, 26, 29, 33, 72, 73, 77, 78, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000
Q17	Q4, 6, 9, 10, 14, 15, 16
CR40	CR7, 35
U20	U7, 8, 9

REVISIONS				CT SYSTEMS INC.	
1	REV'S	BY		SOH HIGH FREQ SYNTHESIZER	
2	REV'S	BY		A3-1	
3	REV'S	BY		DATE	NUMBER
4	REV'S	BY		DATE	NUMBER
5	REV'S	BY		DATE	NUMBER
6	REV'S	BY		DATE	NUMBER
7	REV'S	BY		DATE	NUMBER
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9	REV'S	BY		DATE	NUMBER
10	REV'S	BY		DATE	NUMBER
11	REV'S	BY		DATE	NUMBER

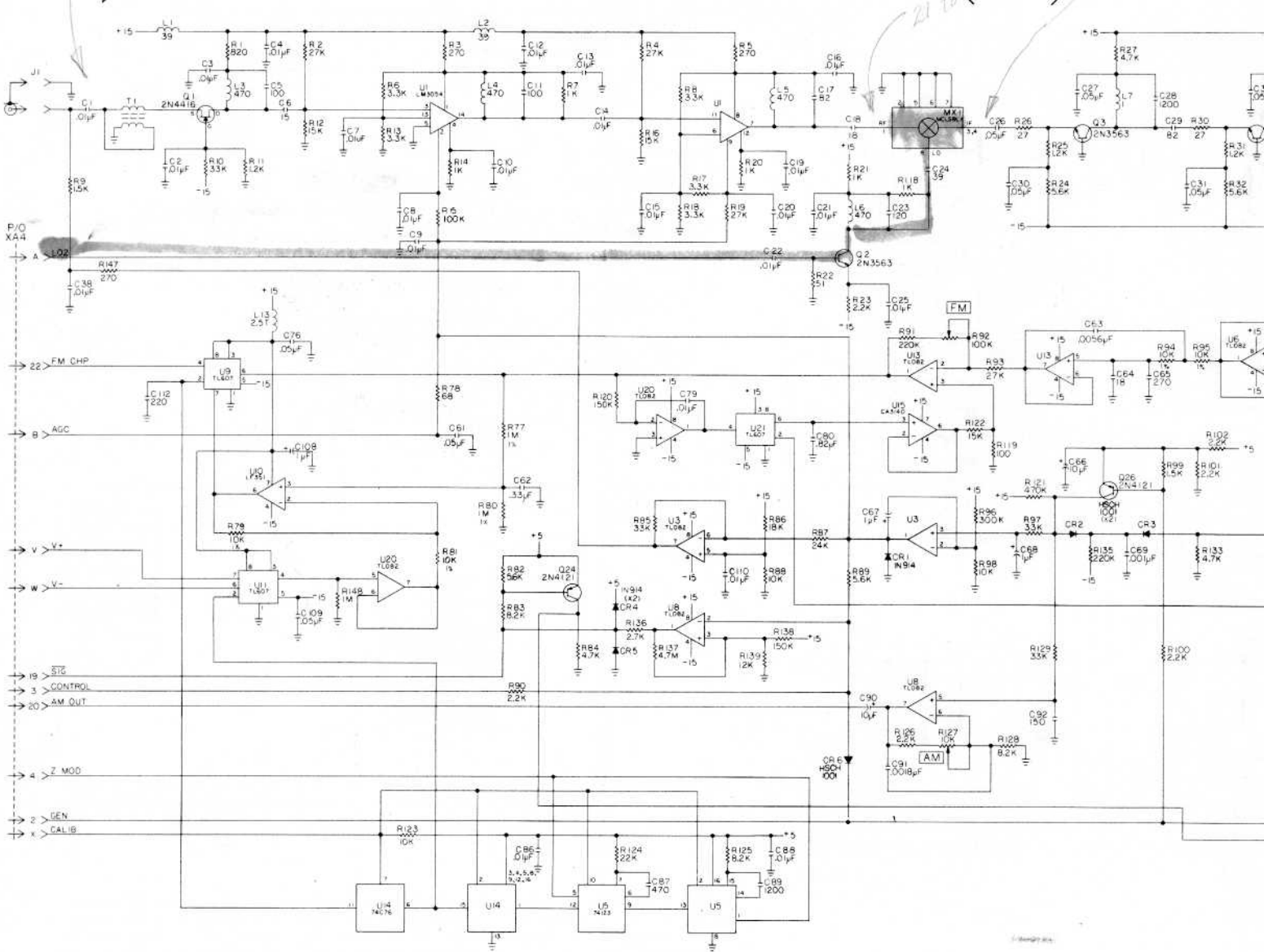
21 to 22 MHz IF

21 to 22 MHz IF

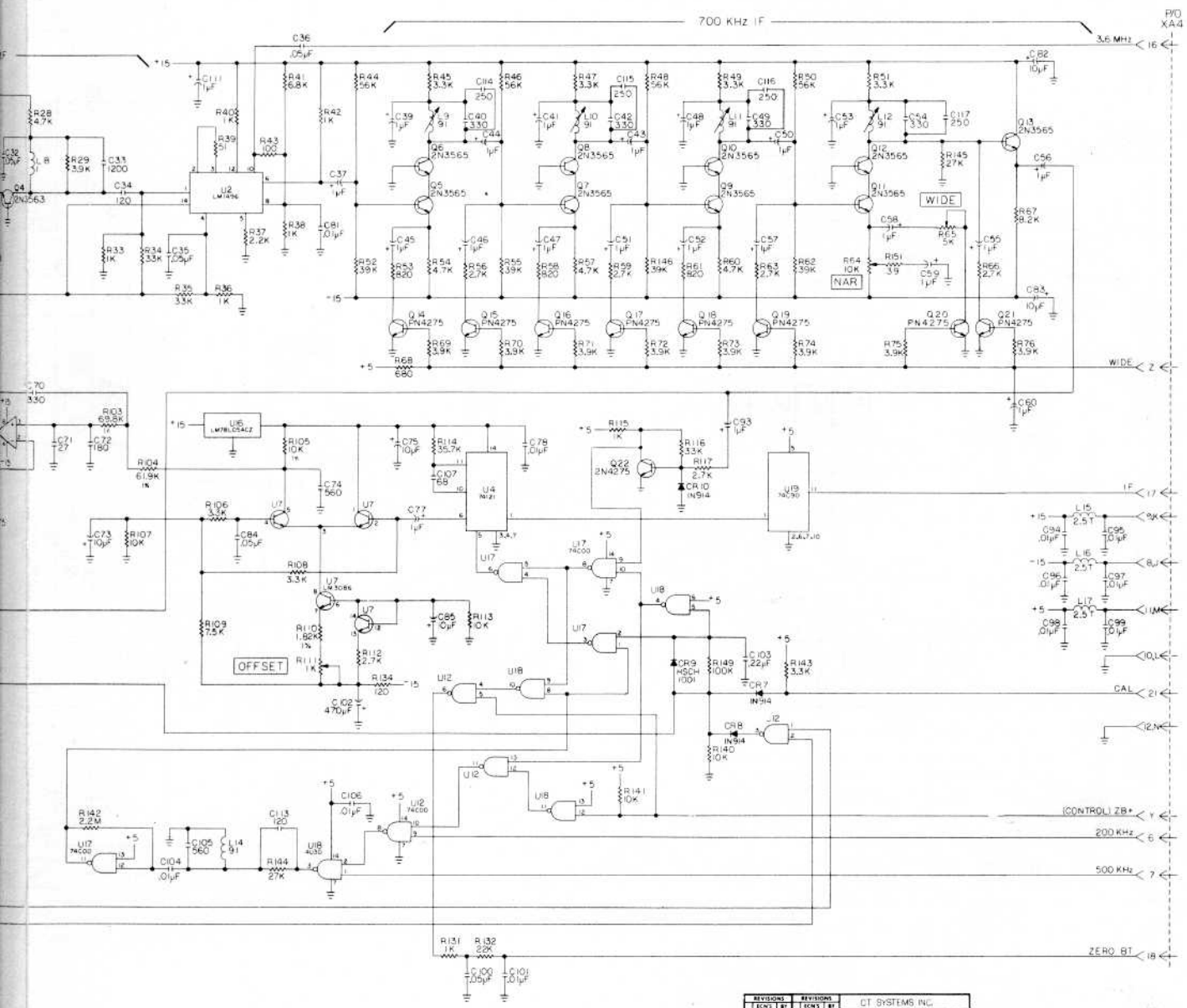
4.3 MHz IF

21-22 MHz IF

4.3 MHz IF



IF AMP BOARD A4
REV F

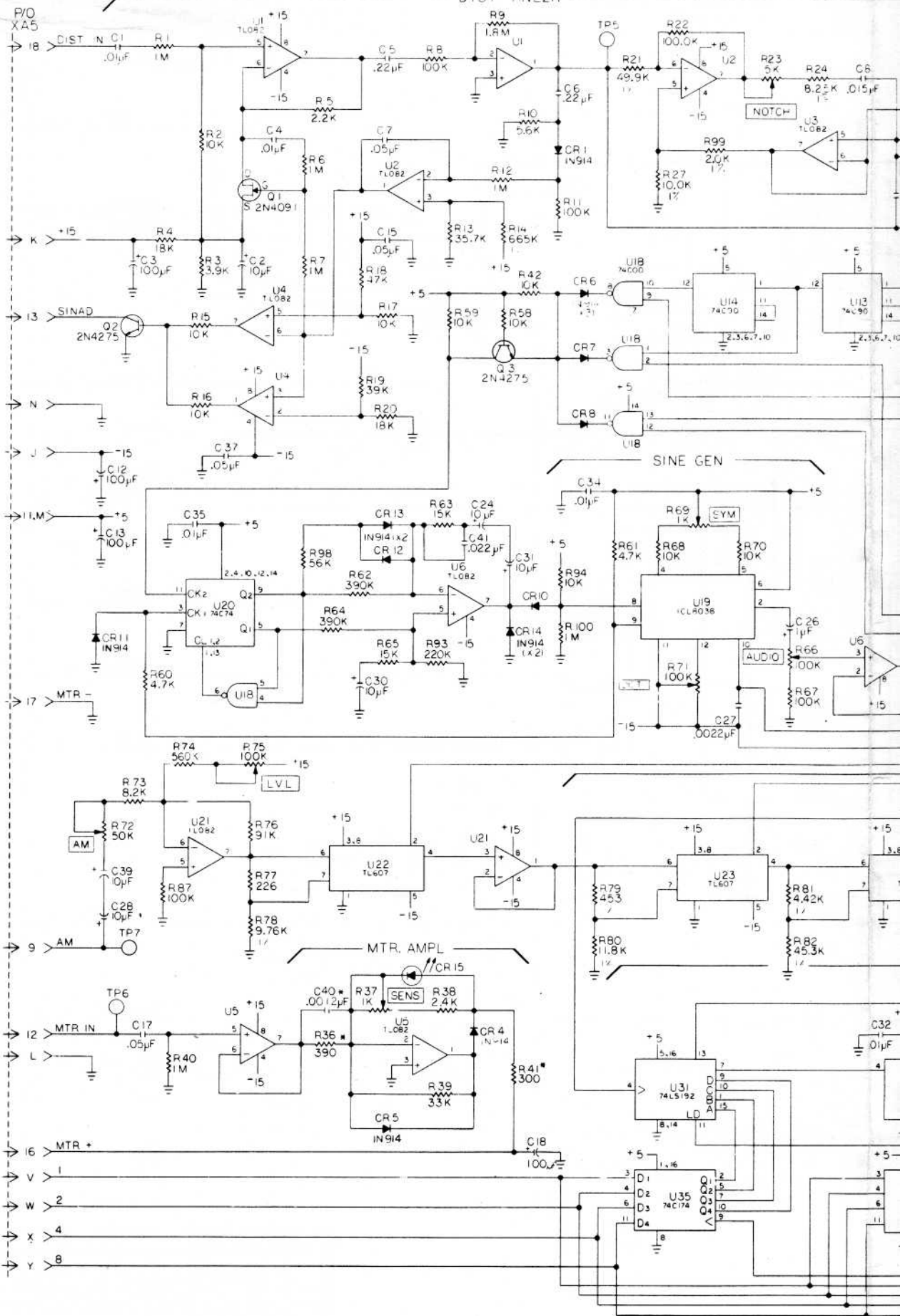


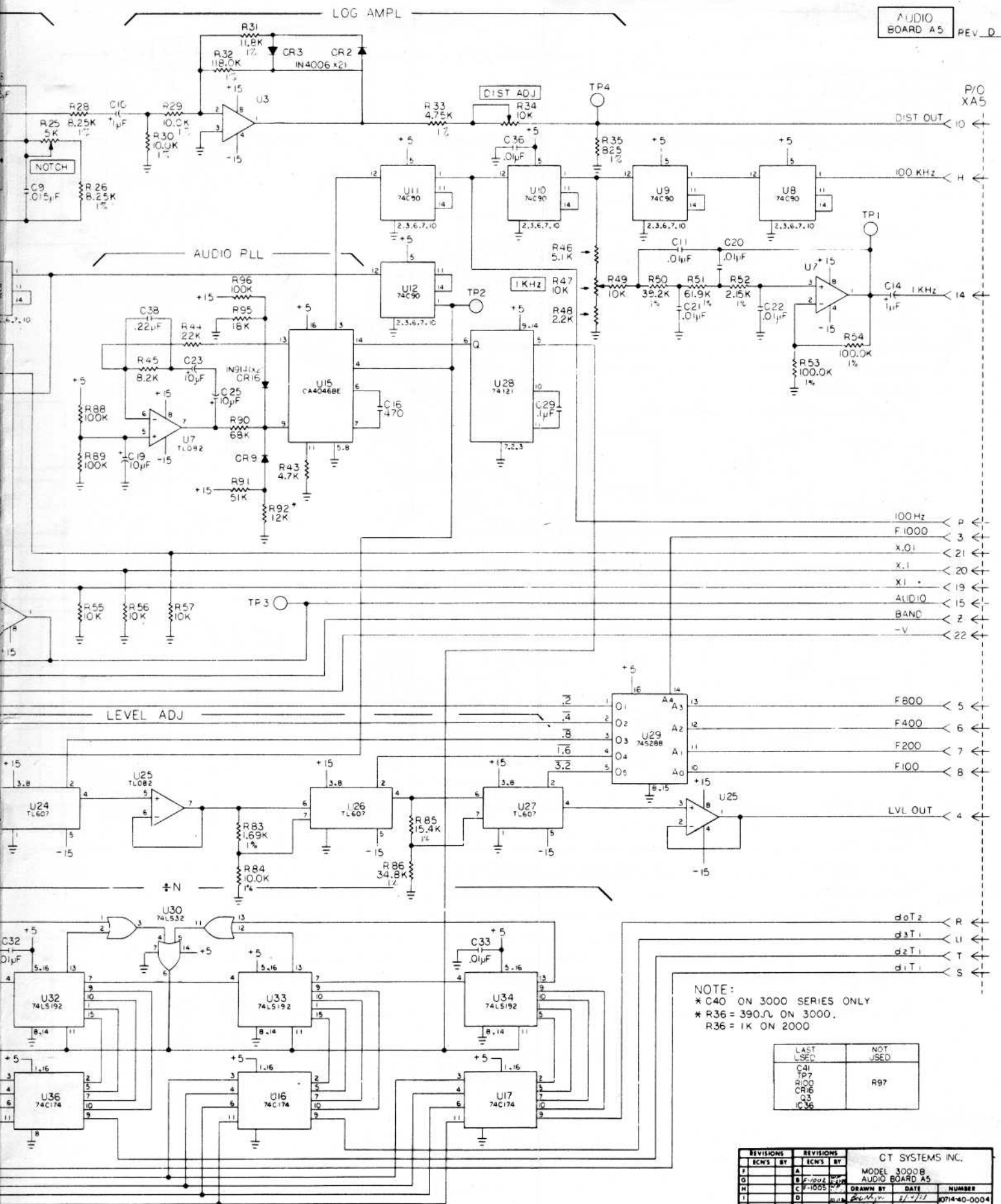
→ to
COUNTER
CHIP

LAST USED	NOT USED
U1	Q10, Q11
U2	Q12, Q13
U3	Q14, Q15
U4	Q16, Q17
U5	Q18, Q19

REV	REV	DATE	BY	DESCRIPTION
1	1	1/27/72	WJ	INITIAL DESIGN
2	1	2/1/72	WJ	REVISED FOR BOARD A4
3	1	2/1/72	WJ	REVISED FOR BOARD A4
4	1	2/1/72	WJ	REVISED FOR BOARD A4
5	1	2/1/72	WJ	REVISED FOR BOARD A4

DIST ANLZR





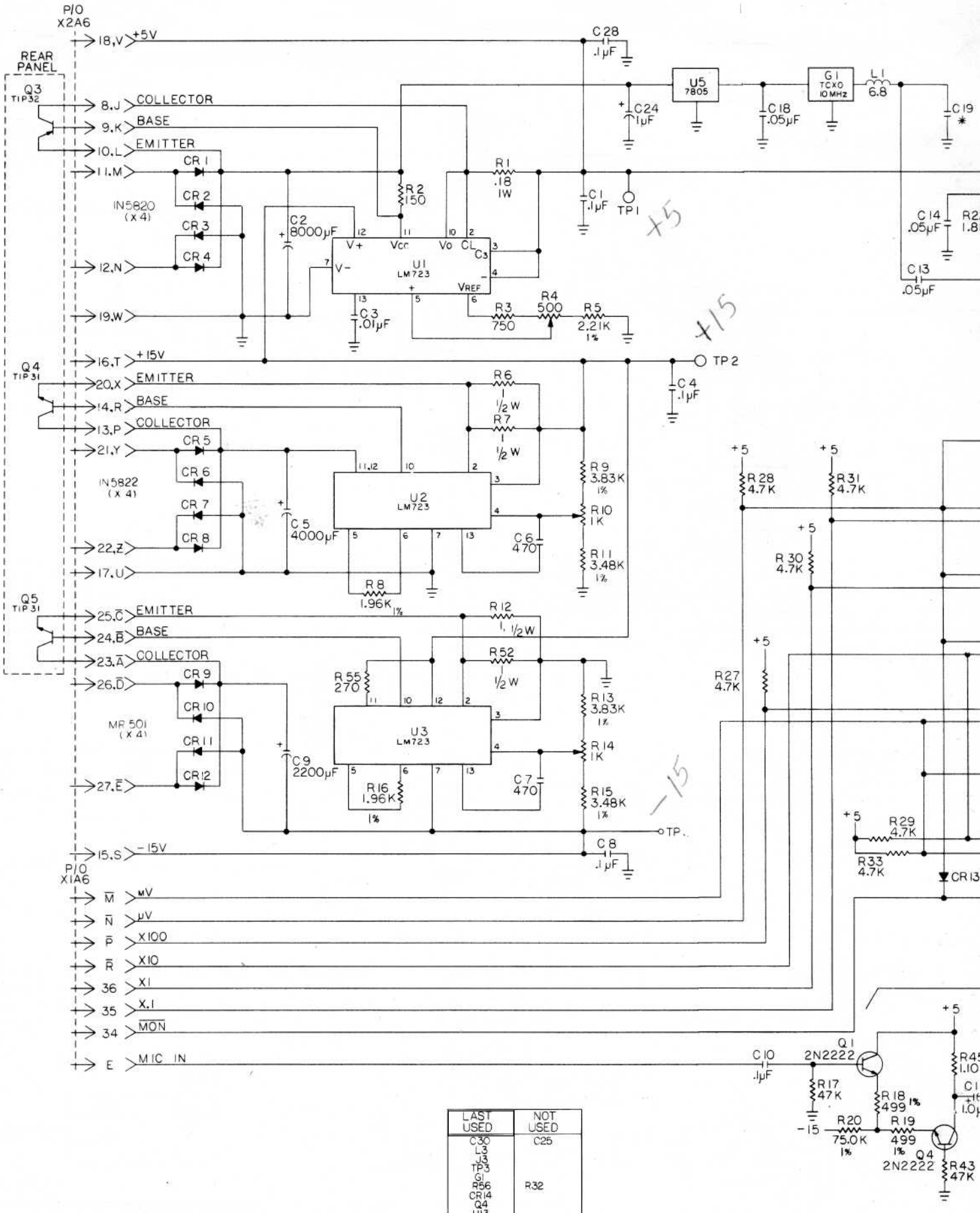
- P/O XA5 < 10
- DIST OUT < 10
- 100 KHz < H
- TP1 < 14
- 1 KHz < 14
- 100Hz < P
- F1000 < 3
- X.O1 < 21
- X.1 < 20
- X1 < 19
- AUDIO < 15
- BAND < 2
- V < 22
- F800 < 5
- F400 < 6
- F200 < 7
- F100 < 8
- LVL OUT < 4
- d0T2 < R
- d3T1 < U
- d2T1 < T
- d1T1 < S

NOTE:
 * C40 ON 3000 SERIES ONLY
 * R36 = 390Ω ON 3000.
 R36 = 1K ON 2000

LAST USED	NOT USED
C41 TP7 R100 CR16 Q3 C36	R97

REVISIONS		REVISIONS		CT SYSTEMS INC.	
ECN'S	BY	ECN'S	BY	MODEL	NUMBER
1	A			3000 B	
2	B			AUDIO BOARD A5	
3	C				
4	D				
5	E				

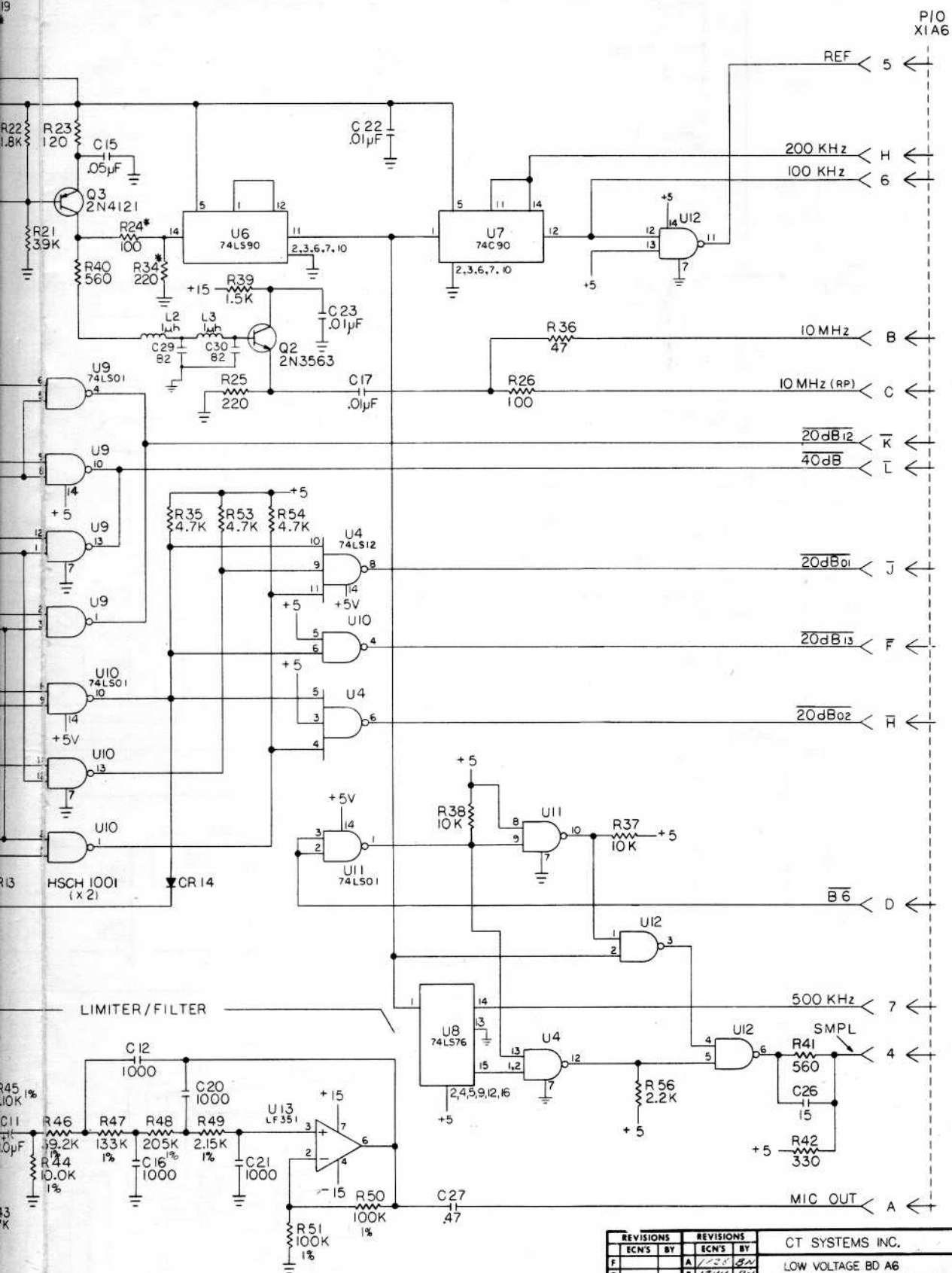
DRAWN BY: [Signature]
 DATE: 1/7/78
 APP B
 0714-00-0004



LAST USED	NOT USED
C30	C25
L3	
J3	
TP3	
G1	
R56	R32
CR14	
Q4	
U13	

LOW VOLTAGE
POWER SUPPLY
BOARD A6

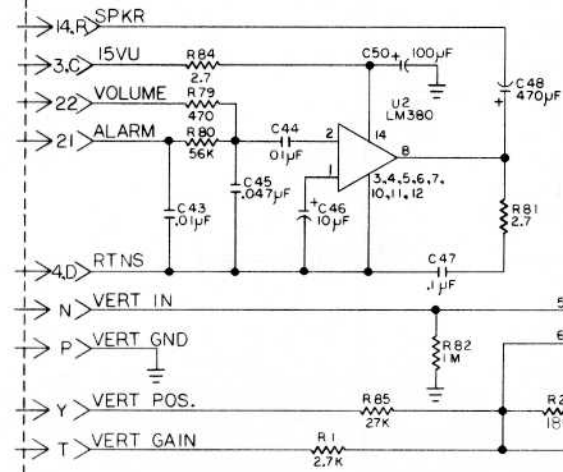
REV C



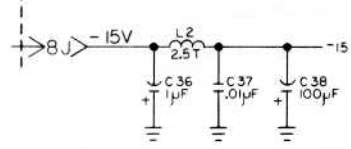
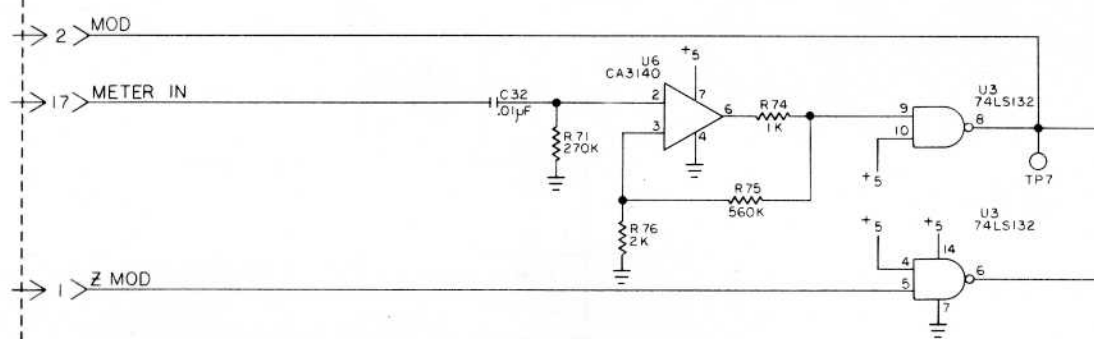
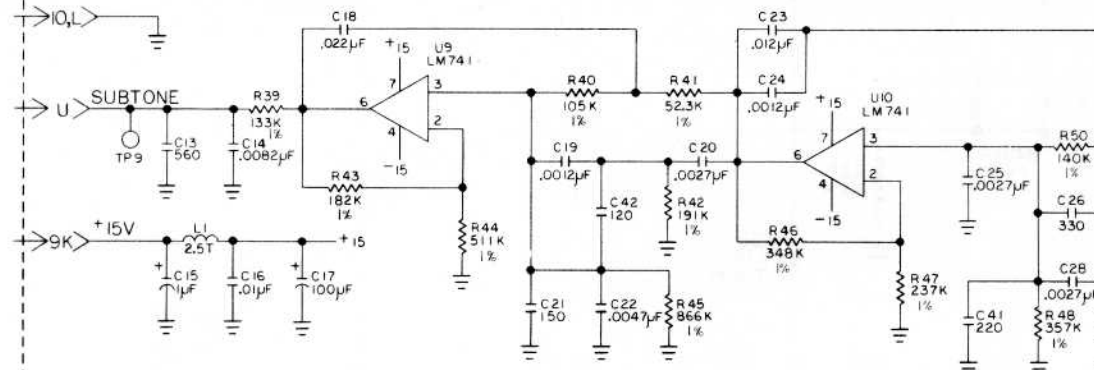
P/O
X1A6

REVISIONS		REVISIONS		CT SYSTEMS INC.		
ECN'S	BY	ECN'S	BY			
F		A	1/28/82	LOW VOLTAGE BD A6		
G		B	1/24/82			
H		C	JDC	DRAWN BY	DATE	NUMBER
I		D		2/23/82	11/27/82	0714-40-0003
J		E		APP'G		

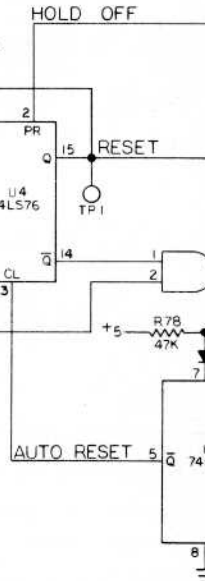
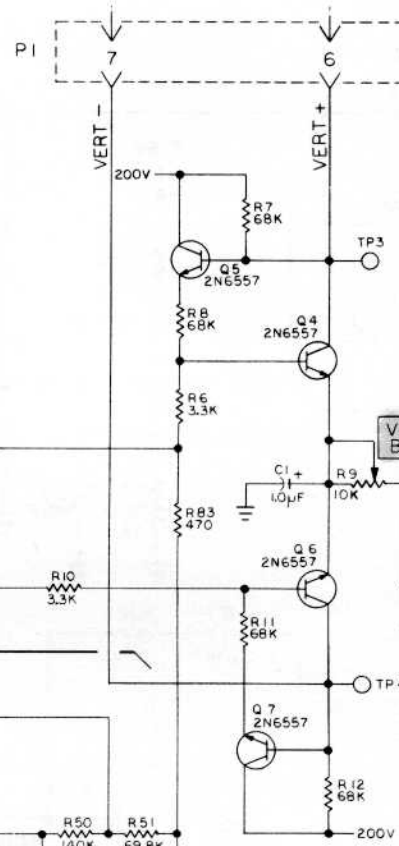
XA7



AUDIO FILTER

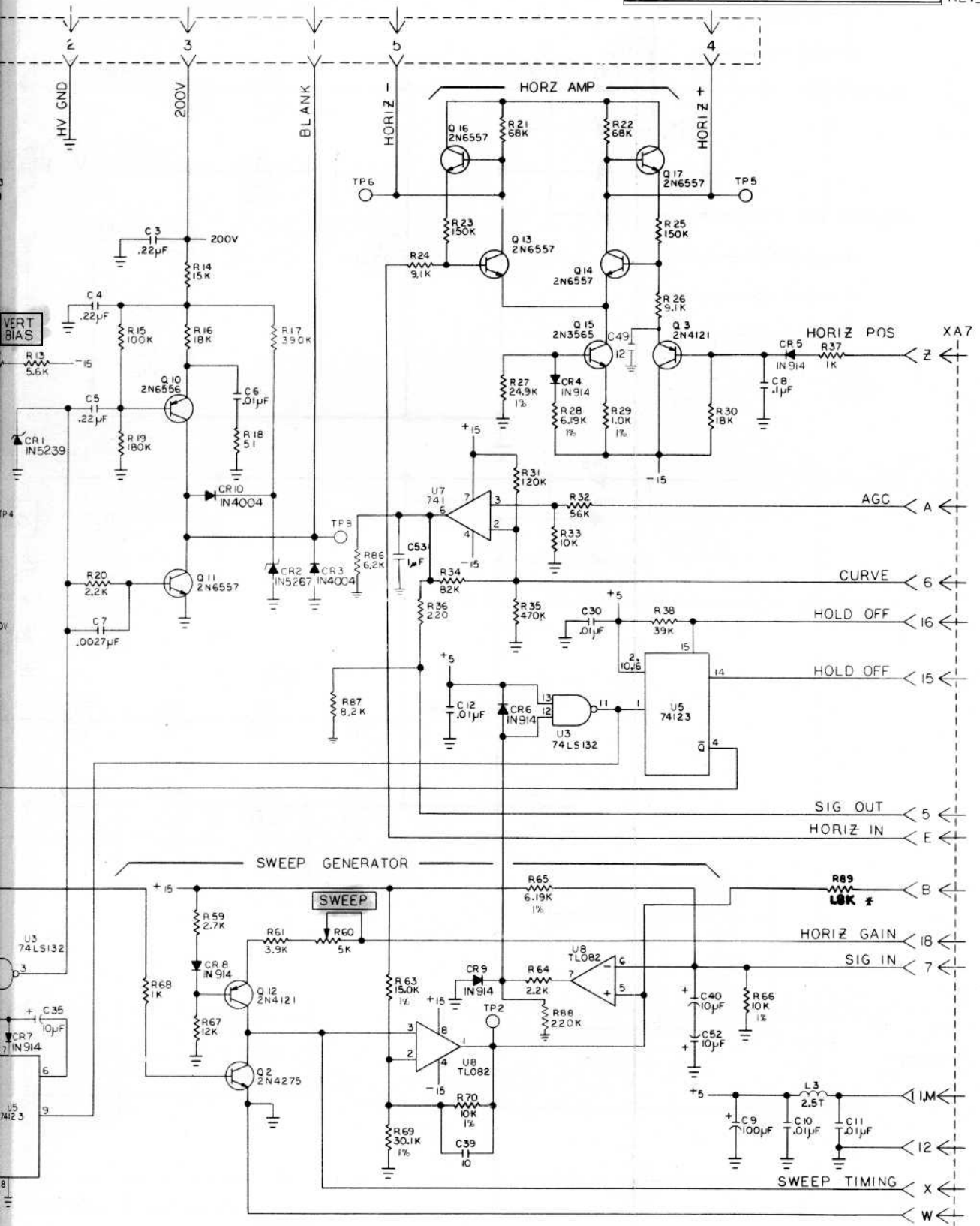


LAST USED	NOT USED
C53	C2, C31, C33, C34
L3	R52, R53, R54,
P1	R55, R56, R57,
TP9	R58, R59, R62, R72,
R89	R73, R77
CP10	
Q17	Q1, Q8, Q9
U1C	



DEFLECTION AMP BOARD A7B

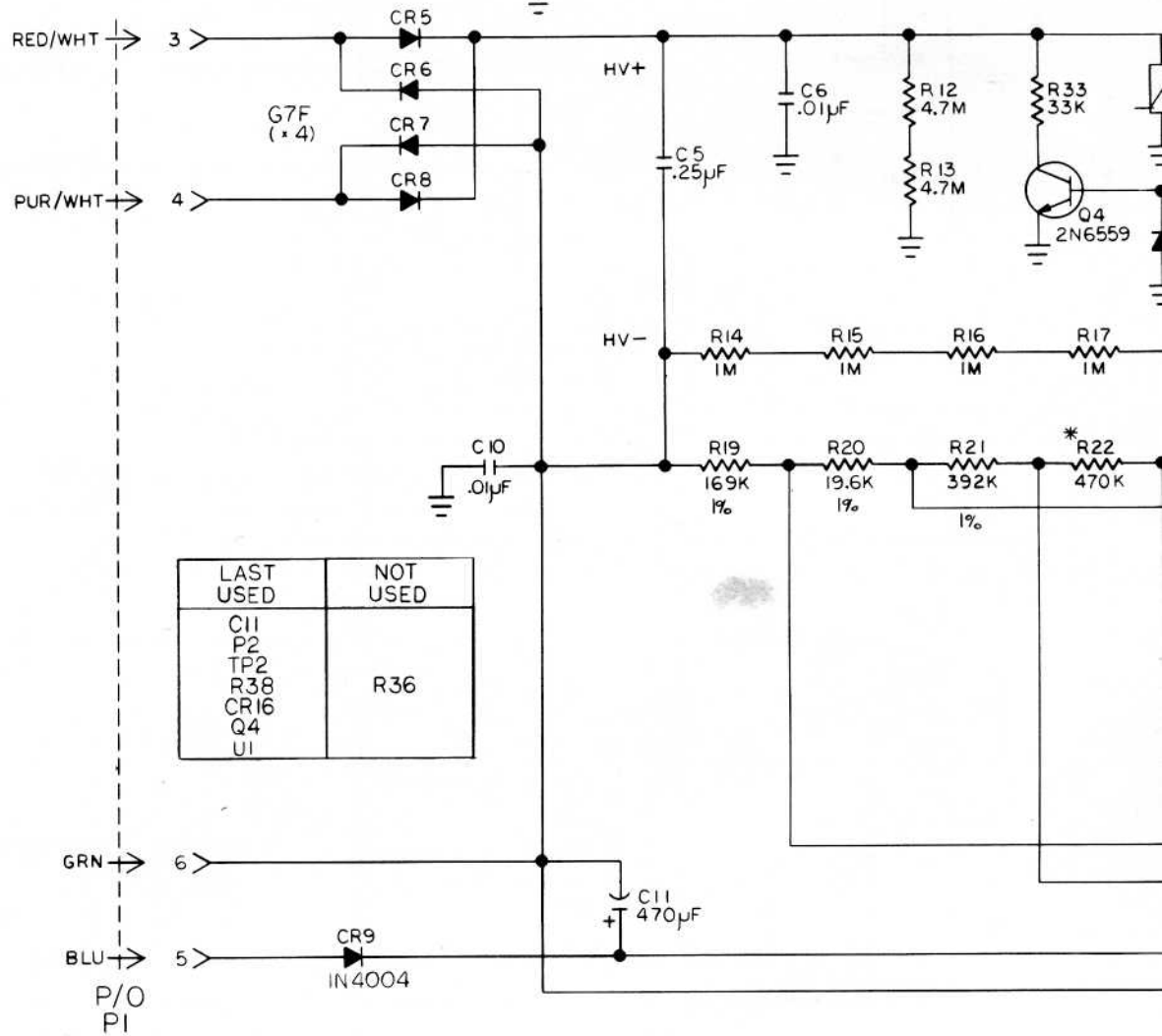
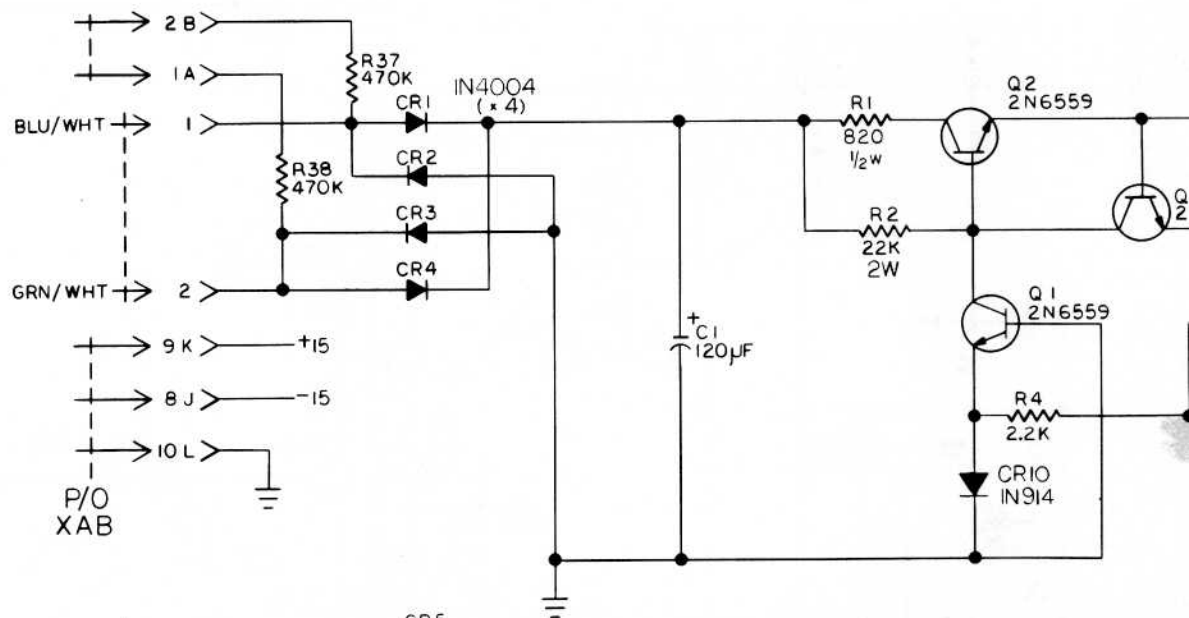
REV. 0



REVISIONS		CT SYSTEMS INC.	
ECN'S	BY	DATE	NUMBER
A	F-1002		
B			
C			
D			
E			

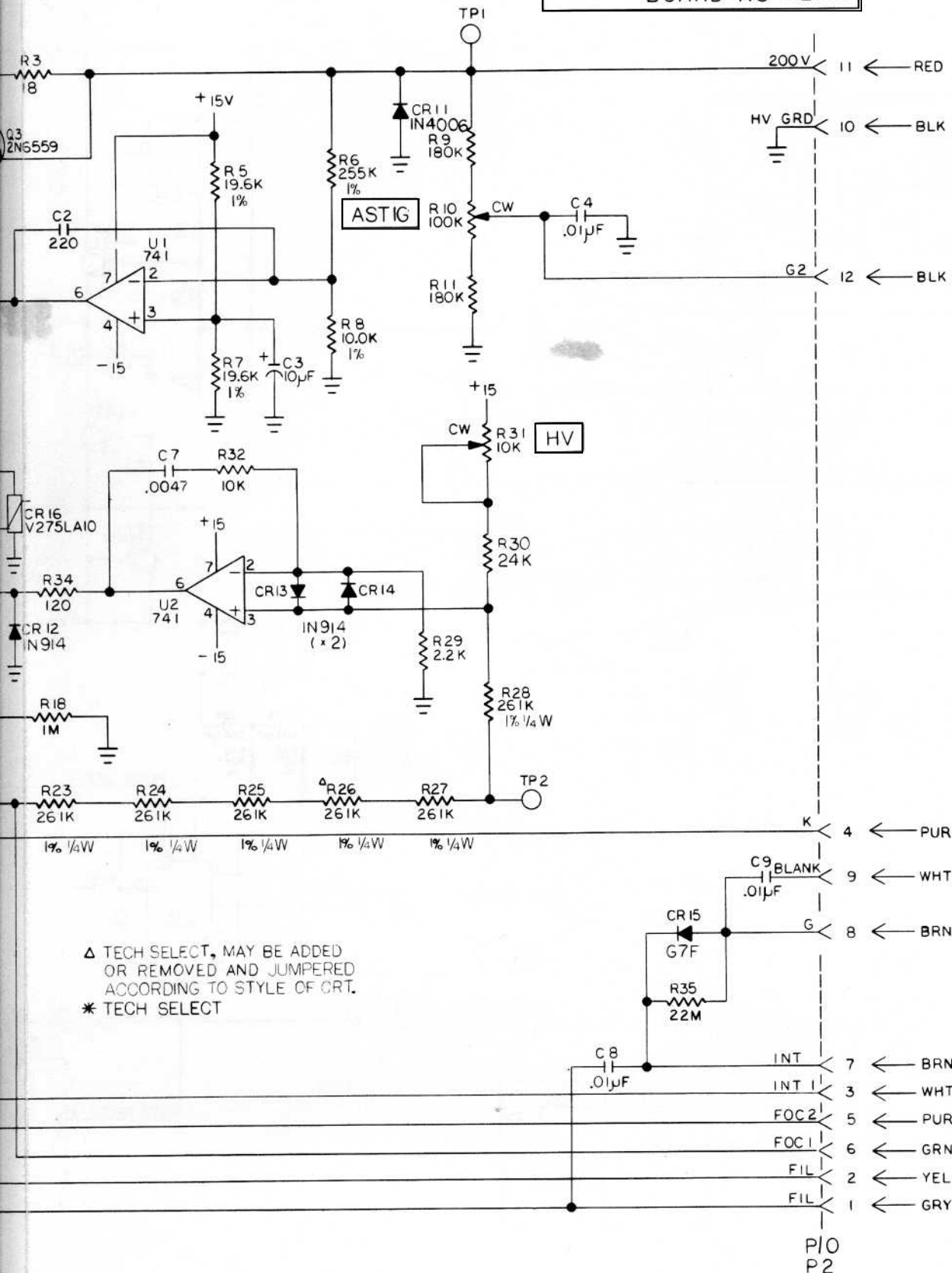
MODEL 3000B DEFLECTION
AMP BD. A7B

APP'D	NUMBER
	10714-40-0006



LAST USED	NOT USED
C11 P2 TP2 R38 CR16 Q4 U1	R36

HIGH VOLTAGE P.S. BOARD A8 REV.A



Δ TECH SELECT, MAY BE ADDED
OR REMOVED AND JUMPED
ACCORDING TO STYLE OF CRT.
* TECH SELECT

REVISIONS		CT SYSTEMS INC.		
ECN'S	BY			
A		MODEL 3000 B		
B		HIGH VOLTAGE P.S. A8		
C		DRAWN BY	DATE	NUMBER
D		<i>Bob Naylor</i>	<i>1/17/83</i>	10714-20-0000
E		APP'D		

8

7

6

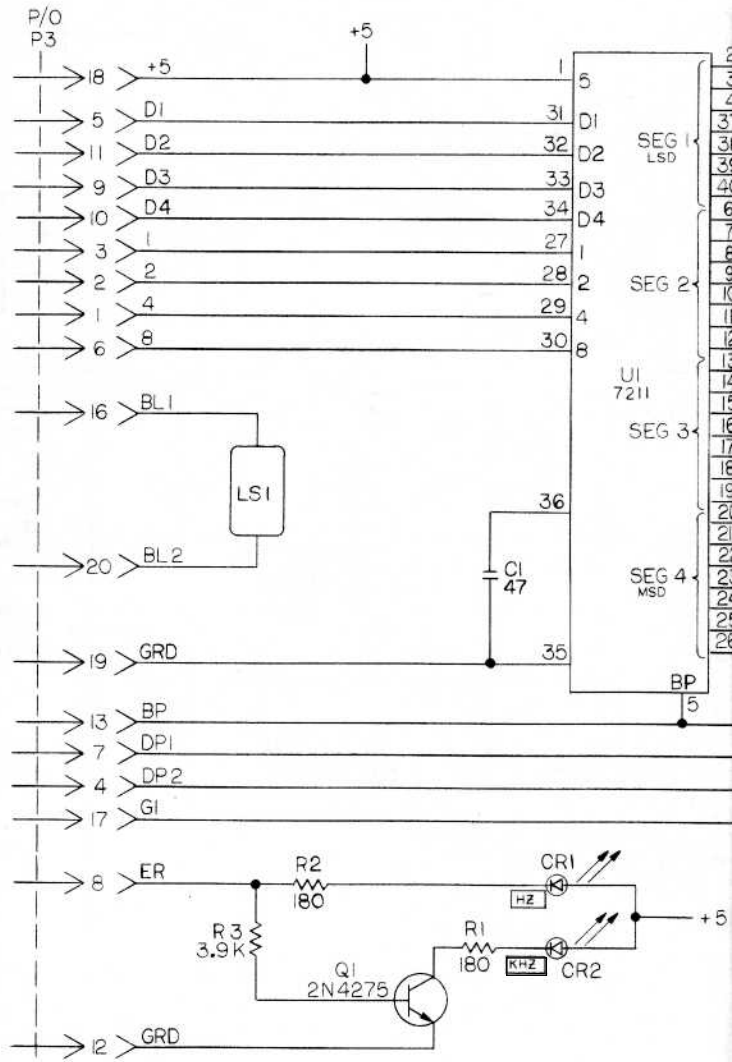
5

D

C

B

A



8

7

6

5

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

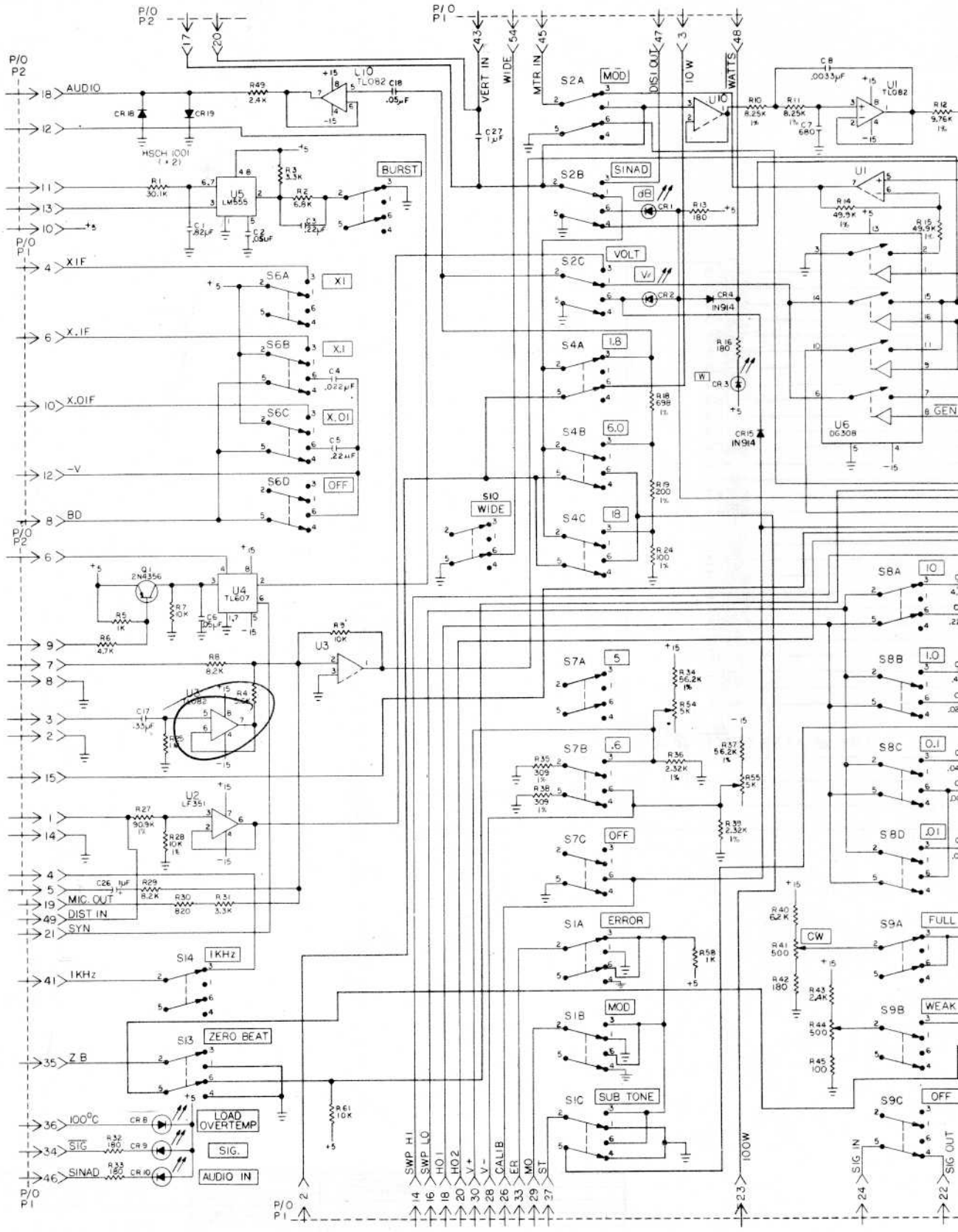
2	17	E5
3	23	G5
4	22	F5
37	21	A5
38	20	B5
39	19	C5
40	18	D5
6	25	A4
7	24	B4
8	15	C4
9	14	D4
10	13	E4
11	27	G4
12	26	F4
13	29	A3
14	28	B3
15	11	C3
16	10	D3
17	9	E3
18	31	G3
19	30	F3
20	34	A2
21	33	B2
22	8	C2
23	7	D2
24	6	E2
25	36	G2
26	35	F2

LCD
DS1

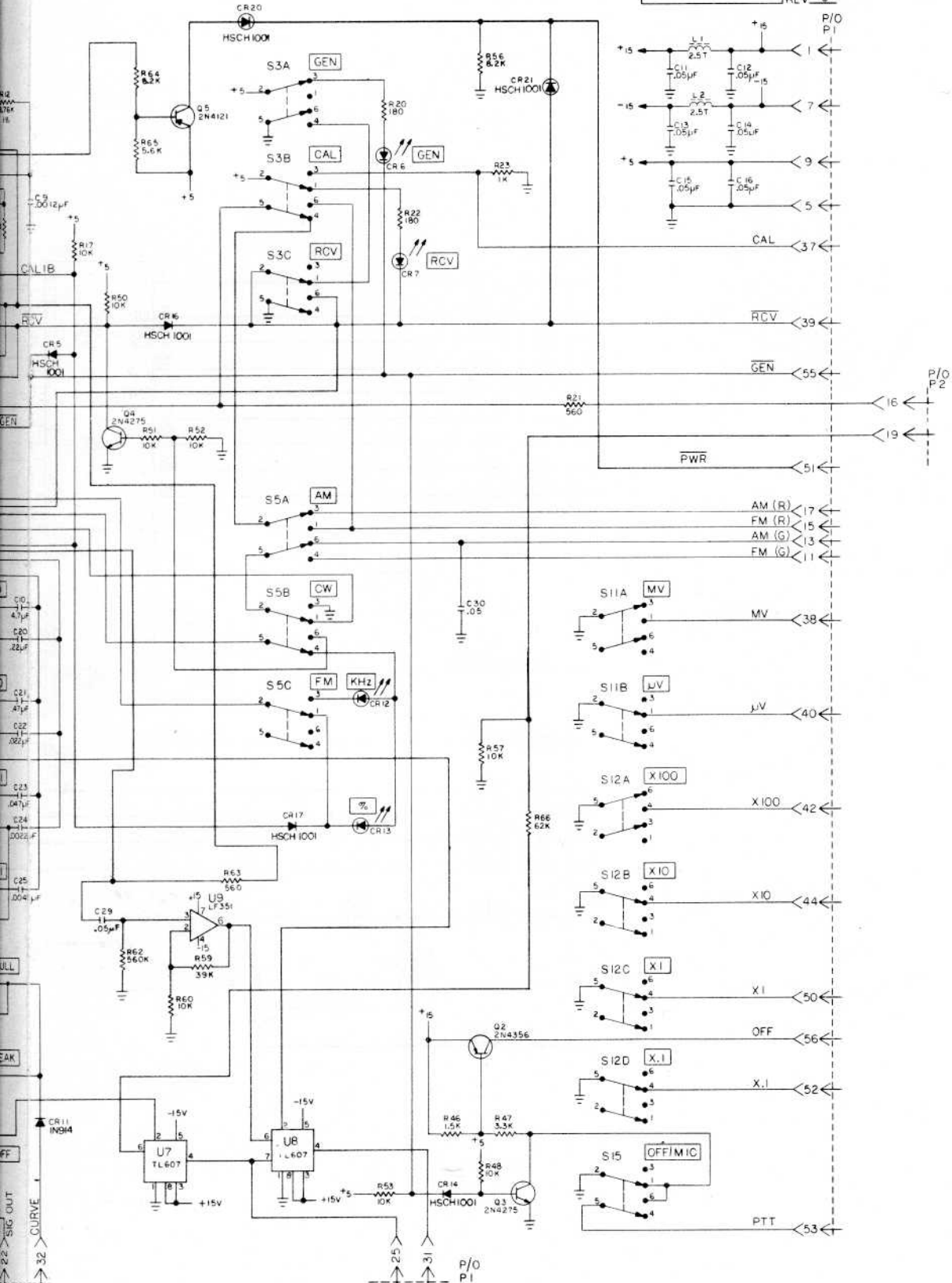
AI-FI 1 2 GI
1,3,4,5,32,37,38,39,40 2 16 2

LAST USED	NOT USED
CI	
LS1	
DS1	
R3	
CR2	
Q1	
UI	
P3	PI,P2

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS/DECIMALS: ANGLES +1/64 XX ± 0.1 ± 30 XXX ± 0.05		CONTRACT NO.		CT SYSTEMS INC.	
MATERIAL		APPROVALS	DATE	SCH A9 DISPLAY	
FINISH		DRAWN D.J. CLAUTINGER	11/1/84	REV A	
NEXT ASSY		CHECKED	RELEASED	SIZE D	CODE IDENT NO. 4J835
APPLICATION		THIS DOCUMENT CONTAINS INFORMATION CONFIDENTIAL TO THE COMPANY. THE IN- FORMER SHALL BE KEPT SECRET BY ALL PERSONNEL AND NOT TO BE REPRODUCED OR USED WITHOUT THE PRIOR APPROVAL IN WRITING OF		DRAWING NO. 10714-30-0033	SCALE
DO NOT SCALE DRAWING		SHEET		OF	



FRONT PANEL BOARD A10B REV. C

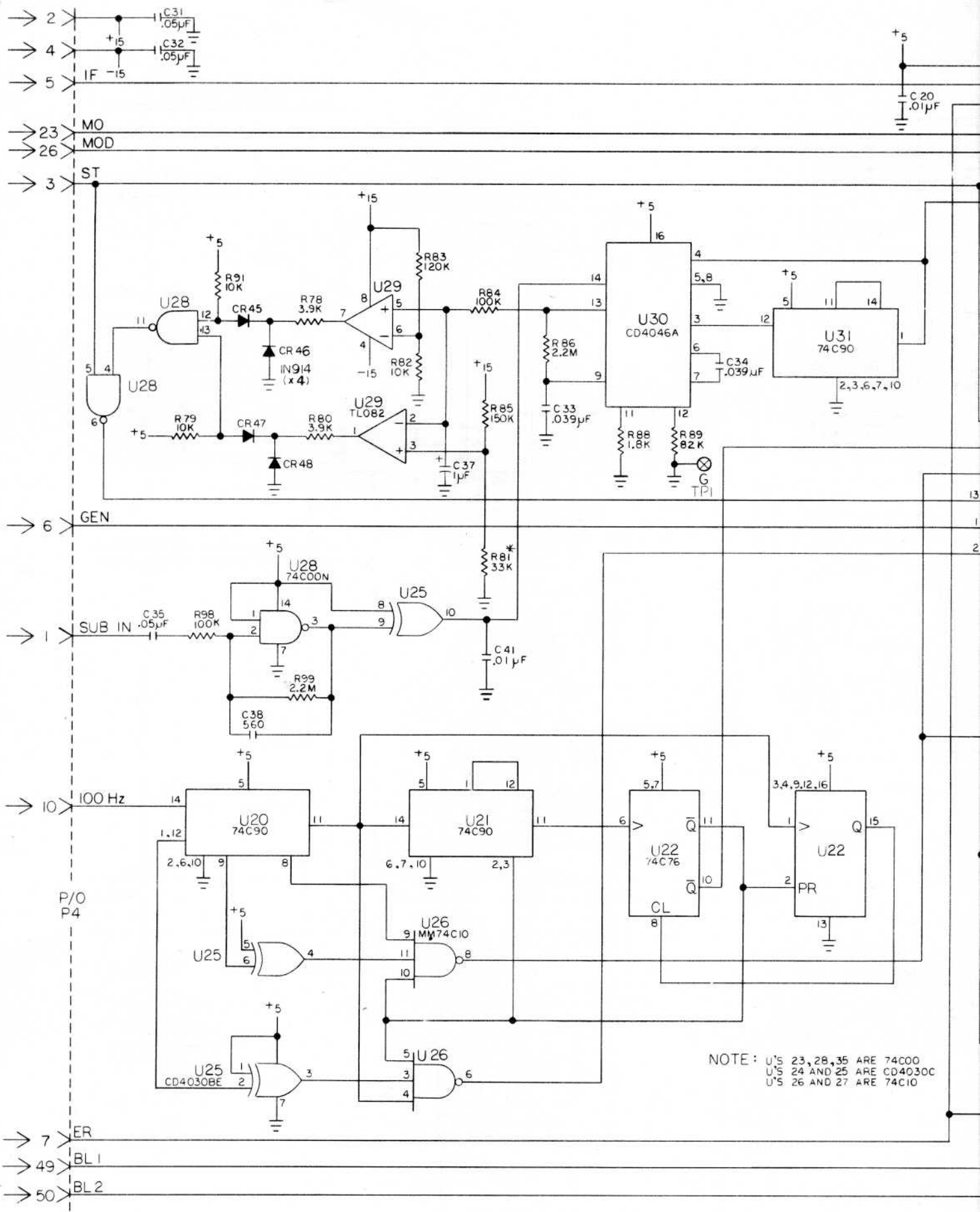


LAST USED	NOT USED
C30	CR9, C28
L2	R26
CR20	
CR21	
S15	
U7	

REVISIONS			
REV'S	BY	DATE	NUMBER
A	F019	10/27	1
B	F1003	11/10	2
C			
D			
E			

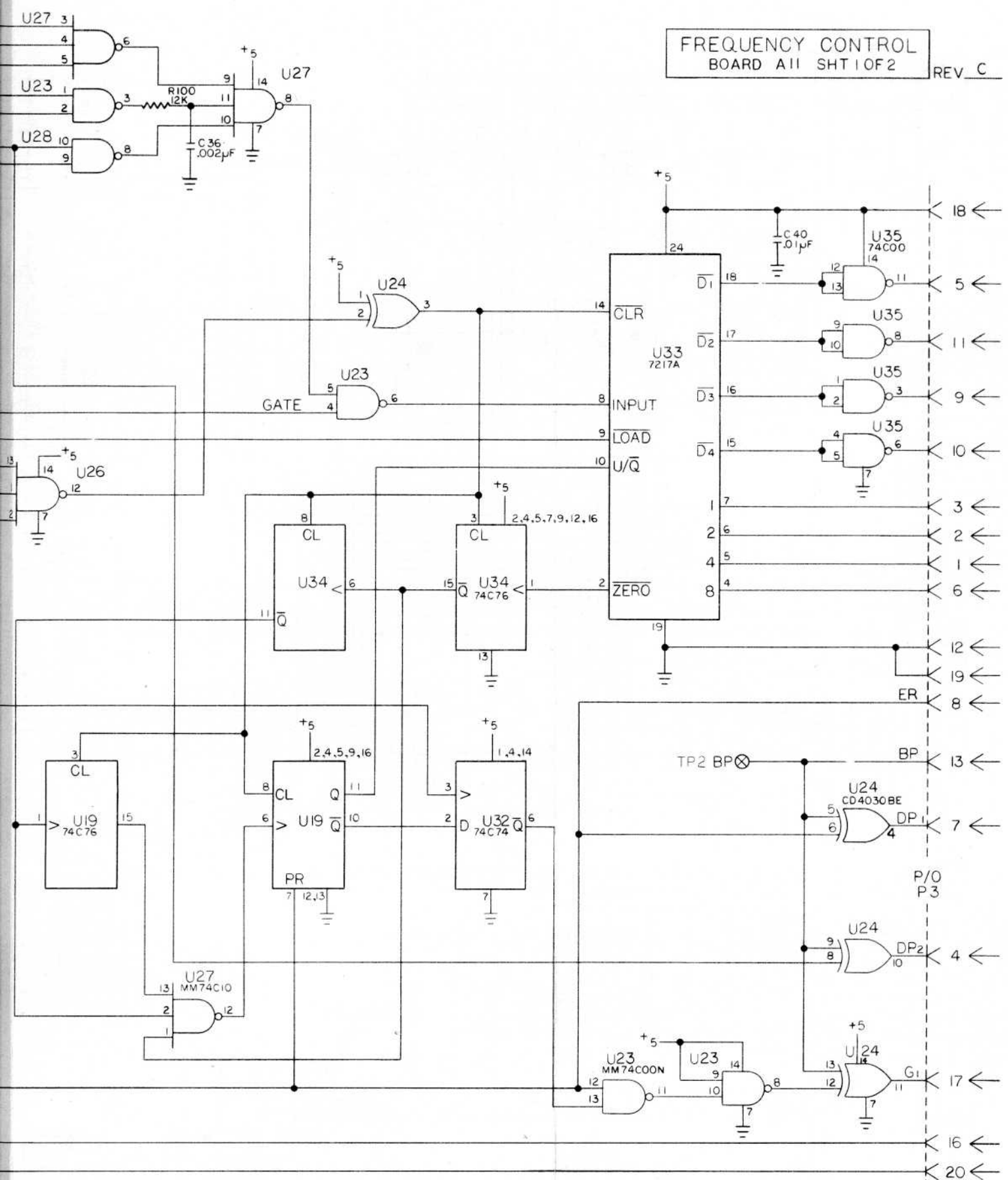
CT SYSTEMS INC.
MODEL 3000B FRONT PANEL BQ,
A10B

DRAWN BY: JLR
DATE: 10/74
NUMBER: 40-0007

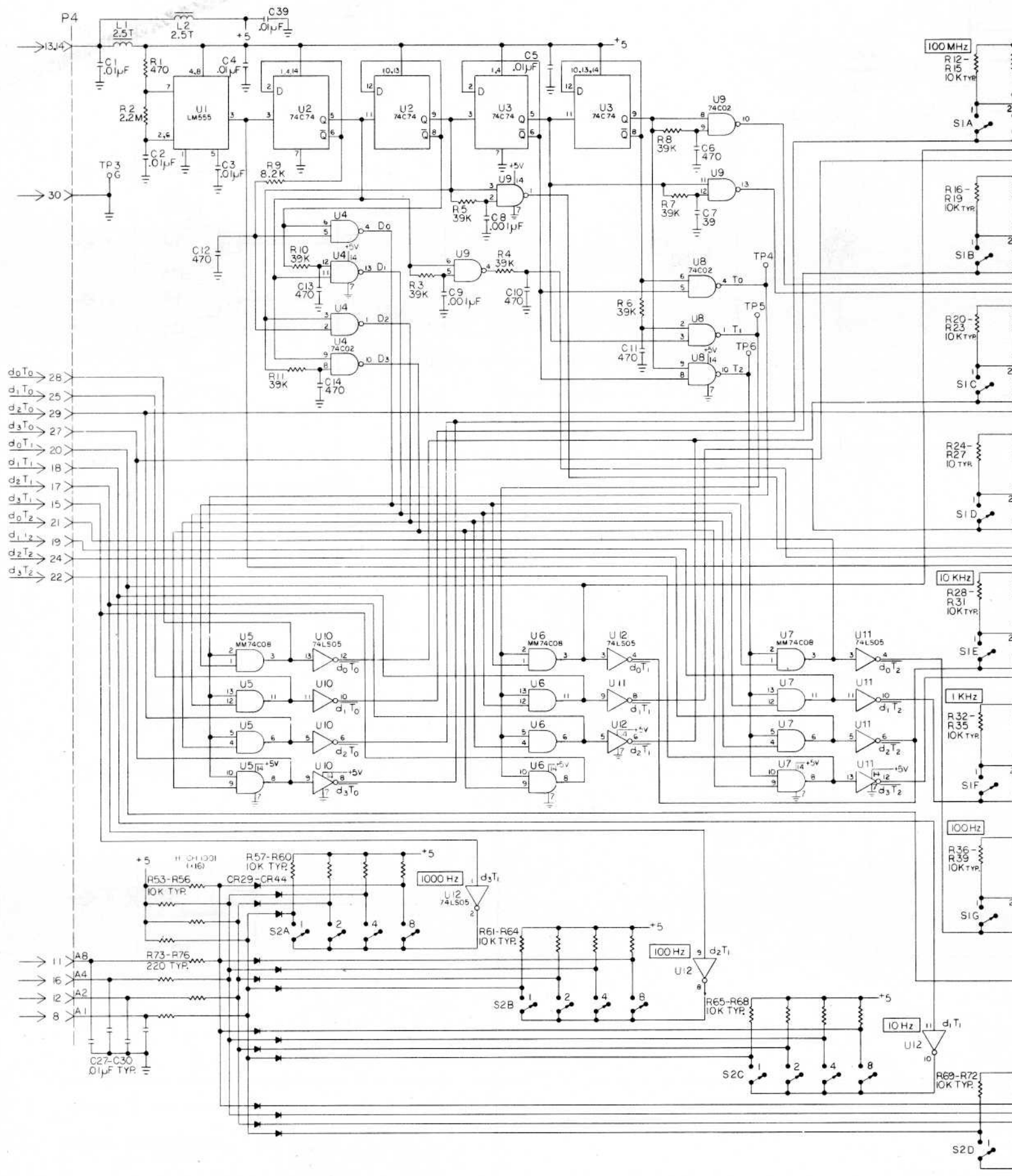


NOTE : U'S 23, 28, 35 ARE 74C00
 U'S 24 AND 25 ARE CD4030C
 U'S 26 AND 27 ARE 74C10

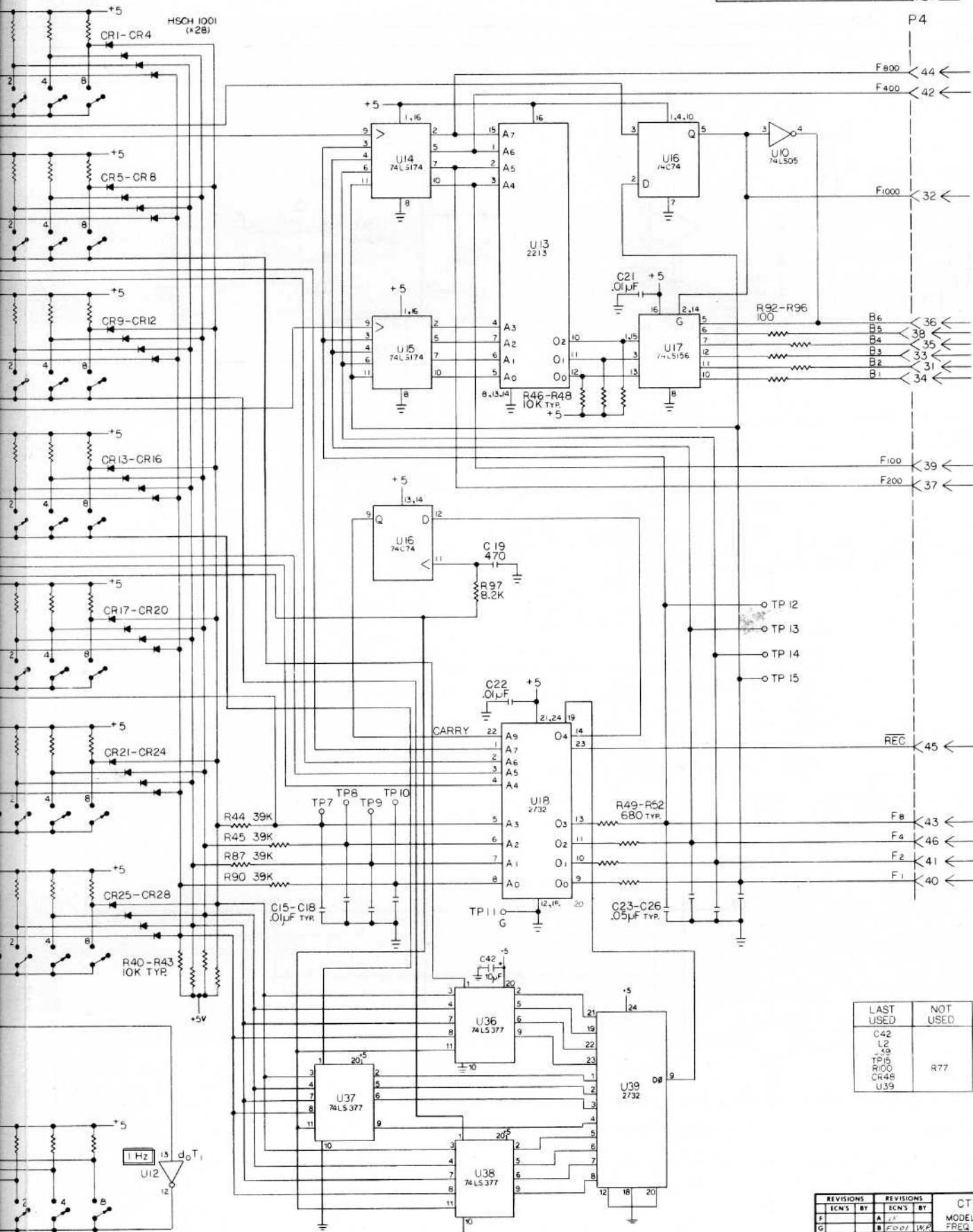
FREQUENCY CONTROL BOARD A11 SHT 1 OF 2 REV. C



REVISIONS		REVISIONS		CT SYSTEMS INC.		
ECN'S	BY	ECN'S	BY	MODEL 3000 B		
F		A	1/19	FREQ CONTROL A11		
G		B	1/20	DRAWN BY	DATE	NUMBER
H		C	1/20	Bob Nader	1/23/73	10714-40-0008
I		D		APP'D	2/25/73	67
J		E				



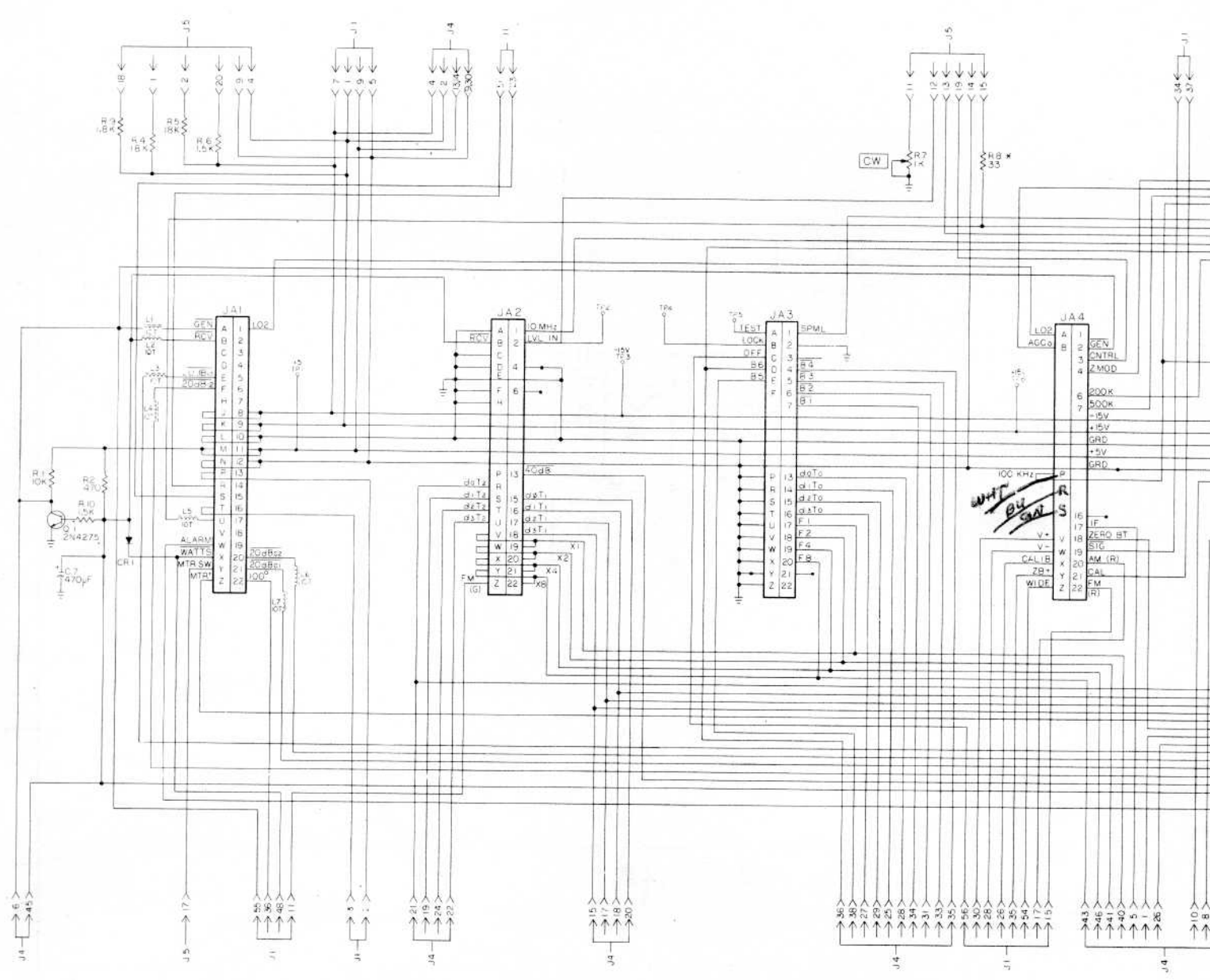
FREQUENCY CONTROL BOARD A11 SHT 2 OF 2 REV. C



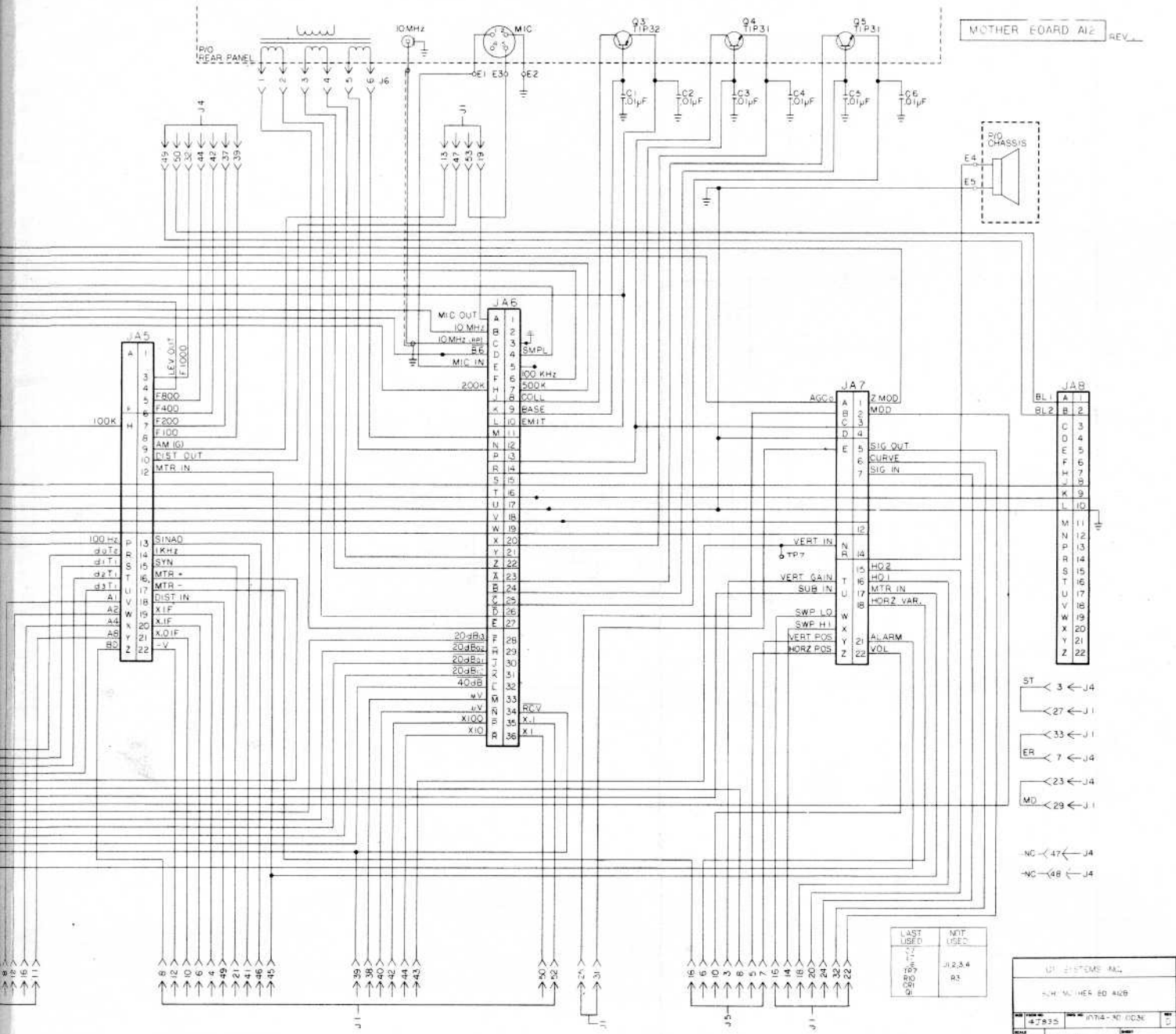
LAST USED	NOT USED
C42 L2 J59 TP5 R100 CR48 U39	R77

REVISIONS		REVISIONS		CT SYSTEMS INC.		
ECN'S	BY	ECN'S	BY	MODEL 3000 B		
F		A		FREQ CONTROL A11		
G		B	F001	DATE	NUMBER	
H		C		DATE	NUMBER	
I		D		DATE	NUMBER	
J		E		DATE	NUMBER	

APP'D



MOTHER BOARD A12 REV. 1



JA5

A	1
B	2
C	3
D	4
E	5
F	6
G	7
H	8
I	9
J	10
K	11
L	12

JA6

A	1
B	2
C	3
D	4
E	5
F	6
G	7
H	8
I	9
J	10
K	11
L	12
M	13
N	14
P	15
Q	16
R	17
S	18
T	19
U	20
V	21
W	22
X	23
Y	24
Z	25
A	26
B	27
C	28
D	29
E	30
F	31
G	32
H	33
I	34
J	35
K	36

JA7

A	1
B	2
C	3
D	4
E	5
F	6
G	7
H	8
I	9
J	10
K	11
L	12
M	13
N	14
P	15
Q	16
R	17
S	18
T	19
U	20
V	21
W	22

JA8

A	1
B	2
C	3
D	4
E	5
F	6
G	7
H	8
I	9
J	10
K	11
L	12
M	13
N	14
P	15
Q	16
R	17
S	18
T	19
U	20
V	21
W	22

- ST < 3 ← J4
- < 27 ← J1
- ER < 7 ← J4
- < 23 ← J4
- MD < 29 ← J1
- NC < 47 ← J4
- NC < 48 ← J4

LAST USED	NOT USED
1-10	J1,3,4
11-15	R1
16-19	
20-22	

G1 SYSTEMS INC.	
MOTHER BOARD A12B	
47835	1974-NO. 002E

8

7

6

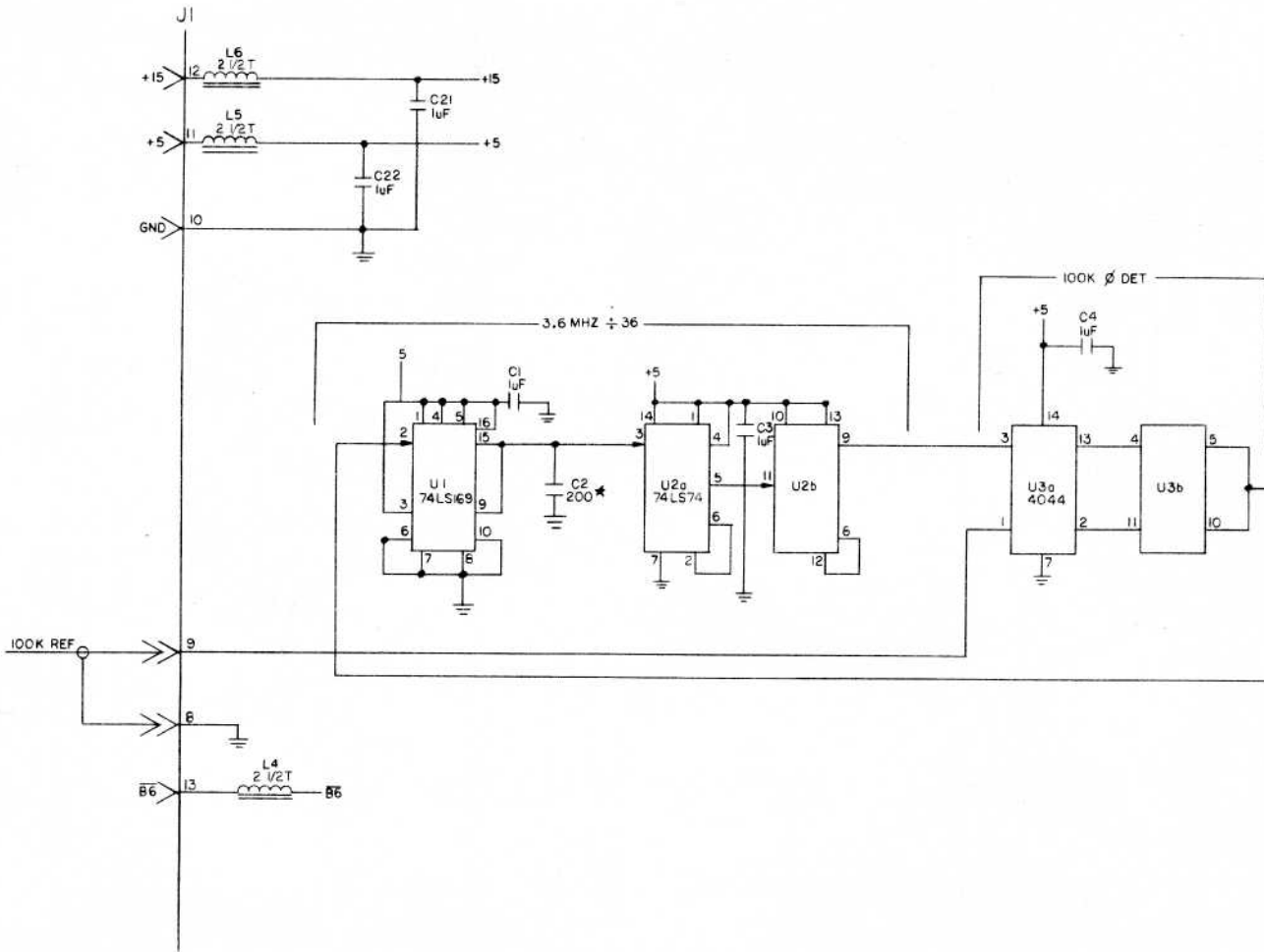
5

D

C

B

A



* TECH SELECT NOT TO EXCEED 300

LAST USED	NOT USED
C25	
L6	
C1	
Q3	
R18	
U5	
J1	

8

7

6

5

4

3

2

1

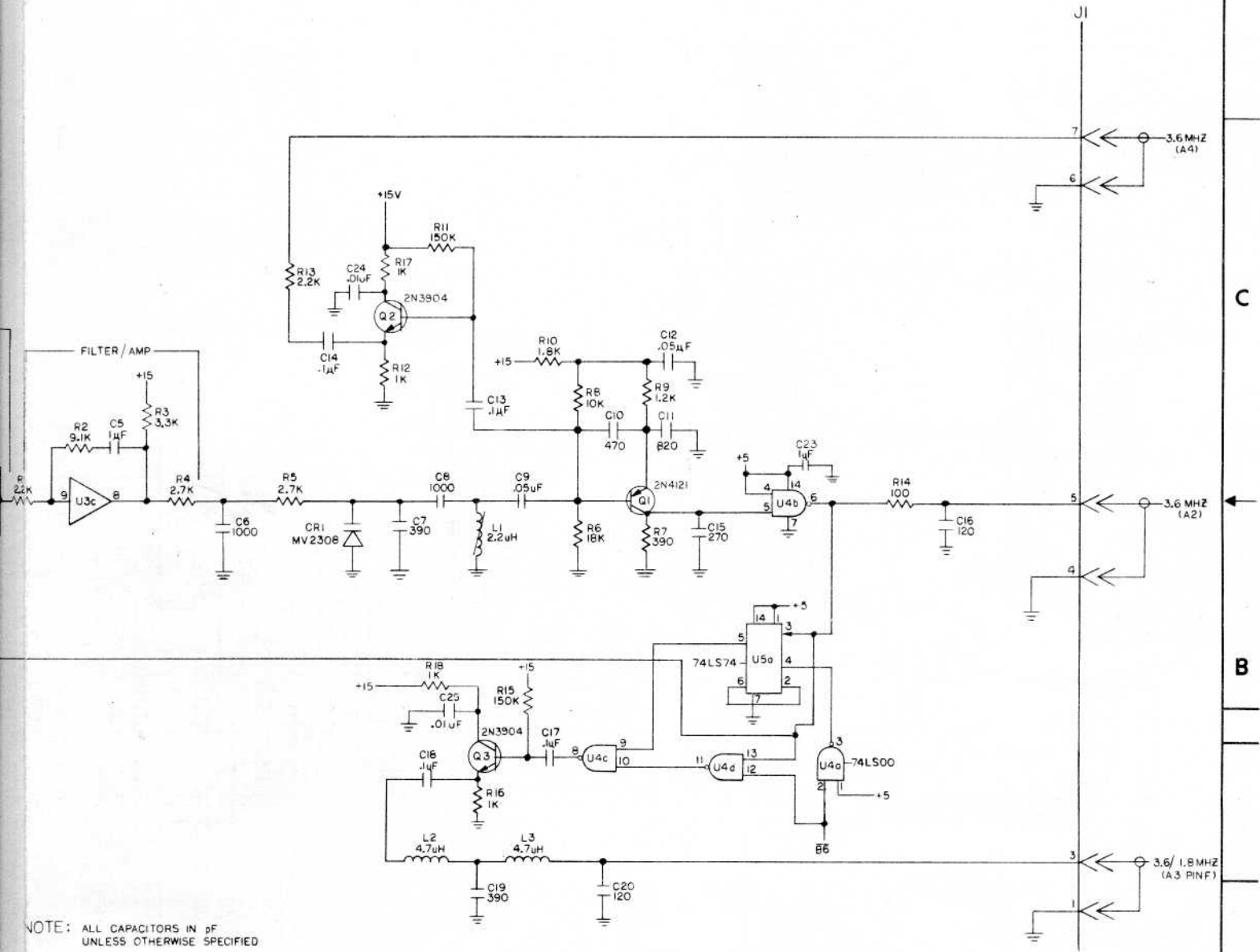
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	10-29-86	DCN

D

C

B

A



NOTE: ALL CAPACITORS IN pF UNLESS OTHERWISE SPECIFIED

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	
±	.XX ±	±	
±	.XXX ±		
MATERIAL		APPROVALS	
		DATE	
FINISH		DRAWN JDC	
		10/16/86	
NEXT ASSY		CHECKED	
USED ON			
APPLICATION		DO NOT SCALE DRAWING	
SIZE	CODE IDENT NO	DRAWING NO.	
D	4J835	10714-30-0085	
SCALE		SHEET / OF /	

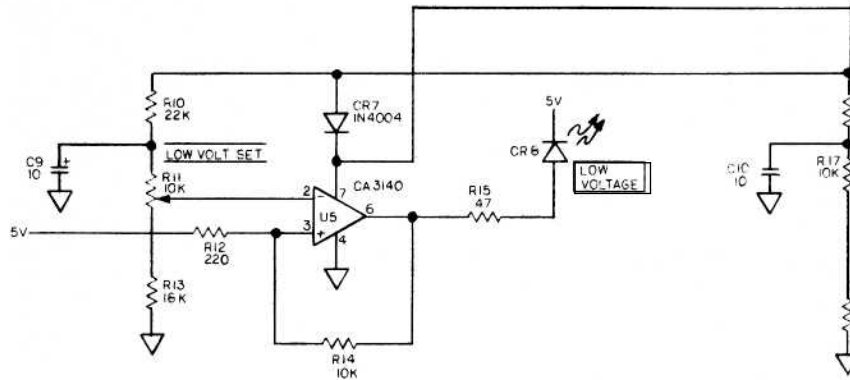
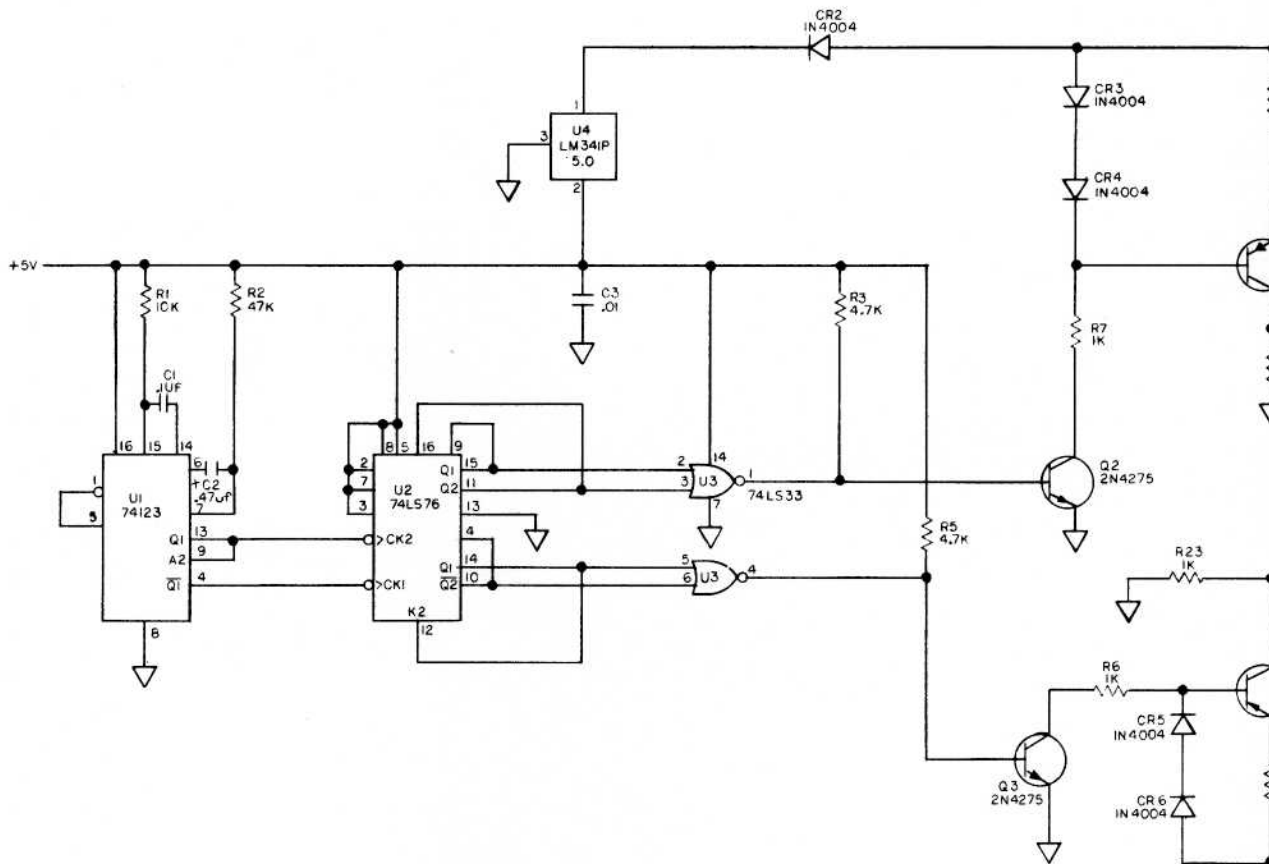
4

3

2

1



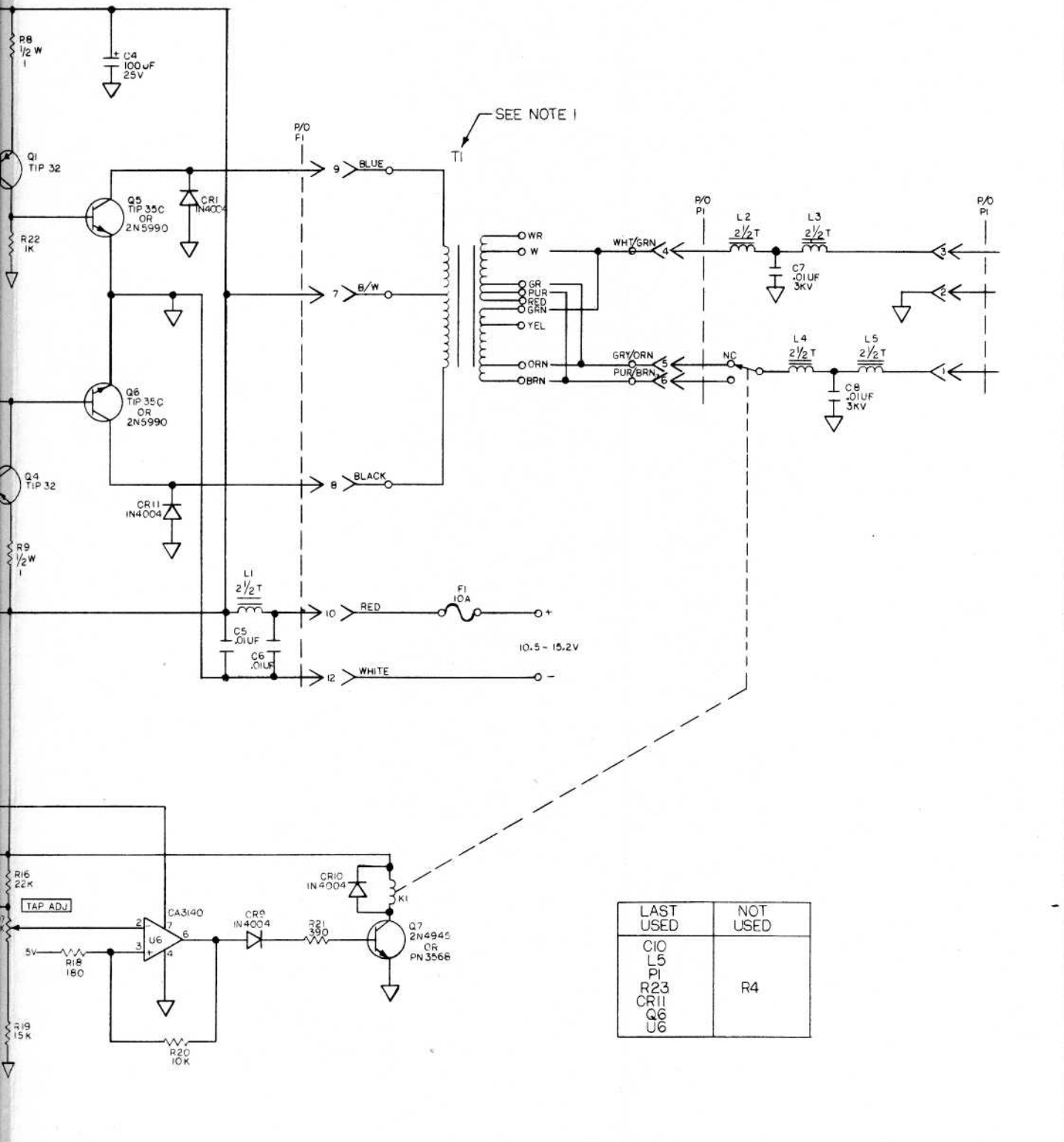


VOLTAGE	SHORT	CONNECTIONS TO TERMINALS			NOT USED
		4	5	6	
220	WHT/ORN	YEL	GRY	RED	WHT/RED PURPLE GREEN BROWN
234	WHT/ORN	GRN	GRY	RED	WHT/RED PURPLE YELLOW BROWN
240	WHT/RED /CRN	GRN	GRY	RED	WHITE PURPLE GREEN BROWN

NOTE:

1. TRANSFORMER (T1) AS SHOWN IS WIRED FOR 117V NOMINAL OUTPUT. SEE TABULATED DATA FOR OTHER TRANSFORMER OUTPUTS.
2. LOW VOLTAGE SET ADJUSTMENT IS MADE TO CAUSE LOW VOLTAGE LED TO LIGHT AS INPUT TO IC 6 VOLTS.
3. TAF ADJUSTMENT IS MADE TO CAUSE ENERGIZE AS INPUT DECREASES TO 12V.

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



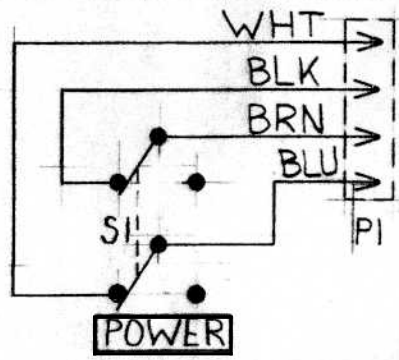
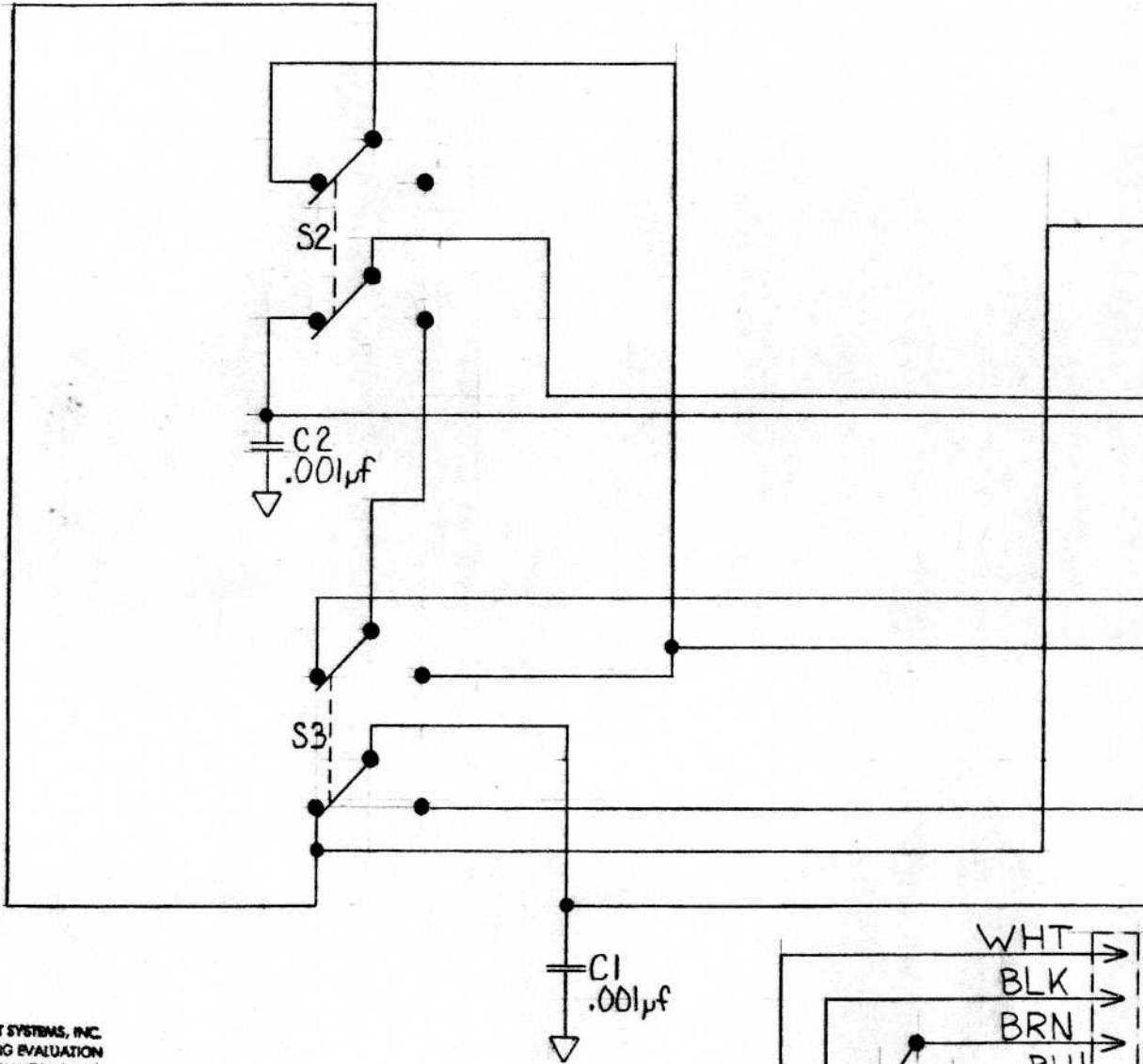
LAST USED	NOT USED
C10 L5 P1 R23 CR11 Q6 U6	R4

ED FOR
TED TABLE
S
MADE TO CAUSE
PUT DECREASES
RE RELAY TO
12.6 VCLTS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS/DECIMALS ANGLES 1/64 XX ± 01 ± 30 XXX ± 005		CONTRACT NO.		CT SYSTEMS INC.	
MATERIAL		APPROVALS	DATE	INVERTER BOARD REV A	
FINISH		CHECKED	8-18-78	3000 B	
NEXT ASSY		RELEASED		SIZE	CODE IDENT NO.
USED ON		THIS DOCUMENT CONTAINS INFORMATION FOR PRODUCTION OF THIS BOARD. IT IS TO BE USED ON THIS BOARD IN ANY MAN- UFACTURING PROCESS WITHOUT THE PRIOR APPROVAL OF DRAWING OF INVENTOR.		D	4J835
APPLICATION		DO NOT SCALE DRAWING		DRAWING NO.	10714-30-0056
		SCALE		SHEET / OF /	

ADDENDUM

An error discovered on the Rear Panel Schematic has resulted in the corrected schematic on the following page.



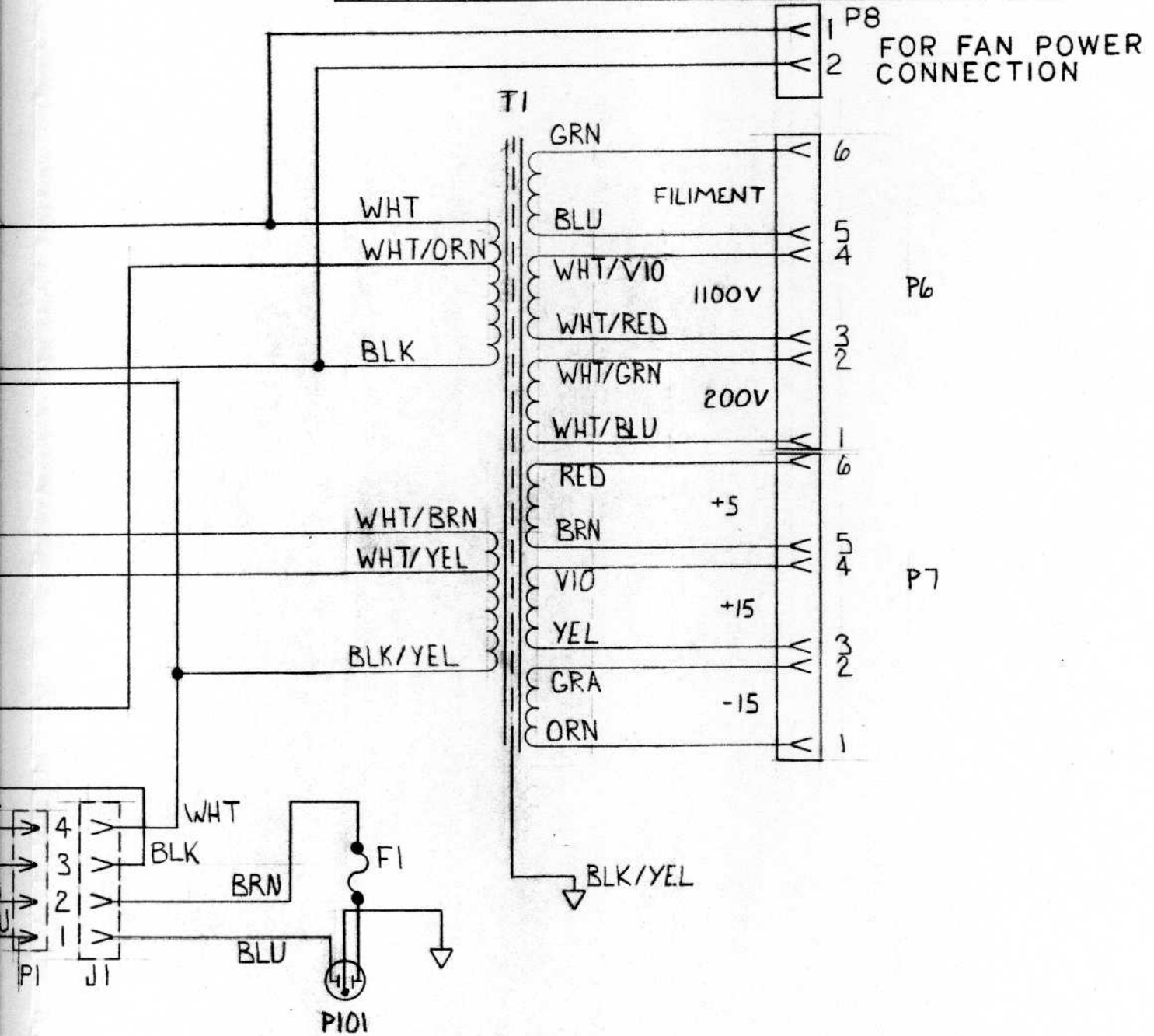
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NEXT ASSY	USED ON
APPLICATION	

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
2	D	DCN F-1002	2-29-84	W.P.
	E	ECN # 87111	1-18-88	JDC



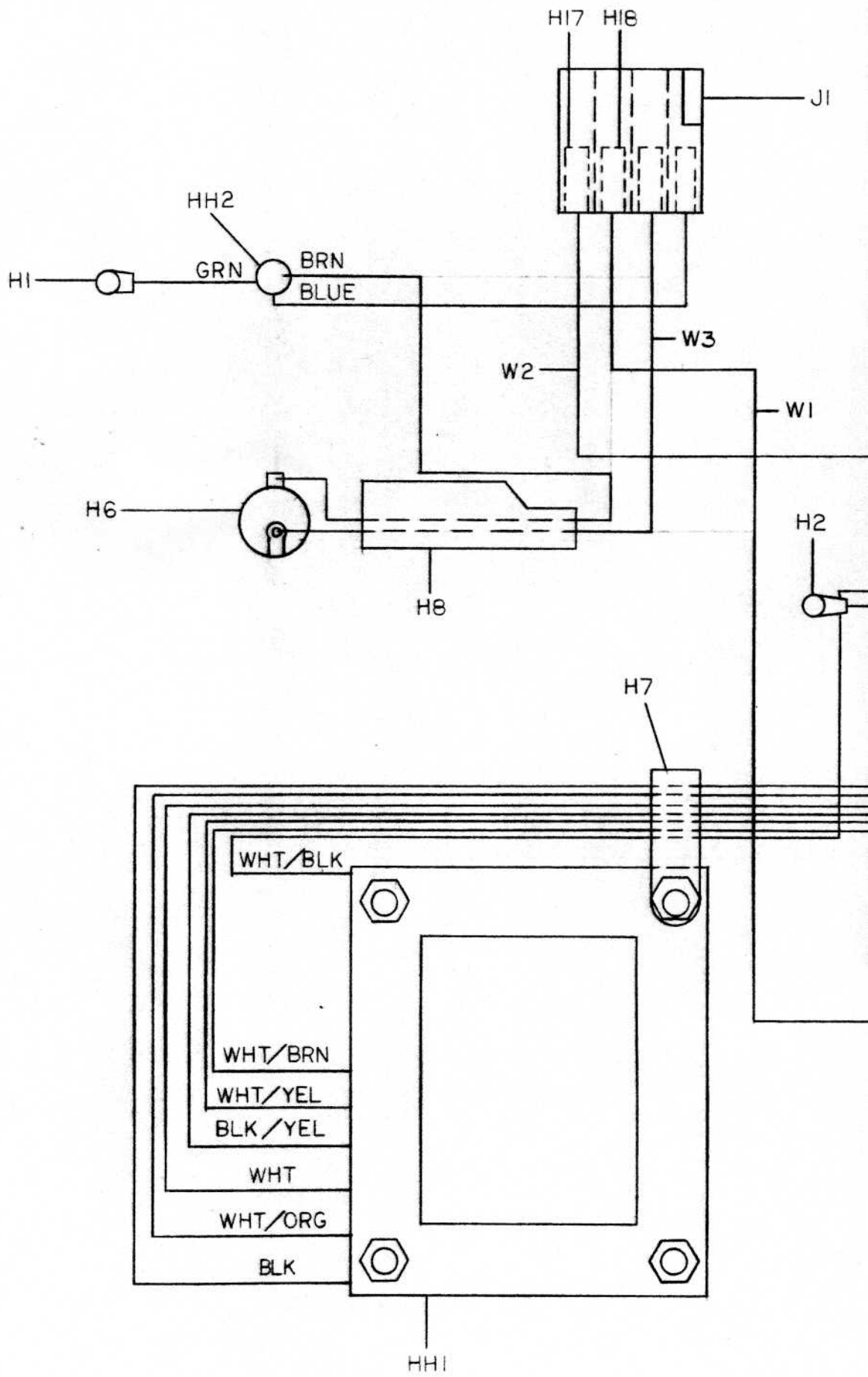
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
 FRACTIONS DECIMALS ANGLES
 ± XX ± ±
 .XXX ± ±
 MATERIAL
 FINISH
 DO NOT SCALE DRAWING

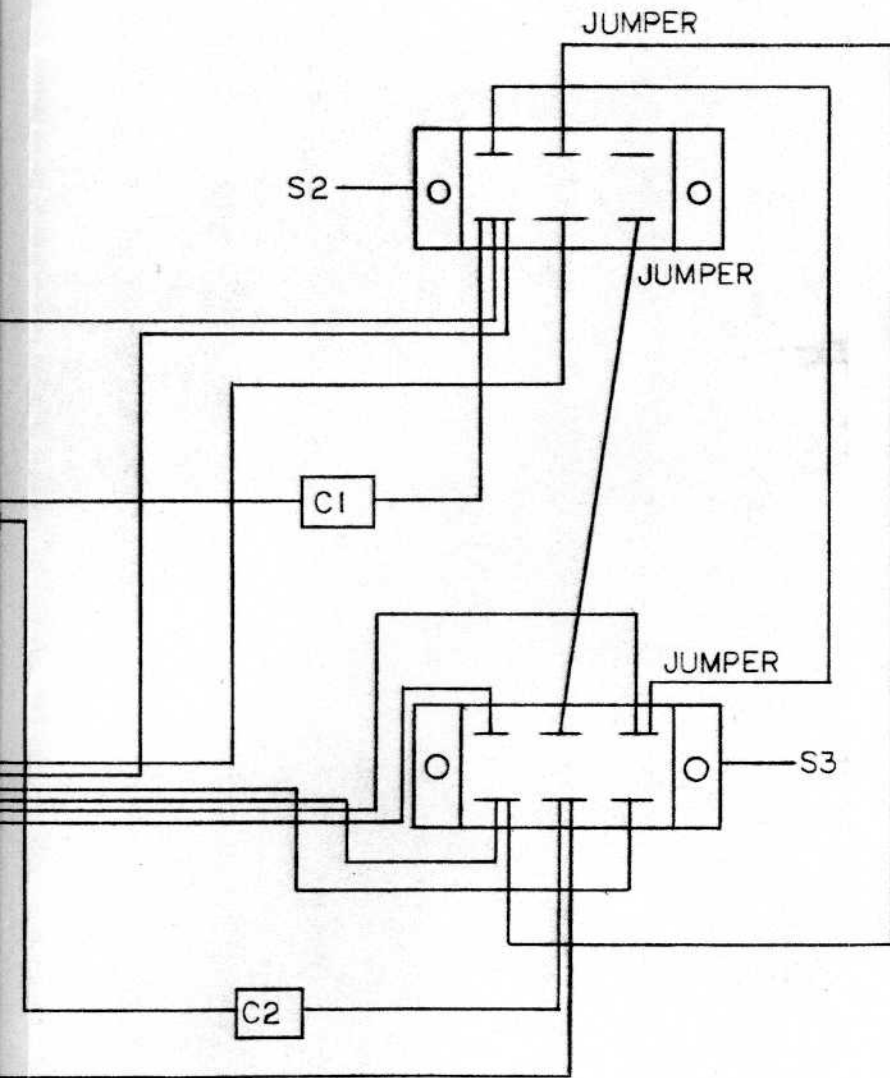
CONTRACT NO.	
APPROVALS	DATE
DRAWN Date Hed9sPeth	10/82
CHECKED	

CT SYSTEMS, INC.

REAR PANEL SCHEMATIC 3000B

SIZE B	CODE IDENT NO. 4J835	DRAWING NO. 10714-15-0004
SCALE	SHEET / OF /	





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RP ASSEMBLY
11118-70-0001

SHT. 2 OF 2