

**TECHNICAL MANUAL**  
**for**  
**SPECTRUM ANALYZER**  
**TS—1379 A/U**

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JETRONIC INDUSTRIES, INC., 4312 Main Street, Philadelphia, Penna. 19127

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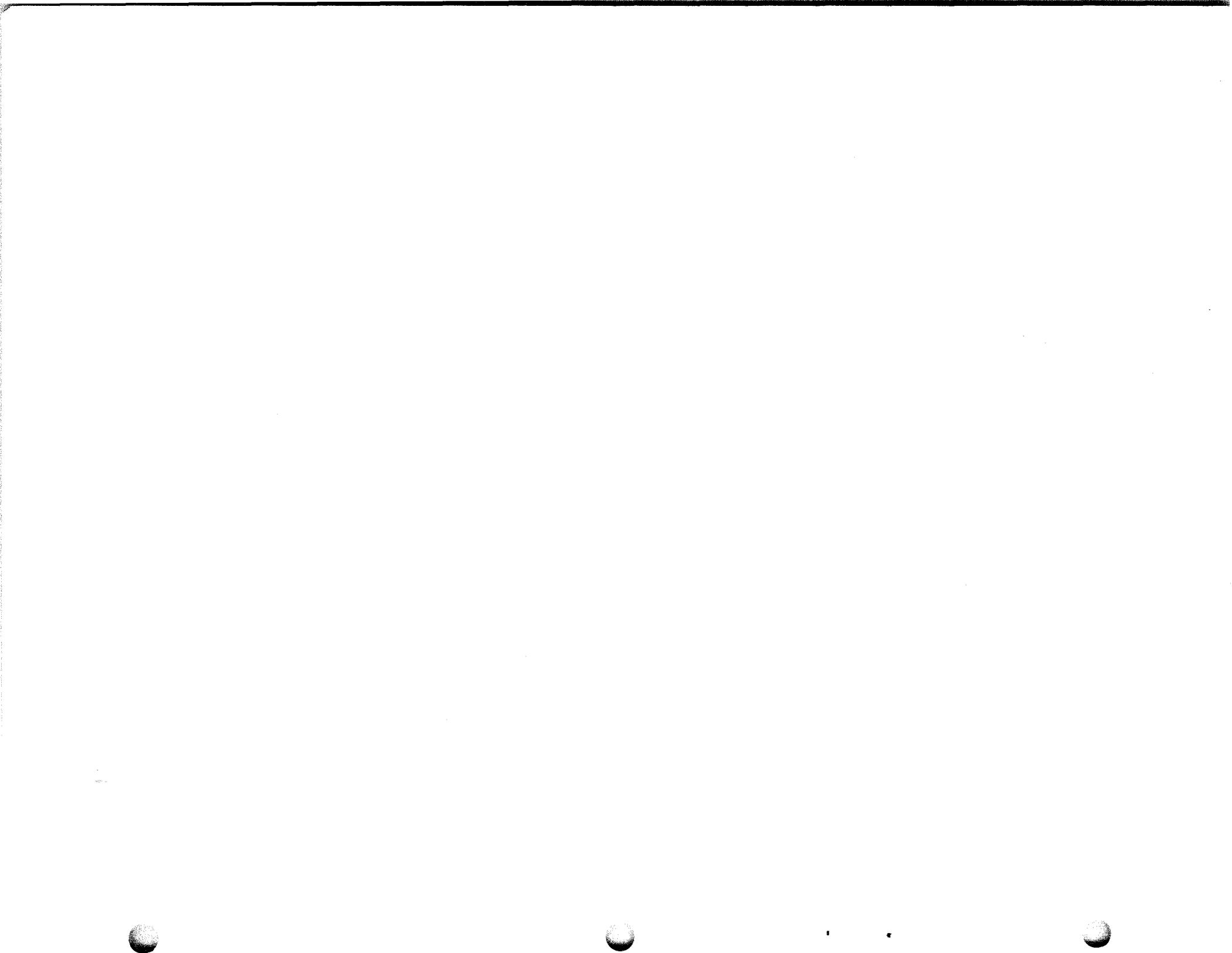
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SECTION 1  
GENERAL INFORMATION

1.1. SCOPE.

This Technical Manual describes the Spectrum Analyzer which is applied in the frequency range of 2 to 30 megacycles (mc) to measure single-sideband (SSB) transmitter characteristics such as intermodulation distortion, hum, noise level, carrier and unwanted sideband suppression, and similar characteristics.

1.2. GENERAL DESCRIPTION.

The Spectrum Analyzer is a precision test instrument designed for radio frequency rf spectrum analysis in narrow band communication systems. This instrument provides visual displays of the signal amplitude distribution over various selected portions of the radio-frequency band. The visual display is in the form of a plot of relative amplitude versus frequency on the screen of the cathode ray tube element. Figure 1-1 is the photograph of the complete test set.

1.3. REFERENCE DATA.

1.3.1. ELECTRICAL SPECIFICATIONS.

1.3.1.1. Input Frequency Range

- a. 485kc to 515 kc
- b. 2mc to 30mc
- c. 100 cps to 2mc with range extender (Not Supplied)

1.3.1.2. Sweep Widths (Sweep width factor indicates full frequency width, divided into plus and minus parts deviation from center frequency.)

Preset Ranges

- a. 150cps
- b. 500cps
- c. 1kc
- d. 2kc
- e. 3.5kc
- f. 7kc
- g. 14kc
- h. 30kc

1.3.1.3. Sweep Rates

- a. 10 seconds - Sweep widths of 150cps and 500cps
- b. 3.3 seconds - Sweep widths of 1kc and 2kc
- c. 1 second - Sweep widths of 3.5kc, 7kc, 14kc, 30kc

1.3.1.4. Fast Sweep

- a. 3.3 seconds and 1 second - Sweep width of 150cps and 500 cps

1. 3. 1. 4.

- b. 1 and .33 seconds - Sweep width of 1kc and 2kc
- c. .33 and 1 second - Sweep width of 3.5kc, 7kc, 14kc, 30kc.

1. 3. 1. 5. Frequency Separation (Minimum) for measurements 60db down- Skirt Selectivity

| Sweep Width, KC | Frequency Separation, CPS |
|-----------------|---------------------------|
| a. .150         | 50                        |
| b. .5           | 100                       |
| c. 1            | 400                       |
| d. 2            | 800                       |
| e. 3.5          | 600                       |
| f. 7.           | 900                       |
| g. 14           | 1400                      |
| h. 30           | 3200                      |

1. 3. 1. 6. Input Impedance

50 ohms Any Range

1. 3. 1. 7. Input Attenuator

Rotary Switch Type, steps of 5db from 0 to 60db for the 2mc to 30mc Input Range.

1. 3. 1. 8. Input Sensitivity

a. Less than 1 millivolt rms for full scale deflection over 2mc to 30 mc Input Range.

b. Less than 0.1 millivolt rms for full scale deflection Linear or Log, at 485 to 515kc Input Range. (Direct Sensitivity).

1. 3. 1. 9. Frequency Response

a. Uniform over 2mc to 30mc range at 30mc less than 3db relative to 2mc response.

b. Uniform within  $\pm 5\%$  over 485kc to 515kc band

1. 3. 1. 10. Leakage

Extraneous Signals down to at least 40db

1. 3. 1. 11. Residual Hum

Suppressed more than 60db

1. 3. 1. 12. Dynamic Amplitude Range

All in band, Odd-order Intermodulation products at least 60db below the level of two equal amplitude reference signals deflected 20db above full scale.

1.3.1.13. CRT Indicator

5 inch high persistence, flat face CRT with variable oscilloscope camera mounting bezel.

1.3.1.14. Scale Calibration

a. Amplitude Scale (Vertical)

- (1) Logarithmic Calibration, 0db to 40db, 5db intervals
- (2) Linear Calibration, 10:1, 0.1 linear intervals
- (3) Low range Extension: 20db calibration

b. Frequency Scale (Horizontal)

- (1) 10 linear incremental factor divisions of 0.1

1.3.1.15. Frequency Stability

a. Swept local oscillator drift less than 15cps per 10 minutes, after 1/2 hour warmup.

1.3.1.16. Tunable Oscillator

a. Frequency Range

- (1) 2.5mc to 30mc

b. Frequency Bands - Oscillator Frequency: Input Frequency

- (1) Band A - 2.5 mc to 3.8mc - 2mc to 3.3mc
- (2) Band B - 3.8mc to 5.8mc - 3.3mc to 5.3mc
- (3) Band C - 5.8mc to 9.0mc - 5.3mc to 8.5mc
- (4) Band D - 9.0mc to 13.2mc - 8.5mc to 12.7mc
- (5) Band E - 13.2mc to 20.0mc - 12.7mc to 19.5mc
- (6) Band F - 20.0mc to 30.5mc - 19.5mc to 30.0mc

c. Frequency Dial Calibration

(1) Calibration from 0 to 2mc is provided for use with frequency extending converter (Not Supplied)

d. Frequency Stability

(1) Better than +0.01% for a 10 minute interval after one-half hour warmup, and +0.005% for a 10 minute interval after 1 hour warmup.

e. Output Level

- (1) 0.3 volts rms adjustable monitored by front panel meter.

f. Output Impedance

- (1) 50 ohms nominal

g. Spurious Output

(1) Hum and noise sidebands at least 60db below the output level of the fundamental frequency.

1. 3. 1. 17. External Variable Oscillator (Not Supplied)

An external variable oscillator with same characteristics as described in 1. 3. 1. 16 may be used, it should not exceed 0. 5 volts rms. The Panel meter monitors the voltage.

1. 3. 1. 18. High Impedance Probe

Impedance of 12 megohms, shunted by 5uuf - 60db attenuation.

1. 3. 1. 19. External Attenuator (Not Supplied)

Maximum Input voltage of 0. 7 volts rms can be increased by insertion of external calibrated attenuation pads (50 ohms).

1. 3. 1. 20. Maximum Input Voltage Level

- a. 2mc to 30mc range: 0. 7 volts rms
- b. 485kc to 415kc range: 1 millivolt rms
- c. External calibrated pads for higher input voltages

1. 3. 1. 21. Internal Self-Checking Features

a. Crystal controlled internal calibration oscillator

- (1) Frequency: 500kc
- (2) Frequency Stability: +0. 02%, 10 minute intervals
- (3) Frequency Calibration Accuracy: +0. 02%
- (4) Internal Voltage Level Adjustable to Maximum 0. 05 volts rms
- (5) Spurious Output: Hum and noise level are at least 60db below

the output level.

(6) External Amplitude modulation capability. The 500kc oscillator may be amplitude modulated by an external audio frequency generator over the frequency range of 50 to 15000cps, 2 volts rms signal required.

b. Internal Dual Frequency RF Test Signal

- (1) Frequencies: 3000kc and 3002kc
- (2) Frequency Stability: +0. 02%
- (3) Frequency Accuracy: +0. 03%
- (4) Frequency Separation: 2kc +20%
- (5) Frequency Mixing: Linear, selectable either as a single frequency signal or dual frequencies.
- (6) Output Voltage: 0. 1 volt rms for dual signals
- (7) Output Impedance: 50ohms nominal
- (8) Signal Setting: Equal Amplitude
- (9) Spurious Output: All Intermodulation products at least 60db

below single frequency level.

## 1. 3. 1. 22. Power Source

- a. Line Voltage: 115 volts +10% single phase 47.5 to 450cps.
- b. Total Power: 40 watts at 126.5 volts.

## 1. 3. 2. Mechanical Description

## a. Dimensions: Combination Case

|      |                 |
|------|-----------------|
| High | 15-15/16 Inches |
| Wide | 20-1/2 Inches   |
| Deep | 18-1/2 Inches   |

(Suitable for standard 19 inch rack mounting)

## b. Weight

With Combination Case - 62 pounds  
Without Combination Case - 30 pounds

## c. Finish

Gray enamel type II, Class 2, of MIL-E-15090

## 1. 3. 3. Equipment Supplied

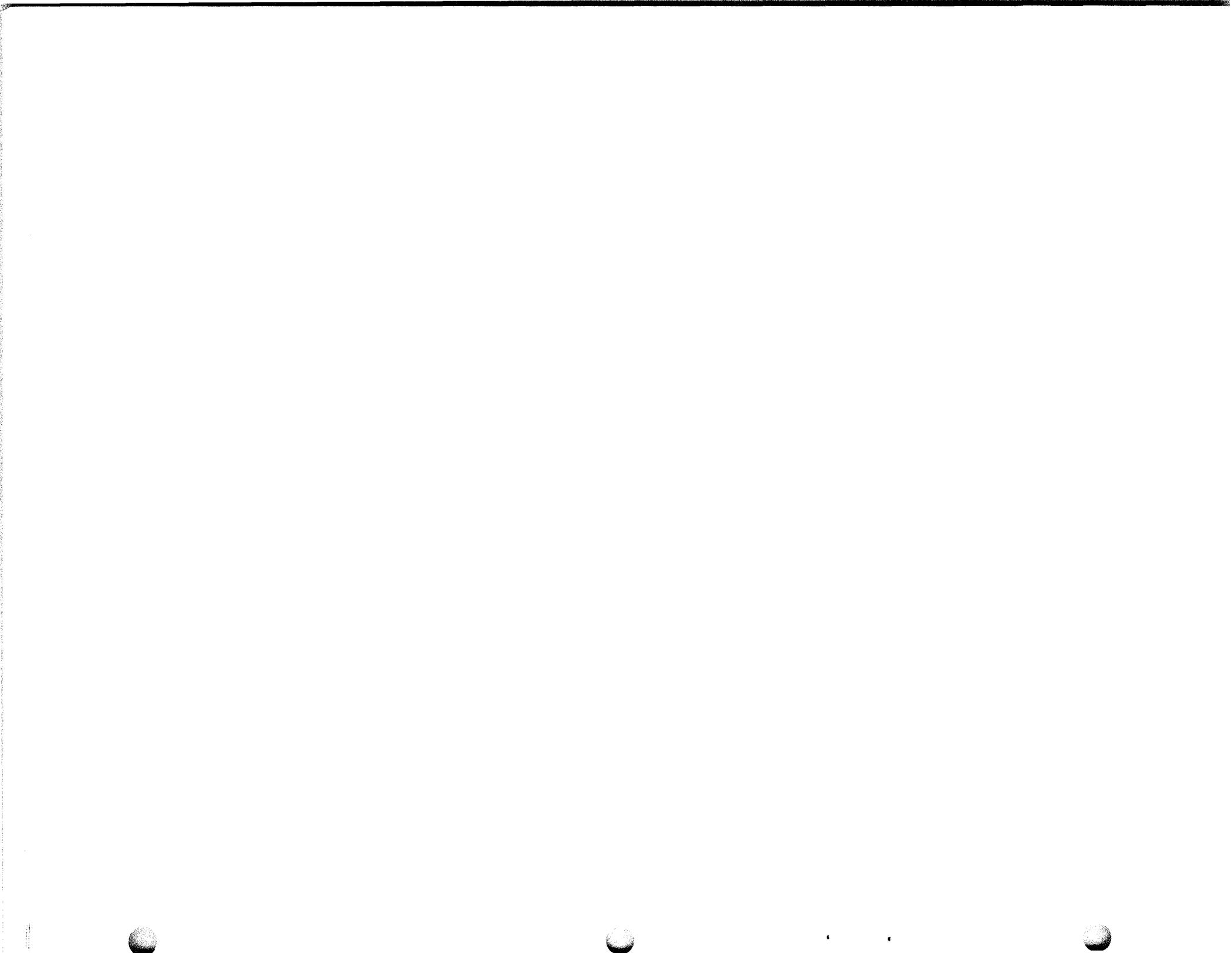
## 1. 3. 3. 1. Accessories

- a. Power Cable - 3 Conductor cable with UP-121M plug and MS3106R-14S-7S connector, 8 foot - 1 required
- b. Interconnection coaxial cable, 7 inches - 2 required
- c. High Impedance probe and cable - 4 feet with MS3102A Connector  
1 required
- d. Instruction Manuals

## 1. 3. 4. Equipment Required But Not Supplied

## 1. 3. 4. 1. Accessory Equipment Required But Not Supplied

- a. Signal generator, audio frequency
- b. RF signal generator.
- c. Attenuators (50 ohms) calibrated pads
- d. Frequency Range Extender: 100cps to 2mc.



SECTION 2  
INSTALLATION

2.1 UNPACKING AND INSPECTION

2.1.1. Unpacking

- a. Remove combination case from shipping container.
- b. Examine exterior of combination case for any evidence of damage due to rough handling, etc.
- c. Prepare damage report if required.
- d. Unscrew retaining clips and remove front of combination case.
- e. Remove analyzer and accessories from combination case.

2.1.2. Inspection

- a. Inspect for any visible damage. Tilt instrument to determine if any interior parts have broken loose.
- b. Check list of equipment supplied (Paragraph 1.3.3) for completeness.
- c. Report damage or shortage.

2.2. POWER REQUIREMENTS

- 2.2.1. The Power requirements are line voltage 115 vac  $\pm 10\%$ , single phase, 47.5 to 450cps.

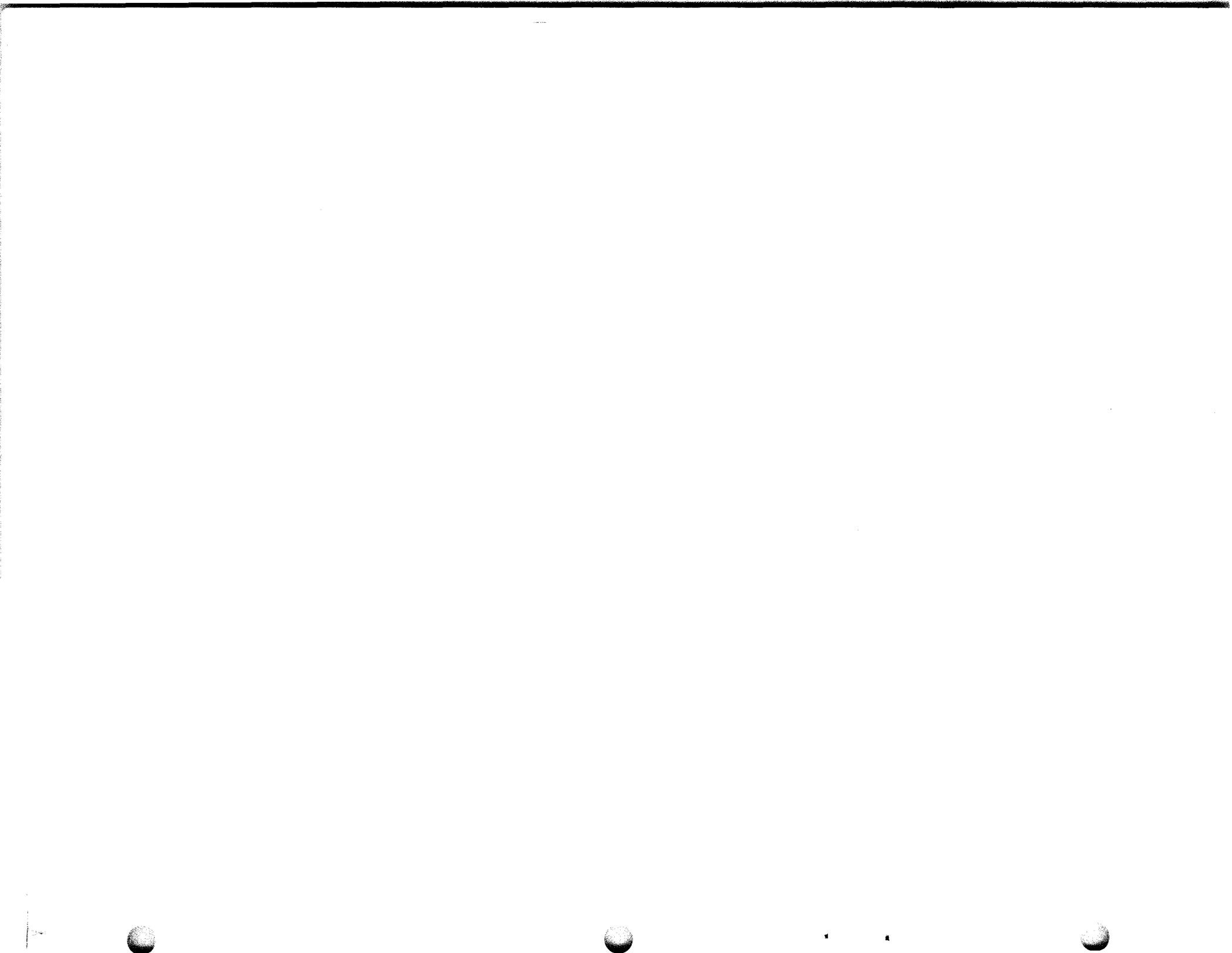
2.3. INSTALLATION

2.3.1. Bench mounted

- a. The spectrum analyzer, with combination case may conveniently be placed upon bench for use.

2.3.2. Rack Mounted

- a. Remove the analyzer from combination case and install in standard 19-inch rack.



### 3.1 GENERAL DESCRIPTION.

The Spectrum Analyzer TS-1379A/U is a sensitive, high resolution test instrument of the automatic scanning, superheterodyne receiver type.

The primary application is in testing Single Side Band (SSB) transmitters and receivers for measurement of third order distortion of the transmitted or received signal.

The Spectrum Analyzer permits analysis of one or many signals simultaneously. Each signal within the band scanned (sweep width) is displayed on the CRT element as one of a series of "pips". The pip amplitude indicates the signal level. The pip position along the horizontal axis indicates the signal frequency.

Any one of six parts of the rf band - the "Band Scanned" - within the 2mc - 30mc range of the Analyzer may be selected by means of the Band Selector tunable oscillator, and the "Scanning Width" may be selected by the Sweep Width Selector. The Sweep Width Selector positions provide eight different degrees of frequency separation of the signal display. A preset operating mode automatically adjusts Sweep Width, Gain, Resolution, and Scanning Rate at each one of the Sweep Width positions.

The Band Selector tunable oscillator is a high stability continuous tuning signal generator designed to provide local injection signals over the frequency range of 2.5mc to 30mc. It is a fully transistorized, precision, variable capacitor tuned oscillator. The 0.3 volts rms output signal is the first local oscillator in the heterodyne system. The tunable oscillator is free from spurious signals, hum and noise are suppressed at least 60db below signal level. The unit is particularly suitable for use in intermodulation testing.

The Spectrum Analyzer is also valuable for monitoring a frequency band for the appearance of or disappearance of and shift of signals. A display of frequency distribution can be obtained by selecting the Sweep Width, bringing the "Scanned Band" into the narrowest position (150cps) to enable examination of signals so closely adjacent in frequency that their corresponding "pips" normally are merged together. At this reduced Sweep Width (150cps) signals with an amplitude ratio of 60db separated by 50cps are clearly indicated. One of the internal self-checking features, the Internal Dual Frequency RF Test, simulates such a test.

NOTE: More details of operation are described in  
SECTION 4.

### 3.2. PREPARATION FOR USE.

Spectrum Analyzer TS-1379A/U is operated from a 115 volt ac,  $\pm 10\%$  single phase, 47.5 to 450cps power source.

#### 3.2.1. Interconnection Procedure

- a. Plug the AC Power Line cord into the front panel 3 conductor connector, Power Input, connect the other end of cord to AC power source.
- b. Connect Internal Variable Freq. OSC, Output to Variable Freq. Osc. Input with Coaxial Cable W102.
- c. Connect Dual RF output to Signal Input with coaxial, if required. Use W103.
- d. Connect Coaxial (BNC) Attenuator Pad from Input Connector to the signal source if Input Signal level exceeds the specified level. (See SECTION 1.3.1.20).

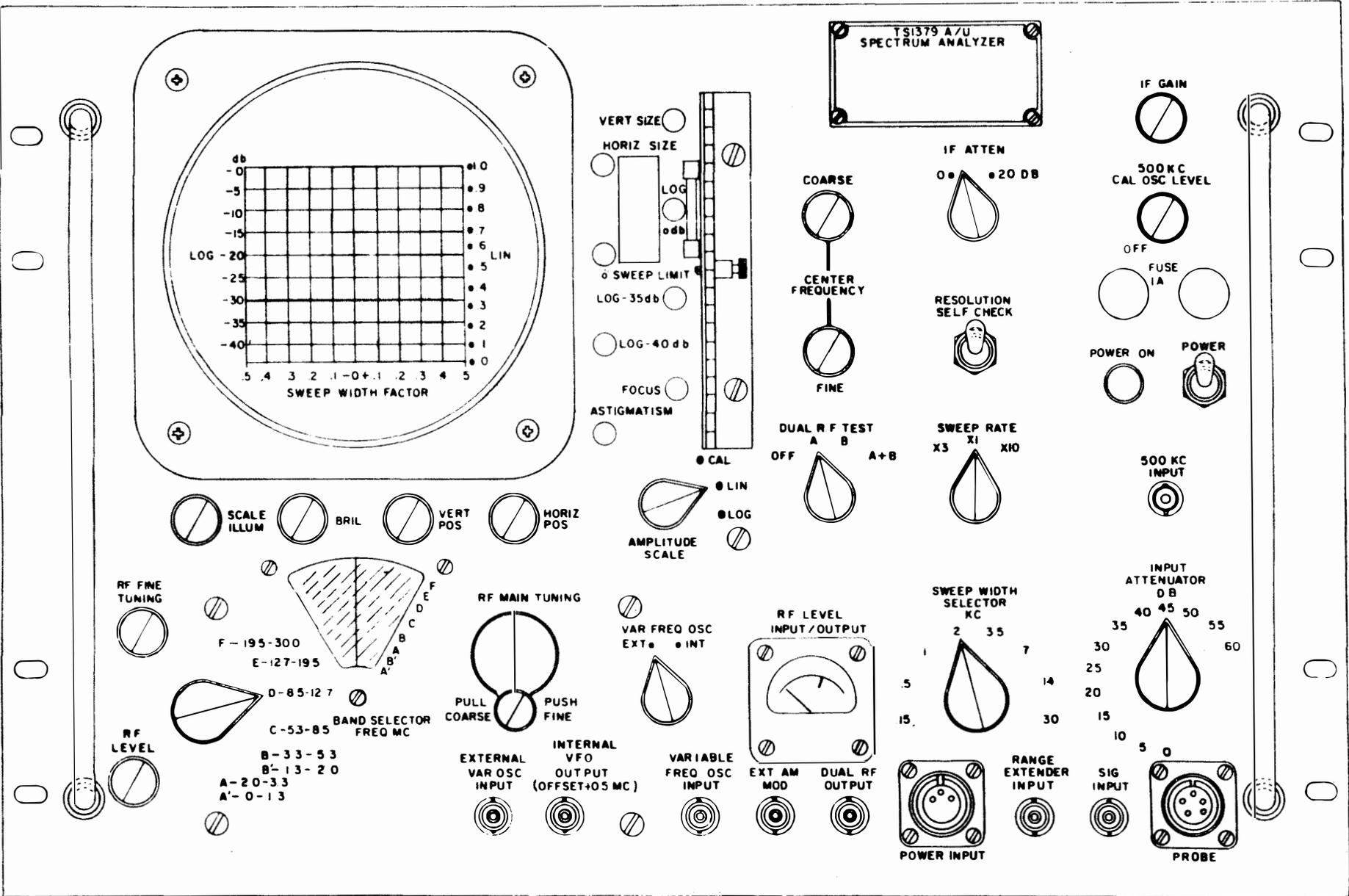


FIGURE 3-1: FRONT PANEL

CAUTION: Excessive signal level may damage input circuits, or produce unwanted harmonics, which leads to erratic evaluation.

### 3.3. OPERATION PROCEDURES

#### 3.3.1. Description of Controls

##### 3.3.1.1. Front Panel Controls

###### a. Input Attenuator

The Input Attenuator is a 13 position rotary switch and provides attenuation in 5db steps from 0 to 60db in the signal input circuit.

###### b. IF Gain

The IF Gain provides more than 20db range. It should initially be set in mid-position, turned clockwise for more gain, counterclockwise for less gain, in making fine adjustment.

###### c. IF Attenuator

This two-position rotary switch provides for insertion of 20db attenuation in the 140kc amplifier when required. When this switch is in the 20db attenuation position, the input signal may be adjusted for full scale log deflection. When this switch is in the 0db position, the full 60db dynamic range may be used. Only the lower 40db portion of the range will be displayed on the CRT within the scale limits.

###### d. Center Frequency, Coarse

This control sets the swept oscillator about its' mean frequency as indicated by the "pip" or "pips" corresponding to signals at the input (center frequency 500kc).

###### e. Center Frequency, Fine

This control serves as fine adjustment for the Center Frequency Adjustment. In use, it should be set at mid-position until the signal is set to the center by the coarse adjustment, the final adjustment is then made by this Fine adjustment.

###### f. Sweep Width Selector

This rotary switch provides choice of eight preset sweep widths, 150cps, 500cps, 1kc, 2kc, 3kc, 7kc, 14kc, and 30kc. In any position the selectivity of the IF amplifier (140kc) is automatically set for optimum resolution. The sensitivity of the Analyzer is constant within 2db on all ranges.

###### g. Sweep Rate

This automatic reset rotary switch provides three different sweep rates; X3, three times the scanning speed, X10, ten times the scanning speed of the X1 position. This allows centering signals on the CRT a screen without a wait of 10 or 3 seconds between sweeps. The fast sweep also shortens the search for signals. The switch circuit is automatically reset in the X1 position.

###### h. Band Selector, Frequency MC

This rotary switch provides choice of any one of six frequency bands for the variable frequency tunable oscillator. (See 1.3.1.6a).

###### i. Main Tuning

This dial shaft is geared down to provide fine tuning of the dial to cover any given band. The dial is pulled out for direct drive fast tuning for initial signal location.

###### j. Fine Tuning

This control is for venier tuning, following Main tuning adjustment.

k. RF Level

This control adjusts the RF level from 0 to greater than 0.3 volts rms. The calibrated meter indicates the output level. At normal operation the output level should be adjusted to 0.3 volts rms.

l. Calibration Oscillator Level

This control varies the output voltage of the 500kc calibration oscillator. The oscillator is internally connected through an attenuator circuit network to the 500kc input connector. The oscillator is crystal controlled, it serves to locate the center of the Analyzer display. When modulated by an external audio signal (2 volts rms), it provides side band marker signals to test sweep width.

Oscillator output is zero when the knob is turned fully counterclockwise and switch is turned off.

m. Dual RF Test

This rotary switch provides 4 positions:

- (1) OFF, both RF Generators are turned OFF.
- (2) A, 3000kc Generator ON.
- (3) B, 3002kc Generator ON.
- (4) A + B, both Generators ON.

In position A and position B, only single frequency output is available at the Dual RF output connector. In position A+B, both Generators are on and provide a linearly mixed output to the Dual RF output connector.

For internal RF Intermodulation Test the Dual RF output must be connected to the RF Input by connector cable.

n. Scale Illumination

This control knob is turned clockwise to increase the edge illumination of the calibrated CRT screen.

o. Brilliance

This control adjusts intensity of the CRT beam.

p. Vertical Position

This control adjusts the level of the base line trace up or down the vertical axis.

q. Horizontal Position

This control adjusts the base line trace along the horizontal axis.

r. Calibration Linear LOG

This rotary switch provides three positions, as follows:

(1) Calibrated Checks CRT operation. Base line trace is moved to top of calibrated reticle.

(2) LIN. Signals of amplitude ratio of 10 to 1 may be observed simultaneously on CRT screen. The dots on right hand side of CRT screen represent 0.1 increments up to 1.0.

(3) LOG. Signals of amplitude ratio of 100: (40db) may be observed simultaneously. Equally spaced horizontal lines on CRT scale represent 5db intervals.

s. Power

The power switch connects or disconnects the line voltage to the set, power ON is indicated by the amber light at the left of the switch.

t. Resolution Self-Check

This switch introduces a momentary change of Scanning Frequency which determines automatic resolution condition. The circuit is automatically reset so that the display returns to its' normal condition when the switch is released.

### 3.3.1.2. Infrequently Used Controls

The following controls are located behind the door on the front panel. They are as follows:

- a. Horizontal Size  
This control adjusts the length of the horizontal trace.
- b. Vertical Size  
This control adjusts the vertical gain of the deflection amplifier.
- c. Sweep Limit  
This control adjusts the Swept Oscillation dispersion to proper sweep width.
- d. Log 0db  
This control is used to adjust the log compressor in the top position of the vertical deflection.
- e. Log-35db  
This control adjusts the log compression in the mid and lower position of the vertical deflection.
- f. Log-40db  
This control sets the base line trace position for the logarithmic operation mode.
- g. Focus  
This control adjusts the sharpness of the CRT beam presentation.
- h. Astigmatism  
This control adjusts the uniformity of the CRT beam.

### 3.3.1.3 Front Panel Indicators

- a. RF LEVEL INPUT/OUTPUT  
This meter indicates the RF input or RF output level.
- b. POWER ON  
The POWER ON condition is indicated when the amber light is lit.

### 3.3.2. SEQUENCE OF OPERATION

#### 3.3.2.1. IF Operation (485 to 515kc Band Pass Region)

- Step 1: Set the Power switch in the ON position. Amber indicator will light. In about two minutes the trace will appear on the CRT screen.
- Step 2: Adjust the BRIL control until the trace is just visible.

NOTE: Allow a 30 minute warm-up period before proceeding with further adjustments.

- Step 3: Set the front panel control as follows:

- a. BRIL Adjust as required
- b. FOCUS Adjust for sharp trace
- c. ASTIG Adjust for uniform trace
- d. AMPLITUDE SCALE Set in LIN position

- e. VERT POS Adjust trace to coincide with the Lin-0 line on CRT SCALE then select SCALE desired.
- f. HORIZ POS Center trace on CRT screen
- g. CENTER FREQ COARSE Center Position pointer up
- h. CENTER FREQ FINE Center Position pointer up
- i. IF GAIN Set in mid position
- j. IF ATTEN Set at 20db
- k. SWEEP WIDTH Set at 30kc
- l. CAL OSC. LEVEL Set position as required
- m. INPUT ATTENUATOR Set at 0db
- n. DUAL RF TEST Set in OFF position unless required
- o. VAR FREQ OSC External position

Step 4: Connect external signal 500kc IF input.

- a. Adjust IF GAIN until signal pip is displayed on CRT scale at full scale deflection (0db level).
- b. Adjust CENTER FREQ COARSE until pip moves into center of the screen.
- c. Change SWEEP WIDTH as required to observe signal on screen.
- d. Adjust CENTER FREQ. COARSE until pip comes to center of screen again.
- e. Adjust CENTER FREQ FINE if required until pip comes to center of screen.
- f. Change IF ATTEN to 0db position, observe pip height, pip goes over the 0db line which shows signal levels at -20db, level the center line -20db becomes the -40db level, and the bottom -40db line becomes the -60db level. Observe skirt width at the bottom line, this is the skirt selectivity at -60db down.

3.3.2.2. If modulation is present on signal, adjust Sweep Width Selector and gain as required to observe Modulation Amplitude and frequency or other characteristics.

3.3.2.3. Operation (2.0mc to 30.0mc)

Step 1: Connect external signal to SIGNAL INPUT.

- Step 2:
- a. Set the front panel control BRIL, FOCUS, ASTIG, VERT, POS, HORIZ. POS, CENTER FREQ COARSE, CENTER FREQ FINE AS given in Step 3 - a through h.
  - b. AMPLITUDE SCALE Set in LOG position
  - c. IF GAIN Set to mid position
  - d. IF ATTEN Set to 20db
  - e. SWEEP WIDTH Set to 30kc
  - f. CAL OSC LEVEL Set to OFF position

- g. INPUT ATTENUATOR           Set as required depending on Input Signal level.
- h. DUAL RF TEST                Set to OFF position
- i. BAND SELECTOR FREQ RANGE   Set to Band for frequency desired
- j. MAIN TUNING                 Set to frequency desired
- k. RF LEVEL                    Set to 0.3 volt rms

- Step 3:   Adjust the MAIN TUNING dial until signal is located near the center of the screen. Use the fast scanning X10 position during the search period to more quickly locate the signal. Use Fine Tuning if required.
- Step 4:   Reduce SWEEP WIDTH to 14kc, or as required to observe signals. Adjust CENTER FREQ COARSE for symmetrical location of pip.
- Step 5:   Adjust IF GAIN for full scale deflection (0db line).
- Step 6:   Change IF ATTEN from 20db to 0db and observe the -20db level, -40db level or -60db level. Distortion components are distributed on either side of the input signal and at separations equal to the frequency difference if a two tone signal is being observed. Usually the first distortion pips are the largest. A SWEEP WIDTH 3 or 4 times greater than the frequency difference between tones should be chosen. See sketch (Paragraph 3-15)

3. 3. 3.   Indicator Presentation

The following illustrations are typical spectrum presentations:

- a.   Figure 3-2 shows a 500kc signal modulated at 800cps' SWEEP WIDTH in 2kc. Amplitude SCALE set on LOG position.

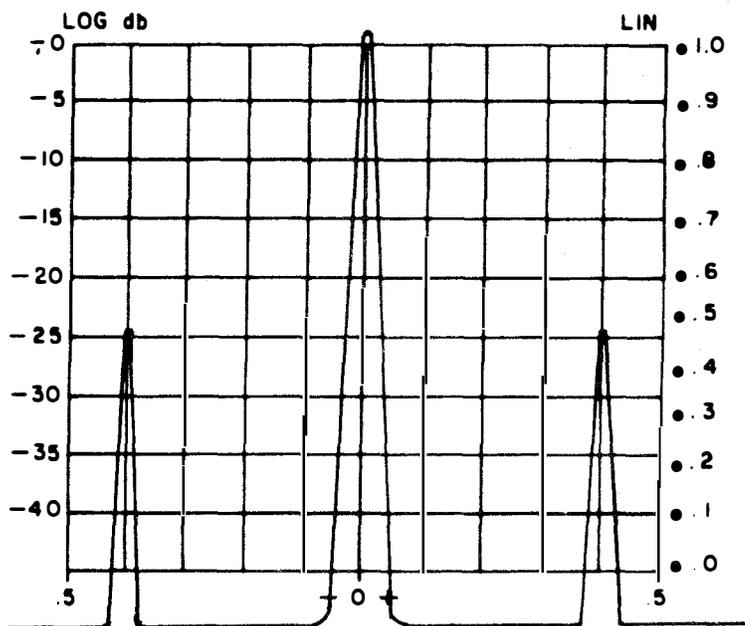


FIGURE 3-2  
500KC SIGNAL, MODULATED AT 800CPS (2KC SWEEP RANGE)

b. Figure 3-3 shows a 500kc signal, SWEEP WIDTH 150cps. The two side pips are 60cps from the center, and indicate a 60cps HUM -40db below the signal level.

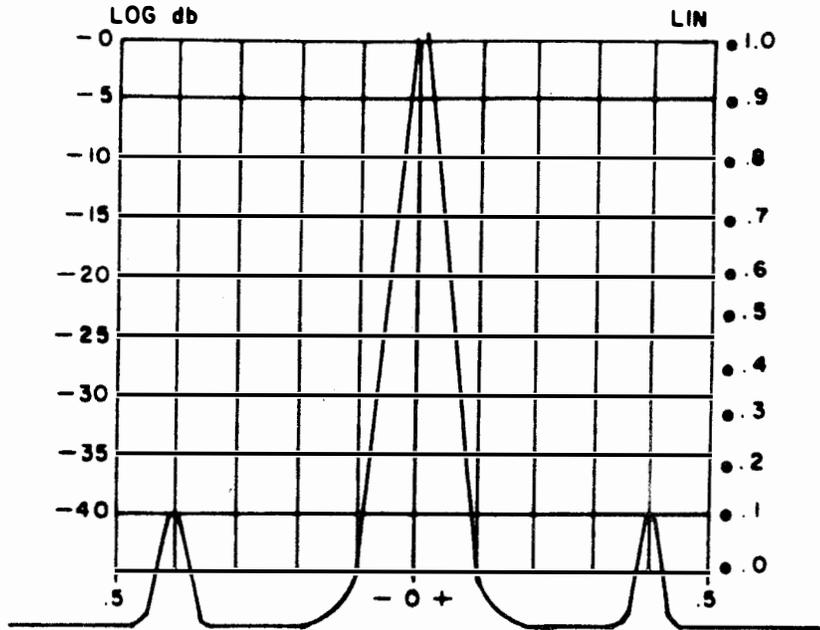


FIGURE 3-3  
500KC SIGNAL MODULATED WITH 60CPS HUM (150CPS SWEEP RANGE)

c. Figure 3-4 shows 3mc signal, heavy HUM modulation produces many side pips; the first side pip represents the 60 cycle HUM modulation, the second side pip shows 120cps components, and the third side pip (right hand side) present 180cps components (3rd harmonic of 60cps).

|                 |   |        |
|-----------------|---|--------|
| SWEEP WIDTH     | - | 500cps |
| AMPLITUDE SCALE | - | LOG    |
| IF ATTN         | - | 0db    |

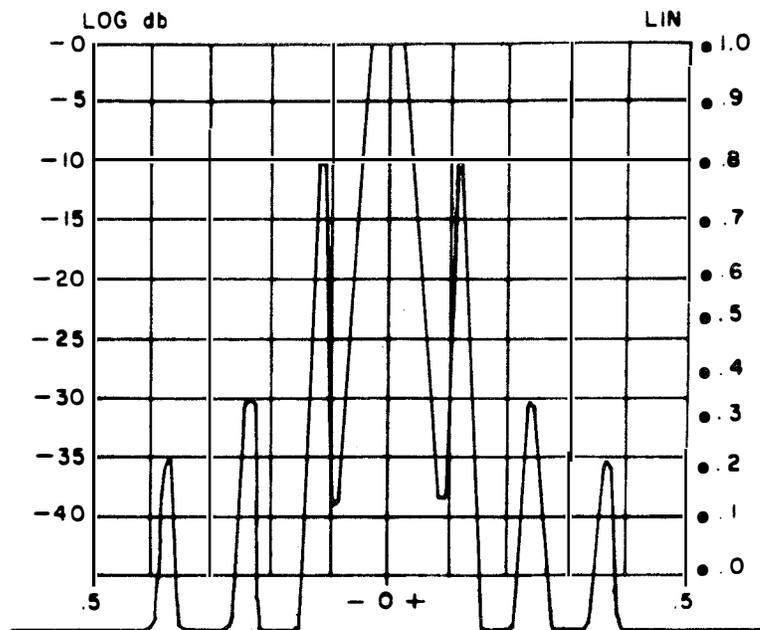


FIGURE 3-4  
3MC SIGNAL MODULATED WITH 60CPS, 120CPS, 180CPS

With AM modulation the pips are symmetrically distributed along the main pip.

#### 3.3.4. Tuning Adjustments

The Spectrum Analyzer TS-1379A/U has been factory aligned in normal use no tuning adjustments are required. Operation of the front panel controls cannot detune it. If the operating instructions are followed, normal conditions can always be re-established.

**CAUTION:** Touching or attempted tuning of the alignments can damage or misalign the Analyzer. In this case, a complete realignment might be necessary. See Manual of Instrument Calibration Procedures.

#### 3.3.5. Auxiliary Equipment

The auxiliary equipment to be used in conjunction with the Analyzer is not yet available.

#### 3.4. SUMMARY OF OPERATING PROCEDURES

3.4.1. Recommend Trial Operation

a. Use the Internal Calibration Oscillator to test center position, Sweep Width, Internal Hum, Dynamic Response, Resolution. Use the two-tone RF Test Oscillator to test intermodulation, spurious modulation.

b. When the operator has familiarized himself with these tests, he can then proceed to test external signals. The former tests provide an immediate comparison between clear signals and distorted signals, stable and noisy signals.

3.5. EMERGENCY OPERATION

In Sequence of Operations, 3.2.3.1., Step 3, normal operation procedure calls for a 30 minute warmup period. In the case of an emergency requirement however, the Spectrum Analyzer can be used in about two minutes after the power is turned on. Under these conditions, signal drift may occur during the first 30 minutes of operation, this can be balanced out with the normal operating controls, such as CENTER FREQ COARSE, or RF TUNING adjustments.

3.6. USE WITH RANGE EXTENDING FREQUENCY CONVERTER

The TS-1379A/U provides two additional V. F. O. Band ranges for use with Range Extending Converter equipments. The bands are marked in red on the dial and panel as A<sup>1</sup> and B<sup>1</sup>. These two bands cover the frequency range from 0 to 1.3 mc and 1.3 to 2.0 mc respectively. The Range Extender output signal must be 2.0 mc above the Range Extender input signal for proper operation with the spectrum analyzer.

SECTION 4  
TROUBLESHOOTING

4.1. GENERAL.

a. Most of the trouble encountered in the Spectrum Analyzer make themselves apparent by the appearance or non-appearance of one or more of the characteristic curves on the oscilloscope screen. Some of the more common troubles, with the appropriate remedial actions, are listed in the Troubleshooting Chart 4-1.

WARNING: DANGEROUS VOLTAGES ARE PRESENT IN THE EQUIPMENT, OBSERVE ALL POSSIBLE PRECAUTIONS WHEN WORKING WITH THE EQUIPMENT.

4.2. VOLTAGE AND RESISTANCE MEASUREMENTS.

a. All voltages should be measured with a vacuum-tube volt meter. Connect the meter with ac power off. Discharge all high voltage capacitors and attach a meter lead to the chassis first and then attach the other lead to the point under test. Observe the proper polarity. Place the meter on its highest range and reduce the range to obtain midscale deflection. Do not touch the voltmeter when making high voltage measurements.

b. All resistances are measured from the test point to ground unless otherwise stated. Generally, measured resistance values should be within plus or minus 10% of the stated value.

4.3. TEST EQUIPMENT REQUIRED.

a. For testing the Spectrum Analyzer TS-1739A/U the following test equipments are recommended. The first named unit in each group is preferred, the other being alternate equipment which may be used if the preferred unit is not available.

- b. Vacuum tube voltmeter with a Hi Impdenace Probe Type AN/USM-116
- c. Oscilloscope - AN/USM-140 or AN/USM-105 TEKTRONIC Model 545 with Plug-In Type C/A
- d. Signal Generator - SG-582/UN - CAQI GUGA
- e. Electronic Counter - AN/USM-207 or CAQI 524D U/525A
- f. 50 ohm Attenuators - HEWLET PACKARD 355C  
HEWLET PACKARD 355D

TROUBLESHOOTING CHART 4-1

| SYMPTOM  | TROUBLE LOCATION  | PROCEDURE  |
|--|---|--|
| (1) With power switch on, no light from "Power On light" no trace on screen. | (1) AC power line defective                                     | (1) Check voltages: 103.5V-126.5V, 47.5-450CPS   |
|  | (2) Poor connection on power switch                             | (1) Replace power line   |
|  | (3) Defective power switch                                      | (2) Repair connections   |
|  | (4) Burned out fuses  | (3) Replace switch   |
|  | (5) Defective filter  | (4) Replace fuses  |
|  | (6) Transformer voltage on primary but not on secondary winding | (5) Replace filter   |
|  | (7) Defective rectifiers  | (6) Replace transformer  |
|  | (8) Defective filter capacitors                                 | (7) Replace rectifiers   |
|  | (9) RF level below normal                                       | (8) Replace filter capacitors  |
|  | (10) Check for 170V at lamp socket and CRT                      | (9) Check - 13V power supply   |
|  | (11) Defective lamp socket or connections                       | (10) Check for -13VDC at converter input<br>(10) Check for defective component<br>(11) Replace lamp socket (socket contains a 62K resistor built in) |
| (2) With power switch on, light from Power on light - no trace on screen.    | (1) Deflection operation controls improperly set                | (1) Reset controls   |
|  | (2) No high voltage at CRT connector                            | (2) Check for open circuits in the converter circuits - <u>WARNING Dangerous Voltages are present in the Equipment.</u>                              |
|  | (3) Defective CRT   | (3) Replace CRT  |
| (3) Trace on CRT is abnormal (Not sharp)                                     | (1) Burn spots indicated on CRT                                 | (1) Replace CRT  |
|  | (2) Dot or very short timing trace                              | (2) Adjust Horizontal line size  |
|  | (3) Trace is jittery  | (2) Replace timing and horizontal amplifier board  |
|  | (4) Trace is fuzzy  | (3) Check power supply for regulation<br>(4) Adjust focus and Astigmatism controls   |
| (4) Trace on CRT normal, but no amplitude indication.                        | (1) Check scale calibration for proper deflection               | (1) Replace Vertical Amplifier board A-2 and adjust vertical size for proper calibration   |
|  | (2) No vertical movement  | (2) Set amplifier scale switch to log position. Check calibration with 500KC internal oscillator performance check. See 3.3.2.                       |
|  | (3) No pip on screen  | (2) Perform RF test with signal through input. See 3.8.2.3.<br>(2) Check vertical size control   |

TROUBLESHOOTING CHART 4-1 (Cont'd)

| SYMPTOM  | TROUBLE LOCATION  | PROCEDURE   |
|--|---|---|
| (4) (Cont'd)   |   | (3) Check all amplifier boards (A-4, A-5, A-6, A-7, A-8) and replace the defective ones.  |
| (5) Set operating normally but no scale illumination | (1) Scale is lit only when controls is fully clockwise. | (1) Check scale illumination control and components.<br>(2) If one bulb is out, the other cannot operate. Replace defective bulb. |

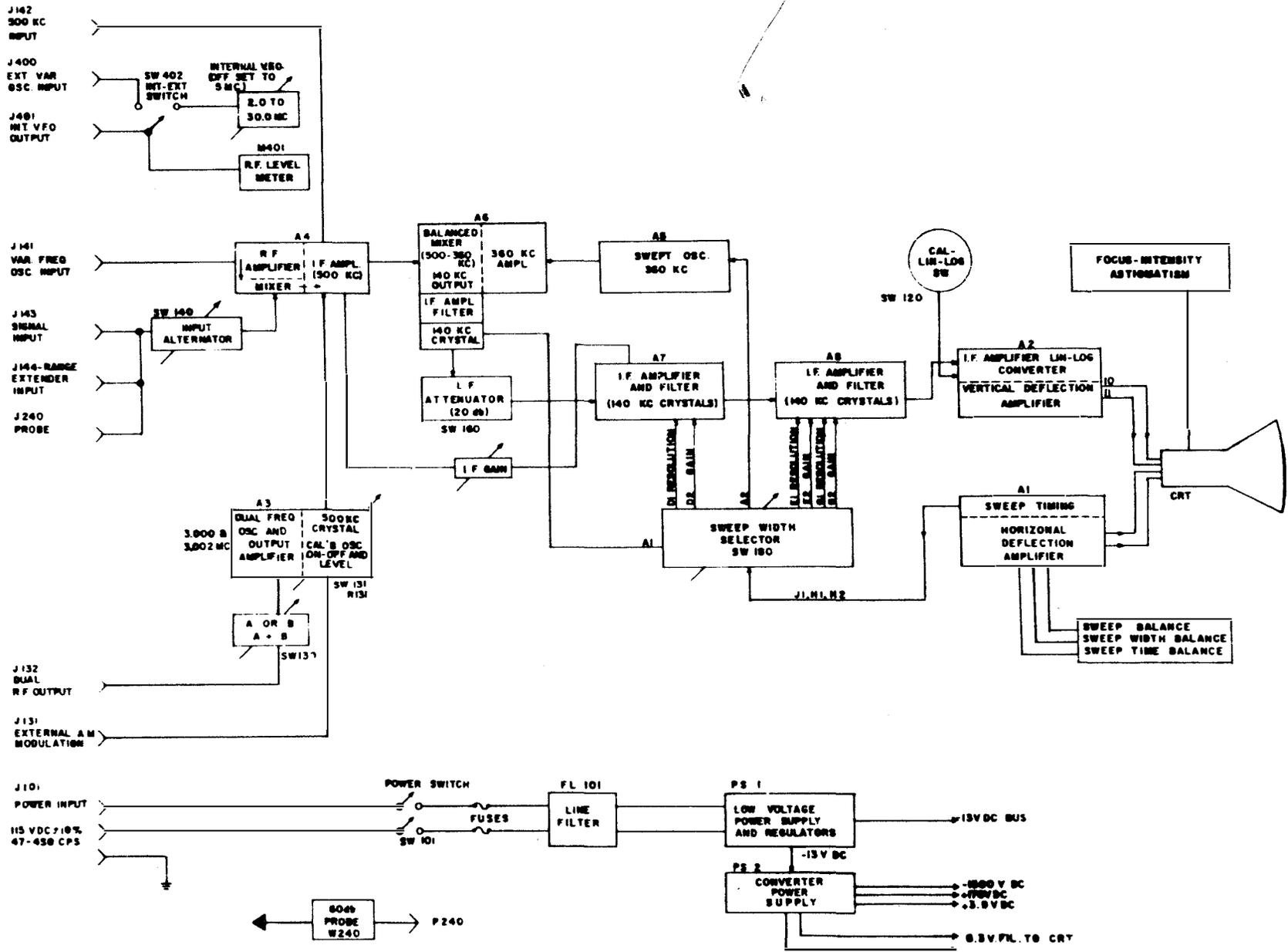


Figure 4-2: Block Diagram

Figure 4-2

UNCLASSIFIED  
NAVSHIPS 0969-094-3010

TS-1379A/U  
TROUBLESHOOTING

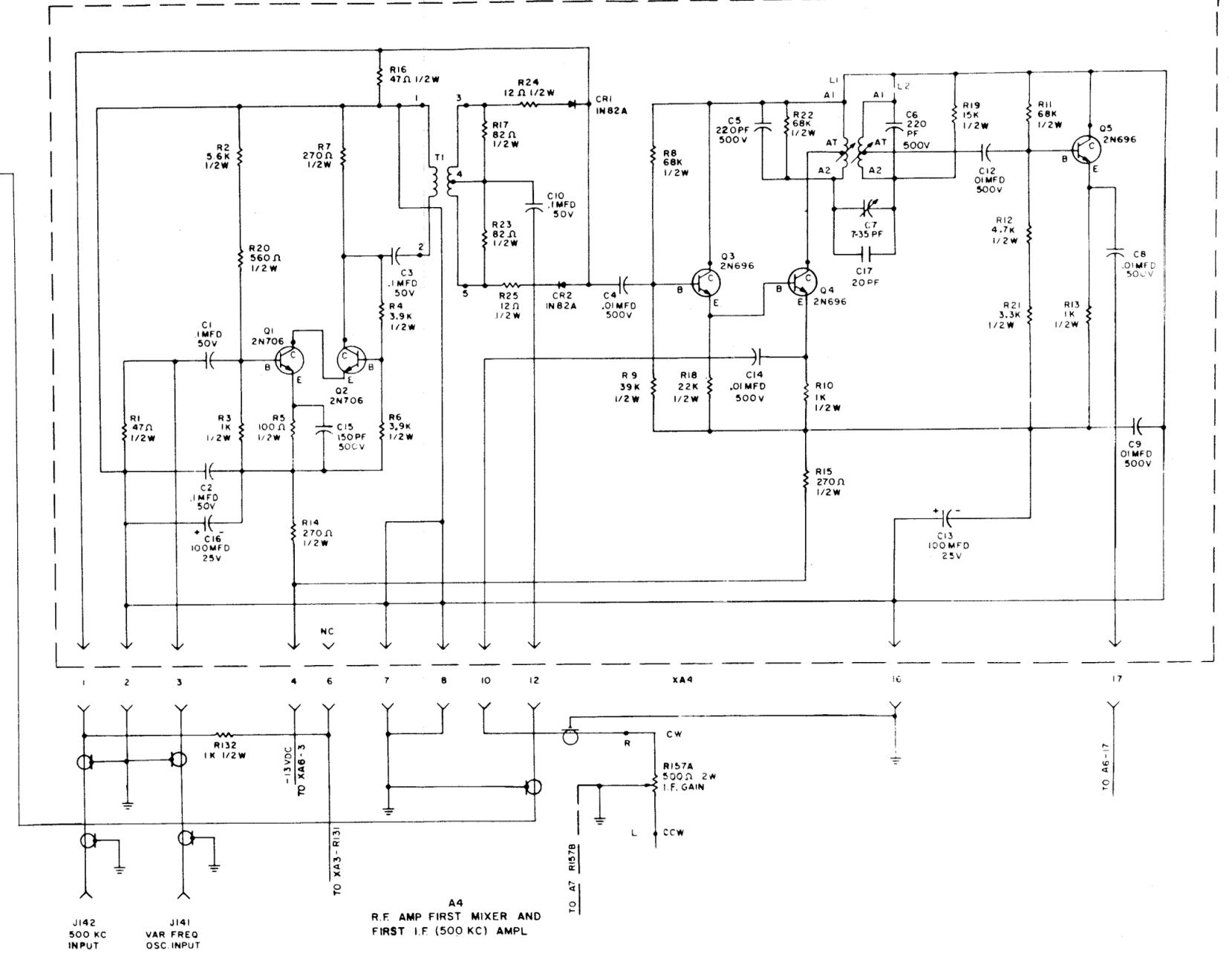
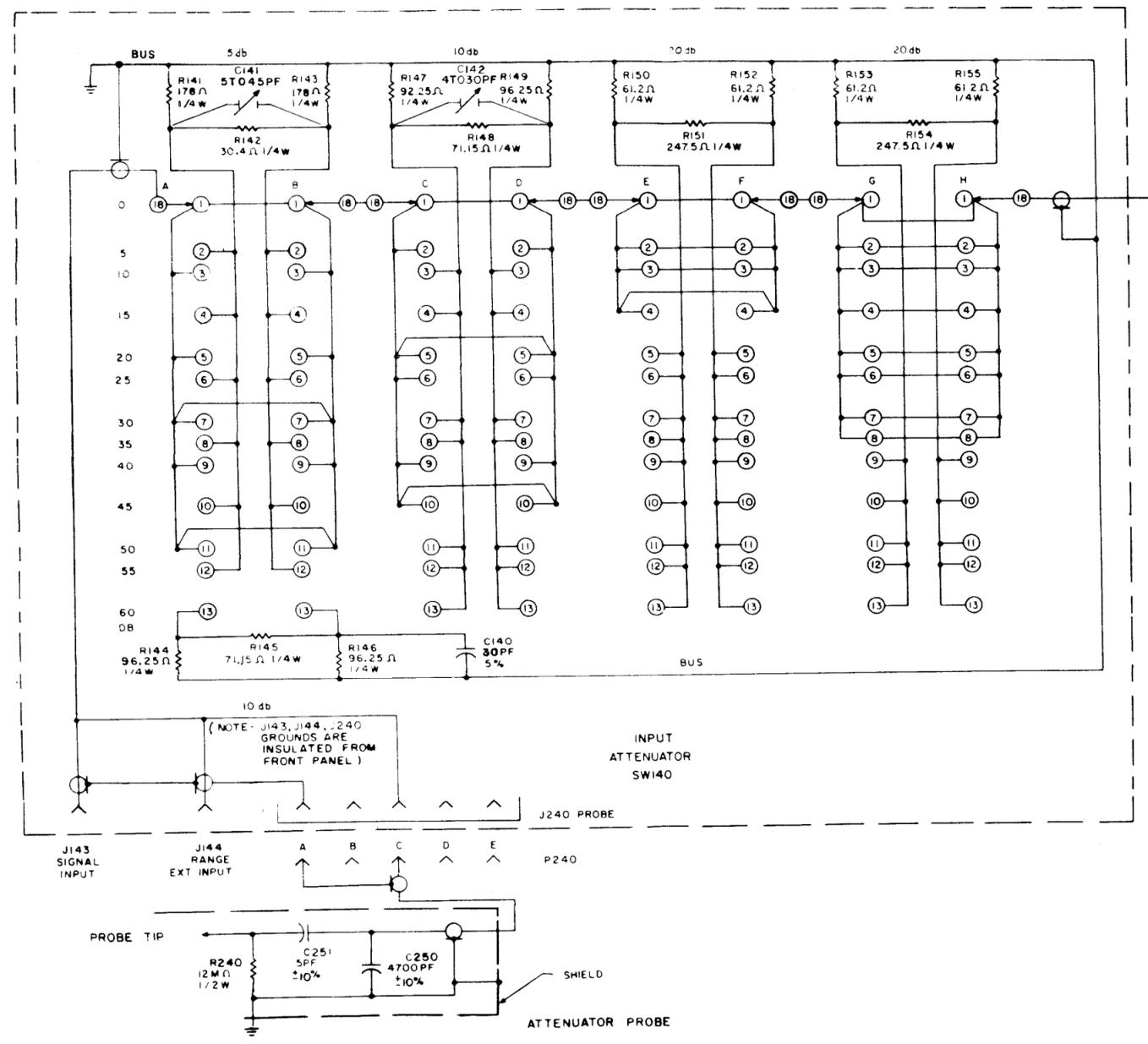


Figure 4-3. Schematic Diagram, Input Attenuator, R. F. Amplifier & First Mixer 4-5, 4-6

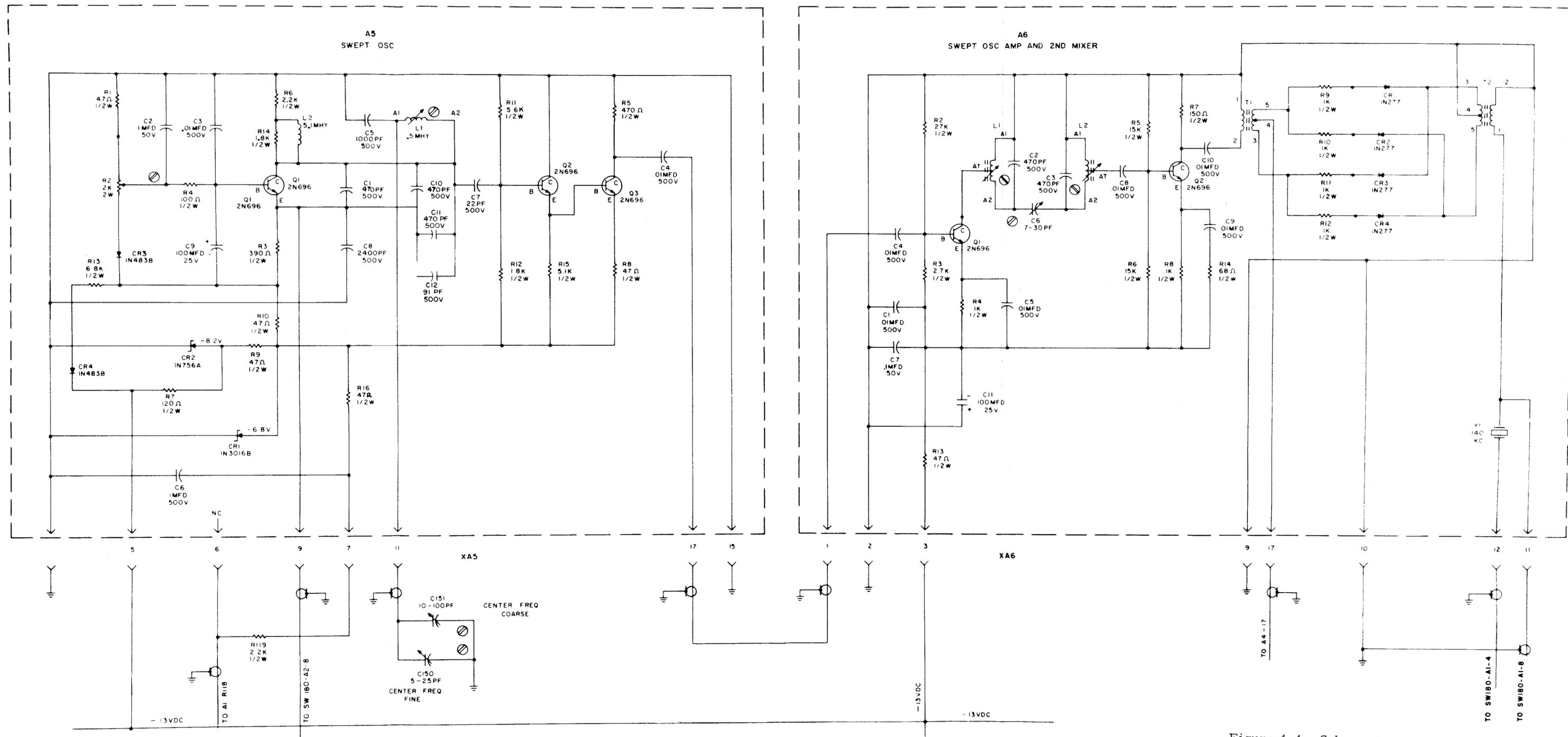


Figure 4-4. Schematic Diagram, Swept Oscillator & Second Mixer

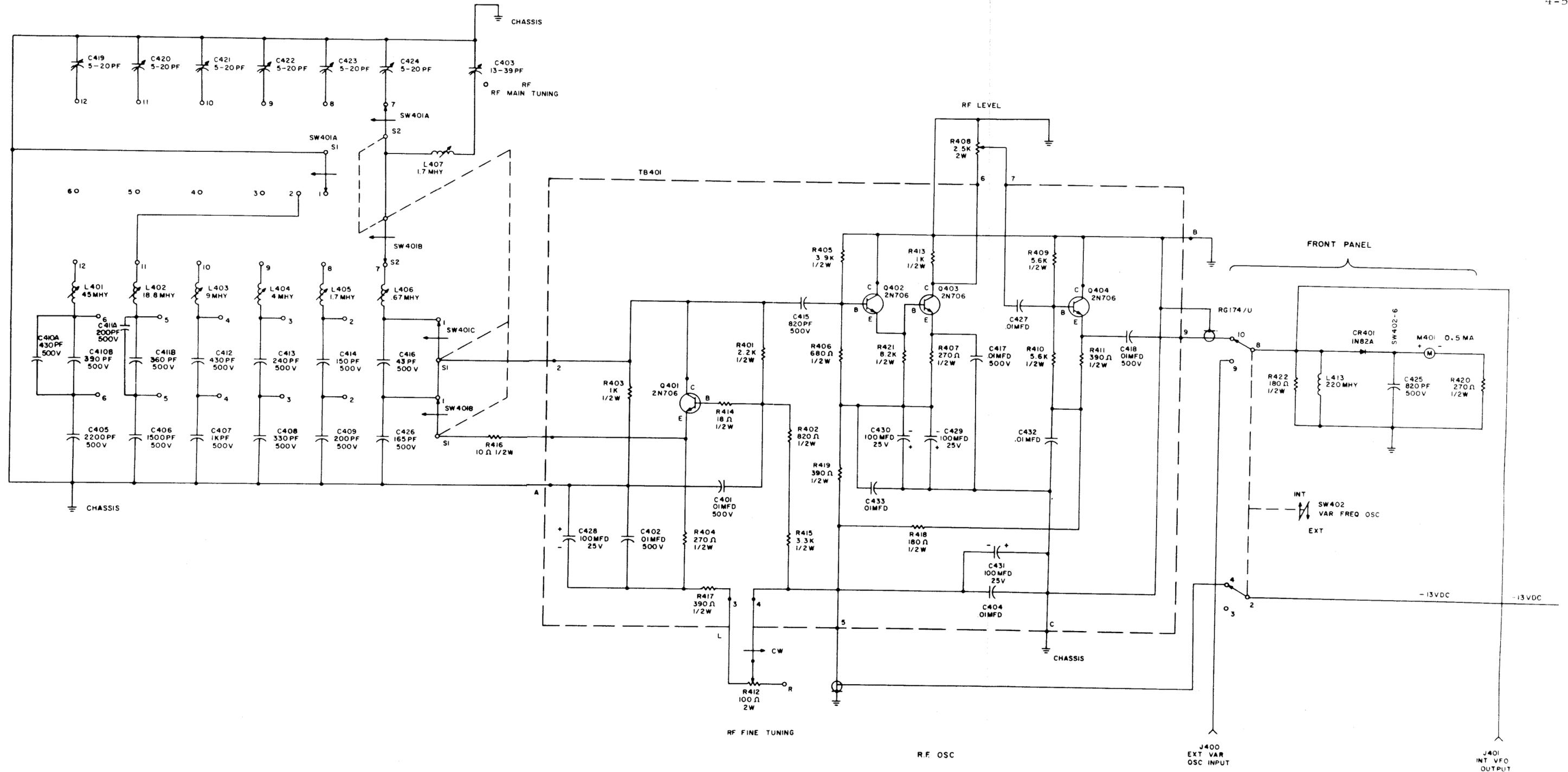


Figure 4-5. Schematic Diagram, Variable Frequency R. F. Oscillator 4-9, 4-10

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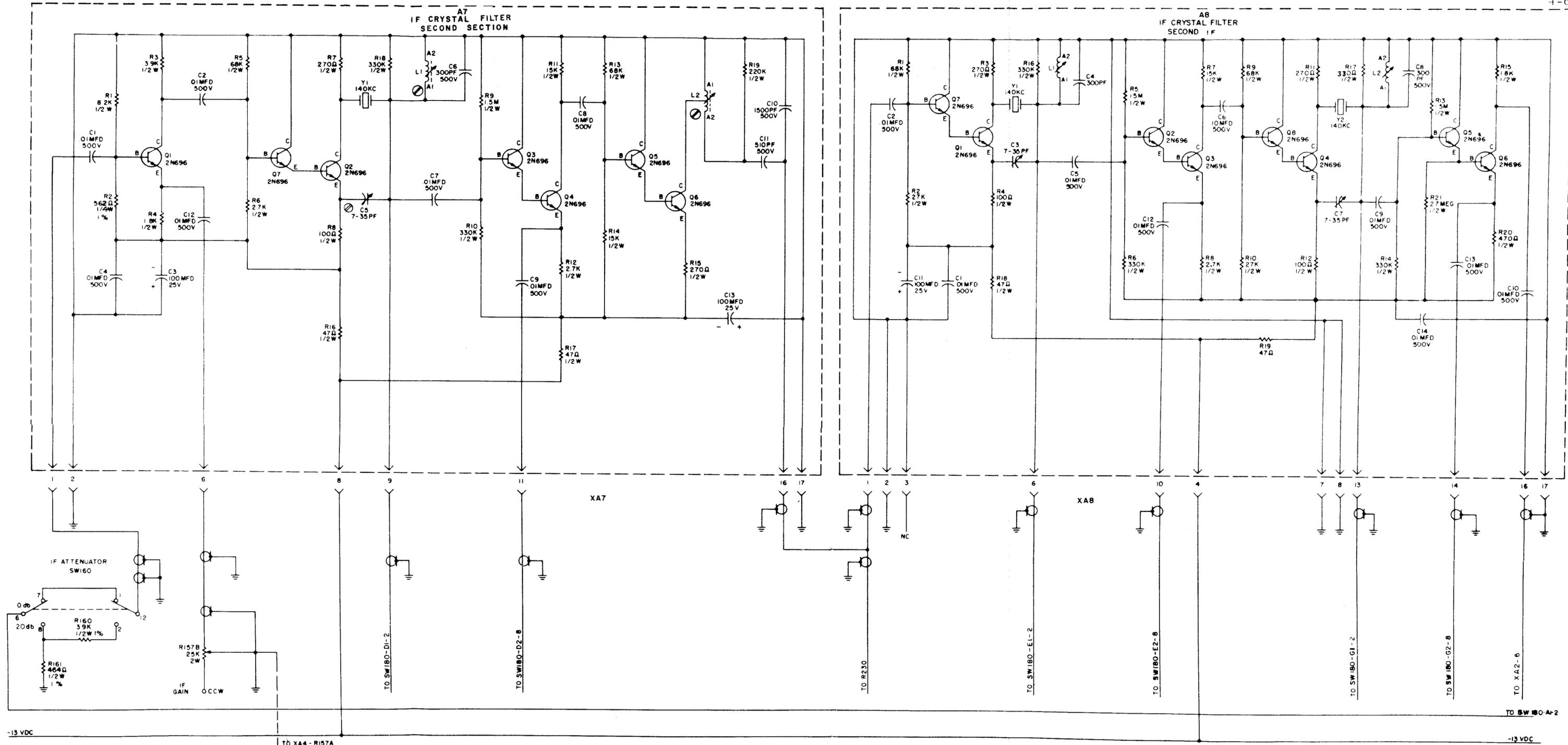


Figure 4-6. Schematic Diagram, Second IF & Crystal Filter 4-11, 4-12

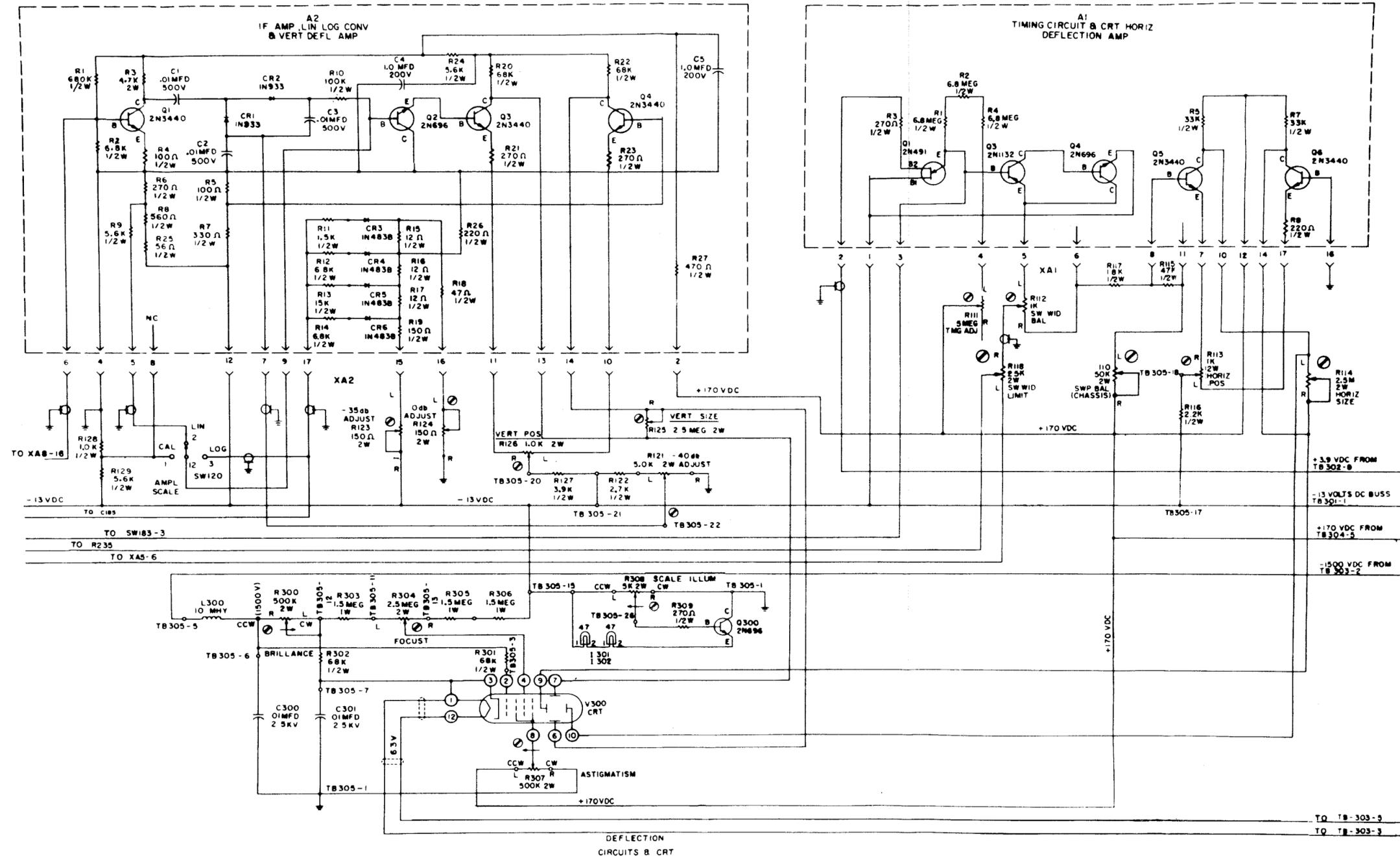


Figure 4-7. Schematic Diagram,  
Vertical and Horizontal Deflection  
Amplifiers and Display Section

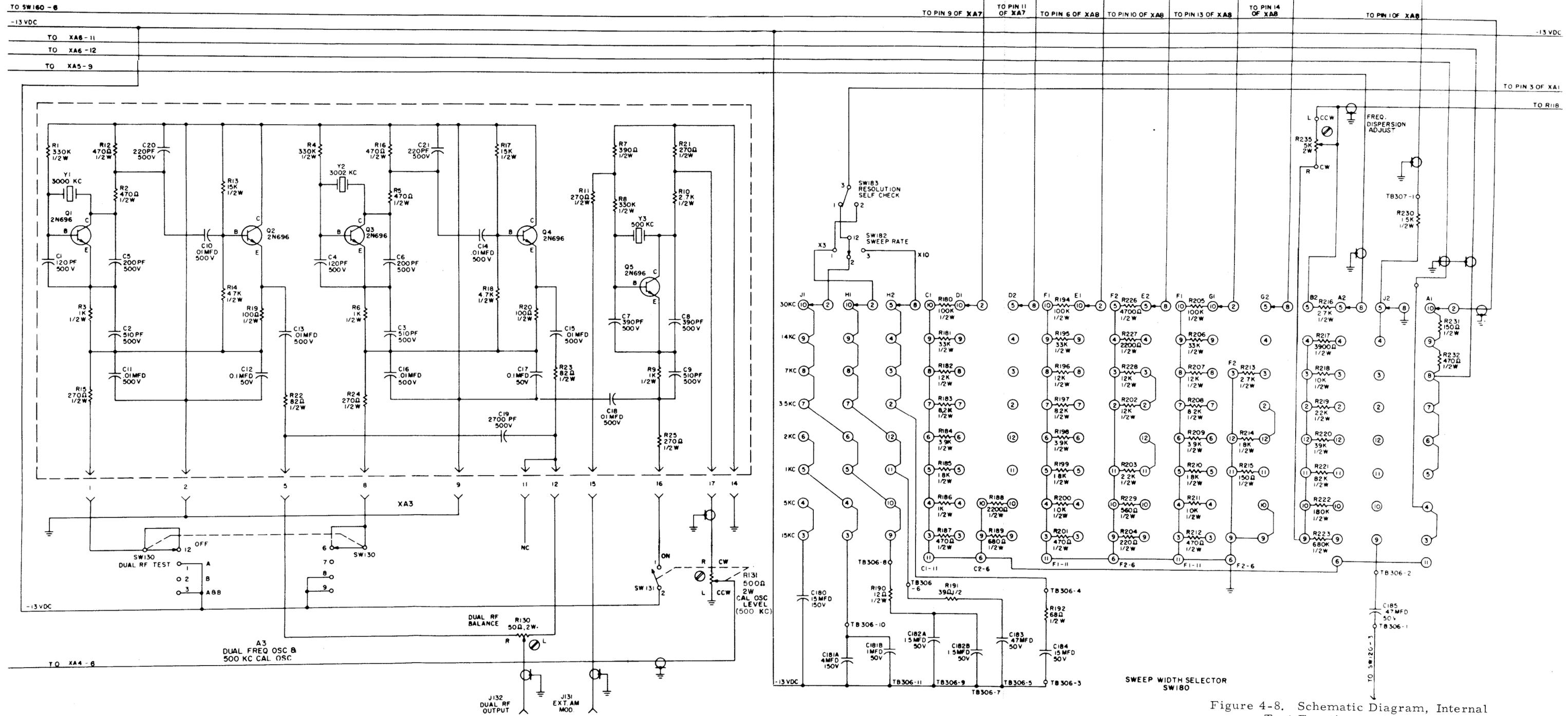


Figure 4-8. Schematic Diagram, Internal Test Functions and Sweep Range Circuits 4-15, 4-16

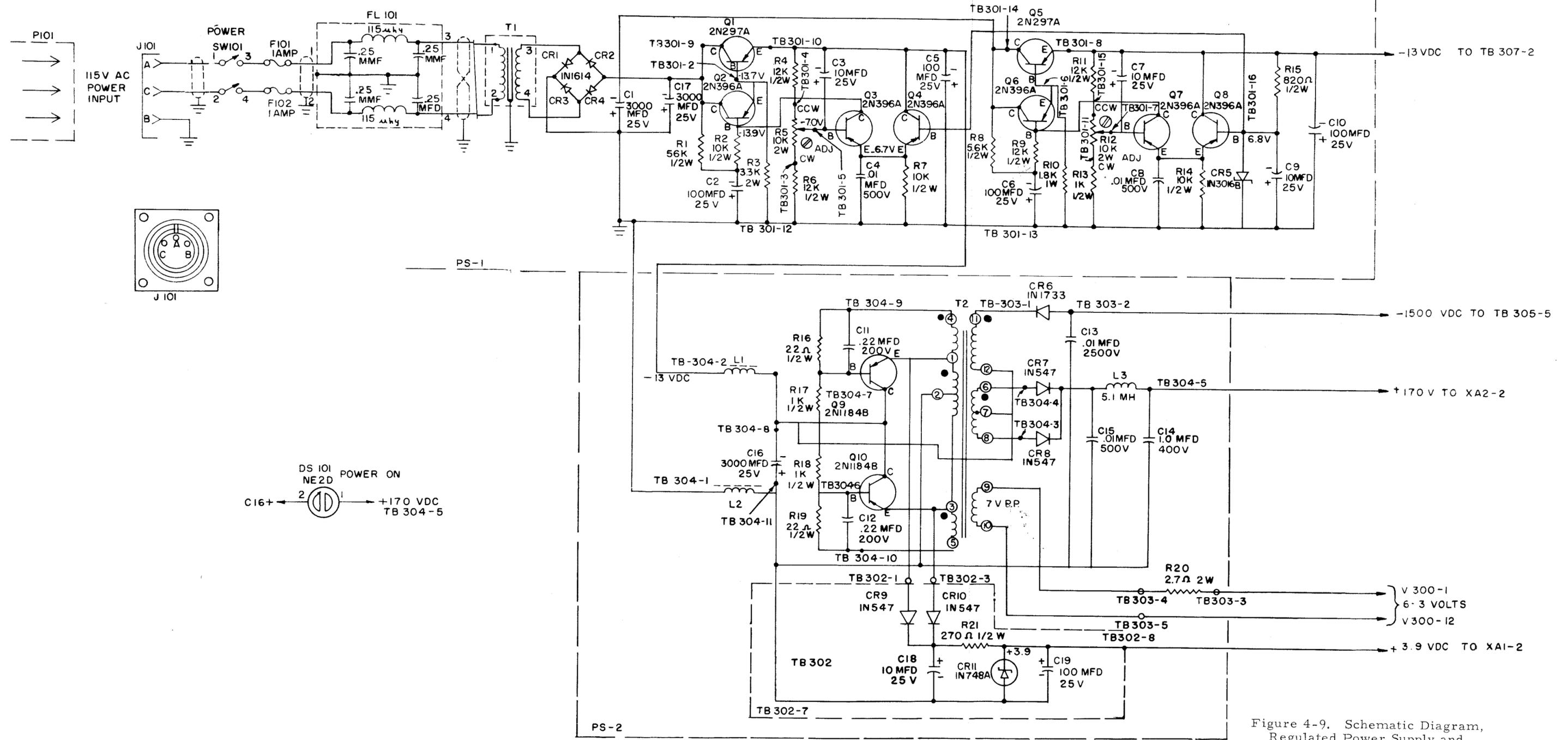


Figure 4-9. Schematic Diagram, Regulated Power Supply and High Voltage Converter

| NO. | WIRE   |          |                  | TERMINATIONS |             | LENGTH<br>INCHES |
|-----|--------|----------|------------------|--------------|-------------|------------------|
|     | COLOR  | GAGE     | TYPE             | FROM         | TO          |                  |
| 1   | GREEN  | 22       | STRD             | XA3-1        | SW130-12    | 3-1/2            |
| 2   | YELLOW | 22       | STRD             | XA3-5        | R130-R      | 2                |
| 3   | ORANGE | 22       | STRD             | XA3-8        | SW130-6     | 4                |
| 4   | BLACK  | 22       | STRD             | XA3-9        | XA3-2       | 2-1/4            |
| 5   | BLUE   | 22       | STRD             | XA3-12       | R130-L      | 3                |
| 6   | WHITE  | 20       | STRD<br>SHIELDED | XA3-15       | J131-CENTER | 8                |
|     | -      | SHIELD   | -                | -            | J131-GRD    | -                |
| 7   | GRAY   | 22       | STRD             | XA3-16       | SW131-1     | 10               |
| 8   | -      | RG-174/U | -                | XA3-17       | R131-R      | 10               |
|     | -      | SHIELD   | -                | -            | SW160-GRD   | -                |
| 9   | -      | 1/8      | FLAT<br>BRAID    | XA4-7        | XA4-8       | 3/8              |
| 10  | -      | 1/8      | FLAT<br>BRAID    | XA4-8        | GRD-1A      | 1-3/4            |
| 11  | -      | RG-58A/U | -                | XA4-10       | R157A-R     | 12               |
|     | -      | SHIELD   | -                | GRD-1        | R157A-C     | -                |
| 12  | -      | RG-174/U | -                | XA4-12       | SW140H-18   | 7                |
|     | -      | SHIELD   | -                | GRD-1A       | SW140-GRD   | -                |
| 13  | -      | 1/8      | FLAT<br>BRAID    | XA4-16       | GRD-1       | 2                |
| 14  | -      | RG-174/U | -                | XA4-17       | XA6-17      | 3-1/2            |
|     | -      | SHIELD   | -                | -            | GRD-3       | -                |
| 15  | -      | 22       | SOLID<br>BUSS    | XA5-1        | GRD-2       | 3/4              |

| NO. | WIRE  |        |                  | TERMINATIONS |              | LENGTH |
|-----|-------|--------|------------------|--------------|--------------|--------|
|     | COLOR | GAGE   | TYPE             | FROM         | TO           |        |
| 16  | WHITE | 20     | STRD<br>SHIELDED | XA5-9        | SW180A2-8    | 5      |
|     | -     | SHIELD | -                | GRD-2        | SW180A2-6    | -      |
| 17  | -     | 22     | SOLID<br>BUSS    | C150-STRATOR | C151-STRATOR | 1-1/2  |
| 18  | WHITE | 20     | STRD<br>SHIELDED | XA5-17       | XA6-1        | 4      |
|     | -     | SHIELD | -                | XA5-15       | XA6-2        | -      |
| 19  | -     | 22     | SOLID<br>BUSS    | XA5-15       | GRD-3        | 3/4    |
| 20  | -     | 22     | SOLID<br>BUSS    | XA6-2        | GRD-2        | 3/4    |
| 21  | BLACK | 22     | STRD             | XA6-9        | GRD-2        | 2      |
| 22  | -     | 22     | SOLID<br>BUSS    | XA6-10       | XA6-9        | 5/8    |
| 23  | WHITE | 20     | STRD<br>SHIELDED | XA6-11       | SW180A1-5    | 3-1/2  |
|     | -     | SHIELD | -                | XA6-10       | -            | -      |
| 24  | WHITE | 20     | STRD<br>SHIELDED | XA6-12       | SW180A1-3    | 3      |
|     | -     | SHIELD | -                | GRD-3        | -            | -      |
| 25  | -     | 22     | SOLID<br>BUSS    | XA6-16       | GRD-3        | 3/4    |
| 26  | -     | 22     | SOLID<br>BUSS    | XA7-2        | GRD-4        | 3/4    |
| 27  | WHITE | 20     | STRD<br>SHIELDED | XA7-9        | SW180D1-2    | 2-1/2  |
|     | -     | SHIELD | -                | GRD-5        | -            | -      |

| NO. | WIRE  |        |                  | TERMINATIONS |           | LENGTH |
|-----|-------|--------|------------------|--------------|-----------|--------|
|     | COLOR | GAGE   | TYPE             | FROM         | TO        | INCHES |
| 28  | WHITE | 20     | STRD<br>SHIELDED | XA7-11       | SW180D2-6 | 4-1/2  |
|     | -     | SHIELD | -                | GRD-5        | -         | -      |
| 29  | WHITE | 20     | STRD<br>SHIELDED | XA7-16       | XA8-1     | 4-1/2  |
|     | -     | SHIELD | -                | XA7-17       | XA8-2     | -      |
| 30  | -     | 22     | SOLID<br>BUSS    | XA7-17       | GRD-5     | 3/4    |
| 31  | -     | 22     | SOLID<br>BUSS    | XA8-2        | GRD-4     | 3/4    |
| 32  | WHITE | 20     | STRD<br>SHIELDED | XA8-6        | SW180E1-2 | 3-1/2  |
|     | -     | SHIELD | -                | GRD-4        | -         | -      |
| 33  | BLACK | 22     | STRD             | XA8-7        | XA8-2     | 2      |
| 34  | -     | 22     | SOLID<br>BUSS    | XA8-8        | XA8-7     | 5/8    |
| 35  | WHITE | 20     | STRD<br>SHIELDED | XA8-10       | SW180E2-8 | 3-3/4  |
|     | -     | SHIELD | -                | GRD-5        | -         | -      |
| 36  | WHITE | 20     | STRD<br>SHIELDED | XA8-13       | SW180G1-2 | 2      |
|     | -     | SHIELD | -                | GRD-5        | -         | -      |
| 37  | WHITE | 20     | STRD<br>SHIELDED | XA8-14       | SW180G2-8 | 4-1/4  |
|     | -     | SHIELD | -                | GRD-5        | -         | -      |
| 38  | BLACK | 22     | STRD             | XA8-17       | XA8-8     | 3      |

| NO. | WIRE            |          |                  | TERMINATIONS       |                       | LENGTH |
|-----|-----------------|----------|------------------|--------------------|-----------------------|--------|
|     | COLOR           | GAGE     | TYPE             | FROM               | TO                    | INCHES |
| 39  | -               | 22       | SOLID<br>BUSS    | R125-R             | R125-C                | 5/8    |
| 40  | GREEN           | 22       | STRD             | XA1-4              | R1H-L                 | 4      |
| 41  | ORANGE          | 22       | STRD             | XA1-5              | R112-L                | 3      |
| 42  | GRAY            | 22       | STRD             | XA1-6              | R112-R                | 4      |
| 43  | W ORN           | 22       | STRD             | XA1-11             | R110-L                | 7-1/4  |
| 44  | -               | 22       | SOLID<br>BUSS    | R114-R             | R114-C                | 5/8    |
| 45  | BLACK           | 22       | STRD             | XA1-16             | XA1-GRD               | 2-1/4  |
| 46  | TWISTED<br>PAIR | 20<br>20 | STRD<br>SHIELDED | J101-A<br>J101-C   | S101-1<br>S101-2      | 11     |
|     | -               | SHIELD   | -                | J101-GRD           | -                     | -      |
| 47  | WHITE           | 20       | STRD             | S101-3             | WITH F101<br>SLEEVING | 2-1/2  |
| 48  | BLACK           | 20       | STRD             | S101-4             | WITH F102<br>SLEEVING | 2      |
| 49  | TWISTED<br>PAIR | 20<br>20 | STRD<br>SHIELDED | F101<br>F102       | FL101-1<br>FL101-2    | 6-1/2  |
|     | -               | SHIELD   | -                | -                  | FL101-GRD             | -      |
| 50  | TWISTED<br>PAIR | 20<br>20 | STRD<br>SHIELDED | FL101-3<br>FL101-4 | T1-1<br>T1-2          | 11     |
|     | -               | SHIELD   | -                | -                  | T1-GRD                | -      |
| 51  | ORANGE          | 20       | STRD             | T1-3               | CR1-ANODE             | 5      |
| 52  | WHITE           | 20       | STRD             | T1-4               | CR3-ANODE             | 5      |
| 53  | -               | 1/4      | FLAT<br>BRAID    | CR1-CATHODE        | C17-PLUS              | 3      |

| NO. | WIRE  |          |                  | TERMINATIONS |           | LENGTH<br>INCHES |
|-----|-------|----------|------------------|--------------|-----------|------------------|
|     | COLOR | GAGE     | TYPE             | FROM         | TO        |                  |
| 54  | -     | 1/4      | FLAT<br>BRAID    | CR1-CATHODE  | C1-PLUS   | 5                |
| 55  | BLUE  | 20       | STRD             | CR2-ANODE    | C1-MINUS  | 2-3/4            |
| 56  | BLUE  | 20       | STRD             | CR2-ANODE    | C17-MINUS | 3-3/4            |
| 57  | RED   | 22       | STRD             | XA1-12       | R110-R    | 8                |
| 58  | -     | 22       | SOLID<br>BUSS    | R110-R       | R110-C    | 5/8              |
| 59  | RED   | 22       | STRD             | R110-C       | R111-C    | 2                |
| 60  | GREEN | 22       | STRD             | Q9-C         | Q10-C     | 2                |
| 61  | GREEN | 22       | STRD             | T2-7         | T2-12     | 2-1/2            |
| 62  | BLACK | 22       | STRD             | TB304-11     | TB302-7   | 3                |
| 63  | WHITE | 20       | STRD<br>SHIELDED | TB401-5      | SW402-4   | 16-1/2           |
|     | -     | SHIELD   | -                | TB401-C      | -         | -                |
| 64  | -     | RG-174/U | -                | TB401-9      | SW402-10  | 14-1/2           |
|     | -     | SHIELD   | -                | TB401-B      | -         | -                |
| 65  | -     | 22       | SOLID<br>BUSS    | R123-R       | R-123-C   | 5/8              |
| 66  | -     | 22       | SOLID<br>BUSS    | R124-L       | R124-C    | 5/8              |
| 67  | -     | 22       | SOLID<br>BUSS    | R235-L       | R235-C    | 5/8              |
| 68  | GRAY  | 22       | STRD             | XDS301-2     | XDS302-1  | 4                |
| 69  | -     | 22       | SOLID<br>BUSS    | R300-L       | R300-C    | 5/8              |

| NO. | WIRE   |         |                  | TERMINATIONS              |                        | LENGTH<br>INCHES |
|-----|--------|---------|------------------|---------------------------|------------------------|------------------|
|     | COLOR  | GAGE    | TYPE             | FROM                      | TO                     |                  |
| 70  |        | 22      | SOL.<br>BUSS     | V300-1                    | V-3003 W/<br>SLEEVING  | 1-1/2            |
| 71  | BLACK  | 22      | STRD             | R307-L                    | R121-R                 | 4                |
| 72  | VIOLET | 22      | STRD             | TB306-11                  | C180-1                 | 1-1/2            |
| 73  | W/GRN  | 22      | STRD             | SW18302 WITH<br>TERM. LUG | SW182-1                | 5-1/4            |
| 74  | W/BLU  | 22      | STRD             | SW183-1 WITH<br>TERM. LUG | SW182-12               | 3-1/4            |
| 75  | VIOLET | 22      | STRD             | SW131-2                   | SW130-9                | 8-1/4            |
| 76  | -      | 22      | SOLID<br>BUSS    | SW130-9                   | SW130-3 W/<br>SLEEVING | 1-1/2            |
| 77  | WHITE  | 20      | STRD<br>SHIELDED | R130-C                    | J132-CENTER            | 4-1/2            |
|     | -      | SHIELD  | -                | -                         | J132-GRD               | -                |
| 78  | -      | RG174/U |                  | J143-CENTER               | SW140A-18              | 3-1/2            |
|     |        | SHIELD  |                  | J143-GRD LUG              | SW140-GRD<br>BUS FRONT |                  |
| 80  | BLACK  | 22      | STRD             | SW180A2-6                 | GRD-3                  | 3-1/2            |
| 81  | BLACK  | 22      | STRD             | SW180G2-10                | GRD-4                  | 3-1/2            |
| 82  | -      | 22      | SOLID<br>BUSS    | R131-L                    | SW160-GRD              | 2-1/4            |
| 83  | -      | 1/4     | FLAT<br>BRAID    | CR1-CATHODE               | GRD-6                  | 3                |
| 84  | -      | 22      | SOLID<br>BUSS    | SW130-3                   | SW130-1                | 1                |
| 85  | -      | 22      | SOLID<br>BUSS    | SW130-8                   | SW130-9                | 5/8              |

| NO. | WIRE   |      |               | TERMINATIONS |            | LENGTH |
|-----|--------|------|---------------|--------------|------------|--------|
|     | COLOR  | GAGE | TYPE          | FROM         | TO         | INCHES |
| 88  | -      | 22   | SOLID<br>BUSS | TB307-2      | TB307-3    | 5/8    |
| 90  | -      | 22   | SOLID<br>BUSS | XA3-14       | GRD-1A     | 1-1/2  |
| 91  | YELLOW | 22   | STRD          | R235-R       | SW180-B2-9 | 2-1/2  |
| 92  | ORN    | 22   | STRD          | R235-C       | SW180-B2-5 | 4      |
| 93  | BLK    | 22   | STRD          | SW180-J2-8   | GRD-6      | 4-3/4  |
| 94  | GREEN  | 22   | STRD          | TB304-8      | C16-MINUS  | 8      |
| 95  | BLACK  | 22   | STRD          | TB304-11     | C16-PLUS   | 9      |
| 96  | GREEN  | 20   | STRD<br>3000V | TB303-1      | T2-11      | 10     |
| 97  | YELLOW | 22   | STRD          | TB304-9      | T2-4       | 13     |
| 98  | BLUE   | 22   | STRD          | TB304-7      | Q9-B       | 9      |
| 99  | GREEN  | 22   | STRD          | TB304-8      | Q9-C       | 10     |
| 100 | GREEN  | 22   | STRD          | TB304-8      | T2-7       | 10-1/2 |
| 101 | BLACK  | 22   | STRD          | TB303-C13    | T2-2       | 12     |
| 102 | W/BRN  | 22   | STRD          | TB304-10     | T2-5       | 15-1/2 |
| 103 | BLACK  | 22   | STRD          | TB303-C13    | TB302-7    | 14     |
| 104 | GRAY   | 22   | STRD          | TB304-6      | Q10-B      | 10-1/2 |
| 105 | ORANGE | 22   | STRD          | TB302-1      | Q9-E       | 9-3/4  |
| 106 | ORANGE | 22   | STRD          | TB302-1      | T2-1       | 7-3/4  |

| NO. | WIRE   |          |                  | TERMINATIONS |             | LENGTH |
|-----|--------|----------|------------------|--------------|-------------|--------|
|     | COLOR  | GAGE     | TYPE             | FROM         | TO          | INCHES |
| 107 | W/ORN  | 22       | STRD             | TB302-3      | Q10-E       | 8-1/2  |
| 108 | W/ORN  | 22       | STRD             | TB302-3      | T2-3        | 12     |
| 109 | W/GRN  | 22       | STRD             | TB304-4      | T2-6        | 11     |
| 110 | W/BLUE | 22       | STRD             | TB304-3      | T2-8        | 10-3/4 |
| 111 | BLUE   | 20       | STRD<br>3000V    | TB303-4      | T2-9        | 10-1/2 |
| 112 | BLUE   | 20       | STRD<br>3000V    | TB303-5      | T2-10       | 10-1/2 |
| 113 | BLACK  | 22       | STRD             | XA3-2        | GRD-2       | 7      |
| 114 | -      | RG-174/U | -                | XA4-1        | J14-2CENTER | 12     |
|     | -      | SHIELD   | -                | GRD-2        | J142-GRD    |        |
| 115 | BLACK  | 22       | STRD             | XA4-2        | GRD-2       | 5-1/2  |
| 116 | -      | RG-174/U | -                | XA4-3        | J141-CENTER | 10     |
|     | -      | SHIELD   | -                | XA4-2        | J141-GRD    | -      |
| 117 | VIOLET | 22       | STRD             | XA4-4        | XA5-5       | 5      |
| 118 | -      | RG-174/U | -                | XA4-6        | R131-C      | 14     |
|     | -      | SHIELD   | -                | -            | R131-L      | -      |
| 119 | VIOLET | 22       | STRD             | XA5-5        | XA6-3       | 5      |
| 120 | WHITE  | 20       | STRD<br>SHIELDED | XA5-6        | R118-L      | 26-1/2 |
|     | -      | SHIELD   | -                | GRD-2        | -           | -      |
| 121 | -      | RG-174/U | -                | XA5-11       | C150 STATOR | 13     |
|     | -      | SHIELD   | -                | GRD-3        | -           | -      |
| 122 | VIOLET | 22       | STRD             | XA6-3        | XA7-8       | 6      |
| 123 | -      | RG-58A/U | -                | XA7-1        | SW160-12    | 15-1/2 |

| NO. | WIRE   |          |                  | TERMINATIONS |           | LENGTH<br>INCHES |
|-----|--------|----------|------------------|--------------|-----------|------------------|
|     | COLOR  | GAGE     | TYPE             | FROM         | TO        |                  |
|     | -      | SHIELD   | -                | GRD-4        | SW160-GRD | -                |
| 124 | -      | RG-58A/U | -                | XA7-6        | R157B-R   | 19-3/4           |
|     | -      | SHIELD   | -                | GRD-4        | R157B-C   | -                |
| 125 | VIOLET | 22       | STRD             | XA7-8        | XA8-4     | 6                |
| 126 | WHITE  | 20       | STRD<br>SHIELDED | XA8-1        | TB307-1   | 4                |
|     | -      | SHIELD   | -                | GRD-4        | -         | -                |
| 127 | BLACK  | 22       | STRD             | XA8-2        | GRD-6     | 14-1/2           |
| 128 | VIOLET | 22       | STRD             | XA8-4        | TB307-2   | 5                |
| 129 | WHITE  | 20       | STRD<br>SHIELDED | XA8-16       | XA2-6     | 15               |
|     | -      | SHIELD   | -                | XA8-17       | XA2-GRD   | -                |
| 130 | BLACK  | 22       | STRD             | XA2-4        | GRD-6     | 22               |
| 131 | WHITE  | 20       | STRD<br>SHIELDED | XA2-17       | TB306-1   | 24               |
|     | -      | SHIELD   | -                | XA2-GRD      | -         | -                |
| 132 | VIOLET | 22       | STRD             | XA1-1        | TB307-3   | 21               |
| 133 | YELLOW | 22       | STRD             | XA1-3        | SW183-3   | 34-1/2           |
| 134 | BLUE   | 20       | STRD             | C1-MINUS     | TB301-14  | 3-1/4            |
| 135 | BLUE   | 20       | STRD             | C17-MINUS    | TB301-9   | 3-1/2            |
| 136 | GREEN  | 20       | STRD             | TB301-10     | TB304-2   | 14               |
| 137 | VIOLET | 20       | STRD             | TB301-8      | TB307-2   | 12               |
| 138 | BLACK  | 20       | STRD             | TB304-1      | GRD-6     | 19-1/2           |
| 139 | BLACK  | 20       | STRD             | TB301-12     | GRD-6     | 7-1/2            |

| NO. | WIRE   |          |                  | TERMINATIONS |            | LENGTH<br>INCHES |
|-----|--------|----------|------------------|--------------|------------|------------------|
|     | COLOR  | GAGE     | TYPE             | FROM         | TO         |                  |
| 140 | RED    | 22       | STRD             | TB304-5      | DS101-1    | 25-1/2           |
| 141 | BLACK  | 22       | STRD             | DS101-2      | C16-GRD    | 25-1/2           |
| 142 | BLUE   | 22       | STRD             | TB301-9      | Q1-C       | 22               |
| 143 | GREEN  | 22       | STRD             | TB301-10     | Q1-E       | 21               |
| 144 | YELLOW | 22       | STRD             | TB301-2      | Q1-B       | 20-3/4           |
| 145 | BLUE   | 22       | STRD             | TB301-14     | Q6-C       | 22-1/2           |
| 146 | VIOLET | 22       | STRD             | TB301-8      | Q6-E       | 24-1/2           |
| 147 | GRAY   | 22       | STRD             | TB301-6      | Q5-B       | 22               |
| 148 | WHITE  | 22       | STRD             | TB301-1      | R5-L       | 10-1/4           |
| 149 | ORANGE | 22       | STRD             | TB301-3      | R5-R       | 11               |
| 150 | W BLUE | 22       | STRD             | TB301-5      | R5-C       | 9-3/4            |
| 151 | W GRN  | 22       | STRD             | TB301-15     | R12-L      | 5-1/4            |
| 152 | W BRN  | 22       | STRD             | TB301-1      | R12-R      | 10               |
| 153 | W ORN  | 22       | STRD             | TB301-7      | R12-C      | 7-1/4            |
| 154 | WHITE  | 20       | STRD<br>SHIELDED | SW402-2      | TB307-2    | 15-3/4           |
|     | -      | SHIELD   | -                | METER GRD    | -          | -                |
| 155 | -      | RG-58A/U | -                | SW160-6      | SW180A1-2  | 18-1/4           |
|     | -      | SHIELD   | -                | SW160-GRD    | SW180A1-11 | -                |
| 156 | GREEN  | 22       | STRD             | TB306-2      | SW180J2-9  | 15               |
| 157 | BLUE   | 22       | STRD             | TB306-4      | SW180H2-3  | 11-1/4           |
| 158 | YELLOW | 22       | STRD             | TB306-6      | SW180H2-11 | 12-1/2           |

| NO. | WIRE   |        |                  | TERMINATIONS |           | LENGTH |
|-----|--------|--------|------------------|--------------|-----------|--------|
|     | COLOR  | GAGE   | TYPE             | FROM         | TO        | INCHES |
| 159 | ORANGE | 22     | STRD             | TB306-8      | SW180H2-9 | 13     |
| 160 | W/ORN  | 22     | STRD             | TB306-10     | SW180H1-3 | 8-3/4  |
| 161 | W/ORN  | 22     | STRD             | TB306-10     | C181A     | 8-1/2  |
| 162 | VIOLET | 22     | STRD             | C181A        | TB306-11  | 9      |
| 163 | VIOLET | 22     | STRD             | C180-1       | TB307-2   | 11     |
| 164 | YELLOW | 22     | STRD             | C180-2       | SW180J1-3 | 10     |
| 165 | W/GRN  | 22     | STRD             | SW182-1      | SW180H1-2 | 21     |
| 166 | W ORN  | 22     | STRD             | SW182-2      | SW180J1-2 | 22     |
| 167 | W/BRN  | 22     | STRD             | SW182-3      | SW180H2-8 | 20     |
| 168 | VIOLET | 22     | STRD             | SW130-3      | TB307-3   | 14     |
| 169 | BLACK  | 22     | STRD             | TB305-8      | GRD-6     | 15-1/2 |
| 170 | RED    | 22     | STRD             | XA2-2        | TB304-5   | 22-1/2 |
| 171 | WHITE  | 20     | STRD<br>SHIELDED | XA2-5        | SW120-2   | 11     |
|     | -      | SHIELD | -                | XA2-GRD      | -         | -      |
| 172 | WHITE  | 20     | STRD<br>SHIELDED | XA2-7        | R121-C    | 16     |
|     | -      | SHIELD | -                | XA2-GRD      | -         | -      |
| 173 | GREEN  | 22     | STRD             | XA2-8        | SW120-1   | 11-1/2 |
| 174 | BLUE   | 22     | STRD             | XA2-9        | SW120-2   | 11     |
| 175 | YELLOW | 22     | STRD             | XA2-10       | R126-L    | 17     |
| 176 | WHITE  | 22     | STRD             | XA2-11       | R126-R    | 17-1/2 |
| 177 | VIOLET | 22     | STRD             | XA2-12       | XA1-1     | 22     |
| 178 | GRAY   | 22     | STRD             | XA2-13       | V300-7    | 19-1/4 |

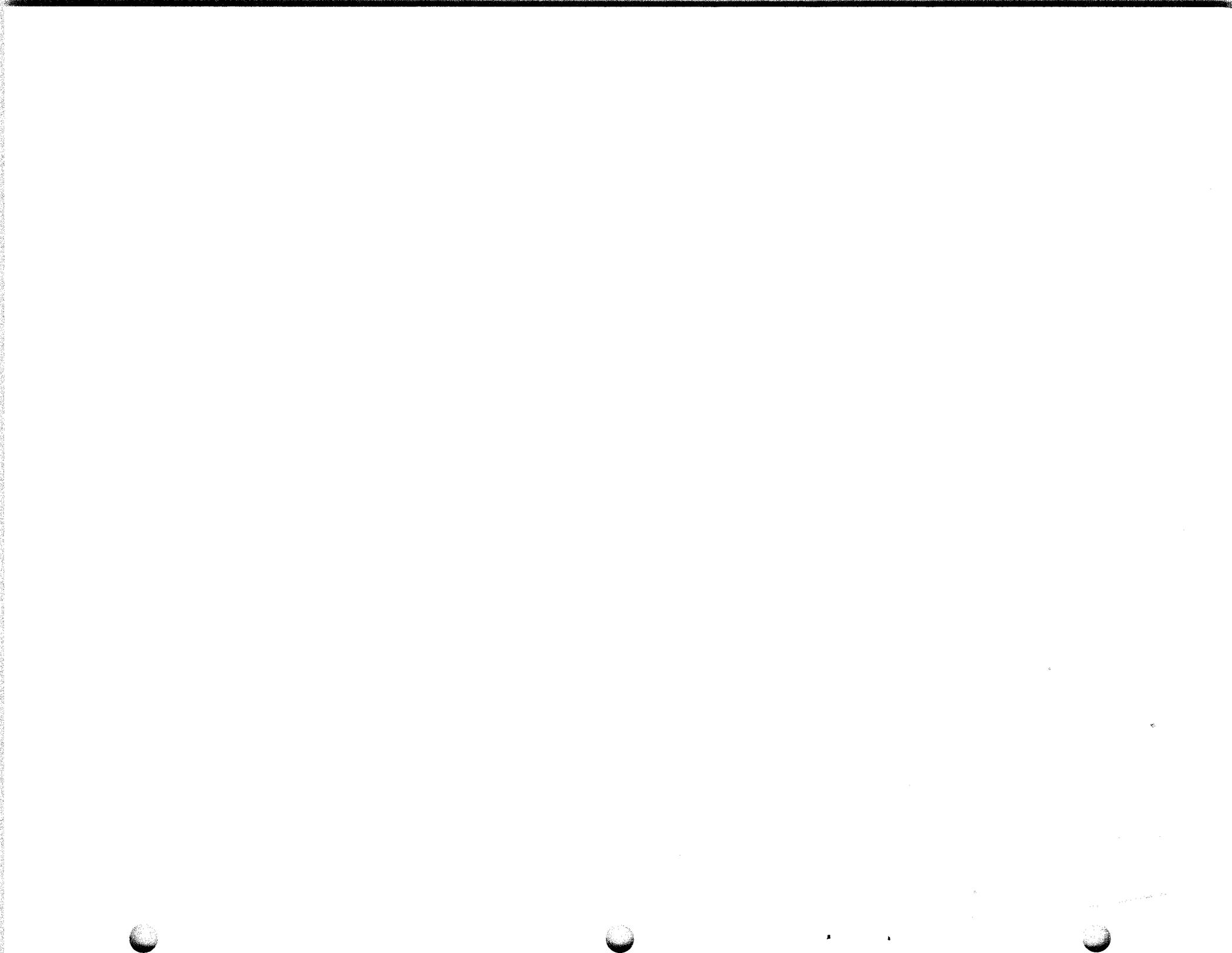
| NO. | WIRE   |        |                  | TERMINATIONS |         | LENGTH |
|-----|--------|--------|------------------|--------------|---------|--------|
|     | COLOR  | GAGE   | TYPE             | FROM         | TO      | INCHES |
| 179 | GRAY   | 22     | STRD             | XA2-13       | R125-L  | 20     |
| 180 | W/ORN  | 22     | STRD             | XA2-14       | V300-6  | 20     |
| 181 | W/ORN  | 22     | STRD             | XA2-14       | R125-R  | 20-1/2 |
| 182 | W/BLUE | 22     | STRD             | XA2-15       | R123-L  | 18     |
| 183 | W/GRN  | 22     | STRD             | XA2-16       | R124-L  | 19     |
| 184 | WHITE  | 20     | STRD<br>SHIELDED | XA2-17       | SW120-3 | 13-1/2 |
|     | -      | SHIELD | -                | XA2-GRD      | -       | -      |
| 185 | WHITE  | 20     | STRD<br>SHIELDED | XA1-2        | TB302-8 | 18     |
|     | -      | SHIELD | -                | XA1-GRD      | -       | -      |
| 186 | W/BRN  | 22     | STRD             | XA1-7        | R113-R  | 32     |
| 187 | WHITE  | 22     | STRD             | XA1-10       | R114-L  | 33     |
| 188 | WHITE  | 22     | STRD             | XA1-10       | V300-10 | 18     |
| 189 | RED    | 22     | STRD             | XA1-12       | XA2-2   | 23-1/2 |
| 190 | W/GRN  | 22     | STRD             | XA1-14       | R114-R  | 34     |
| 191 | W/GRN  | 22     | STRD             | XA1-14       | V300-9  | 18-1/2 |
| 192 | W/BLUE | 22     | STRD             | XA1-17       | R113-L  | 29-3/4 |
| 193 | RED    | 22     | STRD             | R111-C       | R307-R  | 26-1/2 |
| 194 | BROWN  | 20     | STRD<br>3000V    | TB303-5      | V300-12 | 20-1/4 |
| 195 | BROWN  | 20     | STRD<br>3000V    | TB303-3      | V300-1  | 20-1/4 |
| 196 | GREEN  | 20     | STRD<br>3000V    | TB303-2      | TB305-5 | 15-1/4 |

TS-1379A/U  
TROUBLESHOOTING

NAVSHIPS 0969-094-3010

Wire  
List

| NO. | WIRE   |        |                  | TERMINATIONS |          | LENGTH<br>INCHES |
|-----|--------|--------|------------------|--------------|----------|------------------|
|     | COLOR  | GAGE   | TYPE             | FROM         | TO       |                  |
| 197 | VIOLET | 22     | STRD             | R123-R       | TB305-21 | 16               |
| 198 | BLACK  | 22     | STRD             | R124-R       | R121-R   | 12-1/4           |
| 199 | BLUE   | 22     | STRD             | TB305-20     | R126-C   | 17-1/2           |
| 200 | BLACK  | 22     | STRD             | R307-R       | TB305-1  | 23-1/4           |
| 201 | GREEN  | 22     | STRD             | R121-L       | TB305-22 | 16-1/2           |
| 202 | WHITE  | 20     | STRD<br>SHIELDED | R118-C       | R235-L   | 29               |
|     | -      | SHIELD | -                | -            | GRD-2    | -                |
| 203 | WHITE  | 20     | STRD<br>SHIELDED | R112-C       | R118-R   | 29               |
| 204 | GRAY   | 22     | STRD             | TB305-E      | XDS302-2 | 17-1/4           |
| 205 | GRAY   | 22     | STRD             | XDS301-1     | R308-L   | 19-1/2           |
| 206 | GRAY   | 22     | STRD             | R308-L       | TB305-15 | 20               |
| 207 | BLACK  | 22     | STRD             | R308-R       | TB305-1  | 28               |
| 208 | YELLOW | 22     | STRD             | TB305-26     | R308-C   | 16               |
| 209 | BLUE   | 22     | STRD<br>1000V    | R304-C       | V300-4   | 25-3/4           |
| 210 | GREEN  | 22     | STRD<br>1000V    | TB305-13     | R304-L   | 26               |
| 211 | YELLOW | 22     | STRD<br>1000V    | TB305-11     | R304-R   | 25-1/2           |
| 212 | ORANGE | 20     | STRD<br>3000V    | TB305-12     | R300-L   | 18               |
| 213 | GREEN  | 20     | STRD<br>3000V    | TB305-6      | R300-R   | 19-1/2           |



SECTION 5  
MAINTENANCE

5.1. SHELF LIFE MAINTENANCE.

The Spectrum Analyzer has no periodic requirements and does not need shelf life maintenance other than the storage conditions specified for most electronic equipment.

5.2. Operator's Checks and Adjustments

The general operator's checks and adjustments are described in Paragraph 3.2.3 Sequence of Operations, particularly operation with the Self Checking Mode.

5.2.1. Logarithmic Compressor (Scale) Adjustments

-40db Adjustment

- a. Set the front panel controls as follows:

|                     |              |
|---------------------|--------------|
| (1) AMPLIFIER SCALE | LOG position |
| (2) IF GAIN         | mid position |
| (3) CAL OSC LEVEL   | mid position |
| (4) SWEEP WIDTH     | 7kc          |
| (5) IF ATTEN        | 0db          |

b. Adjust IF GAIN and CAL OSC LEVEL until pip top reaches -20db line.

c. Change IF ATTEN to 20db, observe the top of the pip comes down to -40db.

d. If pip does not come down to -40db following adjustment in c above, adjust LOG -40db control to bring it to this position. Observe that LOG-baseline is below the engraved -40db line. Adjusting the -40db control moves the baseline up or down. LOG BASELINE IS NOT ADJUSTED: IT IS POSITIONED BY NORMAL ADJUSTMENTS. The LIN baseline can be adjusted without signal. The LIN baseline must coincide with the lowest screen calibration line.

5.2.1.1. Set the Front Panel Controls as follows:

BRIL, FOCUS, ASTIG, VERT POS, HORIZ POS, CENTER FREQ COARSE, CENTER FREQ FINE, as given in 3.2.3. Set remaining controls as given below.

|                    |              |
|--------------------|--------------|
| a. AMPLITUDE SCALE | LIN position |
| b. IF GAIN         | mid position |
| c. SWEEP WIDTH     | 7kc          |
| d. CAL OSC LEVEL   | mid position |
| e. DUAL RF TEST    | OFF position |
| f. IF ATTENUATOR   | 20db         |

5.2.1.2. Adjust IF GAIN and CAL OSC LEVEL until pip is displayed at full screen deflection.

- 5.2.1.3. Adjust CENTER FREQ COARSE until pip is centered on screen.
- 5.2.1.4. Change AMPLITUDE SCALE to LOG position. Check to see that top of pip remains in same position.
- 5.2.1.5. If top of pip does not remain in same position, adjust LOG 0db to bring top of pip to 0db line.
- 5.2.1.6. Check pip for centering and if necessary, adjust again as in 5.2.1.2, 5.2.1.3, 5.2.1.4, 5.2.1.5.
- 5.2.1.7. -20db Adjustment
- a. Set front panel controls as follows:
- |                     |              |
|---------------------|--------------|
| (1) AMPLITUDE SCALE | LOG position |
| (2) CAL OSC LEVEL   | MID position |
| (3) SWEEP WIDTH     | 7kc          |
| (4) IF ATTENUATOR   | 0db          |
- 5.2.1.8. Adjust IF GAIN and CAL OSC LEVEL until pip top reaches 0db line.
- 5.2.1.9. Change IF ATTEN to 20db and check that top of the pip comes down to the -20db line.
- 5.2.1.10. If pip does not come down, adjust LOG -20db control to bring it to the -20db position. Check that the LOG baseline is below the -40db scale line. The adjustments or 5.2.1.1 thru 5.2.1.10 should be repeated until all checks can be made without further adjustments.

SECTION 6

MAINTENANCE PARTS LIST

6.1. ARRANGEMENT OF THE TABLE.

a. Table 1 constitutes the major portion of this section and falls into one main division including the parts of both the one major unit and the accessories of the Spectrum Analyzer TS-1739A/U. Table 2 includes repair parts for printed circuits.

b. Each sheet of the table is divided vertically into four columns, which are labelled from left to right:

- (1) "Ref. Designation"
- (2) "Notes"
- (3) "Name and Description"
- (4) "Figure Number"

c. Paragraphs 6-1-1 through 6-1-5 provide an explanation of each of these four columns. Paragraphs 6-2 and 6-3 respectively list the abbreviations used in the table.

6.1.1. COLUMN 1: REFERENCE DESIGNATION

a. A reference Designation, consisting of one or two uppercase letters and up to three significant figures, is assigned to each electrical component of the SPECTRUM ANALYZER TS-1739A/U equipment for which a replacement may be required or to which reference is made in the drawings and text of this handbook.

b. The alphabetical portion of each reference designation indicate the particular category of electrical component to which the designation is assigned. The list below covers all categories of component found in the table of replaceable parts for the Spectrum Analyzer TS-1739A/U equipment.

| Description | Type of Component                                    |
|-------------|--|
| A           | Assembly, Sub Assembly                               |
| C           | Capacitors of all types                              |
| CR          | Crystal, rectifier type                              |
| DS          | Indicating lamps                                     |
| F           | Fuses  |
| FL          | Filter   |
| J           | Jacks and receptacles                                |
| L           | Inductors: radio frequency and audio frequency       |
| M           | Meter  |
| P           | Plugs  |
| Q           | Transistor   |
| R           | Resistors: fixed and variable (potentiometers, etc.) |
| S           | Switches   |
| T           | Transformers: radio-frequency and power              |
| TB          | Terminal Board                                       |
| V           | Vacuum and gaseous discharge tubes                   |
| W           | Cables   |
| X           | Sockets  |

c. In the Maintenance Parts List, the components included are listed in alphabetical and numerical series of their reference symbols.

6.1.2. COLUMN 2: NOTES

This column will give any notes applicable to the particular part.

6.1.3. COLUMN 3: NAME AND DESCRIPTION

This column gives the name and description of the component identified by reference in Column 1. The description, however, is given only for the first appearance of a given component. If it appears again (bearing a different reference symbol). Column 3 gives only the name and phrase "same as ..." (reference symbol associated with the component's first appearance.)

This column also contains the manufacturers or contractor's part or drawing number for the applicable component. Where applicable, JAN or AWS specifications are also listed in this column.

This column also contains all the parts required to manufacture the SPECTRUM ANALYZER TS-1739A/U. It does not include spare parts, hardware or structural items.

6.2. ABBREVIATIONS USED IN THE MAINTENANCE PARTS LIST.

ABBREVIATIONS - The following list of abbreviations used in describing the various components in Column 3 conform to the "Joint Army-Navy Manual of Standard Descriptions", Specification JANP-109. ANA Bulletin 261 abbreviations have been used to describe the electrical or mechanical function of the various components.

| Abbreviation | Meaning                     |
|--------------|-----------------------------|
| AC           | alternating current         |
| AF           | Audio Frequency             |
| amp          | ampere(s)                   |
| AN           | Army-Navy                   |
| approx       | approximate(ly)             |
| assem        | assembly                    |
| AWG          | American Wire Gauge         |
| BNC          | A type of coaxial connector |
| c to c       | Center to center            |
| coef         | Coefficient                 |
| cond         | Conductor(s)                |
| cont         | Contact(s)                  |
| cps          | Cycles per second           |
| CRS          | Cold rolled steel           |
| cyc          | cycle(s)                    |
| d            | Depth or deep               |
| DC           | Direct Current              |
| deg          | Degree of angle             |
| °C           | Degrees Centigrade          |
| °F           | Degrees Fahrenheit          |
| diam         | Diameter                    |
| dimen        | Dimensions                  |

| Abbreviation | Meaning                  |
|--------------|--------------------------|
| DPST         | Double Pole Single Throw |
| dwg          | Drawing(s)               |
| ea           | Each                     |
| ext          | External                 |
| ft           | Foot(feet)               |
| gnd          | Ground                   |
| h            | High                     |
| hex          | Hexagonal                |
| HF           | High-Frequency           |
| HV           | High-Voltage             |
| hy           | Henry(ies)               |
| ID           | Inside Diameter          |
| IF           | Intermediate Frequency   |
| term         | Terminal(s)              |
| thd          | Thread(s)                |
| thk          | Thick                    |
| v            | Volt(s) or Voltage       |
| vdcw         | DC working voltage       |
| w            | watt(s)                  |
| w/           | With                     |
| wd           | Wide or Width            |
| x            | By                       |
| mfd          | Microfarad(s)            |
| mmf          | Micro-Microfarad(s)      |
| mh           | Micro-Herry(ies)         |

6.3. LIST OF MANUFACTURERS.

The names and addresses of the manufacturers for replaceable parts are listed in alphabetical order, not showing the prime proper identification to show the general items that can be obtained where the military chooses.

Cambridge Thermionic Corp.  
445 Concord Avenue  
Cambridge, Mass.

\*Jetronic Industries Inc.  
4312 Main Street  
Philadelphia, Penna.

Elco Corporation  
Maryland and Computer Road  
Willow Grove, Penna.

Radio Condenser Corporation  
Davis & Copewood Streets  
Camden, New Jersey

Hammarlund Mfg. Inc.  
53 West 23rd Street  
New York City, New York

Waterman Elex Tube  
26 West Queen Lane  
Philadelphia, Penna.

Jan Hardware Mfg. Inc.  
3801 Queens  
o Long Island City, N. Y.

\*Prime Manufacturer

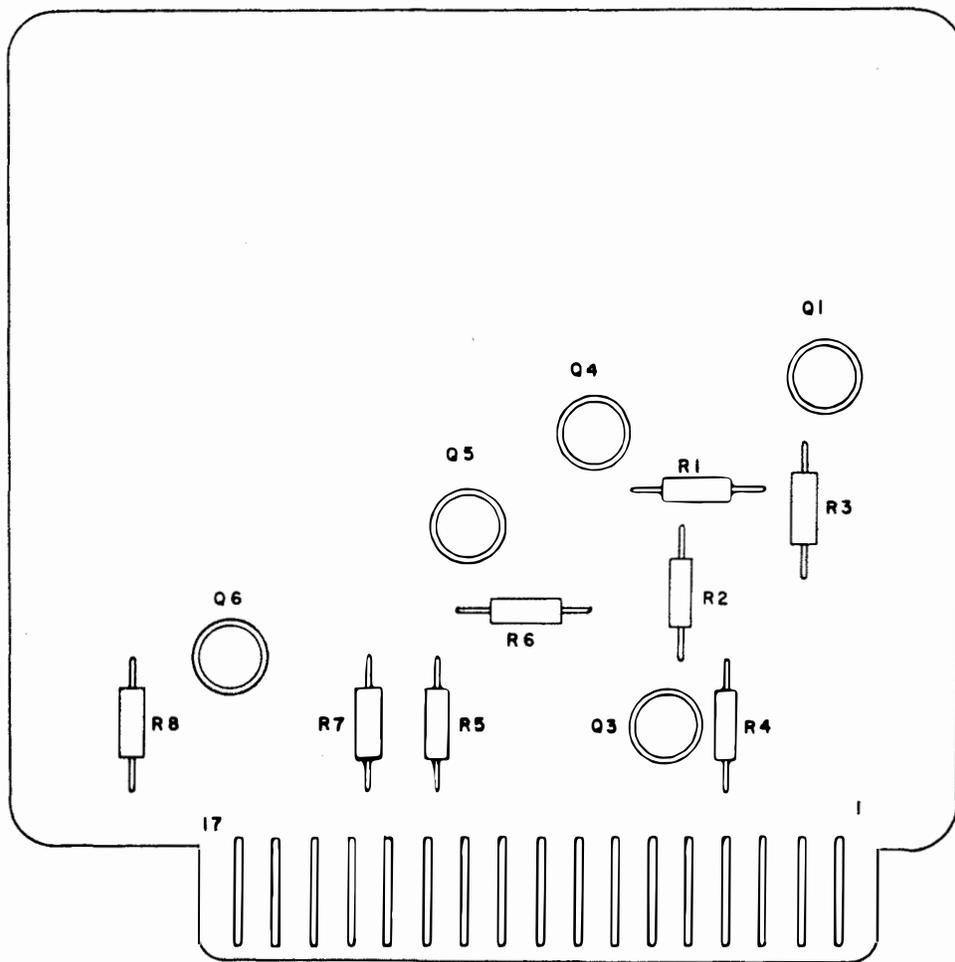


Figure 6-1: P.W. Board Assembly (A1 Timing CKT Horiz. Defl.)

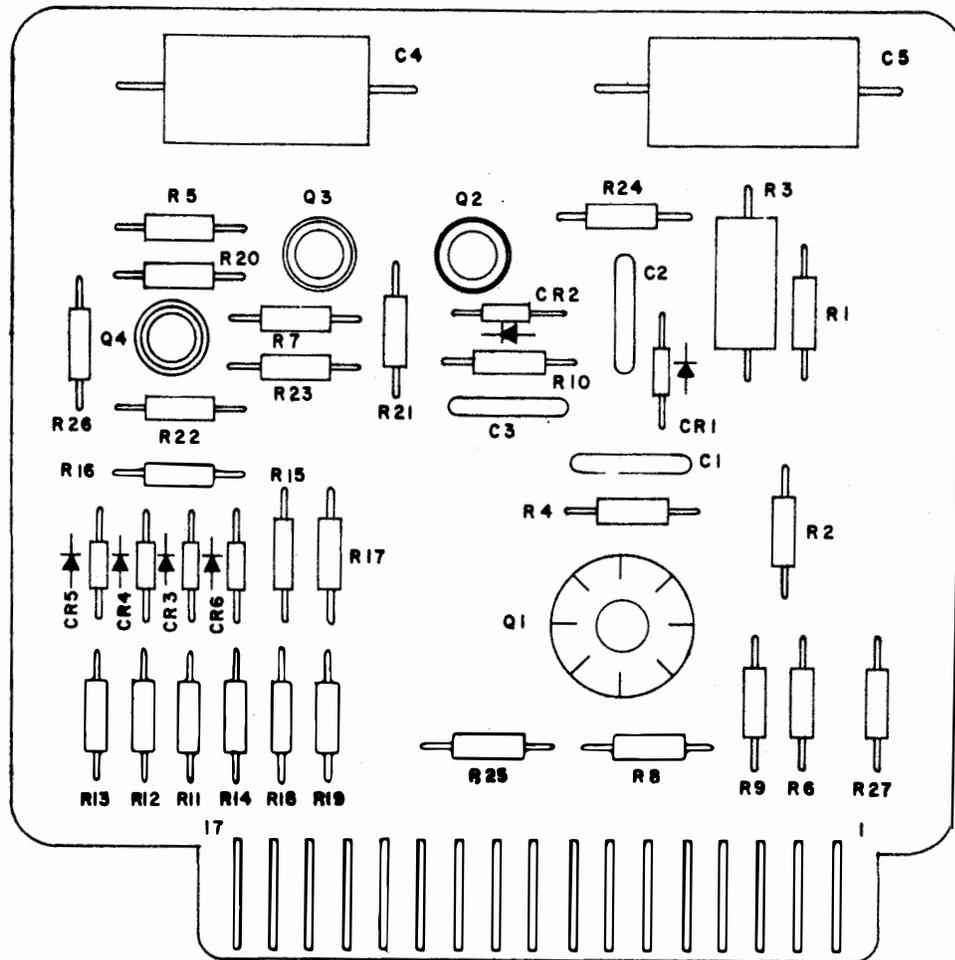


Figure 6-2: P.W. Assembly (A2-IF Amp, Lin-Log Converter, Vert. Defl.)

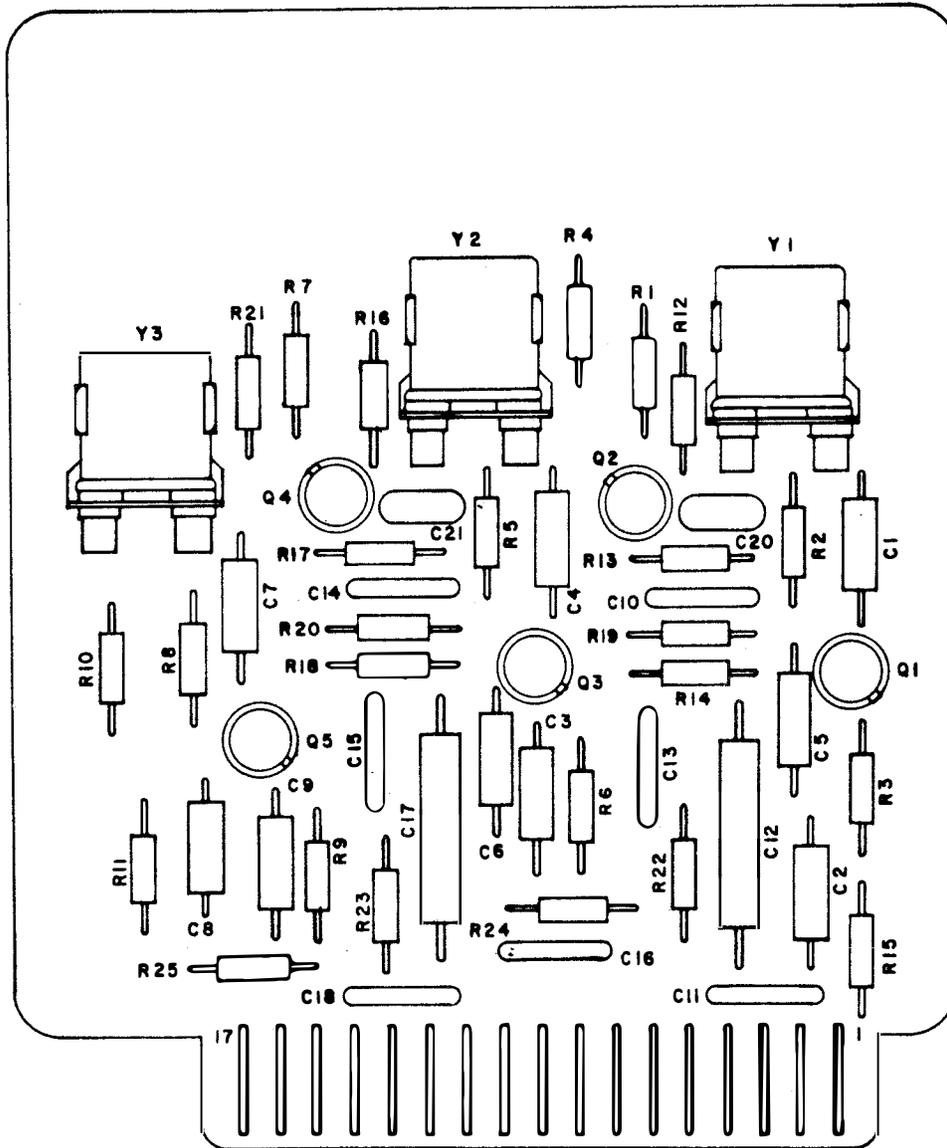


Figure 6-3: P.W. Board Assy (A3 Dual Freq.  
Osc. & 500 KC Calibrated Osc.)

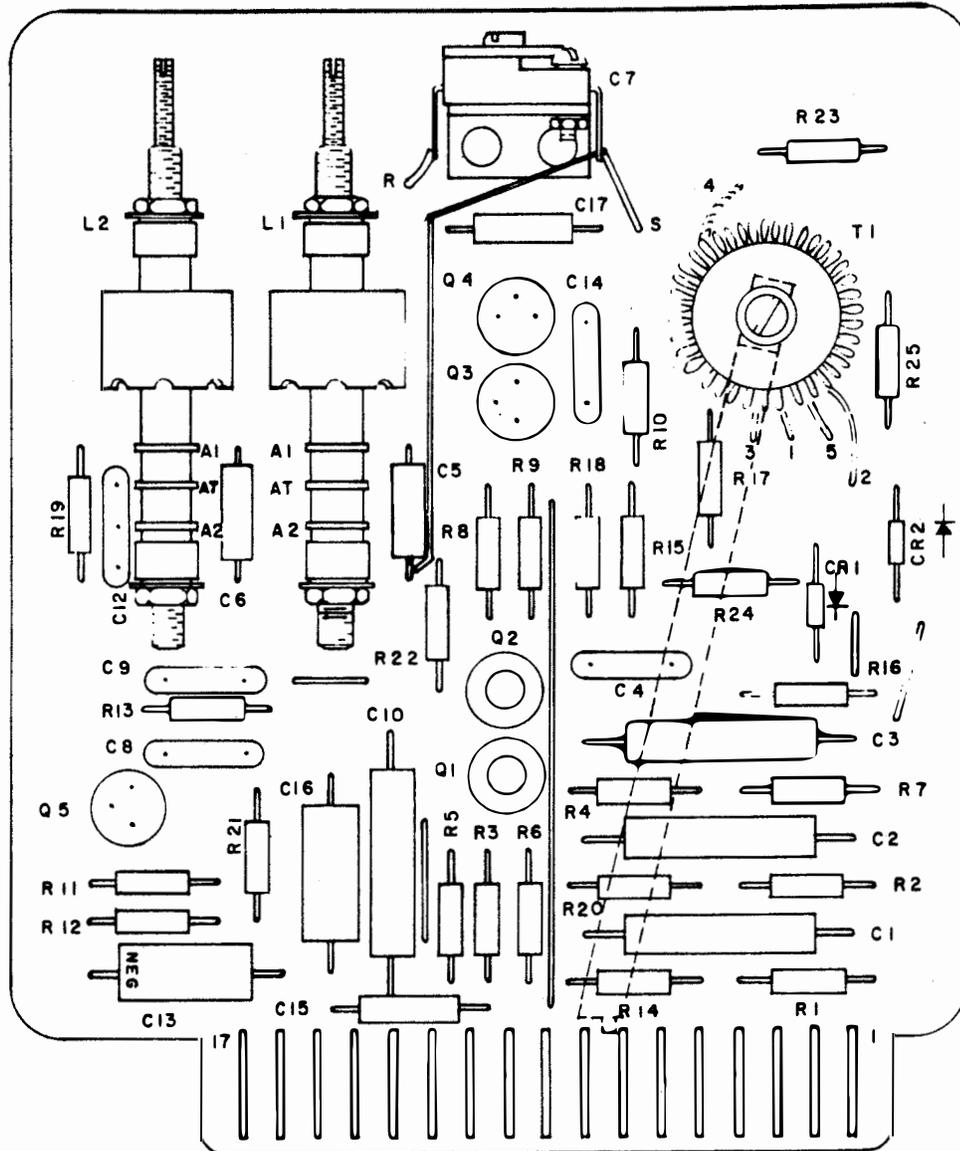


Figure 6-4: P. W. Board Assembly (A4 R. F. Amp.  
1st Mixer & 500 KC IF)



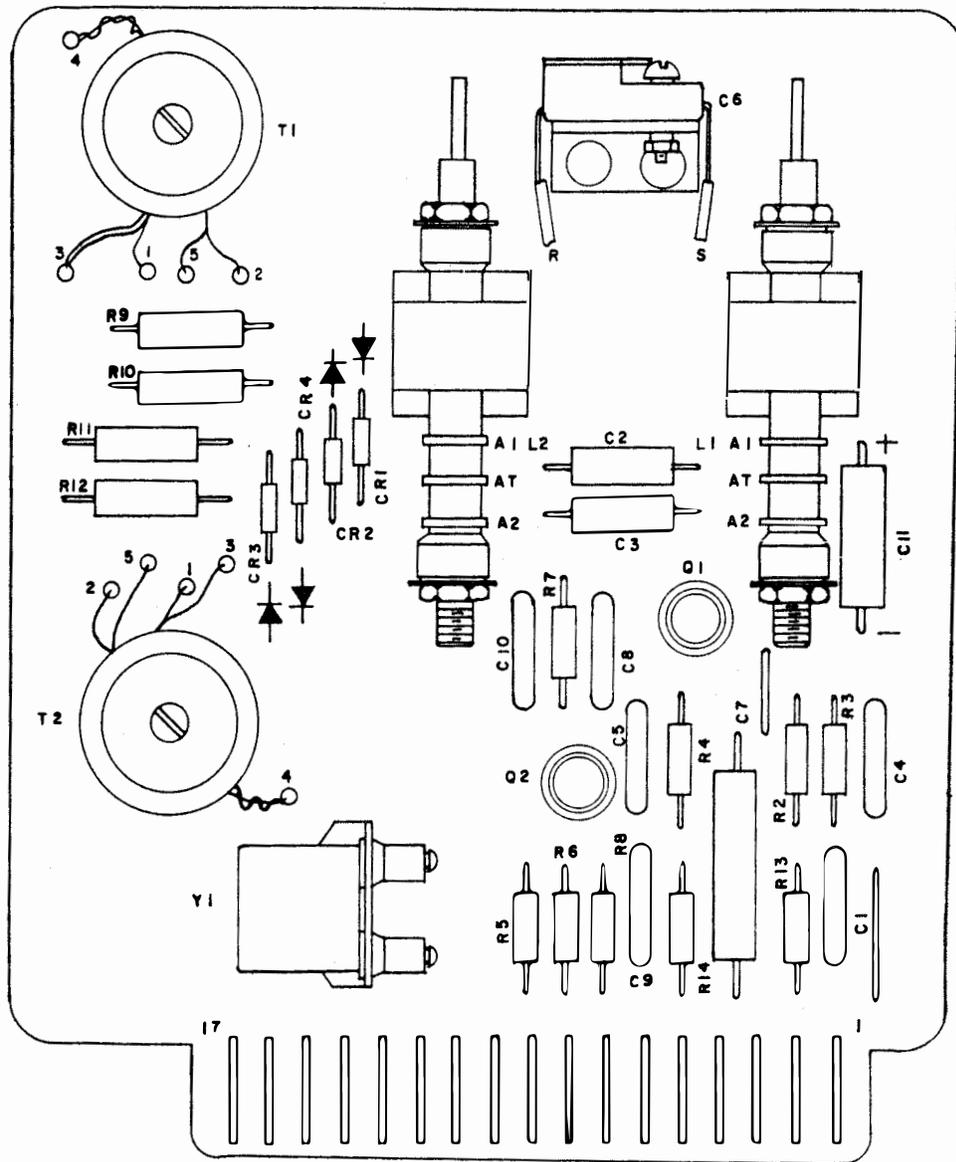


Figure 6-6: P. W. Board Assembly  
A6 Swept Osc. Ampl.

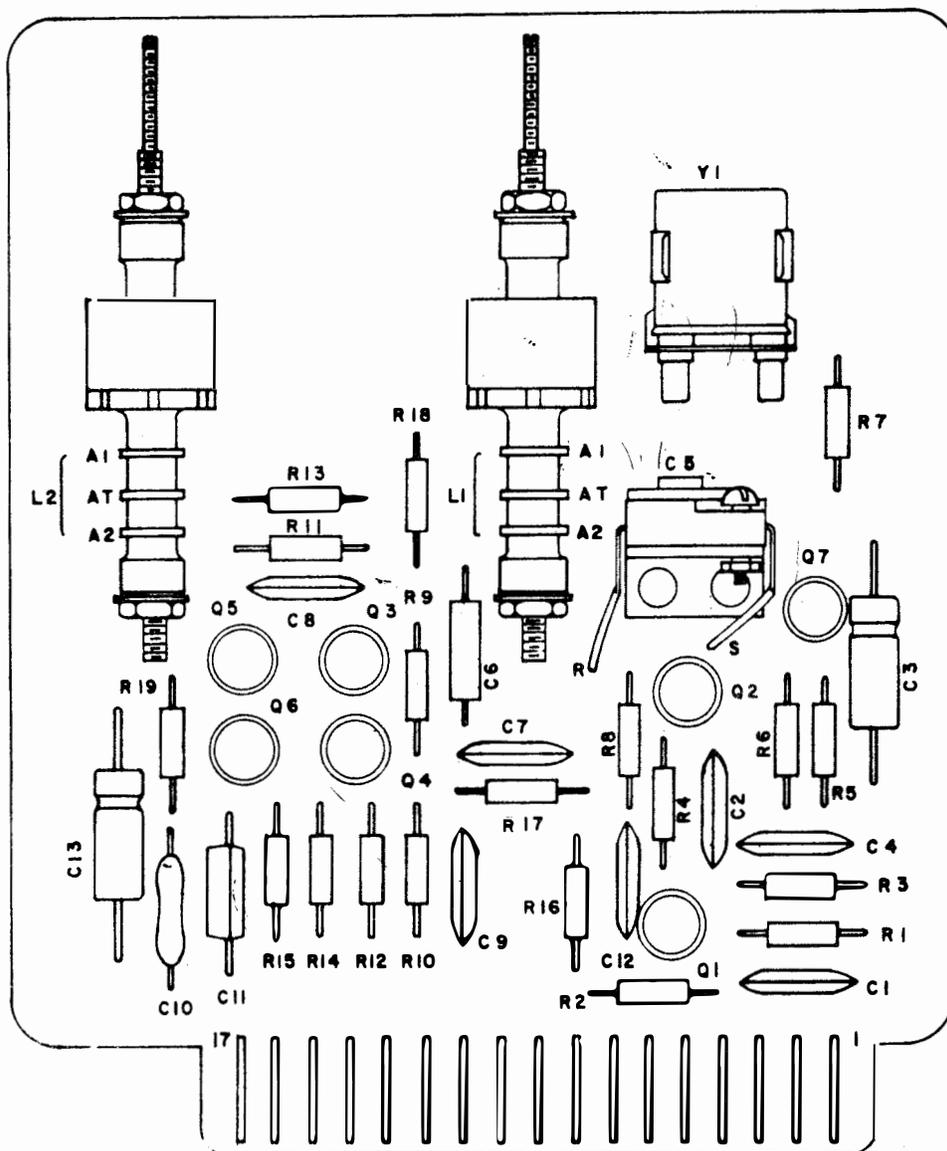


Figure 6-7: P. W. Board Assembly  
(A7 IF Crystal Filter)

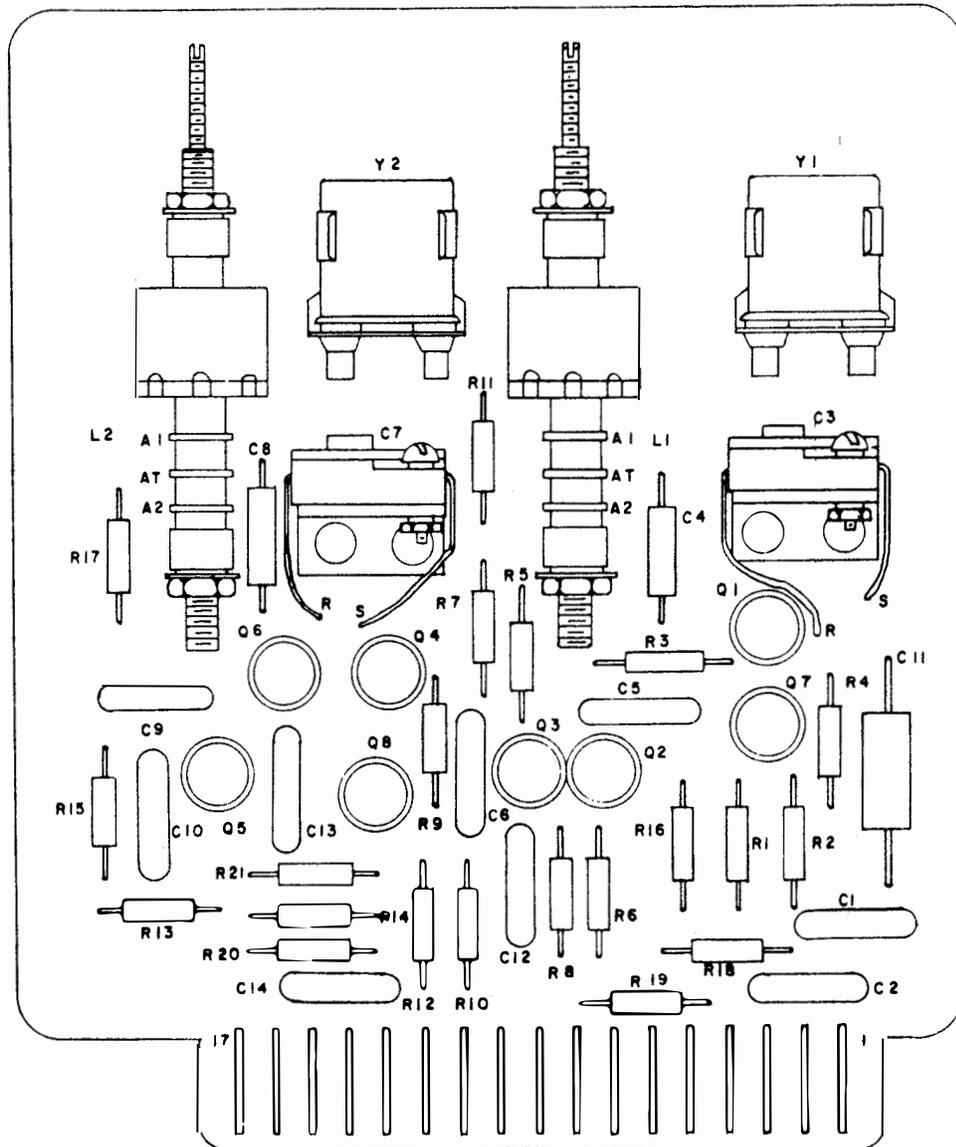


Figure 6-8: P.W. Board Assembly  
(A8 IF Crystal Filter)

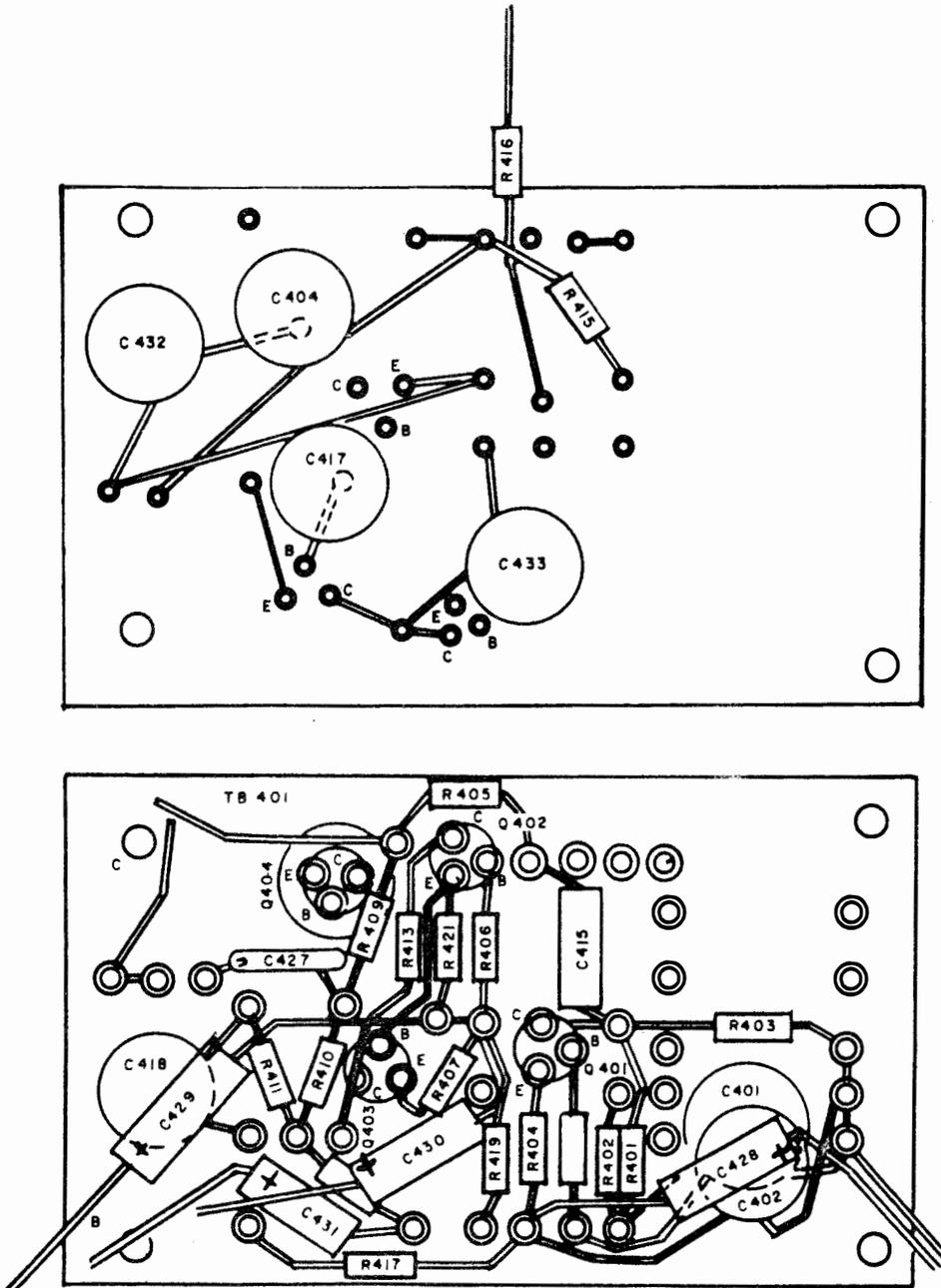


Figure 6-9: Terminal Board (Osc Sect) Assy. Wired TB-401

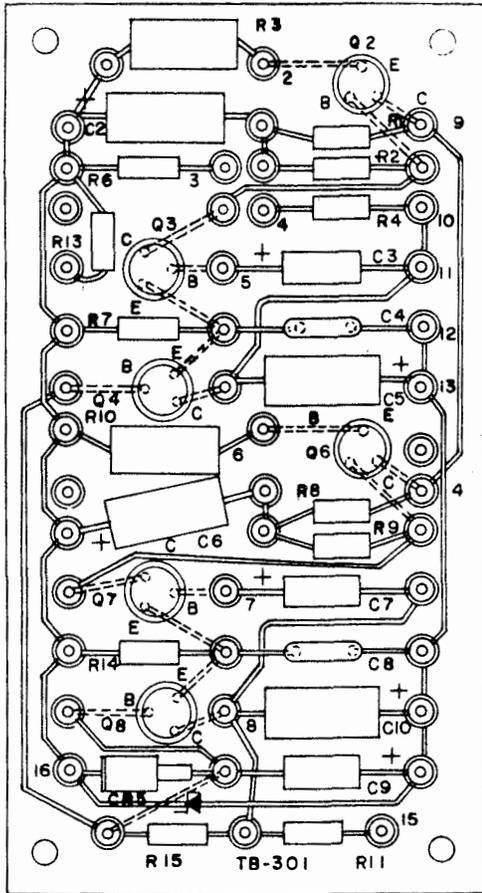


Figure 6-10: Terminal Board Low Voltage Assembly Wired TB-301

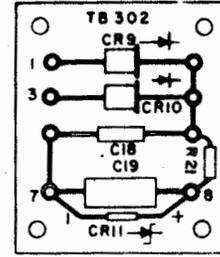


Figure 6-11: Terminal Board - 3.9 Volt Assy Wired TB-302

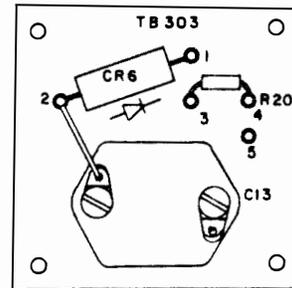


Figure 6-12: Terminal Board 1500V Assy Wired TB-303

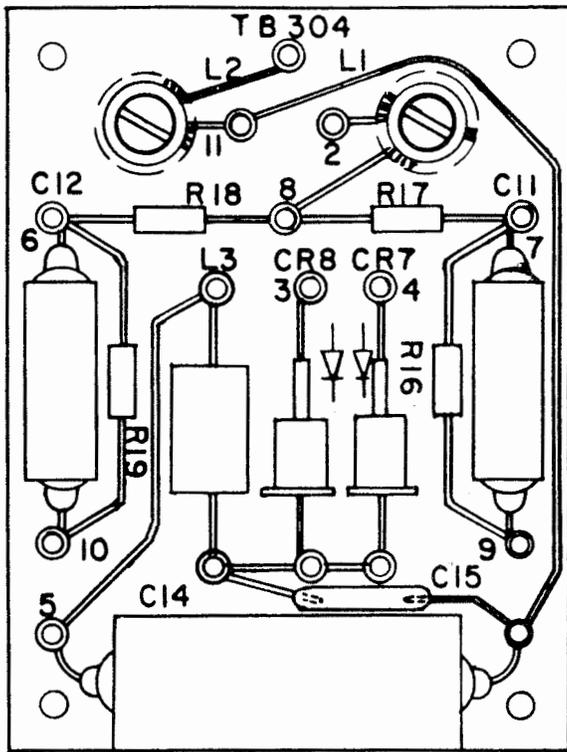


Figure 6-13: Terminal Board 200V  
Assy Wired TB-304

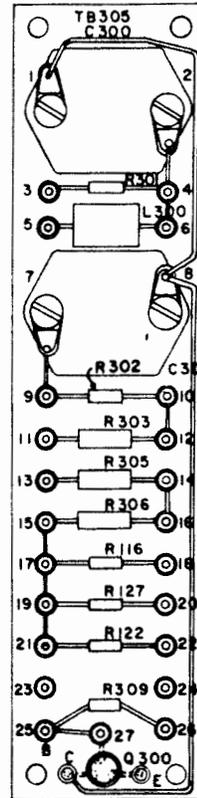


Figure 6-14: Terminal Board Display  
Assy Wired TB-305

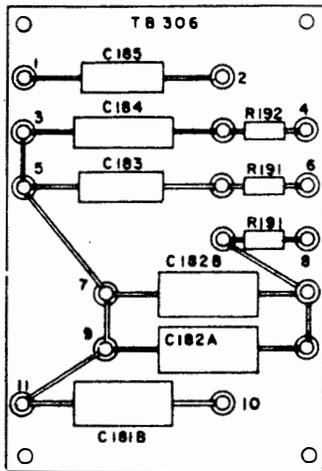


Figure 6-15: Terminal Board  
Sweep Timing Assy Wired TB-306

TABLE 1: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES   | NAME AND DESCRIPTION  | FIG.<br>NO. |
|--------------|---|---|-------------|
| A1           | See Table 6-2<br>for Parts List-<br>ing for A1 thru<br>A8 | ASSEMBLY, P. C. Board<br>C-4551   | 6-1         |
| A2           |   | ASSEMBLY, P. C. Board<br>C-4538   | 6-2         |
| A3           |   | ASSEMBLY, P. C. Board<br>C-4541   | 6-3         |
| A4           |   | ASSEMBLY, P. C. Board<br>C-4562   | 6-4         |
| A5           |   | ASSEMBLY, P. C. Board<br>C-4564   | 6-5         |
| A6           |   | ASSEMBLY, P. C. Board<br>C-4543   | 6-6         |
| A7           |   | ASSEMBLY, P. C. Board<br>C-4567   | 6-7         |
| A8           |   | ASSEMBLY, P. C. Board<br>C-4569   | 6-8         |
| C1           |   | CAPACITOR, electrolytic 3000mfd 25 v<br>MIL Type CE71C302F as per MIL-C-62  | 4-1         |
| C2           |   | CAPACITOR, tantalum 100mfd 25v MIL<br>type CL65BG101M-P3 as per MIL-C-3965. | 6-10        |
| C3           |   | CAPACITOR, tandalum 10mfd 25 v MIL type<br>CL64BG100M-P3 as per MIL-C-3965  | 4-1         |
| C4           |   | CAPACITOR, ceramic .01mfd 500 v MIL<br>type CK63AW103M as per MIL-C-11015   | 4-1         |
| C5           |   | Same as C2  | 6-10        |
| C6           |   | Same as C2  | 6-10        |
| C7           |   | Same as C3  | 4-1         |
| C8           |   | Same as C4  | 4-1         |
| C9           |   | Same as C3  |             |

\* For Major Unit & Accessories

TABLE 1: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION  | FIG.<br>NO. |
|--------------|-------|---|-------------|
| C10          |       | Same as C2  |             |
| C11          |       | CAPACITOR, paper, 22mfd 10% 200v MIL type CH05A1NC224K as per MIL-C-18312 | 6-13        |
| C12          |       | Same as C11   |             |
| C13          |       | CAPACITOR, mica .01mfd 10% 2500v MIL type CM60B103J-3 as per MIL-C-5      | 6-12        |
| C14          |       | CAPACITOR, paper 1.0 mfd 400v MIL type CH05A3NE105M as per MIL-C-18312    | 6-13        |
| C15          |       | CAPACITOR, ceramic .01mfd 500v MIL type CK63AX103K as per MIL-C-11015     | 6-13        |
| C16          |       | Same as C1  |             |
| C17          |       | Same as C1  |             |
| C18          |       | Same as C3  |             |
| C19          |       | Same as C2  |             |
| C140         |       | CAPACITOR, ceramic 33pf 5% 500v MIL type CK61CZ330K as per MIL-C-11015    | 4-1         |
| C150         |       | CAPACITOR, var MIL type MCA-20-S Hammarlund                               | 4-1         |
| C151         |       | CAPACITOR, var MIL type MCA-100-S Hammarlund                              | 4-1         |
| C180         |       | CAPACITOR, plastic 15mfd 50v MIL type CH70B1MV156 as per MIL-C-18312      | 4-1         |
| C181A        |       | CAPACITOR, plastic 4mfd 150v MIL type CH5381MV405K-3 as per MIL-C-18312   | 4-1         |
| C181B        |       | CAPACITOR, plastic 1.0mfd 50v MIL type CH03A3NG105K-3 as per MIL-C-18312  | 6-15        |
| C182A        |       | CAPACITOR, plastic 1.5mfd 50v MIL type CH03ANG155K-3 as per MIL-C-18312   | 6-15        |
| C182B        |       | Same as C182A   |             |

\*For Major Unit &amp; Accessories

TABLE 1: MAINTENANCE PARTS LIST \*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION  | FIG.<br>NO. |
|--------------|-------|---|-------------|
| C183         |       | CAPACITOR, plastic 0.47mfd 50v MIL type CH03A3NG474K-3 as per MIL-C-18312 | 6-15        |
| C184         |       | CAPACITOR, plastic 0.15mfd 50v MIL type CH03A3NG154K-3 as per MIL-C-18312 | 6-15        |
| C185         |       | Same as C183  | 6-15        |
| C250         |       | CAPACITOR, ceramic 4700pf 500v MIL type CK62AX472K as per MIL-C-11015     | 4-1         |
| C251         |       | CAPACITOR, mica 5pf 500v MIL type CM05C050K as per MIL-C-5                | 4-1         |
| C300         |       | CAPACITOR, mica 0.01mfd 2500v MIL type CM60B103J as per MIL-C-5           | 6-14        |
| C301         |       | Same as C300  | 6-14        |
| C401         |       | CAPACITOR, ceramic 0.01mfd 500v MIL type CK63AW103M as per MIL-C-11015    | 6-9         |
| C402         |       | Same as C401  | 6-9         |
| C404         |       | Same as C401  | 6-9         |
| C405         |       | CAPACITOR, mica 2200pf 500v type CM30D222J as per MIL-C-5                 | 6-9         |
| C406         |       | CAPACITOR, mica 1500pf 500v type CM30D152J as per MIL-C-5                 | 6-9         |
| C407         |       | CAPACITOR, mica 1000pf 500v type CM30D102J as per MIL-C-5                 | 6-9         |
| C408         |       | CAPACITOR, mica 330pf 500v type CM15D331J as per MIL-C-5                  | 6-9         |
| C409         |       | CAPACITOR, mica 200pf 500v type CM15D201J as per MIL-C-5                  | 6-9         |
| C410         |       | CAPACITOR, mica 820pf 500v type CM20D821J as per MIL-C-5                  | 6-9         |
| C411         |       | CAPACITOR, mica 560pf 500v type CM20D561J as per MIL-C-5                  | 6-9         |

\*For Major Unit & Accessories

TABLE 1: MAINTENANCE PARTS LIST\*

| REF<br>DESIGN | NOTES | NAME AND DESCRIPTION   | FIG.<br>NO. |
|---------------|-------|--|-------------|
| C412          |       | CAPACITOR, mica 430pf 500v MIL type<br>CM15D431J as per MIL-C-5            | 6-9         |
| C413          |       | CAPACITOR, mica 240pf 500v MIL type<br>CM15C241J as per MIL-C-5            | 6-9         |
| C414          |       | CAPACITOR, mica 150pf 500v MIL type<br>CM15C151J as per MIL-C-5            |             |
| C415          |       | Same as C410   | 6-9         |
| C416          |       | CAPACITOR, mica 47pf 500v MIL type<br>CM15C470J as per MIL-C-5             | 6-9         |
| C417          |       | Same as C401   | 6-9         |
| C418          |       | Same as C401   | 6-9         |
| C419          |       | CAPACITOR, trimmer 5-20pf MIL type<br>CV11C200 as per MIL-C-81             | 4-1         |
| C420          |       | Same as C419   |             |
| C421          |       | Same as C419   |             |
| C422          |       | Same as C419   |             |
| C423          |       | Same as C419   |             |
| C424          |       | Same as C419   |             |
| C425          |       | Same as C419   | 6-9         |
| C426          |       | Same as C414   |             |
| C427          |       | Same as C401   |             |
| C428          |       | CAPACITOR, tantalum 100mfd 25v MIL<br>type CL65BG101M-J3 as per MIL-C-3965 | 4-1         |
| C429          |       | Same as C428   |             |
| C430          |       | Same as C428   |             |
| C431          |       | Same as C428   |             |
| C432          |       | Same as C401   |             |

\*For Major Unit &amp; Accessories

TABLE 1: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|-------|--|-------------|
| C433         |       | Same as C401   |             |
| CR1          |       | DIODE, semiconductor MIL type 1N1614<br>as per MIL-S-19500                   | 4-1         |
| CR2          |       | Same as CR1  |             |
| CR3          |       | Same as CR1  |             |
| CR4          |       | Same as CR1  |             |
| CR5          |       | DIODE, zener 6.8v MIL type 1N3016B as<br>per MIL-S-19500                     | 4-1         |
| CR6          |       | DIODE, semiconductor MIL type 1N1733 as<br>per MIL-S-19500                   | 6-12        |
| CR7          |       | DIODE, semiconductor MIL type 1N547 as<br>per MIL-S-19500                    | 6-13        |
| CR8          |       | Same as CR7  | 6-13        |
| CR9          |       | Same as CR7  | 6-11        |
| CR10         |       | Same as CR7  | 6-11        |
| CR11         |       | DIODE, zener MIL type 1N748A as per<br>MIL-S-19500                           | 6-11        |
| CR401        |       | DIODE, semiconductor MIL type 1N82A<br>as per MIL-S-19500                    | 6-9         |
| DS101        |       | LAMP, neon MIL type MS25252-NE2D   | 4-1         |
| DS300        |       | LAMP, incandescent 6.3 volt 0.14 amp<br>MIL type MS15571-2 as per MIL-L-6363 | 4-1         |
| DS301        |       | Same as DS300  |             |
| F101         |       | FUSE, 1 amp 250v MIL type F02A as per<br>MIL-F-15160/02                      | 4-1         |
| F102         |       | Same as F101   |             |
| FL101        |       | LINE, filter as per A10090   | 4-1         |

\*For Major Unit & Accessories

Table 1

NAVSHIPS 0969-094-3010  
TABLE 1: MAINTENANCE PARTS LIST\*

TS-1379A/U  
PARTS LIST

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION  | FIG.<br>NO. |
|--------------|-------|---|-------------|
| J101         |       | CONNECTOR, male MIL type MS3102A-14S-7P                     | 4-1         |
| J131         |       | CONNECTOR, BNC MIL type UG625B/U                            | 4-1         |
| J132         |       | Same as J131  |             |
| J141         |       | Same as J131  |             |
| J142         |       | Same as J131  |             |
| J143         |       | Same as J131  |             |
| J144         |       | Same as J131  |             |
| J240         |       | CONNECTOR, female MIL type MS3102A-14S-55                   | 4-1         |
| J400         |       | Same as J131  |             |
| J401         |       | Same as J131  |             |
| L1           |       | COIL, RF as per A9954                                       | 6-13        |
| L2           |       | Same as L1  | 6-13        |
| L3           |       | COIL, choke 5.1mh 10% MIL type LT4K072-4 as per MIL-C-15305 | 6-13        |
| L140         |       | COIL, RF MIL type B-8245                                    | 4-1         |
| L300         |       | CHOKE, 10 mh +10% MIL type LT4K013-5 as per MIL-C-15305     | 6-14        |
| L401         |       | COIL, var osc 45mh as per C4549                             | 6-9         |
| L402         |       | COIL, var osc 18.8mh as per C4548                           | 6-9         |
| L403         |       | COIL, var osc 9.0mh as per C4547                            | 6-9         |
| L404         |       | COIL, var osc 4.0mh as per C4546                            | 6-9         |
| L405         |       | COIL, var osc 1.7mh as per C4545                            | 6-9         |
| L406         |       | COIL, var osc. 67mh as per C4544                            | 6-9         |
| L407         |       | Same as L406  | 6-9         |

\*For Major Unit & Accessories

TABLE 1: MAINTENANCE PARTS LISTS\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|-------|--|-------------|
| L413         |       | COIL, RF choke 220mh +10% MIL type<br>LT4K060-2 as per MIL-C-15305 | 6-9         |
| M401         |       | METER Dwg. B8237   | 4-1         |
| P101         |       | CONNECTOR, female MIL type MS3106A-<br>14S-7S                      | 4-1         |
| P240         |       | CONNECTOR, male MIL type MS3106A-14S-<br>5P                        | 4-1         |
| Q1           |       | TRANSISTOR MIL type 2N297A as per<br>MIL-S-19500                   | 4-1         |
| Q2           |       | TRANSISTOR MIL type 2N396A as per<br>MIL-S-19500                   | 4-1         |
| Q3           |       | Same as Q2   |             |
| Q4           |       | Same as Q2   |             |
| Q5           |       | Same as Q1   |             |
| Q6           |       | Same as Q2   |             |
| Q7           |       | Same as Q2   |             |
| Q8           |       | Same as Q2   |             |
| Q9           |       | TRANSISTOR MIL type 2N1184B as per<br>MIL-S-19500                  | 4-1         |
| Q10          |       | Same as Q9   |             |
| Q300         |       | TRANSISTOR MIL type 2N696 as per<br>MIL-S-19500                    | 6-14        |
| Q401         |       | TRANSISTOR MIL type 2N706 as per<br>MIL-S-19500                    | 6-9         |
| Q402         |       | Same as Q401   | 6-9         |
| Q403         |       | Same as Q401   | 6-9         |
| Q404         |       | Same as Q401   | 6-9         |

\* For Major Unit & Accessories

Table 1

 NAVSHIPS 0969-094-3010  
 TABLE 1: MAINTENANCE PARTS LIST\*

 TS-1379A/U  
 PARTS LIST

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION  | FIG.<br>NO. |
|--------------|-------|---|-------------|
| R1           |       | RESISTOR, carbon 5.6K 5% 1/2W MIL type<br>RC20GF562J as per MIL-R-11  | 6-10        |
| R2           |       | RESISTOR, carbon 10K 5% 1/2W MIL type<br>RC20GF103J as per MIL-R-11   | 6-10        |
| R3           |       | RESISTOR, carbon 3.3K 5% 2W MIL type<br>RC20GF123J as per MIL-R-11    | 6-10        |
| R4           |       | RESISTOR, carbon 12K 5% 1/2W MIL type<br>RC20GF123J as per MIL-R-11   | 6-10        |
| R5           |       | RESISTOR, var 10K 2W MIL type RV4LAYS<br>A103B as per MIL-R-94        | 4-1         |
| R6           |       | Same as R4  | 6-10        |
| R7           |       | Same as R2  | 6-10        |
| R8           |       | Same as R1  | 6-10        |
| R9           |       | Same as R4  | 6-10        |
| R10          |       | RESISTOR, carbon 22K 5% 2W MIL type<br>RC42GF223J as per MIL-R-11     | 6-10        |
| R11          |       | Same as R4  | 6-10        |
| R12          |       | Same as R5  |             |
| R13          |       | Same as R4  | 6-10        |
| R14          |       | Same as R2  | 6-10        |
| R15          |       | RESISTOR, carbon 820ohms 1/2W MIL type<br>RC20GF821J as per MIL-R-11  | 6-10        |
| R16          |       | RESISTOR, fixed 22ohms 5% 1/2W MIL type<br>RC20GF220J as per MIL-R-11 | 6-13        |
| R17          |       | RESISTOR, fixed 1K 5% 1/2W MIL type<br>RC20GF102J as per MIL-R-11     | 6-13        |
| R18          |       | Same as R17   | 6-13        |
| R19          |       | Same as R16   | 6-13        |

\*For Major Unit &amp; Accessories

TABLE 1: MAINTENANCE PARTS LIST \*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|-------|--|-------------|
| R20          |       | RESISTOR, wire wound 2.7ohm 3W MIL type RW59V2R7 as per MIL-R-26     | 6-12        |
| R21          |       | RESISTOR, carbon 1500ohm 5% 1/2W MIL type RC20GF152J as per MIL-R-11 | 6-11        |
| R110         |       | RESISTOR, var 50K 2W MIL type RV4LAYS503B as per MIL-R-94            | 4-1         |
| R111         |       | Same as R110   |             |
| R112         |       | RESISTOR, var 1K 2W MIL type RV4LAYS102B as per MIL-R-94             | 4-1         |
| R113         |       | RESISTOR, var 1K 2W MIL type RV4LAYS102B as per MIL-R-94             | 4-1         |
| R114         |       | RESISTOR, var 2.5 meg 2W MIL type RV4NAYS255B as per MIL-R-94        | 4-1         |
| R115         |       | RESISTOR, fixed 47K 5% 1/2W MIL type RC20GF473J as per MIL-R-11      | 4-1         |
| R116<br>RC   |       | RESISTOR, fixed 2.2K 5% 1/2W MIL type RC20GF222J as per MIL-R-11     | 6-14        |
| R117         |       | RESISTOR, fixed 1.8K 5% 1/2W MIL type RC20GF182J as per MIL-R-11     | 4-1         |
| R118         |       | RESISTOR, var 2.5K 2W MIL type RV4NAYS252B as per MIL-R-94           | 4-1         |
| R121         |       | RESISTOR, var 5.0K 2W MIL type RV4NAYS502B as per MIL-R-94           | 4-1         |
| R122         |       | RESISTOR, fixed 2.7K 5% 1/2W MIL type RC20GF272J as per MIL-R-11     | 6-14        |
| R123         |       | RESISTOR, var 150ohm 2W MIL type RV4NAYS151B as per MIL-R-94         | 4-1         |
| R124         |       | Same as R123   |             |
| R125         |       | RESISTOR, var 2.5 meg 2W MIL type RV4NAYS255B as per MIL-R-94        | 4-1         |
| R126         |       | Same as R113   |             |

\*For Major Unit & Accessories

Table 1

NAVSHIPS 0969-094-3010

TS-1379A/U  
PARTS LIST

TABLE 1: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|-------|--|-------------|
| R127         |       | RESISTOR, fixed 3.9K 5% 1/2W MIL type<br>RC20GF392J as per MIL-R-11          | 6-14        |
| R128         |       | Same as R17  |             |
| R129         |       | Same as R1   |             |
| R130         |       | RESISTOR, var 50 ohm 2W MIL type<br>RV4LAYSD500B as per MIL-R-94             | 4-1         |
| R131         |       | RESISTOR, var 500 ohm 2W MIL type<br>RVNBYS501B                              | 4-1         |
| R132         |       | Same as R17  |             |
| R141         |       | RESISTOR, film 178.0 ohm 1% 1/4W MIL<br>type RN65C1780B as per MIL-R-10509/2 | 4-1         |
| R142         |       | RESISTOR, fixed 30.4 ohm 5% 1/4W MIL<br>type MIL-R-10509/2                   | 4-1         |
| R143         |       | Same as R141   |             |
| R144         |       | RESISTOR, fixed 96.25ohm .5% 1/4W as<br>per MIL-R-10509/2                    | 4-1         |
| R145         |       | RESISTOR, fixed 71.15ohm .5% 1/4W as<br>per MIL-R-10509/2                    | 4-1         |
| R146         |       | Same as R144   |             |
| R147         |       | Same as R144   |             |
| R148         |       | Same as R145   |             |
| R149         |       | Same as R144   |             |
| R150         |       | RESISTOR, fixed 61.2ohm .5% 1/4W MIL<br>type RN65C61R2C as per MIL-R-10509/2 | 4-1         |
| R151         |       | RESISTOR, fixed 247.5ohm .5% 1/4W as<br>per MIL-R-10509/2                    | 4-1         |
| R152         |       | Same as R150   |             |
| R153         |       | Same as R150   |             |

\*For Major Unit &amp; Accessories

TABLE 1: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|-------|--|-------------|
| R154         |       | Same as R151   |             |
| R155         |       | Same as R150   |             |
| R157         |       | RESISTOR, var 500ohm 2W MIL type<br>RV4NAYS501B as per MIL-R-94        | 4-1         |
| R160         |       | Same as R127   |             |
| R161         |       | RESISTOR, fixed 560ohm 5% 1/2W MIL<br>type RC20GF561J as per MIL-R-11  | 4-1         |
| R180         |       | RESISTOR, fixed 100K 5% 1/2W MIL type<br>RC20GF104J as per MIL-R-11    | 4-1         |
| R181         |       | RESISTOR, fixed 33K 5% 1/2W MIL type<br>RC20GF333J as per MIL-R-11     | 4-1         |
| R182         |       | Same as R4   |             |
| R183         |       | RESISTOR, fixed 8.2 ohm 5% 1/2W MIL<br>type RC20GF822J as per MIL-R-11 | 4-1         |
| R184         |       | Same as R127   |             |
| R185         |       | Same as R117   |             |
| R186         |       | Same as R17  |             |
| R187         |       | RESISTOR, fixed 470ohm 5% 1/2W MIL<br>type RC20GF471J as per MIL-R-11  | 4-1         |
| R188         |       | Same as R116   |             |
| R189         |       | RESISTOR, fixed 680ohm 5% 1/2W MIL type<br>RC20GF681J as per MIL-R-11  | 4-1         |
| R190         |       | RESISTOR, fixed 12ohm 5% 1/2W MIL type<br>RC20GF120J as per MIL-R-11   | 6-15        |
| R191         |       | RESISTOR, fixed 39ohm 5% 1/2W MIL type<br>RC20GF390J as per MIL-R-11   | 6-15        |
| R192         |       | RESISTOR, fixed 68ohm 5% 1/2W MIL type<br>RC20GF680J as per MIL-R-11   | 6-15        |
| R194         |       | Same as R180   |             |

\*For Major Unit & Accessories

Table 1

NAVSHIPS 0969-094-3010  
TABLE 1: MAINTENANCE PARTS LIST \*

TS-1379A/U  
PARTS LIST

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION  | FIG.<br>NO. |
|--------------|-------|---|-------------|
| R195         |       | Same as R181  |             |
| R196         |       | Same as R4  |             |
| R197         |       | Same as R183  |             |
| R198         |       | Same as R127  |             |
| R199         |       | Same as R117  |             |
| R200         |       | Same as R17   |             |
| R201         |       | Same as R187  |             |
| R202         |       | Same as R4  |             |
| R203         |       | Same as R116  |             |
| R204         |       | RESISTOR, fixed 220K 5% 1/2W MIL type<br>RC20GF221J as per MIL-R-11   | 4-1         |
| R205         |       | Same as R180  |             |
| R206         |       | Same as R181  |             |
| R207         |       | Same as R4  |             |
| R208         |       | Same as R183  |             |
| R209         |       | Same as R127  |             |
| R210         |       | Same as R117  |             |
| R211         |       | Same as R17   |             |
| R212         |       | Same as R187  |             |
| R213         |       | Same as R122  |             |
| R214         |       | Same as R117  |             |
| R215         |       | RESISTOR, fixed 150ohm 5% 1/2W MIL type<br>RC20GF151J as per MIL-R-11 | 4-1         |
| R216         |       | Same as R17   |             |
| R217         |       | Same as R127  |             |

\*For Major Unit & Accessories

TABLE 1: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|-------|--|-------------|
| R218         |       | Same as R2   |             |
| R219         |       | Same as R10  |             |
| R220         |       | RESISTOR, fixed 39K 5% 1/2W MIL type<br>RC20GF393J as per MIL-R-11     | 4-1         |
| R221         |       | RESISTOR, fixed 82K 5% 1/2W MIL type<br>RC20GF823J as per MIL-R-11     | 4-1         |
| R222         |       | RESISTOR, fixed 180K 5% 1/2W MIL type<br>RC20GF184J as per MIL-R-11    | 4-1         |
| R223         |       | RESISTOR, fixed 1 meg 5% 1/2W MIL type<br>RC20GF105J as per MIL-R-11   | 4-1         |
| R226         |       | RESISTOR, fixed 4700ohm 5% 1/2W MIL<br>type RC20GF472J as per MIL-R-11 | 4-1         |
| R227         |       | Same as R116   |             |
| R228         |       | Same as R4   |             |
| R229         |       | RESISTOR, fixed 560ohm 5% 1/2W MIL<br>type RC20GF560J as per MIL-R-11  | 4-1         |
| R230         |       | Same as R226   |             |
| R231         |       | Same as R215   |             |
| R232         |       | Same as R187   |             |
| R235         |       | RESISTOR, var 5000ohm 2W MIL type<br>RV4LAYSA502B as per MIL-R-94      | 4-1         |
| R240         |       | RESISTOR, carbon 12 meg 5% 1/2W MIL<br>type RC20GF126J as per MIL-R-11 | 4-1         |
| R300         |       | RESISTOR, var 500K 2W MIL type<br>RV4NAYS504B as per MIL-R-94          | 4-1         |
| R301         |       | RESISTOR, fixed 68K 5% 1/2W MIL type<br>RC20GF683J as per MIL-R-11     | 6-14        |
| R302         |       | Same as R301   | 6-14        |
| R303         |       | Same as R306   | 6-14        |

\*For Major Unit & Accessories

TABLE 1: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|-------|--|-------------|
| R304         |       | RESISTOR, var 2.5 meg 2W MIL type<br>RV4NAYSB225B as per MIL-R-94        | 4-1         |
| R305         |       | Same as R306   | 6-14        |
| R306         |       | RESISTOR, fixed 1.5 meg 5% 1W MIL type<br>RC32GF155J as per MIL-R-11     | 6-14        |
| R307         |       | RESISTOR, var 500K 2W MIL type<br>RV4NAYSD504B as per MIL-R-94           | 4-1         |
| R308         |       | RESISTOR, var 5K 2W as per MIL-R-94                                      | 4-1         |
| R309         |       | RESISTOR, fixed 270 ohm 5% 1/2W MIL<br>type RC20GF271J as per MIL-R-11   | 6-14        |
| R401         |       | Same as R116   | 6-9         |
| R402         |       | Same as R15  | 6-9         |
| R403         |       | Same as R17  | 6-9         |
| R404         |       | Same as R309   | 6-9         |
| R405         |       | Same as R127   | 6-9         |
| R406         |       | Same as R189   | 6-9         |
| R407         |       | Same as R309   | 6-9         |
| R408         |       | RESISTOR, var 2500 ohm 10% 2W MIL type<br>RV4NAYSK252A as per MIL-R-94   | 6-9         |
| R409         |       | RESISTOR, carbon 5600 ohm 5% 1/2W MIL<br>type RC20GF562J as per MIL-R-11 | 6-9         |
| R410         |       | Same as R409   | 6-9         |
| R411         |       | RESISTOR, carbon 390 ohm 5% 1/2W MIL<br>type RC20GF391J as per MIL-R-11  | 6-9         |
| R412         |       | RESISTOR, var 100 ohm 10% 2W MIL type<br>RV4NAYSK101A as per MIL-R-94    | 6-9         |
| R413         |       | Same as R17  | 6-9         |

\*For Major Unit &amp; Accessories

TABLE 1: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|-------|--|-------------|
| R414         |       | RESISTOR, carbon 18 ohm 5% 1/2W MIL type RC20GF180J as per MIL-R-11  | 6-9         |
| R415         |       | Same as R3   |             |
| R416         |       | RESISTOR, carbon 10 ohm 5% 1/2W MIL type RC20GF100J as per MIL-R-11  | 4-1         |
| R417         |       | Same as R411   |             |
| R418         |       | RESISTOR, carbon 180 ohm 5% 1/2W MIL type RC20GF181J as per MIL-R-11 | 4-1         |
| R419         |       | Same as R411   |             |
| R420         |       | Same as R309   |             |
| R421         |       | Same as R183   |             |
| R422         |       | Same as R418   |             |
| S101         |       | SWITCH, toggle DPST MIL type MS35059                                 | 4-1         |
| S120         |       | SWITCH, rotary as per C4528  | 4-1         |
| S130         |       | SWITCH, rotary dual R. F. as per C4526                               | 4-1         |
| S131         |       | SWITCH as per MIL-R-94   | 4-1         |
| S140         |       | SWITCH, rotary as per C4531  | 4-1         |
| S160         |       | SWITCH, rotary as per C4527  | 4-1         |
| S180         |       | SWITCH, rotary as per C4533  | 4-1         |
| S182         |       | SWITCH, rotary as per C4529  | 4-1         |
| S183         |       | SWITCH, toggle SPDT MIL type MS35058                                 | 4-1         |
| S401         |       | SWITCH, rotary as per C4530  | 6-9         |
| S402         |       | SWITCH, rotary as per C4532  | 4-1         |
| T1           |       | TRANSFORMER, power as per B8087                                      | 4-1         |
| T2           |       | TRANSFORMER, converter as per B8086                                  | 4-1         |

\*For Major Unit & Accessories

Table 1

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TS-1379A/U  
PARTS LIST

TABLE 1: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION                                      | FIG.<br>NO. |
|--------------|-------|---|-------------|
| TB301        |       | TERMINAL BOARD, low voltage assembly wired as per C4442   | 6-10        |
| TB302        |       | TERMINAL BOARD, 3.9v stud assembly as per B8210           | 6-11        |
| TB303        |       | TERMINAL BOARD, 1500v assembly wired as per B8172         | 6-12        |
| TB304        |       | TERMINAL BOARD, 200v assembly wired as per B8167          | 6-13        |
| TB305        |       | TERMINAL BOARD, display assembly wired as per C4478       | 6-14        |
| TB306        |       | TERMINAL BOARD, sweep timing assembly as per B8150        | 6-15        |
| TB307        |       | TERMINAL BOARD, barrier MIL type 37TB3 as per MIL-T-55164 | 4-1         |
| TB401        |       | TERMINAL BOARD, marking as per B8156                      | 6-9         |
| V300         |       | CATHODE, ray tube as per A10091                           | 4-1         |
| W101         |       | CABLE, assembly power electrical as per C4493             | 4-1         |
| W102         |       | CABLE, assembly coaxial as per C4491                      | 4-1         |
| W103         |       | CABLE, assembly coaxial as per C4491                      | 4-1         |
| W240         |       | CABLE, assembly coaxial Dwg. C4535                        | 4-1         |
| XDS101       |       | LAMPHOLDER MIL type LH74LC13CN                            | 4-1         |
| XDS300       |       | SOCKET, crt duodecal Cinch Jones                          | 4-1         |
| XDS301       |       | SOCKET, miniature bayonet as per A10311                   | 4-1         |
| XDS302       |       | Same as XDS301  |             |
| XF101        |       | FUSE, holder MIL type FHN20G as per MIL-F-19207           | 4-1         |
| XF102        |       | Same as XF101   |             |
| XA1          |       | CONNECTOR, electrical as per MIL-C-21097                  | 4-1         |

\*For Major Unit &amp; Accessories

TABLE 1: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION                     | FIG.<br>NO. |
|--------------|-------|--|-------------|
| XA2          |       | Same as XA1                              |             |
| XA3          |       | CONNECTOR, electrical as per MIL-C-21097 | 4-1         |
| XA4          |       | Same as XA3                              |             |
| XA5          |       | Same as XA3                              |             |
| XA6          |       | Same as XA3                              |             |
| XA7          |       | Same as XA3                              |             |
| XA8          |       | Same as XA3                              |             |

\*For Major Unit & Accessories

Table 2

 NAVSHIPS 0969-094-3010  
 TABLE 2: MAINTENANCE PARTS LIST\*

 TS-1379A/U  
 PARTS LIST

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION  | FIG.<br>NO. |
|--------------|-------|---|-------------|
| A1           |       | ASSEMBLY, P. C. Board Dwg. C4551                                    | 6-1         |
| A1 Q1        |       | TRANSISTOR, 2N491 as per MIL-S-19500                                |             |
| Q3           |       | TRANSISTOR, 2N1132 per MIL-S-19500                                  |             |
| Q4           |       | TRANSISTOR, 2N696 per MIL-S-19500                                   |             |
| Q5           |       | TRANSISTOR, 2N3440 RCA  |             |
| Q6           |       | TRANSISTOR, 2N3440 RCA  |             |
| R1           |       | RESISTOR, fixed 6.8 meg. 5%, 1/2W<br>Type RC20GF685J per MIL-R-11   |             |
| R2           |       | Same as A1 R1   |             |
| R3           |       | RESISTOR, fixed 270 ohm, 5%, 1/2W<br>Type RC20GF271J per MIL-R-11   |             |
| R4           |       | Same as A1 R1   |             |
| R5           |       | RESISTOR, fixed 33K, 5%, 1/2W Type<br>RC20GF333J per MIL-R-11       |             |
| R6           |       | RESISTOR, fixed 220 ohm, 5%, 1/2W<br>Type RC20GF221J per MIL-R-11   |             |
| R7           |       | Same as A1 R5   |             |
| R8           |       | Same as A1 R6   |             |
| A2           |       | ASSEMBLY, P. C. Board Dwg. C4538                                    | 6-2         |
| A2 C1        |       | CAPACITOR, ceramic, .01 mfd 500V<br>Type CK63AW103M per MIL-C-11015 |             |
| C2           |       | Same as A2 C1   |             |
| C3           |       | Same as A2 C1   |             |
| C4           |       | CAPACITOR, paper, 1.0 mfd 200V Type<br>CH04A3NC105K per MIL-C-18312 |             |
| C5           |       | Same as A2 C4   |             |

\*For Printed Circuit Assemblies

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION  | FIG.<br>NO. |
|--------------|-------|---|-------------|
| A2 CR1       |       | DIODE, 1N933 per MIL-S-19500                                    |             |
|              |       | Same as A2 CR1  |             |
|              |       | DIODE, 1N483B per MIL-S-19500                                   |             |
|              |       | Same as A2 CR3  |             |
|              |       | Same as A2 CR3  |             |
|              |       | Same as A2 CR3  |             |
|              |       | Same as A1 Q5   |             |
|              |       | Same as A1 Q4   |             |
|              |       | Same as A1 Q5   |             |
|              |       | Same as A1 Q5   |             |
| R1           |       | RESISTOR, fixed 680K, 5%, 1/2W Type RC20GF684J per MIL-R-11     |             |
| R2           |       | RESISTOR, fixed 6800 ohm, 5%, 1/2W Type RC20GF682J per MIL-R-11 |             |
| R3           |       | RESISTOR, fixed 4700 ohm 5% 2W, Type RC42GF472J Per MIL-R-11    |             |
| R4           |       | RESISTOR, fixed 100 ohm 5% 1/2W, Type RC20GF101J per MIL-R-11   |             |
|              |       | Same as A2 R5   |             |
|              |       | Same as A2 R3   |             |
| R7           |       | RESISTOR, fixed 330 ohm 5% 1/2W Type RC20GF331J per MIL-R-11    |             |
| R8           |       | RESISTOR, fixed 560 ohm 5% 1/2W, Type RC20GF561J per MIL-R-11   |             |
| R9           |       | RESISTOR, fixed 5600 ohm 5% 1/2W, Type RC20GF562J per MIL-R-11  |             |
| R10          |       | RESISTOR, fixed 100K 5% 1/2 W, Type RC20GF104J per MIL-R-11     |             |

\*For Printed Circuit Assemblies

TABLE 2: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|-------|--|-------------|
| A2 R11       |       | RESISTOR, fixed 1500 ohm 5% 1/2W, Type RC20GF152J per MIL-R-11 |             |
| R12          |       | Same as A2 R2  |             |
| R13          |       | RESISTOR, fixed 15K 5% 1/2W, Type RC20GF153J per MIL-R-11      |             |
| R14          |       | RESISTOR, fixed 68K 5% 1/2W, Type RC20GF683J per MIL-R-11      |             |
| R15          |       | RESISTOR, fixed 12 ohm 5% 1/2W, Type RC20GF120J per MIL-R-11   |             |
| R16          |       | Same as A2 R15   |             |
| R17          |       | Same as A2 R15   |             |
| R18          |       | RESISTOR, fixed 47 ohm 5% 1/2W, Type RC20GF470J per MIL-R-11   |             |
| R19          |       | RESISTOR, fixed 150 ohm 5% 1/2W, Type RC20GF151J per MIL-R-11  |             |
| R20          |       | Same as A2 R14   |             |
| R21          |       | Same as A2 R6  |             |
| R22          |       | Same as A2 R14   |             |
| R23          |       | Same as A2 R6  |             |
| R24          |       | Same as A2 R9  |             |
| R25          |       | RESISTOR, fixed 56 ohm 5% 1/2W, Type RC20GF560J per MIL-R-11   |             |
| R26          |       | Same as A1 R6  |             |
| R27          |       | RESISTOR, fixed 470 ohm 5% 1/2W, Type RC20GF471J per MIL-R-11  |             |
| A3           |       | ASSEMBLY, P. C. BOARD Dwg. C4541                               | 6-3         |
| A3 C1        |       | CAPACITOR, Mica 120pf 500V Type CM15C121J per MIL-C-5          |             |

\*For Printed Circuit Assemblies

TABLE 2: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION  | FIG.<br>NO. |
|--------------|-------|---|-------------|
| A3 C2        |       | CAPACITOR, mica 510pf 500V, Type CM15D511J per MIL-C-5          |             |
| C3           |       | Same as A3 C2   |             |
| C4           |       | Same as A3 C4   |             |
| C5           |       | CAPACITOR, mica 200pf 500V, Type CM15C201J per MIL-C-5          |             |
| C6           |       | Same as A3 C5   |             |
| C7           |       | CAPACITOR, mica 390pf 500V, Type CM15C390J per MIL-C-5          |             |
| C8           |       | Same as A3 C7   |             |
| C9           |       | Same as A3 C2   |             |
| C10          |       | Same as A2 C1   |             |
| C11          |       | Same as A2 C1   |             |
| C12          |       | CAPACITOR, paper 0.1 mfd 50V, Type CH03A3NG104K per MIL-C-18312 |             |
| C13          |       | Same as A2 C1   |             |
| C14          |       | Same as A2 C1   |             |
| C15          |       | Same as A2 C1   |             |
| C16          |       | Same as A2 C1   |             |
| C17          |       | Same as A3 C12  |             |
| C18          |       | Same as A2 C1   |             |
| C19          |       | CAPACITOR, mica 2700pf 500V, Type CM06D272J per MIL-C-5         |             |
| C20          |       | CAPACITOR, mica 220pf 500V, Type CM15C221J per MIL-C-5          |             |

\*For Printed Circuit Assemblies

TABLE 2: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION  | FIG.<br>NO. |
|--------------|-------|---|-------------|
| A3 C21       |       | Same as A3 C20  |             |
| Q1           |       | Same as A1 Q4   |             |
| Q2           |       | Same as A1 Q4   |             |
| Q3           |       | Same as A1 Q4   |             |
| Q4           |       | Same as A1 Q4   |             |
| Q5           |       | Same as A1 Q4   |             |
| R1           |       | RESISTOR, fixed 330K 5% 1/2W, Type<br>RC20GF334J per MIL-R-11     |             |
| R2           |       | Same as A2 R27  |             |
| R3           |       | RESISTOR, fixed 1000 ohm 5% 1/2W, Type<br>RC20GF102J per MIL-R-11 |             |
| R4           |       | Same as A3 R1   |             |
| R5           |       | Same as A2 R27  |             |
| R6           |       | Same as A3 R3   |             |
| R7           |       | RESISTOR, fixed 390 ohm 5% 1/2W, Type<br>RC20GF391J per MIL-R-11  |             |
| R8           |       | Same as A3 R1   |             |
| R9           |       | Same as A3 R3   |             |
| R10          |       | RESISTOR, fixed 2700 ohm 5% 1/2W, Type<br>RC20GF272J per MIL-R-11 |             |
| R11          |       | Same as A1 R3   |             |
| R12          |       | Same as A2 R27  |             |
| R13          |       | Same as A2 R13  |             |
| R14          |       | RESISTOR, fixed 4700 ohm 5% 1/2W, Type<br>RC20GF472J per MIL-R-11 |             |
| R15          |       | Same as A1 R3   |             |

\*For Printed Circuit Assemblies

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|-------|--|-------------|
| A3 R16       |       | Same as A2 R27   |             |
| R17          |       | Same as A2 R13   |             |
| R18          |       | Same as A3 R14   |             |
| R19          |       | Same as A2 R4  |             |
| R20          |       | Same as A2 R4  |             |
| R21          |       | Same as A1 R3  |             |
| R22          |       | RESISTOR, fixed 82 ohm 5% 1/2W, Type RC20GF820J per MIL-R-11         |             |
| R23          |       | Same as A3 R22   |             |
| R24          |       | Same as A1 R3  |             |
| R25          |       | Same as A1 R3  |             |
| Y1           |       | CRYSTAL, Quartz, 3000.00 KC Frequency Type, CR18 A/U per MIL-STD-683 |             |
| Y2           |       | CRYSTAL, Quartz, 3002.00 KC Frequency Type CR18 A/U per MIL-STD-683  |             |
| Y3           |       | CRYSTAL, Quartz 500.00 KC Frequency Type CR63 A/U per MIL-STD-683    |             |
| A4 C1        |       | Same as A3 C12   | 6-4         |
| C2           |       | Same as A3 C12   |             |
| C3           |       | Same as A3 C12   |             |
| C4           |       | Same as A2 C1  |             |
| C5           |       | CAPACITOR, mica 220pf 500V, Type CM15C221J per MIL-C-5               |             |
| C6           |       | Same as A4 C5  |             |
| C7           |       | CAPACITOR, variable 7 to 45pf, Type CV11C450 per MIL-C-81            |             |

\*For Printed Circuit Assemblies

Table 2

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TABLE 2: MAINTENANCE PARTS LIST\*TS-1379A/U  
PARTS LIST

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|-------|--|-------------|
| A4 C8        |       | Same as A2 C1  |             |
| C9           |       | Same as A2 C1  |             |
| C10          |       | Same as A3 C12   |             |
| C12          |       | Same as A2 C1  |             |
| C13          |       | CAPACITOR, tantalum 100mfd 25V, Type<br>CL65BG101M-P3 per MIL-C-3965 |             |
| C14          |       | Same as A2 C1  |             |
| C15          |       | CAPACITOR, mica 150 pf 500V, Type<br>CM15C151J per MIL-C-5           |             |
| C16          |       | Same as A4 C13   |             |
| C17          |       | CAPACITOR, mica 22pf 500V, Type<br>CM15C220J per MIL-C-5             |             |
| CR1          |       | DIODE, type 1N82A per MIL-S-19500                                    |             |
| CR2          |       | Same as A4 CR1   |             |
| L1           |       | COIL, variable Dwg. A9955  |             |
| L2           |       | Same as A4 L1  |             |
| Q1           |       | TRANSISTOR, type 2N706 per MIL-S-19500                               |             |
| Q2           |       | Same as A4 Q1  |             |
| Q3           |       | Same as A1 Q4  |             |
| Q4           |       | Same as A1 Q4  |             |
| Q5           |       | Same as A1 Q4  |             |
| R1           |       | Same as A2 R18   |             |
| R2           |       | Same as A2 R9  |             |
| R3           |       | Same as A3 R3  |             |

\*For Printed Circuit Assemblies

TABLE 2: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|-------|--|-------------|
| A4 R4        |       | RESISTOR, fixed 3900 ohm 5% 1/2W, Type RC20GF392J per MIL-R-11 |             |
| R5           |       | Same as A2 R4  |             |
| R6           |       | Same as A4 R4  |             |
| R7           |       | Same as A1 R3  |             |
| R8           |       | Same as A2 R14   |             |
| R9           |       | RESISTOR, fixed 39K 5% 1/2W, Type RC20GF393J per MIL-R-11      |             |
| R10          |       | Same as A3 R3  |             |
| R11          |       | Same as A3 R14   |             |
| R12          |       | Same as A3 R14   |             |
| R13          |       | Same as A3 R3  |             |
| R14          |       | Same as A1 R3  |             |
| R15          |       | Same as A1 R3  |             |
| R16          |       | Same as A2 R18   |             |
| R17          |       | Same as A3 R22   |             |
| R18          |       | RESISTOR, fixed 22K 5% 1/2W, Type RC20GF223J per MIL-R-11      |             |
| R19          |       | Same as A2 R13   |             |
| R20          |       | Same as A2 R8  |             |
| R21          |       | Same as A1 R5  |             |
| R22          |       | Same as A2 R14   |             |
| R23          |       | Same as A3 R22   |             |
| R24          |       | Same as A2 R15   |             |
| R25          |       | Same as A2 R15   |             |

\*For Printed Circuit Assemblies

Table 2

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TABLE 2: MAINTENANCE PARTS LIST\*TS-1379A/U  
PARTS LIST

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION  | FIG.<br>NO. |
|--------------|-------|---|-------------|
| A4 R26       |       |   |             |
| T1           |       | TRANSFORMER, IF Dwg. A9953  |             |
| A5           |       | ASSEMBLY, P. C. Board Dwg. C4564                                  | 6-5         |
| A5 C1        |       | CAPACITOR, ceramic 470pf 500V, Type<br>CC35UJ471J per MIL-C-20    |             |
| C2           |       | CAPACITOR, paper 0.1 mfd 200V, Type<br>CH04A3MC104M per MIL-18312 |             |
| C3           |       | Same as A2 C1   |             |
| C4           |       | Same as A2 C1   |             |
| C5           |       | CAPACITOR, mica 1000pf 500V, Type<br>CM06D102J per MIL-C-5        |             |
| C6           |       | Same as A5 C2   |             |
| C7           |       | Same as A4 C17  |             |
| C8           |       | CAPACITOR, mica 2400pf 500V, Type<br>CM30D242J per MIL-C-5        |             |
| C9           |       | Same as A4 C13  |             |
| C10          |       | Same as A5 C1   |             |
| C11          |       | Same as A5 C1   |             |
| C12          |       | CAPACITOR, ceramic 91pf 500V, Type<br>CC25UJ910J per MIL-C-20     |             |
| CR1          |       | DIODE, type 1N3016B per MIL-S-19500                               |             |
| CR2          |       | DIODE, type 1N756A per MIL-S-19500                                |             |
| CR3          |       | Same as A2 CR3  |             |
| CR4          |       | Same as A2 CR3  |             |
| L1           |       | Same as A4 L1   |             |
| L2           |       | COIL, Choke, 5.1 mhy, Type LT4K072<br>per MIL-C-15305             |             |

\*For Printed Circuit Assemblies

TABLE 2: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION  | FIG.<br>NO. |
|--------------|-------|---|-------------|
| A5 Q1        |       | Same as A1 Q4   |             |
|              |       | Same as A1 Q4   |             |
|              |       | Same as A1 Q4   |             |
|              |       | Same as A2 R18  |             |
|              |       | RESISTOR, var. 2000 ohm 1/2W 10%, Type RV6LAYS202A per MIL-R-94 |             |
|              |       | RESISTOR, fixed 390 ohm 5% 1/2W, Type RC20GF391J per MIL-R-11   |             |
|              |       | Same as A2 R4   |             |
|              |       | Same as A2 R27  |             |
|              |       | RESISTOR, fixed, 2200 ohm 5% 1/2W, Type RC20GF222J per MIL-R-11 |             |
|              |       | RESISTOR, fixed 120 ohm 5% 1/2W, Type RC20GF121J per MIL-R-11   |             |
|              |       | Same as A2 R18  |             |
|              |       | Same as A2 R18  |             |
|              |       | Same as A2 R18  |             |
|              |       | Same as A2 R9   |             |
|              |       | RESISTOR, fixed 1800 ohm 5% 1/2W, Type RC20GF182J per MIL-R-11  |             |
|              |       | Same as A2 R2   |             |
|              |       | Same as A5 R12  |             |
|              |       | RESISTOR, fixed 5100 ohm 5% 1/2W, Type RC20GF512J per MIL-R-11  |             |
|              |       | Same as A2 R18  |             |

\*For Printed Circuit Assemblies

TABLE 2: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION  | FIG.<br>NO. |
|--------------|-------|---|-------------|
| A6           |       | ASSEMBLY, P. C. Board Dwg. C4543                                  |             |
| A6 C1        |       | Same as A2 C1   |             |
| C2           |       | CAPACITOR, mica 470pf 500V, Type<br>CM15D471J per MIL-C-5         |             |
| C3           |       | Same as A6 C2   |             |
| C4           |       | Same as A2 C1   |             |
| C5           |       | Same as A2 C1   |             |
| C6           |       | CAPACITOR, variable 4 to 30pf, Type<br>CV11C300 per MIL-C-81      |             |
| C7           |       | Same as A3 C12  |             |
| C8           |       | Same as A2 C1   |             |
| C9           |       | Same as A2 C1   |             |
| C10          |       | Same as A2 C1   |             |
| C11          |       | Same as A4 C13  |             |
| CR1          |       | DIODE, type 1N277 per MIL-S-19500                                 |             |
| CR2          |       | Same as A6 CR1  |             |
| CR3          |       | Same as A6 CR1  |             |
| CR4          |       | Same as A6 CR1  |             |
| L1           |       | Same as A4 L1   |             |
| L2           |       | Same as A4 L1   |             |
| Q1           |       | Same as A1 Q4   |             |
| Q2           |       | Same as A1 Q4   |             |
| R2           |       | RESISTOR, fixed 27K 5% 1/2W, type<br>RC20GF273J per MIL-R-11      |             |
| R3           |       | RESISTOR, fixed 2700 ohm 5% 1/2W, Type<br>RC20GF272J per MIL-R-11 |             |

\*For Printed Circuit Assemblies

TABLE 2: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES  | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|--|--|-------------|
| A6 R4        |  | Same as A3 R3  |             |
| R5           |  | Same as A2 R13   |             |
| R6           |  | Same as A2 R13   |             |
| R7           |  | Same as A2 R19   |             |
| R8           |  | Same as A3 R3  |             |
| R9           |  | RESISTOR, fixed 1000 ohm 1/4W 1%, Type RN65B1001F per MIL-R-10509  |             |
| R10          |  | Same as A6 R9  |             |
| R11          |  | Same as A6 R9  |             |
| R12          |  | Same as A6 R9  |             |
| R13          |  | Same as A2 R18   |             |
| R14          |  | RESISTOR, fixed 68 ohm 5% 1/2W   |             |
| T1           |  | Same as A4 T1  |             |
| T2           |  | Same as A4 T1  |             |
| Y1           | A6Y1, A7Y1, A8Y1 and A8Y2 must be replaced as a set. | CRYSTAL, Quartz, part of matched set of 4 per Dwg. A9993, Type CR37A/U per MIL-STD-683, 140 KC Frequency. See notes. |             |
| A7           |  | ASSEMBLY, P. C. Board Dwg. C4567   | 6-7         |
| A7 C1        |  | Same as A2 C1  |             |
| C2           |  | Same as A2 C1  |             |
| C3           |  | Same as A4 C13   |             |
| C4           |  | Same as A2 C1  |             |
| C5           |  | Same as A6 C6  |             |
| C6           |  | CAPACITOR, mica 300pf 500V, Type CM15D301J per MIL-C-5   |             |

\*For Printed Circuit Assemblies

TABLE 2: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION  | FIG.<br>NO. |
|--------------|-------|---|-------------|
| A7 C7        |       | Same as A2 C1   |             |
| C8           |       | Same as A2 C1   |             |
| C9           |       | Same as A2 C1   |             |
| C10          |       | CAPACITOR, mica 1500pf 500V, Type<br>CM06F152J per MIL-C-5        |             |
| C11          |       | Same as A3 C3   |             |
| C12          |       | Same as A2 C1   |             |
| C13          |       | Same as A4 C13  |             |
| L1           |       | COIL, variable dwg. A9956   |             |
| L2           |       | Same as A7 L1   |             |
| Q1           |       | Same as A1 Q4   |             |
| Q2           |       | Same as A1 Q4   |             |
| Q3           |       | Same as A1 Q4   |             |
| Q4           |       | Same as A1 Q4   |             |
| Q5           |       | Same as A1 Q4   |             |
| Q6           |       | Same as A1 Q4   |             |
| Q7           |       | Same as A1 Q4   |             |
| R1           |       | RESISTOR, fixed 8200 ohm 5% 1/2W, Type<br>RC20GF822J per MIL-R-11 |             |
| R2           |       | Same as A2 R9   |             |
| R3           |       | Same as A2 R9   |             |
| R4           |       | Same as A5 R12  |             |
| R5           |       | Same as A2 R14  |             |
| R6           |       | Same as A6 R2   |             |
| R7           |       | Same as A1 R3   |             |

\*For Printed Circuit Assemblies

TABLE 2: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES             | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|-------------------|--|-------------|
| A7 R8        |                   | Same as A2 R4  |             |
| R9           |                   | RESISTOR, fixed 1.5 meg 5% 1/2"W, Type RC20GF155J per MIL-R-11 |             |
| R10          |                   | Same as A3 R1  |             |
| R11          |                   | Same as A2 R13   |             |
| R12          |                   | Same as A6 R3  |             |
| R13          |                   | Same as A2 R14   |             |
| R14          |                   | Same as A2 R13   |             |
| R15          |                   | Same as A1 R3  |             |
| R16          |                   | Same as A2 R18   |             |
| R17          |                   | Same as A2 R18   |             |
| R18          |                   | Same as A3 R1  |             |
| Y1           | See note for A6Y1 | Same as A6 Y1  |             |
| A8           |                   | ASSEMBLY, P. C. Board Dwg. C4569                               | 6-8         |
| A8 C1        |                   | Same as A2 C1  |             |
| C2           |                   | Same as A2 C1  |             |
| C3           |                   | Same as A4 C7  |             |
| C4           |                   | Same as A7 C6  |             |
| C5           |                   | Same as A2 C1  |             |
| C6           |                   | Same as A2 C1  |             |
| C7           |                   | Same as A4 C7  |             |
| C8           |                   | Same as A7 C6  |             |
| C9           |                   | Same as A2 C1  |             |
| C10          |                   | Same as A2 C1  |             |

\*For Printed Circuit Assemblies

| REF<br>DESIG | NOTES | NAME AND DESCRIPTION | FIG.<br>NO. |
|--------------|-------|----------------------|-------------|
| A8 C11       |       | Same as A4 C13       |             |
| C12          |       | Same as A2 C1        |             |
| C13          |       | Same as A2 C1        |             |
| C14          |       | Same as A2 C1        |             |
| L1           |       | Same as A7 L1        |             |
| L2           |       | Same as A7 L1        |             |
| Q1           |       | Same as A1 Q4        |             |
| Q2           |       | Same as A1 Q4        |             |
| Q3           |       | Same as A1 Q4        |             |
| Q4           |       | Same as A1 Q4        |             |
| Q5           |       | Same as A1 Q4        |             |
| Q6           |       | Same as A1 Q4        |             |
| Q7           |       | Same as A1 Q4        |             |
| Q8           |       | Same as A1 Q4        |             |
| R1           |       | Same as A2 R14       |             |
| R2           |       | Same as A6 R2        |             |
| R3           |       | Same as A1 R3        |             |
| R4           |       | Same as A2 R4        |             |
| R5           |       | Same as A7 R9        |             |
| R6           |       | Same as A3 R1        |             |
| R7           |       | Same as A2 R13       |             |
| R8           |       | Same as A6 R3        |             |
| R9           |       | A2 R14               |             |
| R10          |       | A6 R2                |             |

\*For Printed Circuit Assemblies

TABLE 2: MAINTENANCE PARTS LIST\*

| REF<br>DESIG | NOTES              | NAME AND DESCRIPTION   | FIG.<br>NO. |
|--------------|--------------------|--|-------------|
| A8 R11       |                    | Same as A1 R3  |             |
| R12          |                    | Same as A2 R4  |             |
| R13          |                    | Same as A7 R9  |             |
| R14          |                    | Same as A3 R1  |             |
| R15          |                    | Same as A5 R12   |             |
| R16          |                    | Same as A3 R1  |             |
| R17          |                    | Same as A3 R1  |             |
| R18          |                    | Same as A2 R18   |             |
| R19          |                    | Same as A2 R18   |             |
| R20          |                    | Same as A2 R27   |             |
| R21          |                    | RESISTOR, fixed 2.7 meg. 5% 1/2W, Type RC20GF275J per MIL-R-11 |             |
| Y1           | See note for A6 Y1 | Same as A6 Y1  |             |
| Y2           |                    | Same as A6 Y1  |             |

\*For Printed Circuit Assemblies

