RADIO RECEIVER WITH SPECTRUM DISPLAY

MODEL A-3B

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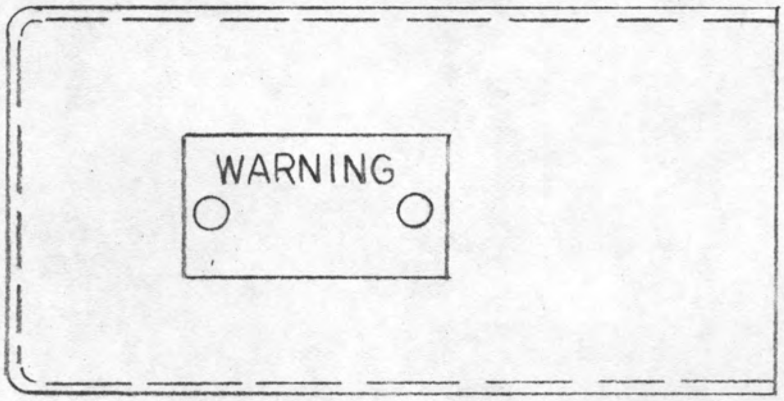
A-3B - MM - 1/76

RADIO RECEIVER WITH SPECTRUM DISPLAY

MODEL A-3B

IMPORTANT NOTICE

IT IS IMPORTANT TO NOTE THAT THIS EQUIPMENT CONTAINS INTERNAL VOLTAGE WHICH MAY BE HAZZARDOUS. MAINTENANCE AND INSPECTION SHOULD ONLY BE PERFORMED BY QUALIFIED TECHNICAL PERSONNEL UTILIZING PROPER SAFEGUARDS. REFER TO THE WARNING LABEL SHOWN BELOW:



PS 10, 11 & 12 CASE

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PART ONE: GENERAL DESCRIPTION

1.1 DESCRIPTION OF A-3B RECEIVER SYSTEM:

The model A-3B Radio Receiver is a portable, miniature, wide frequency coverage instrument with visual display having versatile signal reception, processing and read out functions. The low and high frequency units are usable separately as receivers and the visual display unit is usable as a utility oscilloscope. Together, in various combinations, they are usable in the modes described in Paragraph 1.2. It differs somewhat from the original A-3, mainly concerning the AC power supply (PS-10) and the S3 monitor.

1.2 MODES OF OPERATION:

1.2.1 Receiver Mode: Both the low and the high frequency receiver and power supply are usable as a straight receiver with audio and "S" meter outputs.

1.2.2 Double Detect Mode: Detected output of high frequency receiver is fed to input of low frequency receiver for second detection.

1.2.3 Panadapter Mode: A converter is provided to permit use of the low frequency IF unit and signal analyzer in a conventional "Pan-Adapter" mode. RF coverage in this mode is .3 to 1600 MHz. Simultaneous audio and spectrum display "readouts" are possible in this mode.

1.2.4 Tuner Scanning Mode: The visual display unit used with either receiver provides uncalibrated spectrum display outputs. Audio and visual outputs are not to be monitored simultaneously in this mode.

1.2.5 Video Mode: The visual display unit is usable to display the detected output of either receiver.

1.2.6 Oscilloscope Mode: The visual display unit is usable separately as a Utility Oscilloscope.

1.2.7 All of the above modes are operable without removing any components from the carrying case.

1.2.8 Remote Tuner Operation: Individual tuners may be removed and cable connected with receiver to allow remote tuner operation.

1.3 COMPONENTS AND THEIR FUNCTION:

1.3.1 High Frequency Receiver: This receiver provides signal reception from .3 to 1600 MHz and processes the signal through amplification, filtering, detection-to-Audio and signal meter read-out. This unit also provides outputs for double detect and visual displays as per Paragraph 1.2.2 to 1.2.5. This unit consists of eight (8) tuning heads, 23.5 MHz IF amplifier with selectable filters, 111/23.5 MHz converter, AM, and FM detectors, BFO, audio amplifier and signal strength meter. It does not contain a power source.

1.3.2 Low Frequency Receiver: This receiver provides signal reception from 2 to 300 KHz and processes the signal through amplification, filtering, detection-to-audio and signal meter read-out. This unit also provides for double detection and visual displays as per Paragraphs 1.2.2 to 1.2.5. The unit consists of one tuning head, 455 KHz IF amplifier with selectable filters, AM and FM detectors, BFO, audio amplifier, signal meter and 23.5/.455 MHz voltage tunable converter for panadapter mode. This unit does not contain a power source.

1.3.3 Battery Pack: Two battery packs are provided containing easily replaceable batteries. These packs are capable of providing power to any one or all of the two receivers and visual display unit.

1.3.4 AC Power Supply: This unit supplies any one or all of the two receivers and visual display unit from a 115V $\pm$ 20V or 230V $\pm$ 30V 50 to 60 Hertz AC line. The AC power supply also contains the power line antenna circuit.

1.3.5 Accessories: Accessories include antennas, cables, carrying case, manuals, tools, attenuators, etc.

1.3.6 Visual Display Unit: The visual display unit provides CRT read-out, associated horizontal, vertical and power conversion circuitry needed to process receiver output for frequency spectrum and video display. In addition, the unit provides ramp generator output with appropriate bias voltage to drive voltage tunable oscillators in the receiver sections.

1.4 PHYSICAL CHARACTERISTICS:

1.4.1 Case: All components are carried in a 12" x 17" x 6" case except for the maintainence manual.

1.4.2 Weight: Weight is less than 32 pounds with batteries.

1.4.3 Configuration: All units are operable in the case with all controls, jacks, dials and read-outs in the horizontal plane except the visual display unit which is in the lid of the case with a vertical plane panel. The display screen image appears in this vertical plane. Interconnecting cables are used to facilitate various modes of operation.

1.4.4 All controls and connectors are clearly and permanently marked. Each tuning head is marked indicating frequency range.

1.4.5 IF output frequencies are marked near IF output BNC connectors.

1.4.6 The gain control positions are graduated to indicate position.

1.4.7 All receiver and visual display unit markings are exposed when units are stored in the attache' case with the lid open.

1.4.8 The battery pack schematic diagram, together with substitution battery types and voltages, are displayed on the battery pack.

1.4.9 All screws are locked with break-away adhesive (such as Loctite). This, however, does not preclude the removal of same for equipment repair.

PART TWO: DESCRIPTION OF ACCESSORIES

2.1 ACCESSORIES

The following accessories are provided.

	Item	Quantity
2.1.1	Earphone with cord	1
2.1.2	Whip Antenna	1
2.1.3	Bow Tie Antenna with extenders	1
2.1.4	Ferrite Rod Antenna #1 (2 - 300 KHz)	1
2.1.5	Ferrite Rod Antenna #2 (.3 - 30 MHz)	1
2.1.6	Long Wire Antenna	1
2.1.7	Blocking Capacitor	1
2.1.8	20 dB Attenuator Pad	2
2.1.9	BNC Male/Male adapter	1
2.1.10	BNC Female/Female adapter	1
2.1.11	European Power plug adapter #1	1
2.1.12	European Power plug adapter #2	1
2.1.13	Five foot BNC cable	1
2.1.14	One foot BNC cable	1
2.1.15	Power Cable	1
2.1.16	Remote Tuner Cable	1
2.1.17	Manual	1
2.1.18	Tool, common screwdriver	1
2.1.19	Tool, Phillips Screwdriver	1
2.1.20	Allen wrench	1
2.1.21	Spline Key	1
2.1.22	Attache Case	1
2.1.23	Attache Case insert #1 Lower	1
2.1.24	Attache Case insert #2 Lid, large	1
2.1.25	Attache Case insert #3 Lid, small	1
2.1.26	Attache Case insert #4 (S3 Pads)	2
2.1.27	Interconnecting harness	1
2.1.28	Spinner knob	1
2.1.29	AC 3 wire to 2 wire adapter	1

PART THREE: ELECTRICAL SPECIFICATIONS RECEIVER MODE

3.1 Radio Frequency Coverage:
2 KHz to 1600 MHz

3.2 AM Sensitivity:

RF	IF BW	Max. Input	For Output of
2 KHz - 80 KHz	200 Hz	1.5 uv (CW)	25% S Meter Deflection
80 KHz - 300 KHz	2 KHz	1.5 uv*	10 dB of S+N/N
.3 - 130 MHz	20 KHz	1.5 uv*	"
130 - 400 MHz	20 KHz	2.0 uv*	"
400 - 800 MHz	90 KHz	2.5 uv*	"
800 - 1600 MHz	90 KHz	3.5 uv*	"

* Input signal 30% amplitude modulated with 1000 Hz signal.

3.3 FM Quieting:

RF	IF BW	Max. Input for 20 dB of Audio Output Quieting
2 - 5 KHz	(FM Inoperable)	
5 - 300 KHz	2 KHz	3 uv
.3 - 12 MHz	20 KHz	5 uv
12 - 400 MHz	90 KHz	7 uv
400 - 800 MHz	90 KHz	10 uv
800 - 1600 MHz	90 KHz	15 uv

3.4 IF Bandwidths Selectable:

RF	Bandwidth At - 6 dB Points
2 - 5 KHz	.2 KHz
5 - 15 KHz	.2 and 2 KHz
15 - 300 KHz	.2, 2, and 10 KHz
.3 - 1 MHz*	2 and 20 KHz
1 - 10 MHz*	2, 20, and 90 KHz
10 -1600 MHz*	2, 20, 90, and 1000 KHz

* These RF ranges also have .2 and 10 KHz available by using converter located in the LF Receiver although usability is limited by L. O. stability. It should further be noted that full IF bandwidths may not be realized at all RF's because of narrow RF selectivity.

3.5 Bandwidth Slope Factor:

The slope factor; bandwidth at 50 dB point divided by bandwidth at 6 dB point, is 2.6:1 or less, except in 1 MHz position.

3.6 Spurious Response Rejection:

All spurious response rejections, including IF and Image, and internally generated signals, are as follows:

RF	Minimum Rejection
2 - 300 KHz	50 dB
.3 - 12 MHz	80 dB
12 - 130 MHz	50 dB
130 - 1600 MHz	40 dB

Note: Rejection levels are measured to an RF level reference of 3 uv or less.

3.7 Local Oscillator Radiation:

Local oscillatior voltage level measured at the antenna terminal is less than -60 DBM for RF of 2KHz to 130 MHz and less than -50 DBM for RF of 130 to 1200.

3.8 Antenna Input Impedance:

50 ohms nominal.

3.9 FM Detection:

FM discriminators are provided for all frequencies from 5 KHz to 1600 MHz, however, in the 200 Hz bandwidth position of the low frequency receiver and the 2 KHz bandwidth position of the high frequency receiver, the discriminators may not be usable.

3.10 BFO:

A crystal controlled BFO is provided in the HF receiver which also acts as a center marker for the panadapter mode. A tunable BFO is provided for the LF receiver.

3.11 Audio Output:

Audio output level is 6.5 mw minimum undistorted output into a 1000 ohm load. Harmonic distortion is less than 3%. For this measurement, the input is a 30 uv signal, 30% amplitude modulated by 1 KHz. Receiver is set in AM, with manual IF gain set for red line on "S" meter (LO S-meter range) and AF gain set for rated output (6.5 mw). This specification does not apply to the 200 Hz IF bandwidth position.

3.12 Dial:

Dials are direct reading and have an accuracy of plus or minus 1.5% or 1/8 inch dial displacement whichever is greater. Tuning controls have good positive control with a maximum of 45 degrees of mechanical backlash.

3.13 IF Output:

Undetected IF output is provided at a bandwidth of 20 KHz minimum for an RF center frequency of 20 KHz to 3 MHz, a bandwidth of 90 KHz minimum for an RF center frequency of 3 to 40 MHz, and a bandwidth of 2 MHz minimum for an RF center frequency of 40 to 1600 MHz. Bandwidths are measured at the 6 dB points. Level is 25 uv for 2 uv input signal.

3.14 Post Detection Output:

One-at-a-time detected IF, AM and FM outputs are provided. (FM detection subject to exceptions as noted in Paragraph 3.9).

3.15 Signal Strength Meter:

A signal strength meter indicating relative field strength of all incoming signals, modulated or unmodulated, is provided with low and high level switch. Also, the meter is used to indicate battery and power supply conditions. A redline is positioned on the meter to indicate the battery or AC power supply cutoff point.

3.16 Battery Supply:

Battery packs are supplied which will operate all units for 25 hours or more. They operate one receiver for over 100 hours. Batteries are held in containers separate from the rest of the receivers to insure against leakage, corrosion, and shorting damage. The equipment is so designed that the connecting power cable must be removed when case lid is closed to prevent accidental "on" operation while stored. When using the visual display unit with receivers, use both battery packs to greatly extend operating time. This is important and is required to operate panadapter system for over 25 hours.

3.17 AC Power Supply:

An AC power supply for use in lieu of the batteries is supplied with input of 115V $\pm$ 20V or 230V $\pm$ 30V, 50/60 Hz and provides power for all circuits. The AC power supply is isolated from the AC power mains to eliminate any possible shock hazard to user. A power line to antenna input matching circuit is located in the AC supply thereby using the same power cord and plug. A BNC jack is located on the panel for cable connection to the tuners.

3.18 Oscillation:

The receiver system will not self-oscillate at any dial frequency setting of any head regardless of input or output loads.

3.19 CW Desensitization:

Tests for CW desensitization are made according to the procedure outlined in Mil-STD-449C, Procedure 5.3.11. The resulting curve has the following shape factor or better between the 12 dB and 30 dB points:

RF range 2 KHz to 5 KHz, less than 3:1 frequency slope, with 12 dB points less than 10% of test frequency.

RF range 5 KHz to 1 MHz, less than 3:1 frequency slope, with 12 dB points less than 5% of the test frequency.

RF range of 1 to 1600 MHz, less than 6:1 frequency slope, with 12 dB points less than 1% of the test frequency.

3.20 Temperature Range:

All components operate from 30 to 122 degrees F except for the battery cells provided. The operating temperatures of the cells provided are 50 to 122 degrees F.

3.21 Bandspread and/or Fine Tuning:

Bandspread is provided for all RF frequencies. Bandspread range is equal to or more than 0.2% of the RF frequency from 2 KHz to 420 MHz and .02% from 420 MHz to 1600 MHz.

PART FOUR: ELECTRICAL SPECIFICATIONS-VISUAL DISPLAY MODES

4.1 Dispersion and Calibration:

4.1.1 Panadapter Mode:

Panadapter mode dispersion is as follows: RF .3 to 12 MHz, 3 selectable dispersions between 2 KHz and 80 KHz. RF 12 MHz to 1600 MHz, 6 selectable dispersions from 2 KHz to 5 MHz. Dispersion in panadapter mode is calibrated and so marked on the dispersion switch control. At some RF frequencies, dispersion may be limited by RF selectivity.

4.1.2 Tuner Sweep Mode:

RF 2 to 300 KHz, a maximum of at least 200 KHz dispersion provided. RF .3 to 1600 MHz, an uncalibrated tuner sweep mode is supplied.

4.2 Frequency Linearity:

± 8% of dispersion width, applicable in panadapter mode only.

4.3 Resolution:

Panadapter mode analyzer bandwidths are 200 Hz, 2 KHz, and 10 KHz. Selectable.

4.4 Sweep Rate Calibration:

Sweep rates are provided from 1/10 sec/cm to 2 us/cm continuously adjustable by overlapping switched ranges and vernier adjust control. Sweep rate versus control setting calibration is so marked on display unit panel.

4.5 Sweep Time Linearity:

The sweep time vs. the display spot displacement at calibrated rate positions is within ± 8% of that predicted on the basis of a linear sweep.

4.6 Audio Limitation in Spectrum Mode:

Simultaneous audio and visual outputs are not provided when operating in the "Tuner Scanning" mode.

4.7 Screen Size:

Display screen is 1" x 3" rectangular.

4.8 Signal Gain Control:

Manual signal gain control is provided with 50 dB range.

4.9 Sensitivity:

Minimum detectable visual output is equal to or less than minimum detectable audio signal output.

4.10 Dynamic Range:

Signal display unit in panadapter mode is able to display incoming signals of 30 dB level differential simultaneously at maximum resolution.

4.11 Spurious Response:

The display is free of signals other than those received at the antenna terminal up to input signal levels of 10 mv.

4.12 Video Bandwidth:

Bandwidth of vertical display amplifier is approximately 1 Hz to 1.8 MHz at 3 dB points.

4.13 Phosphor:

P1 phosphor is used.

4.14 Tuner Sweep Mode:

Circuitry is provided to enable user to spectrum display signals employing either one of the receivers and the signal display unit in the tuner scanning mode. (See Paragraph 4.6 for audio limitation in this mode).

4.15 Scope Mode:

The visual display unit is capable of use as a utility oscilloscope with specifications cited in Paragraph 4.4, 4.5, 4.7, 4.8, 4.12 and 4.13. Vertical gain is 2 mv/cm. Synchronizing control is provided with external/internal switch and jack. Z axis input is also provided.

PART FIVE: THEORY

5.1 INTRODUCTION:

The component parts of the A-3B Receiver System are shown in the block diagram of Figure 11-1. The A-3B consists of five (5) basic units: High Frequency Receiver, Low Frequency Receiver, Visual Display Unit, Battery Pack and AC Power Supply.

5.2 HIGH FREQUENCY RECEIVER: (30100 .3-1600 MHz)

The High Frequency Receiver is shown schematically in Drawing SWD-4048-D, Figure 11.2. The bandswitch selects the tuner operating in the frequency range to be covered and applies DC power to the tuner while simultaneously completing the RF connection between the tuner output and the converter for Tuners 4, 6, 7 and 8, or the IF Amplifier in the case of Tuners 1, 2, 3, and 5. Refer to drawing SWD-4056C, Figure 11.11 for details of the bandswitch.

5.2.1 111 MHz to 23.5 MHz Converter

The converter mixes the 111 MHz signal with a local oscillator signal from the 87.5 MHz crystal controlled oscillator. A band stop filter consisting of L7 and C52 is tuned to 151 MHz to prevent the local oscillator of tuner TA3-4 from entering the converter. A two stage amplifier tuned to 111 MHz supplies approximately 6 dB gain and the output of the second stage is coupled to the balance mixer. The 23.5 MHz signal passes through a low pass output filter to remove any residual 87.5 MHz signal from the local oscillator. Since Tuners 1, 2, 3 and 5 have outputs at 23.5 MHz, the preceeding is not necessary when they are in use. J110 and P110 furnish the interconnection with the bandswitch.

5.2.2 Bandwidth Determination

Bandwidth is determined by the selection of either the 2 KHz, 20 KHz or 90 KHz crystal filter by means of the panel mounted four position switch. A fourth position allows straight through operation with a bandwidth of 1 MHz.

5.2.3 23.5 MHz IF Amplifier

The IF amplifier consists of transistors Q1 through Q5. Q1 utilizes a 3N140 insulated gate field effect transistor with AGC applied to gate #2. The following four (4) IF stages use 3N128 IGFETS. The interstage transformers are tunable and have a bandwidth greater than 1 MHz.

5.2.4 AM Detector

AM detection is accomplished by CR4 and CR5. The detected audio is fed through S7 to the audio amplifier. The AGC tap furnishes AGC voltage to the first IF amplifier and the RF stages in Tuners 1, 2, 3 and 4.

5.2.5 FM Detector

Q6 and Q7 serve as limiters for the signal. Two discriminators are employed. CR6 and CR7 form a wide band discriminator having a bandwidth of approximately 350 KHz while a crystal discriminator having a bandwidth of 90 KHz is used for narrow bandwidth FM signals. The discriminator to be used is selected with panel switch S6.

5.2.6 Signal Strength Meter

The S Meter gives a signal strength indication for both AM and FM signals. Maximum S Meter excursion may be controlled by the S Meter sensitivity switch S-3. The S Meter also serves to test the condition of the PS-10 AC Power Supply or the BP-5 battery pack by placing a load (R30) on the voltage terminals of the Power Supply and observing the current drawn through the S Meter. CR3 provides protection in the event the wrong polarity is applied to the input voltage jack, J15.

5.2.7 Audio Amplifier

A two stage audio amplifier consisting of Q8 and Q9 furnishes a minimum of 6.5 mw undistorted output through jack J16. The output impedance is 1000 ohms. Audio output volume is adjustable by panel control R31.

5.2.8 Sweep Amplifier

The sweep amplifier receives a sweeping voltage through J21 from the Visual Display Unit. Q10 is also used as an isolation amplifier to prevent the loading of the sweep generator. After amplification, the sweep voltage is applied to the local oscillator of the Tuner in use through J113. This will be covered more completely in Section 5.5 concerning the Visual Display Unit.

5.3 HIGH FREQUENCY TUNERS:

TA3-1	.3 to 1 MHz
TA3-2	1 to 3.5 MHz
TA3-3	3.5 to 12 MHz
TA3-4	12 to 43 MHz
TA3-5	43 to 130 MHz
TA3-6	130 to 420 MHz
TA3-7	420 to 800 MHz
TA3-8	800 to 1600 MHz

The tuner to be used is selected by the bandswitch S8 located on the front panel of the High Frequency Receiver. The appropriate antenna must be connected to the tuner in use. Power is applied to each tuner through the bandswitch. Only one tuner may be used at a time since the unused local oscillators are disabled to prevent interference to the band being surveyed. Provision is made for external tuners to be used provided they have an I. F. of 111 MHz.

Bandspreading may be accomplished electrically by means of a potentiometer mounted on the front panel. Tuning variation of approximately 0.2% may be had by means of the bandspread control.

5.3.1 Tuner TA3-1 (.3 - 1 MHz)

Refer to drawing SWD-4023-B, Figure 11.3. Q1 is a dual gate EGFET which serves as an RF amplifier for the signals within the tuning range of tuner T1. Both the input and output are tunable and tracked with the local oscillator by sections of C26. Gate #2 is used to apply AGC or manual gain control to the amplifier. T2 couples the RF signal to the balanced mixer.

The local oscillator furnishes a signal voltage to the balanced mixer which tunes over the frequency range of 23.8 MHz to 24.5 MHz. This frequency can be adjusted over a small range by the bandspread voltage introduced at the base of Q2 and controlled by the bandspread control mounted on the front panel. Sweeping voltage which is used to electronically sweep the local oscillator for scanning with the Visual Display Unit when used in the Tuner Sweep Mode is also injected at the base of Q2. The 23.5 MHz output of the balanced mixer is applied to the first IF amplifier through P-101.

5.3.2 Tuner TA3-2 (1-3.5 MHz)

Refer to drawing SWD 4024B, Figure 11.4. The circuit description of the TA3-2 is similar to that of the TA3-1 except that an active mixer using an IGFET is utilized. The local oscillator tunes a frequency range of 24.5 to 27 MHz. The IF output frequency is 23.5 MHz.

5.3.3 Tuner TA3-3 (3.5 - 12 MHz)

Refer to drawing SWD 4025B, Figure 11.5. The circuit description of the TA3-3 follows that of the TA3-2 except that the local oscillator tuning range is 27 to 35.5 MHz.

5.3.4 Tuner TA3-4 (12 - 43 MHz)

Refer to drawing SWD 4026B, Figure 11.6 for circuit functions. The local oscillator tunes 123 to 154 MHz. The IF output frequency is 111 MHz to prevent the RF amplifier from tuning through the IF frequency which would occur if the IF were 23.5 MHz. The output of the TA3-4 is applied to the 111 MHz IF amplifier.

5.3.5 Tuner TA3-5 (43 - 130 MHz)

Refer to drawing SWD 4027B, Figure 11.9. The local oscillator tunes from 66.5 to 153.5 MHz. An IF frequency of 23.5 MHz is used to avoid tuning the RF through the 111 MHz intermediate frequency. There is no provision for AGC in the TA3-5. The Mixer is an IGFET (Q2).

5.3.6 Tuner TA3-6 (130 - 420 MHz)

Refer to drawing SWD 4028C, Figure 11.8. The TA3-6 Tuner covers the frequency range of 130 to 420 MHz in two bands of 130 to 230 MHz and 230 to 420 MHz. SW1 switches the intermediate frequency signal output and the 15V collector voltage between the two local oscillators and the two RF amplifiers. SW2 switches the RF signal and the bandspread/tuner sweep signal voltage to the oscillator section which is being used.

In each band the RF is selected by 3 tank circuits. An RF amplifier is located between the first and second RF tank circuits in each case to improve sensitivity and local oscillator-to-antenna isolation. A common I. F. amplifier (111 MHz) is provided for added gain.

The local oscillators tune the frequency range of 241 to 341 MHz and 341 to 531 MHz. The unused oscillator is made inoperative by SW1 removing the collector bias. Each band has its own balanced mixer. The intermediate frequency is 111 MHz.

5.3.7 Tuner TA3-7 (420 - 800 MHz)

Refer to drawing SWD 4046C, Figure 11.9. The local oscillator tunes 531-911 MHz. Q2 is an RF amplifier which is tuned by a section of Variable Capacitor, C5. A balanced mixer BM1 is used. A 111 MHz IF amplifier is included in the tuner section.

5.3.8 Tuner TA3-8 (800-1600 MHz)

Refer to drawing SWD 4047, Figure 11.10. There is no RF amplification in the TA3-8 Tuner. To provide sufficient isolation of the LO signal from the antenna, a four stage tunable filter is used. The oscillator, Q1-M tunes 455.5 to 855.5 MHz. The mixer consists of DM1, a Schottky Barrier diode, R5 and the coupling loop in parallel with R5. The Mixer diode also serves as a frequency doubler and therefore the local oscillator signal seen by the mixer tunes from 911 to 1711 MHz. R5 is necessary to dampen resonances due to the inductance of the coupling loop and the capacitance of the mixer diodes. A 111 MHz IF preamplifier is included in the TA3-8 Tuner.

5.4 LOW FREQUENCY RECEIVER (30200):

The low Frequency Receiver (LFR) tunes the frequency range from 2 to 300 KHz. It also provides double detection and visual displays when used in conjunction with the High Frequency Receiver and the visual display unit. The LFR is shown schematically in drawing SWD 4031B, Figure 11.12.

The LFR will be broken down into three basic units; The TA3-03B tuner and converter, the swept converter and the basic low frequency unit (B2).

5.4.1 TA3-03B Tuner (2 - 300 KHz)

Refer to SWD-4073B, Figure 11.14. A low pass filter #5037A is used to prevent large out of band signals from entering the tuner. D1 and D2 are protective diodes to prevent burn-out of the broadband amplifier, Q1.

Q2 is an emitter follower used to match the 50 ohm input impedance of the balanced mixer, MX-1.

Q3, the local oscillator, is electrically tuned by varicaps D4 and D5 which are controlled by a ten turn pot, R10. This is the tuning control. The low end of the frequency range is determined by R9, the high end by R11 and the mid range setting by L2. The local oscillator tunes 457 to 755 KHz.

Q4 is a source follower used to match the low input impedance of the balanced mixer. The IF frequency is 455 KHz.

5.4.2 Swept Converter

Refer to drawing SWD 4033-4035C, Figure 11.13. The signal from the High Frequency Receiver enters through a low pass filter having a cutoff frequency of 26 MHz. Q3 serves as a 23.5 MHz amplifier having a bandwidth of 5 MHz.

The swept converter uses a local oscillator range of 31.7 to 36.7 MHz and can be electronically swept by varicap CR4 when used with the Visual Display Unit. The oscillator drives and IGFET (Q5) which serves as a 23.5 MHz buffer amplifier with a bandwidth of 5 MHz.

The 31.7 to 36.7 MHz local oscillator signal is mixed in Q6 with the 21 to 26 MHz signal from the 23.5 MHz amplifier, Q3, to generate a 10.7 MHz IF. This signal is used to provide information for the Visual Display Unit when operated in the panadapter mode in conjunction with the High Frequency Receiver.

The swept 10.7 MHz IF goes through a crystal filter centered on 10.7 MHz which has a bandwidth of 15 KHz. A crystal controlled local oscillator (Q2) furnishes a 10.245 MHz signal to a mixer (Q1) to obtain a 455 KHz signal which is routed to the T-03B/converter input selection switch of the LFR.

5.4.3 Basic Low Frequency Unit (B-2)

Refer to drawing SWD 4031B, Figure 11.12.

5.4.3.1 455 KHz Amplifier, Emitter Follower and Bandpass Filter.

The input to the B-2 may be selected with a front panel switch (T-03B converter) to be either from the TA3-03B Tuner and converter, or from the 23.5 MHz to 455 KHz swept converter. This switch also applies 18 volts to the appropriate unit to be used. The selected signal is amplified by Q1 which has AGC applied to Gate #2. Q2 is an emitter follower which provides an impedance match to one of the bandpass filters which can be selected by switch S14. Bandwidths of .2, 2 or 10 KHz are available.

5.4.3.2 455 Amplifier String, AM Detector and S Meter

Q3, Q4 and Q5 furnish three stages of 455 KHz amplification. AM detection is accomplished by CR5 and CR6. AGC voltage is tapped off at this point (TP4). The S Meter signal is also derived here. The S meter may also be used to monitor the condition of the PS-10 AC Power Supply or the BP-7 battery pack by placing a load (R35) on the voltage terminals of the power supply and observing the current drawn through the S meter.

5.4.3.3 Video Detector

The AM Video Detector consists of CR7 and CR8. This furnished video output through J22 to the Visual Display Unit.

5.4.3.4 FM Limiter and Detector

Q6 is a limiter which feeds the discriminator consisting of the T-4 network and CR11 and CR12. The output of either the FM discriminator or the AM detector is selected by S-16 and routed to the audio amplifier.

5.4.3.5 Audio Amplifier

The audio Amplifier consists of Q7 and Q8. The audio gain is controlled by R50. The audio output is available at J20 which has an output level greater than 6.5 mw and an output impedance of 1000 ohms.

5.4.3.6 455 KHz Beat Frequency Oscillator

Q9 is a 455 KHz oscillator which furnishes a beat signal. The output is tuned by T-3 and coupled to the 455 KHz amplifiers by stray radiation. The pitch of the beat note may be varied by adjusting R65 which appears on the front panel. R65 also contains a switch to turn the BFO on and off.

5.5 VISUAL DISPLAY UNIT (S-3)

Reference to drawings SWD 4038-C, Figure 11.15 and SWD 4039-C, Figure 11.16 shows the schematic diagrams for the visual Display Unit (VDU). The anode voltage of 1200 volts DC is generated by a DC to DC converter housed in a hermatically sealed metal housing. The converter also furnishes 200 volts DC to the vertical deflection plates of the CRT. Filament voltage for the CRT is taken from a third winding on the DC to DC converter.

5.5.1 Sawtooth Sweep Generator

Refer to drawing SWD 4038-C, Figure 11.15 for the schematic of the VDU sawtooth sweep generator. Q1, Q2, Q3 and Q4 make up a sawtooth generator whose frequency is determined by SW-23 with a fine frequency control R2. The output of Q4 is fed to the horizontal printed circuit board. The sweep frequency can be varied between 1 Hz and 66 KHz with these controls.

Provision is made for use of external sync. Q5 and Q6 form a sync amplifier. A minimum of 1.5 volts must be supplied from the external sync source.

5.5.2 Vertical Amplifier

Refer to drawing SWD 4038-C, Figure 11.15. The position of the display switch S17 determines whether the vertical deflection plates are used directly or receive an amplified signal through the vertical amplifier. The vertical amplifier consists of three stages (Q21, Q22 and Q23), driving a push-pull output amplifier consisting of Q24 and Q25. Gain is controlled by R21 in the base circuit of the first stage (Q21). Vertical centering on the CRT screen is accomplished by adjusting R44 on the control panel. A 6 mv peak signal is necessary for full vertical deflection.

5.5.3 Horizontal Amplifier

The horizontal amplifier receives a sawtooth voltage from the sawtooth generator shown on drawing SWD 4038-C, Figure 11.15. Sweep gain is provided by the horizontal output amplifier (Q10 and Q11). Sweep gain may be adjusted by R59 in the emitter circuit of Q10. Horizontal centering is controlled by R57 which balances the DC between the horizontal deflection plates.

Q7, Q8 and Q9 form an isolation amplifier for the sawtooth sweep voltage. Peak amplitude of the sweep voltage is determined by the divider network associated with Switch S22-B (sweep width control).

The sweep output appears at J-27 and is used to furnish sweep voltage to the local oscillators of the low frequency and high frequency receivers for visual display purposes.

The four potentiometers (R47, R48, R49 and R50), are used to adjust the DC bias level on the sweep voltage. It is necessary to have equal average voltage for all sweep widths to provide symmetrical horizontal displays on the CRT.

5.6 POWER SUPPLY PS-10

Refer to drawing SWD 4074B, Figure 11.18 for a schematic of the PS-10. The PS-10 furnishes highly regulated 18 volts DC at 300 ma for powering all A-3B components from commercial power mains. There is no on-off switch on the PS-10.

Input voltages of 115V $\pm$ 20V or 230V $\pm$ 30V, 50 or 60 Hertz may be selected by a panel switch. A $\frac{1}{4}$ ampere fuse is used as protection on the primary side of the transformer.

The power supply uses a full wave bridge rectifier. D2 is a Zener diode voltage regulator. Q1 and Q3 form a Darlington series regulator, integrated circuit IC-1 and Q2 form a feedback regulator. The output voltage is controlled by R4.

The power line antenna is built into the PS-10 for use when the power lines must be scanned. The BNC output connector is located on the top panel of the PS-10.

5.7 BATTERY PACK ASSEMBLY (BP-7)

Refer to drawing 30460C, Figure 11.19 for diagrammatic information. Fourteen (14) cells in series furnish 18 volts for all of the equipment in the A-3 Receiver System.

Lifetime of the batteries will vary with the type used. Minimum operating life is 25 hours with all units operating. The BP-7 will operate one receiver for over 100 hours.

CAUTION: DUE TO THE HIGH ENERGY STORAGE CAPABILITY OF MERCURY BATTERIES, CARE SHOULD BE TAKEN THAT EXPOSED TERMINALS ON THE BP-7 DO NOT CONTACT CONDUCTIVE OBJECTS.

Preferred batteries are Mallory RM12-R or equivalent. For low temperature operation, an Alkiline battery will give improved operation and dependability.

PART SIX: OPERATING PROCEDURE

6.0 Operation of Receiver Mode (Refer to fig. 10-1)

6.1 Low Frequency Receiver:

6.1.1 Select either battery or AC power supply. Select either the interconnecting harness connected as per paragraph 6.3.2 and fig. 10.1; or the 2 connector power cable attached between AC supply or battery pack and LFR. There are no power ON/OFF switches therefore the cable applies power directly. If using AC power supply, set input line voltage switch to voltage range of AC line. If line voltage is unknown, set to high voltage position, hold "Battery Test" switch of receiver to "Test" position. If meter reads below red line, switch input line voltage switch to lower range. If using battery pack, hold battery test switch in "Test" position. It should read above red line. If not, replace batteries or use other battery pack. Operating time will be extended by connecting the battery packs in parallel rather than using them sequentially. To use packs in parallel, connect adjacent power plugs of interconnecting harness to the two battery packs.

6.1.2 Select antenna (with Low Frequency unit use Ferrite Antenna as marked, long wire, power line (located on power supply panel) or other accessory probe. CAUTION: POWER LINE VOLTAGES ARE DANGEROUS TO LIFE AND SOME PROBES DO NOT PROVIDE ISOLATION. Connect antenna to BNC input or tuning section. Connect phones to phone jack.

6.1.3 Control settings: Set converter/T0-3 switch to "T-03". Set no Sweep/Sweep switch to "no Sweep". Set AGC/Manual switch to "AGC". Turn BFO Control to "OFF". Set bandwidth switch to 2 KHz. Set meter Level switch to "LOW". Turn Audio Gain Control up until noise is heard in earphones. Turn tuning knob until signal desired is heard and indicates on meter. Read frequency on direct reading dial. Adjust AM/FM, Bandwidth, Low/High, AGC/Manual and IF Gain Controls as required. If desired turn BFO Control on and adjust pitch by turning clockwise or counterclockwise. Note that below an RF frequency of 15 KHz, the 10 KHz bandwidth position should not be used. If used, the bandpass response will include the local oscillator thereby overloading the IF amplifier and blocking the receiver. The same may occur if the 2 KHz position is used below 5 KHz RF. Figure 10-1 shows the power hook-up and location of controls.

6.2 Operation of high Frequency Receiver:

6.2.1 Connect cable and adjust and test power supplies with High Frequency Receiver as in Paragraph 6.1.1.

detached and the power supply or battery pack and the monitor used as a complete oscilloscope.

6.8.2 Vertical Amp. Operation: Set Sweep Rate Switch to the approximate repetition rate of signal to be displayed. Set synchronizing Internal/External switch to internal unless horizontal sweep rate is to be controlled by external signal in which case feed synchronizing signal to external synchronizing jack and switch the internal/external switch to external. Attach input signal cable to input jack. Note that monitor does not have signal attenuators except for the gain control. However, 50 ohm BNC/BNC calibrated attenuators found in the A-3 accessories may be used. Set Sweep Gain, Sweep Centering, Intensity, Focus, and Signal Center controls for best display. Advance signal gain control for desired vertical display height. With synchronizing control at minimum, set sweep rate so that the pattern is as steady as possible. Then advance synchronizing control until signal locks on. Synchronizing control operates level of either internal or external synchronizing dependent on the synchronize switch position.

6.8.3 TV Display Operation: Set Sweep Rate, Sweep Vernier, Synchronizing Switch and Synchronizing Control as in Paragraph 6.8.2 for external synchronizing of horizontal signal. Attach vertical signal to signal input jack and set Amp/Pan switch and signal gain control for vertical signal deflection. Video signal is fed to the Z axis jack. Adjustments are then made as follows: Sweep Rate and Synchronizing Control for "Horizontal Hold". Signal Gain, Signal Centering, Sweep Gain and Sweep Center for proper picture centering and proportion. Intensity for proper "brightness" and full cut off so that the unbiased AC video signal will swing beam current towards cutoff and maximum without distortion. Z axis signal level, controlled by external equipment sets "contrast". Vertical sweep rate and synchronizing controlled by external equipment sets "vertical hold".

It is possible to use the A-3 high frequency receiver as the signal receiver for television type signals, the output appearing at the detected output jack. Video information may be limited by the one MHz maximum bandwidth of the receiver. Five (5) MHz bandwidth may be taken at low level at the IF output jack. However, this signal must be further amplified and detected. For video display, external equipment must also have a vertical sweep generator, synchronizing, vertical hold and video amplification. An attachment for this purpose (TV-1) is available.

6.2.2 Select RF band to be used and adjust band switch accordingly. Frequencies covered by each band are indicated next to tuner dial window. (Note that Tuner No. 6 has two bands. Use push-pull switch on tuner panel to choose band. Antenna connector is common). Next, select antenna, Ferrite loops, long wire, power line pickup, or whip may be used effectively up to 3 MHz. (The Ferrite Loop so marked is good to 30 MHz). Above 30 MHz, the whip antenna may conveniently be used. A "bow tie" type antenna is also provided for frequencies from 600 to 1600 MHz. Extend telescoping mast and place large end in socket hole provided in battery pack top. Then mount bow tie antenna on mast with block provided. Attach BNC cable between bow tie connector and tuner to be used. Entire antenna, mast and battery pack assembly may be remotely deployed from carrying case. Since the bow tie antenna is directional, it may be necessary to rotate it for maximum signal strength. The frequency range of this antenna may be extended down to 100 MHz by fully extending the four rods provided. This does not cause the 600 to 1600 MHz performance to suffer.

6.2.3 Adjust settings of receiver in same manner as described in Paragraph 6.1.3 for the low frequency receiver except that there is no "No Sweep/Sweep" switch to set. Again, as with the low frequency receiver, the bandwidth setting must always be set to a bandwidth frequency of 1/10 or less than the RF frequencies. Therefore, do not use the 1 MHz bandwidth below an RF of 10 MHz. There is an additional switch on the High Frequency Receiver marked FM wide/narrow. The purpose of this switch is to provide a narrow, crystal type discriminator with peak separation of 90 KHz for use when the IF bandwidth switch is in the 90 or 20 KHz position. Use "Wide" FM position of switch for 1 MHz IF bandwidth. Figure 10-1 shows the power supply hook-up and location of the controls.

6.3 <u>Panadapter Mode:</u>

The purpose of the panadapter mode is to visually display all signals within a certain RF band, the center of which is determined by the tuner frequency setting. The sweepwidth displayed (dispersion), and the resolution of adjacent signals, are adjustable. Many important features of incoming signals may be determined and analyzed by proper adjustment of the receiver in the panadapter mode. Some of these are side band determination type of modulation, frequency spacing of signals and relative signal levels. The panadapter mode is also an aid in signal searching. The details of signal analysis will not be covered in this Manual since they are common to the trade. It will suffice here to cover the operational procedure to achieve the desired displays.

6.3.1 Theory: The panadapter mode utilizes the low frequency receiver section and the visual display unit together in what is commonly known as a "Panadapter". This panadapter is then attached to the high frequency receiver and scans or "looks at" signals appearing at the high frequency receiver IF output. The scan width or "dispersion" capability of this combination unit is 0 to 5 MHz adjustable. Therefore its maximum Sweep frequency coverage is 21 to 26 MHz (5 MHz about the high frequency receiver IF center frequency of 23.5 MHz). Following the signal through the system, the incoming antenna signal is converted by the tuner used to 23.5 MHz. At this point it branches off to the low frequency receiver converter input and the high frequency IF with its filters. The high frequency receiver unit further processes the signal to audio and meter read out as a straight receiver. All controls of the high frequency receiver are used as described in Paragraph 2.2 to 2.2.3. The local oscillator of the converter of the low frequency receiver is driven through the 5 MHz scan range by a sawtooth signal from the Visual Monitor. It therefore scans and converts to 10.7 MHz and then to 455 KHz, all signals on a time sharing basis within the 21 to 26 MHz band. These signals are then processed by the 455 KHz IF amplifier with its .2, 2 and 10 KHz filters (which now control the resolution) and detectors. The signal is then fed to the monitor and displayed as a frequency verses amplitude plot.

To conveniently use the S-3 Monitor, remove pad in case lid above monitor. Next, rest monitor with power connector down and facing out on lower edge of open attache' case lid. Align Velcro hook and eye latching tape disks found on underside of S-3 and in the lid and press firmly together. Raise mirror to convenient angle and make cable hook ups as needed. To repack S-3, close mirror, and remove by pulling top out first. Pack all accessories in large pocket and place lower pad provided on top of accessories. Then place monitor, panel up in pocket on top of lower pad and replace upper monitor pad in lid. Make sure that interconnecting harness section between S-3 and LFR is clear of case hindge as lid is closed. ALWAYS REPLACE MONITOR AND PADS FOR HAND CARRYING AND SHIPPING. DO NOT LEAVE MONITOR MOUNTED ON CASE LID.

6.3.2 Cable Hook-up (Refer to Figure 10-1):

Attach interconnecting harness as follows:

A) S-3 POWER IN.
B) S-3 SWEEP OUT
C) S-3 PAN IN.
D) S-3 SIGNAL IN.
E) HFR DETECT OUT.
F) HFR IF OUT. Either WIDE or 90 KHz (see instructions)
G) HFR POWER IN.
H) LFR POWER IN.
P) LFR SWP IN.
J) LFR PAN out.
K) T03 Antenna input.

L) LFR CONVERTER IN.
M) PS-10 18V OUT or BP-7 18V OUT
N) No connection or (BP-7 18 volts out if PS-10 not used)

This harness may be left connected except for battery pack connection when unit is stored with lid closed. The harness provides all connections except antenna and earphone for Receiver Mode, Panadapter Mode, T03 Tuner Scanning Mode, Double Detect Mode, and Video Mode. Remote Tuner Mode, Oscilloscope Mode, and HFR Tuner Scanning Mode require special hook ups.

Note that there are two (2) 23.5 MHz IF output jacks. The right hand output is used in bands 1, 2 and 3 limiting the dispersion to 90 KHz and eliminating spurious responses due to the tuner local oscillator being in the 21 to 26 MHz region. Use the left hand outlet for tuners 4 through 8 allowing up to 5 MHz dispersion. Select tuner and antenna as in Paragraph 6.2.2. Use ear phones on high frequency receiver only. When using the visual display unit with receivers, use both battery packs to greatly extend operating time. This is important and is required to operate panadapter system for over 25 hours. Disconnect BOTH battery packs when using AC supply and when unit is not in use.

6.3.3 Adjustments Low Frequency Receiver: Converter/T0-3 switch to "Converter". No Sweep/Sweep switch to "Sweep". Bandwidth switch to 10 KHz resolution for wide dispersion and 2 KHz or 200 Hz for narrow dispersion. Audio frequency gain off (counter clockwise). S meter level switch to "High". AM/FM switch to AM. BFO off.

6.3.4 Adjustments, High Frequency Receiver: Same as Paragraphs 6.2 to 6.2.3.

6.3.5 Adjustment Visual Display Unit: Sweep rate switch next to slowest position. Swing mirror hood to "UP" position for reflected image. Amplifier switch tp PAN position. Sweep frequency vernier to speed where flicker just appears. Sweep gain control and Sweep centering control until baseline is wide enough and centered to align between outside lines at edge of screen. Sweep width control: 6 KHz per division for Bands 1, 2 and 3; and maximum for other bands. Focus and intensity for best display. The tracking of the centering of the sweep width positions is factory set however adjustments may be required from time to time as unit ages or if different LFR is used. To check alignment turn tuner select switch to 8. Use no antenna on tuner. Set sweep width switch to 500 KHz/Div (Max CCW). Turn BFO of HFR to "ON" position and LFR Bandwidth position to 2 KHz. Also place connector "F" of harness on "wide" IF output of HFR. A signal should appear on screen. If not, place extra BNC cable between "Det out" HFR and "Converter IN" of LFR and turn LFR IF gain down to show single distinct spike on screen.

Now turn sweep width control to .3 KHz/div (Max CW). Center this signal on screen by adjusting centering control of LFR. Now switch step by step counter clockwise through each Sweep Width position. The signal caused by the BFO should remain within 1/8 inch of center. If signal does not remain on center, remove plate above sweep width control and adjust trimmer with small screw driver to center signal on switch position which is off center. Maximum CCW of sweep width position is controlled by trimmer 1-C, next clockwise is controlled by trimmer 2 and so forth. If all positions heed adjustment, set centering control LFR to its mechanical center. Then proceed to center each position with trimmers in the following order 1, 6, 5, 4, 3, 2. If it is impossible to center it this see alignment instructions for S-3 and C-2 under part seven of this manual.

6.3.6 VDU Operation: As the operator tunes the signals with the tuner knob, incoming signals will be displayed on the CRT screen showing frequency position and amplitude. If magnification of certain areas is desired, tune area to screen center then back down on sweep width control. It may be required to recenter with the low frequency receiver centering control. When area of interest has been magnified, set low frequency bandwidth switch for next lower BW. This will further increase resolution and further magnification is possible. If difficulty is encountered in determining proper center at narrow dispersion so that visual signal on center is the same as that heard in phones, proceed as follows: With sweep width set at wide dispersion, turn high frequency BFO on. Back off sweep width control to narrow dispersion position. Adjust center frequency control to place this response at screen center. Now, with BFO off, tune to any RF signals. Centered visual signals should be the same as the audio output signals.

6.4 Tuner Scanning Mode:

(Refer to Figure 10-1) The purpose of the tuner scanning mode is to provide visual scanned displays of signals on the T0-3B Tuner range (2-300 KHz) not available in panadapter mode and to provide visual scanned displays of the high frequency receiver without use of low frequency unit.

6.4.1 Cable Hook-up Low Frequency Receiver is provided by the interconnecting harness (Refer to Figure 10-1).

6.4.2 Control Settings, LFR Tuner Scanning Mode: Set converter/T03 Switch to "T-03". Set No Sweep/Sweep switch to "Sweep". Set AGC/Manual switch to "AGC". Set BFO control to "OFF". Set Bandwidth switch to "2 KHz". Set meter Level switch to "HIGH'. Set Audio Gain Control to Minimum. Set Visual Display Unit as in Paragraph 6.3.5 except set sweep width control to Maximum.

6.4.3 Operation of LFR Tuner Scanning Mode: Turn tuning knob through band to search. Signals will appear on screen as they are received. Maximum sweep width in this band (2-300 KHz) is 250 KHz. T0-3B Tuner Sweep widths are listed at the sweep width control of the S-3. Note that if the T0-3 tuned frequency is less than $\frac{1}{2}$ the total sweep width the S-3 scan will include the IF response. To set the display for zero frequency on the left side of the screen, remove T0-3 antenna connection, set sweep width as desired and tune T-03 so that IF response (spike on base line) just shows on left end of base line. When using 200 Hz position, use very slow sweep speed for best resolution. Magnification of desired area of spectrum is accomplished as in Paragraph 6.3.6. It should be noted that in the "Tuner Scanning Mode" audio output cannot be used since the tuner local oscillator is being scanned through a range of frequencies thereby producing audio output of signals on a time sharing basis making them unintelligible. If audio output is desired, tune signal in by scanning and centering on screen, then switch to "NO Sweep" position. Signal tuned in should now be heard on phones. If not perfectly centered, retune control slightly. Besides being an aid in searching and analyzing signals, the tuner scanning mode can be used in alignment of the receiver IF amplifiers and AM and FM detectors since the curves presented are frequency verses amplitude plots of the amplifier/detector response curves. The alignment procedure will be covered in the Alignment Section.

6.4.4 Cable Hook-up of High Frequency Receiver: Use interconnecting harness as per paragraph 6.3.2 and Figure 10-1 except disconnect BNC "B" and connect spare one foot BNC Cable from S-3 "Sweep Out" and HFR "SWP. IN".

6.4.5 Control Settings, HFR Tuner Scanning Mode: Set controls as Paragraph 6.2.2 and 6.2.3 "Receiver Mode" and set visual display unit as per Paragraph 6.3.5 except AMP/PAN Switch to "AMP". As in the panadapter mode, care must be used in selection of sweep width and bandwidth. The "Sig Gain" Control will adjust the signal gain of the S-3. Again, as with the low frequency receiver, the audio output will be unintelligible unless sweep is minimum or removed. This is accomplished by rotating sweep width control to minimum or disconnecting sweep cable. Also, as in the low frequency receiver tuner scanning mode, this mode may be used for receiver alignment. An advantage of using the high frequency receiver tuner scanning mode over the panadapter mode is that the bandwidths of 20, 90 and 1000 KHz are available which show up better as a larger percentage of the scanned frequency on the visual monitor. The markings on the Sweep Width Control on the visual monitor do not apply to the tuner scanning mode. Also, non-linearities may occur in frequency verses displacement in this mode.

6.5 <u>Double Detect Mode:</u>

(Refer to fig. 10-1) The purpose of this mode is to detect the modulation existing on a sub-carrier of a radio signal.

6.5.1 Such a signal is produced by modulating the main carrier frequency with a fixed frequency usually above the audio spectrum. The type of modulation producing this sub-carrier may be AM, FM or other. The sub-carrier will appear as fixed side bands on the visual display unit, either in the pan-adapter or tuner scanning modes. They appear as equally spaced pips, one on each side of the carrier and lower in level than the carrier dependent on the percent modulation. Some transmitting systems use suppressed carrier or single side bands in which case only one pip will appear next to the carrier.

Resolutions as low as 2 KHz may be necessary to resolve the side bands as they may be very close (5 KHz) to the main carrier. Normal single demodulation, when centered on the main carrier, will provide at the detected output the sub-carrier with its modulation still undetected. Also at this point will be the detected modulation of the main carrier. The sub-carrier will be present only if the bandwidth of the receiver and detector is wide enough to accept the displacement of the sub-carrier. For instance, a carrier having a 100 KHz sub-carrier produces upper and lower sidebands 200 KHz apart. A receiver bandwidth of 200 KHz and detector bandwidth of 100 KHz is necessary to extract the energy in both side bands. The sub-carrier modulation is then detected by using a second receiver tuned to the sub-carrier frequency. The input of the second receiver is connected to the detected output of the first receiver.

6.5.2 Cable Hook-up, Double Detect Mode is provided by the interconnecting harness (Figure 10-1).

6.5.3 Control Setting: Set high frequency receiver controls as in "Receiver Mode" (Paragraph 6.2.2 and 6.2.3). The high frequency receiver bandwidth must be set wide enough to encompass the side bands desired. Use 1 MHz position if possible. Set low frequency receiver controls as in "Receiver Mode" (Paragraph 6.1.2 and 6.1.3).

6.5.4 Operation of Double Detect Mode: First, tune in signal having sub-carrier on high frequency receiver. (Such signals may be determined first by using the panadapter mode or the tuner scanning mode and observing side band carriers on display screen. After tuning the signal for the best audio output and highest "S" meter reading of high frequency receiver, then tune low frequency receiver through entire range for best low frequency "S" meter reading. Once sub-carrier is received on low frequency receiver, try all combinations of AM/FM detection on both high and low frequency receivers for best audio output of low frequency receiver. (Sub-carrier may be an FM modulation of the main carrier. This sub-carrier may then be AM modulated. The types of modulation used may be determined by observing the display in the panadapter or tuner scanning mode). The visual display unit may be used in the double detect mode as a searching aid to locate the sub-carrier existing once the main signal has been tuned in by the high frequency receiver. Proceed as in the "Tuner Scanning Mode Low Frequency Receiver" Paragraphs 6.4.1

to 6.4.3). Once sub-carrier is located, switch No Sweep/Sweep switch back to "No Sweep" to monitor modulation by earphones. A convenient method of spectrum scanning and modulation analyzing is to connect and set controls of system for panadapter mode as per Paragraph 6.3. Also set and adjust T03 tuner scanning mode for 0 to 200 KHz display. Place T03/converter switch of low frequency receiver to converter position and tune high frequency receiver tuner as per panadapter mode. When side bands or other modulation appears on screen center signal on screen and switch T03/converter switch of low frequency receiver to T03. Modulation components from 0 to 200 KHz will then be displayed.

6.6 <u>Video Mode:</u>

(Refer to Figure 10-1). In the video mode, the detected output of the receiver is displayed on the visual monitor in an amplitude verses time base display. Also, undetected IF signals of low frequency receiver (455 KHz) may be displayed.

6.6.1 Cable Hook-up Video Mode is provided by the interconnecting harness (Figure 10-1).

6.6.2 Control Setting: Set receiver controls as in "Receiver Mode" (Section 6.1 or 6.2). Set visual monitor controls as follows:

Sweep Rate Switch: To time base desired.
Sweep Rate Vernier Control: To time base desired.
Synchronizing Control: Adjust to synchronizing signal.
Sweep Gain Control: Set for base line width to end marks on gradicule.

Sweep Width Control: Not used.
Sweep Center Control: Center base line.
Signal Gain Control: Adjust to desired "OnScreen" amplitude of signal.
Amplifier/Pan switch to Amp. for HFR use, and Pan for LFR use.
Signal Center Control: Center base line in vertical direction.
Intensity and Focus Control: For best display.

6.6.3 Operation: Tune signal in as in "Receiver Mode" (Section 2.1 and 2.2). Observe detected output on visual display unit. Adjust time base controls and synchronizing control for desired display. Audio output may be used simultaneously.

6.7 Remote Tuner Operation: The purpose of the remote tuner operation is to allow the tuner and its antenna to be physically placed for best signal reception in such a manner that would be impossible or inconvenient while mounted in the receiver. Also, remote tuner operation allows servicing, alignment and test of tuners.

6.7.1 To remove the tuner, first remove the 4-40 binder head panel screws located on the perimeter of the tuner sub panel. There may be two, three or four screws depending on which tuner is being removed. Do not remove the two binder head screws near the dial window or the knob. Connect a BNC terminated cable to the antenna connector and using this as a handle, pull tuner straight out. Side to side and back to front movement may be necessary to help tuner bottom connector release. CAUTION: Handle tuner with care when out of receiver as some wiring and the gear and dial mechanism are exposed. Special care should be exercised to avoid touching the dial or dial spools. Connect remote cable connector with handle to socket at bottom of opening left in receiver. Connect other end of cable to plug at bottom of tuner. Follow color dot for proper indixing of cable connectors to receiver frame and tuner. Now proceed with any of the operational modes described in this Manual.

6.8 Oscilloscope Mode:

The purpose of the "oscilloscope mode" is to utilize the features of the visual display unit for utility oscilloscope functions such as field repair of electronic equipment, monitoring of signal wave shapes, rough frequency measurements, special visual displays such as video signals, and any other utility oscilloscope use. It is especially useful where portability and battery operations are imperative. Check specifications under Part Four, Paragraph 4.4, 4.5, 4.7, 4.8, 4.13, 4.14 and 4.16 for oscilloscope mode specifications.

6.8.1 Power Connection: Attach power cable between monitor and either the PS-10 power supply or the BP-7 battery pack. To check conditions of battery or line voltage, connect branch of power cable to either low or high frequency receiver and proceed as per Paragraph 6.1.1. The receiver may then be

PART SEVEN: REPAIR AND ALIGNMENT OF COMPONENT PARTS

7.1 SCOPE

Due to the extreme complexity, miniature size and frequency range of the A3 Receiving System, repairs should be limited to those persons who are familiar with equipment of this type. Except for emergency cases, it will consume less time to return the system and/or component to F. G. Mason Engineering for repair or replacement. Special care must be taken in examining any of the tuners as placement of components and routing of wiring will affect the performance. THIS IS IMPORTANT!

To remove the tuner, first remove the 4-40 binder head panel screws located on the perimeter of the tuner sub panel. There may be two, three or four screws depending on which tuner is being removed. Do not remove the two binder head screws near the dial window or the knob. Connect a BNC terminated cable to the antenna connector and using this as a handle, pull tuner straight out, side to side and back to front movement may be necessary to help tuner bottom connector release. CAUTION: Handle tuner with care when out of receiver as some wiring and the gear and dial mechanism are exposed. Special care should be exercised to avoid touching the dial or dial spools. Connect remote cable connector with handle to socket at bottom of opening left in receiver. Connect other end of cable to plug at bottom of tuner.

TA3-2 ALIGNMENT PROCEDURE

17. Adjust trimmer on C-26 for maximum output.

18. Rotate tuning knob to frequency noted in Step 13 and tune signal for maximum output. If frequency is not the frequency noted in Step 13, retune L5 oscillator coil until frequency is correct.

19. Repeat steps 13 through 18.

20. Tune tuner and signal to approximately center of tuning range and adjust T3-IF coil for maximum output.

21. Put bees wax or "Q" dope on all adjustments.

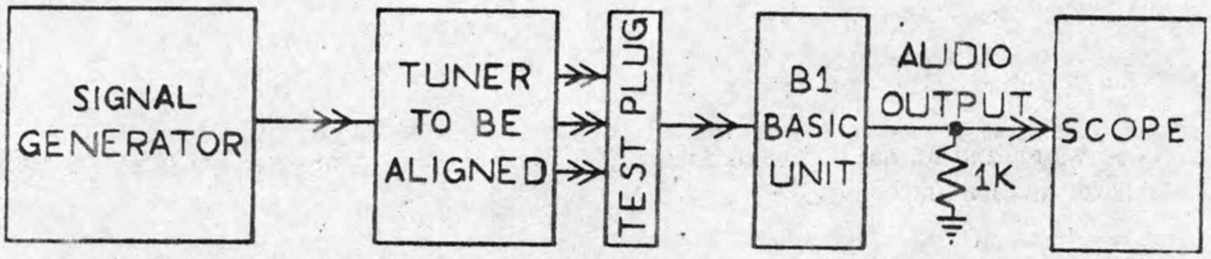
22. Test bandspread and sweep. (Use S3 monitor).

23. Check low, mid and high points in band for sensitivity and image rejection. Sensitivity at S+N/N = 10 dB should be better than 1.5 microvolts. Image rejection should be 80 dB minimum.

TA3-3 ALIGNMENT PROCEDURE

1. Remove the TA3-3 tuner from the HFR chassis by removing the screws at the edge of the tuner face.

2. Connect as shown below:



Refer to drawings PWD-4025-C, 30118-B and SWD-4025-C for location of test points and components.

Use B1 in 20 KHz bandwidth position.
Adjust bandspread for center of range.

3. Turn tuner knob to maximum counterclockwise.

4. Tune signal generator to 3.5 MHz with 10 microvolt output and apply power to the system.

5. Adjust L5 oscillator coil for maximum output on scope.

6. Turn tuner knob maximum clockwise and tune signal generator to 12.1 MHz.

7. Adjust trimmer on C27 for maximum output. Repeat steps 3 through 7 to be certain the frequencies are still correct.

8. Turn tuner knob maximum counterclockwise and signal generator to 3.5 MHz.

9. Adjust cores in T1 and T2 for maximum output on scope.

10. Rotate tuning knob maximum clockwise and signal generator to 12.1 MHz.

11. Adjust C18 and C19 for maximum output.

12. Rotate tuning knob 6 turns clockwise from extreme counterclockwise position and tune signal generator to 6.25 MHz.

13. Adjust L5 oscillator coil for maximum output and retune signal generator until best signal to noise is obtained. Note frequency.

14. Rotate tuning knob to extreme CCW position and tune signal generator to 3.5 MHz.

15. Adjust C21 for maximum output.

TA3-3 ALIGNMENT PROCEDURE

16. Rotate tuning knob to extreme CW position and tune signal generator to 12.1 MHz.

17. Adjust trimmer on C27 for maximum output.

18. Rotate tuning knob to frequency noted in Step 13 and tune signal for maximum output. If frequency is not the frequency noted in Step 13, retune L5 oscillator coil until frequency is correct.

19. Repeat steps 13 through 18.

20. Tune tuner and signal to approximately center of tuning range and adjust T3-IF coil for maximum output. Tune signal generator to 23.5 MHz, high output level. Adjust coil L7 for minimum output.

21. Put bees wax or "Q" dope on all adjustments.

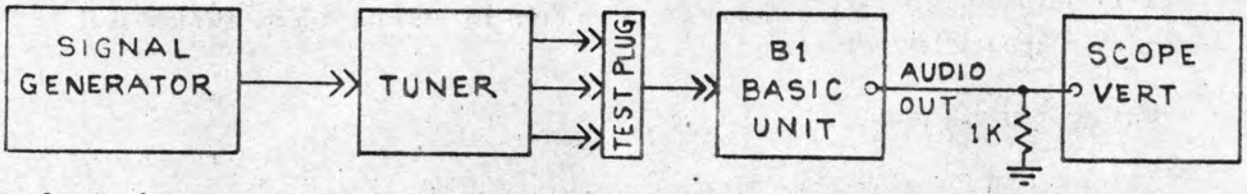
22. Test bandspread and sweep. (Use S3 monitor).

23. Check low, mid and high points in band for sensitivity and image rejection. Sensitivity at S+N/N = 10 dB should be better than 2 microvolts. Image rejection should be 80 dB minimum.

TA3-4 ALIGNMENT PROCEDURE

1. Remove the TA3-4 tuner from the HFR chassis by removing the pan head screws at the edge of the tuner face.

2. Connect as shown below:



Refer to drawings PWD 4026C, 30119B and SWD 4026B for location of test points and components.

3. Remove cover from RF assembly.

4. Rotate tuner knob to maximum counterclockwise position and adjust signal generator frequency to 11.7 MHz and output level to approximately 20 microvolts.

5. Adjust core in coil T3. Then adjust cores in coils T1 and T2 for maximum output on oscilloscope.

6. Turn tuner knob to maximum clockwise position and adjust signal generator frequency to 44 MHz.

7. Adjust trimmer capacitors C26, C18 and C19 for maximum output.

8. Turn tuning knob exactly 5 turns.

9. Adjust signal generator frequency to 20 MHz and adjust core in T3 for maximum output.

10. Rotate tuner knob to maximum counterclockwise position and adjust signal generator frequency to 11.7 MHz.

11. Adjust capacitor C21 for maximum output.

12. Rotate tuner knob to maximum clockwise position and adjust signal generator frequency to 44 MHz.

13. Adjust capacitor C26A for maximum output.

14. Repeat steps 8 thru 13 until sensitivity is 1.5 uv for $\frac{S+N}{N} = 10$ dB.

15. Tune tuner to approximately the center of the tuning range and adjust signal generator frequency to 111 MHz with high level output.

16. Replace cover on RF assembly.

17. Adjust coil L7 for minimum output.

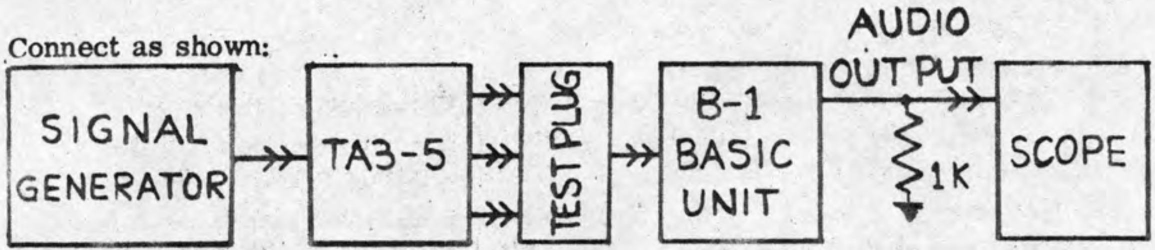
18. Measure image rejection at a few points in the band. It should be as follows:
    RF Frequency of 12 to 20 MHz, image rejection 80 dB
    RF Frequency of 20 to 43 MHz, image rejection 50 dB

19. Measure IF rejection in approximately the center of the tuning range. Rejection should be 80 dB.

TA3-5 ALIGNMENT PROCEDURE

1. Remove the TA3-5 tuner from the HFR chassis by removing the screws at the edge of the tuner face.

2. Connect as shown:



Refer to drawings PWD-30133-B, SWD-4027-B, PWD-4027-C and 30130-C for location of adjustments and components. Use B-1 in 90 KHz bandwidth, AM, Manual, and IF gain full clockwise. Adjust bandspread control to center. Track tuner with covers installed and tuner powered by remote cable.

3. Turn tuner knob to maximum CCW position. (Low end)

4. Tune signal generator to 41.5 MHz with 100 uv output (30% modulation 1000 Hz) and apply power to system.

5. Adjust L-1. Turn spacing and core to 41.5 MHz or to match the dial. Cement L-1 coil, L-1 & T-1 core & Q-1 & Q-2.

6. Tune tuner & Generator to 46 MHz.

7. Adjust T-2, L-5, L-4 & L-3 for maximum output.

8. Tune Tuner to maximum clockwise position (High End).

9. Adjust oscillator trimmers C-3-A and C-3-D so RF frequency will be 137 MHz or match the dial.

10. Tune tuner and generator to 110 MHz.

11. Adjust C16-A, C-16-D, C17-A and C17-D for maximum output.

12. Retune generator and tuner to low end and recheck sensitivity (1.5 uv for 10 dB S+N or less) at 43, 60, 80 and 130 MHz. (NOTE: Some compromise between the tracking adjustment frequencies of 46 & 130 MHz may be necessary).

13. Check the operation of the tuner in the swept mode & check operation of bandspread control. Image and IF rejection should be checked at 43, 60 and 130 MHz. It must be better than 50 dB.

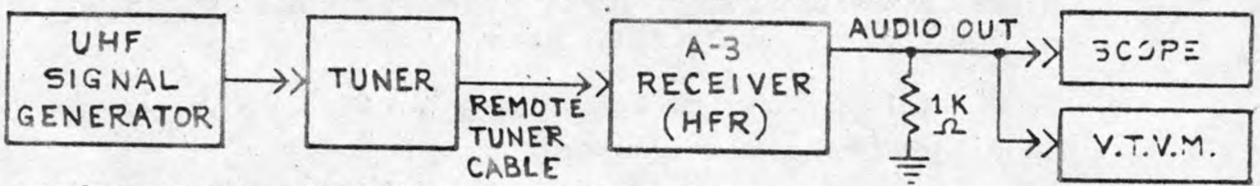
14. Secure screws for T-2, L-5, L-4 and L-3 with a dot of paint.

TA3-6 ALIGNMENT PROCEDURE

NOTE: IT IS STRONGLY RECOMMENDED THAT THE ALIGNMENT OF THIS TUNER BE CONDUCTED BY THE MANUFACTURER AT HIS FACILITY SINCE SEALED COVERS MUST BE REMOVED AND SPECIAL TOOLS AND TECHNIQUES APPLIED.

1. Remove the TA3-6 tuner from the HFR chassis by removing the screws at the edge of the tuner face.

2. Connect tuner, receiver, and test equipment as shown below:



Refer to drawings SWD 4028-C and 30135-D for location of adjustments and components. Place the controls of the High Frequency Receiver in the side IF bandwidth (1 MHz), AM, Manual IF gain max, and adjust the audio gain for convenient readout on scope (some receiver noise should be seen on the scope). Use the remote tuner cable to allow accessibility to the tuner tracking adjustments. Covers, designated on the tuner assembly drawing 30135-D as numbers 78 and 79, must be removed for alignment. To remove soldered covers, start at corner, melting solder with iron while prying cover up with screwdriver or knife. Continue to run around cover in the same manner, until cover is removed. These covers are usually damaged by removal and should be replaced with new ones when remounted.

3. ALIGNMENT OF BAND 6A (130-230 MHz)

3.1 Adjust L-1 for minimum output with 111 MHz input.

3.2 Turn tuning knob to maximum counterclockwise position. Set bandswitch to 130-230 MHz.

3.3 Set signal generator for 500 uv level and 1000 Hz AM modulation 30% and search for receiver output response.

3.4 Adjust the spacing of the turns of L7 (oscillator portion of bottom section) until response frequency is between 128 and 130 MHz or matches dial if dial has been calibrated. Use needle nose pliers or small screwdriver to perform the adjustments being careful not to break the stator from the ceramic support.

3.5 Adjust L8 and L9 in the same manner for maximum output response.

3.6 Rotate tuning knob to the maximum clockwise position.

3.7 At high signal generator level search for response about the 220-270 MHz area.

3.8 Bend the capacity tab associated with the C18 tuning capacitor (located below and perpendicular to the C18 stator) until the response frequency occurs between 235-245 MHz or matches the dial if the dial has been calibrated.

3.9 Bend the corresponding tabs of C19 and C20 for maximum output.

3.10 Rotate tuning knob CCW until first (smallest) segment of adjustable rotor blades are meshed with the stator.

3.11 Find the RF location by searching downward with the signal generator at high level. It should be between 215 and 235.

3.12 With the signal generator frequency set at the tuner RF frequency, adjust the first segments on capacitors C19 and C20 only as required for maximum output. If the segments have to be adjusted inwardly, adjust each side evenly so that segments do not approach stator too closely.

3.13 Repeat steps 3.10, 3.11 and 3.12 for each blade segment. Note that the higher frequency segments affect the positions of the lower frequency segments, but the reverse is not true due to the meshing sequence. It is imperative, therefore, to start at the top frequency and work down.

4. ALIGNMENT OF BAND 6B (230-420 MHz)

4.1 Turn tuning knob to the maximum CCW position. Set tuner bandswitch to the 230-420 MHz position.

4.2 Repeat steps 3.3 to 3.5 only this time set L4, L5, and L6 for maximum output at a frequency between 228 and 230 MHz.

4.3 Repeat steps 3.6 to 3.13 only this time set tabs of C15, C16, and C17 for maximum output at 420 to 430 MHz.

5. Place re-tinned cover seals marked 78 upper and 78 lower on Drawing No. 30135-D on tuner as shown, and solder in place. These covers must be completely solder-sealed to the edges of the tuner walls and the internal dividers to assure oscillator radiation suppression requirements.

6. Starting at the high frequency end of the bands, retrim blade segments of each band if necessary to compensate for cover capacity.

7. Solder final covers number 79 upper and 79 lower in place.

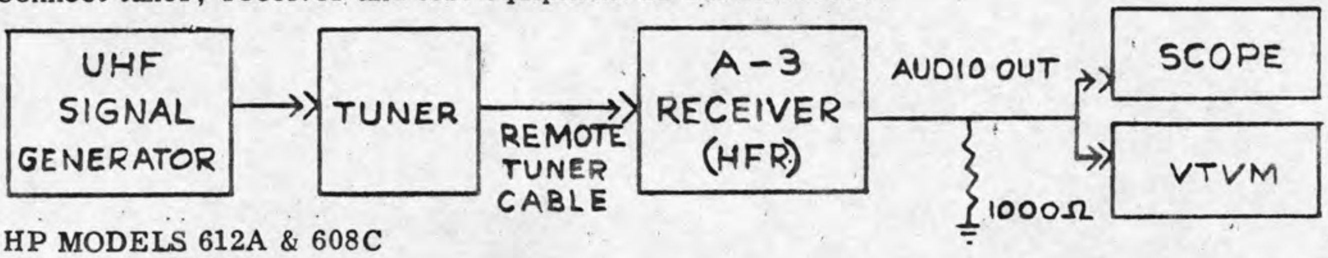
8. Recheck sensitivity of both bands according to instructions of paragraph 8.2 of the Receiver Testing Section.

TA3-7 ALIGNMENT PROCEDURE

NOTE: IT IS STRONGLY RECOMMENDED THAT THE ALIGNMENT OF THIS TUNER BE CONDUCTED BY THE MANUFACTURER AT HIS FACILITY SINCE SEALED COVERS MUST BE REMOVED AND SPECIAL TOOLS AND TECHNIQUES APPLIED.

1. Remove the TA3-7 tuner from the HFR chassis by removing the screws at the edge of the tuner face.

2. Connect tuner, receiver and test equipment as shown below:



HP MODELS 612A & 608C
OR EQUIVALENT

Refer to drawings SWD 4046-C, 30140-D, and PWD 4029-B for location of adjustments and components. Position the controls of the High Frequency Receiver in the wide IF bandwidth position (1 MHz), AM, Manual IF gain Max, and adjust the audio gain for convenient readout level on scope. (Some receiver noise should be seen on the scope.) Use remote tuner cable to allow accessibility to the tuner tracking adjustments. Cover, designated on the tuner assembly drawing 30140-D with numbers 25, 26, 27, and 28, must be removed for alignment. To remove soldered covers, start at the corner, melting solder with iron while prying up cover with screwdriver or knife. Continue around the cover in the same manner until cover is removed. These covers are usually damaged when removed and should be replaced with new ones.

3. Turn tuning knob to maximum CCW position.

4. Set signal generator for 500 uv level and search frequency for receiver output response. Use 1000 Hz, 30% AM modulation.

5. If frequency of tuner is above 420 MHz, bend endmost segment of rotor blade of C9M towards stator to lower frequency (tool must be removed to test frequency). If frequency is below 400 MHz, bend blade segment away from stator until frequency falls between 400 and 420 MHz or matches the dial, if dial has been previously calibrated. Be careful not to break stator loose from the ceramic support when prying blade segments.

6. Open or close spacing between turns of L2 and L4 with needle nose pliers or small screwdriver until maximum receiver output is obtained. This is a coarse adjustment and need not be precise. Again, be careful not to apply undue force on the stator support. As sensitivity increases, reduce signal generator gain.

4

B-1 ALIGNMENT

1. The B-1 section of the High Frequency Receiver includes those portions from the Bandswitch output through the audio and video outputs. Refer to SWD 4048D for the circuit schematic. Remove the B1/C1 from the main chassis by removing all screws from the bottom plate. This will expose the 4 wire cable and 3 coax cables connected to the B1/C1. Carefully remove these. Remove the 4 screws at the edge of the B1/C1 front panel face. The B1/C1 may now be pulled from the main frame through the top. Remove the 4 binder head screws which fasten the top plate to the B1. Remove this plate to expose the alignment coils.

2. With all transistors in their sockets, and battery test shows normal, check voltage at points C18, C19, C20, C21, C22. This should be + 18 volts.

3. If voltages are corrects, set controls as follows:

IF Gain	Full CW
AGC-Man	Man
AM-FM	AM
FM-Nar. Wide	Wide
BFO	Off
AF Gain	Full CW
Meter Hi-Lo	Lo
Bandwidth	1 MHz

Place plug in "Audio Out" jack. Connect audio "Out" to "Y" input on oscilloscope, shunt with 1 K resistor. Also, connect VTVM across audio "out".
Apply a 23.5 MHz signal to J11. (IF OUT-WIDE)
Remove Q1
Apply power to receiver at jack J15 (POWER IN)

4. Noise should not appear on the oscilloscope. Using a high level signal and tuning through 23.5 MHz, 1000 Hz modulation, a 1000 Hz signal should appear on the scope. At this point tune each coil slug for maximum signal, lowering the input signal as you tune the slug to 23.5 MHz. Switch to FM, increase signal input and adjust the FM coil slugs of T6 and T7 for maximum response. Switch to AM.

5. With signal on scope in AM Mode, turn BFO switch to "on". Tune signal generator through 23.5 MHz - there should be a beat note at 23.5 MHz if the BFO is working. This "beat" may be used as a marker later in the alignment procedure. Switch BFO to "off". With signal on scope, test AF gain control for operation. Then test manual gain control for operation. "S" meter should operate with change in manual gain. Test meter "Hi-Lo" switch. When "S" meter reads full scale in "Lo", the "Hi" position should be approximately 20.

TA3-7 ALIGNMENT PROCEDURE

7. Adjust L-21 for maximum output. This IF pre-amplifier coil tunes broadly.

8. Next, turn tuning knob CW to maximum position.

9. Search with signal generator at high output level from 750 to 900 MHz until output is located.

10. Bend the capacity adjust tab associated with the C9M capacitor (located below and perpendicular to the C9M stator blades) until output occurs between 815 and 835 MHz or matches the dial. To insure that the local oscillator is tracked on the high side, check for the image between 1037 and 1057 MHz. A very high signal generator level will be necessary to locate the image.

11. Bend corresponding capacity adjust tabs of C5M and C6M for maximum output.

12. Rotate knob CCW until first (smallest) segment of adjustable rotor blades are meshed with stators.

13. Find RF frequency location by searching downward with signal generator set at high level. It should be between 790 and 810.

14. With signal generator frequency set at the tuner RF frequency, adjust these first segments on C6M and C5M only as required for maximum output. If segments have to be adjusted inwardly, adjust each side evenly so that segments do not approach the stator too closely.

15. Repeat steps 12, 13 and 14 for each balde segment. Note that the higher frequency segment positions affect the lower frequency segments, but the reverse is not true due to the meshing sequence. It is imperative, therefore, to start at the top frequency and work down.

16. Place new pre-tinned cover seals marked 27 and 25 on drawing 30140-D on tuner as shown and solder in place. These covers must be completely solder-sealed to all wall edges and internal dividers to assure oscillator radiation suppression requirements.

17. Starting at the high frequency end of the band, retrim blade segments if necessary to compensate for cover capacity.

18. Solder final covers 26 and 28 into place.

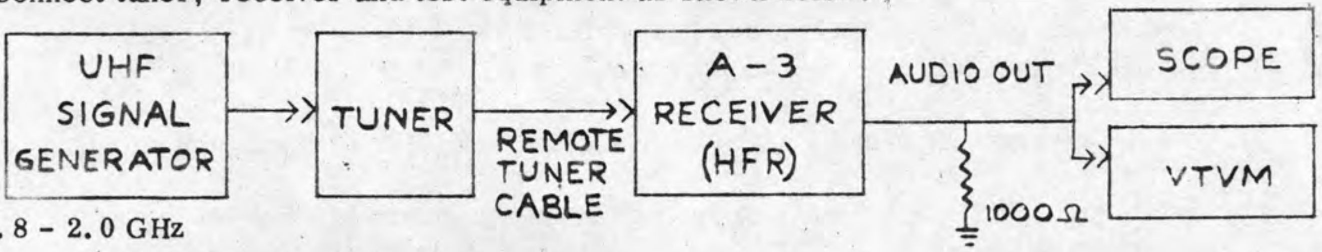
19. Recheck tuner sensitivity at 5 places across the band according to paragraph 8.2 of the Receiver Testing Section.

TA3-8 ALIGNMENT PROCEDURE

NOTE: IT IS STRONGLY RECOMMENDED THAT THE ALIGNMENT OF THIS TUNER BE CONDUCTED BY THE MANUFACTURER AT HIS FACILITY SINCE SEALED COVERS MUST BE REMOVED AND SPECIAL TOOLS AND TECHNIQUES APPLIED.

1. Remove the TA3-8 tuner from the HFR chassis by removing the screws at the edge of the tuner face.

2. Connect tuner, receiver and test equipment as shown below:



.8 - 2.0 GHz

Refer to drawings SWD 4047-C, 30150-D, and PWD 4029-B for location of adjustments and components. Place the controls of the High Frequency Receiver in the wide IF bandwidth position (1 MHz), AM, Manual IF gain Max, and adjust the audio gain for convenient readout level on scope (some receiver noise should be seen on the scope). Use remote tuner cable to allow accessibility to the tuner tracking adjustments. Covers, designated on the tuner assembly drawing 30150-D with number 25, 26, 27, and 28, must be removed for alignment. To remove soldered covers, start at the corner, melting solder with iron while prying up cover with screwdriver or knife. Continue around the cover in the same manner until cover is removed. These covers are usually damaged when removed and should be replaced with new ones.

3. Turn tuning knob to maximum CCW position.

4. Set signal generator for 500 uv level and search frequency for receiver output response. Use 1000 Hz, 30% AM modulation.

5. If frequency of tuner is above 800 MHz, bend endmost segment of rotor blade of C5M towards stator to lower frequency (tool must be removed to test frequency). If frequency is below 780 MHz, bend blade segment away from stator until frequency falls between 780 and 800 MHz or matches the dial, if dial has been previously calibrated. Be careful not to break stator loose from the ceramic support when prying blade segments.

6. Adjust L-21 for maximum output. This IF pre-amplifier coil tunes broadly.

7. Turn tuning knob CW to maximum position.

TA3-8 ALIGNMENT PROCEDURE

8. Search with signal generator at high output level from 1500 to 1700 MHz until output is located.

9. Bend the capacity adjust tab associated with the C5M capacitor (located below and perpendicular to the C5M stator blades) until output occurs between 1620 and 1640 MHz or matches the dial if the dial has been previously calibrated. To insure that the local oscillator is tracked on the high side, check for the image between 1842 and 1862 MHz. A very high signal generator level will be necessary to locate the image.

10. Bend corresponding capacity adjust tabs of C1M, C2M, C3M, and C4M for maximum output.

11. Rotate knob CCW until first (smallest) segment of adjustable rotor blades are meshed with stators.

12. Find RF frequency location by searching downward with signal generator set at high level. It should be between 1585 and 1605.

13. With signal generator frequency set at the tuner RF frequency, adjust the first segments on C1M, C2M, and C4M only as required for maximum output. If segments have to be adjusted inwardly, adjust each side evenly so that segments do not approach the stator too closely.

14. Repeat steps 10, 11, and 12 for each balde segment. Note that the higher frequency segment positions affect the lower frequency segments, but the reverse is not true due to the meshing sequence. It is imperitive, therefore, to start at the top frequency and work down.

15. Place new pre-tinned cover seals marked 27 and 25 on drawing 30150-D on tuner as shown and solder in place. These covers must be completely solder sealed to all wall edges and internal dividers to assure oscillator radiation suppression requirements.

16. Starting at the high frequency end of the band, retrim blade segments, if necessary, to compensate for cover capacity.

17. Solder final covers 26 and 28 into place.

18. Recheck tuner sensitivity at 5 places across the band according to paragraph 8.2 of the Receiver Testing Section.

B-2 ALIGNMENT

1. The B-2 section of the Low Frequency Receiver includes those portions from the T03/converter switch to the audio and visual outputs. Refer to drawings SWD 4031 B, PWD 4032C, PWD 30215D, 5831B and PWD 4031D.

2. To remove the B-2 from its case:
   (a) Remove the 3 flathead screws from bottom of case.
   (b) Remove the 9 binder head screws along the side of the case.
   (c) Remove the B-2 from the case. Note that the T03 tuner is removed with the B-2. Care should be taken not to damage the T03 printed circuit plug. Unplug the T03 tuner and carefully lay aside.

3. Plug a VTVM into the audio output jack. Connect a 455 KHz signal generator to the B-2 through pin A of the chassis T03 plug of the B-2. The ground connection for the signal should be put on pin B.

4. Set the controls as follows:
   (a) AM/FM Switch S16 in AM position.
   (b) Sweep/no SWP in NO SWP position.
   (c) AF gain R50 in mid position.
   (d) Conv. ?T03 switch S13 in T03 position.
   (e) AGC/Man switch S12 in Man position.
   (f) IF Gain R37 Full CW (Max gain) position.
   (g) BFO, S9-R65 Full CCW in off position.
   (h) Meter SW S11 in Lo position.
   (i) Bandwidth switch S14 in 2 KHz position (centerposition).

5. Apply power by connecting power supply to J23 and measure load current. It should be 20-30 ma.

6. Place meter switch S10 in test position - meter should indicate at or above red line. This indicates that the power supply voltage is correct.

7. Adjust signal generator frequency while bandwidth is in 200 Hz position. Adjust Capacitor C6 and Transformer T1 for Maximum reading on "S" meter to peak the gain of IF Amplifier. 10-50 uv input should give full scale deflection on "S" meter in 2 KHz bandwidth position.

8. Align BFO. Set the signal generator to 455 KHz. Place BFO control S9-R65 in center position. Set input signal to 455 KHz unmodulated with a level of 5 uv. Using an earphone at audio output, a tone should be heard. Tune coil T-3 until zero beat is obtained and seal core of coil with Q dope. The tone should increase when R65 is moved in either direction. Place BFO switch S9 in off position.

9. Align FM discriminator. Connect equipment as shown in Block Diagram. Remove Q4 and apply signal at Pin 3 of Q4 transistor socket.

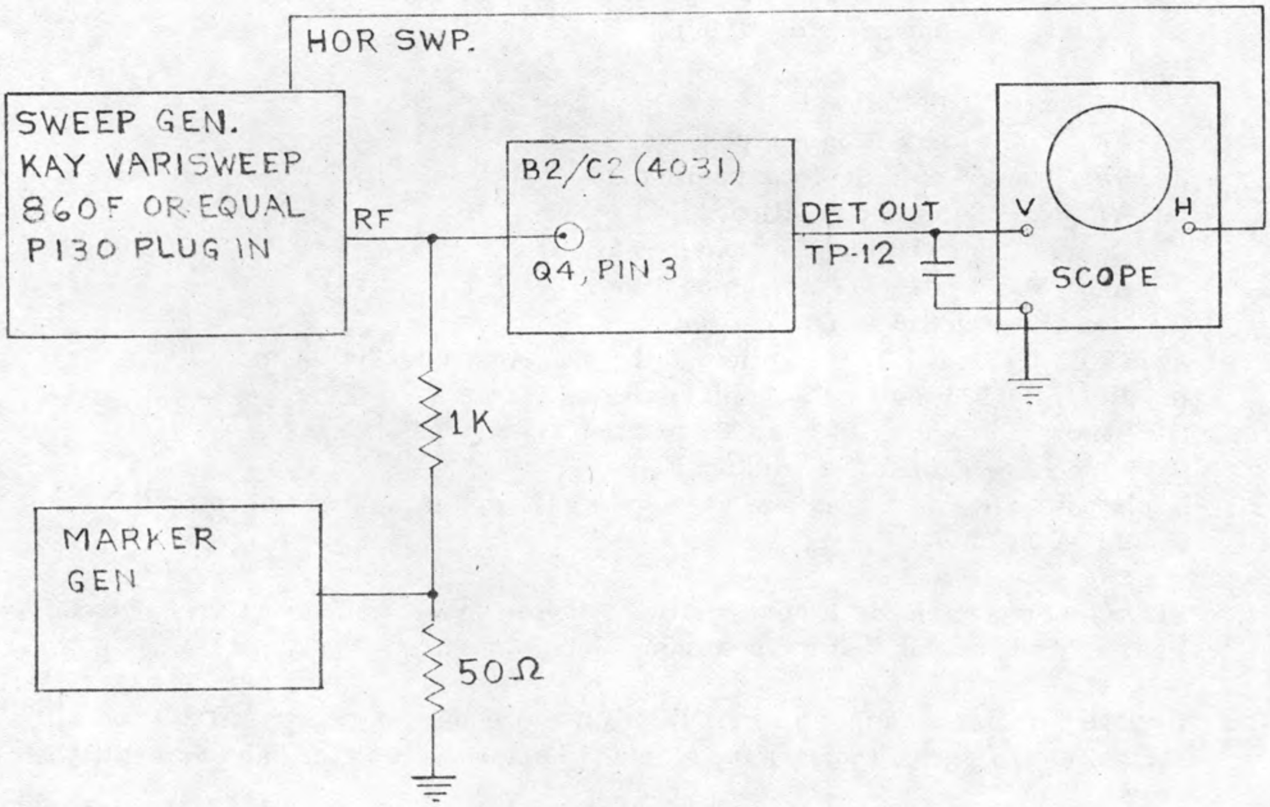
B-2 ALIGNMENT

10. Place AM/FM switch in FM position.

11. Place bandwidth switch S14 in 10 KHz position.

12. Tune sweep generator for display on scope and adjust sweep width and sweep rate for best display.

13. Adjust the pink core of T4 for maximum output. Adjust the blue core of T4 for "S" curve crossover at 455 KHz. Peak to peak separation of "S" curve should be 20 KHz. Put Q4 back into socket. Disconnect all connections. Replace the unit in case. If C2 is not aligned, do that before putting this unit into box as the C2 is on the same chassis as the B2.



C2 ALIGNMENT

1. The C2 consists of that portion of the Low Frequency Receiver which includes the 26 MHz low pass filter, 23.5 MHz to 10.7 MHz converter and 10.7 MHz to 455 KHz converter. Refer to drawings SWD 4033C, PWD 4033C, SWD 4035C and PWD 4035C.

2. To remove the B-2 from its case:
   (a) Remove the 3 flathead screws from bottom of case.
   (b) Remove the 9 binder head screws along the side of the case.
   (c) Remove the B-2 from the case. Note that the TO3 tuner is removed with the B-2. Care should be taken not to damage the TO3 printed circuit plug. Unplug the TO3 tuner and carefully lay aside. The C2 section is the cast aluminum chassis holding the TO3 socket.

3. Connect a 23.5 MHz signal generator to the B-2 through J17 (converter in). Set the level to approximately 100 uv.

4. Set the controls as follows:
   (a) AM/FM Switch S16 in AM position.
   (b) Sweep/no SWP in NO SWP position.
   (c) AF gain R50 in mid position.
   (d) Conv./TO3 switch S13 in Conv. position.
   (e) AGC/Man switch S12 in Man position.
   (f) Meter switch S11 in Lo Position.
   (g) IF Gain Control R37: position so that S meter reads half scale.
   (h) BFO, S9-R65 Full CCW in off position.
   (i) Bandwidth switch S14 in 2 KHz position (Center position).
   (j) Sig cent control R13 in mid position.

5. Apply power by connecting power supply to J23 and measure load current. It should be 20-30 ma.

6. Place meter switch S10 in test position - meter should indicate at or above red line. This indicates that the power supply voltage is correct.

7. Use the S meter as an indicator. It will be necessary to decrease the IF gain control as the various stages are aligned to bring the S meter back to a half scale reading.

8. Referring to SWD 4033, tune L-2,the output coil associated with Q4(2N3646 - 34.2 MHz swept local oscillator) until the S meter indicates a maximum.

9. Tune T1, the output transformer of Q6 - the 10.7 MHz output stage) until a maximum is reached on the S meter.

10. Tune C29, the output capacitor of Q8 - The 10.245 MHz local oscillator) until a maximum is reached on the S meter.

C2 ALIGNMENT

11. Tune T-2, the output transformer of Q7 - the 10.7 MHz to 455 KHz mixer) until a maximum is reached on the S meter.

12. Alignment of the C2 is complete. Replace the B2/C2 chassis in its case.

TA3-03B ALIGNMENT PROCEDURE

1. The TA3-03B tuner may be removed from the case by removing the 3 binder head screws on the side of the low frequency receiver case. The TA3-03B tuner may now be pulled through the top of the LFR case. When making the following adjustments refer to drawings PWD 4021C and SWD 4021B.

2. Connect tuner to low frequency receiver using remote cable. Set controls on low frequency unit in following positions.

AM/FM Sw.	-	AM Pos.
No SW/Sweep	-	Swp. pos.
AF Gain	-	CCW Pos.
Converter/TO3	-	T03 Pos.
IF Gain	-	CW Pos.
BW	-	20 KHz Pos.
BFO	-	Off
"S" Meter Hi/Lo	-	LOW
AGC/Man.	-	Man. Pos.
Sig. Cent.	-	Cent. of Rotation

Note: The signal center control on LFR is used to set 23.5 MHz center only. It has no effect on TA3-03B tuner.

3. Connect LFR to S-3 with coaxial cable "Sweep in" to "Sweep out" and "Pan out" to "Pan in". Set controls on S-3 in following positions:

SWP Width	-	25 KHz/Div.
Sweep Time/Div	-	20 - 100 ms
Sweep Vern.	-	Center
Syn	-	CW
INT/EXT SYNC	-	INT
AMP/PAN	-	PAN

4. Connect signal generator to tuner antenna connector using BNC Cable.

5. Rotate tuning knob clockwise dial reading of 300 KHz and set signal generator to 300 KHz, 10 microvolt output level.

6. Set R11 for 0.8 volt at terminal "2" of the 10-turn pot.

7. Adjust L2 to bring signal to center of the screen. Change BW switch at LFR to .2 KHz position and progressively change SWP WIDTH switch to .25 KHz position, trim L-2 to exact center. After that, leave LFR BW and S-3 swp width as is, and proceed to "8".

8. Rotate the tuning knob to 2 KHz and set signal generator to 2 KHz.

9. Adjust R9 until the signal is at the center of the S-3 screen. Notice that at the right hand edge there is an 455 IF peak. Move the signal generator to 2.5 KHz. The signal should move two divisions to the left and the IF remains stationary. If it moves to the right, the R9 setting is wrong, and you are seeing the image of 2 KHz. Turn R9 counterclockwise to bring the right signal in.

10. Repeat procedure "5 & 6". See that the voltage at Terminal "2" is still 0.8 volt. Reset it, if necessary, and repeat 7 to 9.

11. If 10 is o.k. reduce the signal generator output level to 1 uv. The signal should be visible on the screen to indicate that the sensitivity of the tuner is up to standard.

VISUAL DISPLAY UNIT S-3 ALIGNMENT

1. All of the following controls referred to are located on the outside control panel and appear as recessed screwdriver adjustments. The trimpots numbered R20, R27, R29, R47, R48 and R50 may be exposed by removing the 2 binder head screws holding the 2" x 3/4" cover on the face of the VDU front panel. These trimpots control the sweep output circuit. Note that the R numbers and SWP width position numbers appear on either side of the screwdriver adjustments.

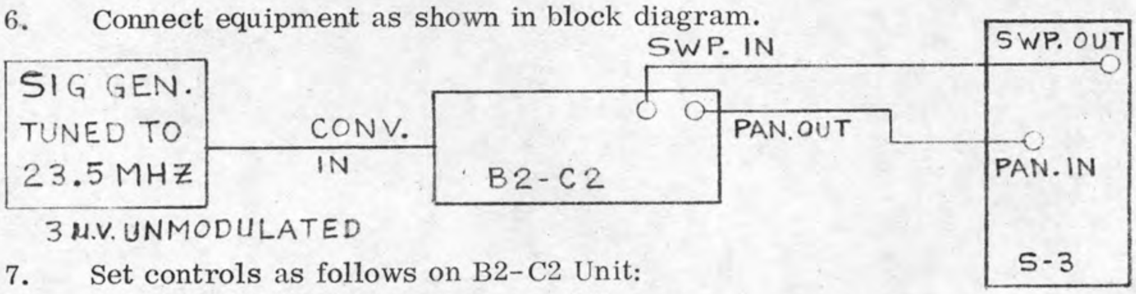
2. Set S-23 (SWP RATE) to the 135-700 us position, set R2 (SWP VERN.) to full counterclockwise. Set S-22 (SWP WIDTH) to .3 KHz/DIV. and connect power supply. Adjust R20 to obtain 7.9 volts dc at J-27 (SWEEP OUT). Use a VTVM at J-27 to measure voltage.

3. Turn S-22 to 500 KHz/DIV position. Adjust the saw-tooth output to 1.2 volt RMS (saw-tooth p-p 4 volts) with R-27. Adjust R29 to obtain 7.9 volts average dc output. After the dc adjustment, see that the saw-tooth output is still 1.2volt RMS. If not, readjust to that value with R27 and adjust R29 for dc value again.

4. Turn S-22 to 120 KHz/DIV position and adjust R47 to obtain exactly the same dc output voltage as before.

5. Repeat procedure 4 for the 30, 6 and 1 KHz/DIV positions and adjust R48, R49 and R50 respectively for 7.9 V DC.

6. Connect equipment as shown in block diagram.



7. Set controls as follows on B2-C2 Unit:

AM. FM Sw.	-	AM
Swp. No Swp. Sw.	-	No Swp.
Bandwidth Sw.	-	.2 KHz
T03/Conv. Sw.	-	Converter
AGC/MAN Sw.	-	Man
Hi/Low Sw.	-	Lo
IF Gain	-	Max. CW
BFO	-	OFF
Sig. Cent.	-	Center of Range.

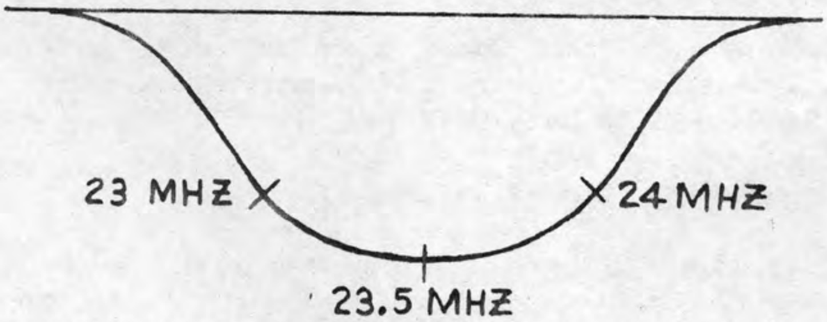
B-1 ALIGNMENT

6. At this time, it is safe to assume that most of the B-1 circuits are functional. Apply power. Switch and controls should be the same as Step #3. Because the IF coils are tuned to peak at 23.5 MHz, the system may have too much gain and tend to oscillate. The "S" meter will peg if the B1 oscillates. Turn down the manual gain control. Load the input with a 50 pad. This should allow you to read the "S" meter. You are ready for stagger tuning.

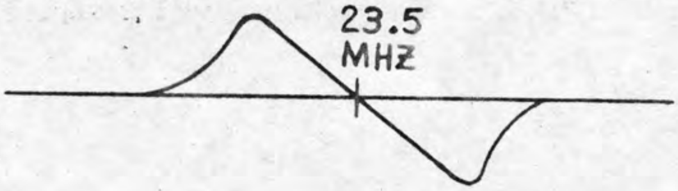
7. This step requires the following equipment:

   Sweep Generator Eico (369)
   Oscilloscope

   Connect sweep "Demod In" to detect out J14 (see drawing SWD 4048D).
   Connect "RF Out" cable to J11, use 50 ohm pad.
   Connect scope cable to scope. Switch scope to "Ext-Horz".
   Tune marker to 23.5 MHz.
   Tune sweep to 23.5 MHz.
   Set RF level to "High".
   Apply power to B-1.
   Adjust controls on sweep generator and scope until you get a picture of the IF response of the B-1. Adjust T1, T2, T3, T4, and T5 until you have the following picture:



   Adjust system until you achieve 1 MHz bandwidth at 6 dB points on response curve. This is done by stagger tuning, ie, T1 is tuned a little below 23.5, T2 is tuned a little above 23.5 etc., so that the net result is as pictured. The marker may be checked by switching to BFO - the BFO should superimpose the marker if the marker is correct. The BFO is crystal controlled.
   Switch AM-FM switch to FM, Nar-Wide to Wide. Remove Q5, inject signal from sweep generator through a .01 capacitor into pin 1 of Q5 socket.
   Adjust T6 for maximum amplitude, then adjust T7 for FM crossover. You should get a presentation as below:



S-3

SWP. VERN.	-	2
SWP. RATE	-	20 100 us
SYNC.	-	0
INT./EXT. Sync Sw.	-	INT.
AMP/PAN Sw.	-	PAN
Swp. Width Sw.	-	.3 KHz/Div.

8. Using S-3 graticule for calibration, adjust Swp. Gain and Cent. for full scale (10 divisions on graticule).

9. Tune generator to peak signal on S-meter.

10. Switch B2-C2 sweep select switch to Sweep and adjust R20 on S-3 until swept signal is centered on S-3. Switch S-22 (Swp. Width) to 500 KHz/Div. and B2-C2 bandwidth switch to 2 KHz. Adjust R-29 to center swept signal. Repeat for R-47 and R-48 switching S-22 (Swp. width) to corresponding sweep width positions. Switch B2-C2 BW switch back to .2 KHz and repeat procedure for R-49 and R-50.

11. Return S-22 to 500 KHz/Div. Tune signal generator until swept signal is positioned at extreme line on S-3 graticule and note frequency on generator. Repeat for opposite end of S-3 graticule. Difference between two ends should be 5 MHz.

12. If sweep width is less than 5 MHz, adjust R-27 CW increasing P. P. sawtooth output at J-27 above 4v and readjust R-29 for center at 23.5 MHz. Continue this procedure until 5 MHz sweep width is obtained.

13. If Sweep width is more than 5 MHz the opposite adjustments to step 12 are necessary.

PS-10 ALIGNMENT

1. CHECK THE 1/4 AMP FUSE:

2. Refer to drawings SWD 4074B, PWD 4074D, and 30410-D for the schematic diagrams for the AC power supply.

3. Remove the 2 pan head screws on lower side of the power supply.

4. Remove the 2 small pan head screws top of the case.

5. The circuit board with transformer may now be pulled from the case.

6. Switch power on.

7. Measure voltage across C1. It should be 23 ± 2 volts.

8. Measure voltage across C3. It should be 20 ± 1 volts. Measure output voltage across the output terminal and adjust it to 18 volts by R4.

9. Switch power off.

10. Connect 60 ohms (10 W) resistor across output terminals of PWD-4074B. One of the receivers may be used as a load in which case the S meter will be the indicator.

11. Switch power on again and measure the output voltage of PS-10. It should be 18 ± .2 volts.

12. Connect a VTVM to the output terminals of PS-10. The ripple voltage should not be more than 1 mv.

13. Disconnect the circuit. Test is completed.

14. Return the circuit boards and transformer to the case and tighten screws.

BP-7 BATTERY PACK

1. There are no adjustments on the BP-7 Battery Pack.

2. To replace batteries, remove the 3 flat head screws on the cover containing the printed instructions. Remove the cover.

3. Remove the old batteries by inverting the battery pack.

4. Replace the batteries as marked on the cover observing the battery polarities. The following batteries or their equivalent are suggested for use:

RM - 12R	E91
N46	915

5. Check Battery Polarities.

6. Replace cover by fastening the lid with the 3 flat head screws.

7. Check voltage using the meter on either receiver in battery test position.

B-1 ALIGNMENT

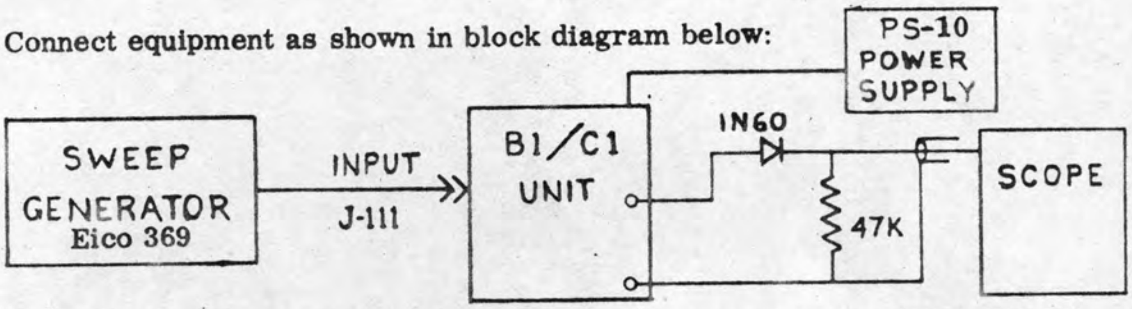
The FM Nar. position has no adjustment. It is a crystal discriminator. Switch back to AM mode; remove sweep generator connections; turn off sweep. Set switches and controls as indicated in Step #3. Inject signal of 23.5 MHz at 10 uv into J11. The "S" meter should read full scale in the 1 MHz position for 8-10 uv. Tune through 23.5 MHz to check bandwidth.

8. Crystal Filter Check: Turn bandwidth to 2 KHz position. Tune signal generator for maximum reading on "S" meter. Switch through all positions of the bandwidth switch. "S" meter readings should remain between 6 and full scale.

C-1 ALIGNMENT PROCEDURE

1. The C-1 is the 111 MHz to 23.5 MHz converter located on the chassis of the A3 High Frequency Receiver. Refer to SWD 4048D for the schematic diagram. Remove the HFR from the main chassis by removing all the screws from the bottom plate. This will expose the 4 wire cable and 3 coax cables connected to the HFR. Carefully remove these. Remove the 4 screws at the edge of the HFR front panel face. The HFR may now be pulled from the main frame through the top. Remove the 17 binder head screws which hold the bottom plate of the HFR. Remove the bottom plate.

2. Connect equipment as shown in block diagram below:



Connect diode detector shown above by referring to drawing PWD 30106X sheet 2 and performing the following steps:

(A) Disconnect wire from coil L-12 center tap at balanced mixer.

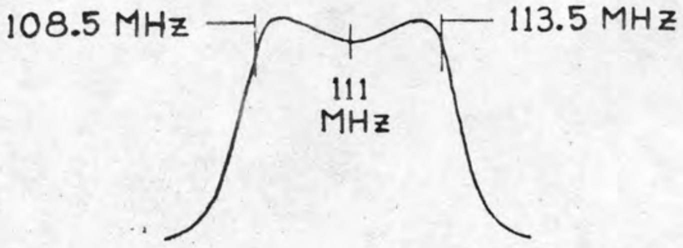
(B) Connect diode to lead disconnected from coil L12. Connect 47K resistor to ground terminal on balanced mixer.

(C) Connect shielded cable from diode to scope.

3. Connect a jumper between pin A and Pin D on J113.

4. Tune sweep generator to 111 MHz with output attenuator set for maximum output. Set sweep width on 10 MHz.

5. Adjust transformers L8, L11, L9, and L12 until the following waveform is obtained:



Adjust L6 for maximum amplitude. It will be necessary to reduce sweep generator output level as these adjustments are made.

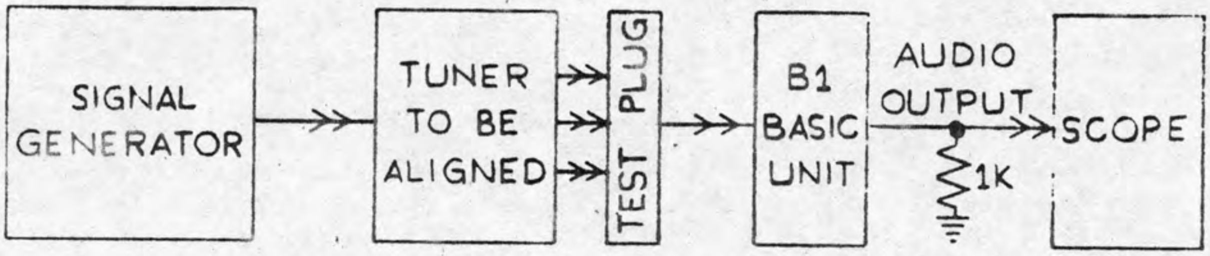
C-1 ALIGNMENT PROCEDURE

6. This completes alignment. Remove diode and 47K resistor and reconnect coil lead to balanced mixer. Replace rear cover. Remove jumper from J113. Return B1/C1 chassis to case.

TA3-1 ALIGNMENT PROCEDURE

1. Remove the TA3-1 tuner from the HFR chassis by removing the screws at the edge of the tuner face.

2. Connect as shown below:



Refer to drawings PWD 4023C and 30116B and SWD 4023B for the location of test points and components. Use the B1 in the 20 KHz bandwidth position. Adjust the bandspread control for mid-range.

3. Turn tuner knob to maximum CCW.

4. Tune signal generator to 300 KHz with 100 microvolt output and apply power to the system. Use 1000 Hz, 30 per cent modulation.

5. Adjust the oscillator transformer T3 for maximum output on scope.

6. Turn tuner knob to maximum CW and tune signal generator to 1.1 MHz.

7. Adjust trimmer on C26 for maximum output. Repeat steps 3 through 7 to be certain the frequencies are still correct.

8. Turn tuner knob maximum CCW and signal generator to 300 KHz.

9. Adjust cores in T1 and T2 for maximum output on scope.

10. Rotate tuning knob maximum clockwise and signal generator to 1.1 MHz.

11. Adjust C18 and C19 for maximum output.

12. Rotate tuning knob 3 turns clockwise from extreme counterclockwise position and tune signal generator to 400 KHz.

13. Adjust T3 oscillator transformer for maximum output and retune signal generator until best signal to noise is obtained. Note frequency.

14. Rotate tuning knob to extreme CCW position and tune signal generator to 300 KHz.

TA3-1 ALIGNMENT PROCEDURE

15. Adjust C21 for maximum output.

16. Rotate tuning knob to extreme CW position and tune signal generator to 1.1 MHz.

17. Adjust trimmer on C-26 for maximum output.

18. Rotate tuning knob to frequency noted in step 13 and tune signal for maximum output. If frequency is not the frequency noted in Step 13, retune T3 oscillator transformer until frequency is correct.

19. Repeat steps 13 through 18.

20. Put "Q" dope on all adjustments.

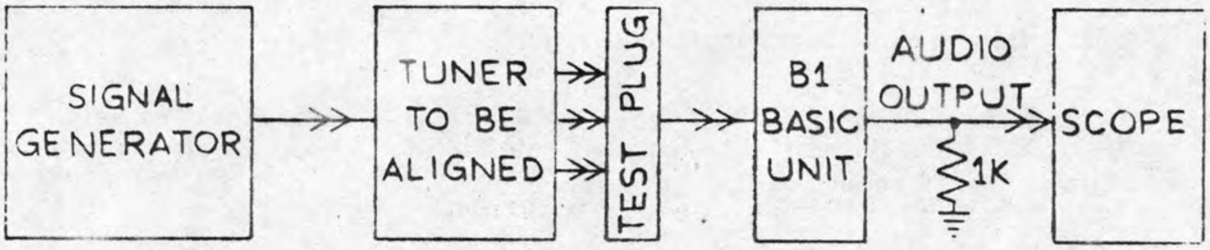
21. Test bandspread and sweep. (Use S3 monitor).

22. Check low mid and high points in band for sensitivity and image rejection. Sensitivity at S+N/N = 10 dB should be better than 1.5 microvolts. Image rejection should be 80 dB minimum.

TA3-2 ALIGNMENT PROCEDURE

1. Remove the TA3-2 tuner from the HFR chassis by removing the screws at the edge of the tuner face.

2. Connect as shown below:



   Refer to drawings PWD-4024-C, 30117-B and SWD 4024-C for location of test points and components.
   Use B1 in 20 KHz bandwidth position.
   Bandspread adjusted for center of range.

3. Turn tuner knob to maximum counterclockwise.

4. Tune signal generator to 1 MHz with 10 microvolt output and apply power to the system.

5. Adjust L5 oscillator coil for maximum output on scope.

6. Turn tuner knob maximum clockwise and tune signal generator to 3.6 MHz.

7. Adjust trimmer on C26 for maximum output. Repeat steps 3 through 7 to be certain the frequencies are still correct.

8. Turn tuner knob maximum counterclockwise and signal generator to 1 MHz.

9. Adjust cores in T1 and T2 for maximum output on scope.

10. Rotate tuning knob maximum clockwise and signal generator to 3.6 MHz.

11. Adjust C18 and C19 for maximum output.

12. Rotate tuning knob 6 turns clockwise from extreme counterclockwise position and tune signal generator to 2 MHz (mid point).

13. Adjust L5 oscillator coil for maximum output and retune signal generator until best signal to noise is obtained. Note frequency.

14. Rotate tuning knob to extreme CCW position and tune signal generator to 1 MHz.

15. Adjust C21 for maximum output.

16. Rotate tuning knob to extreme CW position and tune signal generator to 3.6 MHz.

PART EIGHT: OPERATIONAL TESTS, RECEIVER MODES

8.0 This section provides the depot Repair and Inspection personnel with a procedural guide to assure that the equipment is functioning properly before sending it into the field for use. Data sheets A thru D of PART FOURTEEN may be used as sample forms to record this data. In most tests go / no go records suffice. Actual measured levels may be desirable when tracing malfunctions.

8.1 AM SENSITIVITY AND DIAL ACCURACY

(Reference MIL-STD-449C, Paragraphs 3.18, 5.3.2, 5.3.3 and 5.3.4. Note however, that with the A-3 specifications, 25% meter deflection or 10 dB of S+N/N is the required standard signal rather than 6 dB of S+N/N.) Sensitivity tests are taken at three points in each band - the lower and upper ends of the dial and one middle point. These points assure that the unit is properly functioning across the required RF range. Dial accuracy data is also taken with sensitivity tests.

TEST SETUP:

Refer to Figure 13.1. The equipment required is:

1. Signal Generators covering a frequency range of 80 KHz to 2 GHz. The output level and frequency must be calibrated. These generators must have 30% 1000 cycle amplitude modulation. Also 2 to 80 KHz signal generator with calibrated level output, no modulation required.

2. AC VTVM with frequency response to 5 MHz and maximum voltage range of at least 10 volts. Scales should also be calibrated in decibels.

3. 1000 ohm resistor.

4. 50 ohm matching pads.

5. Connecting cables.

Connect equipment as shown in Figure 13.1. (Use counters for more accurate dial calibration as in Figure 13.2 if desired.) Set LF Receiver as per instructions in section 6.1 except connect signal generator and output meter with 1000 ohm resistor instead of antenna and ear phone. Also set bandswitch to 200 Hz and audio gain to minimum. Set generator to 2 KHz at 1.5 microvolt level by setting attenuator strip and generator level control. Center "signal center" control. Adjust TA3-03 Tuner until S meter peaks on signal. S meter should deflect at least 25% with meter switch on low signal position. If deflection is o.k., check appropriate box on test sheet. If dial is within 1/8" of

proper position also check appropriate box under "dials" on test sheet. Next, set Receiver to 100 KHz RF and 2 KHz bandwidth and audio gain for about .1 volts of noise on VTVM output meter with no input signal. Then set generator to 100 KHz RF with 1000 Hz, 30% modulation at 1.5 microvolts level allowing for pads and peak output meter response by tuning tuner. Now remove modulation from carrier and read output level. Output level should drop 10 dB or more. If so check appropriate box as o.k. Dial position should be within the limits shown on the data sheet and appropriately checked. Proceed in the same manner for all test frequencies from 100 KHz to 1600 MHz. Be sure to set proper receiver bandwidth for each RF frequency as required by specification Paragraph 3.2 and as shown on test data sheet. Also set generator level as shown on test data sheet. Fine tune control should be centered. Some signal generators above 1200 MHz have no built in AM modulation, therefore external modulation must be applied and calibrated. Another method is to cross calibrate the internal square wave on pulse modulation with the next lower signal generator having AM modulation in the RF overlap region. The factor thus found may be used to correct for square wave or pulse modulation throughout the upper band. It may be useful to display the output wave shape when using sine wave modulation to check for distortion or stray signals.
All sensitivity tests should be done in a screen room and with shielded cables to avoid stray pickup. Receiver should be in maximum IF gain condition when making these measurements.

8.2 FM QUIETING:

(Reference MIL-STD-449C, Paragraph 3.18, 5.3.2, 5.3.3, and 5.3.4)

TEST SETUP:

Same as for AM sensitivity, Paragraph 8.1 Figure 13.1. Set LF receiver controls as in Paragraph 6.1 except AM/FM switch to FM. When testing the HF receiver the AM/FM switch should be in FM and FM Wide/Nar should be in Nar position. For FM, use generator with no modulation. Start at 100 KHz, since at the 2 KHz point the FM in inoperable. Set generator at 100 KHz and tune in receiver for maximum S meter deflection. Detune signal generator and set audio gain and VTVM output meter for .1 volts of receiver noise. Set generator level at 3 microvolts allowing for pads. Then tune in signal generator for maximum drop in output meter reading. The drop in output meter reading should be 20 dB or more than the original reading. Fine readjustment of signal frequency may be necessary to peak signal quieting. Proceed in the same manner for all test point frequencies on data sheet taking note to adjust the receiver bandwidths as shown and signal generator levels as shown.

8.3 BANDSPREAD: (Fine Tune)

Data Sheet B is set up for tests that require one reading of each test in each band. It is therefore expeditious to set each tuner at the RF frequency shown on the test data sheet and then perform each test across all tuners before going to the next test. Again, specification requirements are shown.

At each test frequency using setup 13.2, measure plus and minus frequency extreme of bandspread control. Using 2 KHz IF bandwidth, set bandspread control to C. W. extreme and peak S meter by adjusting signal generator frequency. Repeat for the C. C. W. extreme and record the difference of the two frequencies. Several peaks may occur within the band pass of the IF. To avoid confusion always use lowest frequency peak. If tuning range of Fine tune control is in excess of minimum requirement, it is only necessary to check the appropriate box on data sheet.

8.4 IF REJECTION:

With tuner set at frequency shown (Sheet B), set signal generator at IF frequency shown and with level set at the DBM value shown. Allow for Pads. (-50 DBM = -30 DBM on signal generator +20 dB fixed Pad) (Use 1000 Hz AM modulation at 30%). Peak output signal by tuning generator slightly. If less than 10 dB S+N/N is shown by output meter, check appropriate box as o.k. In many cases, no output will occur indicating that the rejection level is much better than required. (The IF and Image DBM levels were calculated from the specification by changing the UV sensitivity specification level of the receiver at the RF frequency, to its equivalent in DBM and subtracting the dB rejection specification. This means that if the sensitivity is better than minimum specification and the test for rejection is made and found o.k. as indicated above, then the rejection is better than specified. If not, then an absolute reading must be taken by comparing the dB levels of the tuned RF signal and the spurious response for the same output level.)

8.5 IMAGE REJECTION:

Proceed in the same manner as taking IF rejections only use image frequencies instead of IF frequencies.

8.6 Local Oscillator Radiation:

To measure the local oscillator voltage level at the antenna terminal, connect the antenna terminal of the receiver under test to the antenna input terminal of a second receiver. Tune the second receiver to the local oscillator frequency of the first receiver. The local oscillator frequency is found by adding the RF (dial reading) to the first IF frequency. IF frequencies for the individual turners are: TO3, 455 KHz; T1/T3, 23.5 MHz; T4, 111 MHz; T5 23.5 MHz, T6/T8 111 MHz. Note the "S" meter reading of the second receiver. Then calibrate this level by substituting a signal generator for the first receiver, setting the generator frequency and level to indicate the same "S" meter reading. This level is then the voltage level of the local oscillator at the antenna terminal.

8.7 IF BANDWIDTHS:

Use test setup as per Figure 13.2. Since most counters require a high input signal level, be sure that generator frequency does not shift when increasing output to read the counter. If possible, couple counter in so as to read at all times without signal generator level changes. This is the purpose of coupling the counter in before attenuation to receiver level of signal. The A3 receiver requires measurement of bandwidth by unmodulated CW signal with S meter read out rather than modulated wave with audio readout. This is because some bandwidths are too narrow to pass the 1000 Hz modulation side bands, and the ceramic and crystal filters distort audio modulation when measuring slopes. L. F. R. Bandwidths are measured with input at 60 KHz through the T03 Tuner. The 2 KHz and 20 KHz Bandwidths of the HFR are measured at 600 KHz RF input (T1). The 90 KHz and 1 MHz bandwidths are measured at 23.5 MHz at the "Wide IF Output" Jack, with Tuner Select Switch on "Ext" position.

PROCEDURE:

Set generator to test frequency. Set receiver to test frequency. Set AGC/MAN switch to Man. AM/FM switch to AM. MAN Gain to maximum. S meter switch to Lo. Fine tune receiver to center the signal in band pass response. Set attenuators and signal generator level so that S meter reads on Red line. Proper settings should allow counter to operate at the same time. Set bandwidth switch to test BW. Increase signal level by removing 10 dB attenuation from attenuator strip. Tune generator far below center frequency then approach tuning point until S meter reads original red line point. Note counter reading. Now turn generator frequency way above counter frequency. Then slowly lower frequency until meter climbs to red line and read the counter. If difference of these two readings is within the limits shown, mark as o.k. Repeat the above procedure for all frequencies and bandwidths required.

8.8 SWEEP WIDTH:

The panadapter mode dispersion is a measure of the spectrum width visable under the test conditions in the panadapter mode. Since dispersion is basically a function of the low frequency receiver and visual display unit circuitry, it varies only slightly at different RF frequencies due to RF bandwidth limitation. RF test frequencies are chosen for ease of measurement.

TEST SETUP:

Set up panadapter mode in accordance with Paragraph 6.3 of the Operation Procedure. Set high frequency receiver to test frequency and connect the corresponding signal generator to the tuner antenna connector. Set signal generator to test frequency at 10 uv level. Set sweep width position of VDU to the 500 KHz/DIV position. Use minimum useable bandwidth of LFR and best sweep rate consistent with a visable high resolution pip on the display screen. Move PIP to extreme left side of screen by adjusting signal generator frequency and note frequency. Then move PIP to extreme right side of screen in the same manner and note frequency. The frequency difference is the total dispersion for these test conditions. If within the specified limit (Sheet C) mark as o.k. Repeat the above procedure for all sweep width positions. Note that some PIP amplitude changes may occur across the screen due to RF bandpass limitations.

Set LFR controls for T03 sweep as per Paragraph 6.4.1 and 6.4.2 and proceed to measure sweep width for T03 operation (Sheet C).

For centering check for both T03 and HFR, set signal in center at minimum sweep width. Signal should remain on screen at next to minimum Sweep Width position and within $\pm$ one screen division at all other positions. Use RF and BW positions shown on Sheet C.

8.9 SWEEP RATE

Connect Sweep out jack of S-3 to frequency counter. Set sweep width control to maximum sweep width, full CCW. Set sweep rate to full CW position (highest sweep rate). Set Sweep Vernier full CW position (highest vernier rate). Counter should read a higher frequency than the upper frequency requirement shown for that position. Upper and lower frequency requirements are shown on Sheet C of test data as calculated from time base ranges shown on S-3 monitor. These ranges indicate the minimum coverage of that particular switch position. In all cases these ranges should be exceeded. In each switch position test for meeting or exceeding upper and lower frequency requirements and check appropriate box.

8.10 S3 VERTICAL SENSITIVITY

The rest of the receiver checkout tests are taken under one set of conditions only and are go/no go type tests. They cover controls and jacks not previously used for other tests.

Set visual display unit up as per Paragraph 6.8 of the Operating Instructions. For vertical amplifier tests, set controls as per Paragraph 6.8.2, maximum vertical gain, attach signal generator to signal input jack and set for 1000 Hz CW, 50 or 600 ohm impedance or less. Adjust level of generator until one large division of vertical deflection is displayed. Signal generator level should be less than 1 millivolts. Check item off if o.k.

8.11 SIGNAL GAIN CONTROL

Next, adjust signal gain control to minimum and reset signal generator level for one division of vertical deflection. The differential between the first and second signal generator level reading. should be 50 dB or greater. Check item off if o.k.

8.12 VIDEO BANDWIDTH

With same set up as above, set vertical gain control to maximum. Set generator to 1000 Hz and level to produce two main vertical divisions deflection on screen. Then increase generator level by 3 dB and adjust frequency to 1 Hz. Original or greater deflection should be observed. At same generator level (3 dB above 1000 Hz setting) move frequency to 1.8 MHz. Deflection should be greater or the same as at 1000 Hz.

8.13 Z AXIS SENSITIVITY

For Z axis sensitivity, set intensity control halfway between maximum bright and cutoff. Then insert a 1000 Hz square wave signal into Z axis jack and adjust signal generator level until full brightness and cutoff occurs. Peak to peak voltage of square wave required as Z axis sensitivity should be 40 volts P. P. or less.

8.14 BRIGHTNESS CONTROL

Brightness control should provide full beam cut off at full CCW.

8.15 FOCUS CONTROL

With sweep rate switch in "0" position, focus control should adjust focus of dot to blurred image on both sides of sharp focus.

8.16 SWEEP CENTERING CONTROL

Sweep Centering Control should adjust base line to either side of center.

8.17 SIGNAL CENTERING CONTROL

In "amp" position of Amp/PAN Switch signal centering control should adjust base line from center screen vertically to bottom graticule base line or more.

8.18 SYNC CONTROL

With S3 controls set for vertical amplifier use and sync switch in internal position, and sync control center position, insert 1000 Hz sine wave in signal in jack. Adjust signal input level and sweep rate so that sine wave display is slightly out of synchronization. Now adjust sync control until sine wave is synchronized on screen.

8.19 EXTERNAL SYNC JACK

Now switch "INT/EXT SYNC" switch to ext. Sine wave should now be out of sync. until external sync signal is applied by connecting the signal input and the external sync jacks together with the signal generator. A higher level of generator output may be required to operate the external sync.

8.20 SWEEP GAIN CONTROL:

Sweep gain control should adjust the base line length to less than or more than 10 divisions.

8.21 LFR HI-LOW METER SWITCH

With LFR set for T03 receiver operation, 10 KHz BW, insert 100 KHz signal in T03 antenna and tune and level with generator for full deflection of S meter with S meter switch in LOW position. Then switch meter to Hi position. Meter reading should drop to approximately 2.

8.22 LFR IF GAIN CONTROL

With same set up as 8.21, and AGC/Man switch set in manual position, manual gain maximum, set signal generator level for full meter deflection with meter switch in Hi position. Now turn IF gain control to minimum position and S meter should read at or near zero in lo meter switch position.

8.23 LFR AGC TEST JACK

With same set up as above set AGC/Man switch in AGC position and attach high impedance V. T. V. M. between AGC test jack and ground. With no signal input to tuner DC voltmeter should read between +4.2 and +5.2 volts. With .1 volt level signal input DC voltmeter should read less than 3.0 volts.

8.24 LFR DETECT OUT JACK

With same test set up as above, insert 10 uv, 1000 Hz 30% AM modulation at 100 KHz RF to T03 antenna with receiver in AM, 10 KHz bandwidth position. Attach an oscilloscope vertical input to the Detect out jack. The 1000 Hz modulation wave should appear on scope.

8.25 LFR AUDIO OUTPUT

With same setting as above, measure audio output voltage at audio output jack with AF gain maximum. 5 uv input 1000 Hz, 30% modulated AM, should produce a minimum 2.5 volts out across a 1000 ohm resistor, with manual IF gain set for 8 on S meter low switch position.

8.26 LFR IF OUT JACK

Switch LFR controls to NO SWP and CONV. Attach signal generator at converter input and set to 23.5 MHz, no modulation and 30 uv signal level. Attach oscilloscope to IF output jack. A 455 MHz (approximately) signal should appear on oscilloscope.

8.27 LFR BFO TEST

With same set up as above (100 KHz RF, No modulation, 10 uv level input 10 KHz BW) and with earphones attached, turn BFO on. Beat frequency tone should be heard and be able to be reduced to zero beat with BFO control on RF tuning.

8.28 HFR HI-LOW METER SWITCH

Proceed in the same manner as 8.21 for the HFR Meter Switch test, only use 100 MHz input (T5) and 90 KHz in this and the following HFR tests.

8.29 HFR IF GAIN CONTROL

Proceed with same test as was done on LFR Paragraph 8.22.

8.30 HFR AGC TEST JACK

Proceed with same test as was done on LFR, Paragraph 8.23.

8.31 HFR DETECT OUTPUT AND SWP JACK

Connect cables and adjust switches and controls for tuner sweep mode as per Paragraph 6.4.4 and 6.4.5 of the operating instructions. Set sweep width switch of S-3 to maximum setting. Set HFR IF BW to 90 KHz and AM/FM switch to AM. Check tuner sweep operation by locating signal response of signal generator (attached to T5 input and set at 100 MHz approximately. No modulation, 10 uv input level at center of screen. Signal response curve should occupy less than 2 divisions of the base line.

8.32 HFR AUDIO OUTPUT

Proceed with same test as was done on LFR, Paragraph 8.25.

8.33 HFR BFO TEST

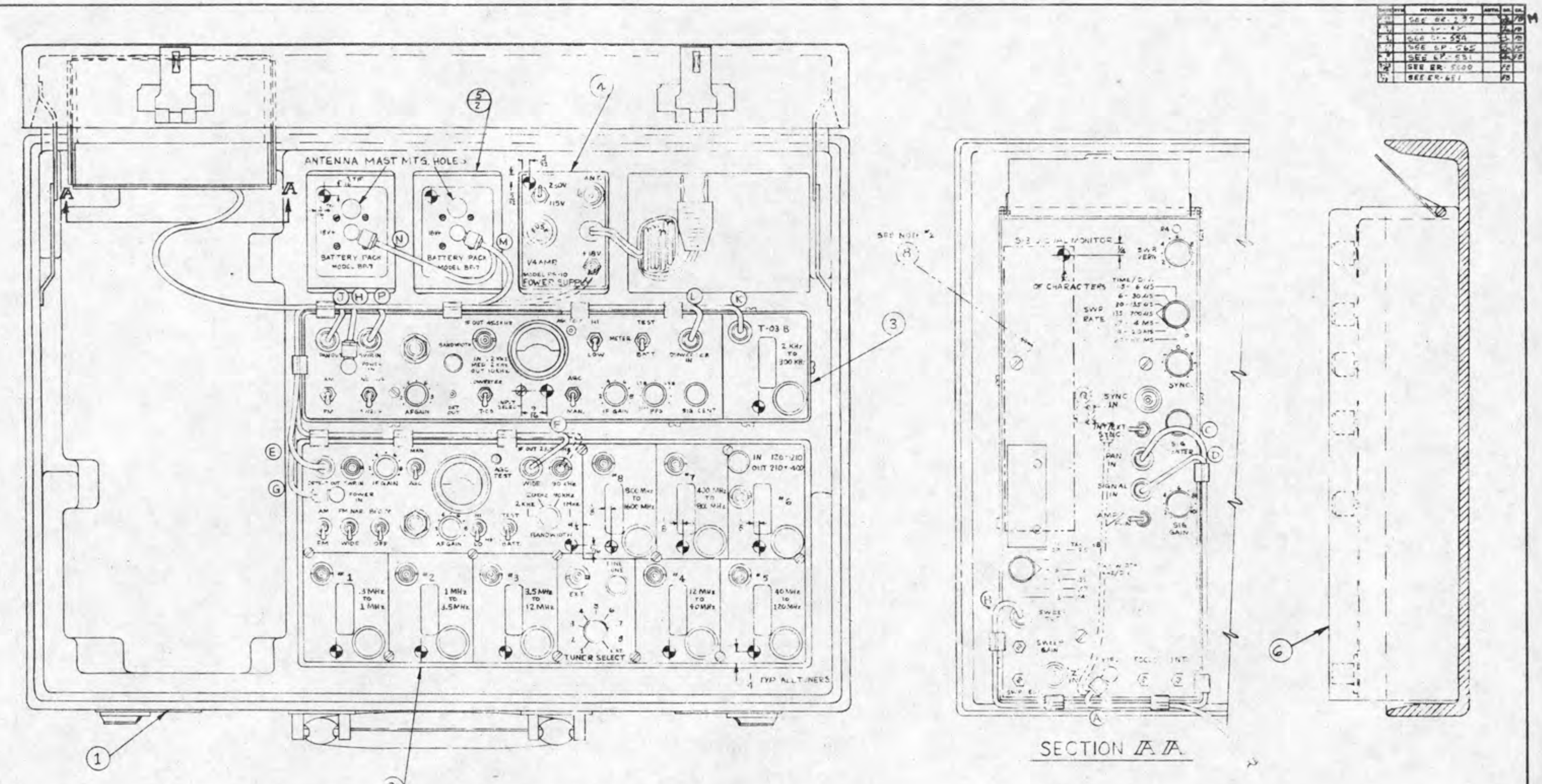
Proceed with same test as was done on LFR, Paragraph 8.27.

8.34 BP7 BATTERY PACK TEST

Connect one battery pack at a time to receiver system with all circuits on and press momentary battery test switch on either HFR or LFR. Meter should read red line or above if batteries are fresh. Then connect both packs and repeat test to check interconnecting cable terminals.

8.35 ACCESSORY CHECK

Check accessories for complete list and condition.



CIR NO.	NO. REQ'D	PART NO.	PART NAME	
9	1	30740-A	ACCESSORY KIT AC-5	WITH TV-1 ADAPTER
8	1	30350-C	TV-1 ADAPTER ASSY.	SEE NOTE 2
7	1	30730-A	ACCESSORY KIT AC-5	WITHOUT TV-1 ADAP.
6	1	30300-C	MONITOR ASSY (S-3)	
5	2	30460-C	BATTERY PACK BP-7 ASSY	
4	1	30410-D	POWER SUPPLY PS-10	
3	1	30200-D	LOW FREQ. REC. ASSY.	
2	1	30100-D	HIGH FREQ. REC. ASSY.	
1	1	30787-D	ATTACHE' CASE ASSY.	

THIS PARTS LIST DOES NOT APPLY IF M.W.T. IS REQ'D. SEE SHEET Nº 2 FOR USAGE F.S. M.W.T.

THIS DWG. USED ON SER Nº 102 & UP

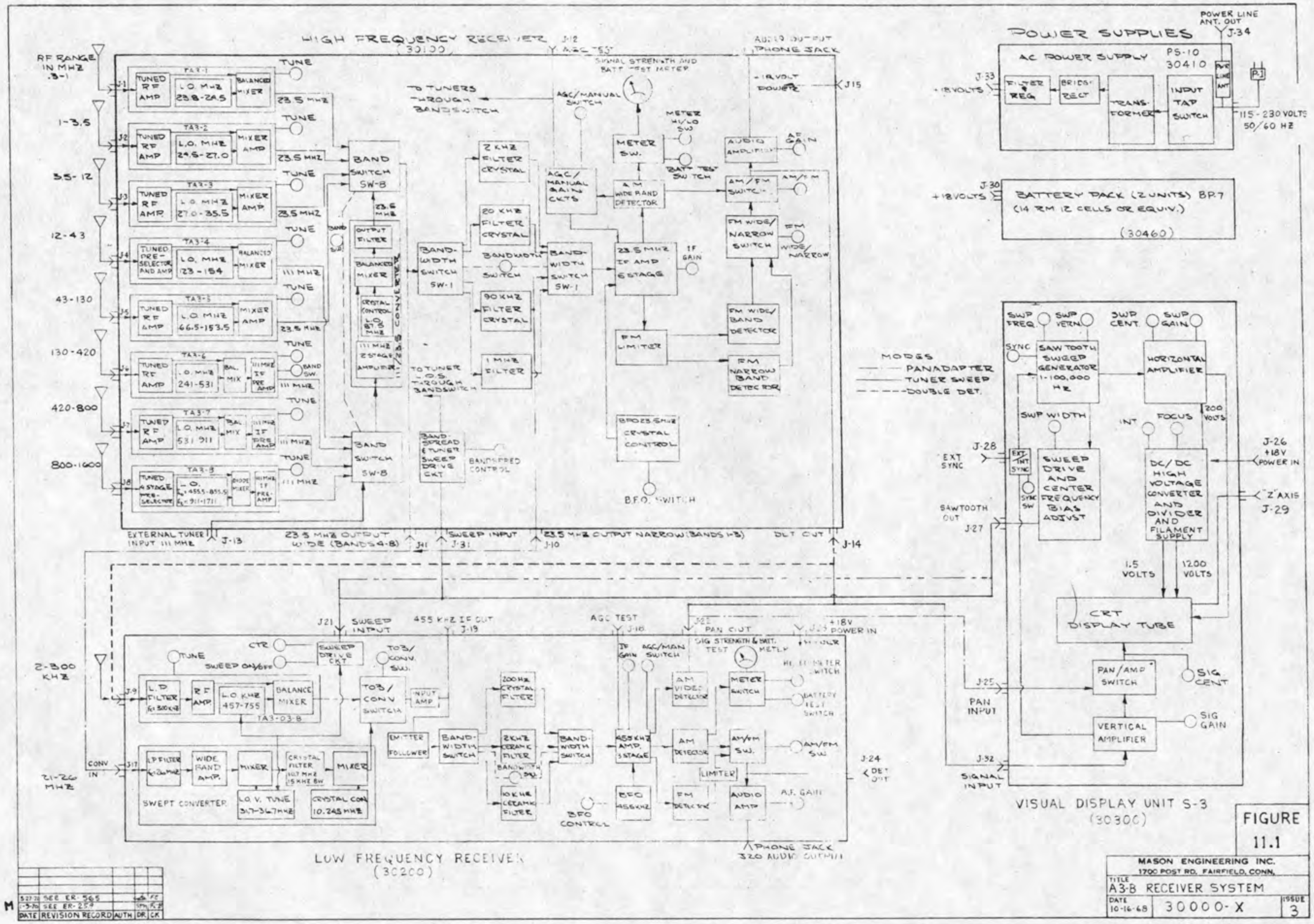
NOTES

1. INDICATES SERIAL NUMBER
2. PART TV-1 AS INDICATED OPTIONAL TV-1 ADAPTER ASSY. & SWEEP CABLE

SHEET Nº 1 OF 2 SHEETS. SHEET Nº 2 IS USED ONLY WHEN M.W.T. IS REQ'D

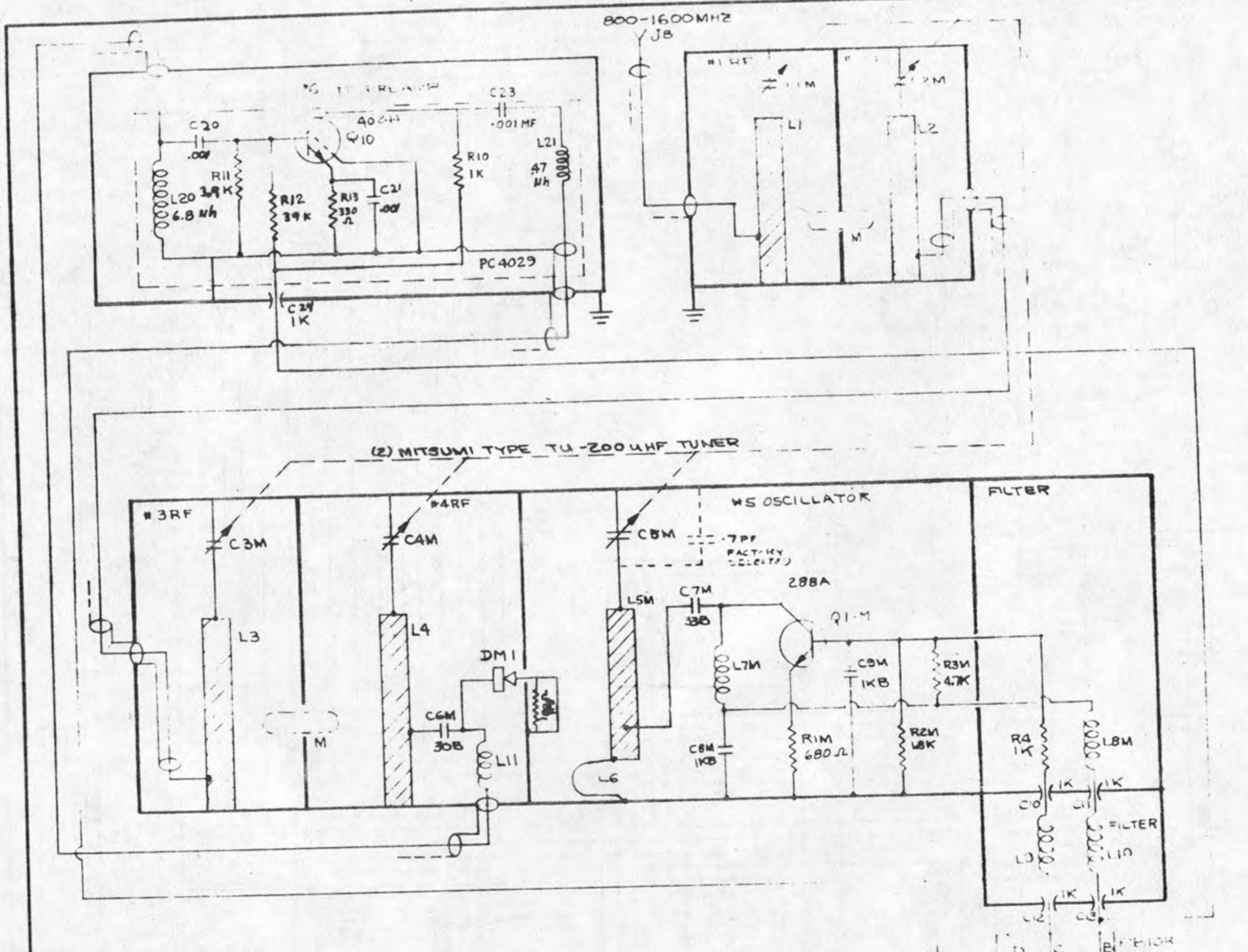
FIGURE 10.1

NELSON ENGINEERING, INC.
SCALE: FULL
DRAWN BY: S.P.M.
TITLE: MASTER REF. DRAWING
DATE: 11-24-61
DRAWING NUMBER: MRD-30000-D
ISSUE: E



HIGH FREQUENCY RECEIVER
(30100)
RF RANGE IN MHZ
.3-1
1-3.5
3.5-12
12-43
43-130
130-420
420-800
800-1600
TUNED RF AMP
L.O. MHZ 23.8-24.5
BALANCED MIXER
L.O. MHZ 24.5-27.0
L.O. MHZ 27.0-35.5
MIXER AMP
L.O. MHZ 23-154
L.O. MHZ 66.5-153.5
241-531
531-911
23.5 MHZ
111 MHZ
TUNE
BAND SWITCH SW-8
BAND-WIDTH SWITCH SW-1
2 KHZ FILTER CRYSTAL
20 KHZ FILTER CRYSTAL
90 KHZ FILTER CRYSTAL
1 MHZ FILTER
AGC/MANUAL GAIN CKTS
AM WIDE BAND DETECTOR
METER SW.
23.5 MHZ IF AMP 6 STAGE
IF GAIN
FM LIMITER
FM WIDE/NARROW SWITCH
FM WIDE BAND DETECTOR
FM NARROW BAND DETECTOR
AM/FM SWITCH
AUDIO AMPLIFIER
AF GAIN
AUDIO OUTPUT PHONE JACK
B.F.O. SWITCH
TO TUNERS THROUGH BANDSWITCH
EXTERNAL TUNER INPUT 111 MHZ
23.5 MHZ OUTPUT WIDE (BANDS 4-8)
SWEEP INPUT
23.5 MHZ OUTPUT NARROW (BANDS 1-3)
DET OUT
MODES
PANADAPTER
TUNER SWEEP
DOUBLE DET.
POWER SUPPLIES
AC POWER SUPPLY
PS-10 30410
FILTER REG.
BRIDGE RECT
TRANS-FORMER
INPUT TAP SWITCH
115-230 VOLTS 50/60 HZ
+18 VOLTS
BATTERY PACK (2 UNITS) BR7
(14 RM 12 CELLS OR EQUIV.)
(30460)
SWP FREQ.
SWP VERN.
SWP CENT.
SWP GAIN
SAW TOOTH SWEEP GENERATOR 1-100,000 HZ
HORIZONTAL AMPLIFIER
SWP WIDTH
FOCUS
SWEEP DRIVE AND CENTER FREQUENCY BIAS ADJUST
DC/DC HIGH VOLTAGE CONVERTER AND DIVIDER AND FILAMENT SUPPLY
1.5 VOLTS
1200 VOLTS
CRT DISPLAY TUBE
PAN/AMP SWITCH
VERTICAL AMPLIFIER
SIG CENT
SIG GAIN
EXT SYNC
SAWTOOTH OUT
PAN INPUT
SIGNAL INPUT
"Z" AXIS
VISUAL DISPLAY UNIT S-3
(30300)
LOW FREQUENCY RECEIVER
(30200)
2-300 KHZ
21-26 MHZ
CONV IN
L.P. FILTER
RF AMP
L.O. KHZ 457-755
BALANCE MIXER
SWEEP DRIVE CKT
TO3/CONV SWITCH
WIDE BAND AMP.
SWEPT CONVERTER
CRYSTAL CON 10.245 MHZ
EMITTER FOLLOWER
200 KHZ CRYSTAL FILTER
2 KHZ CERAMIC FILTER
10 KHZ CERAMIC FILTER
455 KHZ AMP. 5 STAGE
BFO 455KHZ
BFO CONTROL
AM DETECTOR
FM DETECTOR
AUDIO AMP
A.F. GAIN
PHONE JACK 320 AUDIO OUTPUT
SWEEP INPUT
455 KHZ IF OUT
AGC TEST
PAN OUT
+18V POWER IN
MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.
TITLE A3-B RECEIVER SYSTEM
DATE 10-16-68
30000-X
ISSUE 3
DATE REVISION RECORD AUTH DR. CK
SEE ER-565
SEE ER-257

FIGURE 11.1



FREQUENCIES
RF- 800-1600 MHZ
OSC F0 455-855 MHZ
OSC F2 911-1711 MHZ
IF 111 MHZ

NOTE ÷
1. "M" SUFFIX INDICATES SUPPLIED WITH MITSUMI TUNER
2. "B" SUFFIX INDICATES BUTTON TYPE LEADLESS CAPACITOR
3. SEE TUNER ASS'Y 30155-D FOR DETAIL

REVISION RECORD	
ER 108	
SEE ER 246	
SEE ER 252	
SEE ER 293	

FIGURE 11.10

MASON ENGINEERING INC
FAIRFIELD, CONN.

WIRING DIAGRAM

ISSUE 5

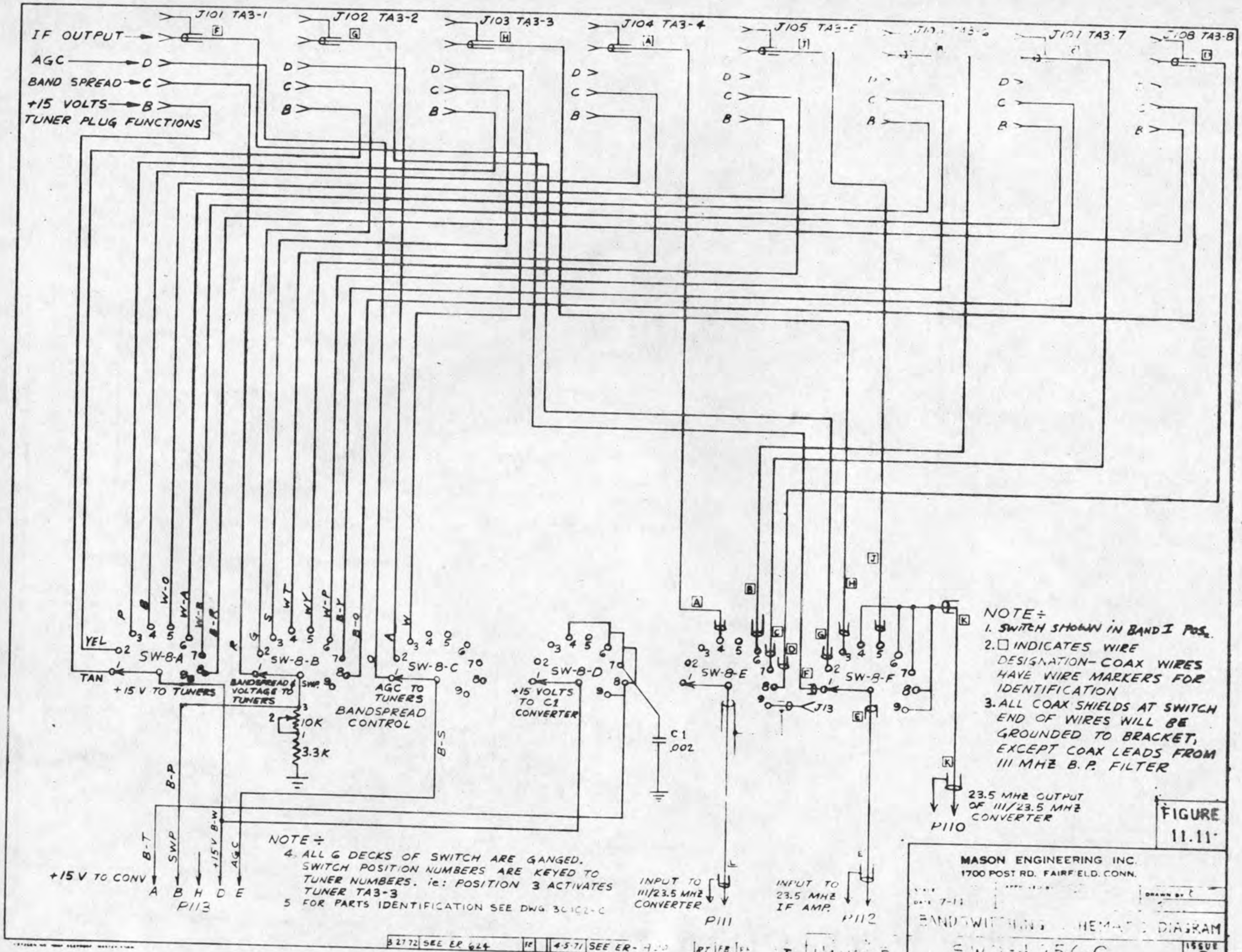

J101 TA3-1
J102 TA3-2
J103 TA3-3
J104 TA3-4
J105 TA3-5
J107 TA3-7
J108 TA3-8
IF OUTPUT
AGC
BAND SPREAD
+15 VOLTS
TUNER PLUG FUNCTIONS
SW-8-A
SW-8-B
SW-8-C
SW-8-D
SW-8-E
SW-8-F
YEL
TAN
+15 V TO TUNERS
BANDSPREAD VOLTAGE TO TUNERS
SWP
AGC TO TUNERS
BANDSPREAD CONTROL
10K
3.3K
+15 VOLTS TO C1 CONVERTER
C1 .002
J13
B-S
B-P
B-T
+15 V B-W
+15 V TO CONV
P113
INPUT TO 111/23.5 MHZ CONVERTER
P111
INPUT TO 23.5 MHZ IF AMP.
P112
23.5 MHZ OUTPUT OF 111/23.5 MHZ CONVERTER
P110
NOTE ÷
1. SWITCH SHOWN IN BAND I POS.
2. □ INDICATES WIRE DESIGNATION- COAX WIRES HAVE WIRE MARKERS FOR IDENTIFICATION
3. ALL COAX SHIELDS AT SWITCH END OF WIRES WILL BE GROUNDED TO BRACKET, EXCEPT COAX LEADS FROM 111 MHZ B.P. FILTER
NOTE ÷
4. ALL 6 DECKS OF SWITCH ARE GANGED. SWITCH POSITION NUMBERS ARE KEYED TO TUNER NUMBERS. ie: POSITION 3 ACTIVATES TUNER TA3-3
5 FOR PARTS IDENTIFICATION SEE DWG 30102-C
MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.
SEE ER 624
4-5-71
SEE ER-
ISSUE
3

FIGURE 11.11

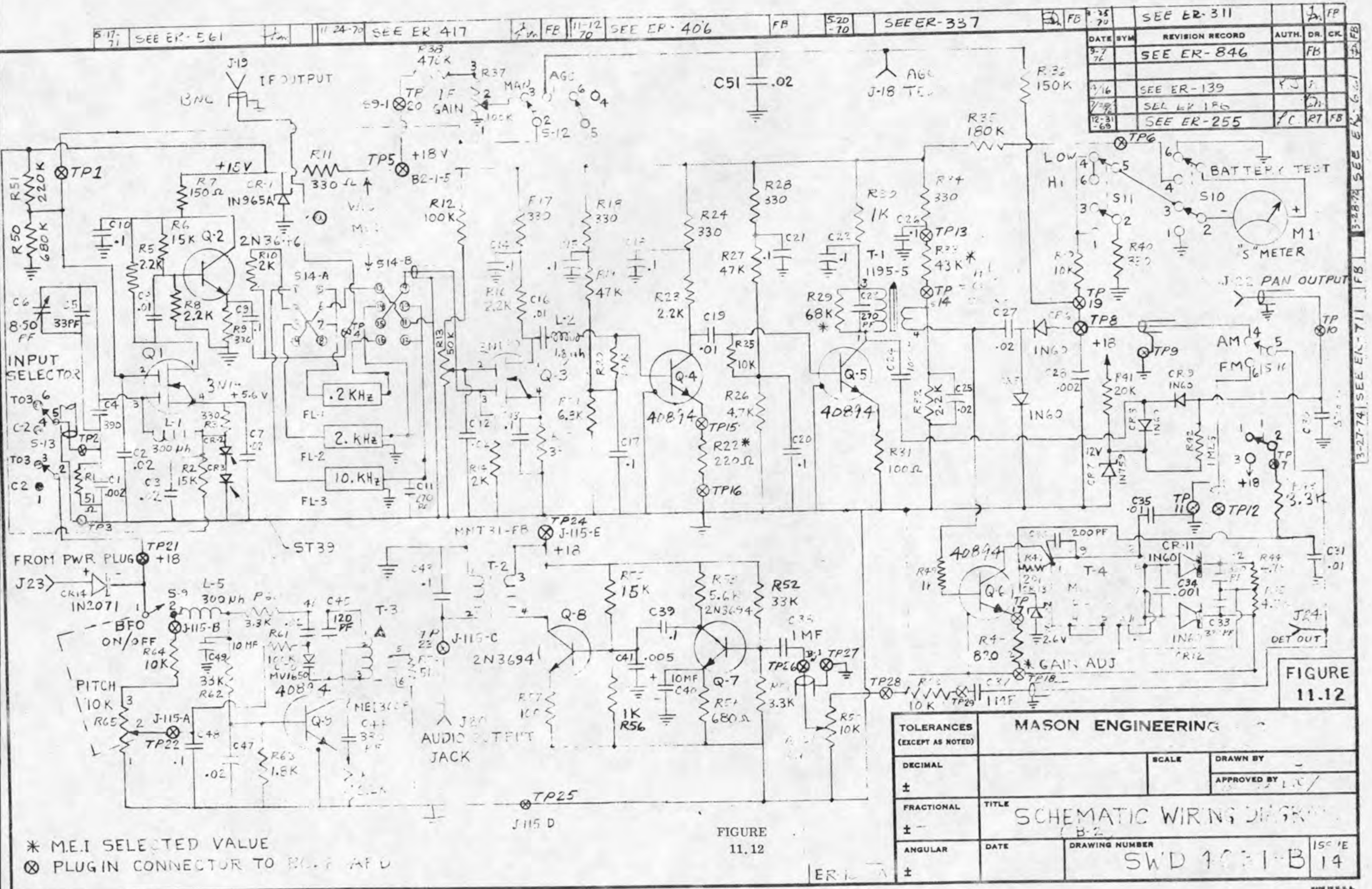

SEE ER-561
SEE ER 417
SEE ER-406
SEE ER-337
SEE ER-311
DATE
SYM
REVISION RECORD
AUTH.
DR.
CK.
SEE ER-846
SEE ER-139
SEE ER-255
SEE EK-711
IF OUTPUT
BNC
IF GAIN
C51 .02
R36 150K
R35 180K
LOW
HI
S11
S10
BATTERY TEST
"S" METER
M1
PAN OUTPUT
AM
FM
INPUT SELECTOR
FL-1
FL-2
FL-3
.2 KHz
2. KHz
10. KHz
Q-2
2N3646
IN965A
Q-4
Q-5
40894
T-1
1195-5
Q-6
T-4
GAIN ADJ
DET OUT
FROM PWR PLUG
J23
IN2071
BFO ON/OFF
PITCH
L-5
300 μh
T-3
T-2
Q-8
2N3694
Q-7
AUDIO OUTPUT JACK
ST39
* M.E.I SELECTED VALUE
⊗ PLUGIN CONNECTOR TO
TOLERANCES (EXCEPT AS NOTED)
DECIMAL
FRACTIONAL
ANGULAR
MASON ENGINEERING
SCALE
DRAWN BY
APPROVED BY
TITLE
SCHEMATIC WIRING DIAGRAM
DATE
DRAWING NUMBER
ISSUE
14

FIGURE 11.12

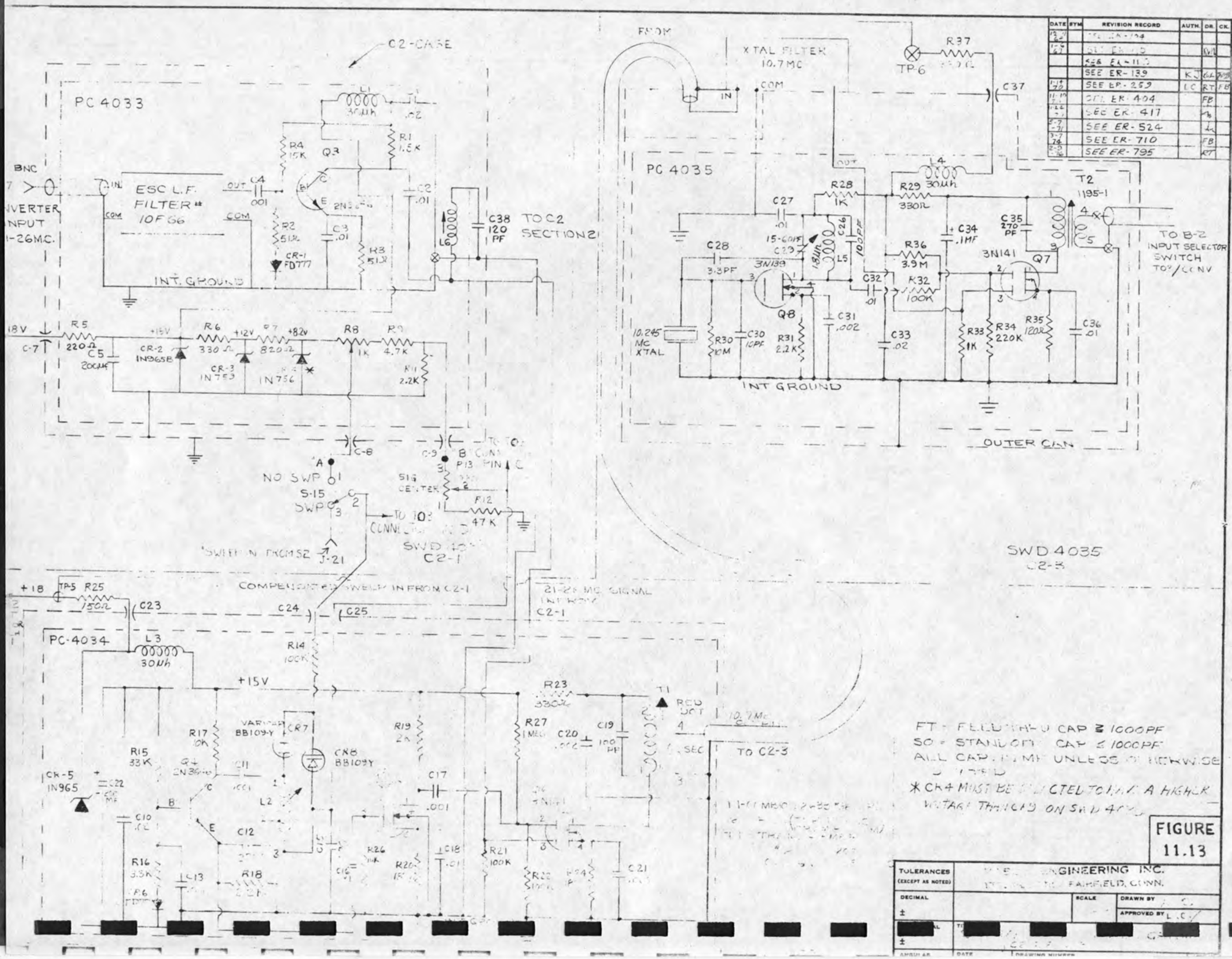
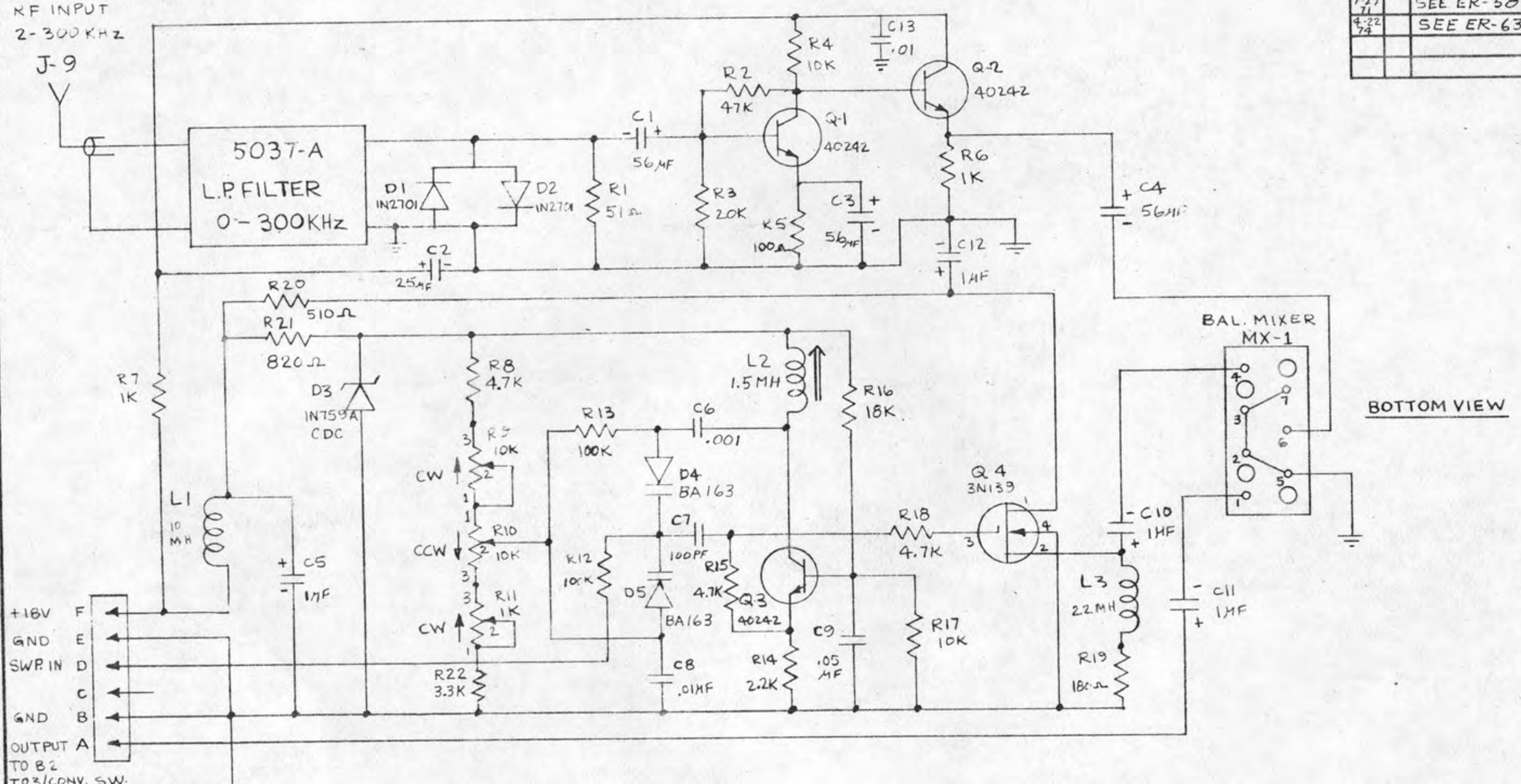

PC 4033
C2-CASE
BNC
INVERTER INPUT
21-26MC.
ESC L.F. FILTER # 10F66
INT. GROUND
PC 4035
XTAL FILTER 10.7MC
FROM
TP-6
INT GROUND
OUTER CAN
TO B-2 INPUT SELECTOR SWITCH
TO C2 SECTION 2
NO SWP
S-15
SWP
SIG CENTER
SWD 4035 C2-3
PC-4034
+15V
+18
COMPENSATED SWEEP IN FROM C2-1
TO C2-3
10.245 MC XTAL
FT = FEEDTHRU CAP ≥ 1000PF
SO = STANDOFF CAP ≤ 1000PF
ALL CAP. IN MF UNLESS OTHERWISE
* CR4 MUST BE SELECTED TO HAVE A HIGHER
REVISION RECORD
SEE ER-139
SEE ER-259
SEE ER-404
SEE ER-417
SEE ER-524
SEE ER-710
SEE ER-795
TOLERANCES (EXCEPT AS NOTED)
DECIMAL
ANGULAR
SCALE
DRAWN BY
APPROVED BY
DATE
DRAWING NUMBER
ENGINEERING INC.
FAIRFIELD, CONN.

FIGURE 11.13

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
4-14-71		SEE ER-489		FB	
7-27-71		SEE ER-589		FB	
4-22-74		SEE ER-638		FB	

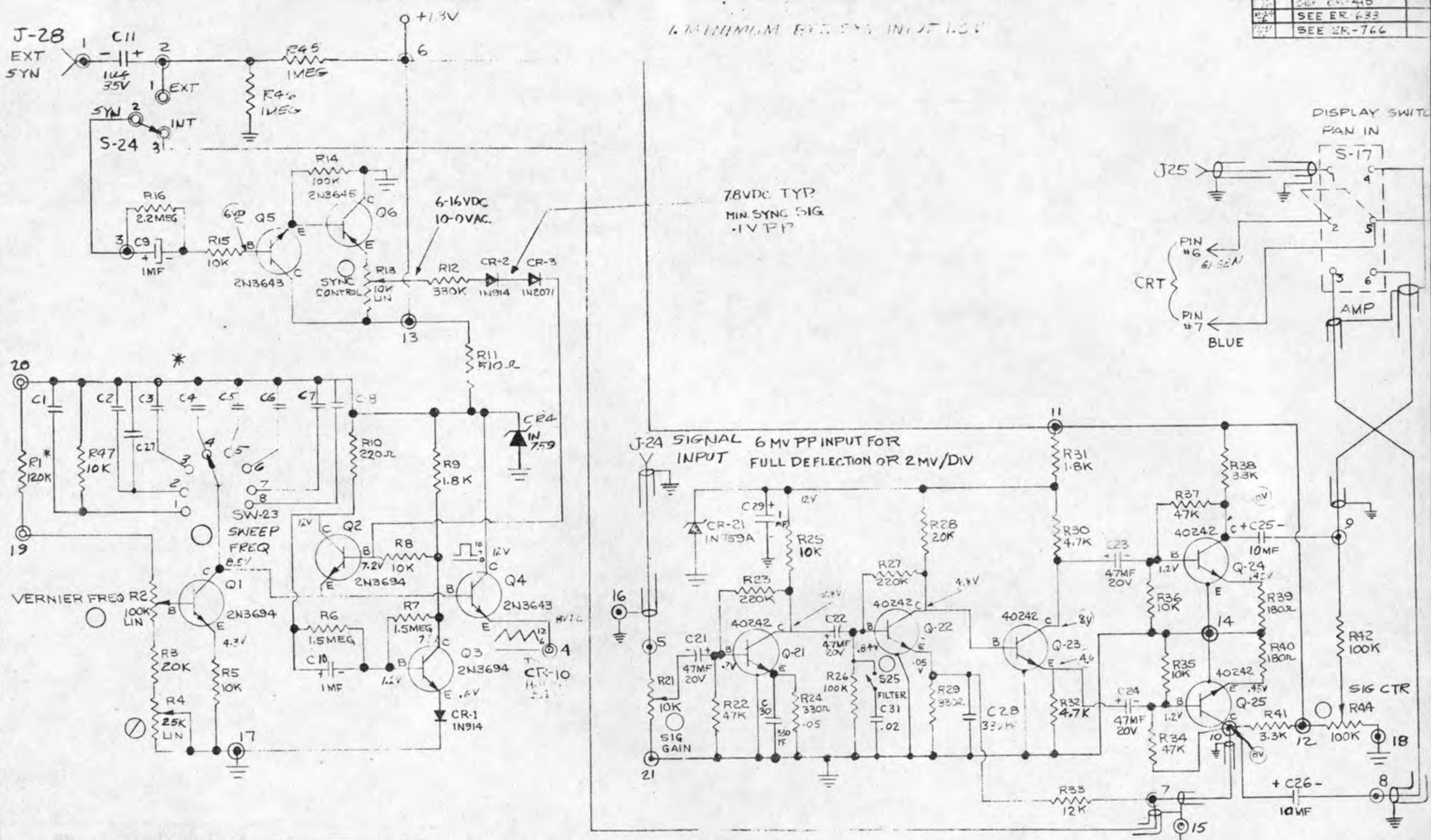


NOTE:
1. OSC. FREQ. 457-755 KHz

FIGURE 11.14

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
DECIMAL ±		SCALE ~	DRAWN BY SPM / APPROVED BY
FRACTIONAL ±	TITLE SCHEMATIC WIRING DIAGRAM TA3-03B		
ANGULAR ±	DATE 1-21-71	DRAWING NUMBER SWD-4073-B	ISSUE 4

ER-100-W



* "C" VALUES	PERIOD TIME/DIV	SWEEP FREQ
C1 10MF	MANUAL	
C27 10MF, C2 10MF	20 – 100 MS	5 – 1 Hz
C3 3.3MF	4 – 20 MS	25 – 5 Hz
C4 .67MF	.7 – 4 MS	143 – 25 Hz
C5 .12MF	135 – 700 µS	740 – 143 Hz
C6 .022 MF	30 – 135 µS	3.3 – .74 KHz
C7 4700 MMF	6 – 30 µS	16.6 – 3.3 KHz
C8 1000 MMF	1.5 – 6 µS	66 – 16.6 KHz

◉ TERMINAL ON CIRCUIT BD. (COPPER SIDE)

○ EXTERNAL CONTROL

⊘ SCREWDRIVER ADJ.

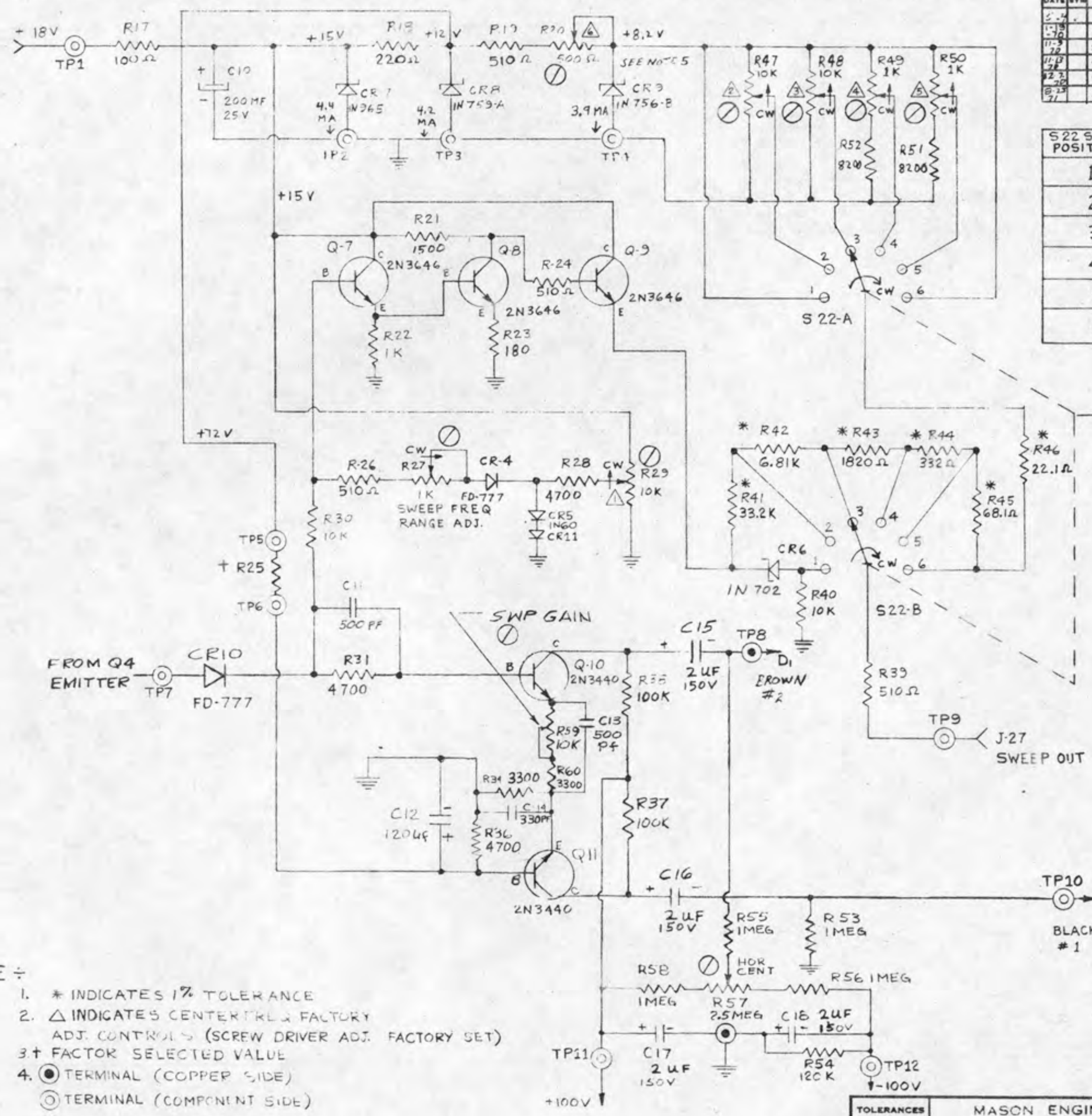
◎ TERMINAL ON CIRCUIT BD. (COMPONENT SIDE)

✱ FACTORY ADJUSTED, VALUE MAY BE DIFFERENT FOR EACH UNIT

ER-100-A

TOLERANCES (EXCEPT AS NOTED)			
DECIMAL ±		SCALE —	DRAWN BY
FRACTIONAL ±	TITLE SCHEMATIC WIRING DIAGR. VERTICAL AMP S-3		APPROVED BY
ANGULAR ±	DATE 11-12-68	DRAWING NUMBER SWD-4038-C	

SWEEP WIDTH ALIGNMENT PROCEDURE	
S22 SWITCH POSITION	
1	ADJUST R27 FOR 5MHz SWEEP WIDTH
	ADJUST R29 FOR CENTERING
6	ADJUST R20 FOR 3KHz CENTERING
	REPEAT ABOVE 2 STEPS UNTIL WIDTH AND CENTERING ARE CORRECT
2	ADJUST R47 FOR 1.2MHz CENTERING
3	ADJUST R49 FOR 300KHz CENTERING
4	ADJUST R49 FOR 60KHz CENTERING
5	ADJUST R50 FOR 10 KHz CENTERING



NOTE ÷
1. * INDICATES 1% TOLERANCE
2. △ INDICATES CENTER FREQ FACTORY ADJ. CONTROLS (SCREW DRIVER ADJ. FACTORY SET)
3. + FACTOR SELECTED VALUE
4. ◉ TERMINAL (COPPER SIDE)
   ◎ TERMINAL (COMPONENT SIDE)
   ○ EXTERNAL CONTROL
   ⊘ SCREW DRIVER ADJUSTED CONTROL
5. CR3 MUST HAVE A LOWER VOLTAGE THAN CR4 ON PWD 4033-C

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
5-4-		SEE ER 162			
11-19-70		SEE ER-262		RT	FB
11-8-72		SEE ER-40-		FB	
11-8-72		SEE ER-400		FB	
12-3-73		SEE ER-423			FB
8-25-81		SEE ER-593		FB	

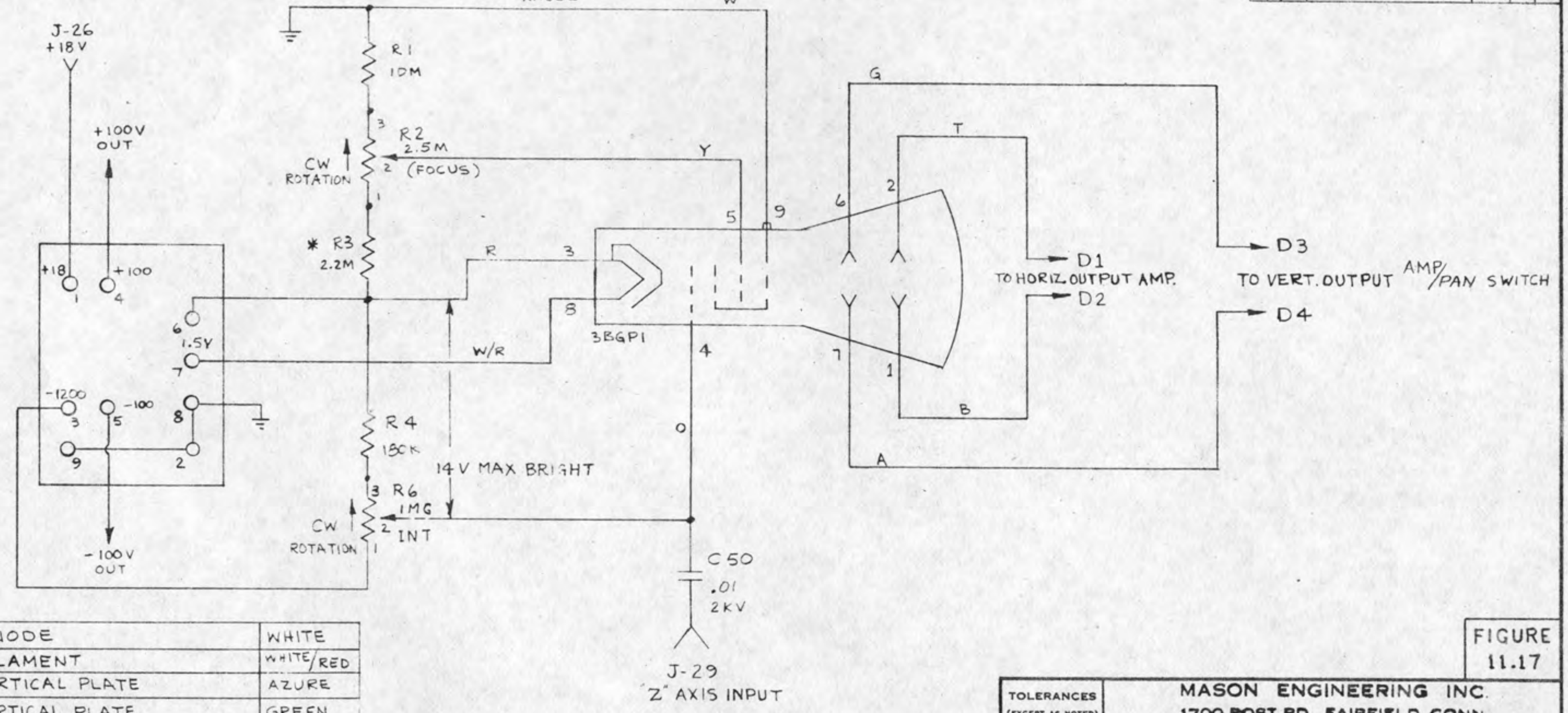
S22 SWITCH POSITION	SWEEP WIDTH
1	5 MHz
2	1.2 MHz
3	300 KHz
4	60 KHz
5	10 KHz
6	3 KHz

FIGURE 11.16

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.	
DECIMAL ±	SCALE	DRAWN BY FPB 2/PM
		APPROVED BY KWT
FRACTIONAL ±	TITLE SCHEMATIC WIRING DIAGRAM SWEEP OUTPUT & HORIZONTAL AMP. (S-	
ANGULAR ±	DATE 10-22-68	DRAWING NUMBER SWD-4039-C

ER-100-A

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
[illegible]		SEE ER-120	KJ		
5-16-68		SEE ER-151	KL.		
12-16-69		SEE ER-251		RT	FB
1-19-70		SEE ER-262		[illegible]	FB
3-25-71		SEE EK 489		[illegible]	FB
11-11-71		SEE ER-726		FB	



NO.	FUNCTION (CRT)	COLOR
9	ANODE	WHITE
8	FILAMENT	WHITE/RED
7	VERTICAL PLATE	AZURE
6	VERTICAL PLATE	GREEN
5	GRID (FOCUS)	YELLOW
4	GRID (INTENSITY)	ORANGE
3	CATHODE & FILAMENT	RED
2	HORIZONTAL PLATE	TAN
1	HORIZONTAL PLATE	BLACK

NOTE:

1. FOR PARTS LIST SEE DWG. 30310-D
2. "*" FACTOR ADJUST FOR FOCUS

ER-100-A

FIGURE 11.17

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
DECIMAL ± ~	SCALE ~	DRAWN BY S.P.M.	APPROVED BY [illegible]
FRACTIONAL ± ~	TITLE H.V. DIVIDER & VERT. POS. SCHEMATIC		
ANGULAR ± ~	DATE 7-1-68	DRAWING NUMBER SWD-4042-B	ISSUE 7

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
12-29-75		SEE ER-771		RT	

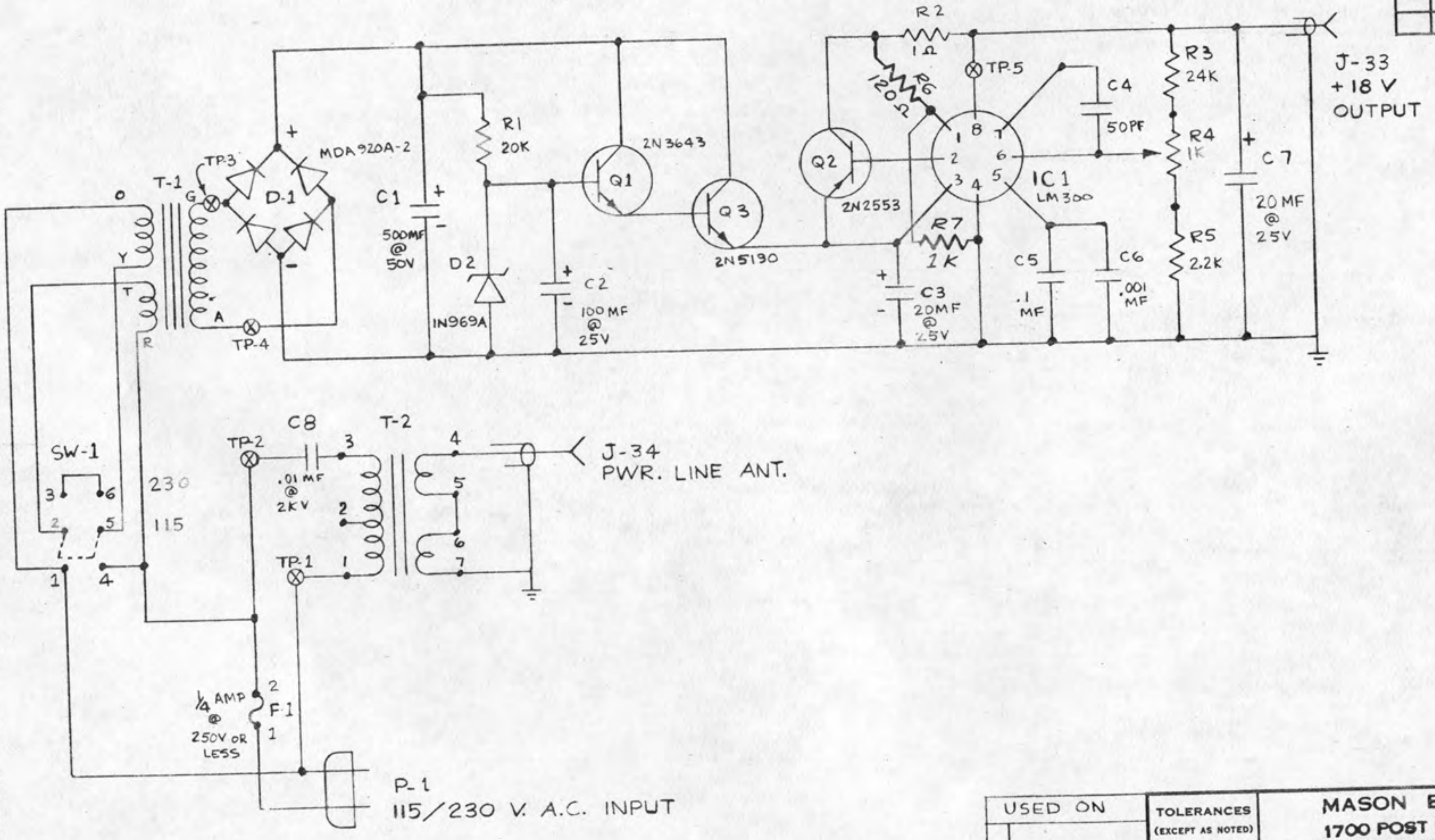


FIGURE 11.18

ER-100-X

USED ON	TOLERANCES (EXCEPT AS NOTED)	
	DECIMAL ±	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.
		SCALE · DRAWN BY S.P.M. · APPROVED BY F.L.B.
	FRACTIONAL ±	TITLE: SCHEMATIC WIRING DIAG. PS-10
	ANGULAR ±	DATE: 3-5-71 · DRAWING NUMBER: SWD-4074-B · ISSUE: 2

K+E ALBANENE® 10 5465 ENGINEERS' STANDARD FORM

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
11-9-74		SEE ER-726		FB	
12-23-75		SEE ER-770		RT	

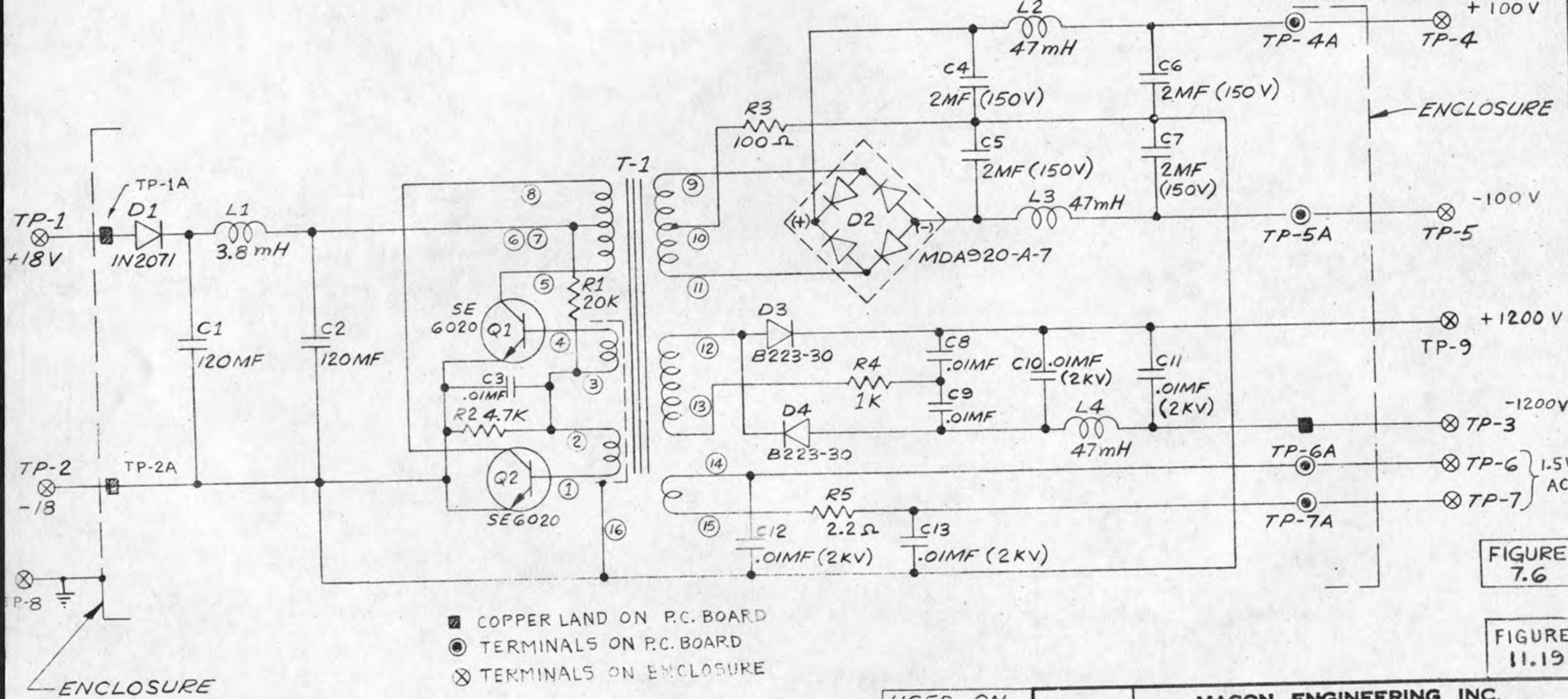
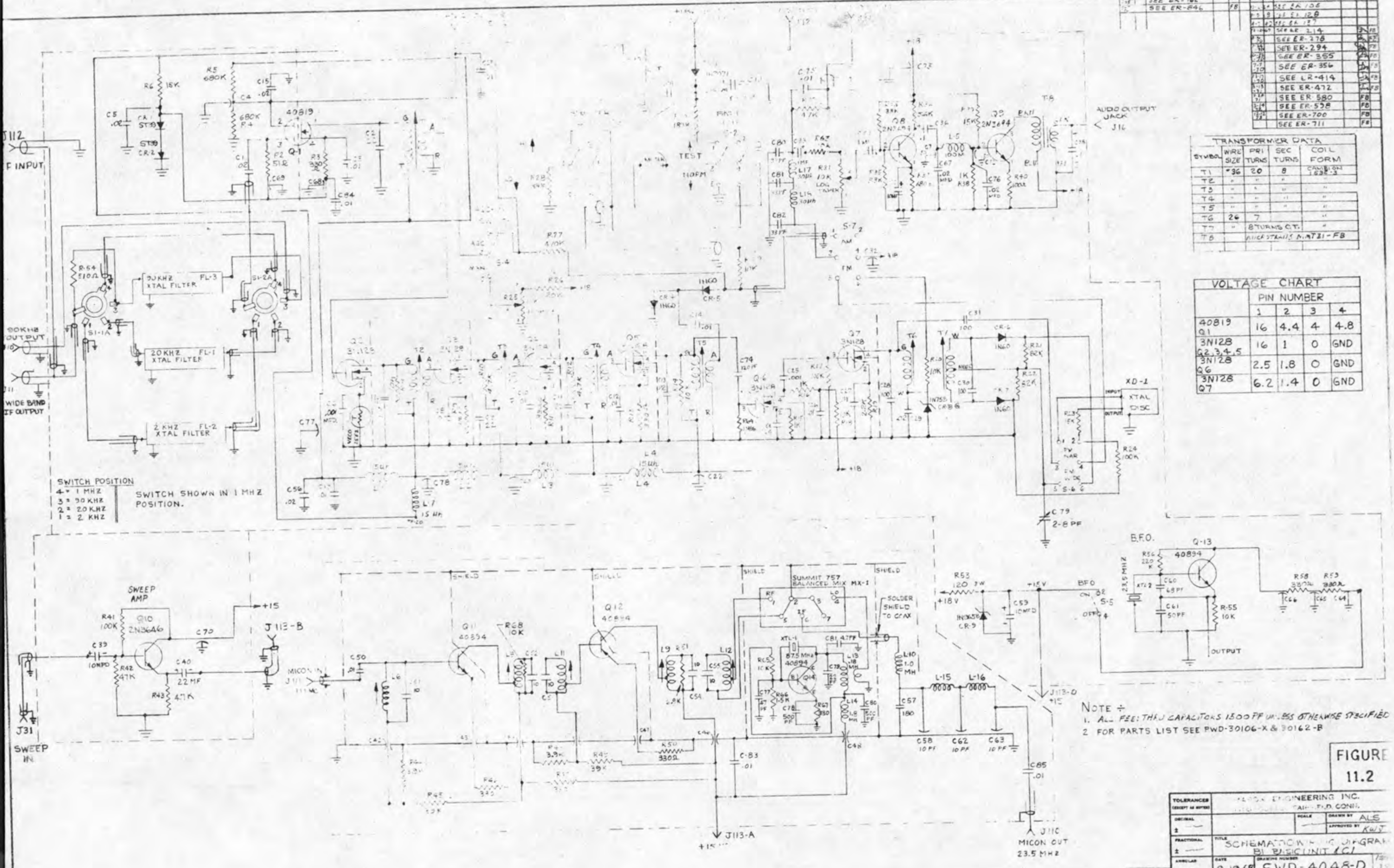


FIGURE 7.6

FIGURE 11.19

USED ON	TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
	DECIMAL ±		SCALE ~	DRAWN BY RHT; APPROVED BY [illegible]
	FRACTIONAL ±	TITLE SCHEMATIC WIRING DIAG., H.V. CONVERTER		
ER-100-Y	ANGULAR ±	DATE 3-16-71	DRAWING NUMBER SWD-4077-B	ISSUE 3

ALBANENE ® 10 5466 ENGINEERS' STANDARD FORM



SEE ER-76E
SEE ER-846
SEE ER 106
SEE ER 128
SEE ER 187
SEE ER 214
SEE ER-278
SEE ER-294
SEE ER-355
SEE ER-356
SEE ER-414
SEE ER-472
SEE ER 580
SEE ER-538
SEE ER-700
SEE ER-711

TRANSFORMER DATA

SYMBOL	WIRE SIZE	PRI TURNS	SEC TURNS	COIL FORM
T1	#36	20	8	CAMBION 1538-3
T2	"	"	"	"
T3	"	"	"	"
T4	"	"	"	"
T5	"	"	"	"
T6	26	7		"
T7	"	8 TURNS C.T.		"
T8		MICROTRAN N.MT31-FB		

VOLTAGE CHART

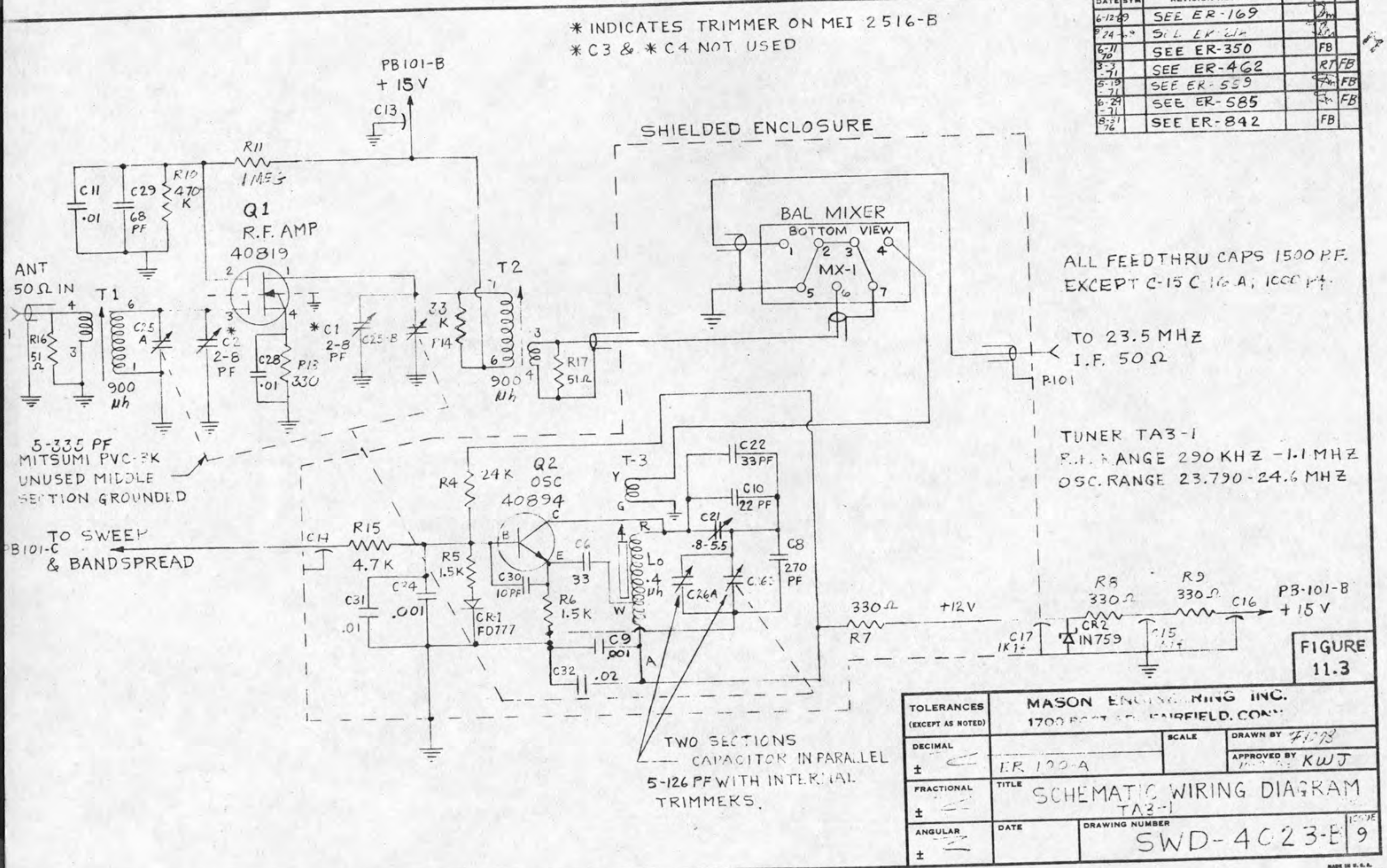
	PIN NUMBER			
	1	2	3	4
40819 Q1	16	4.4	4	4.8
3N128 Q2,3,4,5	16	1	0	GND
3N128 Q6	2.5	1.8	0	GND
3N128 Q7	6.2	1.4	0	GND

NOTE ÷
1. ALL FEED THRU CAPACITORS 1500 PF UNLESS OTHERWISE SPECIFIED
2. FOR PARTS LIST SEE PWD-30106-X & 30162-B

FIGURE 11.2

TOLERANCES (EXCEPT AS NOTED)	[illegible] ENGINEERING INC. [illegible] CONN.		
DECIMAL ±		SCALE	DRAWN BY ALS / APPROVED BY KWJ
FRACTIONAL ±	TITLE SCHEMATIC WIRING DIAGRAM B1 BASIC UNIT (C)		
ANGULAR ±	DATE 9-19-68	DRAWING NUMBER SWD-4048-D	

ER-100-A

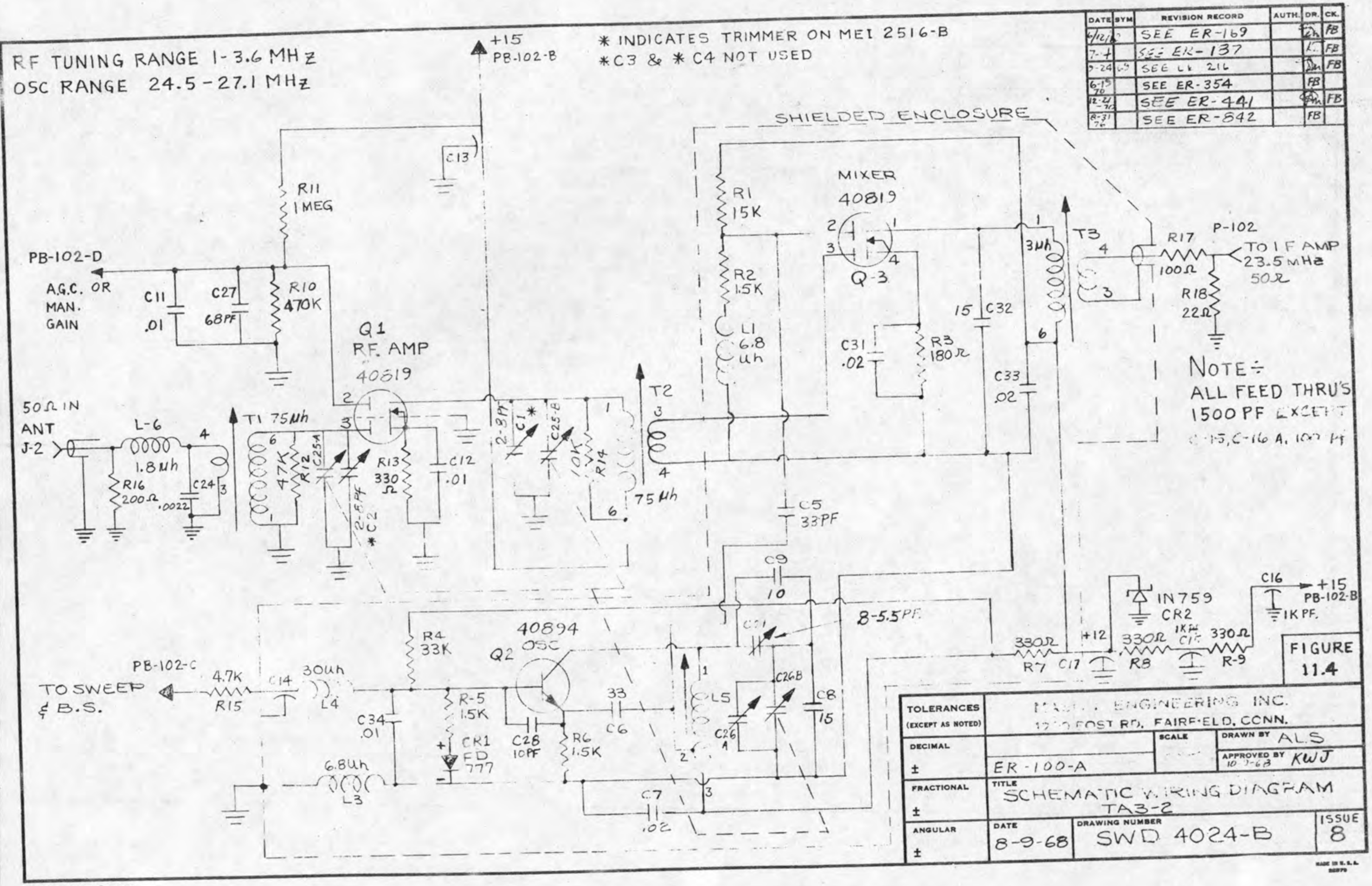


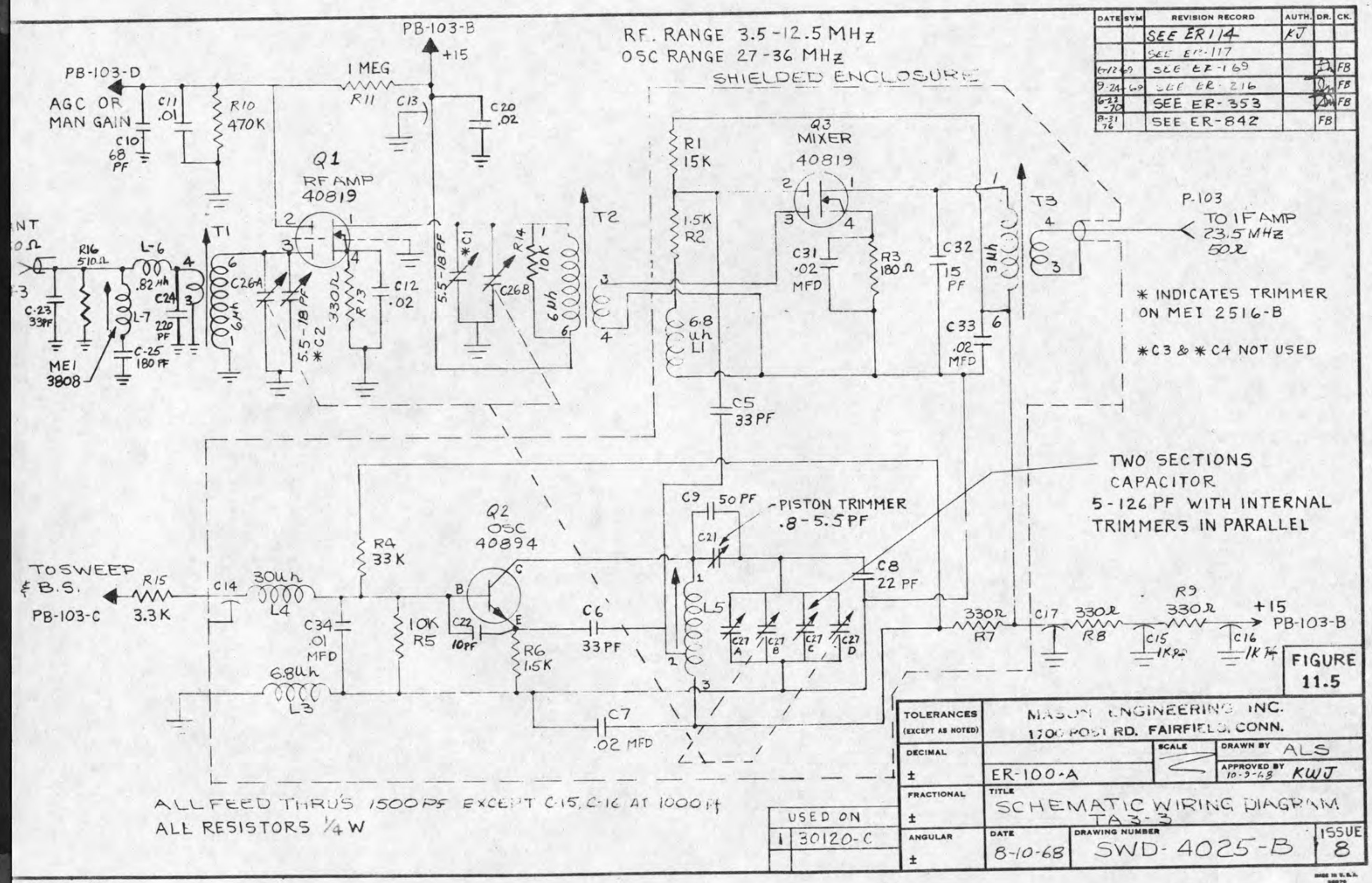
DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
6-12-69		SEE ER-169			
9-24-69		SEE ER-214			
6-11-70		SEE ER-350		FB	
3-3-71		SEE ER-462		RT	FB
5-19-71		SEE ER-559			FB
6-24-71		SEE ER-585			FB
8-31-76		SEE ER-842		FB	

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
DECIMAL ±	ER 100-A	SCALE	DRAWN BY FJ 73 / APPROVED BY KWJ
FRACTIONAL ±	TITLE SCHEMATIC WIRING DIAGRAM TA3-1		
ANGULAR ±	DATE	DRAWING NUMBER SWD-4023-E	ISSUE 9

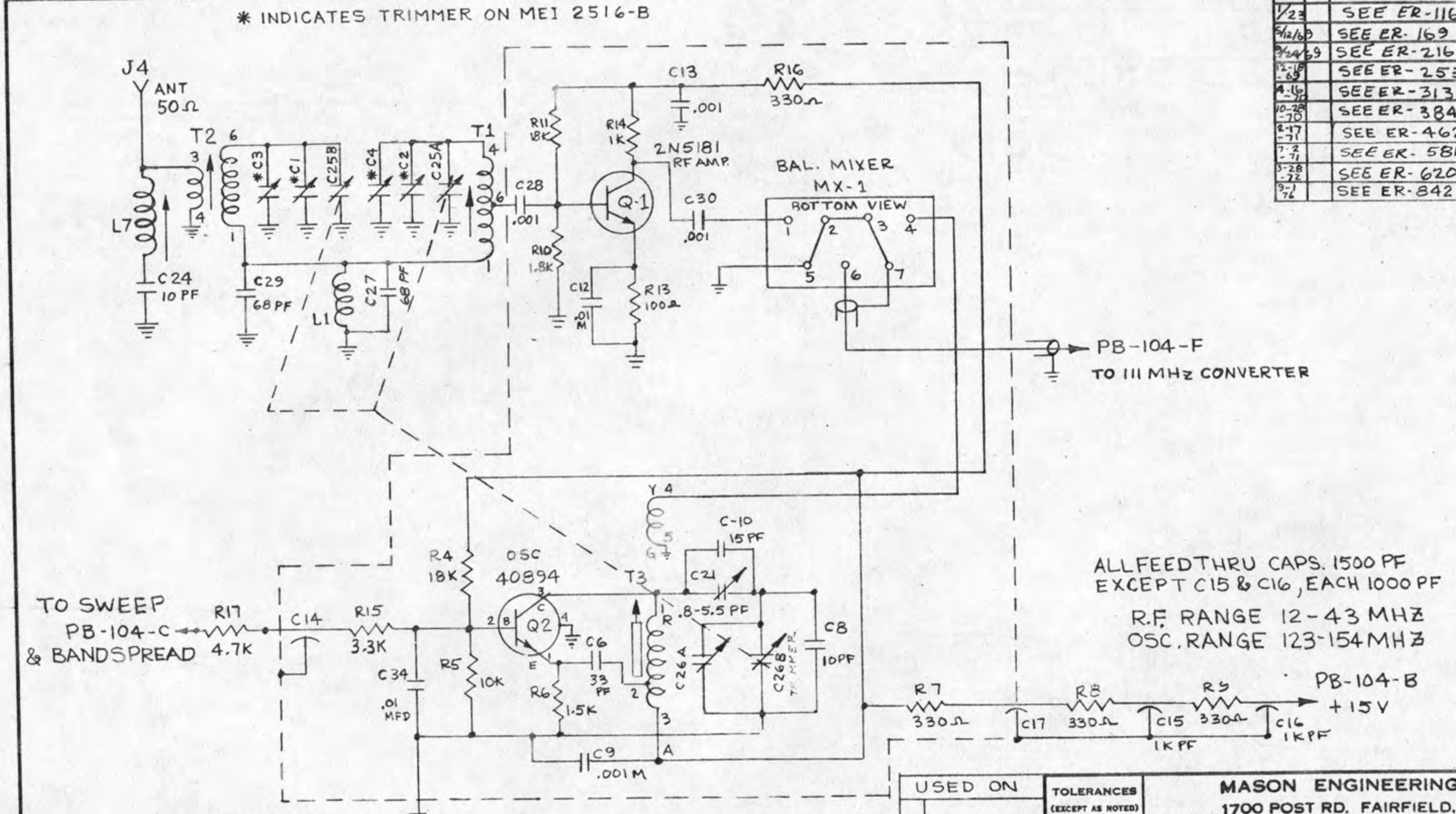
K+E ALBANENE ® 10 5460 ENGINEERS' STANDARD FORM

MADE IN U.S.A.


RF TUNING RANGE 1-3.6 MHz
OSC RANGE 24.5-27.1 MHz
+15 PB-102-B
* INDICATES TRIMMER ON MEI 2516-B
*C3 & *C4 NOT USED
DATE SYM REVISION RECORD AUTH. DR. CK.
SEE ER-169
SEE ER-137
SEE ER 216
SEE ER-354
SEE ER-441
SEE ER-842
SHIELDED ENCLOSURE
MIXER 40819
Q-3
P-102
TO I F AMP 23.5 MHz 50Ω
R17 100Ω
R18 22Ω
T3 3μh
PB-102-D
A.G.C. OR MAN. GAIN
C11 .01
C27 68PF
R10 470K
R11 1MEG
C13
Q1 RF. AMP 40819
R1 15K
R2 1.5K
L1 6.8 uh
C31 .02
R3 180Ω
15 C32
C33 .02
NOTE: ALL FEED THRU'S 1500 PF EXCEPT C-15, C-16 A, 100 PF
50Ω IN ANT J-2
L-6 1.8 μh
R16 200Ω
C24 .0022
T1 75 μh
47K R12
C25-A
2-8PF *C2
R13 330 Ω
C12 .01
2-8PF *C1
C25-B
10K R14
T2 75 μh
C5 33PF
C9 10
8-5.5PF
C21
IN759 CR2
C16 +15 PB-102-B 1K PF.
+12
330Ω R7
C17
330Ω R8
1KPF C15
330Ω R-9
FIGURE 11.4
R4 33K
40894 OSC Q2
PB-102-C
TO SWEEP & B.S.
4.7K R15
C14
30uh L4
C34 .01
R-5 1.5K
CR1 FD 777
C28 10PF
R6 1.5K
33 C6
L5
C26A
C26B
C8 15
6.8uh L3
C7 .02
TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±
FRACTIONAL ±
ANGULAR ±
MAGNA ENGINEERING INC.
1250 POST RD. FAIRFIELD, CONN.
SCALE
DRAWN BY ALS
APPROVED BY KWJ 10-7-68
ER-100-A
TITLE SCHEMATIC WIRING DIAGRAM TA3-2
DATE 8-9-68
DRAWING NUMBER SWD 4024-B
ISSUE 8



DATE | SYM | REVISION RECORD | AUTH. | DR. | CK.
SEE ER114 | KJ
SEE ER-117
1-12-69 | SEE ER-169 | FB
9-24-69 | SEE ER-216 | FB
6-23-70 | SEE ER-353 | FB
8-31-76 | SEE ER-842 | FB
R.F. RANGE 3.5-12.5 MHz
OSC RANGE 27-36 MHz
SHIELDED ENCLOSURE
PB-103-D
AGC OR MAN GAIN
C10 68 PF
C11 .01
R10 470K
PB-103-B
+15
1 MEG R11
C13
C20 .02
Q1 RF AMP 40819
Q3 MIXER 40819
R1 15K
1.5K R2
6.8 uh L1
R3 180 Ω
C31 .02 MFD
C32 15 PF
C33 .02 MFD
3 uh
T1
T2
T3
P-103
TO IF AMP 23.5 MHz 50Ω
* INDICATES TRIMMER ON MEI 2516-B
*C3 & *C4 NOT USED
R16 510Ω
L-6 .82 uh
C24
C-23 33PF
L-7
220 PF
C-25 180 PF
MEI 3808
C26A
6 uh
5.5-18 PF *C2
330Ω R13
C12 .02
5.5-18 PF *C1
R14 10K
C26B
6 uh
C5 33 PF
TWO SECTIONS CAPACITOR 5-126 PF WITH INTERNAL TRIMMERS IN PARALLEL
C9 50 PF
PISTON TRIMMER .8-5.5 PF
C21
C8 22 PF
L5
C27 A
C27 B
C27 C
C27 D
Q2 OSC 40894
R4 33K
TO SWEEP & B.S.
PB-103-C
R15 3.3K
C14
30 uh L4
C34 .01 MFD
10K R5
C22 10PF
R6 1.5K
C6 33 PF
6.8 uh L3
C7 .02 MFD
330Ω R7
C17
330Ω R8
R9 330Ω
C15 1K PF
C16 1K PF
+15 PB-103-B
FIGURE 11.5
ALL FEED THRU'S 1500 PF EXCEPT C-15, C-16 AT 1000 PF
ALL RESISTORS 1/4 W
USED ON
1 30120-C
TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±
FRACTIONAL ±
ANGULAR ±
MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.
SCALE
DRAWN BY ALS
APPROVED BY 10-9-68 KWJ
ER-100-A
TITLE SCHEMATIC WIRING DIAGRAM TA3-3
DATE 8-10-68
DRAWING NUMBER SWD-4025-B
ISSUE 8

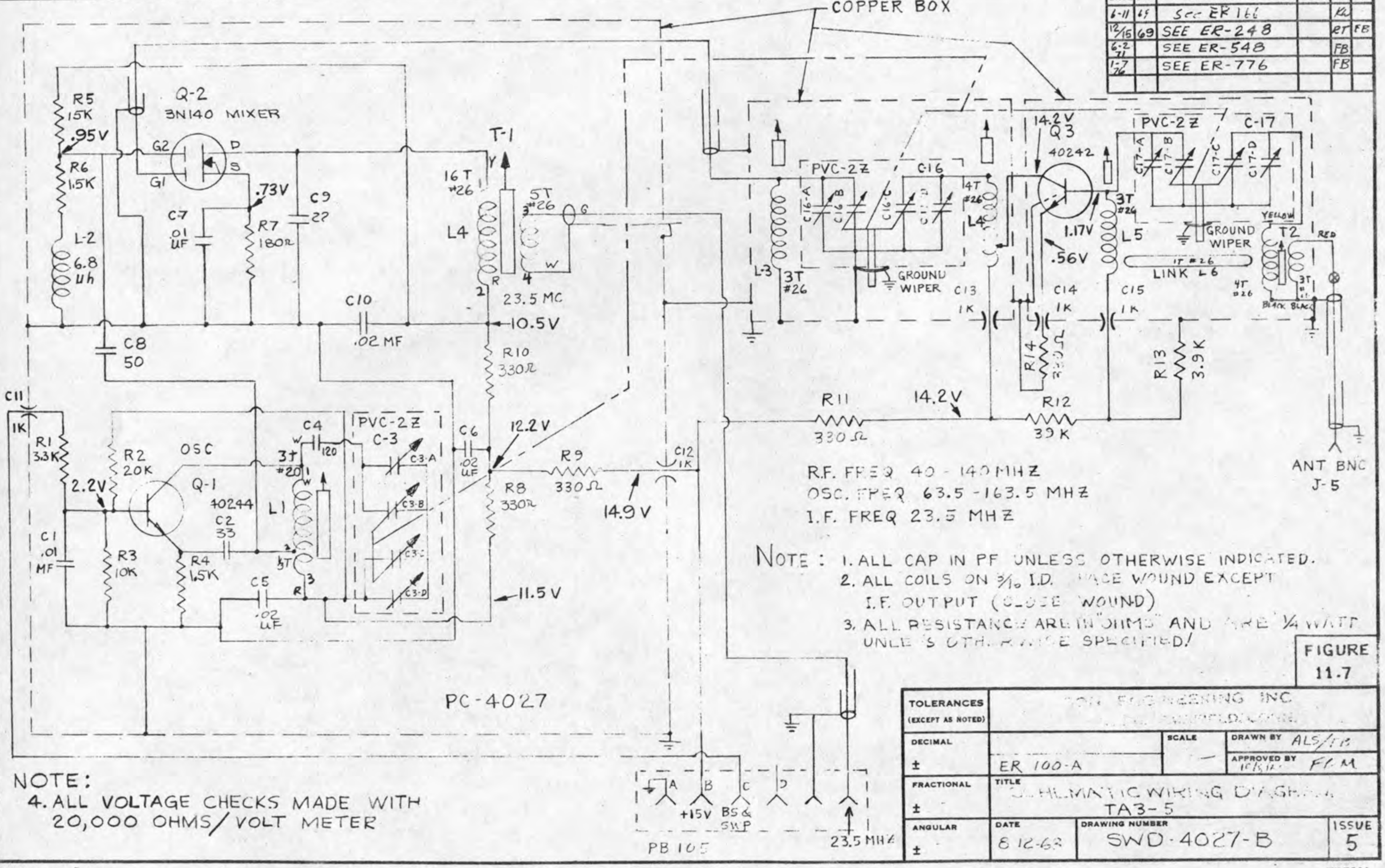


DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
1/23		SEE ER-116			
5/12/69		SEE ER-169			FB
9/24/69		SEE ER-216			FB
12-18-69		SEE ER-253		RT	FB
4-16-70		SEE ER-313			FB
10-28-70		SEE ER-384			FB
8-17-71		SEE ER-462			FB
7-2-71		SEE ER-581			FB
3-28-72		SEE ER-620			FB
9-1-76		SEE ER-842		FB	

FIGURE 11.6

USED ON	TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
	DECIMAL ±	SCALE ~	DRAWN BY S.P.M.	APPROVED BY
	FRACTIONAL ±	TITLE SCHEMATIC WIRING DIAGRAM TA3-4		
ER-100-A	ANGULAR ±	DATE 4-20-70	DRAWING NUMBER SWD-4026-B	ISSUE 11

K+E ALBANENE ® 10 8468 ENGINEERS' STANDARD FORM



DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
6-11	65	See ER 166		KL	
12/15	69	SEE ER-248		RT	FB
6-2-71		SEE ER-548		FB	
1-7-76		SEE ER-776		FB	

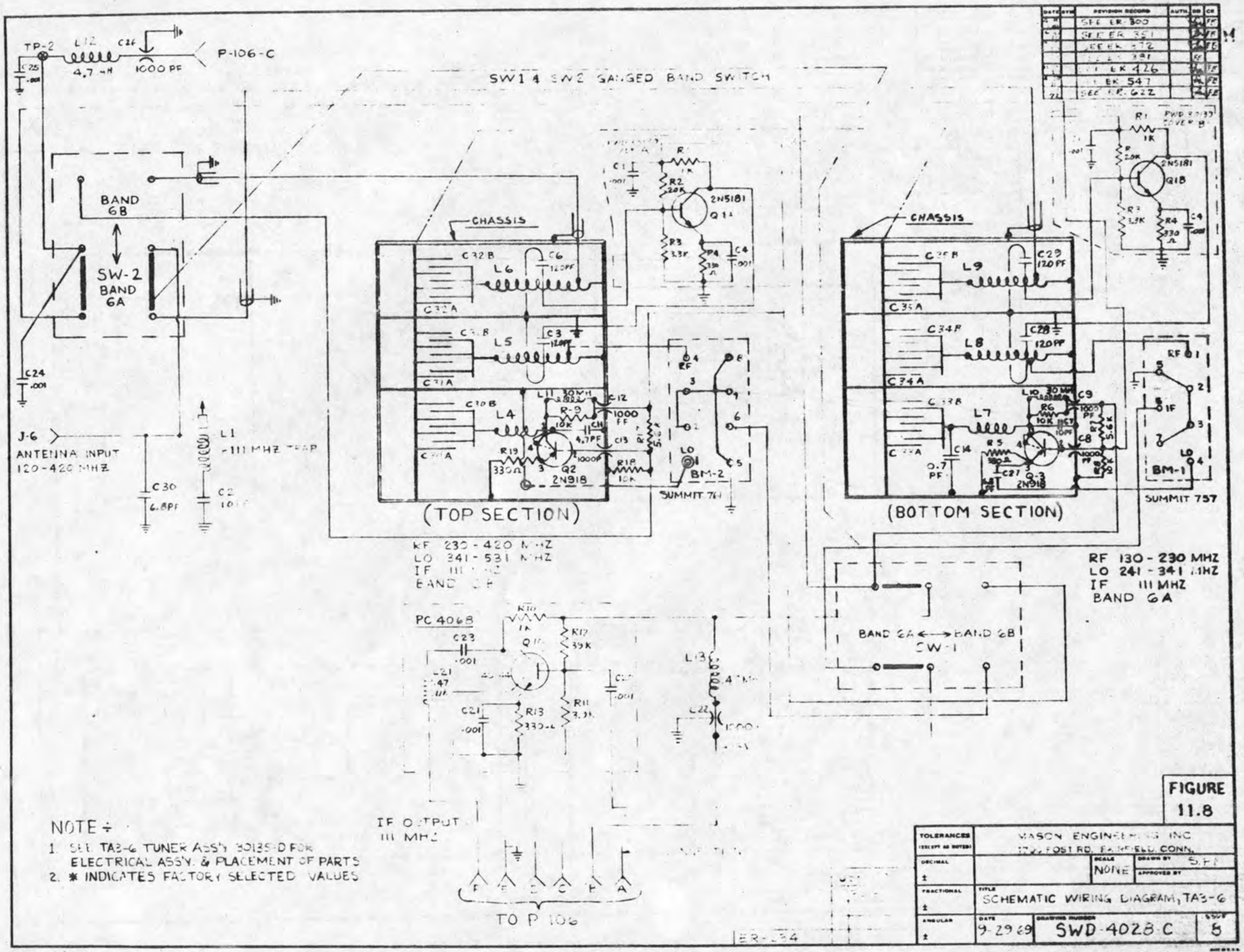
R.F. FREQ 40 - 140 MHZ
OSC. FREQ 63.5 - 163.5 MHZ
I.F. FREQ 23.5 MHZ

NOTE : 1. ALL CAP IN PF UNLESS OTHERWISE INDICATED.
2. ALL COILS ON 3/16 I.D. SPACE WOUND EXCEPT I.F. OUTPUT (CLOSE WOUND)
3. ALL RESISTANCE ARE IN OHMS AND ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED.

NOTE:
4. ALL VOLTAGE CHECKS MADE WITH 20,000 OHMS/VOLT METER

FIGURE 11.7

TOLERANCES (EXCEPT AS NOTED)	ENGINEERING INC		
DECIMAL ±	ER 100-A	SCALE —	DRAWN BY ALS/FB; APPROVED BY FLM
FRACTIONAL ±	TITLE SCHEMATIC WIRING DIAGRAM TA3-5		
ANGULAR ±	DATE 8-12-63	DRAWING NUMBER SWD-4027-B	ISSUE 5

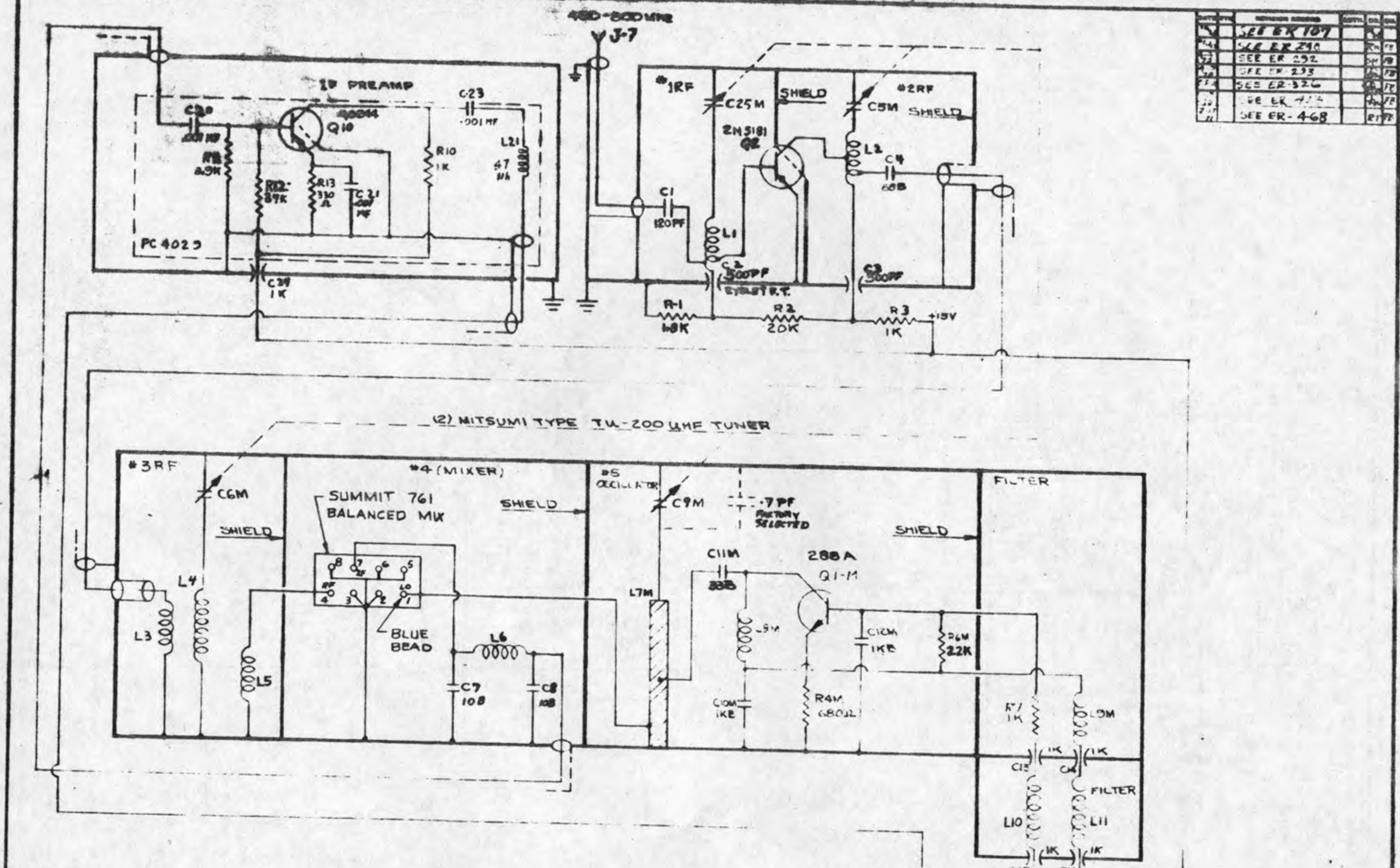


NOTE:
1. SEE TAB-6 TUNER ASS'Y 30135-D FOR ELECTRICAL ASS'Y. & PLACEMENT OF PARTS
2. ✱ INDICATES FACTORY SELECTED VALUES

TOLERANCES (EXCEPT AS NOTED)			
DECIMAL ±	MASON ENGINEERING INC 1790 POST RD. FAIRFIELD CONN.	SCALE NONE	DRAWN BY S.F.F. APPROVED BY
FRACTIONAL ±	TITLE SCHEMATIC WIRING DIAGRAM, TA3-6		
ANGULAR ±	DATE 9-29-69	DRAWING NUMBER SWD-4028 C	5

FIGURE 11.8

ER-234



NOTE ÷
1. "M" SUFFIX INDICATES SUPPLIED WITH MITSUMI TUNER
2. "B" SUFFIX INDICATES BUTTON TYPE LEADLESS CAPACITOR
3. SEE TUNER ASS'Y 30140-D FOR DETAIL

FREQUENCIES
RF - 400-800 MHZ
OSC - 511-911 MHZ
IF - 111 MHZ

FIGURE 11.9

MASON ENGINEERING INC.
FAIRFIELD, CONN.

DRAWN BY ALS

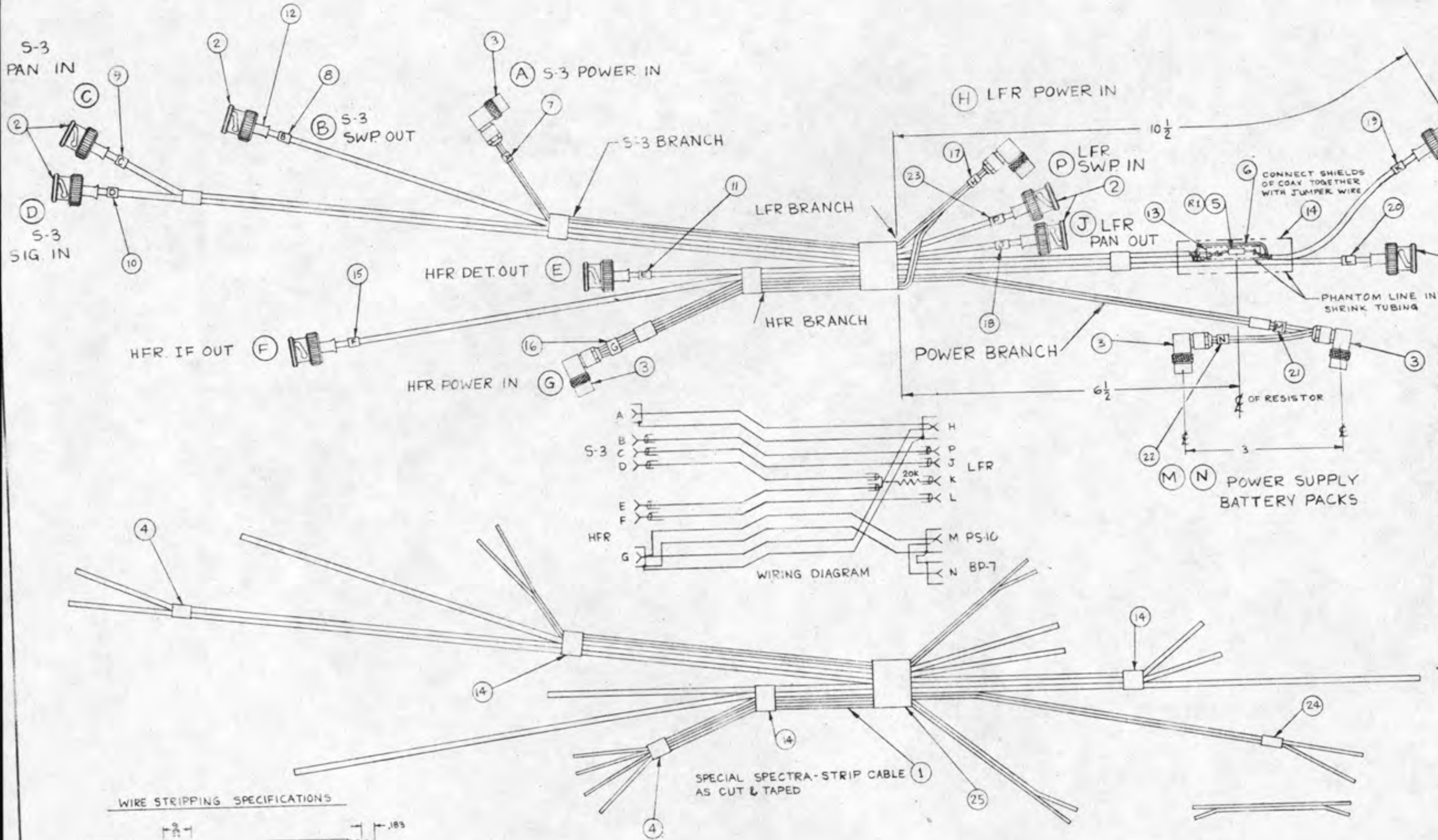
TITLE: SCHEMATIC WIRING DIAGRAM TA3-7

DATE: 10-9-68 DRAWING NUMBER: SWD-4046-C

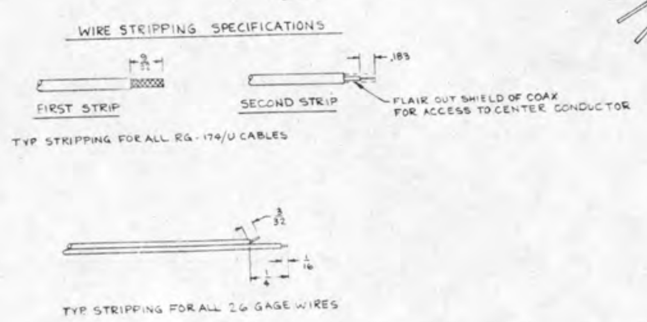
ER-100A

8

SEE ER-551	
SEE ER-561	



CONNECTOR	CONNECT TO	HARNESS INTERCONNECTION
A	S-3 POWER IN	G, M, N, H
B	S-3 SWP. OUT	P
C	S-3 PAN IN	J
D	S-3 SIG IN	E, THRU R-1 TO K
E	HFR DET. OUT	D, THRU R-1 TO K
F	HFR IF OUT WIDE OR NAR.	L
G	HFR. POWER	A, M, N, H
H	LFR. POWER	A, G, M, N
J	LFR. PAN OUT	C
K	T03-B IN	THRU R-1 TO D, E
L	LFR. CONV. IN	F
M	PS-10 OR BP-7	N, G, H, A
N	PS-10 OR BP-7	M, G, H, A
P	LFR. SWP. IN	B



NOTE -
1 USE THIS DRAWING AS A TEMPLATE FOR CUTTING WIRES TO THEIR PROPER LENGTHS.

REF NO	ITEM NO	QTY	PART NO	PART NAME
	14	~	24267-A	TUBING, SHRINKABLE (BULK)
	13	~	24220-A	TUBING, SHRINKABLE (BULK)
	12	9	16509-A	EYELET
	11	1	24124-A	WIRE MARKER (E)
	10	1	24123-A	WIRE MARKER (D)
	9	1	24122-A	WIRE MARKER (C)
	8	1	24121-A	WIRE MARKER (B)
	7	1	24120-A	WIRE MARKER (A)
	6	1	STD-2	WIRE, JUMPER (BW)
R-1	5	1	10-RBC-3-2	RESISTOR 25K 1/4W 5%
	4	~	24104-A	TUBING, SHRINKABLE (BULK)
	3	5	5649-A	CONNECTOR MB ANGLE
	2	9	5661-A	CONNECTOR BNC
	1	1	6810-A	SPECIAL SPECTRA-STRIP CABLE

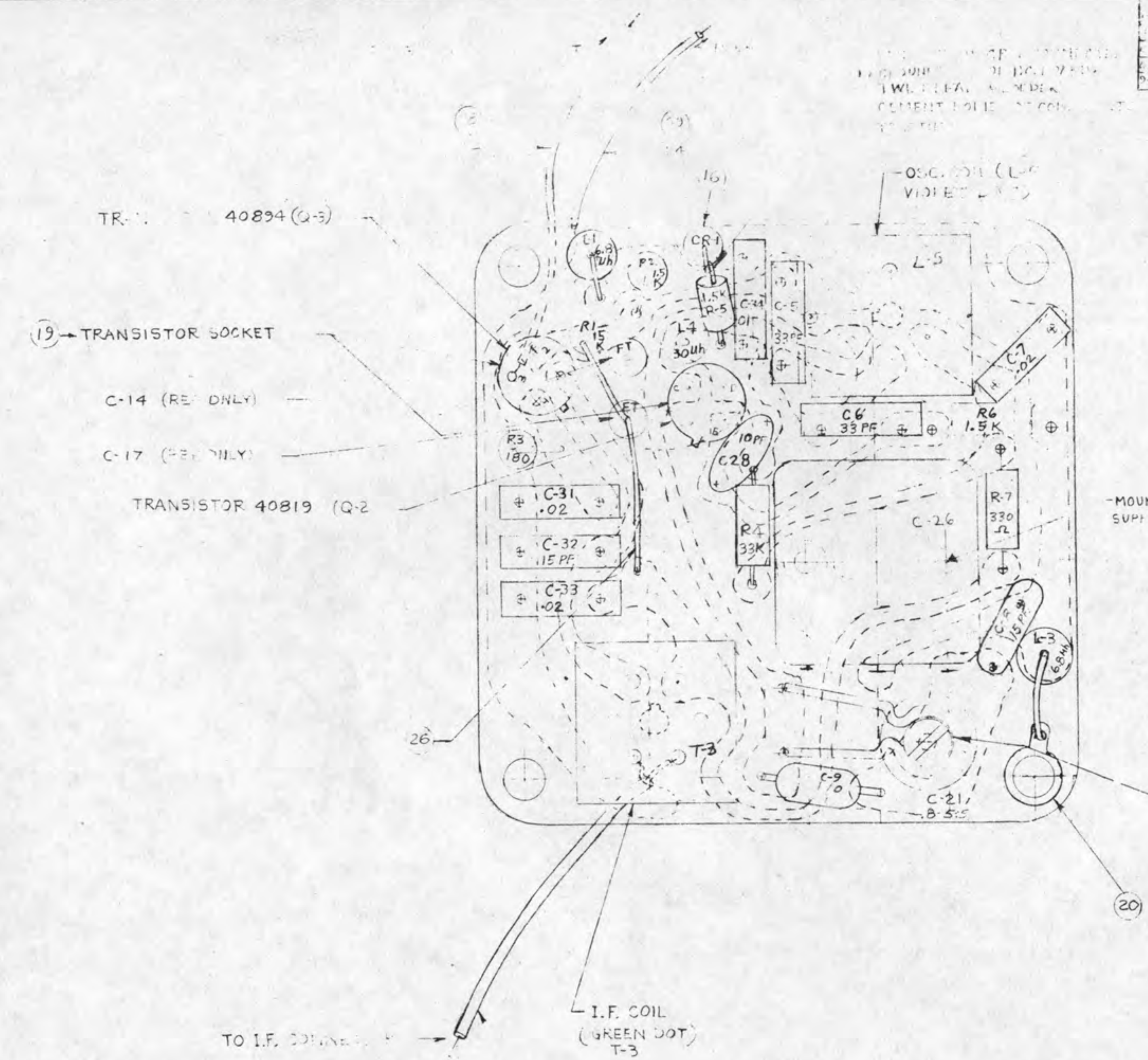
ITEM NO	QTY	PART NO	PART NAME
25	~	24115-A	TUBING, SHRINKABLE (BULK)
24	~	24062-A	TUBING, SHRINKABLE (BULK)
23	1	24133-A	WIRE MARKER (P)
22	[illegible]	24132-A	WIRE MARKER (N)
21	1	24131-A	WIRE MARKER (M)
20	[illegible]	24130-A	WIRE MARKER (L)
19	[illegible]	24129-A	WIRE MARKER (K)
18	1	24128-A	WIRE MARKER (J)
17	[illegible]	24127-A	WIRE MARKER (H)
16	1	24126-A	WIRE MARKER (G)
15	[illegible]	24125-A	WIRE MARKER (F)

ER-550

SEE DWG 30730-A ACCESSORY KIT AC-5

FIGURE 12.1

USED ON	TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
1 30730-A	DECIMAL ±.005	SCALE FULL	DRAWN BY S.P.M.	APPROVED BY FPB
	FRACTIONAL ± 1/64	TITLE HARNESS, INTERCONNECTING A3-B		
	ANGULAR ± 1°	DATE 5-3-71	DRAWING NUMBER 6811-D	ISSUE 3



		CIR NO.	NO. REQ.	PART NO.	PART NAME
C-	C31 C-7	1	3	2-.02M-0093	CAPACITOR .02-150
C-8	C32	2	2	2-15P-0065	CAPACITOR 15P-150
	C34	3	1	2-.01M-0040	CAPACITOR .01M-150
C-6	C5	4	2	2-33P-0014	CAPACITOR 33P-150
	C26	5	1	2507-A	CAPACITOR
		6			
	C-21	7	1	2511-A	CAPACITOR .8-5.5PF
	R-1	8	1	10TGO 3 2	RESISTOR 15K ¼W 5%
R-6	R-5 R-2	9	3	10-TGP 3 2	RESISTOR 1.5K ¼W 5%
	R-3	10	1	10-TST-3-2	RESISTOR 180Ω ¼W 5%
	R-7	11	1	10-OOT-3 2	RESISTOR 330Ω ¼W 5%
	R-4	12	1	10-OO 3-2	RESISTOR 33K ¼W 5%
	T-3	13	1	3016-A	TRANSFORMER
L-3	L-1	14	2	3602-A	CHOKE 6.8 µH
	L-5	15	1	3611-A	OSC COIL
	CR1	16	1	4508	DIODE FD777
	Q-1	17	1	4749-A	XSISTOR 40819
	Q-3	18	1	4748-A	XSISTOR 40894
		19	2	5425-A	XSISTOR SOCKET
		20	1	5483-A	SOLDER LUG
C28	C-9	21	2	2-10P-0011	CAPACITOR 10P-150
		22	1	4024-C	P.C. BOARD
		23	1	7001	RG 146/U COAX 2"
		24	1	STD-2	WIRE, JUMPER (BW)
		25			
		26	1	24-2-4-4¾	WIRE
	L-4	27	1	3604-A	CHOKE 30 uh
		28	2	24260-A	TUBING INSULATING (RED)
		29	2	24261-A	TUBING INSULATING (YELLOW)
		30			

23

FIGURE 12.10

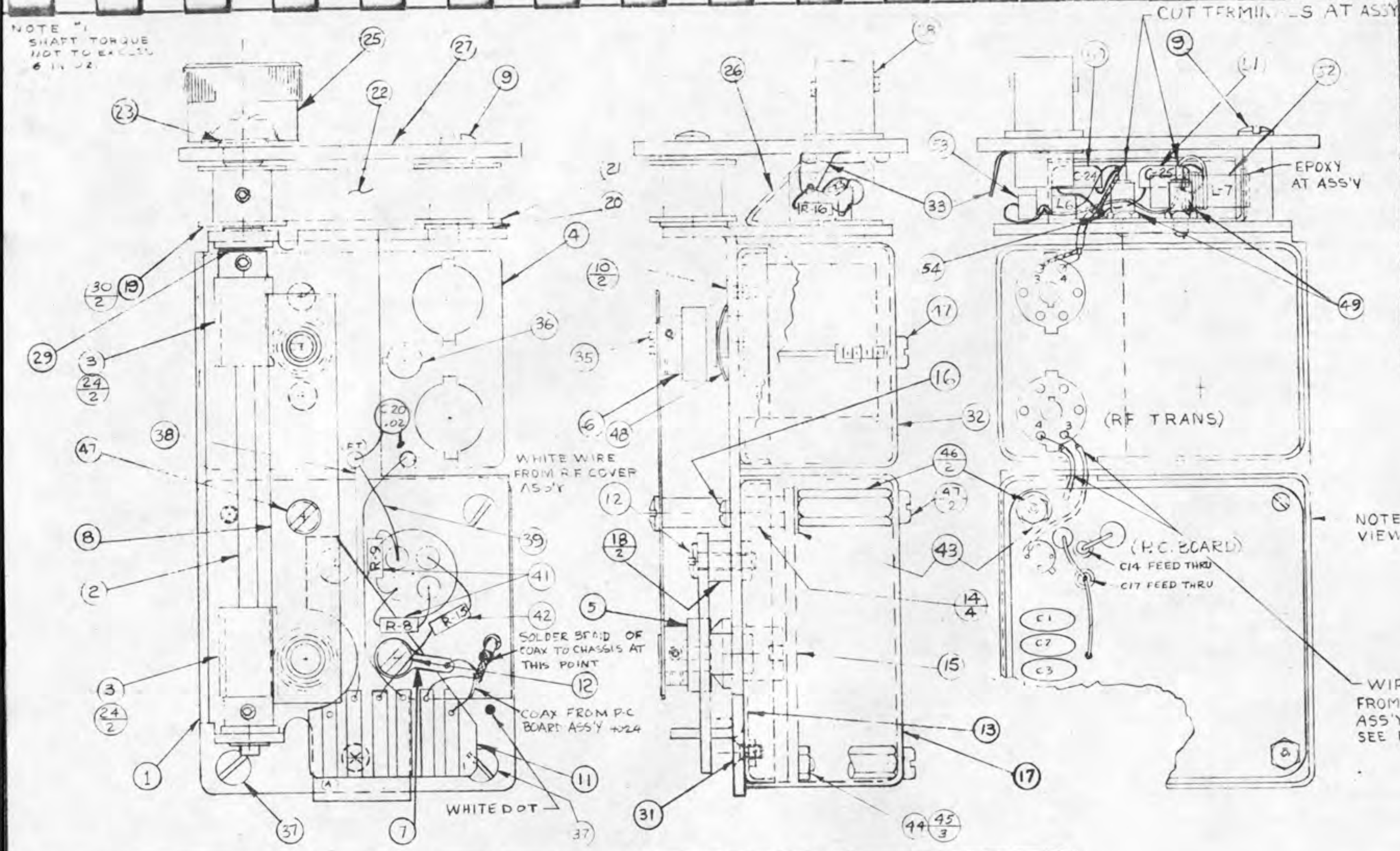
USED ON
1 30115

TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±
FRACTIONAL ±
ANGULAR

MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.

SCALE 4:1
DRAWN BY FHS
APPROVED BY KWJ

TITLE PICTORIAL WIRING DIAGRAM TA3-2



DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.	
		SEE ER-216			FB	2
10/29/69		SEE ER-234		RT	FB	3
		SEE ER-270			FB	4
		SEE ER-269			FE	5
		SEE ER-284				6
		SEE ER-291			FB	7
		SEE ER-331			FB	8
		SEE ER-288			FB	9
		SEE ER-353			FB	10
		SEE ER-363			FB	11
		SEE ER-374			FB	12
		SEE ER 383			FB	13
		SEE ER-427			FB	14
		SEE ER-452		FB		15
1/5/71		SEE ER-457			FB	16
		SEE ER-459			FB	17
		SEE ER-486			FB	18
		SEE ER-549			FB	19
		SEE ER-530			FB	20
		SEE ER-700		RT	FB	21
		SEE ER-823		FB		22

CIR. NO.	NO. REQ.	PART NO.	PART NAME	CIR. NO.	NO. REQ.	PART NO	PART NAME	CIR NO	NO REQ	PART NO	PART NAME	
1	1	30111-B	BRACKET COMPL, MTG	20	1	17541-A	WASHER, TEFLON	39	1	24-33-6-61	WIRE	
2	1	15001-A	SHAFT	21	1	16000-A	SPOOL, IDLER	40	1	10 GTT-32	RESISTOR 510Ω	R16
3	2	9002-A	WORM	22	1	23008-A	TAPE, DIAL	41	2	10-00T3-2	RES[illegible] 330Ω	R8 R9
4	1	30118-B	COVER COMPL R.F.	23	1	10000-A	BUSHING	42	1	10-00R-[illegible]	RESISTOR 3.3K	R15
5	1	30191-A	DRIVE GEAR ASS'Y	24	4	[illegible]	2-56 x 1/4 SET SCREW	43	1	17522-A	WASHER, INTERNAL LOCK	
6	1	30190-A	DRIVE GEAR ASS'Y	25	1	8014-A	KNOB	44	1	18001	NUT, HEX, 4-40	
7	1	5449-A	SOLDER LUG #4	26	1	24053-B	MIRR[illegible]	45	2	17514	WASHER #4 FLAT	
8	1	24007-A	PLATE, GEAR	27	1	[illegible]-A	PLATE WINDOW COMPL.	46	2	13049-A	SPACER, HEX.	
9	2	440-8-6-SSB	SCREW #4-40 x 1/4 BLACK	28	1	5663-A	CONNECTOR BNC.	47	4	[illegible]	SCREW, 4-40 x 1/4 PAN HD.	
10	2	356-6-1ASS	SCREW 3-56 x 3/16 LG FLT HD	29	1	17500-A	WASHER BOWED	48	1	[illegible]	WIPER	
11	1	4022-A	BOARD, CONNECTOR	30	2	440-4-5-SS	SCREW SET	49	2	544[illegible]-A	TERMINAL, INSULATED	
12	2	440-10-6-SS	SCREW #4-40 x 5/16	31	1	256-4-1ASS	SCREW #2-56 FLAT HD	50	1	2-220R006T	CAPACITOR 220PF	C24
13	1	30114-A	COVER OSC COMPL	32	1	R-19004-A	CASE R.F.	51	1	2-18-P[illegible]	CAPACITOR 180 PF	C25
14	4	13004-A	SPACER, BOARD	33	1	5454-A	S[illegible]	52	1	3872-A	COIL TRAN	L-7
15	1	PWD 4025	P.C. BOARD ASS'Y	34				53	1	3619-A	COIL .82 μh	L6
16	1	440-20[illegible]	SCREW #4-40 x 5/8 LG.	35	1	356-16-4-SS	SCREW 3-56 FIL HD 1/2 LG	54	1	[illegible]	SOLDER LUG	

USED ON	
1	30100

TOLERANCES (EXCEPT AS NOTED)
DECIMAL ± .005
FRACTIONAL ± 1/64

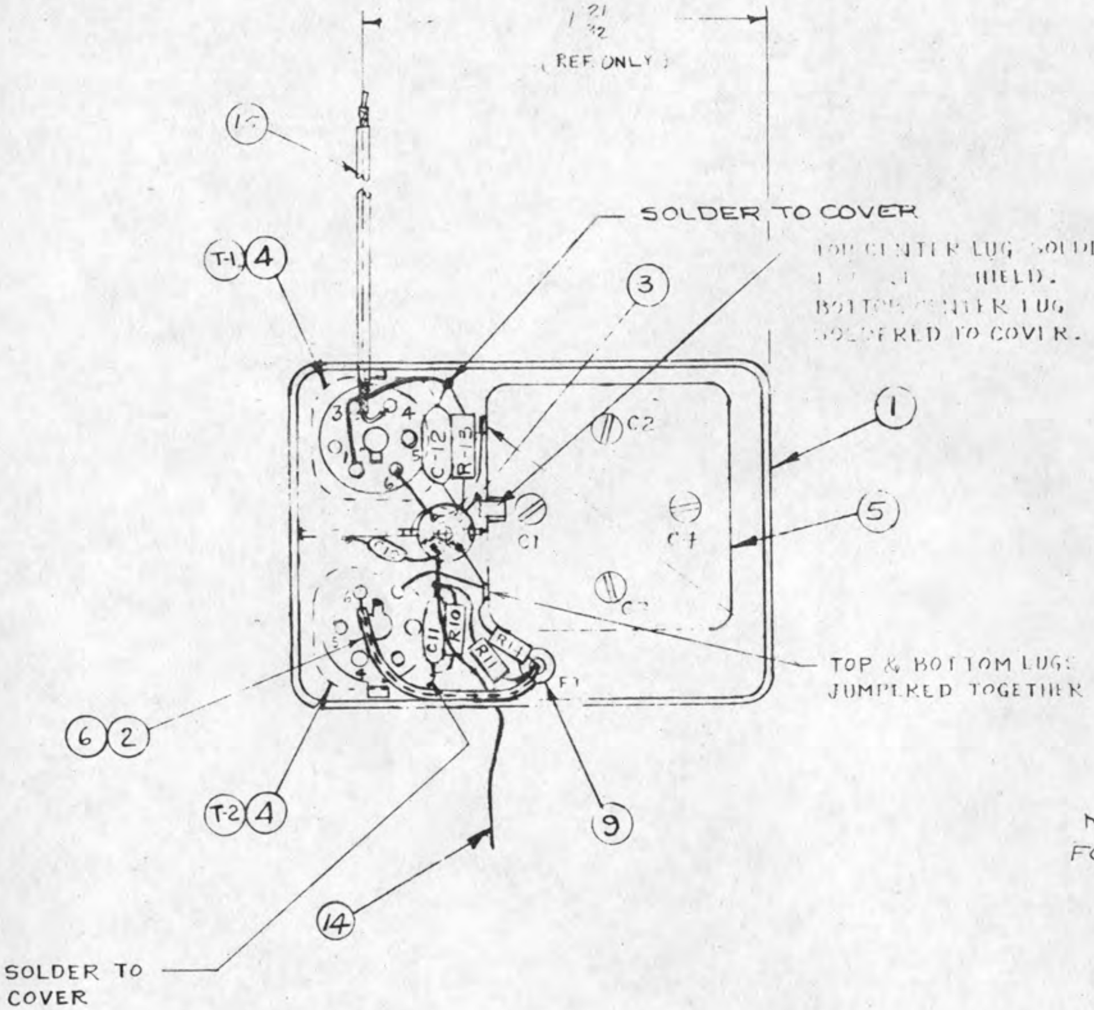
MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.

SCALE 2:1
DRAWN BY ALS
APPROVED BY

TITLE TUNER ASSY TA3-3

FIGURE 12.11

ER-100-P



DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
		[illegible]			FB
		SEE ER-353			FB
		SEE EK-812		FB	

	CIR. NO.	NO. REQ.	PART NO	PART NAME
	1	1	[illegible]	COVER, COMP'L R.F.
	2		[illegible]	JUMPER WIRE
	3	1	5422-A	SOCKET, TRANSISTOR
T-2 T-1	4	2	5013-A	TRANSFORMER R.F.
C	5	1	2516-B	VARIABLE CAPACITOR
	6		[illegible]	INSULATING TUBING
C-11	7	1	[illegible]	CAPACITOR .01
C-12	8	1	2-02M-0043	CAPACITOR .02
C-13	9	1	2-1500-0032	CAPACITOR FEED THRU 1500 PF
R 10	10	1	10 YPY-3-2	RESISTOR 470K 1/4W
R 11	11	1	10-18G-3-2	RESISTOR 1MEG 1/4W
R 13	12	1	10 00T-3-2	RESISTOR 330Ω 1/4W
R 14	13	1	10 TB0-3-2	RESISTOR 10K 1/4W
	14	1	24-9-6-6-2½	WIRE
	15	1	7000-A	RG 196/U COAX .2"
C 10	16	1	2-68P-0058	CAPACITOR, DISC 68 PF

NOTE:
FOR SCHEMATIC WIRING DIAGRAM SEE SWD 4025-B

FIGURE 12.12

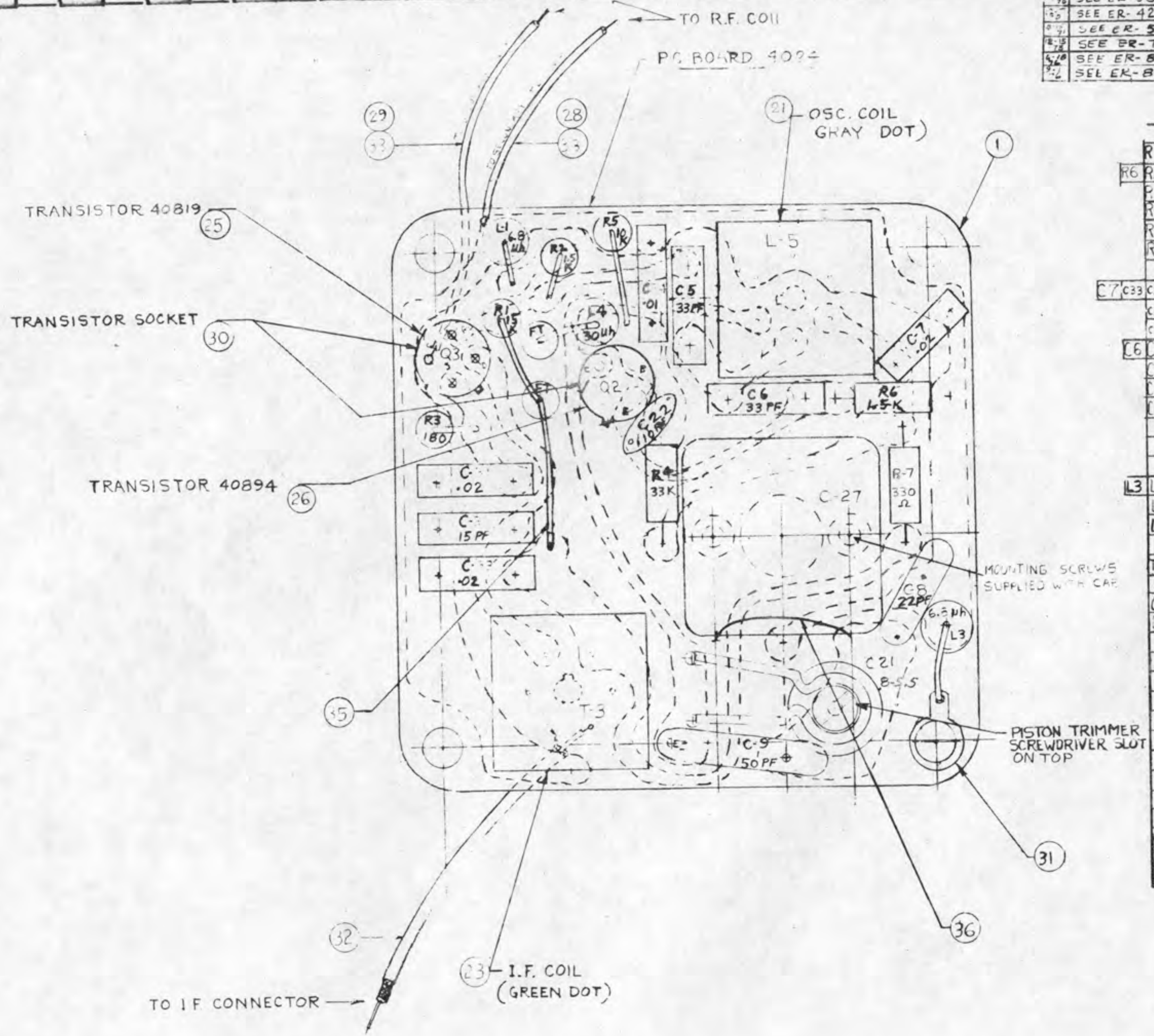
USED ON	
1	30120-C

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
DECIMAL ± ~		SCALE 2:1	DRAWN BY ALS / APPROVED BY KJ
FRACTIONAL ± ~	TITLE COVER ASS'Y R.F. TA3-3		
ANGULAR ± ~	DATE 9-5-68	DRAWING NUMBER 30118-B	ISSUE 4

ER-100-D

K+E ALBANENE 10 6405

	SEE ER-353		FB		SEE ER-125			
	SEE ER-422	FB	FB		SEE ER-135			
	SEE ER-500				SEE ER-169			
	SEE ER-700	RT	FB		SEE ER-176			
	SEE ER-823	FB			SEE ER-331			
	SEE ER-842	FB						



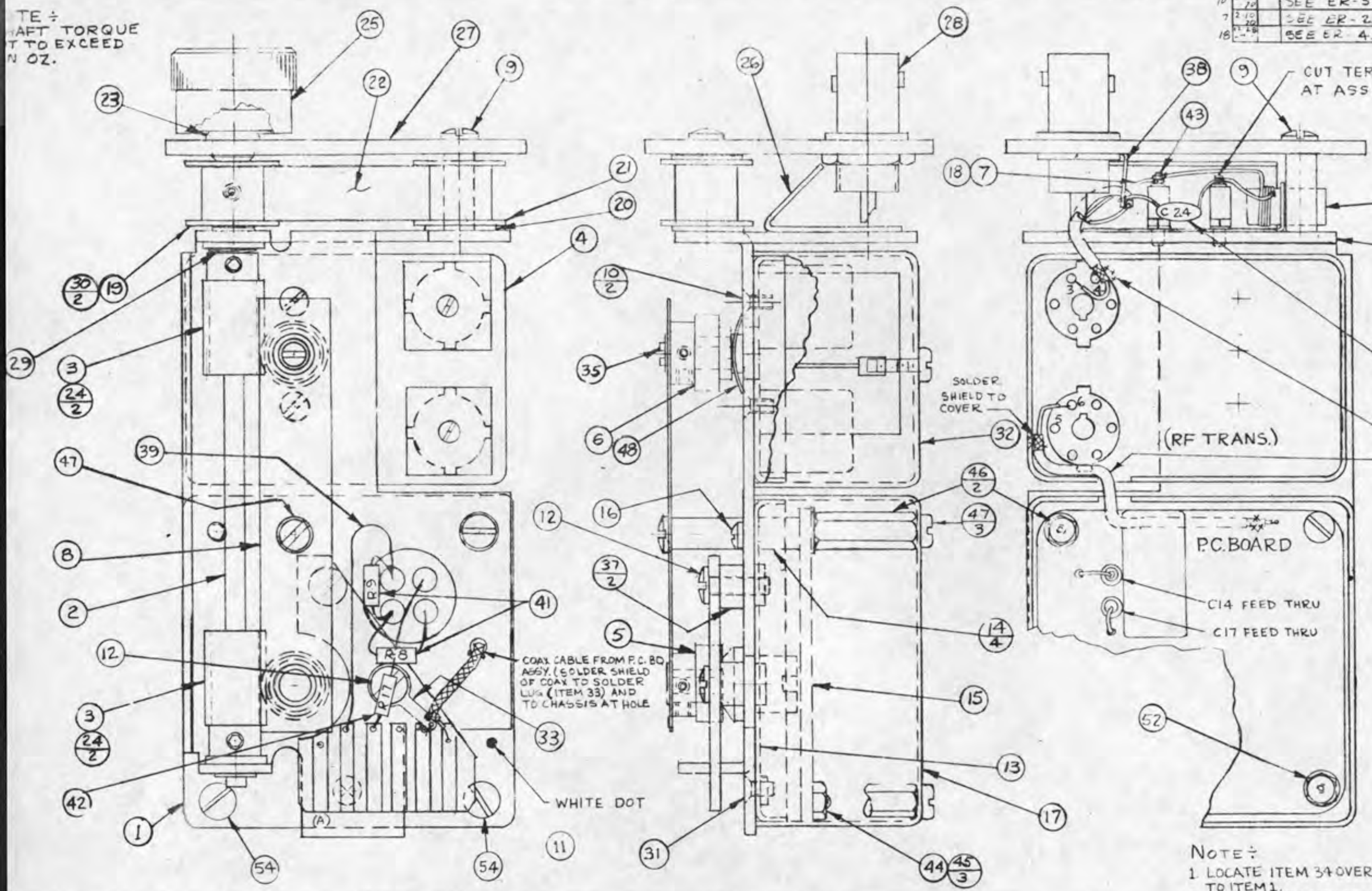
	CIR NO	NO REQ	PART NO	PART NAME
	1	1	4024-C	PC BOARD
R1	2	1	10-TG0-3-2	RESISTOR 15K 1/4W
R6 R2	3	2	10 TGR-3-2	1.5K 1/4W
R3	4	1	10 TST-3-2	180Ω 1/4W
R4	5	1	10-000 3-2	33K 1/4W
R5	6	1	10-TB0-3-2	10K 1/4W
R7	7	1	10-00T-3-2	RESISTOR 330 1/4W
	8			
C7 C33 C31	9	3	2-.02M-0043	CAPACITOR .02-150
C32	10	1	2-15P-0065	15P-150
C34	11	1	2-.01M-0040	.01M-150
C6 C5	12	2	2-33P-0014	33P-150
C9	13	1	2-50P-0016	50P-150
C21	14	1	2511-A	PISTON TRIMMER B-5.5
C27	15	1	2507-A	CAPACITOR
	16			
	17			
	18			
L3 L1	19	2	3602-A	CHOKE 6.8uH
L4	20	1	3604-A	" 30uH
L5	21	1	3610-A	OSC COIL
	22			
T3	23	1	3016-A	TRANSFORMER
	24			
Q3	25	1	4749-A	TRANSISTOR 40819
Q2	26	1	4748-A	" 40894
	27			
	28	Z	24261-A	TUBING INSULATING (YELLOW)
	29	Z	24260-A	TUBING INSULATING (RED)
	30	2	5425-A	SOCKET, TRANSISTOR
	31	1	5483-A	SOLDER LUG
	32	1	7001	RG 196/U COAX 2"
	33		STD-2	WIRE, JUMPER (BW)
	34	1		
	35	1	24-33-4-3	ORANGE
	36		24-44 4-4-1	" YELLOW
C8	37	1	2-22P-0012	CAPACITOR 22 PF NPO
C22	38	1	2-10P-0011	CAPACITOR 10 PF NPO
	39			

FIGURE 12.13

USED ON	TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.
1 30120	DECIMAL ±	SCALE 4:1
	FRACTIONAL ± 1/64	TITLE PICTORIAL WIRING DIAGRAM TA3-3
	ANGULAR ±	DATE / DRAWING NUMBER PWD 4025

ER-100-D

...TE ÷
...HAFT TORQUE
...T TO EXCEED
...N OZ.



10		SEE ER-331		FB			
7		SEE ER-283		FB			
18		SEE ER-451		FB			

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
		SEE ER-620			FB
		SEE ER-216			FB
	67	SEE ER-234		RT	FB
		SEE ER-253		RT	FB
		SEE ER-256		SM	FB
		SEE ER-269			FB
		SEE ER-291			FB
		SEE ER-313			FB
		SEE ER-352			FB
8-3-70		SEE ER-363			FB
		SEE ER-374			FB
		SEE ER-384			FB
		SEE ER-383			FB
		SEE ER-409			FB
		SEE ER-427			FB
		SEE ER-452			FB
		SEE ER-453			FB
		SEE ER-459			FB
		SEE ER-462		RT	FB
		SEE ER-486			FB
		SEE ER-549			FB
		SEE ER-562			FB
		SEE ER-548			FB

SOLDER COAX SHIELD TO PIN 4 & CASE

SOLDER SHIELD OF COAX CABLE FROM P.C. BOARD ASS'Y. 4026 TO R.F. COVER SEE PWD-4026-D

NOTE ÷
1. VIEW WITHOUT RF & OSC CASES
2. DO NOT USE LOCTITE ON TERMINALS (ITEM # 43)

NOTE ÷
1. LOCATE ITEM 34 OVER SCREW HEAD ITEM 16 & SOLDER ITEM 34 TO ITEM 1.
2. AFTER COMPLETION OF WIRING ITEM 34, TACK SOLDER CASE ITEM 57 TO ASS'Y.

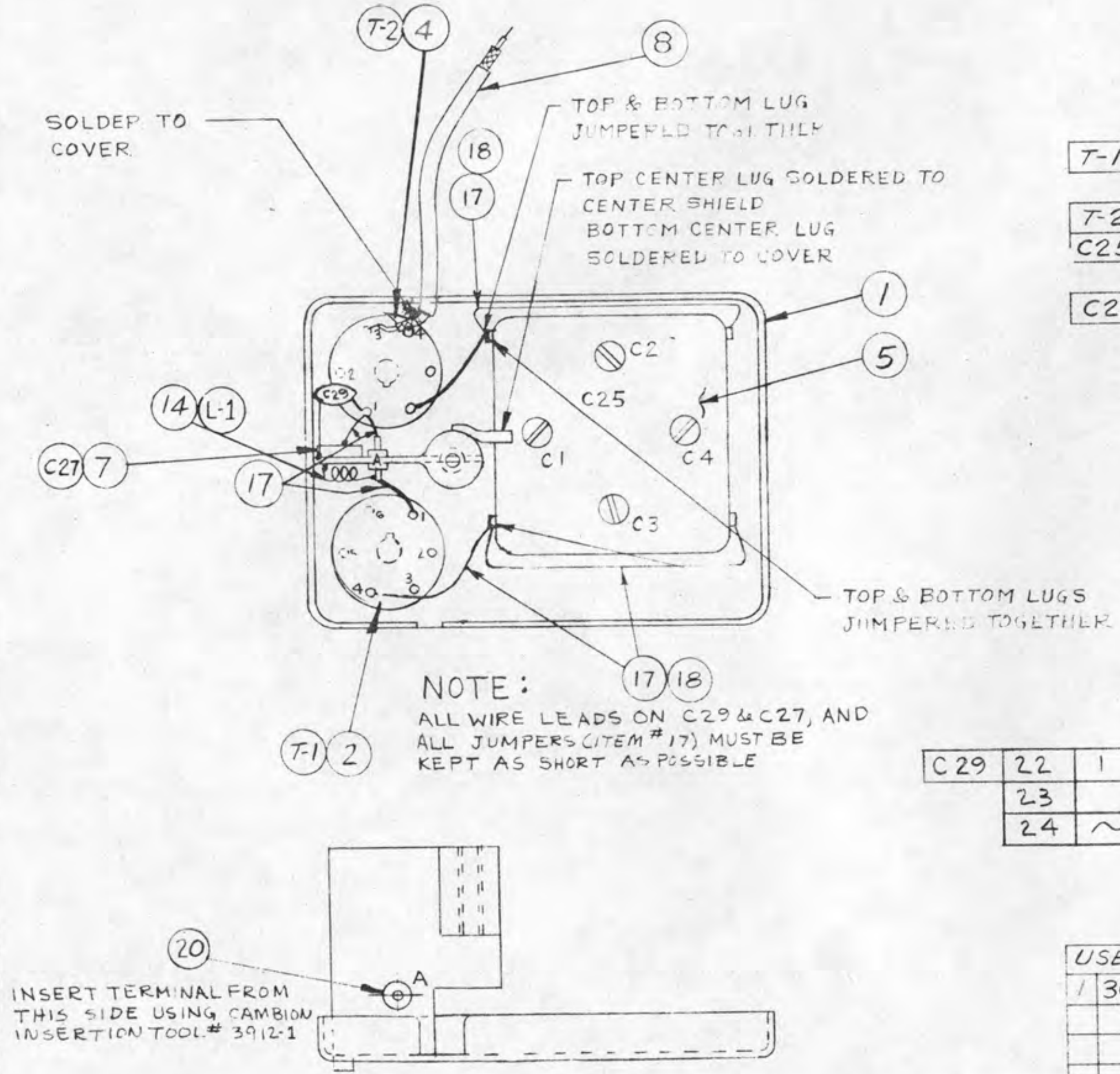
NO REQ.	PART NO.	PART NAME	CIR NO.	NO REQ.	PART NO.	PART NAME	CIR NO.	NO REQ.	PART NO.	PART NAME	CIR NO.
1	30111-F	BRACKET COMPL, [illegible]	20	1	17541-A	WASHER, TEFLON	39	1	24-37-662	WIRE	
1	15001-A	SHAFT	21	1	16000-A	SPOOL, [illegible]	40				
2	9002 A	[illegible]	22	1	23008-A	TAPE, DIAL SAME AS A2 CUT TO LENGTH	41	2	10 [illegible]-3-2	RESISTOR 390Ω 1/4W 5%	R8 R9
1	30119-B	COVER COMP'L R.F.	23	1	10000-A	BUSHING	42	1	10-YPR3-2	RESISTOR 4.7K 1/4W 5%	R17
1	30191-A	GEAR [illegible] DRIVE	24	4	256 3-55S	2-56X 1/8 SET SCREW	43	2	5440-A	TERM. [illegible], INSUL. [illegible]	
1	30190-A	GEAR ASSY DRIVE	25	1	8014-A	KNOB	44	1	15001	NUT, HEX, 4-40	
1	STD. 2	WIRE, JUMPER (BW) CUT TO SUIT	26	1	24053-B	MIRROR	45	2	17514	WASHER #4 FLAT	
1	24007-A	POINTER, GEAR	27	1	30155-A	PLAT. WINDOW COMPL.	46	2	13049A	SPACER, HEX	
2	4408-6-55B	SCREW [illegible]	28	1	5663-A	CONNECTOR BNC.	47	4	440-8-666	SCREW, 4-40X1/2 PAN HD.	
2	356-6-1A-SS	SCREW [illegible] FLT HD	29	1	17500-A	WASHER BOWED	48	1	24257A	WIPER	
1	[illegible]022-A	BOARD, [illegible]	30	2	440-45-S	SCREW SET	49				
2	440-12-6	SCREW #4-40	31	1	256-41ASS	SCREW [illegible]	50	1	2-10P-0011	CAPACITOR, 10 PF	C24
1	30114-A	COVER OSC [illegible]	32	1	19704	CASE R.F.	51				
4	[illegible]-4-A	SPACER, [illegible]	33	1	5449-A	SOLDER LUG #4	52	1	17522-A	WASHER, INTERNAL LOCK	
1	PWD 4026D	P.C. BOARD ASS'Y	34				53				
1	440-20	SCREW #4-40 X 5/16 LG	35	[illegible]	[illegible]	SCREW [illegible]	54	2	[illegible]	SCREW 4-40 X 1/2 LG.	
1	[illegible]006-B	[illegible]	36				55	1	[illegible]5-A	[illegible]	
1	24213-A	TUBING, INSULATING	37	2	13006-A	SPACER BOARD	56				

58			
59			
60			
61			
62			
63			
64			
65			
66			
67			
68			

FIGURE 12.14

ER-100-P

USED ON	TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
1 30100	DECIMAL ± .005		SCALE 2:1	DRAWN BY ALS
	FRACTIONAL			APPROVED BY [illegible]
		TITLE TUNER ASS'Y TA-4		
	ANGULAR	DATE	DRAWING NUMBER [illegible]	ISSUE



NOTE:
ALL WIRE LEADS ON C29 & C27, AND ALL JUMPERS (ITEM # 17) MUST BE KEPT AS SHORT AS POSSIBLE

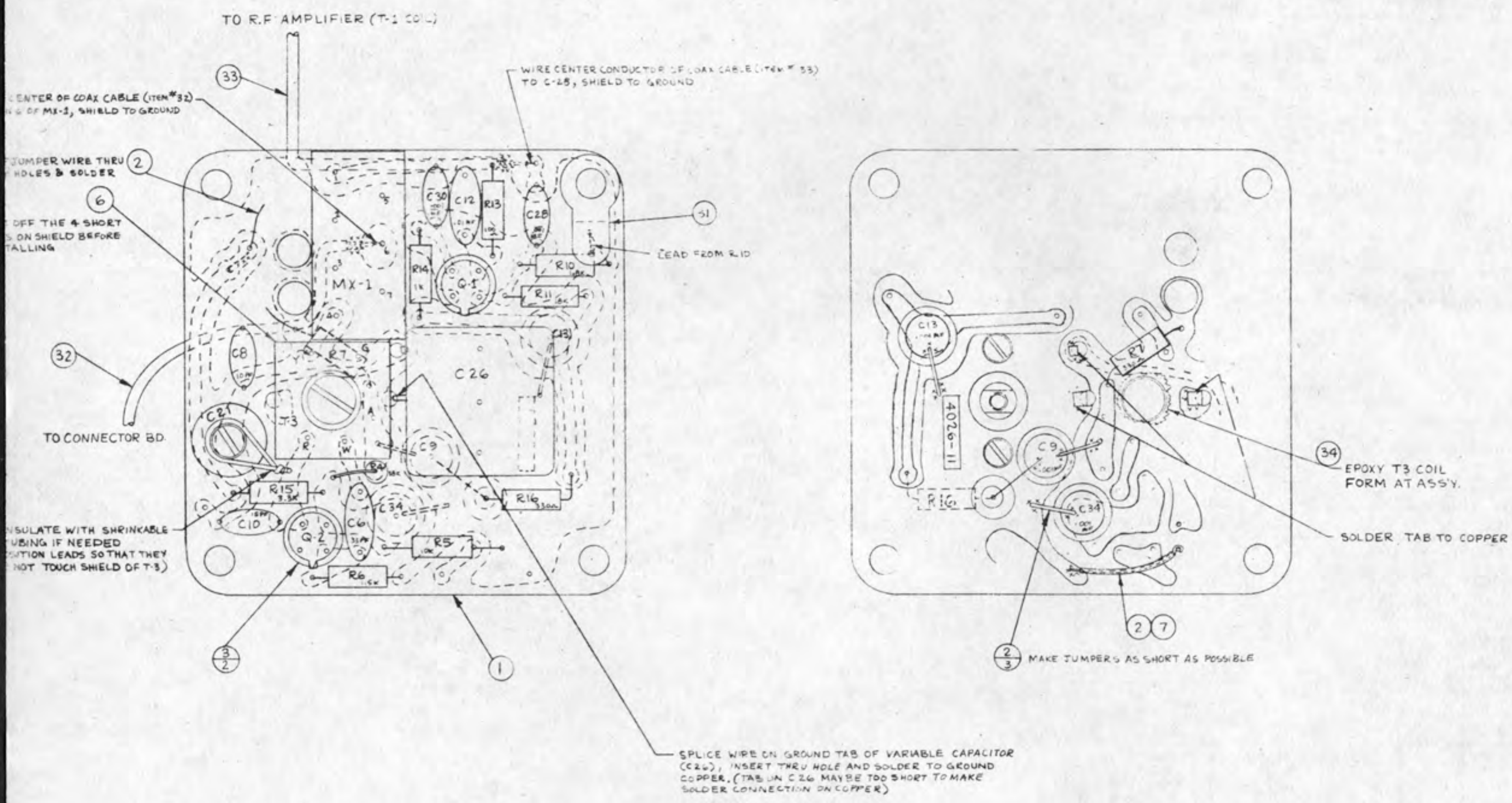
3-2-71	SEE ER-462		DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
	SEE ER-562		6-18-69		SEE ER-175		SM	
	SEE ER-842		11-26-69		SEE ER-245		SM	FB
			12-30-69		SEE ER-253		RT	FB
			4-14-70		SEE ER-313			FB
			10-28-70		SEE ER-384		FB	

	CIR. Nº	Nº REQ'D.	PART Nº	PART NAME
	1	1	30121-B	COVER, COMP'L., R.F.
T-1	2	1	3870-A	COIL, R.F.
	3			
T-2	4	1	3014-A	TRANSFORMER, R.F.
C25	5	1	2516-A	CAPACITOR, VARIABLE
	6			
C27	7	1	2-68P-0088	CAPACITOR, 68 PF BUTTON
	8	1	7061-A	WIRE, COAX
	9			
	10			
	11			
	12			
	13			
	14	1	3871-A	COIL, R.F.
	15			
	16			
	17	=	STD. 2	WIRE, JUMPER (BW) CUT TO SUIT
	18	=	24213-A	TUBING, INSULATING
	19			
	20	1	5423-A	TERMINAL, INSULATED
	21			
C29	22	1	2-68P-0058	CAPACITOR 68 PF.
	23			
	24	~	3400-A	EPOXY (FAST)

FIGURE 12.15

USED ON	TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
1 30125-C	DECIMAL ± ~		SCALE 2:1	DRAWN BY RHT; APPROVED BY
	FRACTIONAL ± ~	TITLE COVER ASS'Y., R.F., TA3-4		
ER-100-D	ANGULAR ± ~	DATE 12-29-69	DRAWING NUMBER 30119-B	ISSUE 9

K+E ALBANENE 10 5465



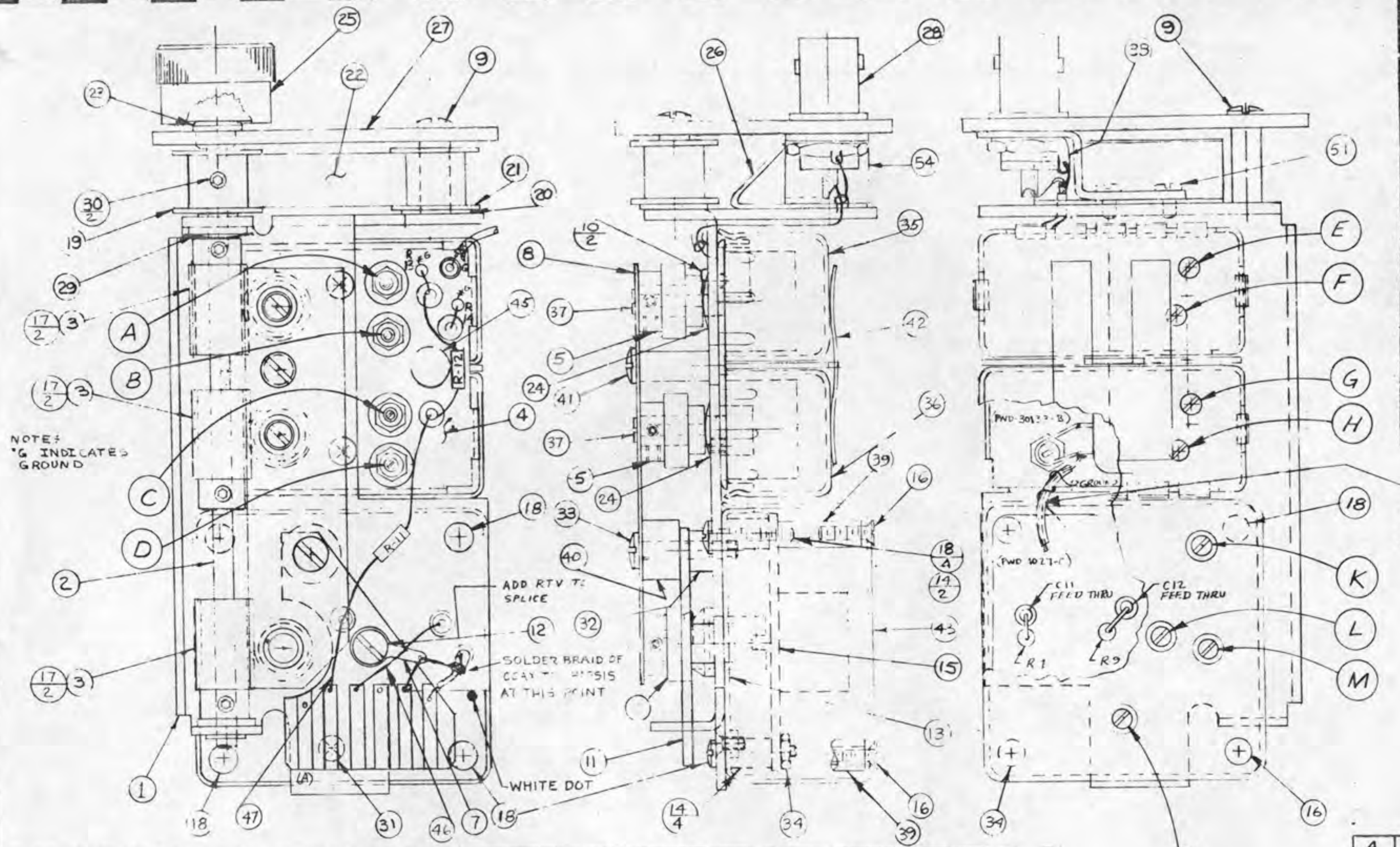
DATE	SYM	REVISION RECORD	AUTH	DR	CK
		SEE ER-462			
		SEE ER-581			
		SEE ER-620			
		SEE ER-700			
		SEE ER-842			

			CIR. NO.	NO REQ	PART NO.	PART NAME
			1	1	4026-C	P.C. BOARD AS MACHINED
			2	5	STD-2	WIRE, JUMPER (BW)
			3	2	5425-A	SOCKET, TRANSISTOR
		Q1	4	1	4723-A	TRANSISTOR 2N5181
		Q2	5	1	4748-A	TRANSISTOR 40894
			6	1	19083-A	COVER, COIL FORM
			7	~	24213-A	TUBING, INSULATED
	R11	R4	8	2	10-TS0-3-2	RESISTOR 18K 1/4W 5%
		R5	9	1	10-TB0-3-2	10K
		R6	10	1	10-TGR-3-2	1.5K
	R16	R7	11	2	10-00T-3-2	330Ω
		R10	12	1	10-TSR-3-2	1.8K
		R13	13	1	10-TBT-3-2	100Ω
		R14	14	1	10-TBR-3-2	1K
		R15	15	1	10-00R-3-2	RESISTOR 3.3K 1/4W 5%
			16			
			17			
C13	C9	C34	18	3	2-1000P-0091	CAPACITOR .001MFD (BUTTON)
		C6	19	1	2-33P-0014	33 PF
		C8	20	1	2-10P-0011	10 PF
		C10	21	1	2-15P-0065	15 PF
		C12	22	1	2-.01M-0040	.01 MF
	C30	C28	23	2	2-1000P-0103	CAPACITOR .001MF
		C21	24	1	2511-A	CAPACITOR, PISTON TRIMMER
		C26	25	1	2507-A	CAPACITOR, POLY-VARIABLE
			27			
			28			
		T-3	29	1	3017-A	COIL, OSC. TA3-4
		MX-1	30	1	5036-B	MIXER, DOUBLY BALANCED
			31	1	5449-A	SOLDER LUG
			32	1	7002-A	WIRE, COAX 2¾" LG
			33	1	7001-A	WIRE, COAX 2" LG.
			34	~	3400-A	EPOXY (FAST)

FIGURE 12.16

USED ON	TOLERANCES	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.	
1 30125-C	DECIMAL ± .005	SCALE 4:1	DRAWN BY S.P.M.
	FRACTIONAL ± 1/64	TITLE PICTORIAL WIRING DIAGRAM TA3-4	
	ANGULAR ± 1°	DATE 2-17-71	DRAWING NUMBER PWD-4026-D ISSUE 12

ER-100-C



9-1-69		SEE ER-209		FB
9-4-69		SEE ER-226		FB
10/29	69	SEE ER-234	RT	FB
12/15	69	SEE ER-248	RT	FB
12/23	69	SEE ER-254	RT	FB
3-5-70		SEE ER-291		FB
4-28-70		SEE ER-317		FB
[illegible]-70		SEE ER-288		FB
6-13-70		SEE ER-352	FB	
[illegible]		SEE ER-308		FB
9-10-70		SEE ER-374		FB
11-16-70		SEE ER-408		FB
11-17-70		SEE ER-412		FB
12-18-70		SEE ER-427		FB
12-28-70		SEE ER-451		FB
12-31-70		SEE ER-452	FB	
1-12-71		SEE ER-459		FB
3-22-71		SEE ER-486		FB
4-14-71		SEE ER-494		FB
5-4-71		SEE ER-549		FB
5-27-71		SEE ER-546		FB
6-2-71		SEE ER-548	FB	
1-5-72		SEE ER-609		RT
12-15-73		SEE ER-700	RT	FB
1-5-76		SEE ER-775	FB	
1-6-76		SEE ER-776	RT	

A	T-2 ADJ
B	L-5 ADJ
C	L-4 ADJ
D	L-3 ADJ
E	C-17D ADJ
F	C-17A ADJ
G	C-16D ADJ
H	C-16A ADJ
J	L-1 ADJ
K	T-1 ADJ
L	C-3A ADJ
M	C-3D ADJ

FIGURE 12.17

CIR. NO.	NO. REQ	PART NO	PART NAME
1	1	30131-A	BRACKET COMPL., MTG
2	1	15001-A	SHAFT, MAIN
3	3	9002-A	WORM
4	1	PWD30133-B	COVER ASS'Y R.F.
5	2	30192-A	DRIVE GEAR ASSY
6	1	30193-A	DRIVE GEAR ASS'Y
7	1	5443-A	[illegible]
8	1	24011-A	PLATE, GEAR
9	2	440-8-6 [illegible]	SCREW #4-40 x 1/4 (BLACK)
10	2	256-4-655	SCREW #2-56 PAN HD
11	1	4022-A	BOARD, CONNECTOR
12	1	440-12-6 [illegible]	SCREW #4-40 x 3/8 FH
13	1	[illegible]A	COVER OSC [illegible]
14	4	13002A	SPACER
15	1	PWD4027	P.C. BOARD ASSY
16	2	256-10-1ASS	SCREW [illegible] 5/16 F.H.
17	6	[illegible]	SCREW SET [illegible] x 3/32
18	4	256-16-655	SCREW 1/2
19	1	16001-A	SPOOL, DRIVE

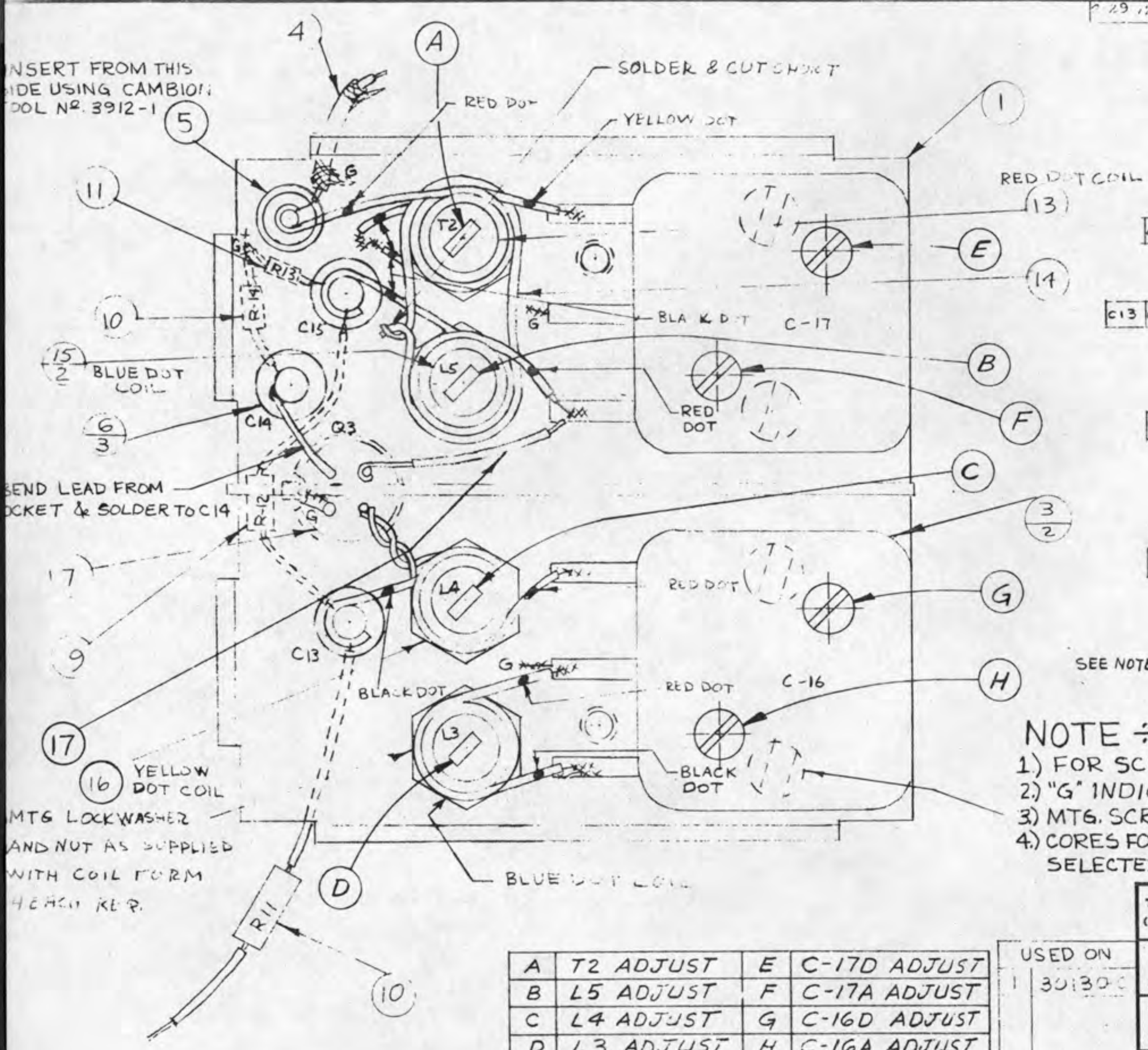
CIR. NO.	NO. REQ.	PART NO.	PART NAME
20	1	17541-A	WASHER
21	1	16000-A	SPOOL, IDLER
22	1	2300 A	TAPE, DIAL
23	1	10000-A	BUSHING
24	[illegible]	24257A	WIPER
25	1	8014-A	KNOB
26	1	24052-A	[illegible]
27	1	[illegible]	PLATE, WINDOW COMPL.
28	1	5663-A	CONNECTOR BNC
29	1	17500-A	WASHER, BOWED
30	2	440-4-8-SS	SCREW, SET
31	1	2564-1ASS	SCREW #2-56 FLT HD
32	2	13006-A	SPACER, BOARD
33	1	[illegible]	SCREW, 4-40 x 5/8
34	1	18000	NUT [illegible]
35	1	19009 B	CASE, R.F. (TOP)
36	1	19010 B	CASE, R.F. (BOTTOM)
37	2	680-16-4SS	SCREW [illegible] HD 1/2 LG
33	1	[illegible]	SOLDER LUG

CIR NO	NO REQ	PART NO	PART NAME	
39	2	13015-A	SPACER [illegible] 2-56 [illegible] LG	
40	1	[illegible]-A	SPACER [illegible]	
[illegible]	1	[illegible]	SCREW #4-40 PAN HD. 1/4 LG.	
[illegible]	1	5434 A	CLIP [illegible]	
43	1	R19[illegible]	[illegible], OSC.	
44				
[illegible]	1	4748-A	TRANSISTOR 40894	Q-3
46	1	24-33-4-4-3/4	WIRE #24 3/4 LG	
47	1	24-[illegible]	WIRE #24 1/2 LG	
48	2	10-0[illegible]	RESISTOR 33 [illegible]	R-11 R-14
[illegible]	1	10 [illegible]	RESISTOR 39K 1/4 W	R-12
[illegible]	1	10-0WR-3-2	RESISTOR 3.9K 1/4 W	R-13
[illegible]	2	256-5-6-SS	SCREW 2-56 PAN HD 5/32 LG	
53				
[illegible]	1	[illegible]27-[illegible]	[illegible] KIT [illegible]	

ER [illegible]

USED ON	
1	30100

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
DECIMAL ±.005		SCALE 2:1	DRAWN BY ALS / APPROVED BY [illegible]
FRACTIONAL ± 1/64	TITLE TUNER ASS'Y, TA3-5		
ANGULAR ± 1°	DATE 6-28-68	DRAWING NUMBER 30130-C	27



A	T2 ADJUST	E	C-17D ADJUST
B	L5 ADJUST	F	C-17A ADJUST
C	L4 ADJUST	G	C-16D ADJUST
D	L3 ADJUST	H	C-16A ADJUST

ER-120-E

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
12/15	69	SEE ER-248		RT	FB
4/28/70		SEE ER-318		SH	FB
6/70		SEE ER-348			FB
11/16/70		SEE ER-408			FB
4/19/71		SEE ER-506			FB

CIR.			CIR.	REQ.	PART NO.	PART NAME
			1	1	30129-B	COVER R.F. COMP'L
			2			
	C16	C17	3	2	2527-A	MITSUMI PVC-2Z
			4	1	7002-A	MINATURE COAX, 2 1/4"
			5	1	5423-A	TERMINAL, INSULATED
C13	C14	C15	6	3	210-P-0029	CAP. FEED THRU 1000 PF
			7	1	5422-A	SOCKET, TRANSISTOR
			8			
		R12	9	1	10-OWO-3-2	RESISTOR 39 K Ω 1/4 W
	R11	R14	10	2	10-OWT-3-2	RESISTOR 330 Ω 1/4 W
		R13	11	1	10-OWR-3-2	RESISTOR 3.9 K Ω 1/4 W
			12			
		T2	13	1	3018-A	TRANSFORMER 3P/4S W26
		L6	14	1	3837-A	LINK COUPLER 1T #26
	L5	L3	15	2	3836-A	COIL, 4T # 26 CW
		L4	16	1	3838-A	COIL, 4T # 26 CCW
			17	1	STD-2	JUMPER (BW) 1/2" Lg
			18		3206-A	CORE, COIL (GREEN)
			19		3223-A	CORE, COIL (WHITE)
			20			

SEE NOTE 4 (items 18, 19)

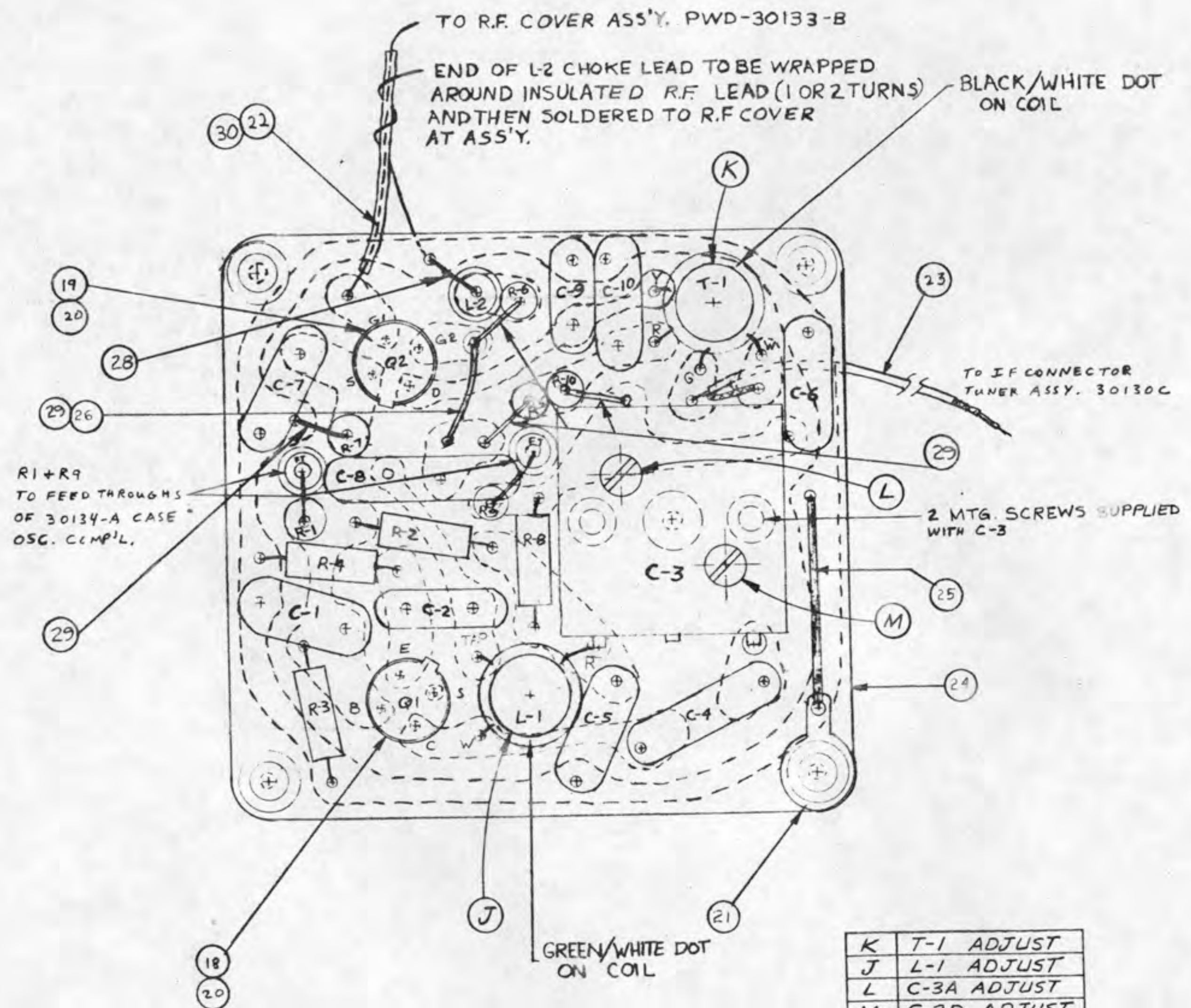
NOTE ÷

1.) FOR SCHEMATIC SEE SWD-4027-B
2.) "G" INDICATES CHASSIS GROUND CONNECTION
3.) MTG. SCREWS AS SUPPLIED WITH PART 3 (4 RQD)
4.) CORES FOR L3, L4, L5 & T2 ARE FACTORY SELECTED. (GREEN MEI 3206-A OR WHITE MEI 3223-A)

FIGURE 12.18

USED ON 30130-C	TOLERANCES (EXCEPT AS NOTED)	M... ENGINEERING INC. ... POST RD. FAIRFIELD, CONN.			
	DECIMAL ±		SCALE 4:1	DRAWN BY S.P.M. / APPROVED BY	
	FRACTIONAL ±	TITLE COVER ASS'Y R.F. TA3-5			
	ANGULAR ±	DATE 9-30-68	DRAWING NUMBER PWD-30133-B		ISSUE 7

ALBANENE ® 10 5465 ENGINEERS' STANDARD FORM



K	T-1 ADJUST
J	L-1 ADJUST
L	C-3A ADJUST
M	C-3D ADJUST

8-76	ER-823				FB
		7-23-65	SEE ER-154		
		6-11-66	SEE ER-166		
			SEE ER-176		
		5-21-69	SEE ER-209		
		12/15/69	SEE ER-248	RT	
			SEE ER-700	RT	FB

M

		CIR. NO.	NO. REQ.	PART NO.	PART NAME
		R-1 1	1	10-00R-3-2	RESISTOR 3.3K 1/4W
		R-2 2	1	10-RB0-3-2	RESISTOR 20K 1/4W
		R-3 3	1	10-TB0-3-2	RESISTOR 10K 1/4W
	R-4	R-6 4	2	10-TGR-3-2	RESISTOR 1.5K 1/4W
		R 5 5	1	10-TG0-3-2	RESISTOR 15K 1/4W
		R 7 6	1	10-TST-3-2	RESISTOR 180 1/4W
R-8	R-9	R-10 7	3	10-00T-3-2	RESISTOR 330 1/4W
	C-1	C-7 8	2	2-.01M-0040	CAPACITOR .01M
		C-2 9	1	2-33P-0014	CAPACITOR 33P
		C-3 10	1	2507-A	CAPACITOR, MITSUMI PVC-22
		C-4 11	1	2-120P-0092	CAPACITOR 120 P
C-5	C-6	C-10 12	3	2-.02M-0043	CAPACITOR .02M
		C-8 13	1	2-50P-0133	CAPACITOR 50P
		C-9 14	1	2-22P-0012	CAPACITOR 22P
		T-1 15	1	3019-A	TRANSFORMER, IF
		L-1 16	1	3839	COIL, OSC
		L-2 17	1	3602	CHOKE, 6.8 UH.
		Q-1 18	1	4748-A	TRANSISTOR, 40894
		Q-2 19	1	4749-A	TRANSISTOR, 40819
		20	2	5425-A	SOCKETS, Q1, Q2
		21	1	5487-A	SOLDER LUG
		22	1	STD-2	JUMPER (BW) 7/8 LG.
		23	1	7004	COAX, RG 196/U, 3"
		24	1	4027-B	PC BOARD AS MACH. TA3-5
		25	1	STD-2	JUMPER (BW) 1" LG.
		26	1	STD-2	JUMPER (BW) 1/2 LG
		27	1	STD-2	JUMPER (BW) 2" LG
		28	1	24079-A	TUBING, INSULATED 1/2"
		29	5	24054-A	TUBING, INSULATED 3/8
		30	1	24070-A	TUBING, INSULATED 3/4"

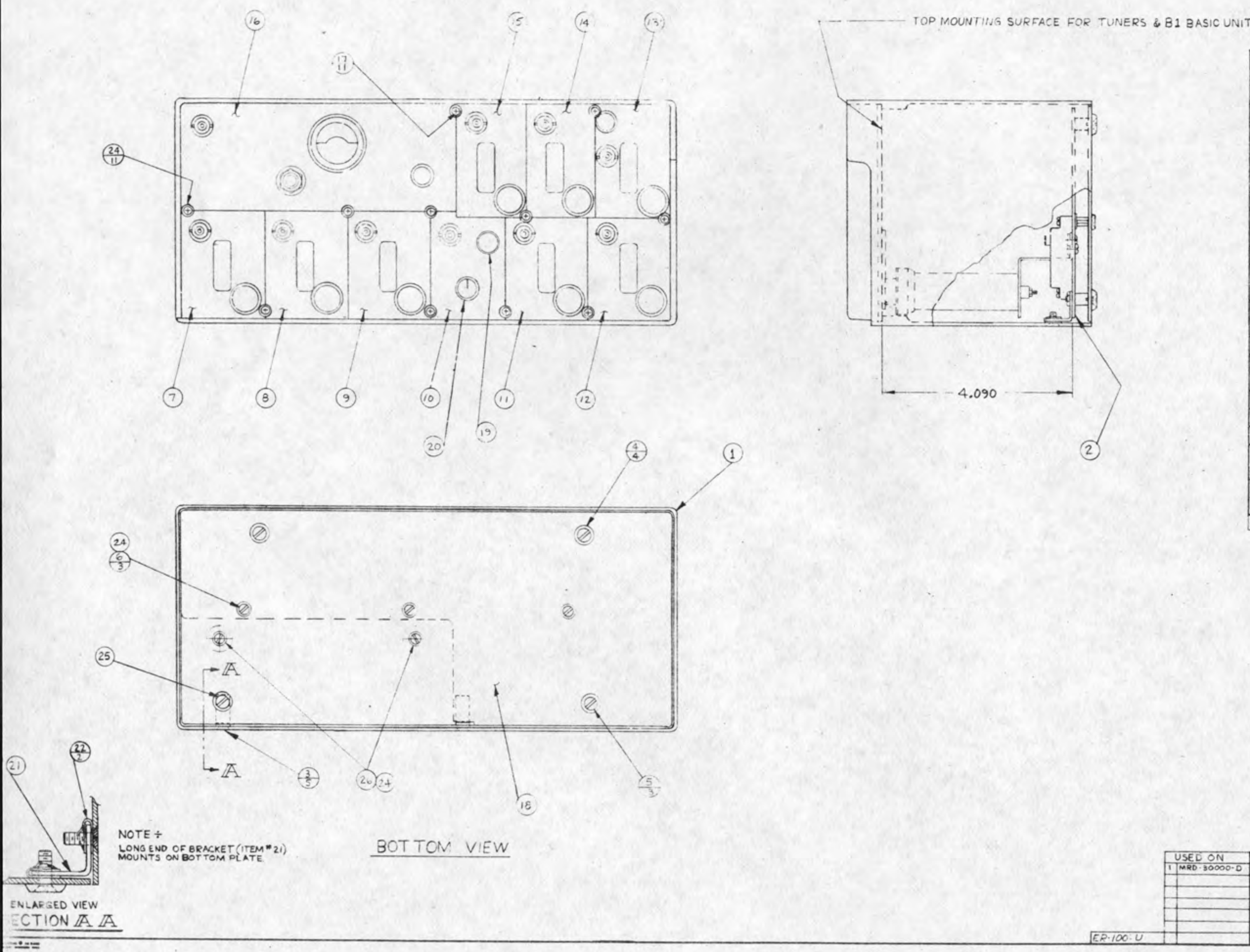
NOTE: —

1. ADD COATING OF BETACOTE CLEAR #91-1B TO BOTH SIDES OF P-C BOARD AT ASSEMBLY (ESSEX CHEMICAL, NEW JERSEY)

FIGURE 12.19

USED ON	TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.	
1 30130-C	DECIMAL ±	SCALE 4:1	DRAWN BY SPM; APPROVED BY FKB
	FRACTIONAL ±	TITLE PICTORIAL WIRING DIAGRAM TA3-5	
	ANGULAR ±	DATE 5-23-69	DRAWING NUMBER PWD 4027-C; ISSUE 8

ER-100-E



CIR NO	NO. RQD	PART NO.	PART NAME
1	1	19052-D	CASE-H.F.R. AS MACHINED
2	1	30102-C	SWITCHBOARD ASS'Y
3	5	632-12-18-SSB	SCREW, #6-32 × 3/8 FLAT HD.
4	4	17543-A	CUP WASHER #6
5	3	632-10-1A-SSB	SCREW, #6-32 × 5/16 FLAT HD (82°)
6	3	440-6-6-SSB	SCREW, #4-40 × 3/16 PAN HD.
7	1	30110-C	TUNER ASS'Y. - TA3-1
8	1	30115-C	TUNER ASS'Y - TA3-2
9	1	30120-C	TUNER ASS'Y. - TA3-3
10	1	5874-B	PLATE, GRAPHIC, BANDSWITCH
11	1	30125-C	TUNER ASS'Y. TA3-4
12	1	30130-C	TUNER ASS'Y TA3-5
13	1	30135-D	TUNER ASS'Y TA3-6
14	1	30140-D	TUNER ASS'Y TA3-7
15	1	30150-D	TUNER ASS'Y TA3-8
16	1	PWD 30106-X	B1-C1 ASS'Y
17	11	440-12-6-SSB	SCREW #4-40 × 3/8 PAN HD.
18	1	24086-C	PLATE, BOTTOM. H.F.R.
19	1	8004-A	KNOB, CONTROL
20	1	8015-A	KNOB, SELECTOR
21	1	21016-A	BRACKET, SWITCHBOARD MTG.
22	2	18021-A	NUT, SPEED
23			
24	16	17542-A	WASHER, PANEL
25	1	632-12-1A-SSB	SCREW, #6-32 × 3/8 FLAT HD. (82°)
26	2	440-8-6-SSB	SCREW, #4-40 × 1/4 PAN HD. (BLACK)

USED ON: MRD-30000-D

MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.

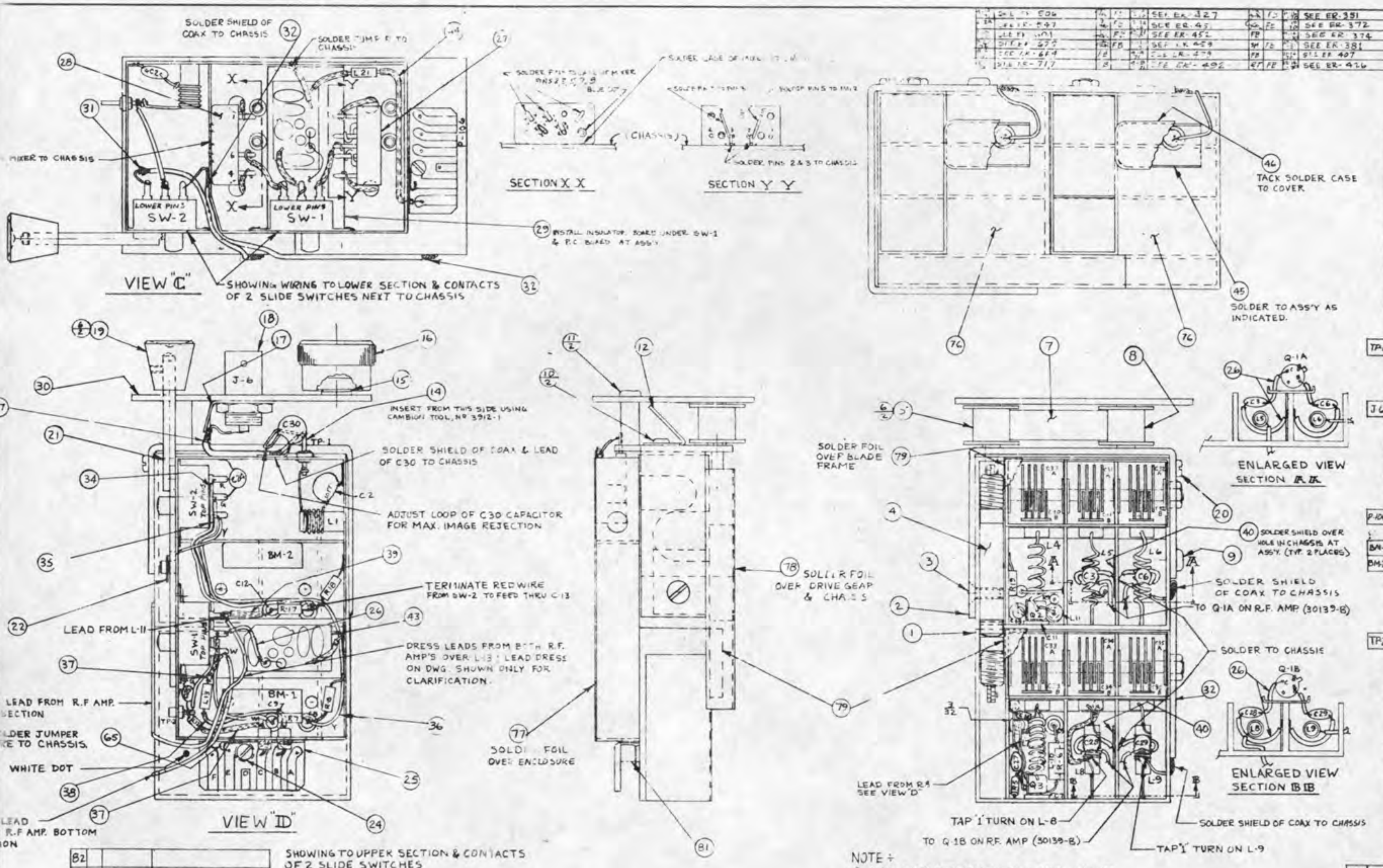
SCALE: FULL — DRAWN BY: S.P.M.

TITLE: HIGH FREQ. RECEIVER ASS'Y.

DATE: 1-16-70 — DRAWING NUMBER: 30100-D — ISSUE: 10

ER-100-U

FIGURE 12.2



CIR NO	NO REQ	PART NO.	PART NAME
	1	1	30136-D	CHASSIS COMP'L
	2	1	30138-B	BRACKET COMP'L MTG
	3	1	440-10-18-SS	SCREW #4-40 FLAT HD
	4	1	30143-A	DRIVE GEAR COMP'L
	5	1	16001-A	SPOOL, DRIVE
	6	4	4404-5-SS	SCREW, SET
	7	1	23004-A	TAPE, DIAL
	8	1	16000-A	SPOOL, IDLER
	9	1	440-6-6-SS	SCREW #4-40 PAN HD
	10	2	256-3-6-SS	SCREW #2-56 PAN HD
	11	2	440-8-6-SSS	SCREW #4-40 PAN HD
	12	1	24056-B	MIRROR
	13			
TP1	14	1	5423-A	TERMINAL, INSULATED
	15	1	10020-A	BUSHING
	16	1	8014-A	KNOB
	17	1	5454-A	SOLDER LUG
J6	18	1	5663-A	CONNECTOR, BNC
	19	1	8005-A	KNOB, PULL
	20	1	256-4-6-SS	SCREW #2-56 PAN HD
	21	1	30175-A	SWITCH ARM COMP'L
	22	1	17005-A	RETAINING RING
	23			
	24	1	256-10-1A-SS	SCREW #2-56 FLAT HD
P-106	25	1	4058-B	CONNECTOR BD
	26	S	24213-A	TUBING, INSULATED
BM-2	27	1	5036-B	BALANCED MIXER
BM-2	28	1	5035-B	BALANCED MIXER
	29	1	24273-A	INSULATOR, P.C. BOARD
	30	1	30178-A	PLATE, WINDOW COMP'L
	31	1	7021-A	COAX $2\frac{1}{2}$" LG.
	32	1	7026-A	COAX 4" LG.
TP2	33	1	5450-A	TERMINAL, INSULATED
	34	1	[illegible]	WIRE LEAD "R"
	35	1	[illegible]	WIRE LEAD "G"
	36	1	[illegible]	WIRE LEAD "Y"
	37	2	24071-A	TUBING, INSULATED
	38	1	24070-A	TUBING, INSULATED
	39	1	24054-A	TUBING, INSULATED
	40	2	24274-A	SHIELD
	41			
	42			
	43	1	[illegible]	I.F. PREAMP. ASS'Y [illegible]
	44	~	24213-A	INSULATING TUBING
	45	2	30139-B	R.F. AMP. COMP'L
	46	2	R-13013-A	CASE AMP.
	47	1	7076-A	WIRE, COAX
R13 R5	48	2	10-0073-2	RESISTOR 330 Ω
R18 R9 R8	49	4	10-780-5	RESISTOR 10K
R17 R7	50	2	10-6H8-3	RESISTOR 5.6K

	82			
	81	1	13037-A	SPACER, BD. (L-M)
	80			
	79	2	19017-A	COVER BLADE
	78	1	19080-A	COVER, SHAFT
	77	1	19057-A	FOIL COVER
	76	2	19018-A	COVER, OSC.
Q-3 Q-2	75	2	4703-A	TRANSISTOR 2N918
	74			
	73			
	72			
	71			

	70			
	69			
L11 L10	68	2	3604-A	CHOKE 30 μH
L9 L8	67	2	3864-A	COIL
	66			
	65	1	STD-2	JUMPER (BW) $\frac{1}{2}$ LG
L7 L6 L5	64	3	3861-A	COIL
L4	63	1	3860-A	COIL
L13 L12	62	2	3607-A	CHOKE .47 μH
L1	61	1	3865-A	COIL

NOTE ÷
3) * INDICATES FACTORY SELECTED VALUE

* C14 C0	1	2-0.7P-0112	CAPACITOR 0.7 PF	
C30 C27	59	2	2-6.8P-0008	CAPACITOR 6.8 PF
C29 C28 C6 C3	58	4	2-120P-0022	CAPACITOR 120 PF
C26 C22 C13 C12 C9 C8	57	6	2-1000P-[illegible]	CAPACITOR F.T. 1000 PF
C2	56	1	2-10P-[illegible]	CAPACITOR 10 PF
C25 C24	55	2	2-[illegible]	CAPACITOR .001 MF
C7	54	1	2-10P-[illegible]	CAPACITOR BUTTON 10 PF
C11	53	1	2-4.7P-0113	CAPACITOR BUTTON 4.7 PF
	52			
	51			

NOTE ÷
1) FOR SCHEMATIC WIRING DIAGRAM, SEE SWD-4028-C
2) ALL WIRES TO P-106 SHOULD BE LOOPED FOR SLACK BEFORE SOLDERING.

FIGURE 12.20

USED ON

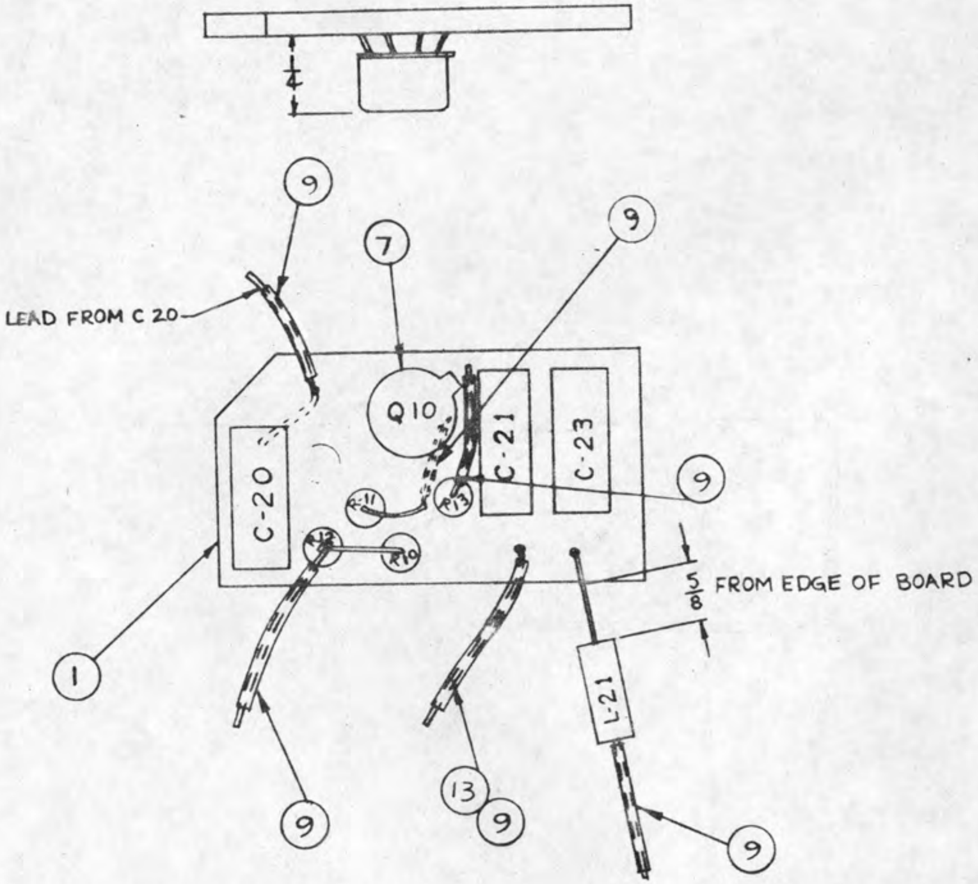
TOLERANCES: DECIMAL ± .005; FRACTIONAL ± 1/64; ANGULAR ± 1°

M[illegible] ENGINEERING INC.

TITLE: TUNER ASS'Y (T[illegible])

DATE 9-11-69 — 30[illegible]35-D

ER-100-R



DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
		SEE ER-509			FB
		SEE ER-700			FB

	CIR NO	NO REQ	PART NO	PART NAME
	1	1	4068-A	P.C.BOARD (AS MACH)
R-11	2	1	10-OWR 2-2	RESISTOR 3.9K
R-12	3	1	10-OWO-2-2	RESISTOR 39K
R-13	4	1	10-OOT-2-2	RESISTOR 330 Ω
	5			
	6			
Q-10	7	1	4748-A	TRANSISTOR 40894
	8			
	9	5	24213-A	INSULATING SLEEVE
C23 C21 C20	10	3	2-1000P.0103	CAPACITOR .001 MF
	11			
L-21	12	1	3607-A	CHOKE
	13	1	STD-2	WIRE, JUMPER (BW)
R10	14	1	10-TBR 2 2	RESISTOR 1K

12.21

NOTE ÷

1. INSULATING SLEEVE ON LEAD OF TRANSISTOR 1/8 LG. TERMINATE TO COPPER LAND OF R11
2. MOUNT TRANSISTOR LAST ON ASS'Y.

FIGURE 12.21

USED ON	TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 R... RD. FAIRFIELD, CONN.
1 30135-D	DECIMAL ±	SCALE 4:1 / DRAWN BY / APPROVED BY
	FRACTIONAL ±	TITLE I.F. PREAMP ASS'Y TA3-6
	ANGULAR ±	DATE / DRAWING NUMBER PWD-4068-B / ISSUE 3

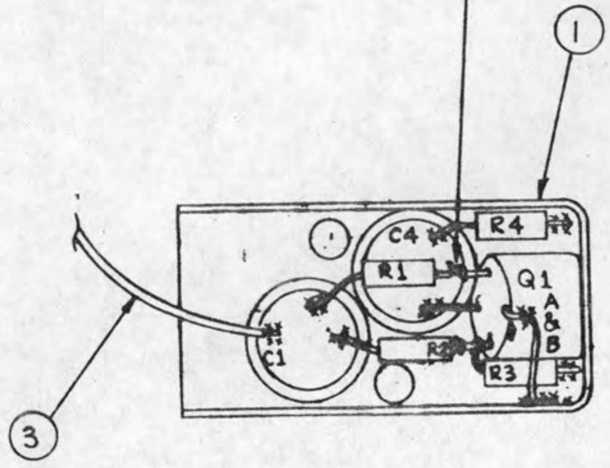
ER-381

K+E ALBANENE 10 6465

SIM PWD-4023-B

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
9-30-70		SEE ER-381 NEW DWG			FB
10-?-70		SEE ER-426			FB
12-?-70		SEE ER-451			

THIS JOINT IS NOT SOLDERED TO BUTTON CAPACITOR



		CIR. NO.	NO. RQD.	PART NO.	PART NAME
		1	1	R-19078-A	COVER, R.F. AMP.
		2			
		3	1	24-22-4-4-5	WIRE, LEAD (R) 5" LG.
Q-1B	Q-1A	4	1	4723-A	TRANSISTOR 2N5181
		5			
C-4	C-1	6	2	2-1000R-D091	CAPACITOR .001
		7			
		8			
		9			
	R1	10	1	10-TBR-2-2	RESISTOR 1K 1/8 W
	R2	11	1	10-RBO-2-2	20K
	R3	12	1	10-OOR-2-2	3.3K
	R4	13	1	10-OOT-2-2	RESISTOR 330Ω 1/8 W
		14			

12.22

NOTE ÷

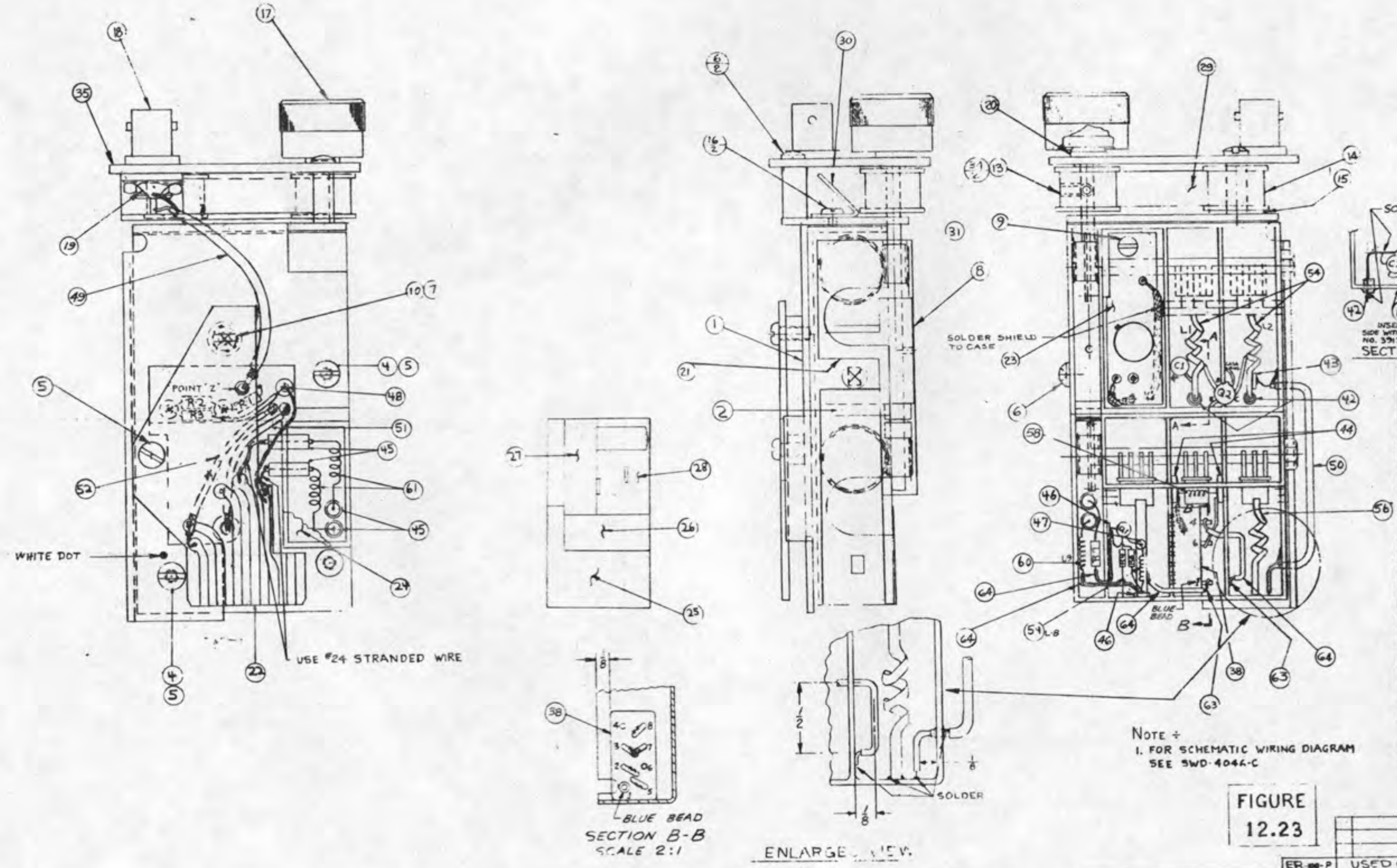
FOR SCHEMATIC INFORMATION SEE SWD-4028-C

FIGURE 12.22

USED ON		TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.	SCALE 4:1	DRAWN BY S.P.M. / APPROVED BY
2	30135-D	DECIMAL ± .005			
		FRACTIONAL ± 1/64	TITLE R.F. AMP. COMP'L.		
		ANGULAR ± 1°	DATE 10-30-70	DRAWING NUMBER 30139-B	ISSUE 5

ER-381

K+E ALBANENE



NOTE:
1. FOR SCHEMATIC WIRING DIAGRAM SEE SWD-4044-C

FIGURE 12.23

Revision record	Revision record	Revision record
SEE ER-427	SEE ER-232	SEE ER-202
SEE ER-449	SEE ER-233	SEE ER-226
SEE ER-459	SEE ER-326	SEE ER-234
SEE ER-468	SEE ER-288	SEE ER-240
SEE ER-494	SEE ER-373	SEE ER-291
SEE ER-506	SEE ER-374	
SEE ER-604	SEE ER-405	
SEE ER-539	SEE ER-413	
SEE ER-664		
SEE ER-[illegible]		

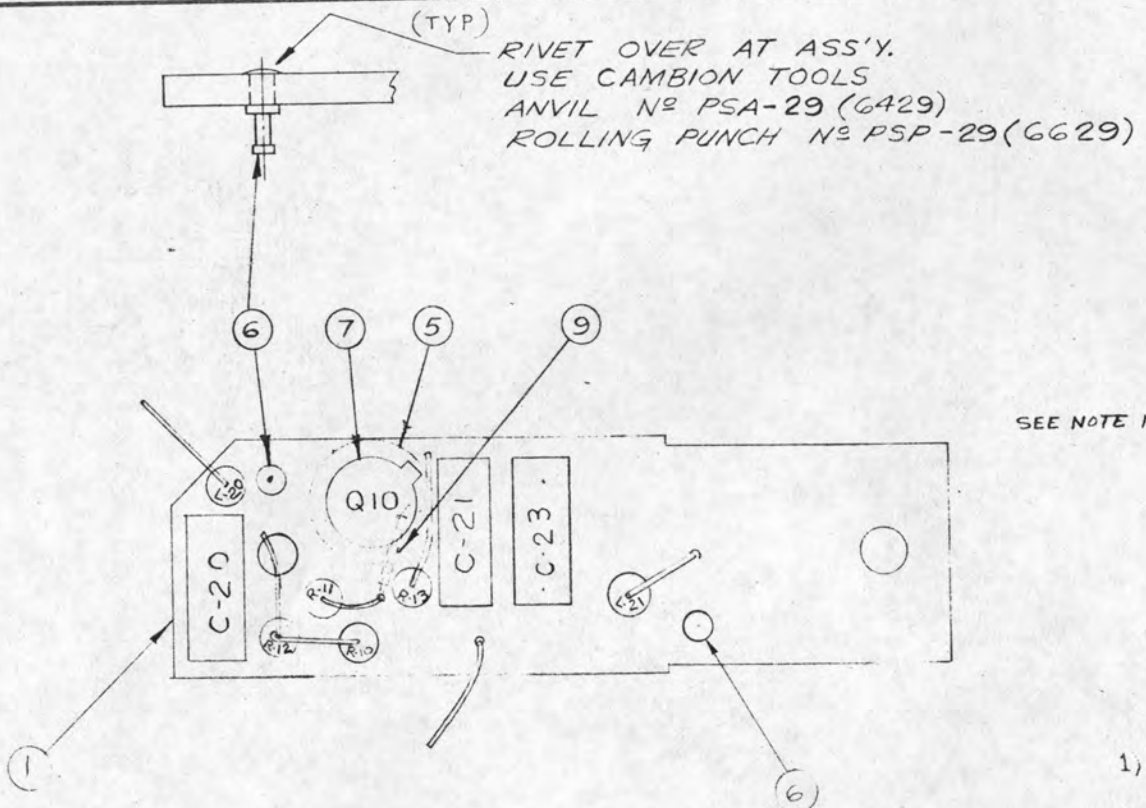
* PARTS SUPPLIED W/TUNER

					Cir. No.	No. Req.	Part No.	Part Name
					1	1	30144-A	BRACKET COMPL., MTG.
					2	1	30142-B	CHASSIS, UHF TA3-7 COMPL.
					3			
					4	2	17521-A	WASHER
					5	3	440-6-4SS	SCREW 4-40 FIL. 3/16 LG.
					6	2	440-8-6-SS	SCREW 4-40 PAN HD. 1/4 LG.
					7	1	13006-A	SPACER, BOARD
					8	1	30143-A	DRIVE GEAR COMPL.
					9	1	2564SS	SCREW, 2-56 x 1/8
					10	1	440-10-6-SS	SCREW 4-40 x 5/16 LG PAN HD.
					11	1	5923A	TERMINAL, INSULATED
					12			
					13	1	16001A	SPOOL, DRIVE
					14	1	16000A	SPOOL, IDLER
					15	1	17541A	WASHER, TEFLON
					16	2	256-3-6-SS	SCREW 2-56 x 3/32 LG
					17	1	8014--	KNOB
					18	1	5624-A	CONNECTOR BNC
					19	1	5454-A	SOLDER LUG
					20	1	10000A	BUSHING
					21	1	19066-A	COVER, SHAFT
					22	1	4030-A	BOARD CONNECTOR
					23	1	PWD4029-B	P.C. BOARD ASSY
					24	1	19038A	COVER, FILTER (5)
					25	1	19018A	COVER, OSC (3)
					26	1	19017A	COVER, BLADES (2)
					27	1	19019A	COVER, I.F. (4)
					28	1	19016A	COVER, R.F. (1)
					29	1	23004-A	TAPE DIAL
					30	1	24056-B	MIRROR
					31			
					32			
					33			
					34	2	440-4-5-SS	SCREW, SET
					35	1	30149-A	PLATE, WINDOW CONT
					36			
					37			
				BM1	38	1	5035-B	MIXER, DOUBLY BALANCED
				Q2	39	1	4723A	TRANSISTOR 2N5181
*				Q1	40	1	4724-A	TRANSISTOR 2N918A
				C-1	41	1	2-120P-0077	CAPACITOR 120PF DISC
			C-3	C-2	42	2	2-500P-0087	500 PF FT
				C4	43	1	2-68P-0048	68 PF BUTTON
			C8	C7	44	2	2-10P-0089	10 PF BUTTON
C13	C16		C5	C14	45	4	2-1000P-0090	1K PF FTEYE
*			C12	C10	46	2	2-1000P-0091	1K PF BUTTON
*				C11	47	1	2-33P-0090	33 PF BUTTON
				C24	48	1	2-1000P-0029	CAPACITOR 1K PF. FT
					49	1	7006A	COAX
					50	1	7039A	COAX
					51	1	7040A	COAX
					52	1	7008A	COAX
					53			
			L-1	L-2	54	2	3846-A	COIL
					55			
				L4	56	1	3847-A	COIL RF
					57			
				L-6	58	1	3849A	COIL MIX-IF-COUPLING
*				L-8	59	1	3850A	COIL
*				L-9	60	1	3851A	COIL OSC FILTER
			L11	L-10	61	2	3852A	COIL, FILTER
					62			
					63	~	STD-2	JUMPER TSW 22 GA
					64	~	24213-A	TUBING, INSULATING
					65			
					66			
10*				R-1	67	1	10-TSR-3-2	RESISTOR 1.8K
				R-2	68	1	10-RB032	20K
			R7	R3	69	2	10-TBR32	1K
*				R4	70	1	10-TBR32	1K
				R6	71	1	10-RRO-3-2	RESISTOR 22K
					72			
					73			

MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.

TOLERANCES EXCEPT AS NOTED			
DECIMAL ± .005		SCALE 2:1	DRAWN BY R.T.M. / APPROVED BY F.M.B.
FRACTIONAL ± 1/64	TITLE: TUNER ASSY TA3+7		
ANGULAR ± 1°	DATE: 1-24-69	DRAWING NO. 30140-D	28

ER-100-P | USED ON



DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
11-6-?		SEE ER 240		[illegible]	FB
4-3-70		SEE ER-292		EM	FB
12-15-73		SEE ER-70?		RT	F?

	CIR NO	NO. REQ	PART NO	PART NAME
	1	1	4029-?	P-C BOARD (AS MACH)
R11	2	1	10-0W?-32	RESISTOR 3.9K
R12	3	1	10-0WD-32	RES[illegible] 3?K
R13	4	1	10-00T-32	RESISTOR 330Ω
	5	1	5425-A	SOCKET, TR[illegible]
	6	2	5436-A	TERMINAL, TUR[illegible]
Q10	7	1	4748-A	TRANS[illegible] 40894
SEE NOTE Nº 3 → L-20	8	1	3615-A	CHOKE 6.8MH
	9	1	2403?-A	INSULAT[illegible]
C-23 C-21 C-20	10	3	2-10-?P-0102	CAPACITOR .001 MF
	11	1		
L-21	12	1	3607-A	CHOKE
	13	1	STD-2	WIRE, JUMPER (3W)
R10	14	1	10-TBK 32	RESISTOR 1K

NOTES:

1) IN[illegible] S[illegible]E ON LEAD OF R-11 [illegible] ⅜ LG, FROM [illegible] PR[illegible]).
2) ADD COATING OF [illegible]OTE #91-18 TO BOTH SIDES OF P[illegible] BO[illegible] AT [illegible].
3) L-20 IS OMITTED ON TAB 7.

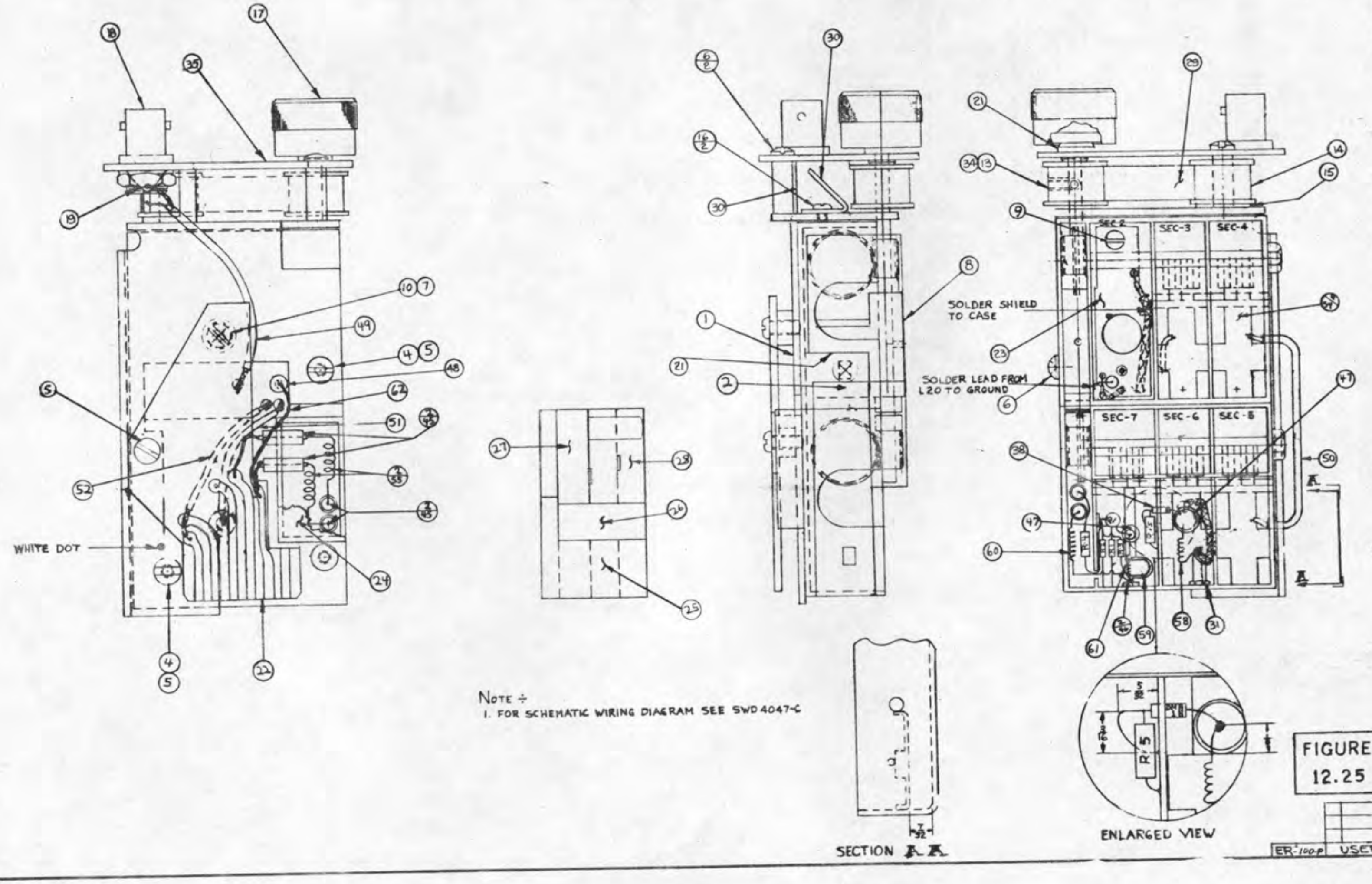
FIGURE 12.24

USED ON
1 30140-D
1 30150-D

TOLERANCES (EXCEPT AS NOTED)	[illegible] INC. [illegible] CONN.			
DECIMAL ± .005		A.D. 3	SCALE 4:1	DRAWN BY S.P.M / APPROVED BY [illegible]
FRACTIONAL ± 1/64	TITLE I.F. PREAMP ASS'Y.			
ANGULAR ± 1°	DATE 2-6-69	DRAWING NUMBER PWD-4029 B		ISS 4

ER-100-G

ALBANENE ® 10 5465 ENGINEERS' STANDARD FORM



NOTE ÷
1. FOR SCHEMATIC WIRING DIAGRAM SEE SWD 4047-C

FIGURE 12.25

SEE ER-427	SEE ER-292
SEE ER-449	SEE ER-298
SEE ER-459	SEE ER-388
SEE ER-604	SEE ER-374
SEE ER-822	SEE ER-405
SEE ER-202	SEE ER-344
SEE ER-240	SEE ER-377
SEE ER-251	

* PARTS SUPPLIED W/ TUNER

Ref.	CIR. NO.	NO. REQ'D	PART NO.	PART NAME
	1	1	30144-A	BRACKET COMPL., MTG.
	2	1	30151-B	CHASSIS, UHF COMPL.
	3			
	4	2	17521-A	WASHER
	5	3	440-6-4 SS	SCREW 4-40 PAN 3/16 LG.
	6	2	440-8-6 SS	SCREW, NO. 4-40 PAN HD. 1/4 LG.
	7	1	13006-A	SPACER, BOARD
	8	1	30143-A	DRIVE GEAR COMPL.
	9	1	2564-6 SS	SCREW 2-56-1/8
	10	1	440-10-6-SS	SCREW 4-40 X 5/16 LG. PAN HD.
	11			
	12			
	13	1	16001	SPOOL, DRIVE
	14	1	16000	SPOOL, IDLER
	15	1	175[illegible]-A	WASHER, TEFLON
	16	2	2563 SS	SCREW 2-56
	17	1	8014-A	KNOB
	18	1	5624-A	CONNECTOR BNC
	19	1	5454-A	SOLDER LUG
	20	1	10000A	BUSHING
	21	1	19066-A	COVER, SHAFT
	22	1	4030-C	BOARD, CONNECTOR
	23	1	PWD 4029	P.C. BOARD ASSY
	24	1	19038A	COVER, FILTER
	25	1	19018A	COVER, OSC.
	26	1	19017A	COVER, BLADE
	27	1	19019A	COVER, I.F.
	28	1	19016A	COVER R.F.
	29	1	23004-A	TAPE DIAL
	30	1	24056B	MIRROR
	31			
	32			
	33			
	34	8	440-4-SS	SCREW, SET
	35	1	30152-A	PLATE, WINDOW COMP'L
	36			
	37			
	38	1	4507A	MIXER DIODE [illegible]
	39			
*	40	1	4724-A	TRANSISTOR, OSC. [illegible]
	41			
	42			
	43			
	44			
C3, C12, C11, C10	45	4	[illegible]	CAPACITOR 1KPF FEEDTHRU
* C9, C8	46	2	[illegible]	1KPF BUTTON
(1) * C7, C6	47	2	33P-0090	33PF BUTTON
C24	48	1	[illegible]	CAP. [illegible] 1KPF FT
	49	1	7025-A	COAX
	50	1	7010-A	COAX
	51	1	7011-A	COAX
	52	1	7008-A	COAX
	53			
L4, L3, L2, L1	54	4	3855A	INDUCTOR
L10, L9	55	2	3852A	COIL, FILTER
	56			
	57	1		
L11	58	1	3849-A	COIL MIXER
* L6	59	1	3856-A	COIL, OSC - REWORKED
* L8	60	1	3851-A	COIL, OSC - FILTER
* L7	61	1	3850-A	COIL
	62		24224-41[illegible]	WIRE
	63			
	64			
	65			
	66			
* R2	67	1	10-TSR32	RESISTOR 1.8K
R5	68	1	10-TBT32	100 Ω
R4	69	1	10-TBR32	1K
* R1	70	1	10-TBR32	1K
* R3	71	1	10-YPR32	RESISTOR 4.7K
	72			
	73			

MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.

TOLERANCES: DECIMAL ±.005; FRACTIONAL ±1/64; ANGULAR ±1°	SCALE 2:1
TITLE	TUNER ASSY TA3-8
DATE	1/22/69
DRAWING NO.	30150-D
USED ON	ER-100P
	16

5-3-61 SEE ER-554 9-21 FB

DATE	REVISION RECORD
	SEE ER-186
	SEE ER-255
	SEE ER-374
	SEE EP-416
	SEE ER-100-W

	CIR NO	NO REQ	PART NO	PART NAME
	1	1	19024-C	CASE L.F.R.
	2	1	PWD 30205-D	LF WIRING ASS'Y
	3	4	8004-A	KNOB CONTROL
	4	1	8005-A	KNOB, PULL
	5	1	15005-A	SHAFT
	6	3	440-6-18-55B	SCREW, #4-40 FLAT HD. (BLACK
	7	9	440-6-6-56B	SCREW, #4-40 P.H. (BLACK)
USED ONLY FOR SER № 1 TO 101 → TA3-03	8	1	30210-D	TUNER ASS'Y TA3-03
	9	2	440-4-5-56	SCREW, SET
TA3-03B	10	1	30250	TUNER ASS'Y TA3-03-B

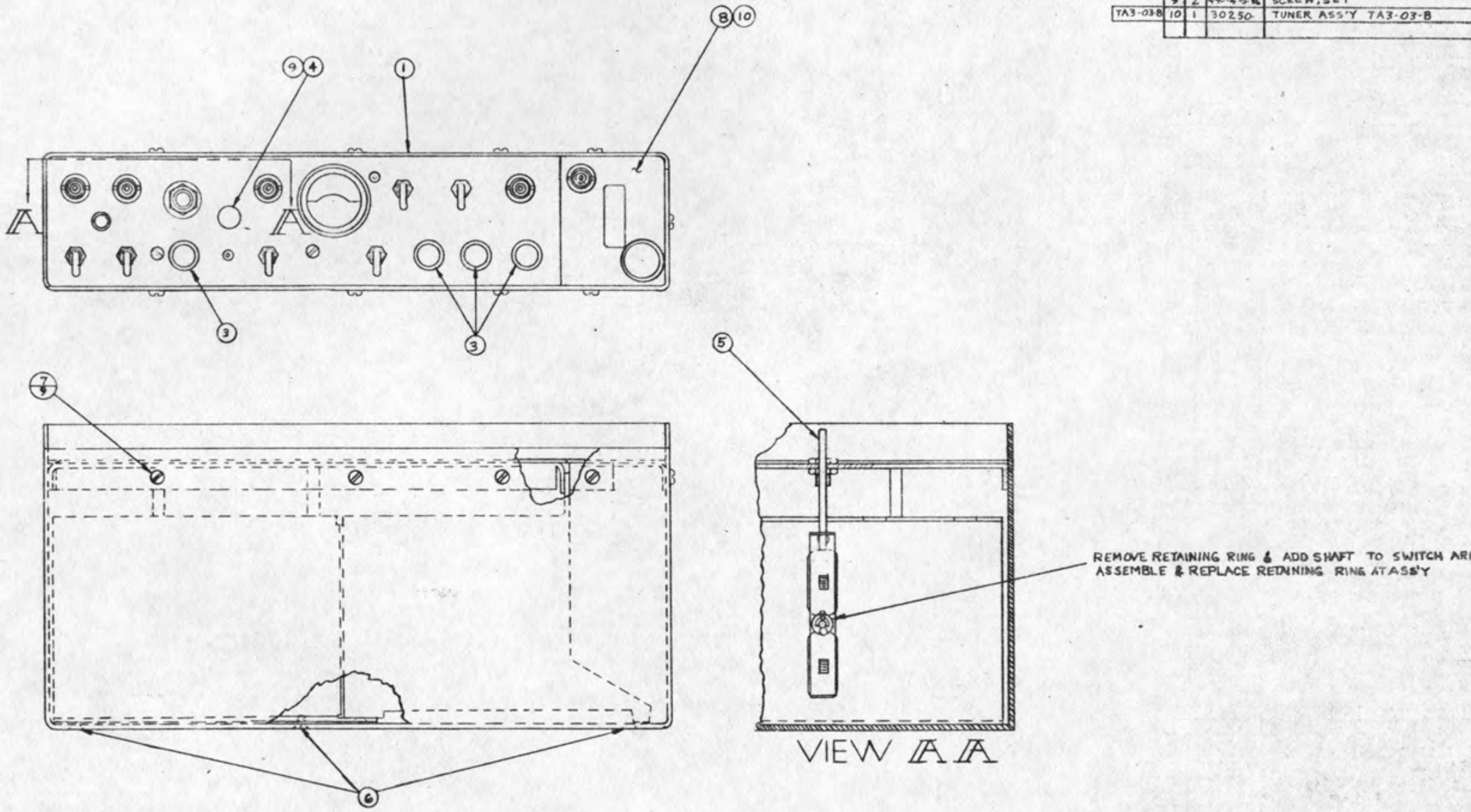


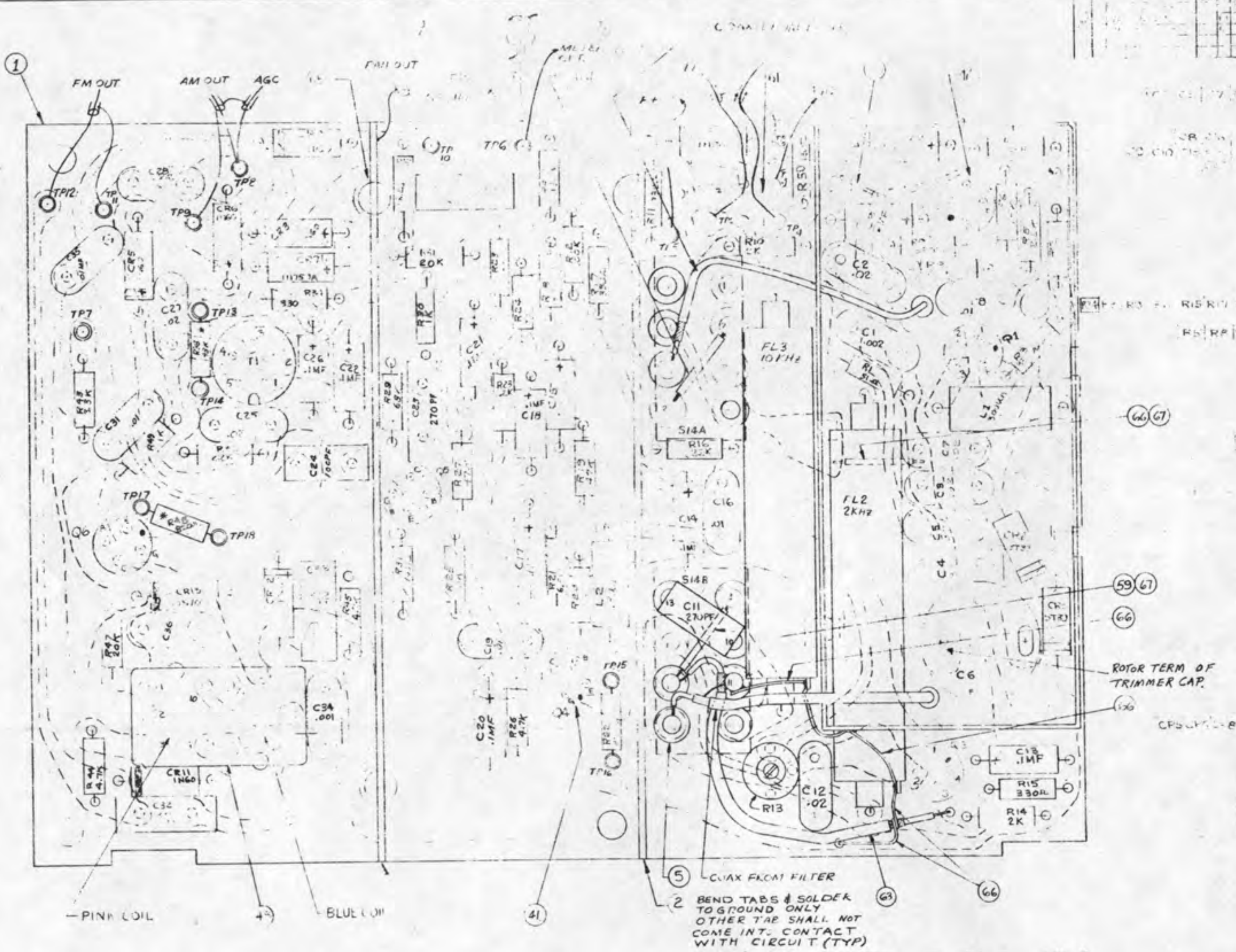
FIGURE 12.26

MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.

LOW FREQ. RECEIVER ASS'Y.

DATE 4-14-67 | DRAWING NUMBER 30200-D

USED ON ER-100-J



Ref.	Item	Qty	Part No.	Description	Value / Spec.
	1	1	4032-B	P.C. BD. (AS MACH)	
	2	2	2272-A	SHIELD	
	3	1	26023-S	[illegible]	
	4	1	[illegible]	[illegible]	
	5	16	[illegible]	[illegible]	
			[illegible]	CAPACITOR	[illegible] CTL [illegible]
C27	7	6	[illegible]	"	.02MF CTL DDM 203
C[illegible]	8	1	[illegible]	"	33PF CTL DTZ-33
C6	9	1	7604	" TRIMMER	8-53PF
C35	10	[illegible]	[illegible]	"	.01MF CTL DDM-103
C15	11	11	7JM-0044	"	.1MF SPR 150D104X9035
C11	12	2	2-2701-0093	"	270PF ELMENCO DM15K271100WVICR
C[illegible]	13	2	[illegible]	"	330PF ELMENCO DM15K 331100WVICR
C[illegible]	14	1	[illegible]	"	100PF CTL DTZ-103
C30	15	1	[illegible]	"	500PF ELMENCO DM15K [illegible] 100WVICR
C31	[illegible]	1	2001M-0110	"	.001 PF ELMENCO DM15F102KP100WVICR
C[illegible]6	[illegible]	[illegible]	2-200[illegible]	"	20PF CTL D[illegible]-200
C4	18	1	2-330P-00[illegible]	"	330 [illegible]
R1	19	1	10-GTK-3-2	RESISTOR	51Ω 1/4W
R2, R6	20	2	[illegible]	"	15K "
R[illegible] R15 R17 R18, R[illegible], R28	21	9	[illegible]	"	330 "
R[illegible]	[illegible]	1	1829-B	"	50K POT
R5, R8, R[illegible], R[illegible], R[illegible]	[illegible]	[illegible]	10-RRR 3-2	"	2.2K 1/4W
R7	24	1	10T [illegible]	"	150Ω "
R10, R14	25	2	10-RBR-3-2	"	2K "
* R50	26	1	10-ASY-3-2	"	680K "
R19, R27	27	2	10-YFO-3-2	"	47K "
R2[illegible], R25	[illegible]	2	10-TBO-[illegible]	"	10K "
R2[illegible]	29	1	10-ASI-[illegible]	"	6.8K "
R22	30	1	10-[illegible]	"	220Ω "
R26, R14, R45	[illegible]	[illegible]	10-YFI-[illegible]		4.7K "
R29	[illegible]	1	10-A[illegible]	"	65K "
R50, R48	[illegible]	2	10-TBR-[illegible]	"	1K "
R31	34	1	10-TBT-[illegible]	"	100Ω "
* R33	35	1	10-YOO-3-2	"	43K "
R51	36	1	10-[illegible]	"	220K "
R41, R47	37	2	10-[illegible]-2	"	20K "
R42	38	1	10-TFO-3-2	"	1MEG "
R[illegible]	[illegible]	[illegible]	10-OOR-3-2		8.2K "
R12	4[illegible]	1	10-TBY-3-2	"	100K
	[illegible]	5	5425-A	SOCKET, TRANSISTOR	
	42	1	[illegible]	"	
FL2	4[illegible]	1	502[illegible]	FILTER, LADDER	2KC BW
FL3	41	1	5027-A	"	10KC BW
L1	[illegible]	1	3605	CHOKE	300uH MILLER 9220-[illegible]
L2	[illegible]		3601-A	"	1.8uH MILLER 9310-18
T1	[illegible]		3004	IF TRANSFORMER 455KC	CAMBION 1195-5
T4	[illegible]		3004-E	DISCRIMINATOR	455KC
CR1	[illegible]		4516-A	DIODE, ZENER	1N965B
CR2, CR3	[illegible]	2	4514	DIODE	ST39 EASTRON LOW V REG.
CR5, CR6, CR8, CR9, CR1[illegible]	51	[illegible]	4500	DIODE	1N60
CR7	52	1	4[illegible]03-A	DIODE, ZENER	1N759A 4[illegible]
CR13	5[illegible]	1	4511	DIODE, ZENER	1N702 250MW
S[illegible]	54	[illegible]	5202	SWITCH, [illegible]	
Q1, Q3	55	2	4749-A	TRANSISTOR	40819
Q2	[illegible]6	1	4716	"	2N3546
Q4, Q5, Q6 (SEE NOTE 3)	57	3	4748-A	"	40894
	[illegible]	18	5417	TERMINAL, TURRET	
	[illegible]9	2	STD-2	JUMPER (BW)	1 1/2
R35	[illegible]	1	10-TSY-3-2	RESISTOR	180K 1/4 WATT
	61	1	24934-41	WIRE, LEAD	ORANGE
* R48	62	1	10-SRT-3-2	RESISTOR	820Ω 1/4W 5%
	63	1	7005-A	WIRE, COAX	RG-196-U
	[illegible]				
	65	4	16502-A	EYELETS	
	66	6	STD-2	WIRE, JUMPER - CUT TO SUIT	
	67	3	24213-A	TUBING, INSULATING	
	68	~	3406-A	SEALER, P.C. BOARD	

Rev.	Revision Record
	SEE ER-621
	SEE ER-143
	SEE ER-255
	SEE ER 311
	SEE ER 406
	SEE ER-4[illegible]
	SEE ER-504

NOTE:
1. APPLY SEALER (ITEM # [illegible]) TO [illegible]
2. [illegible]
3. RECOMMENDED SWAGING TOOLS FOR ITEM NO 5- CAMBION ANVIL PSA 6340, CAMBION PUNCH PSP-[illegible]
4. "*" INDICATES FACTORY SELECTED VALUE

SHOULDER [illegible] TERMINAL [illegible] FLUSH TO EYELET.

NOTE: SOLDER ALL EYELETS TO COPPER LANDS

4. ASSEMBLE COVER WITH HOLE CENTRAL WITH ADJUSTING SCREW ON C-6 (ITEM 9)

3. TURN TABS INWARD & SOLDER

FIGURE 12.27

USED ON	TOLERANCES	
1 30220-C	[illegible] INC. FAIRFIELD, CONN.	SCALE 4:1 · DRAWN BY ALS
	TITLE: PRINTED CIRCUIT BD. ASSY. B2-1	
	DATE 12-18-65 · DRAWING NUMBER PWD 4031-D	ISSUE 11

ER 10[illegible]3

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
		SEE ER-337			FB
		SEE ER-417			FB
		SEE ER-503			FB
		SEE ER-561			FB
		SEE ER-700		RT	FB

		CIR.	REQ.	PART No.	DESCRIPTION
		1	1	4032-C	P.C. BOARD (AS MACH.
		2	–	STD-2	JUMPER WIRE 1" LG
	T2	3	1	3020	TRANSFORMER, AUDIO MMT31-EB
	T3	4	1	3008	" OSC. MEI 3008
R60	R51	5	2	10-00R-3-2	RESISTOR 3.3K
		6			
	R53	7	1	10-GAR-3-2	" 5.6K
	R54	8	1	10-AST-3-2	" 680Ω
R62	R52	9	2	10-000-3-2	" 33K
	R59	10	1	10-RRR-3-2	" 2.2K
	R57	11	1	10-TBT-3-2	" 100Ω
	R58	12	1	10-GTB-3-2	" 51Ω
	R63	13	1	10-TSR-3-2	" 1.8K
	R61	14	1	10-TBY-3-2	RESISTOR 100K
	C38	15	1	2-1M-0048	CAPACITOR 1MF SPR. CS13BF 105K
C49	C40	16	2	2-10M-0051	" 10MF SPR. CS13BE 106K
C48	C43	C39	17	3	2-.1M-0044	" .1MF SPR. CS13BH 104K
	C41	18	1	[illegible]	" .005 MFD
	C44	19	1	2-330P-...	" DM 15K33 330PF
C46	C47	20	2	2-02M-0043	" .02MF CTL. DDM 203
	C45	21	1	2-120P-0021	" 120PF
		22			
	L5	23	1	3605	CHOKE 300uh MILLER 9220-02
	C50	24	1	4518	VARICAP MV1650
		25	2	18013	NUT, PEM KFZ-256
		26	2	256-6-6-SS	SCREW - #2-56 x 3/16 LG.
		27			
Q-7	Q-8	28	2	4730	TRANSISTOR 2N3694
	Q-9	29	1	4748-A	TRANSISTOR 40894
		30	2	5427	SOCKET TRANSISTOR
		31	1	5425	SOCKET TRANSISTOR
		32			
	R56	33	1	10-TBR-3-2	RESISTOR 1K
	R55	34	1	10-T60-3-2	" 15K

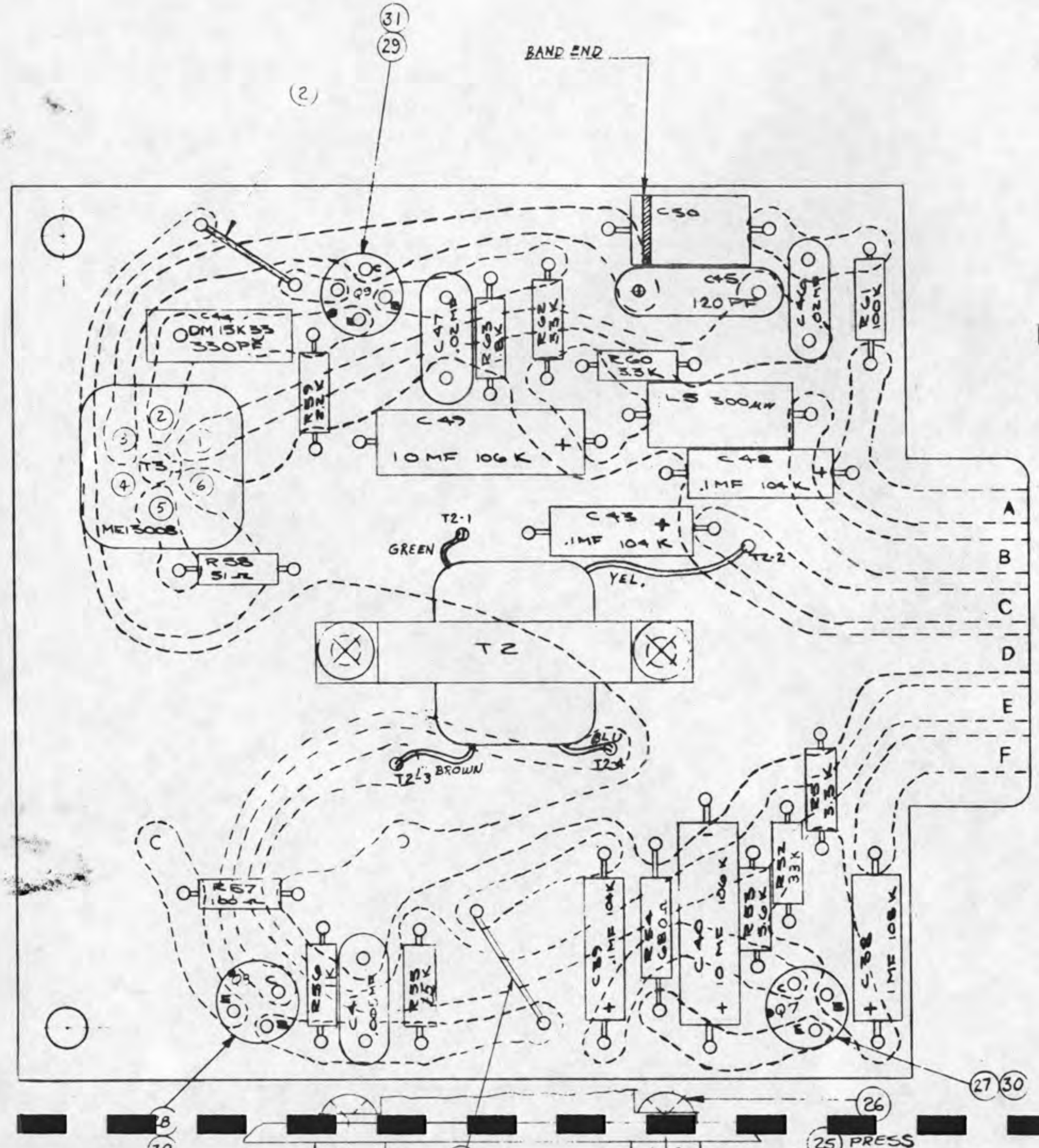


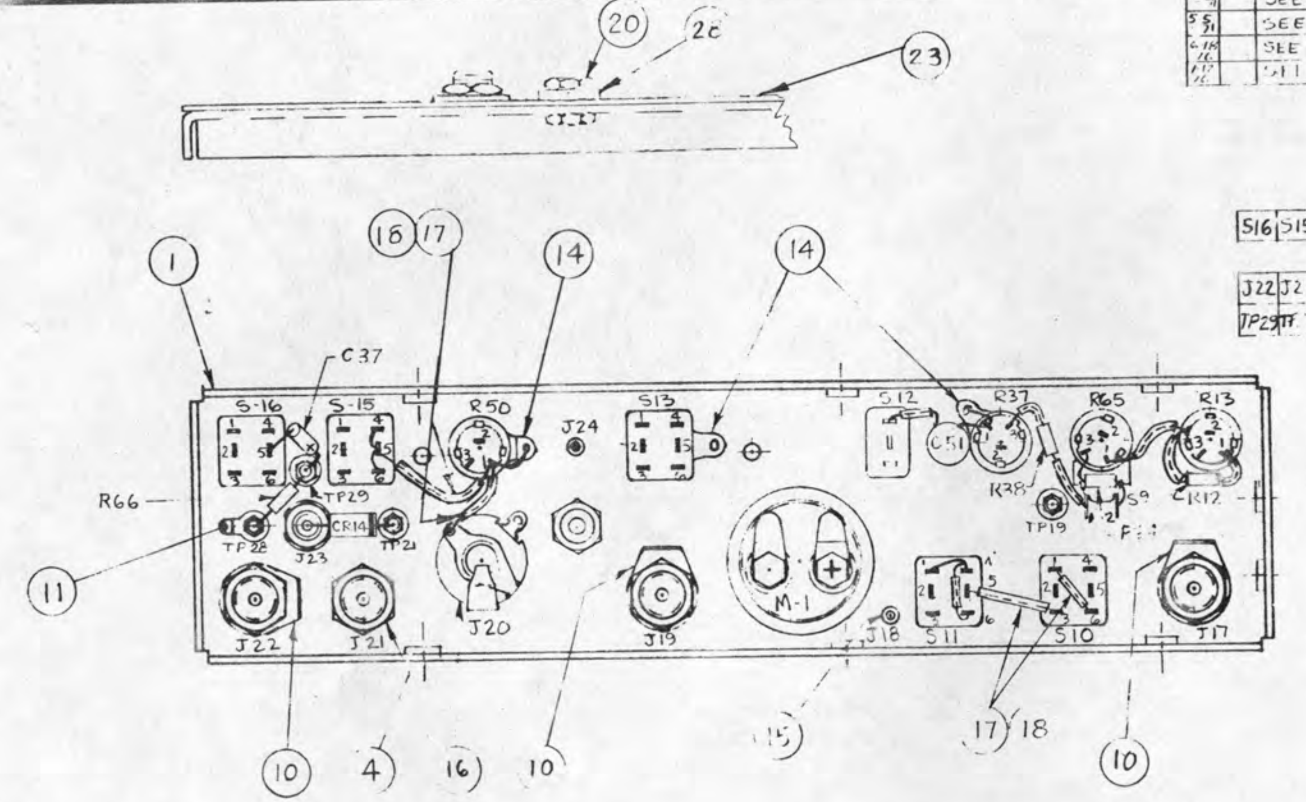
FIGURE 12.28

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.	
DECIMAL ±		SCALE 4:1
FRACTIONAL	TITLE P.C. BD. ASSY	
ANGULAR	DATE	DRAWING NUMBER PVD 4032

USED ON

5-4-71	SEE ER-552		FB
5-5-71	SEE ER-554		FB
6-18-76	SEE ER-823	FB	
6-17-76	SEE ER-831	FB	

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
		SEE ER-566			FB
9-70		SEE ER-374			FB
11-12-70		SEE ER-406		FB	
12-31-70		SEE ER-452		FB	
		SEE ER-497			FB



CIR. NO.	NO. REQD	PART NO.	PART NAME
1	1	30216-B	PANEL, COMPL. MTG.
S16 S15 S13 S11 2	4	5207-A	SWITCH, TOGGLE
S10 3	1	5208-A	" " , MOMENTARY
J22 J21 J19 J17 4	4	5663-A	CONNECTOR, BNC.
TP29 TP28 TP21 TP19 5	4	5440-A	TERMINAL, INS. CAMBION
R50 6	1	1806-B	POTENTIOMETER 10K
R37 7	1	1807-B	" 100K
R65 S9 8	1	1804-B	" 10K SNT
R13 9	1	1801-E	" 10K
10	3	5484-A	SOLDER LUG
11	1	5456-A	TERMINAL, SOLDER
J23 12	1	5633-A	RECEPTACLE, POWER
M-1 13	1	6213-A	METER
14	3	5438-A	TERMINAL, SOLDER
J24 J18 15	2	5629-A	JACK TEST
J20 16	1	5627-A	JACK, PHONE
17	Z	24213-A	TUBING, INSULATING
18	Z	STD-2	WIRE, JUMPER (BW)
CR14 19	1	4504-A	DIODE IN 2071
20	1	11950-A	BUSHING
C51 21	1	2-02M-0043	CAPACITOR .02 MF.
22			
23	1	5831-B	GRAPHIC PLATE
C37 24	1	2-1M-0048	CAPACITOR 1MF 35V
R12 25	1	10-YPO-3-2	RESISTOR 47 K 1/4W

SHEET 1 OF 4 SHEETS

30				
29	1	5220-A	SWITCH, TOGGLE (SPDT)	S12
28	1	17508-A	WASHER, FLAT	
27	2	10-TBO-3-2	RESISTOR 10K 1/4W	R64 R66
26	1	10-YPY-3-2	RESISTOR 1 K 1/4W	R38

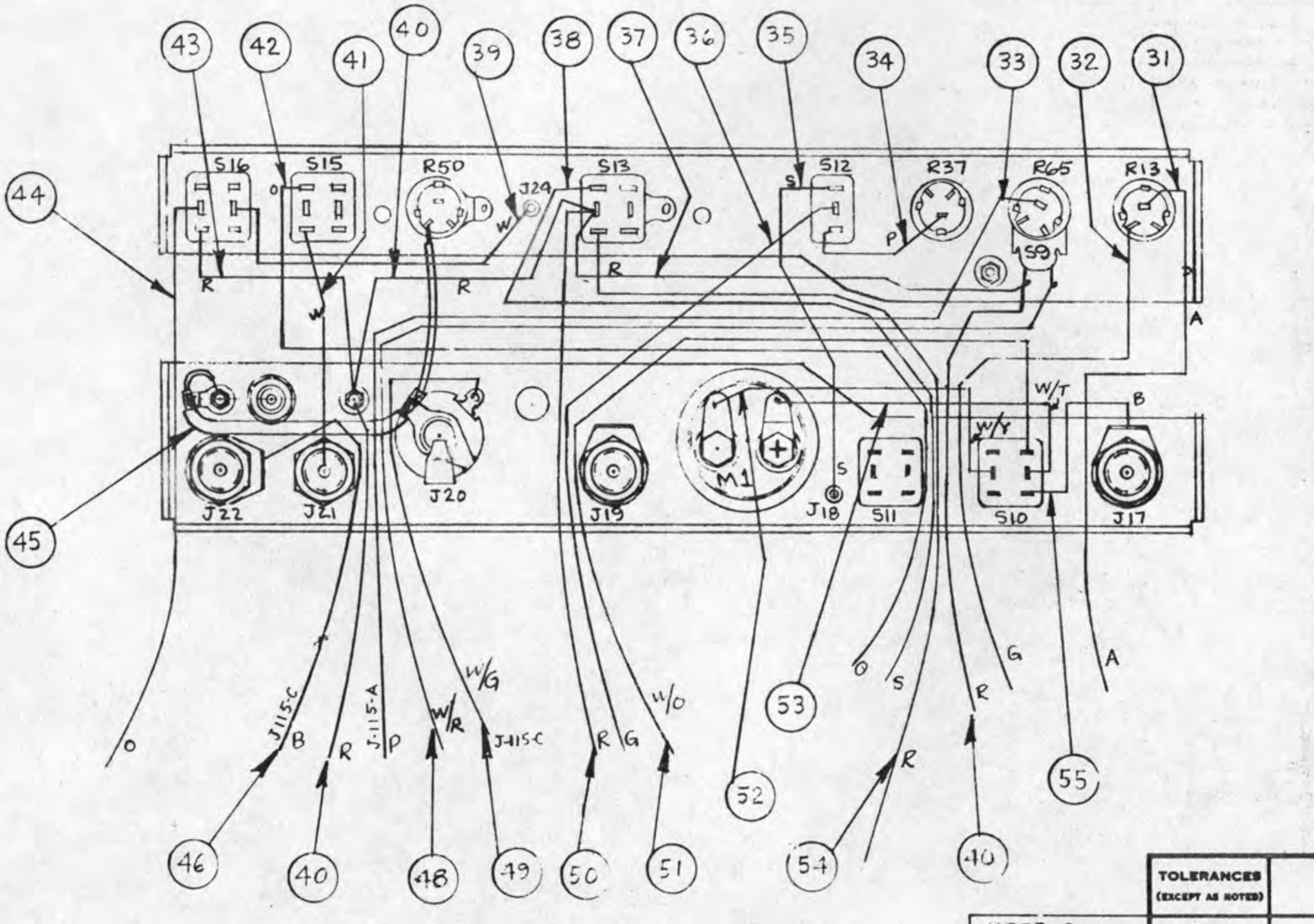
FIGURE 12.29A

ER-100-J

USED ON	
1	SHEET Nº2

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD. CONN.		
DECIMAL ±		SCALE FULL	DRAWN BY / APPROVED BY
FRACTIONAL ±	TITLE PANEL ASS'Y, MOUNTING		
ANGULAR ±	DATE	DRAWING NUMBER PWD-30215-B	ISSUE 16

K+E



DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
		SEE SHEET 1			

CIR No	No RQD	PART NO.	PART NAME	
31	1	24-66-44-5½	WIRE LEAD	(A)
32	1	24-55-44-7¾		G
33	1	24-77-44-8½		P
34	1	24-77-44-2½		P
35	1	24-88-44-2½		S
36	1	24-55-44-5½		G
37	1	24-22-44-5¼		R
38	1	24-88-44-8¾		S
39	1	24-99-44-3⅝		W
40	3	24-22-44-3¼		R
41	1	24-99-44-2¼		W
42	1	24-33-44-12		O
43	1	24-22-44-2½		R
44	1	24-33-44-3¾	WIRE LEAD	O
45	1	7073-A	WIRE COAX	
46	1	24-00-44-3⅝	WIRE LEAD	B
47				
48	1	24-92-44-8½	WIRE LEAD	W/R
49	1	24-95-44-3½		W/G
50	1	24-22-44-3¾		R
51	1	24-93-44-8		W/O
52	1	24-94-44-4¼		W/Y
53	1	24-91-44-4½		W/T
54	1	24-22-44-14¼		R
55	1	24-00-44-2⅛	WIRE LEAD	B

SHEET "2" OF "4" SHEETS

FIGURE 12.29-B

ER-100-J

USED ON
1 SHEET No 3

TOLERANCES (EXCEPT AS NOTED)
DECIMAL ± —
FRACTIONAL ± —
ANGULAR ± —

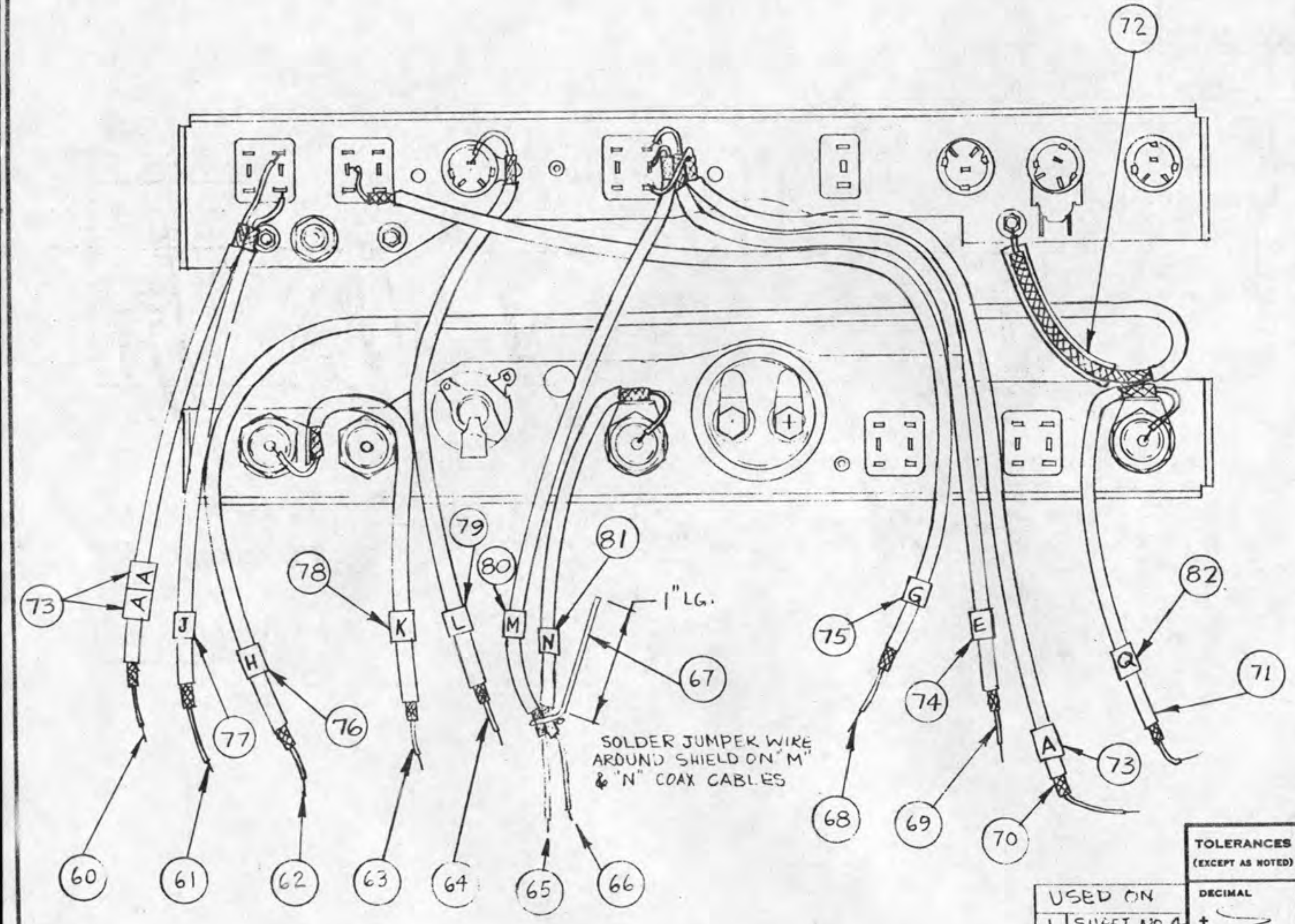
MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.

SCALE —
DRAWN BY S.P.M.
APPROVED BY 4/1/73

TITLE PANEL ASS'Y. MOUNTING

DATE 8-24-70
DRAWING NUMBER PWD-30215-B
ISSUE 16

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
		SEE SHEET 1			



CIR NO	NO RQD	PART Nº	PART NAME
60	1	7062-A	WIRE, COAX.
61	1	7063-A	WIRE, COAX
62	1	7064-A	
63	1	7025-A	
64	1	7065-A	
65	1	7066-A	
66	1	7067-A	WIRE, COAX
67	1	STD-2	WIRE, JUMPER (BW)
68	1	7068-A	WIRE, COAX
69	1	7069-A	
70	1	7070-A	
71	1	7071-A	WIRE, COAX
72	1	24248-A	TUBING, SHRINKABLE
73	3	24120-A	WIRE MARKER "A"
74	1	24124-A	WIRE MARKER "E"
75	1	24126-A	WIRE MARKER "G"
76	1	24127-A	WIRE MARKER "H"
77	1	24128-A	WIRE MARKER "J"
78	1	24129-A	WIRE MARKER "K"
79	1	24130-A	WIRE MARKER "L"
80	1	24131-A	WIRE MARKER "M"
81	1	24132-A	WIRE MARKER "N"
82	1	24134-A	WIRE MARKER "Q"

FIGURE 12.29C

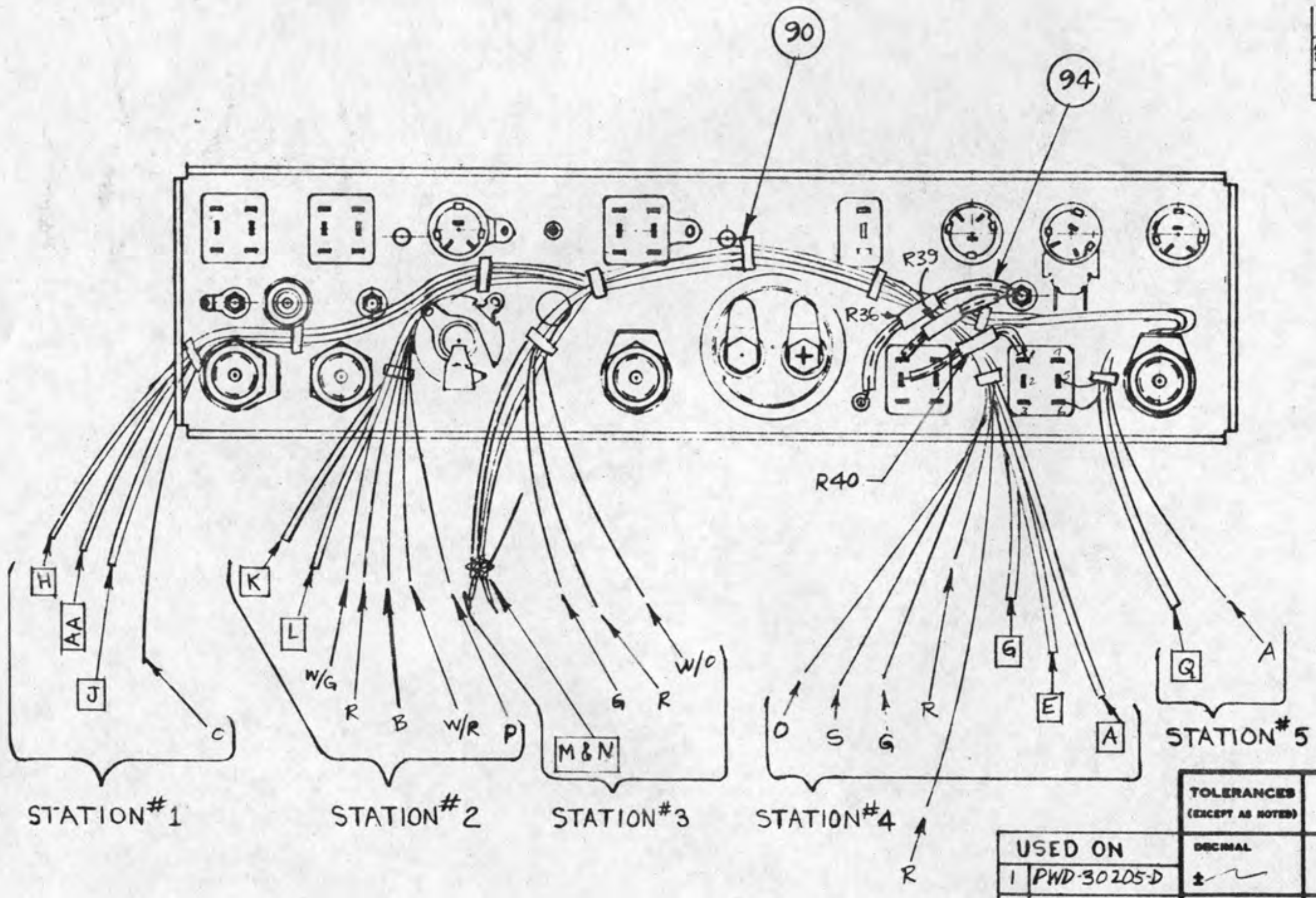
SHEET "3" OF "4" SHEETS

USED ON	
1	SHEET NO. 4

ER-100-J

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.
DECIMAL ±	SCALE — DRAWN BY S.P.M APPROVED BY
FRACTIONAL ±	TITLE PANEL ASS'Y. MOUNTING.
ANGULAR ±	DATE 8-24-70 DRAWING NUMBER PWD-30215-B ISSUE 16

K+E ALBANENE ® 10 0465 ENGINEERS' STANDARD FORM



DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
		SEE SHEET 1			

	CIR. NO	NO. RQD	PART NO.	PART NAME
	90	~	24247-A	LACING CORD
R36	91	1	10-TGY-3-2	RESISTOR 150 K
R39	92	1	10-T8O-3-2	RESISTOR 10K
R40	93	1	10-00T-3-2	RESISTOR 330Ω
	94	~	24213-A	TUBING INSULATING

SHEET "4" OF "4" SHEETS

FIGURE 12.29-D

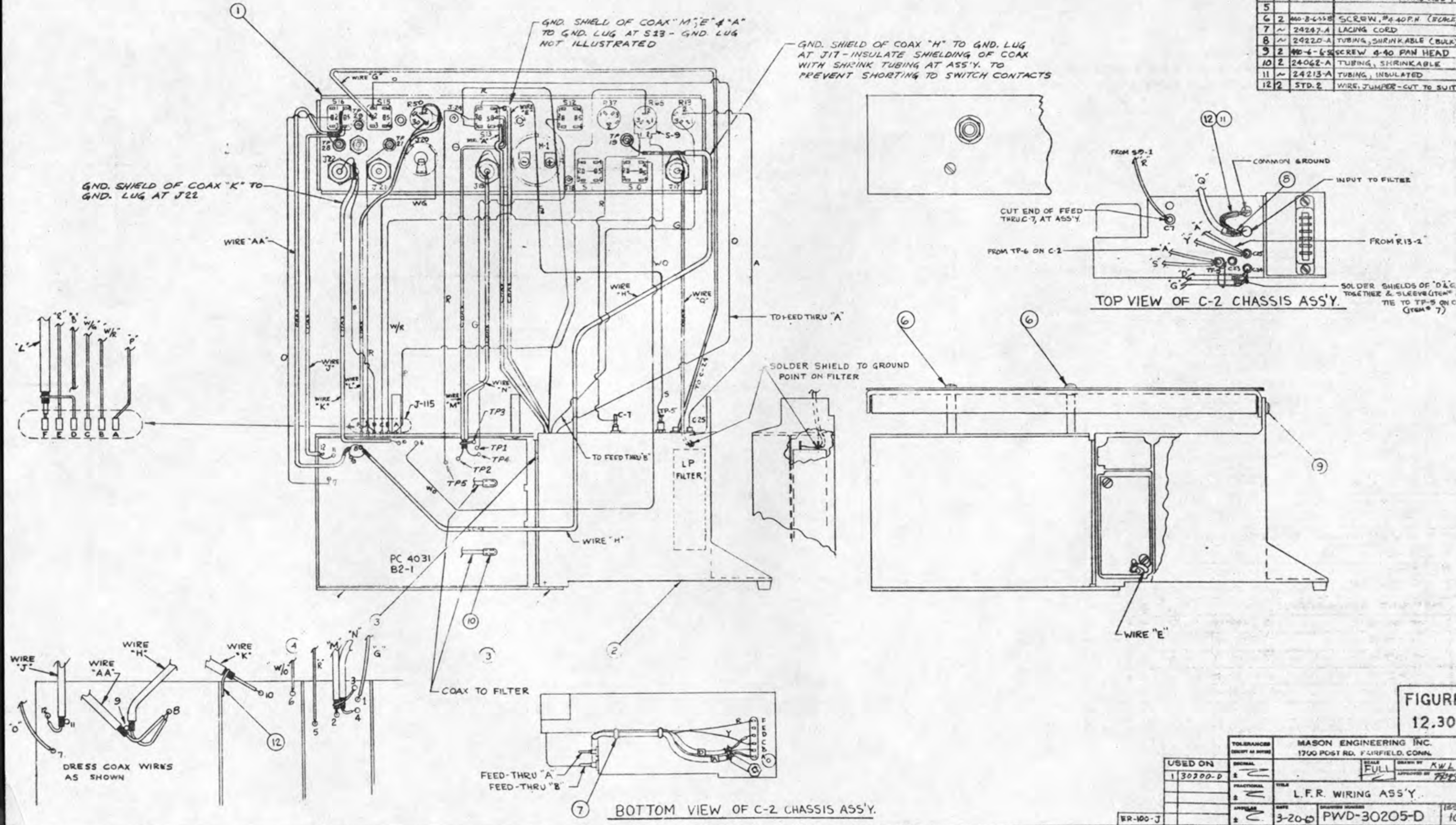
TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.
DECIMAL ± ~	SCALE ~ / DRAWN BY S.P.M. / APPROVED BY [illegible]
FRACTIONAL ± ~	TITLE PANEL ASS'Y MOUNTING
ANGULAR ± ~	DATE 8-24-70 / DRAWING NUMBER PWD-30215-B / ISSUE 16

USED ON
1 PWD-30205-D

ER-100-J

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.	DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
[illegible]		SEE ER-374		[illegible]	TB	[illegible]		SEE ER-186		[illegible]	
[illegible]		SEE ER-554		[illegible]	FB	5-11	CB	SEE ER-215		[illegible]	
[illegible]		SEE ER 560		[illegible]	FB	[illegible]		SEE ER-255		[illegible]	FB
[illegible]		SEE ER-699		FB		[illegible]		SEE ER-315		[illegible]	FB
						[illegible]		SEE ER-366		[illegible]	FB

ITEM NO	NO REQ	PART NO	PART NAME
1	1	PWD 30215-D	PANEL ASS'Y MOUNTING
2	1	30225-D	CHASSIS ASS'Y
3	2	440-6-10-SS	SCREW 4-40 FLAT HEAD
4	1	30220-C	BRACKET MOUNTING ASS'Y
5			
6	2	440-8-6-SSB	SCREW, #4 40 P.H. (BLACK)
7	~	24247-A	LACING CORD
8	~	24220-A	TUBING, SHRINKABLE (BULK)
9	2	440-6-6-SS	SCREW 4-40 PAN HEAD
10	2	24062-A	TUBING, SHRINKABLE
11	~	24213-A	TUBING, INSULATED
12	2	STD. 2	WIRE, JUMPER-CUT TO SUIT



USED ON
1 30200-D

MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.

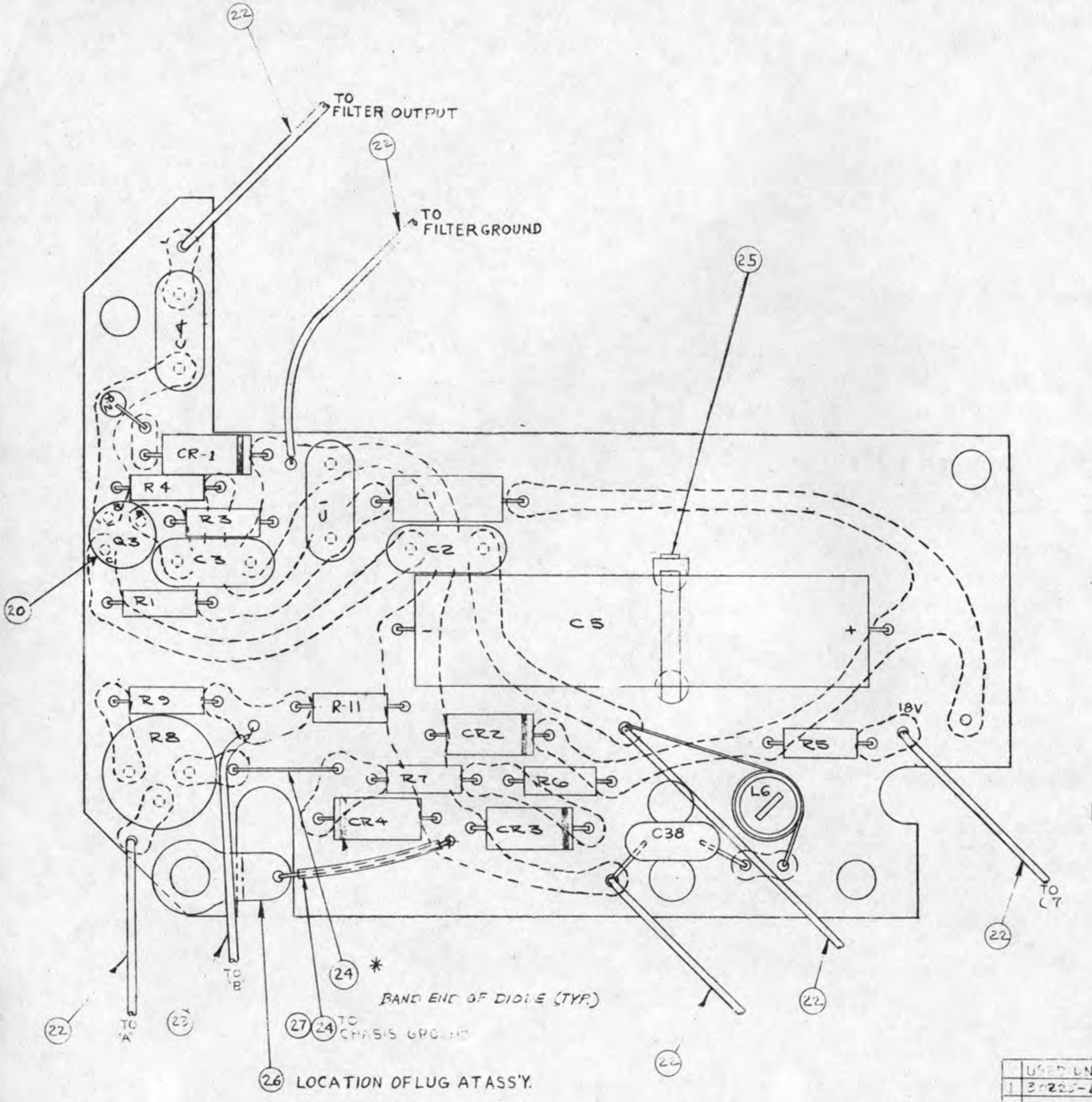
SCALE FULL — DRAWN BY KWL

L.F.R. WIRING ASS'Y.

3-20-60 — PWD-30205-D — 10

ER-100-J

FIGURE 12.30



DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
		SEE ER-203			
		SEE ER-259		FB	FB
		SEE ER-404		FB	
		SEE ER-417			FB
		SEE ER-482		FB	
		SEE ER-514			FB
		SEE ER-762		RT	
		SEE ER-795		RT	

		CIR	REQ.	PART No.	DESCRIPTION
		1	1	4033-A	P.C.BD. AS MACH.
R3	R2	2	2	10-GTB-3-2	RESISTOR 51 Ω
	R4	3	1	10-TGO-3-2	" 15K
	R9	4	1	10-YPR-3-2	" 4.7K
	R11	5	1	10-RRR-3-2	" 2.2K
	R5	6	1	10-RXT-3-2	" 220 Ω
	R7	7	1	10-SRT-3-2	" 820 Ω
	R6	8	1	10-OOT-3-2	" 330 Ω
	Q3	9	1	4716	TRANSISTOR 2N3646
	C4	10	1	2-.001M-0103	CAPACITOR .001
	C1	11	1	2-.02M-0043	" .02 CRL DDM 203
C3	C2	12	2	2-.01M0040	" .01 CRL DDM103
	C5	13	1	2-200M-0071	" 200MF 25V SPRAGUE 30D
	CR2	14	1	4516	DIODE 1N965-B
	CR3	15	1	4503	" 1N759A
	CR4	16	1	4512-A	" 1N756-A
	CR1	17	1	4508	" FD.777
	R8	18	1	1810	POTENTIOMETER 1K Ω
	L1	19	1	3604	CHOKE, RF 30 μH
		20	1	5427-A	SOCKET, TRANSISTOR
	R1	21	1	10-TGR-3-2	RESISTOR 1.5K
		22	6	STD-2	JUMPERS 1½ LG
		23	1	249-44-1½	WIRE, LEAD (WHITE)
		24	2	STD-2	JUMPER (BW)
		25	1	6221-A	CABLE TIE
		26	1	5421-A	SOLDER LUG #8
		27	1	24073-A	TUBING, INSULATED ½ LG
	L6	28	1	3884-A	COIL
	C38	29	1	2-120P-0022	CAPACITOR 120 PF

NOTE ÷
* CR4 MUST HAVE A HIGHER VOLTAGE THAN CR-9 ON PWD-4039-C

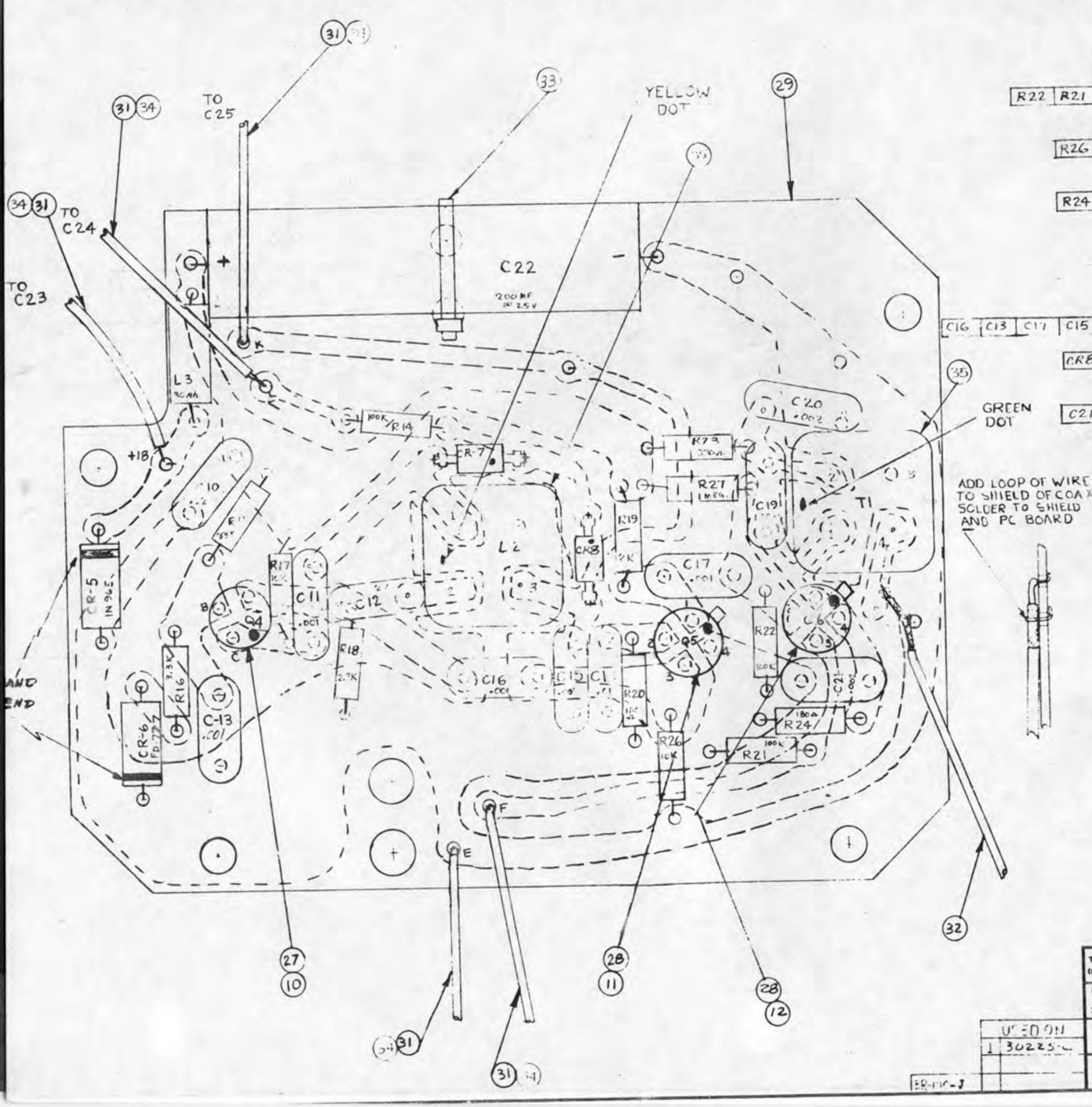
FIGURE 12.31

USED ON	30225-D

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 120 [illegible] RD. FAIRFIELD, CONN.		
DECIMAL ±		SCALE 4:1	DRAWN BY JGH / APPROVED BY FB
FRACTIONAL ±	TITLE P.C. BOARD ASS'Y CZ-1		
ANGULAR ±	DATE 1-7	DRAWING NUMBER PW-40[illegible]-C	ISSUE

ER-100

DATE	REVISION	AUTH.		
	SEE ER-259	LC	RT	FB
	SEE ER-524			FB
	SEE ER-700			FB
	SEE ER-710			FB
	SEE ER-762			RT
	SEE ER-774			RT



				CIR NO.	NO. REQ.	PART NO.	PART NAME
R22	R21			R14	1	3	10-TBY-3-2	RESISTOR 100K 1/4W
				R15	2	1	10-000-3-2	" 33K "
				R16	3	1	10-00R-3-2	" 3.3K "
R26				R17	4	2	10-TB0-3-2	" 10K "
				R18	5	1	10-RRR-3-2	" 2.2K "
				R19	6	1	10-RBR-3-2	" 2K "
R24				R20	7	2	10-TST-3-2	" 180Ω "
				R23	8	1	10-00T-3-2	" 330Ω "
				R27	9	1	10-TBG-3-2	" 1MEG "
				Q4	10	1	4716	TRANSISTOR 2N3646
				Q5	11	1	4725	" 3N139
				Q6	12	1	4749	" 40819
				C10	13	1	2-02[illegible]-0013	CAPACITOR .02MF CRL DDM 209
C16	C13	C17	C15	C11	14	5	2-001M-0103	" .001MF
				C12	15	1	2-22P-0012	" 22PF CRL QTZ 22
CR8				CR7	16	2	4546	VARICAP BB 109Y
					17			
				C18	18	1	2-01M-0040	" .01MF CRL DDM-103
C21				C20	19	2	2-200P-0035	" .002MF CRL DD-202
				C19	20	1	2-100P-0020	" 100PF CRL DTZ-100
				C22	21	1	2-200M-00T1	" 200MF 25V 2-200M-00T1
					22			
				CR-5	23	1	4516-A	DIODE 1N965-B
				CR-6	24	1	4508	" FD777
				L2	25	1	3554-A	COIL, SWEPT OSC
				T1	26	1	3353-A	COIL CONV OUT RED DOT CAMBION 3428-2
					27	1	5427-A	SOCKET TRANSISTOR
					28	2	5425-A	" "
					29	1	4034-A	P.C. BOARD (AS MACH)
L3					30	1	3604-A	CHOKE R.F.
					31	5	STD-2	JUMPER BW 1 1/2 LG
					32	1	7012-A	WIRE, COAX RG196-U-6" LG
					33	1	6221-A	CABLE TIE
					34	~	24215-A	INSULATING TUBING 1 1/4 LG.
					35	2	13083-A	COVER, COIL FORM

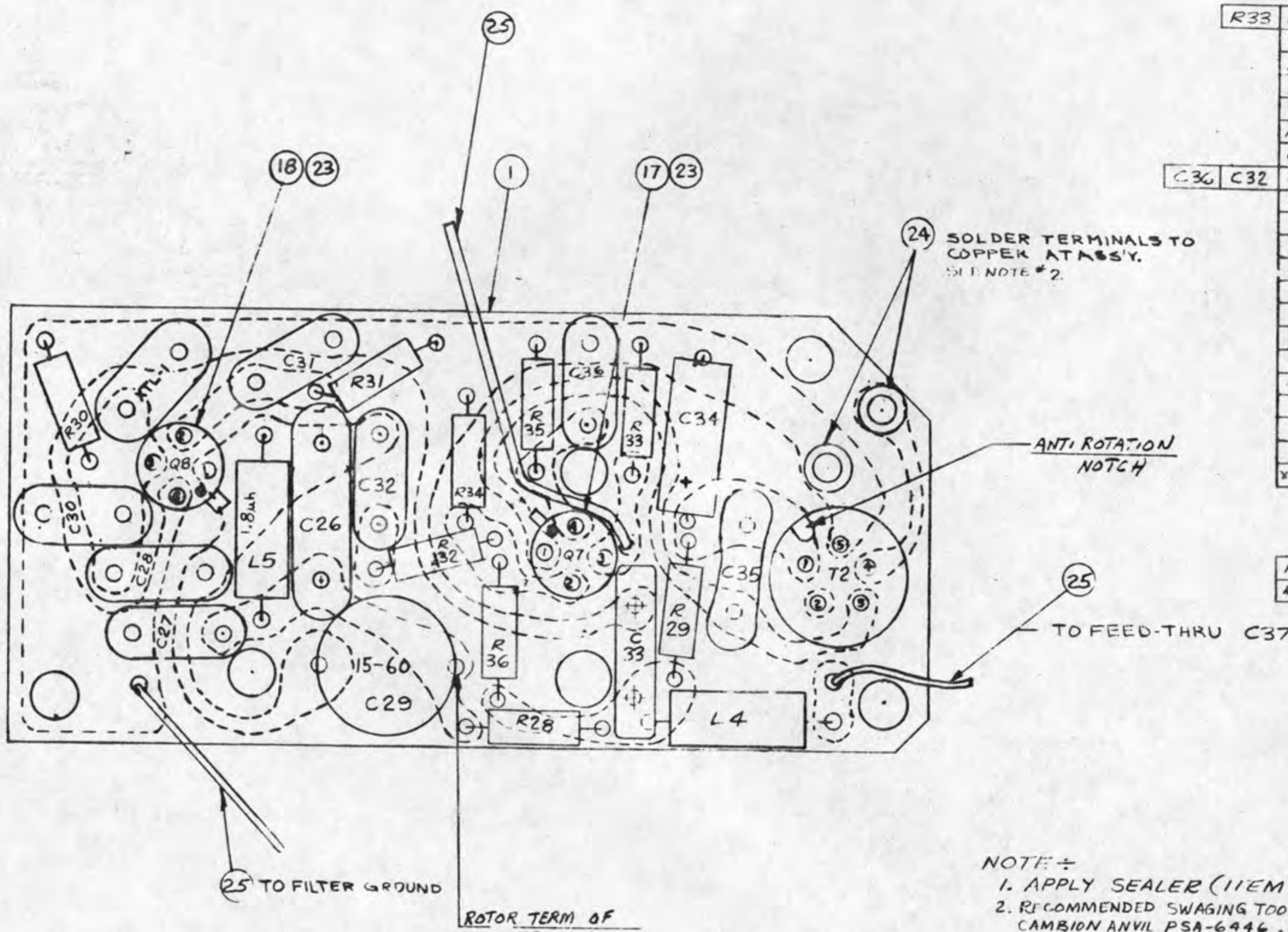
FIGURE 12.32

USED ON	TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
1 30225-C	DECIMAL ±		SCALE 4:1	DRAWN BY ALS
	FRACTIONAL ±	TITLE PRINTED CIRCUIT BD ASSY C2-2		APPROVED BY
	ANGULAR ±	DATE 1-7-69	DRAWING NUMBER PWD-4034-C	ISSUE 8

ER-[illegible]-J

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
		SEE ER-259			
		SEE ER-335			FB
		SEE ER-417			FB
		SEE ER-504			FB
		SEE ER-700			FB

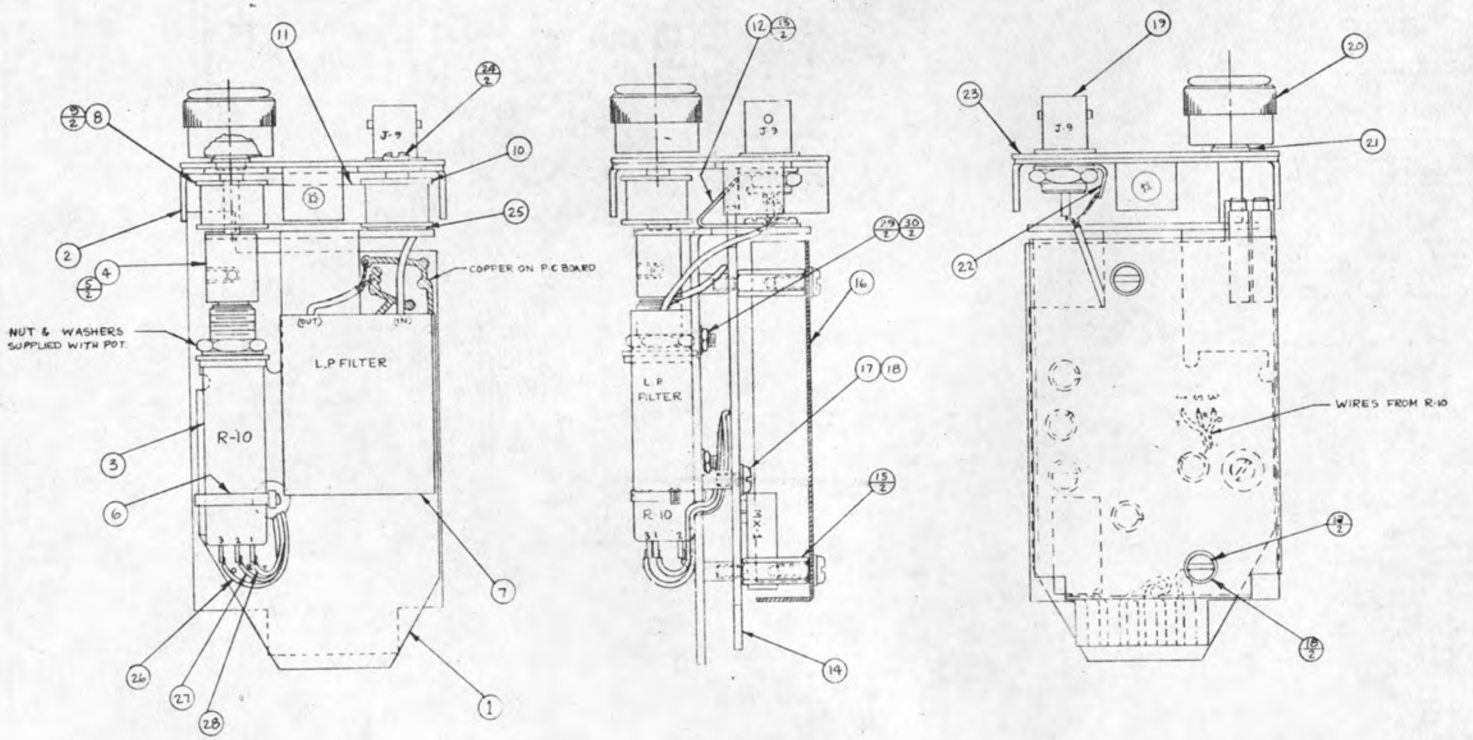
		CIR.	REQ	PART No.	DESCRIPTION
		1	1	4035-A	P.C. BD. AS MACH.
R33		R28	2	10-TBR-3-2	RESISTOR 1K
		R29	1	10-00T-3-2	" 330Ω
		R30	1	10-TBA-3-2	" 10 MEG.
		R31	1	10-RRR-3-2	" 2.2 K
		R32	1	10-TBY-3-2	" 100 K
		R35	1	10-TRT-3-2	" 120Ω
		C26	1	2-10CP-0C20	CAPACITOR 100 PF DISC.
C36	C32	C27	3	2-.01M-0040	" .01
		C33	1	2-.02M-0043	" .02
		C29	1	2509-A	" 15-60 PF
		C30	1	2-10P-0011	" 10 PF
		C31	1	2-2000P-0035	" .002 MF
		C34	1	2-.1M-0044	" .1 MF TANTALUM
		C35	1	2-270P-0083	" 270 PF
		C28	1	2-3.3P-0006	" 3.3 PF
		Q7	1	4749-A	TRANSISTOR 40819
		Q8	1	4725	" 3N139
		L4	1	3604	CHOKE RF – "
		L5	1	3601	CHOKE RF
		T2	1	3003	TRANSFORMER CAMBION 1198-1
		XTL-1	1	5031-	CRYSTAL TEXAS HC 18/U 10.845MC
		23	2	6425-A	SOC. TRANSISTOR
		24	2	5417-A	TERMINAL, TURRET
		25	3	STD-2	WIRE, JUMPER 1" LG
	R34	26	1	10-RRY-3-2	RESISTOR 220 K
	R36	27	1	10-OWG-3-2	RESISTOR 3.9 MEG.
		28	~	3406-A	SEALER, P.C. BOARD



NOTE ÷
1. APPLY SEALER (ITEM #28) TO BOARD AS REQ'D.
2. RECOMMENDED SWAGING TOOLS FOR ITEM #24 : CAMBION ANVIL PSA-6446, CAMBION PUNCH PSP-6603

FIGURE 12.33

USED ON	TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.				
30225-C	DECIMAL ±	A.D. 3	P.S. 6	SCALE 4:1	DRAWN BY JAA	APPROVED BY
	FRACTIONAL ±	TITLE P.C. BOARD ASS'Y C2-3				
ER-10	ANGULAR ±	DATE	DRAWING NUMBER PWD 4035-C			

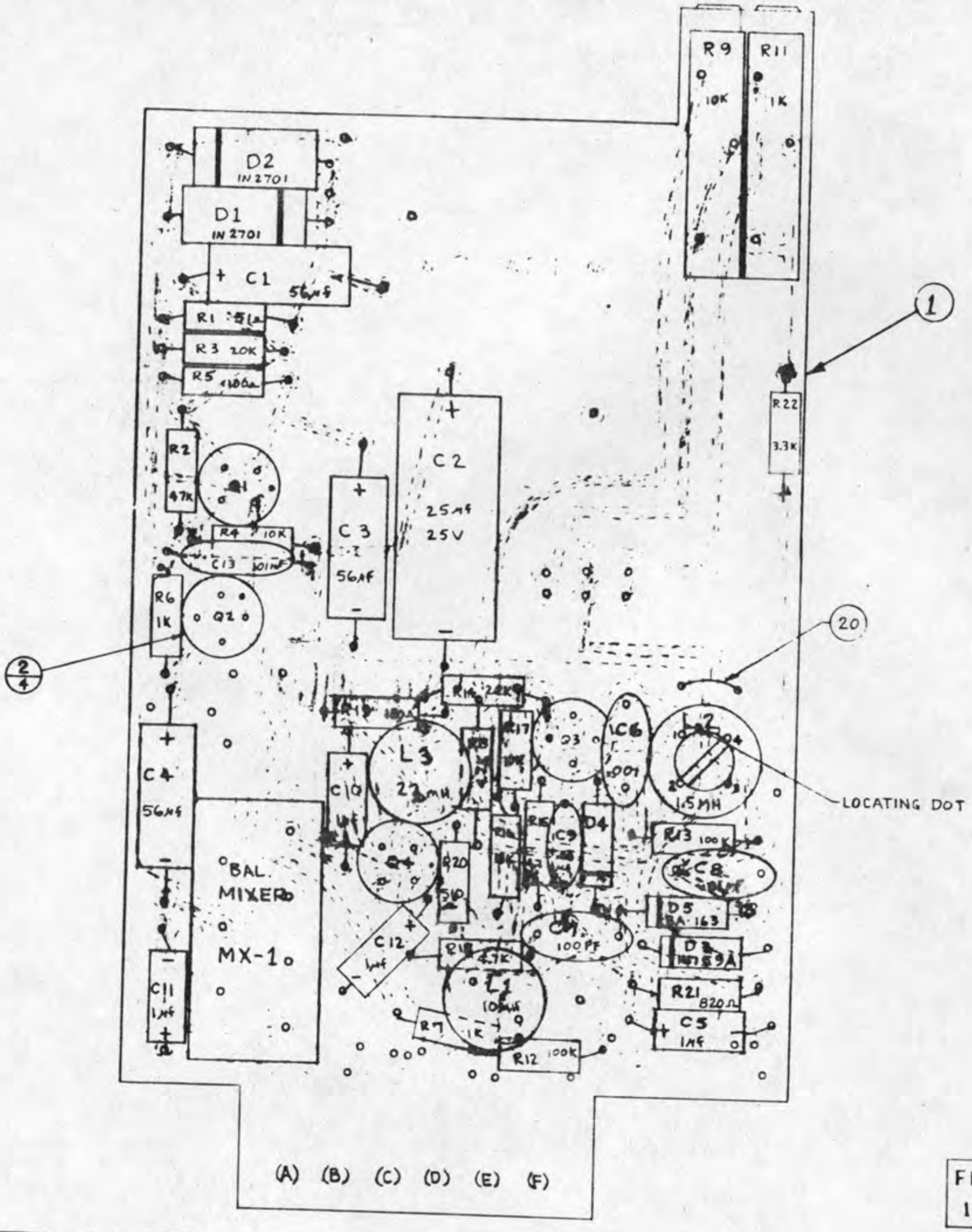


DATE	SYM	REVISION RECORD	AUTH	CK
		SEE ER. 489		

	CIR NO.	NO. REQ	PART NO	PART NAME
	1	1	30251-B	BRACKET COMPL. TA3-03-B
	2	1	30212-A	BRACKET, WINDOW COMPL. TA3-03
R-10	3	1	1815-A	POTENTIOMETER, 10 TURN
	4	1	15963-A	SHAFT EXTENDER
	5	2	440-3-555	SCREW, SET #4-40 x 3/32
	6	1	6221-A	CABLE TIE
	7	1	5037-A	FILTER, L.P. 300KC
	8	1	16001-A	SPOOL, DRIVE
	9	2	440-4-555	SCREW, SET #4-40 x 1/8
	10	1	16000-A	SPOOL, IDLER
	11	1	23008-A	TAPE, DIAL
	12	1	24052-B	MIRROR
	13	2	256-3-6-58	SCREW, #2-56 x 3/32 PAN HD.
	14	1	PWD-4073-C	P.C. BOARD ASS'Y. TA3-03-B
	15	2	13046-A	STANDOFF, MALE/FEMALE
	16	1	24268-B	COVER, HAND (TA3-03-B)
	17	3	440-6-656	SCREW, #4-40 x 3/16 PAN HD.
	18	3	17523-A	WASHER #4 EXTERNAL TOOTH
J-9	19	1	5663-A	CONNECTOR, BNC.
	20	1	8014-A	KNOB
	21	1	10000-A	BUSHING
	22	1	5454-A	SOLDER LUG
	23	1	30252-A	PLATE, WINDOW COMPL. TA3-03-B
	24	2	440-86-568	SCREW, #4-40 x 1/4 PAN HD. (BLACK)
	25	1	17541-A	WASHER, FLAT
	26	1	24-33-442	WIRE, LEAD (ORANGE)
	27	1	24-22-442	WIRE, LEAD (RED)
	28	1	24-11-442	WIRE, LEAD (TAN)
	29	2	17522-A	WASHER, INTERNAL LOCK
	30	2	18001-A	NUT, HEX

FIGURE 12.34

USED ON	TOLERANCES EXCEPT AS NOTED	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.
	DECIMAL ± .005	SCALE 2:1 — DRAWN BY S.F.M. — APPROVED BY [illegible]
	FRACTIONAL ± 1/64	TITLE TUNER ASS'Y TA3-03-B
ER.100 W	ANGULAR ± 1°	DATE 2-9-71 — DRAWING NUMBER 30250-D — ISSUE 2



			CIR NO	NO REQ	PART NO	PART NAME	
			1	1	4273 C	PC BOARD TA3-03B	
			2	4	5425-A	SOCKET TRANSISTOR	
		MX1	3	1	5036-B	MIXER, DOUBLY BALANCED	
		R9	4	1	1809-B	POTENTIOMETER, TRIM 10K	
		R11	5	1	1808 B	POTENTIOMETER, TRIM 1K	
		R1	6	1	10-GTB-3-2	RESISTOR	51Ω 1/4W 5%
		R2	7	1	10-YPO-3-2		47K
		R3	8	1	10-RBO-3-2		20K
R17		R4	9	2	10-TBO-3-2		10K
		R5	10	1	10-TBT-3-2		100Ω
	R7	R6	11	2	10-TBR-3-2		1K
	R13	R12	12	2	10-TBY-3-2		100K
		R14	13	1	10-RRR-3-2		2.2K
R8	R18	R15	14	3	10-YPR-3-2		4.7K
		R16	15	1	10-TSO-3-2		18K
		R19	16	1	10-TST-3-2		180Ω
		R20	17	1	10-GTT-3-2	RESISTOR	510Ω 1/2W 5%
		R21	18	1	10-SRT-3-2	RESISTOR	820Ω 1/2W 5%
		R22	19	1	10-OOR-3-2	RESISTOR	3.3K 1/2W 5%
			20	5	STD 2	JUMPER WIRE	(BW)
C4	C3	C1	21	3	2-56M-0100	CAPACITOR	56µf
		C2	22	1	2-25M-0111		25µf @ 25V
C12 C11	C10	C5	23	4	2-1.0M-0048		1µf
C13	C8		24	2	2-.01M-0040		.01µf (DISC)
		C7	25	1	2-100P-0020		100 PF (DISC)
		C9	26	1	2-.05M-0138	CAPACITOR	.05µf (DISC)
		C6	27	1	2-1000P-0103	CAPACITOR	.001MF (DISC)
			28				
			29				
	D2	D1	30	2	4504-A	DIODE	IN2701
		D3	31	1	4503 A	DIODE	IN759A (CDC ONLY)
	D5	D4	32	2	4542-A	DIODE	BA163
			33				
			34				
		L1	35	1	3620-A	CHOKE	10MH
		L2	36	1	3629-A	OSC. COIL	1.5 MH
		L3	37	1	3621-A	CHOKE	22MH
Q3	Q2	Q1	38	3	4748-A	TRANSISTOR	40894
		Q4	39	1	4725-A	TRANSISTOR	3N133

FIGURE 12.35

ER 100 W

MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.

TOLERANCES (EXCEPT AS NOTED) — FRACTIONAL ± 1/64

SCALE 4:1 — DRAWN BY SPM

TITLE: P.C. BOARD ASS'Y. TA3-03B

DRAWING NUMBER: PWD-4073-C — ISSUE 6

REVISION RECORD
SEE ER-233
SEE ER-262
SEE ER 100-5
SEE ER 3[illegible]
SEE ER 374
[illegible]
SEE ER 410

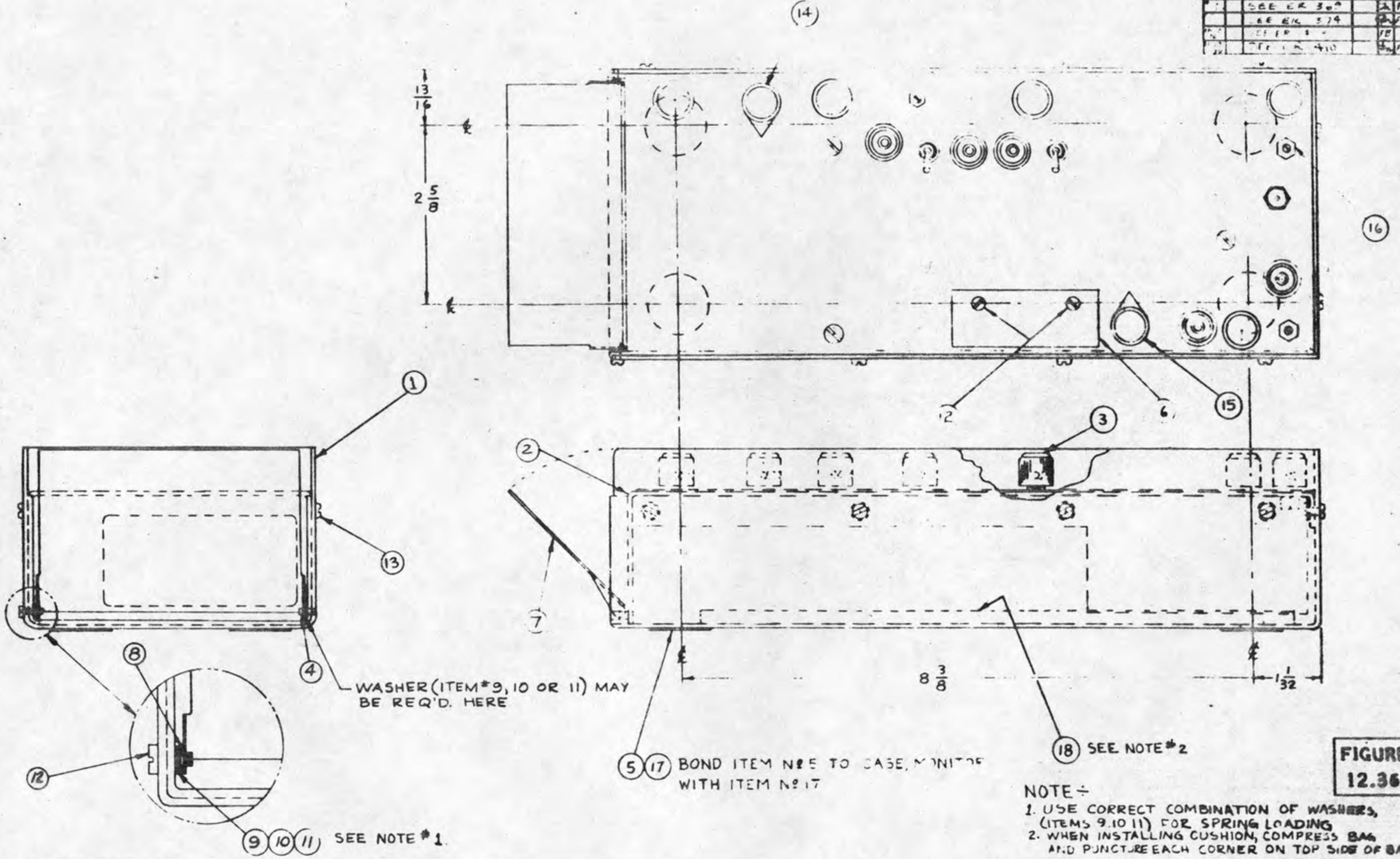


FIGURE 12.36

NOTE ÷
1. USE CORRECT COMBINATION OF WASHERS, (ITEMS 9, 10, 11) FOR SPRING LOADING
2. WHEN INSTALLING CUSHION, COMPRESS BAG AND PUNCTURE EACH CORNER ON TOP SIDE OF BAG.

CIR NO	NO REQ	PART NO	PART NAME	CIR NO	NO REQ	PART NO	PART NAME	CIR NO	NO RQD	PART NO.	PART NAME
1	1	19027C	CASE, MONITOR	9		17525-A	WASHER, FLAT	18	1	30306-A	CUSHION CR TUBE COMPL
2	1	30310-D	FRONT COVER ASS'Y	10		17524-A	WASHER, FLAT	19			
3	5	8004A	KNOB	11		17531-A	WASHER, FLAT	20			
4	1	23803-A	ROLLPIN	12	3	256-66-558	SCREW 2-56 [illegible]	21			
5	4	24230-A	TAPE, FASTENER	13	9	4406-[illegible]	SCREW #4-40 [illegible]	22			
6	1	19050-A	COVER, TRIMPOT	14	1	8010-A	KNOB, SELECTOR (W)	23			
7	1	24046-B	MIRROR	15	1	8009-A	KNOB, SELECTOR (K)	24			
8	2	17528-A	WASHER BELLEVILLE	16	3	24069-A	SHAFT LOCK	25			
				17	7	7412-A	ADHESIVE, VELCRO	26			

ER-100-P

USED ON: 1 MRD-30000

TOLERANCES EXCEPT AS NOTED

TITLE: MONITOR ASS'Y (S-3B)

DRAWING NUMBER: 30300-C

11

F.R.	SEE ER-529			SEE ER-262	
	SEE ER-606			SEE ER-369	
6-27-72	SEE ER-633	FB		SEE ER-410	
11-11-74	SEE ER-726	FB		SEE ER-463	
				SEE ER-488	

	NO. REQ	PART NO	PART NAME
1	1	30303-B	COVER FRONT COMPL
2	1	30311-B	TUBE CRT COMPL
3	3	632-6-6-558	SCREW 6-32 PAN HD. (BLACK)
4			
5	1	PWD 4039-C	PWD HORIZ AMP
6	1	24044-B	INSULATOR, HORIZ
J-29 7	1	5624-A	CONNECTOR, BNC
J-26 8	1	5633-A	RECEPTICAL, POWER
9	1	440-8-6-558	SCREW, #4-40 PAN HD (BLACK)
10	1	5438-A	SOLDER LUG
11			
12	1	30480-C	CONVERTOR DC - DC
13	2	440-6-18-55	SCREW 4-40 FLAT HEAD 100°
14		PWD 4039-C	PWD VERTICAL AMP
15	1	6501-B	HARNESS MONITOR S-2
C-50 16	1	2-.01M-0041	CAPACITOR .01uv 2 KV
17			
R-1 18	1	10-TBA-3-2	RESISTOR 10 MEG 1/4W 5%
R-2 19	1	1903-B	RESISTOR VAR. 2.5 MEG LIN
R-3 20	1	10-RRG-3-2	RESISTOR 2.2 MEG 1/4W 5%
R-4 21	1	10-TSY-3-2	RESISTOR 180K 1/4W 5%
R-6 22	1	1813-B	RESISTOR VAR 1.0 MEG LIN
23			
24			
25		22-22 4 4-2	WIRE LEAD 2" BLACK
26		22-22 4 4-2 3/4	WIRE LEAD 2 3/4" RED
27	1	2233-4 4-3	WIRE LEAD 3" ORANGE
28			
29	4	STD 2	WIRE, JUMPER (BW)
30			
31	4	24213-A	TUBING, INSULATED
32	1	6221-A	CABLE TIE
33			
34			
35	1	24030-B	GRATICULE, CLEAR
36	1	5836-B	GRAPHIC PLATE
37			
38			
39	1	STD-5A	LOCTITE STANDARD

BIRNBACK CO. INC
22 AWG
MIL-W-76B DESIGNATION
HW-22 ...

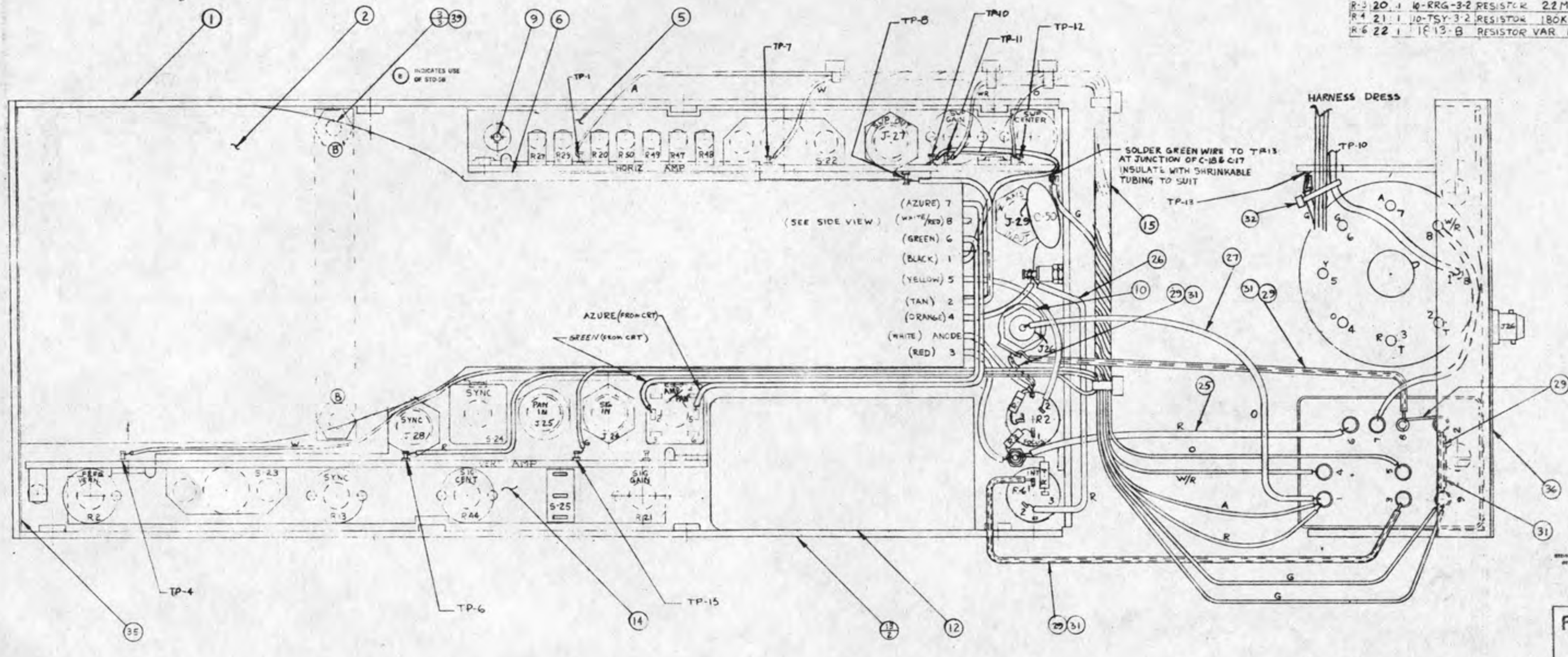


FIGURE 12.37

TOLERANCES		SCALE	DRAWN BY
DECIMAL		2:1	
FRACTIONAL	TITLE: FRONT COVER ASS'Y (S-3)		
ANGULAR	DATE	DRAWING NUMBER: 30310-D	ISSUE: 10

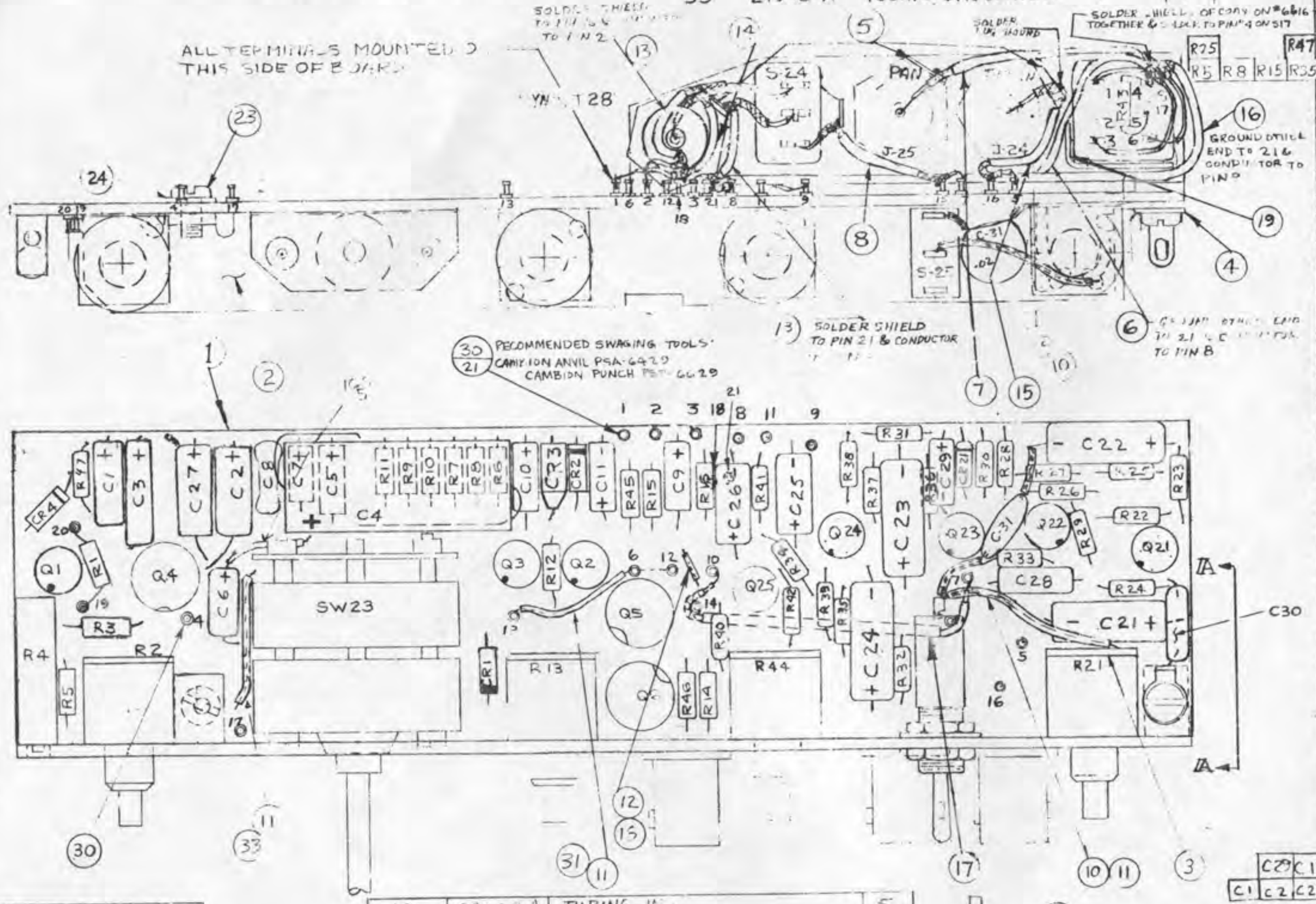
USED ON 30300-

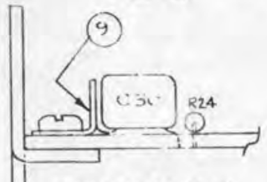
DECIMALS		FRACTIONS	ANGLES	SURFACE ROUGHNESS	DIMENSIONS ARE IN INCHES
PLACE	3 PLACE	±	±	√ A.A. MAX.	ALL DIAS. ON SAME AXIS CONC. WITHIN .006 T.I.R.
±	±				BREAK SHARP EDGES .01R. OR .01 × 45° MAX.
					ALL DIMENSIONS AND TOL. APPLY BEFORE FINISH

NOTE: AFTER PRE-ASS'Y TEST ADD COATING OF BE[illegible] CLEAR #91-[illegible] TO BOTH SIDES OF P.C. BOARD AT ASS'Y (PURCHASED FROM [illegible] CHEMICAL, N.J.)

22	STD-2	WIRE JUMPER (B/W)		1
[illegible]	4408-653	SCREW 440		1
24	17532A	WASHER [illegible]		1
S17	5207A	SWITCH 2 [illegible]		1
J24 J25	5424-A	CONNECTOR, PLUG		3
Q456	5426A	SOCKET, TRANSISTOR		3
Q-123	5127A	SOCKET, T[illegible]		3
Q21-25	5425A	[illegible] 4 PIN SM		5
30	5436-A	TERMINAL, TURRET		21
31	24070 A	TUBING, INSULATED	3/4	2
32	24071 A	TUBING, INSULATED	5/8	1
33	24072 A	TUBING INSULATED	1"	1
34	5438-A	SOLDER LUG		1

ALL TERMINALS MOUNTED ON THIS SIDE OF BOARD





SECTION A-A

MATERIAL LIST

ITEM	PART NO.	DESCRIPTION		QTY
1	4038-C	P.C. BOARD (AS MACH)		1
2	21006-C	BRACKET VERT AMP		1
3	4055	P.C. BOARD POT MTG		4
4	17514 A	WASHER FLAT		1
5	5484-A	LUG SOLDER		3
R43	[illegible]	[illegible] 1/4W 5%		1
R39,40	10-TST-3-2	RESISTOR 180Ω 1/4W 5%		2
R10	10-RRT-3-2	" 220Ω " "		1
R24,29	10-OOT-3-2	" 330Ω " "		2
R11	10-GTT-3-2	" 510Ω " "		1
R9,31	10-TSR-3-2	" 1.8K " "		2
R39,41	10-OOR-3-2	" 3.3K " "		2
R30,32,R47	10-YPR-3-2	" 4.7K " "		3
R25, R5, R8, R15, R35, R36, R47	10-TBO-3-2	" 10K " "		7
R3, 29	10-RBO-3-2	RESISTOR 20K 1/4W 5%		2
R33	10-OOO-3-2	" 33K " "		1
R22, 34, 37	10-YPO-3-2	" 47K " "		3
R1	10-TRY-3-2	" 120K " "		1
R23,27	10-RRY-3-2	" 220K " "		2
R12	10-OOY-3-2	" 330K " "		1
R45,46	10-TBG-3-2	" 1M " "		2
R6, 7	10-TGG-3-2	" 1.5M " "		2
R16	10-RRG-3-2	" 2.2M " "		1
R[illegible],42	10-TBY-3-2	" 100K " "		3
R4	1811	RESISTOR VAR 20K LIN		1
R13	1801-B	" " 10K LIN		1
R2,44	1802-B	" " 100K LIN		2
SW23	5213	SWITCH 12 POS JENNINGS		1
R21	1806-B	RESISTOR VAR 10K LOG DB		1
6	7054-A	WIRE, COAX		1
7	7056-A	WIRE, COAX		1
8	7055-A	WIRE, COAX		1
CR1,2	4521	DIODE IN914	2	
CR3	4504	DIODE IN2071	1	
CR4,21	4503	DIODE, ZENER IN759A	2	CHG.
Q4,5	4729	TRANSISTOR 2N3643		2
Q6	4709	" 2N3645		1
Q1,2,3	4730	" 2N3694		3
Q21-25	4748-A	" 40894		5
9	5452-A	SOLDER LUG		1
C8	2-1000P-0077	CAPACITOR 1000 μμf 100V		1
C7	2-.0047M-0160	" 4700 μμf 20V		1
C6	2-.022M-0075	" .022 μf 35V		1
C5	2-.12M-0159	" .12 μf 20V		1
C4	2-.67M-0158	" .67 μf 20V		1
C3	2-3.3M-0112	" 3.3 μf 35V		1
C-31	2-.02M-0043	CAPACITOR .02 μf 150V		1
C29, C11, C9,10	2-1M-0048	" 1 μf 35V		4
C1, C2, C27, C25,26	2-10M-0051	" 10 μf 20V		5
C21-24	2-47M-0081	" 47 μf 20V		4
C30, C28	2-330P-0084	" 330 PF		2

10	24050 A	TUBING IN[illegible]		5
11	STD-2	WIRE JUMPER		2
12	STD-2	JUMPER 3/8		1
13	70[illegible]-A	COAX		2
14	7014-A	COAX		1
15	70[illegible]2-A	COAX		1
16	7014-A	COAX		1
17	70[illegible] A	COAX		1
18	24094 A	TUBING, INSULATED	1/16	1
19	24055-B	SHIELD [illegible]		1
20	[illegible]	[illegible]		1
S-25, S-24	5420-A	SWITCH, TOGGLE		2

[illegible]	SEE ER-5[illegible]	6-18-76	
[illegible]	SEE ER-807	3-29-76	
[illegible]	SEE ER-766	11-10-75	
[illegible]	SEE ER-700	12-15-73	FF
[illegible]	SEE ER-633	10-27-72	
[illegible]	SEE ER-507	4-20-71	FB
[illegible]	SEE ER-497	4-[illegible]	FB
[illegible]	SEE ER-410	11-17-70	
[illegible]	SEE ER-307	3-20-70	
[illegible]	SEE ER 262	1-19-70	
[illegible]	SEE ER 203	9/18/69	
CHG.	DESCRIPTION	DATE	

FIGURE 12.38

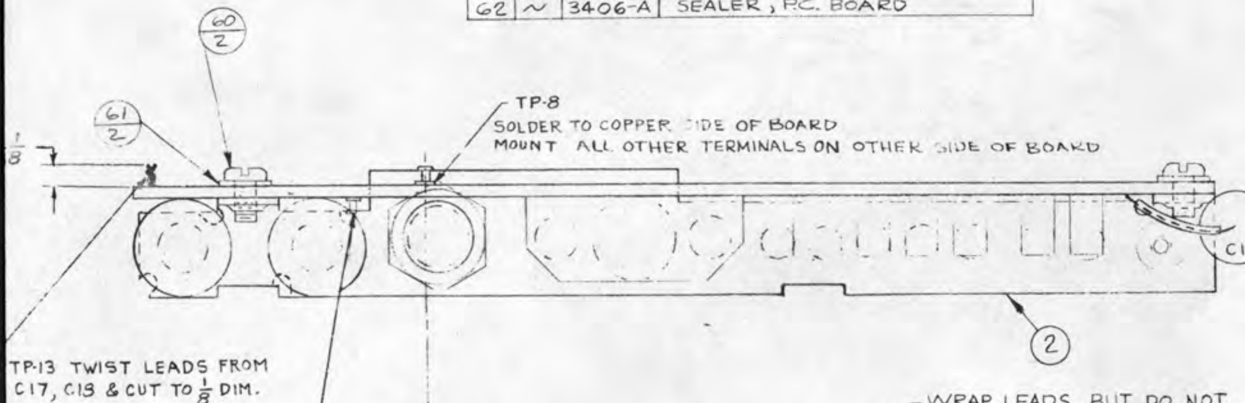
TOLERANCES (EXCEPT AS NOTED)		PS 12	SCALE 2:1	DRAWN BY [illegible]
DECIMAL ±				APPROVED BY [illegible]
FRACTIONAL ±	TITLE	VERT. AMP ASS'Y		
ANGULAR ±	DATE 5-16-69	DRAWING NUMBER PWD 4038-C		ISSUE 13

1 | 36310 D

REVISION	DATE	AUTH
SEE ER-423		
SEE ER-496		
SEE ER-504		
SEE ER-507		
SEE ER-593		
SEE ER-196		FE
SEE ER-262		FE
SEE ER-271		FB
SEE ER-339		FB
SEE ER-402		

TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP12
										TP11

CIR NO.	NO REQ	PART NO	PART NAME	
[illegible]		24-[illegible]-4-2	WIRE	2½
[illegible]	1	24-[illegible]-4-2	WIRE	2
[illegible]	1	[illegible]	[illegible]	1"
54				
55	11	5436	TERMINAL, TURRET	
56		5417-A	TERMINAL, TURRET	
57	1	24054-A	TUBING, INSULATED	
58	2	24073 A	TUBING, INSULATED	1/4"
59				
60	2	440-3-6-[illegible]	SCREW 4-40	
61	2	17514-4	WASHER FLAT	
62	~	3406-A	SEALER, P.C. BOARD	



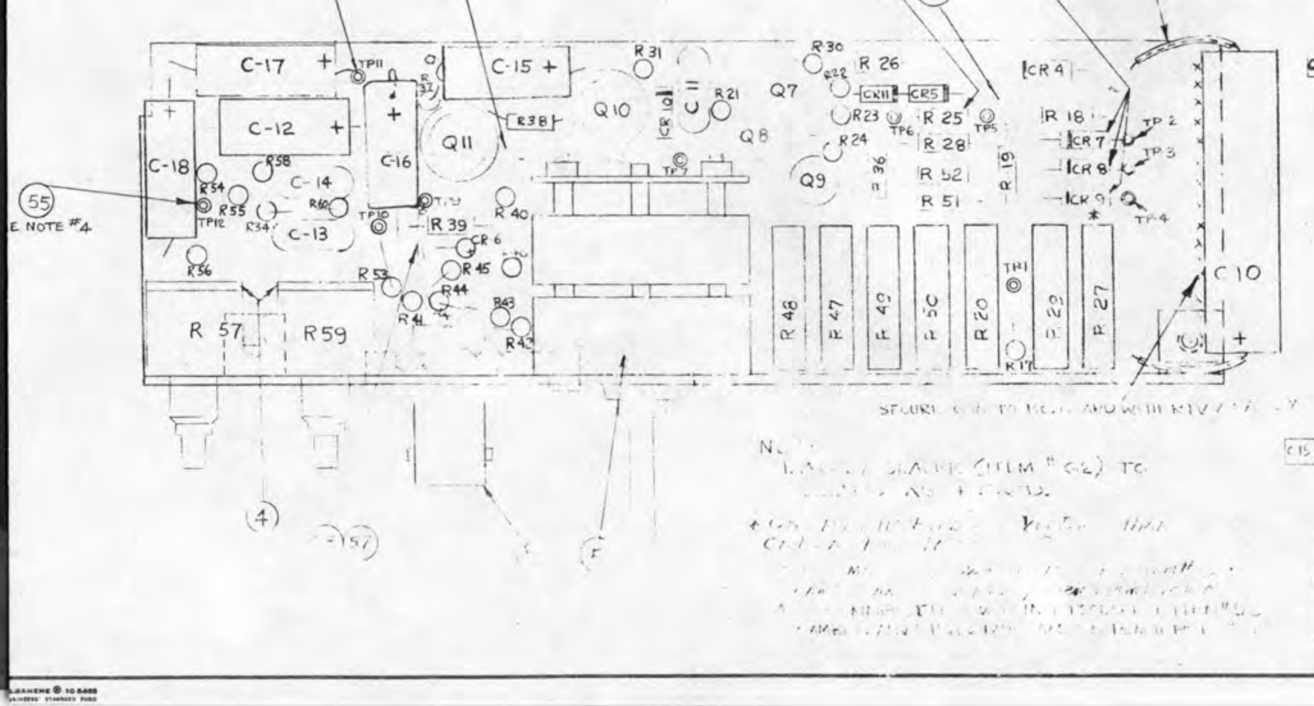
TP-8 SOLDER TO COPPER SIDE OF BOARD
MOUNT ALL OTHER TERMINALS ON OTHER SIDE OF BOARD

TP-13 TWIST LEADS FROM C17, C13 & CUT TO $\frac{1}{8}$ DIM.

SEE NOTE # 3

FACTORY SELECTED VALUE NOT INSTALLED IN W.&A.

WRAP LEADS BUT DO NOT SOLDER DIODES CR-7,8 & 9 TO TERMINALS IN W & A



			CIR NO	NO REQ	PART NO	PART NAME			
			1	1	40[illegible]-C	PC BOARD	AS MARKED		
			2	1	30308-B	BRACKET COMP'L HORIZ			
			3	2	5426-A	SOCKET XSISTOR			
			4	2	4055-A	PC BOARD, POT MOUNTING			
			5	1	5214-A	SWITCH, JENNINGS 6 POS.			
			6	1	5624-A	CONNECTOR BNC			
			7	3	54[illegible]-A	SOCKET TRANSISTOR			
		R 17	8	1	10-TBT-3-2	RESISTOR	100 Ω	1/4W	5%
		R 18	9	1	10-RRT-3-2		220 Ω		
			10						
		R22	11	1	10-TBR-3-2		1K		
		R-2[illegible]	12	1	10-TGR-3-2		1500		
R19	R26	R-24 R-39	13	4	10-GTT-3-2		510 Ω		
		R-40	14	2	10-TB[illegible]-3-2		10K		
R31	R28	R-36	15	3	10-YP[illegible]-3-2		4700 Ω		
	R60	R 34	16	2	10-[illegible]-3-2		3300 Ω		
	R38	R37	17	2	10-TBY-3-2		100 K		5%
		R-41	[illegible]	1	1302-A		33.2 K	1/4W	1%
		R42	[illegible]	1	1303-A		6.81 K		
		R45	20	1	1304-A		68.1 Ω		
		R4[illegible]	21	1	1305-A		22.1 Ω		
		R43	22	1	1306-A		1820 Ω		
		R44	23	1	1307-A		332 Ω	1/4W	1%
	R51	R52	[illegible]	2	10-[illegible]-2		8200 Ω	1/4W	5
R-53	R-55	R-[illegible] R-58	[illegible]	4	10-TBG-3-2	RESISTOR	1MEG	1/4W	5
		R-25	26	1		FACTORY SELECTED VALUE		1/4W	5%
		R-20	27	1	1812-B	RESISTOR VARIABLE	500 Ω	TRIMPOT	
	R-27	R-49 R-50	[illegible]	3	1808-B		1K	TRIMPOT	
	R29	R-4[illegible] R-48	[illegible]	3	1809-B		10K	TRIMPOT	
		R-57	[illegible]	1	1803-B	RESISTOR VARIABLE	2.5MEG		
		R-59	[illegible]	1	1801-B	RESISTOR VARIABLE	10 K		
		R-54	[illegible]	1	10-TRY-3-2	RESISTOR	120K	1/4W	5%
		R-23	[illegible]	1	10-TST-3-2	RESISTOR	150 Ω	1/2W	5%
Q-7	Q-8	Q-9	[illegible]	[illegible]	4716-A	[illegible]	2N3646		
		Q-10 Q-11	[illegible]	[illegible]	4734-A	[illegible]	2N3440		
	CR10	CR-4	37	2	4508-A	DIODE	FD777		
	CR11	CR-5	[illegible]	2	4[illegible]-A		IN60		
		[illegible]	[illegible]	1	4511-A		IN702		
		[illegible]	4[illegible]	1	4516-A		IN965-B		
		[illegible]	41	[illegible]	45[illegible]-A		IN759-A		
		[illegible]	42	1	45[illegible]-A	DIODE	IN756-A		
			[illegible]						
			4[illegible]						
		[illegible]	4[illegible]	1	[illegible]	CAPACITOR	200M	25V	
		C13	[illegible]	[illegible]	[illegible]		500P	500V	
		[illegible]	[illegible]	1	[illegible]		120M	10V	
		[illegible]	[illegible]	[illegible]	[illegible]		330P	500V	
C15	C[illegible]	[illegible]	[illegible]	4	[illegible]		2.0M	150V	

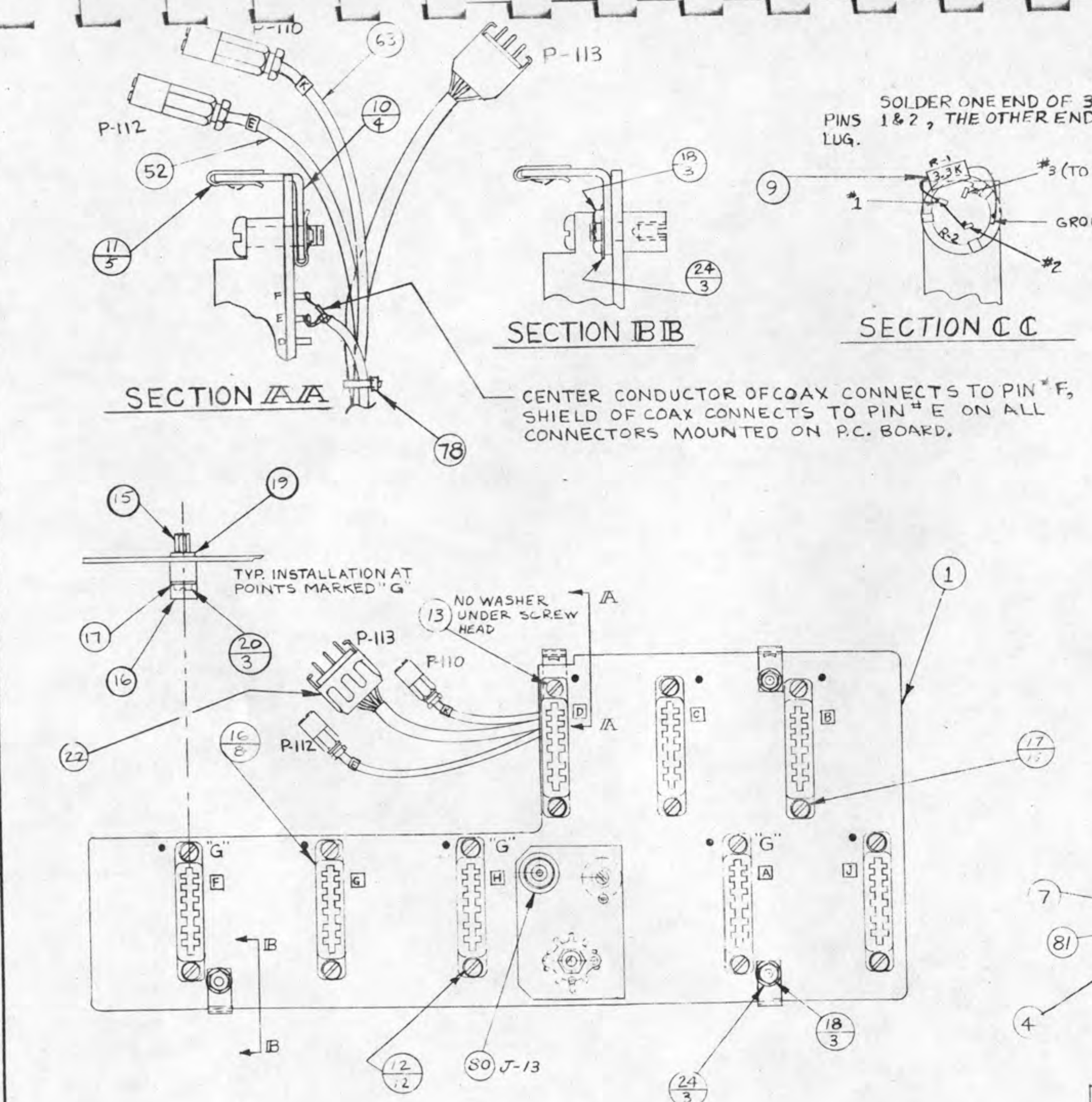
FIGURE 12.39

SECURE [illegible] TO [illegible] WITH RTV [illegible]

NOTES:
[illegible] (ITEM # 62) TO [illegible]

TOLERANCES (EXCEPT AS NOTED)			
DECIMAL ±		SCALE 2:1	DRAWN BY [illegible] / APPROVED BY [illegible]
FRACTIONAL ±	TITLE	HORIZONTAL AMP	
ANGULAR ±	DATE 4-[illegible]-[illegible]	DRAWING NUMBER	PWD 4039-C

	REV	ORD	CK
7-14	SEE ER-260		FB
3-7	SEE ER-291		FB
7-7	SEE ER-343		FB
7-16	SEE ER-357		FB
11-15	SEE ER-405		FB
3-31	SEE ER-490		
5-24	SEE ER-624		
7-19	SEE ER-833		FB
8-	SEE ER-835		FB



NOTE ÷

1) ALL MOUNTING HARDWARE FOR ITEMS 4 & 8 SUPPLIED WITH PURCHASED PARTS.
2) ● INDICATES MOUNTING HOLES FOR ROTARY SWITCH
3) □ INDICATES WIRE DESIGNATION COAX WIRES MUST HAVE WIRE MARKERS ON EACH END FOR IDENTIFICATION.
4) ALL COAX SHIELDS TO BE GROUNDED TO BRACKET (ITEM 2) EXCEPT COAX LEAD L
5) USE EXISTING NUT ON SWITCH FOR FASTENING
6) SEE SHEET 3 OF 3 FOR M.E.I. NUMBERS FOR WIRE MARKERS.
7) LONG END OF BRACKET ITEM № 10 MOUNTS ON BOARD.
8) USE LOCTITE ON ALL SCREWS. REFER TO M.E.I. LOCTITE STD-5
9) FOR SCHEMATIC INFORMATION SEE SWD 4056-C

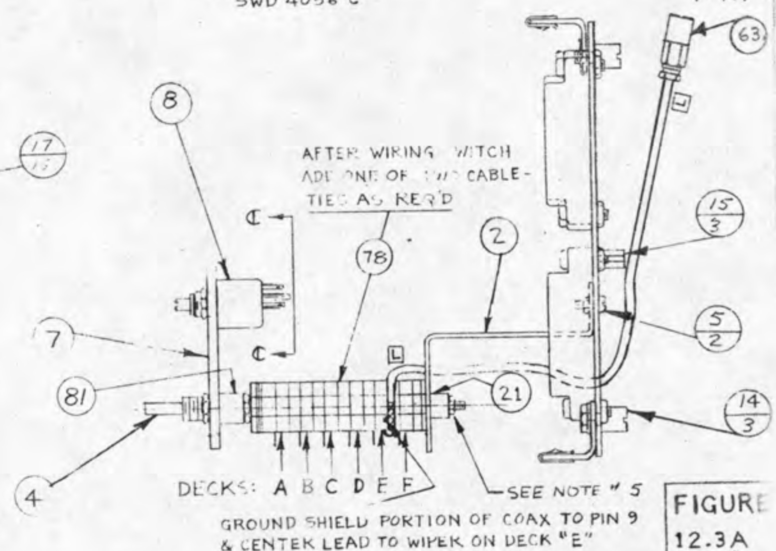


FIGURE 12.3A

USED ON	TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC 1700 POST RD. FAIRFIELD, CONN		
1 30100-D	DECIMAL ± ✓		SCALE FULL	DRAWN BY S.P. / APPROVED BY
	FRACTIONAL ± ✓	TITLE SWITCH BOARD ASS'Y		
	ANGULAR ± ✓	DATE 8-11-6?	DRAWING NUMBER 30102-C	

SHEET 1 OF 3

EP-16

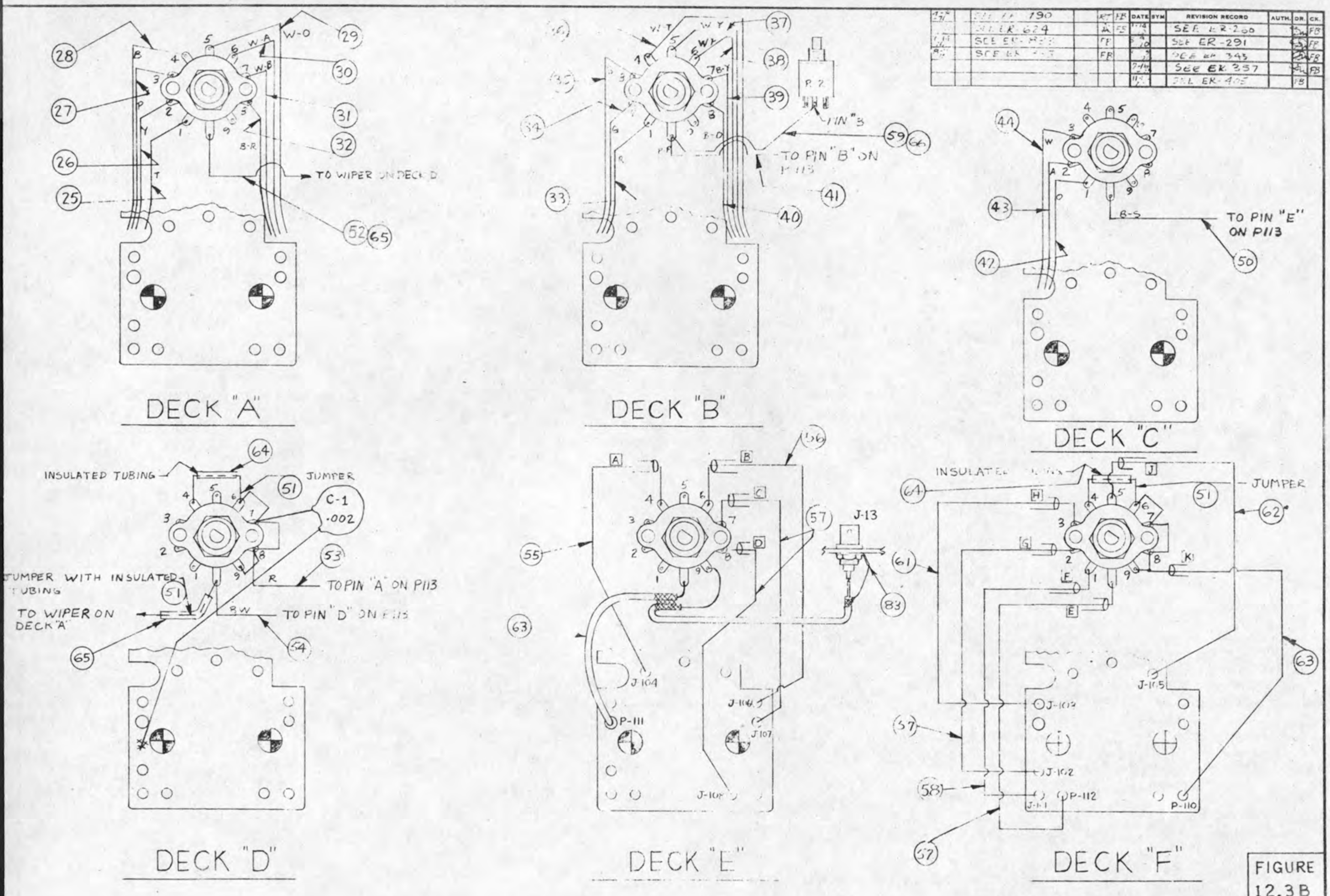


FIGURE
12.3 B

SHEET 2 OF 3

MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.

SCALE: NONE

TITLE: SWITCH BOARD ASS'Y.

	SEE ER-490					DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
	SEE ER-624		FB			1-14-70		SEE ER-260			FB
	SEE ER-[illegible]	FR				3-9-70		SEE ER 291			FB
	SEE ER-[illegible]	FR				5-25-70		SEE ER-343			FB
						7-[illegible]-70		SEE ER-357			FB
						11-12-70		SEE ER-405		FB	

CIR. NO.	NO. RQD	PART NO.	PART NAME
1	1	30103-C	SWITCH BOARD COMPL
2	1	30153-B	BRACKET SWITCH COMPL
3			
4	1	5227-E	SWITCH, ROTARY
5	2	440-6-6-SS	SCREW, #4-40 × 3/16 PAN HD
6			
7	1	24272-B	SUBPLATE
8	1	1801-B	RESISTOR, VARIABLE (R-2)
9	1	10-00R-3-2	RESISTOR, 3.3 K (R-1)
10	4	21016-A	BRACKET, SWITCH BD.
11	5	18021-A	NUT, SPEED
12	12	440-14-6SS	SCREW, #4-40 × 7/16 PAN HD
13	1	632-16-6-SS	SCREW, #6-32 × 1/2 PAN HD.
14	3	13031-A	SPACER, BOTTOM PLATE
15	3	13032-A	SPACER, SWITCH BOARD
16	8	P-5628-A	CONNECTOR, 6 WAY
17	15	17514-A	WASHER, FLAT #4
18	3	18003-A	NUT, HEX #6-32
19	3	17522-A	WASHER, INTERNAL LOCK
20	3	440-16-6-SS	SCREW, #4 40 × 1/2 PAN HD
21	2	13052-A	SPACER, BANDSWITCH MTG
22	1	R-5641-B	CONNECTOR, 5 PIN

CIR. NO.	NO. RQD.	PART NO.	PART NAME
23			
24	3	17501-A	WASHER, INTERNAL TOOTH
25	1	24-11-4-4-4	WIRE, LEAD "T"
26	1	24-44-4-4-4	WIRE, LEAD "Y"
27	1	24-77-4-4-3 3/4	WIRE, LEAD "P"
28	1	24-00-4-4-4	WIRE, LEAD "B"
29	1	24-93-4-4-3 3/4	WIRE, LEAD "W/O"
30	1	24-96-4-4-4	WIRE, LEAD "W/A"
31	1	24-90-4-4-3 3/4	WIRE, LEAD "W/B"
32	1	24-02-4-4-4	WIRE, LEAD "B/R"
33	1	24-22-4-4-4	WIRE, LEAD "R"
34	1	24-55-4-4-3 1/2	WIRE, LEAD "G"
35	1	24-88-4-4-3 1/2	WIRE, LEAD "S"
36	1	24-91-4-4-3 3/4	WIRE, LEAD "W/T"
37	1	24-94-4-4-3 1/2	WIRE, LEAD "W/Y"
38	1	24-97-4-4-4	WIRE, LEAD "W/F"
39	1	24-04-4-4-3 3/4	WIRE, LEAD "B/Y"
40	1	24-05-4-4-3 1/4	WIRE, LEAD "B/O"
41	1	24-07-4-4-11 3/8	WIRE, LEAD "B/F"
42	1	24-33-4-4-3 3/4	WIRE, LEAD "O"
43	1	24-66-4-4-3 1/4	WIRE, LEAD "A"
44	1	24-99-4-4-3 3/4	WIRE, LEAD "W"

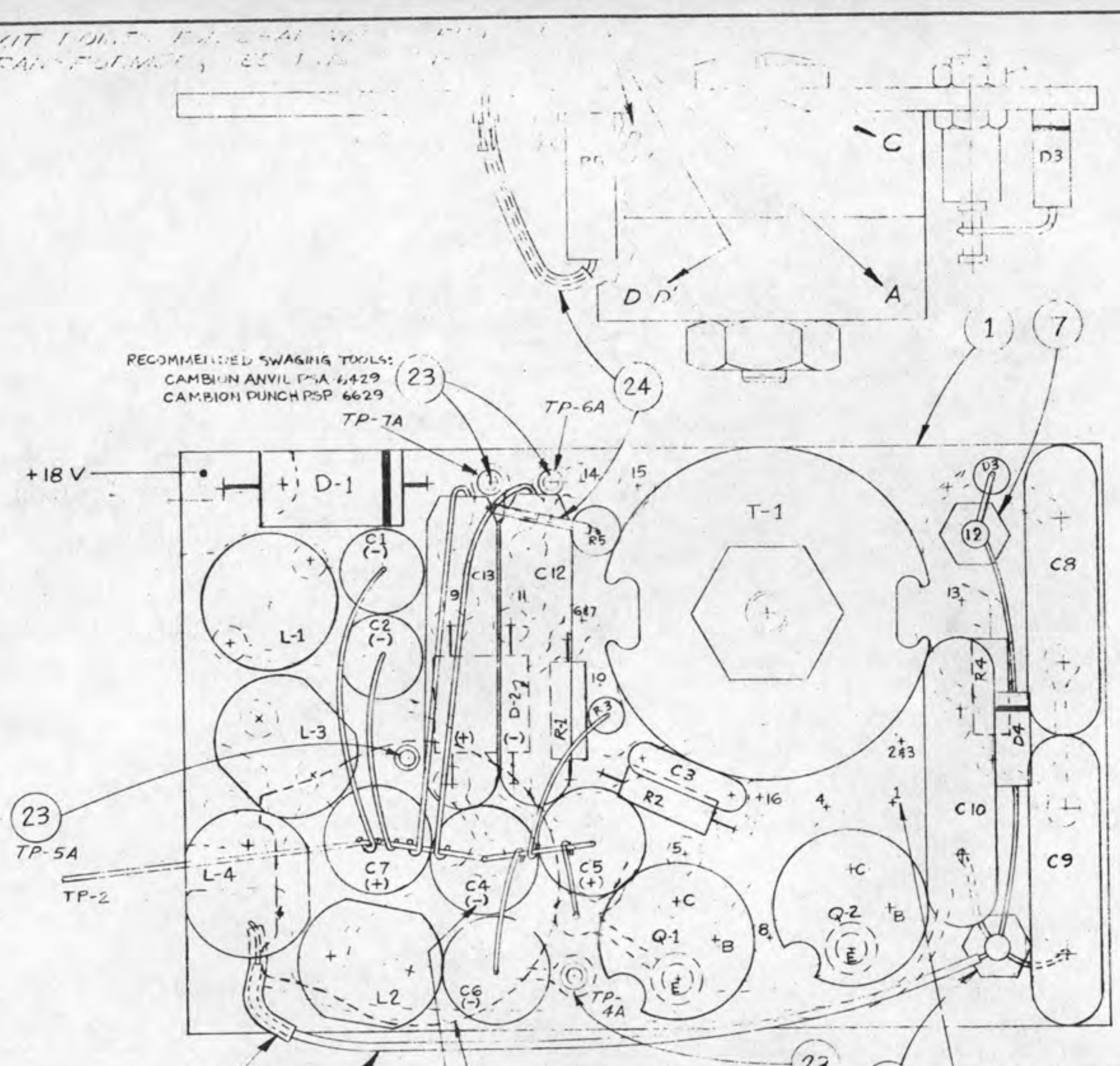
CIR. NO.	NO. RQD	PART NO.	PART NAME
45			
46			
47			
48			
49			
50	1	24-08-4-4-11 1/8	WIRE, LEAD "B/S"
51	3	STD-2	WIRE, JUMPER (BW) 1" LG.
52	1	30126-A	WIRE, COAX COMPL.
53	1	24-01-4-4-10 7/8	WIRE, LEAD R
54	1	24-09-4-4-10 7/8	WIRE, LEAD "B/W"
55	1	7031 A	WIRE, COAX 6 3/4 LG.
56	1	7032 A	WIRE, COAX 5 9/16 LG.
57	3	7033 A	WIRE, COAX 7 1/16 LG.
58	1	7034-A	WIRE, COAX 8 1/4 LG.
59	1	STD 2	WIRE, JUMPER (BW) 1 7/8 LG.
60			
61	1	7035-A	WIRE COAX 5 3/4 LG
62	1	7036 A	WIRE COAX 8 1/2 LG.
63	2	30127-A	WIRE, COAX COMPL
64	2	2407[illegible] A	TUBING, INSULATED 1/4 LG.
65	2	2407[illegible] A	TUBING INSULATED 3/4 LG.
66	1	24115 A	TUBING INSULATED 1[illegible] LG.

CIR. NO.	NO. RQD	PART NO.	PART NAME
67	2	24120-A	WIRE MARKER "A"
68	2	24121-A	WIRE MARKER "B"
69	2	24122-A	WIRE MARKER "C"
70	2	24123-A	WIRE MARKER "D"
71	2	24124-A	WIRE MARKER "E"
72	2	24125-A	WIRE MARKER "F"
73	2	24126-A	WIRE MARKER "G"
74	2	24127-A	WIRE MARKER "H"
75	2	24128-A	WIRE MARKER "J"
76	2	24129-A	WIRE MARKER "K"
77	2	24130-A	WIRE MARKER "L"
78	3	6221-A	CABLE TIE
79			
80	1	5624-A	CONNECTOR, BNC
81	1	13054-A	SPACER, BANDSWITCH
82	1	2-002M-0035	CAPACITOR .002 C-1
83	1	5454 A	SOLDER LUG
84			
85			

SHEET 3 OF 3

FIGURE 12.3C

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
DECIMAL ±		SCALE NONE	DRAWN BY S.P.M. APPROVED BY
FRACTIONAL ±	TITLE SWITCH BOARD ASS[illegible]		
ANGULAR	DATE	DRAWING NUMBER [illegible]0102-C	

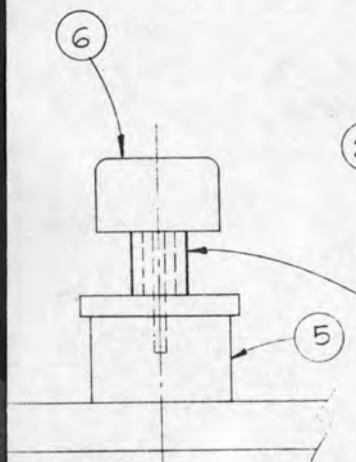


—Nos 1 THRU 16 INDICATE LOCATION OF SOLDER POINTS OF LEAD WIRES 1 THRU 16 FROM T-1 TRANSFORMER

C11-LOCATE ON COPPER SIDE OF BOARD

(+) OR (-) DESIGNATION ON C1, C2, C4, C5, C6 & C7 INDICATES POLARITY FARTHEST AWAY FROM BOARD

(25) (22) SEE NOTE #1



YPICAL ELEVATION OF Q-1 & Q-2

(27) PASS EMITTER PIN OF Q-1 & Q-2 THRU FERRITE BEADS & SECURE IN PLACE WITH R.T.V. (ITEM No 28)

NOTE:
1. ITEM 22 TO BE 22 GA. WIRE WITH 2500 V. INSULATION, WIRE DESIGNATION MIL. TYPE HW-C22 (7) U (MFGR. No 25-0/22 - DABURN)

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
		SEE ER-490			FB
		SEE ER-507			FB
		SEE ER-594		FB	
		SEE ER-613			FB
		SEE ER-649		FB	

REF.	CIR No	No REQ.	PART No	PART NAME
	1	1	4077-C	P.C. BOARD (AS MACH.)
T-1	2	1	3031-C	TRANSFORMER, CONVERTER
L-1	3	1	3425-B	CHOKE, POT CORE 3.3mh
L-4, L-3, L-2	4	3	3626-A	CHOKE [illegible] mh
	5	2	54[illegible]-A	SOCKET, TRANSISTOR
Q2, Q-1	6	2	473[illegible]-A	TRANSISTOR (SE 6020)
	7	[illegible]	5440-A	TERMINAL, INSULATED
D-2	8	1	4547-A	DIODE, QUAD MDA 920A-7
D-1	9	1	4504-A	DIODE IN2071
D-4, D-3	10	2	45[illegible]-A	DIODE B223-30
C2, C-1	11	2	2-120M-0156	CAPACITOR 120MF
C3	12	1	2-.01M-0039	CAPACITOR .01 MF
C-7, C-6, C-5, C-4	13	4	2-2M-0108	CAPACITOR 2MF
C-13, C-12, C-11, C-10, C-9, C-8	14	6	2-01[illegible]-0041	CAPACITOR .01MF 3KV
	15			
	16			
R-1	17	1	10-KB[illegible]	RESISTOR [illegible] 1/4W
R-2	18	1	10-YPR [illegible]	RESISTOR 4.7K 1/4W
R-3	19	1	10-TBT [illegible]	RESISTOR 100 [illegible] 1/4W
R-4	20	1	10-TB[illegible]-32	RESISTOR 1K
R5	21	1	10-RRU-4-2	RESISTOR 2.2 Ω 1/2W
	22	~	22-22-T-88-2 3/4	WIRE, LEAD (R) 2500 V.
	23	4	5436-A	TERMINAL, TURRET
	24	~	24213-A	TUBING, INSULATING
	25	~	24104-A	TUBING, SHRINKABLE
	26	2	18014-A	NUT, HEX. (NYLON)
	27	2	3209-A	FERRITE BEAD
	28	~	3407-A	POTTING COMPOUND

FIGURE 12.40

USED ON
1 3048[illegible]-C

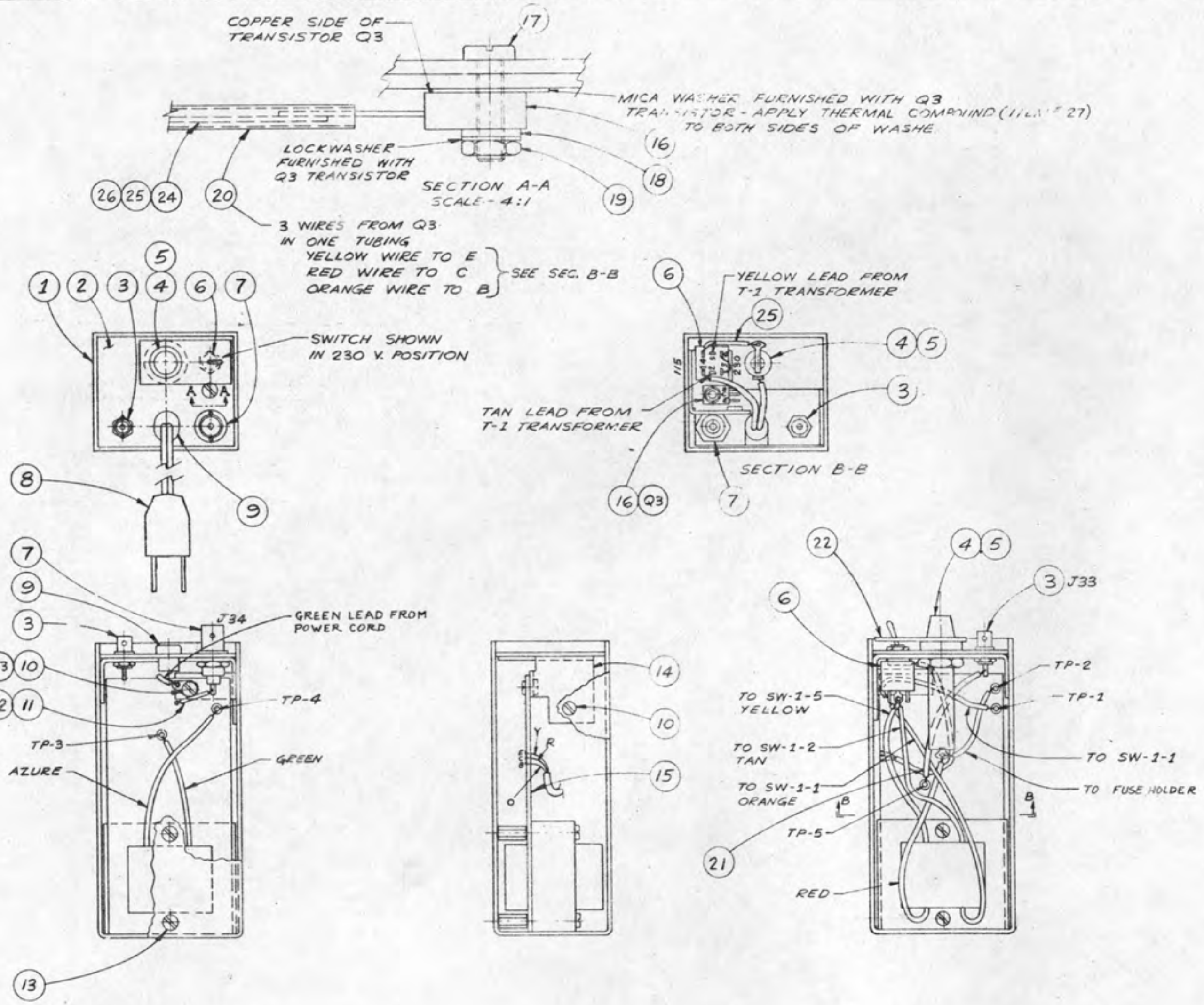
TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±.005
FRACTIONAL ± 1/64
ANGULAR

MASON [illegible]
1700 POST RD [illegible]

SCALE 4:1 | DRAWN BY RHT | APPROVED BY [illegible]

TITLE: P.C. BOARD ASS'Y. H.V. CONVERTER A-3

DATE 3-[illegible]-71 | DRAWING NUMBER PWD-4077-C | ISSUE 8



	CIR. NO	NO REQD.	PART NO	PART NAME
	1	1	19084-C	CASE, PS-10
	2	1	5873-B	GRAPHIC PLATE, PS-10
J33	3	1	5633-A	RECEPTACLE, POWER
	4	1	5444-A	HOLDER, FUSE
	5	1	6206-A	FUSE
	6	1	5207-A	SWITCH, TOGGLE (DPDT)
J34	7	1	5663-A	CONNECTOR, B.N.C.
	8	1	6267-A	POWER CORD
	9	1	5701-A	CONNECTOR, STRAIN RELIEF
	10	3	440-8-65-SS	SCREW, #4-40 x 1/4 LG., PAN HD.
	11	1	STD.-2	WIRE, JUMPER (BW)
	12	1	24213-A	TUBING, INSULATED
	13	2	440-8-65-SSB	SCREW, #4-40 x 1/4 LG., PAN. HD.
	14	1	30411-B	BRACKET, COMPLETE PS-10
	15	1	PWD-4074-D	P.C. BOARD ASSEMBLY PS-10
Q3	16	1	4735-A	TRANSISTOR (2N5190)
	17	1	440-16-65-SSB	SCREW, #4-40 x 1/2 LG., PAN HD.
	18	1	17519-A	WASHER, FIBER
	19	1	18001-A	NUT, HEX
	20	1	24220-A	TUBING, SHRINKABLE
	21	1	24-77-4-4-2½	WIRE, LEAD (PURPLE)
	22	1	21059-A	BRACKET, SWITCH STOP
	23	1	5483-A	SOLDER LUG
	24	1	24-22-4-4-5	WIRE, LEAD (RED)
	25	1	24-33-4-4-5	WIRE, LEAD (ORANGE)
	26	1	24-44-4-4-5	WIRE, LEAD (YELLOW)
	27	~	3422-A	THERMAL COMPOUND

REVISION RECORD
SEE ER-584
SEE ER-738
SEE ER-823
SEE ER-837

FIGURE 12.41

USED ON: 1 PRD-30000

TOLERANCES: DECIMAL ±.005; FRACTIONAL ±1/64; ANGULAR ±1°

MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.

SCALE: FULL

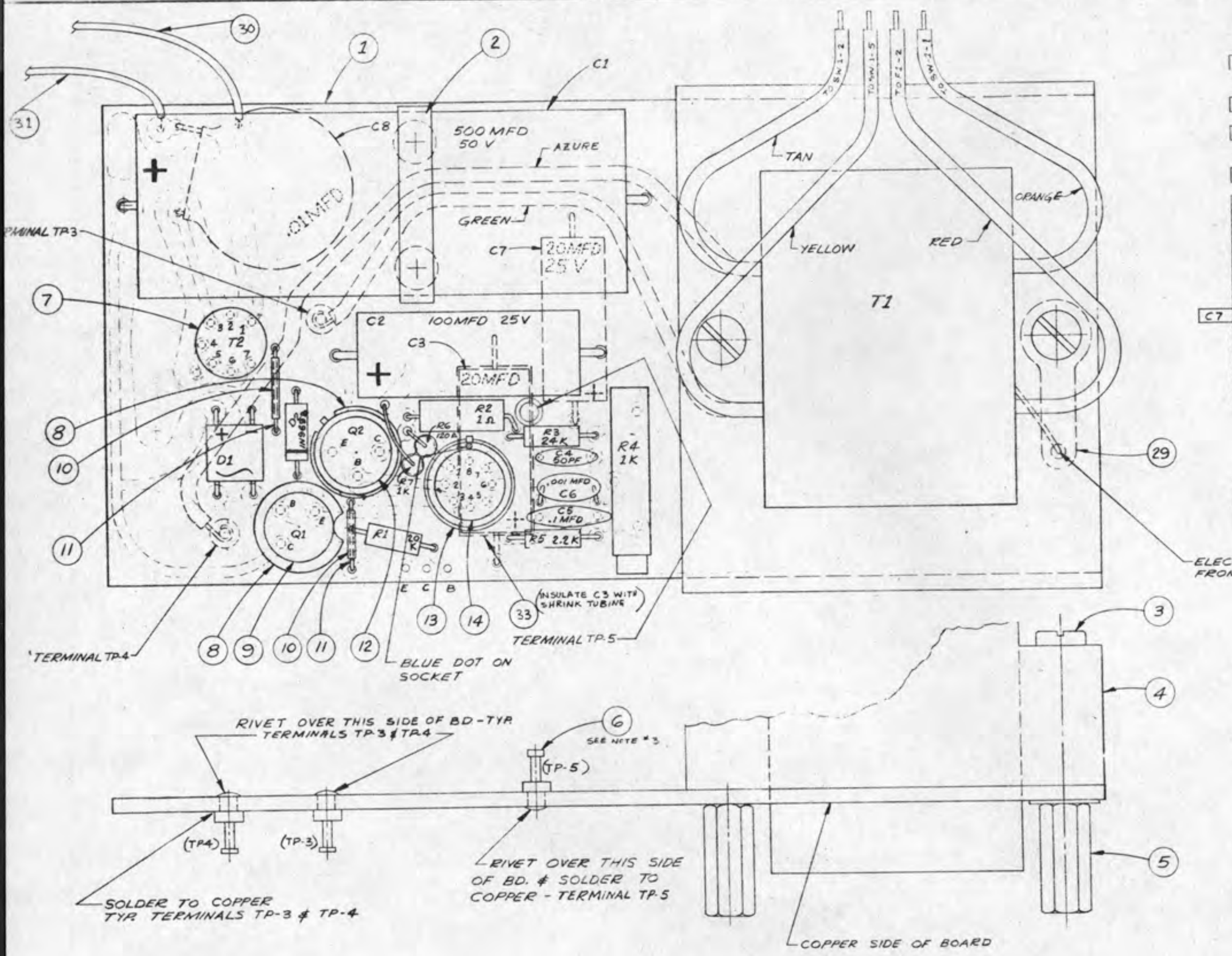
TITLE: POWER SUPPLY ASS'Y. PS-10

DATE: 3-12-71

DRAWING NUMBER: 30410-D

ISSUE: 5

ER-100-X



	CIR. Nº	Nº REQ'D.	PART Nº	PART NAME
	1	1	4074-C	P.C. BOARD, AS MACH., PS-10
	2	1	6231-A	CABLE TIE
	3	2	440-32-25-SS	SCREW, #4-40 x 1" LG., BINDING HD.
T1	4	1	3030-B	TRANSFORMER, POWER
	5	2	13014-A	SPACER, HEX
	6	3	5417-A	TERMINAL, TURRET
T2	7	1	3027-A	TRANSFORMER
	8	2	5426-A	SOCKET, TRANSISTOR
Q1	9	1	4729-A	TRANSISTOR 2N3643
	10	2	24213-A	TUBING, INSULATED
	11	2	STD-2	WIRE, JUMPER (BW)
Q2	12	1	4737-A	TRANSISTOR 2N2553
	13	1	5443-A	SOCKET, I.C. (8 PIN)
IC-1	14	1	4726-A	INTEGRATED CIRCUIT LM-300
R1	15	1	10-RBO-3-2	RESISTOR 20K
R2	16	1	10-TBU-4-2	RESISTOR 1Ω ½W 5%
R3	17	1	10-RYO-3-2	RESISTOR 24K
R4	18	1	1808-B	POTENTIOMETER, TRIM 1K
R5	19	1	10-RRR-3-2	RESISTOR 2.2K
C1	20	1	2-500M-0139	CAPACITOR SPRAGUE 39D507G050GJ4
C2	21	1	2-100M-0136	CAPACITOR 100MF 25V
C7, C3	22	2	2-25M-0111	CAPACITOR 25MF 25V
C4	23	1	2-50P-0059	CAPACITOR 50PF CENTRALAB DD-500
C5	24	1	2-.1M-0140	CAPACITOR .1MF 10V SPRAGUE HY-320
C6	25	1	2-1000P-0103	CAPACITOR .001 SPRAGUE DD-102G
C8	26	1	2-.01M-0041	CAPACITOR .01M 2KV
D1	27	1	4533-A	DIODE, QUAD MDA-920A-2
D2	28	1	4532-A	DIODE, ZENER IN969B (IRC)
	29	1	5419-A	SOLDER LUG
	30	1	24-88-4.4-2	WIRE, LEAD (SLATE)
	31	1	24-99-4.4-2	WIRE, LEAD (WHITE)
	32	~	3407-A	POTTING COMPOUND
	33	~	24267-A	TUBING, SHRINKABLE
R6	34	1	10-TRT-3-2	RESISTOR 120 Ω
R7	35	1	10-TBR-3-2	RESISTOR 1K

REVISION RECORD	AUTH.	CK.
SEE ER-504		
SEE ER-556		
SEE ER-535		
SEE ER-477		
SEE ER-584		
SEE ER-771		

NOTE:
1. CAPACITORS C3, C7 & C8 ARE LOCATED ON COPPER SIDE OF BOARD
2. SECURE BLUE & GREEN LEAD WIRES FROM TRANSFORMER (ITEM #4) WITH THE SAME CABLE TIE (ITEM #2) USED FOR HOLDING C1 CAPACITOR
3. RECOMMENDED SWAGING TOOLS FOR ITEM #6: CAMBION ANVIL PSA-6446, CAMBION PUNCH PSP-6663
4. APPLY RTV POTTING COMPOUND (ITEM #32) TO C_3, C_7, C_8, Q_1, Q_2 & IC_1 FOR SECURING TO P.C. BOARD

FIGURE 12.42

USED ON	TOLERANCES	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.
130410-D	DECIMAL ±.005	SCALE 4:1
	FRACTIONAL ± 1/64	TITLE P.C. BOARD ASSEMBLY (PS-10)
	ANGULAR ± 1°	DATE 3-4-71 DRAWING NUMBER PWD-4074-D ISSUE 7

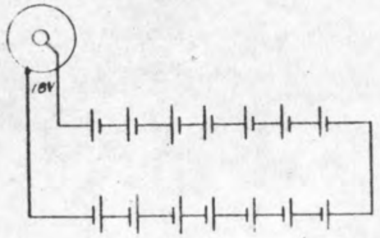
ER-100-X

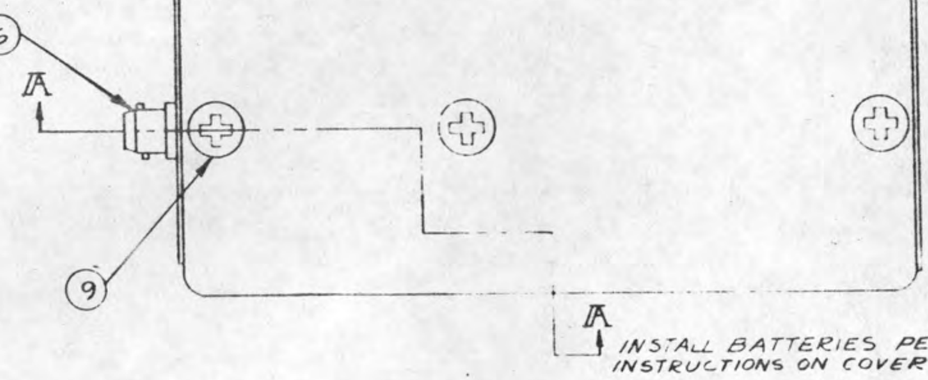
NOTE:
1 BATTERY MALLORY RM12 R OR EQUIV., MERCURY PREFERRED OR ALKLINE FOR LOW TEMPERATURES.

DATE	LTR	REVISION RECORD	AUTH.	DR	CK
	2	SEE ER-438			

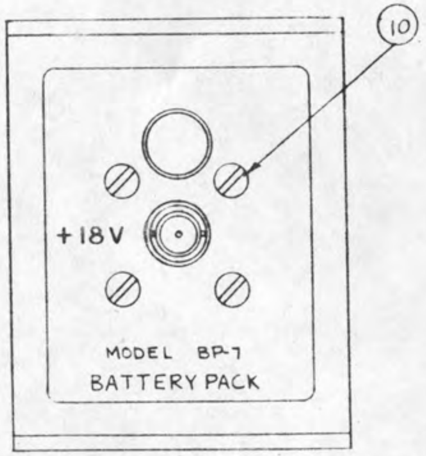
CIR NO	NO REQ	PART NO	PART NAME
1	1	19049-C	CASE, BATTERY
2	1	4075-B	COVER, RIGHT
3	1	3046 B	COVER, LEFT COMP'L.
4	14	23001-A	SPRING
5	14	6401-A	BATTERY (SEE NOTE #1)
6	1	5633-A	RECEPTACLE, POWER
7			
8	1	24058-A	PAD, FELT 2 x 1½
9	6	832-16-1A-SS	SCREW #8-32 x ½ R. HD
10	4	440-6-6-SS	SCREW, 4-40 x ¼ PAN HD.
11	1	5872-A	GRAPHIC PANEL PLATE
12	1	24-22-4-4-3	WIRE, LEAD (RED)
13			
14	1	24-00-4-4-3	WIRE, LEAD (BLACK)
15			
16	2	24248-A	TUBING, SHRINKABLE
17	1	5438-A	SOLDER LUG

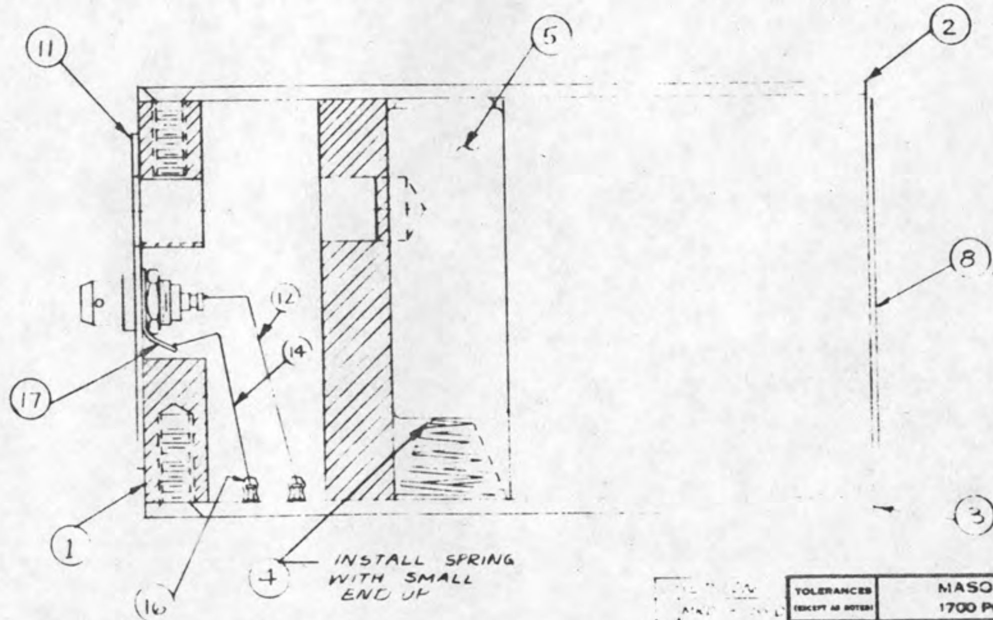
BP-7 SCHEMATIC





INSTALL BATTERIES PER INSTRUCTIONS ON COVER





INSTALL SPRING WITH SMALL END UP

SECTION A-A

ER 474

FIGURE 12.43

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
DECIMAL ±		SCALE 2:1	DRAWN BY SPM / APPROVED BY
FRACTIONAL ±	TITLE BATTERY PACK BP-7 ASS'Y		
ANGULAR ±	DATE 3 8 71	DRAWING NUMBER 30460-C	ISSUE 2

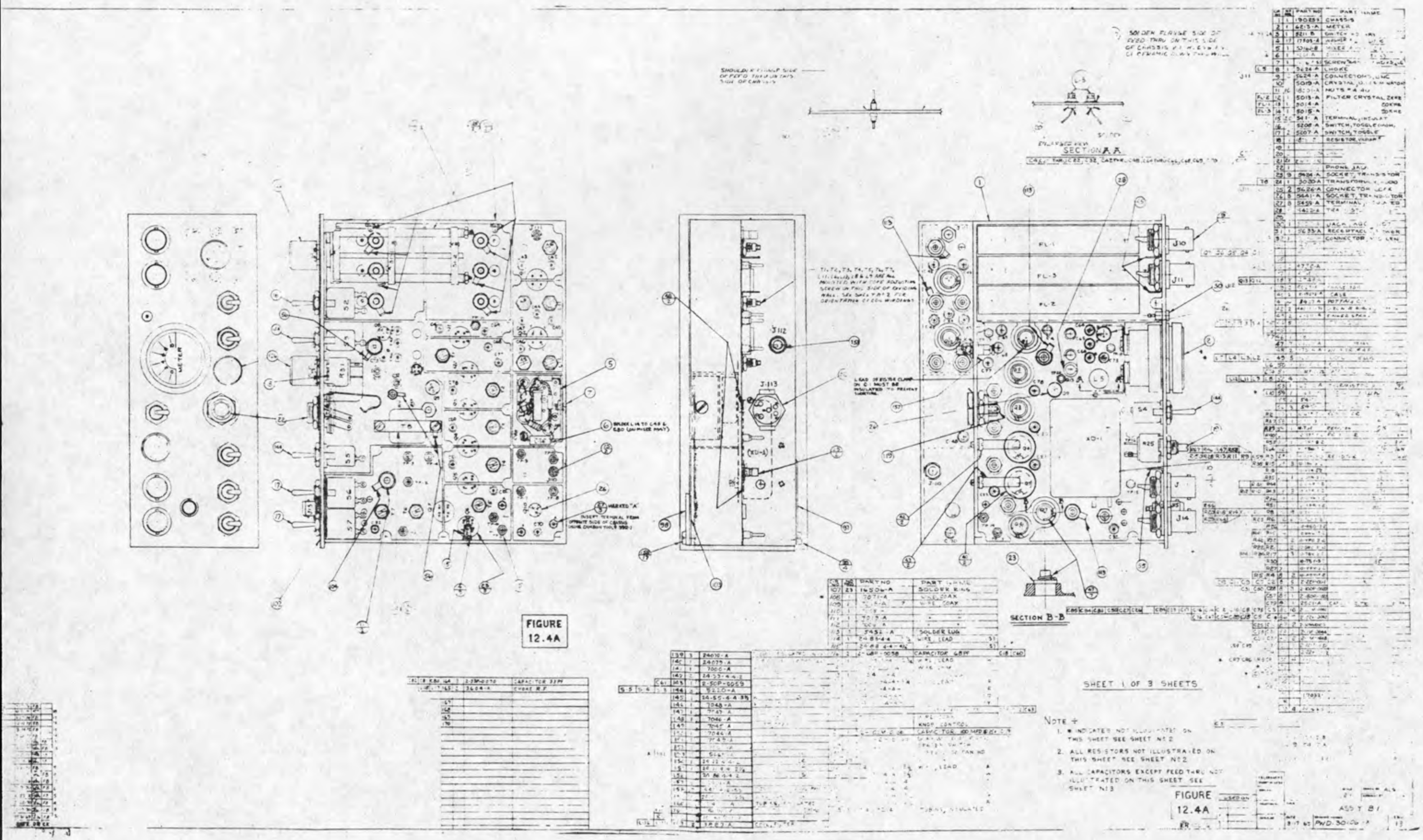
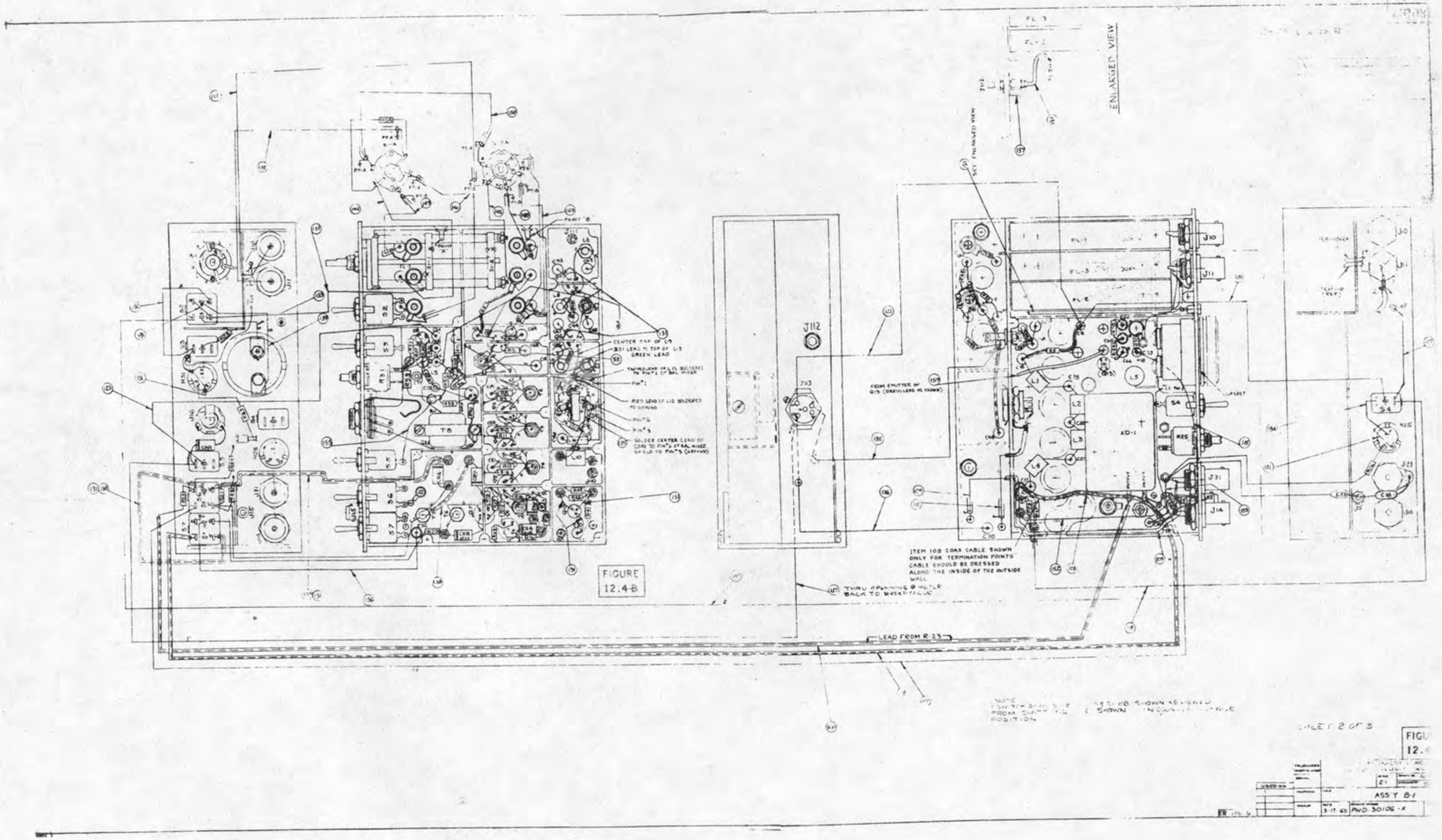

SECTION A-A
SECTION B-B
METER
SHEET 1 OF 3 SHEETS
NOTE +
2. ALL RESISTORS NOT ILLUSTRATED ON THIS SHEET SEE SHEET NO 2
CHASSIS
CHOKE
PHONE JACK
SOLDER LUG
WIRE, LEAD
CAPACITOR

FIGURE 12.4A


ENLARGED VIEW
SEE ENLARGED VIEW
CENTER TAP OF L-9
351 LEAD TO TOP OF L-9
GREEN LEAD
RED LEAD OF L10 SOLDERED TO GROUND
SOLDER CENTER LEAD OF COAX
FROM EMITTER OF Q15
ITEM 108 COAX CABLE SHOWN
ONLY FOR TERMINATION POINTS
CABLE SHOULD BE DRESSED
ALONG THE INSIDE OF THE OUTSIDE
WALL
THRU OPENING
BACK TO
LEAD FROM R-23
J112
AD-1
T6
R25
R31
J10
J11
J14
J31
FIGURE
12.4-B
NOTE
POSITION
SHEET 2 OF 3
ASS'Y B-1
PWD-30106-X

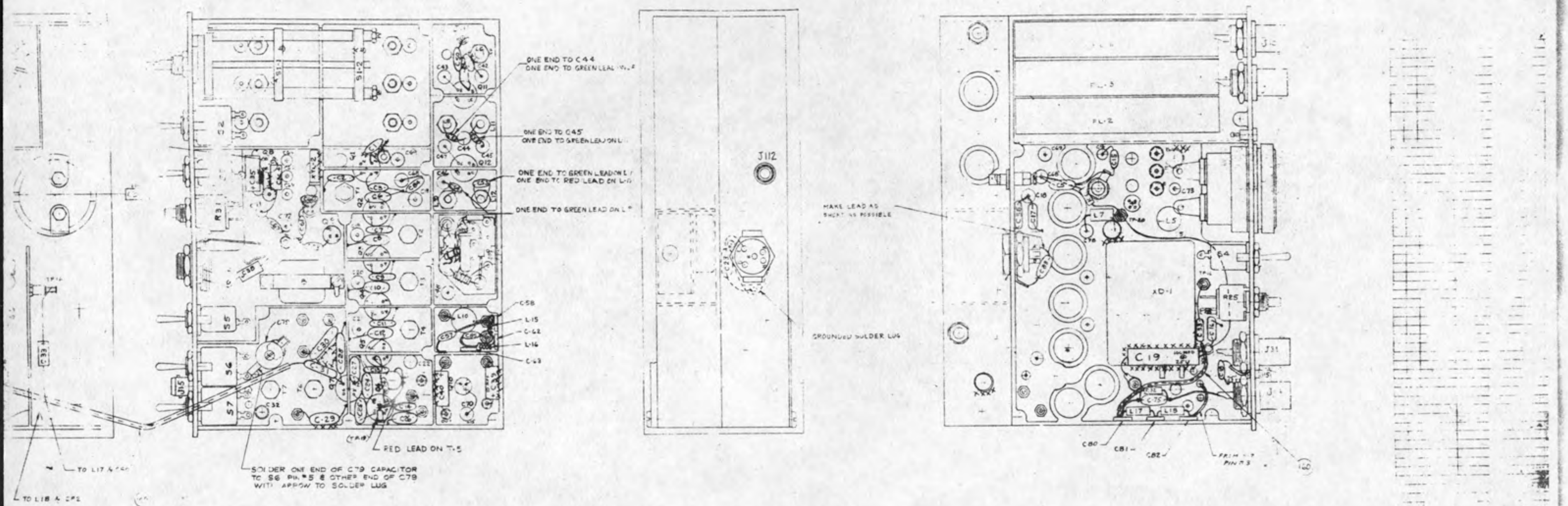


FIGURE 12.4C

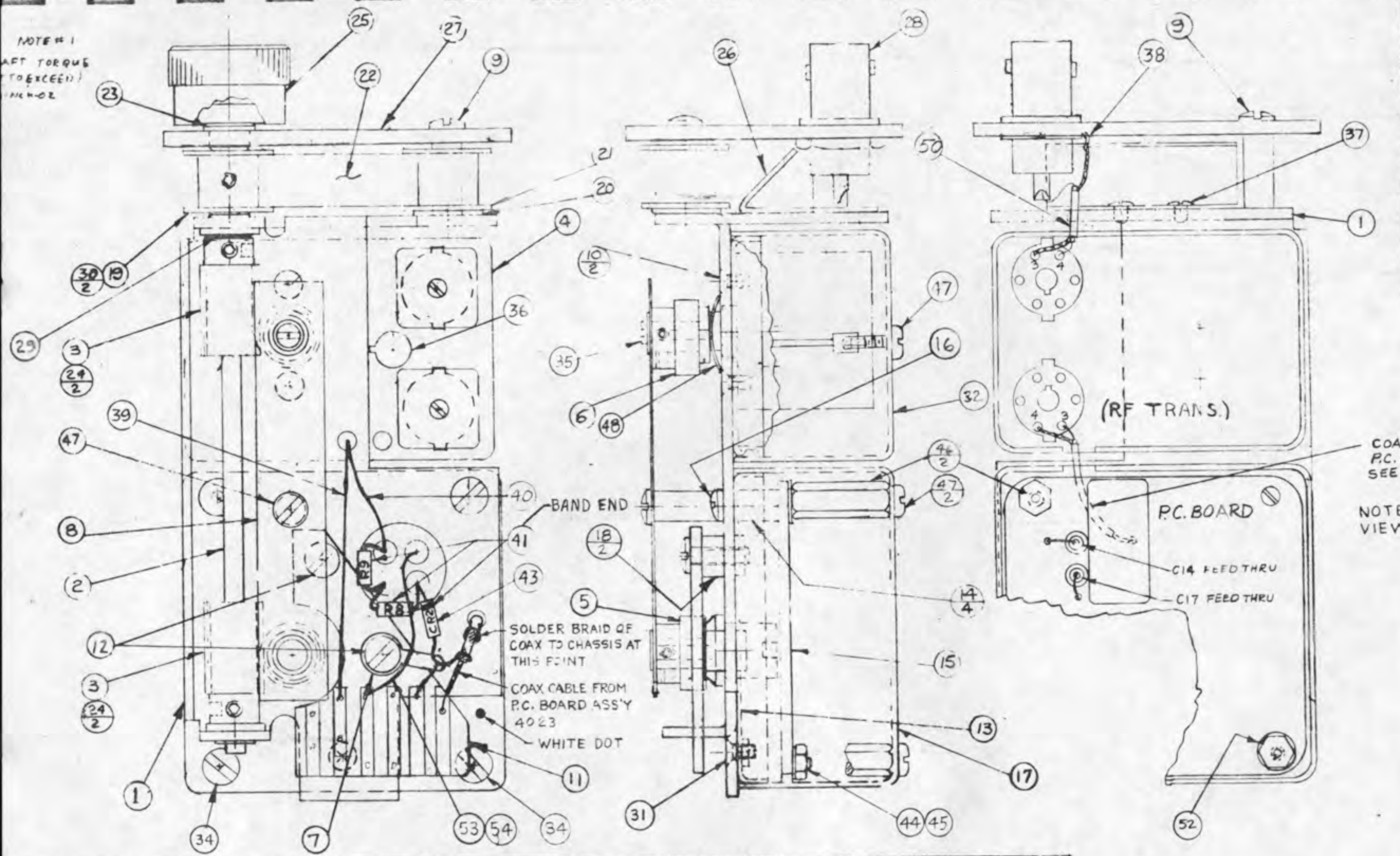
NOTE ÷

1. "X" DENOTES APPLICATION OF RTV (ITEM #41) ON COMPONENTS FOR SHOCK ABSORPTION.

SHEET 3 OF 3

FIGURE 12.4

MASP. ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.



DATE		REVISION		AUTH		
9/24/68		SEE ER-216			FB	2
10/29	69	SEE ER-234		RT	FB	3
1/12-70		SEE ER-256		SM	FB	4
2-5-70		SEE ER-263			FB	5
3-9-70		SEE ER-271			FB	6
5-14-70		SEE ER-331			FB	7
2-10-70		SEE ER-288			FB	
6-15 70		SEE ER-350		FB		
6-15 70		SEE ER-352		FB		
8-3 70		SEE ER-363			FB	11
9-10-70		SEE ER-374			FB	12
11-3-70		SEE ER-383			FB	13
12-15-70		SEE ER-427			FB	14
12-31 70		SEE ER-452		FB		15
1-12-71		SEE ER-459			FB	
3-22-71		SEE ER-486			FB	
5-4-71		SEE ER-549			FB	
12-15-73		SEE ER-700		RT	FB	

CIR NO.	NO. REQ	PART NO	PART NAME	CIR NO.	NO. REQ	PART NO	PART NAME	CIR NO	NO. REQ	PART NO	PART NAME		
1	1	30111-B	BRACKET COMPL. MTG	20	1	17541-A	WASHER, TEFLON	39	1	24-33-6-62	WIRE		
2	1	15001-A	SHAFT	21	1	16000-A	SPOOL, IDLER	40	1	24-33-6-61	WIRE		
3	2	9002-A	WORM	22	1	23008A	TAPE, DIAL	41	2	10-00T-3-2	RESISTOR 330 Ω	R8	R9
4	1	30116-B	COVER, COMP'L R.F.	23	1	10000-A	BUSHING	42					
5	1	30191-A	DRIVE GEAR ASS'Y	24	4	256-3-5SS	2-56 X 3/32 SCREW	43	1	4503-A	ZENER DIODE 1N759A	CR2	
6	1	30190A	DRIVE GEAR ASS'Y	25	1	8014-A	KNOB	44	1	18001	NUT, HEX, 4-40		
7	1	5449-A	SOLDER LUG #4	26	1	24052-B	MITER	45	2	17514	WASHER #4 FLAT		
8	1	24007-A	PLATE, GEAR	27	1	30113-A	PLATE WINDOW COMPL.	46	2	13049-A	SPACER HEX		
9	2	440-8-4-SS	SCREW #4-40 x 1/4 BLACK	28	1	5663-A	CONNECTOR BNC.	47	4	440-8-SS	SCREW, 4-40-1/4 PAN HD.		
10	2	3566-1ASS	SCREW 3-56 3/16 LG FLT HD	29	1	17500-A	WASHER BOWED	48	1	24257A	WIPER		
11	1	4022-A	BOARD, CONNECTOR	30	2	440-4-5-SS	SCREW SET	49					
12	2	44010-6-SS	SCREW #4-40 x 5/16	31	1	256-4-1ASS	SCREW #2-56 FLAT HD	50	1	7001-A	COAX, 1 1/4 LG		
13	1	30114-A	COVER OSC, COMPL	32	1	19004	CASE R.F.	51					
14	4	13004-A	SPACER, BOARD	33				52	1	17522A	WASHER, INTERNAL LOCK		
15	1	PWD4023D	P.C. BOARD ASS'Y	34	2	440-SS	SCREW 4-40 x 1/4 LG	53	1	STD-2	WIRE, JUMPER (BW)		
16	1	440-20-6SS	SCREW #4-40 x 5/16 LG	35	1	356-16-4SS	SCREW #3-56 FIL HD 1/2 LG	54	1	24213-A	INSULATING TUBING		
17	1	R1-19006-B	CASE, OSC	36	1	4749-A	TRANSISTOR 40819						
18	2	13006A	SPACER, BOARD	37	2	256-3-SS	SCREW 2-56 PAN HD 3/32 LG						
				38	1	5454-A	SOLDER LUG						

USED ON
1 30100

TOLERANCES (EXCEPT AS NOTED)
DECIMAL ± .005
FRACTIONAL ± 1/64
ANGULAR ± 1°

MASON ENGINEERING INC.
1700 POST RD. FAIRFIELD, CONN.

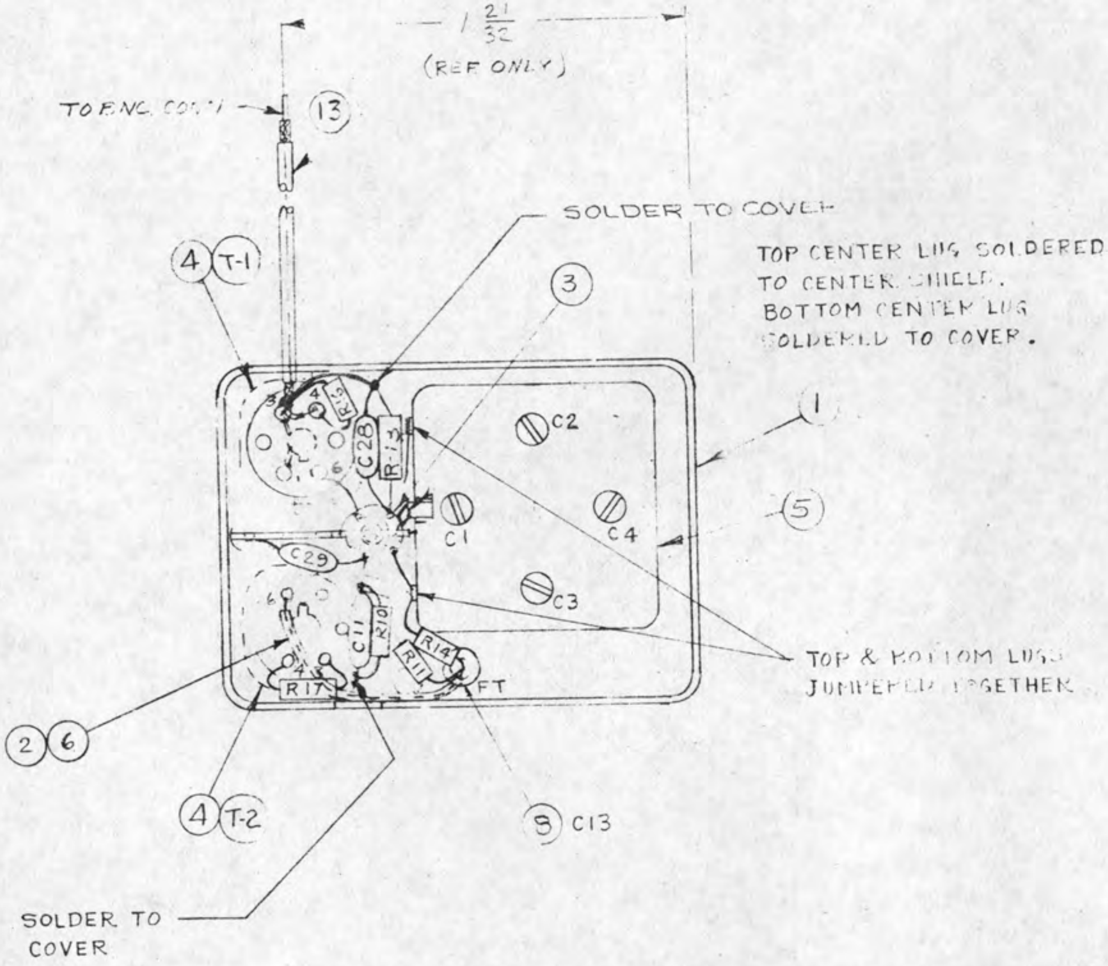
SCALE 2:1
DRAWN BY ALS
APPROVED BY

TITLE TUNER ASSY TA3

DATE 6-10-68
DRAWING NUMBER 30110-C

ER-100-P

FIGURE 12.5



DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
		SEE ER 115			
6-12-70		SEE ER-350		FB	
5-19-71		SEE ER-560			FB
		SEE ER 842		FB	

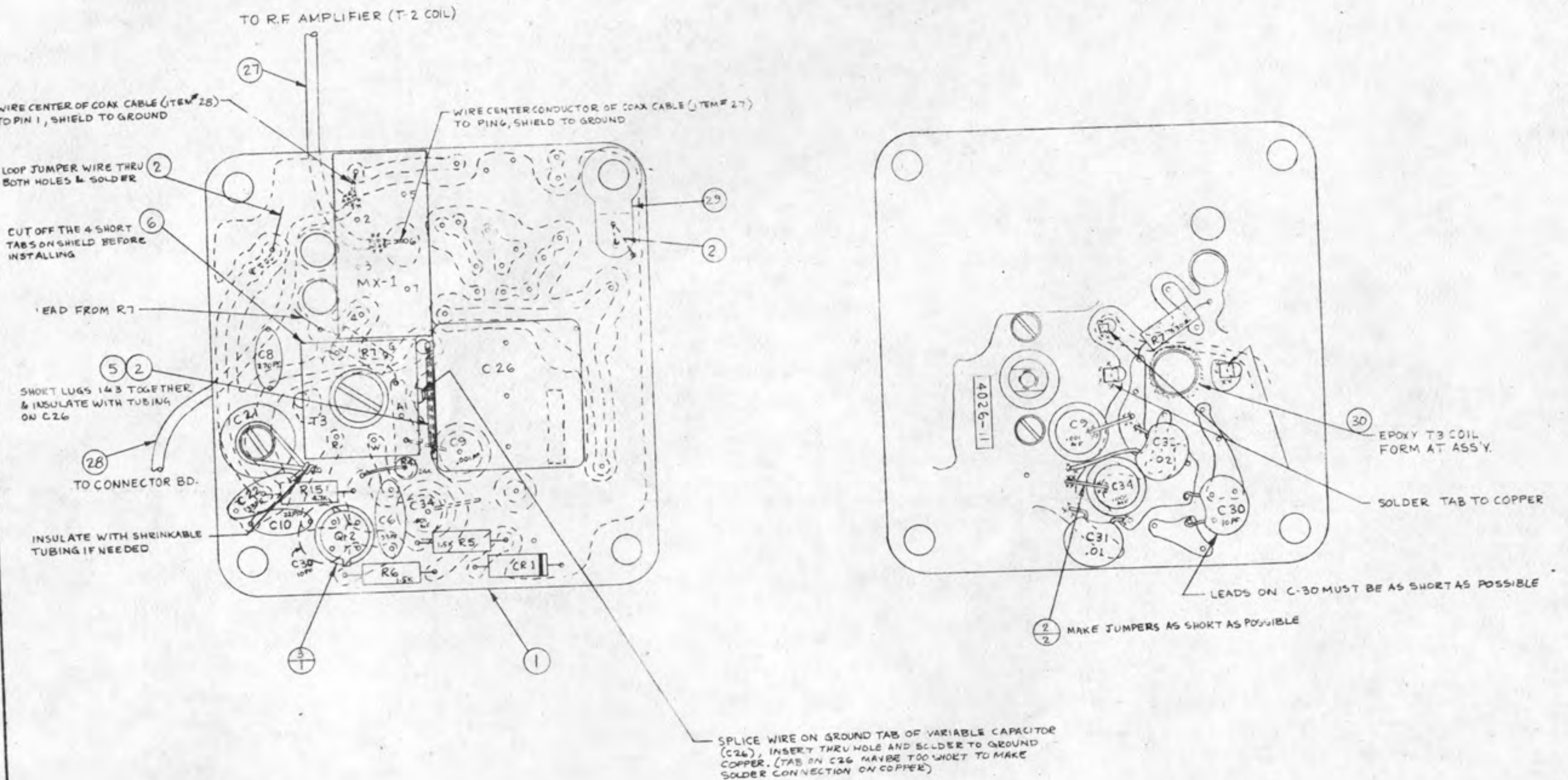
		CIR. NO.	NO. REQ.	PART NO.	PART NAME
		1	1	30121-B	COVER, COMPL. R.F.
		2	S	STD	JUMPER WIRE
		3	1	5423-A	SOCKET, TRANSISTOR
T-2	T-1	4	2	3011-A	TRANSFORMER R.F.
	C25	5	1	2516-B	VARIABLE CAPACITOR
		6	S	24213A	INSULATING TUBING
C28	C11	7	2	2-01M-0040	CAPACITOR .01
	C-13	8	1	2-1500P-0[illegible]	CAPACITOR FEED THRU 1500PF
	R-10	9	1	10-YPY-3-2	RESISTOR 470K 1/4W
	R-11	10	1	[illegible]-TBS-3-2	RESISTOR 1MEG 1/4W
	R-13	11	1	[illegible]	RESISTOR 330Ω 1/4W
	R-14	12	1	10-00[illegible]	RESISTOR 33K 1/4W
		13	1	7000-A	RG 196/U COAX 2" LG
		14			
	C29	15	1	2-68P-0058	CAPACITOR 68PF DISC.
R16	R17	16	2	10-GTB-3-2	RESISTOR 51Ω 1/4W

NOTE:
FOR SCHEMATIC WIRING DIAGRAM SEE SWD 4023-B

FIGURE 12.6

USED ON	TOLERANCES (EXCEPT AS NOTED)			
1 30110 C	DECIMAL ±	MA[illegible] ENGINEERING INC. [illegible] RD. FAIRFIELD CONN.	SCALE 2/1	DRAWN BY ALS / APPROVED BY KJ
	FRACTIONAL ±	TITLE COVER ASS'Y R.F. TA3-1		
	ANGULAR ±	DATE 9-5-68	DRAWING NUMBER 30116-B	ISSUE 5

ER 100-D



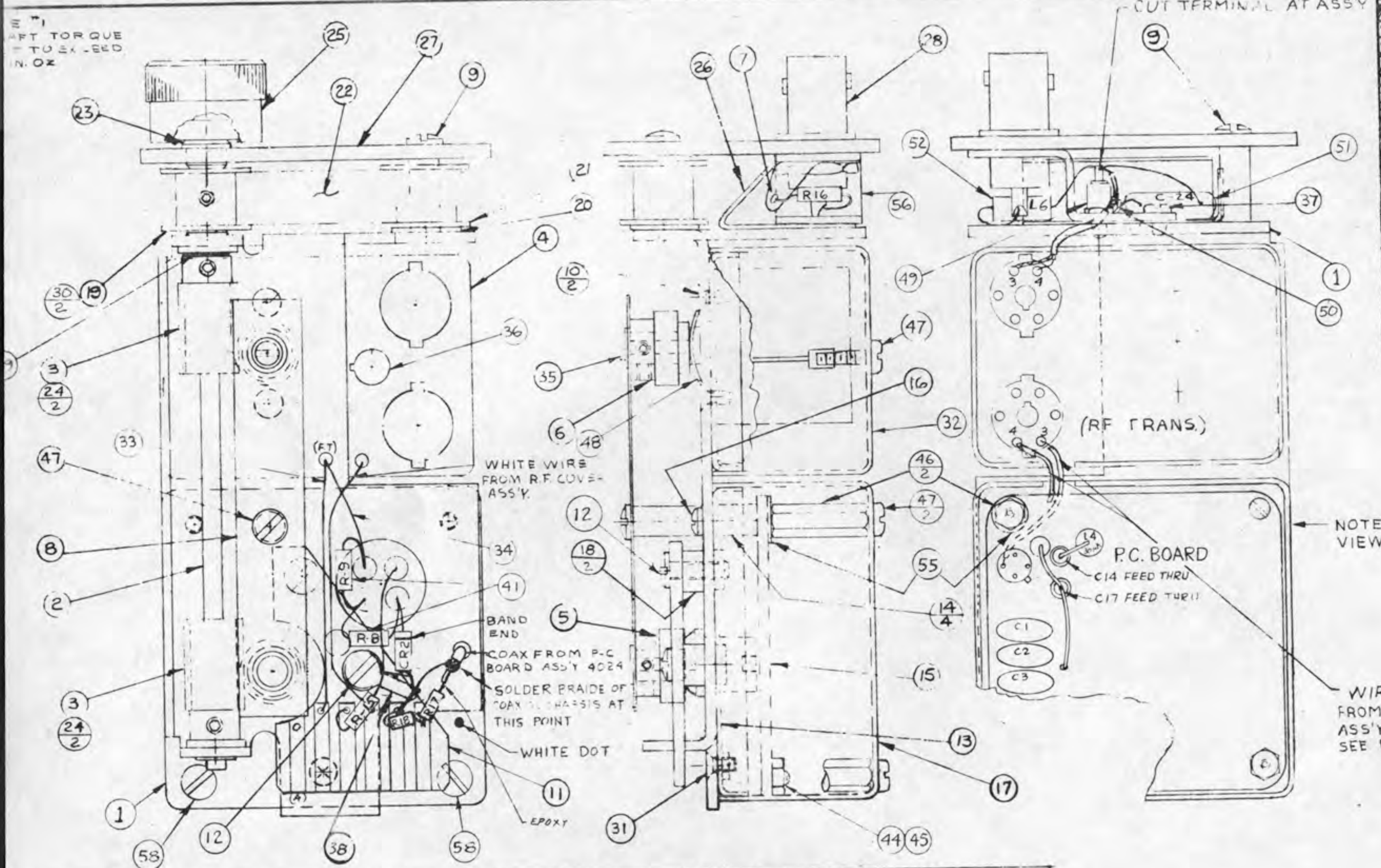
DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
		SEE ER-462			
		SEE ER-685			
		SEE ER-700		RT	
		SEE ER-842		FB	

	CIR NO	NO REQD	PART NO.	PART NAME
		1	1	4026-C	P.C. BOARD AS MACHINED
		2	5	STD-2	WIRE, JUMPER (BW)
		3	1	5425-A	SOCKET, TRANSISTOR
Q2		4	1	4748-A	TRANSISTOR 40894
		5	5	24213-A	TUBING, INSULATED
		6	1	19083-A	COVER, COIL FORM
		7			
	R4	8	1	10-RYO-3-2	RESISTOR 24K 1/4W 5%
R6	R5	9	2	10-TGR-3-2	1.5K
	R7	10	1	10-OOT-3-2	330Ω
	R15	11	1	10-YPR-3-2	RESISTOR 4.7K 1/4W 5%
		12			
		13			
C9	C34	14	2	2-1000P-0051	CAPACITOR .001MFD (BUTTON)
C22	C6	15	2	2-33P-0014	33 PF
	C8	16	1	2-270P-0073	270 PF
	C10	17	1	2-22P-0012	22 PF
	C30	18	1	2-10P-0011	CAPACITOR 10 PF
	C21	19	1	2511-A	CAPACITOR, PISTON TRIMMER
	C26	20	1	2507-A	CAPACITOR, POLY-VARIABLE
	C31	21	1	2-.01M-0040	CAPACITOR .01 MF
	C32	22	1	2-.02M-0043	CAPACITOR .02 MF.
	T3	23	1	3029-A	COIL, OSC. TAB-1
	MX1	24	1	5036-B	MIXER, DOUBLY BALANCED
	CR1	25	1	4508-A	DIODE, FD-777
		26			
		27	1	7001-A	WIRE, COAX 2" LG.
		28	1	7002-A	WIRE, COAX 2 1/2" LG.
		29	1	5449-A	SOLDER LUG
		30	~	3400-A	EPOXY (FAST)

FIGURE 12

USED ON	TOLERANCES (EXCEPT AS NOTED)		
1 30110-C	DECIMAL ± .005	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.	SCALE 4:1
	FRACTIONAL ± 1/64	TITLE PICTORIAL WIRING DIAGRAM	
	ANGULAR ± 1°	DATE 2-18-71	DRAWING NUMBER PWD-4023-D

ER-100-C



DATE	SYM	REVISION RECORD	AUTH	DR	CK	
		SEE ER-216			FB	2
		SEE ER 226			FB	3
		SEE ER-234		RT	FB	4
2-5-70		SEE ER-269			FB	5
		SEE ER-291			FB	6
		SEE ER-331			FB	7
		SEE ER-288			FB	8
6-22-70		SEE ER-354		FB		9
8-3-70		SEE ER-363			FB	10
		SEE ER-374			FB	11
		SEE ER-383			FB	12
12-7-70		SEE ER-422		FB		13
12-16-70		SEE ER-427			FB	14
12-31-70		SEE ER-452		FB		15
1-12-71		SEE ER-459			FB	16
		SEE ER-486			FB	17
		SEE ER-494			FB	18
		SEE ER-549			FB	19
		SEE ER-530			FB	20
		SEE ER-700		RT	FB	21
6-18-76		SEE ER-823		FB		22

NO REQ	PART NO	PART NAME	CIR NO.	NO. REQ	PART NO	PART NAME	CIR NO	NO REQ	PART NO	PART NAME	
1	30111-B	BRACKET COMPL, MTG	20	1	17541-A	WASHER, TEFLON	39	1	1/4 TBT-1-2	RESISTOR 100Ω	R17
1	15001-A	SHAFT	21	1	16000-A	SPOOL, IDLER	40	1	1/2-KRB-1-2	RESISTOR 22 Ω	R18
2	9002-A	WORM	22	1	23008-A	TAPE, DIAL	41	2	1/2 OOT-3-2	RESISTOR 330Ω	R8 R9
1	30117-B	COVER COMP'L R.F.	23	1	10000-A	BUSHING	42	1	1/2-YPR-3-2	RESISTOR 1.7	R15
1	30191-A	DRIVE GEAR ASS'Y	24	4	256-3-5SS	SCREW 2-56 X 3/32	43	1	45-3-A	ZENER DIODE IN7-9A	CR2
1	30190-A	DRIVE GEAR ASS'Y	25	1	8014-A	KNOB	44	1	18001	NUT, HEX, 4-40	
1	5454-A	SOLDER LUG	26	1	24052-B	MIC...	45	2	17514	WASHER #4 FLAT	
1	24007-A	PLATE, GEAR	27	1	30123-B	PLATE, WINDOW COMP'L	46	2	13049-A	SPACER, HEX	
2	440-8-6-SS	SCREW #4-40 x 1/4 (BLACK)	28	1	5663-A	CONNECTOR BNC.	47	4	440-8-6-SS	SCREW, 4-40 x 1/4 PAN HD	
2	356-6-1ASS	SCREW 3-56 3/16 LG FLT HD	29	1	17500-A	WASHER BOWED	48	1	24257-A	WIPER	
1	4022-A	BOARD, CONNECTOR	30	2	440-4-5-SS	SCREW SET	49		5440-A	TERMINAL, INSULATED	
2	440-10-6SS	SCREW #4-40 x 5/16	31	1	256-4-1ASS	SCREW #2-56 FLAT HD	50	1	5455-A	SOLDER LUG	
1	30114	COVER OSC., COMPL	32	1	19004	CASE R.F.	51		2-220P-0069	CAPACITOR 2200P	C24
4	13004-A	SPACER, BOARD	33	1	24-33-6-6-2	WIRE, LEAD	52	1	8601-A	COIL 1.8 μH	L6
1	PWD 4024	P.C. BOARD ASS'Y	34	1	24-33-6-6-1	WIRE, LEAD	53				
1	[redacted]SS	S[redacted]W #4-[redacted]5/8 LG	35	1	356-1-4SS	SCREW 3-56 FIL HD 1/2 LG	54				
1	R2-19006-B	CASE OSC.	[redacted]6	1	[redacted]9-A	[redacted]IST[redacted]819	[redacted]5	1	[redacted]2-A	W[redacted]R, IN[redacted]AL L[redacted]	
2	13006-A	SPACER, BOARD	37	1	256-5-6-SS	SCREW 2-56 "A" HD 5/32 LG	56	1		BRACKET BNC SUPPORT	

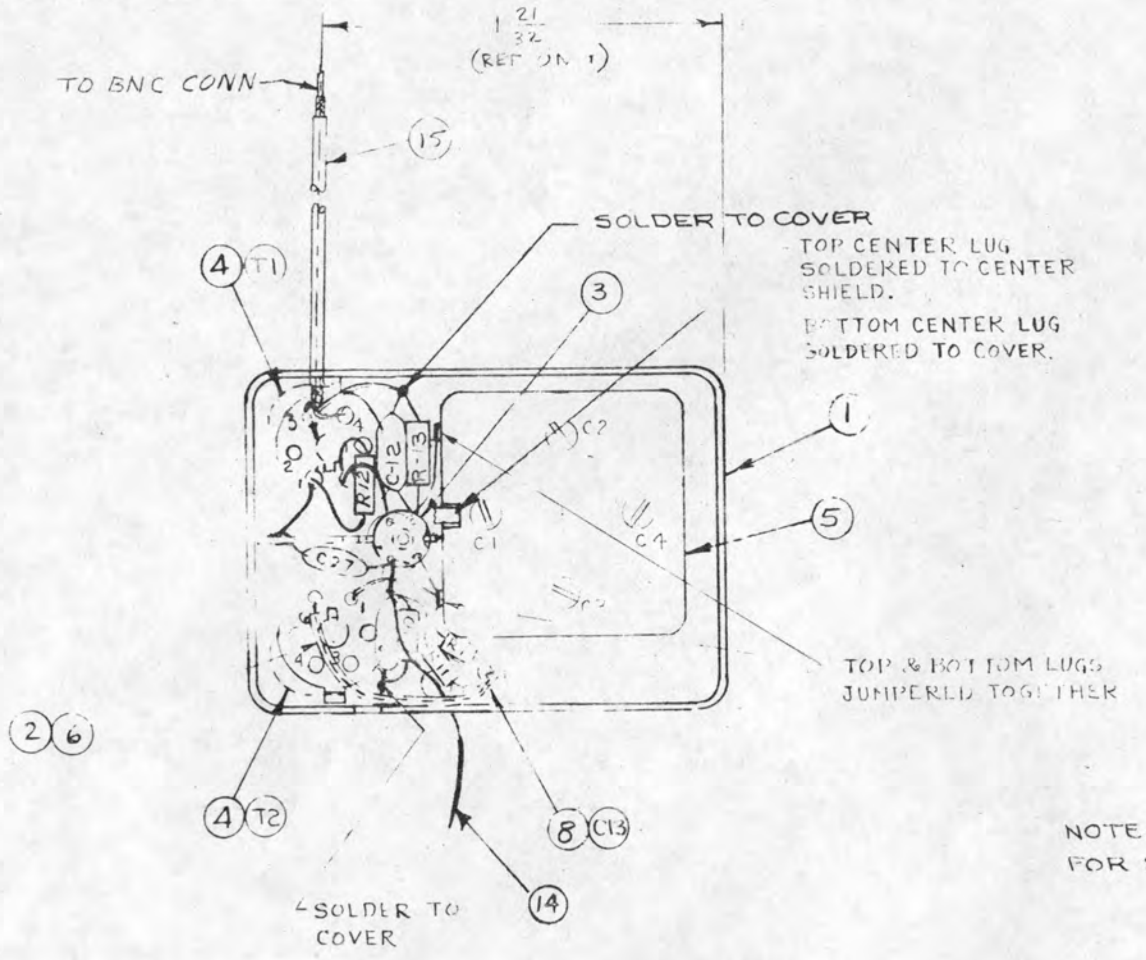
CIR NO.	NO. RQD	PART NO	PART NAME
58	2	440-16-6-SS	SCREW, #4 40 x 1/2 LG
59			
60			
61			

FIGURE 12.8

ER-100-P

USED ON	
1	30100

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
DECIMAL ± .005		SCALE 2:1	DRAWN BY ALS
FRACTIONAL 1/64	TITLE TUNER ASSY TA3-2		
ANGULAR ± 1°	DATE 6-10-68	NUMBER 30115-C	ISSUE 22



DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.
[illegible]	[illegible]	SEE ER-[illegible]		[illegible]	
6-22-[illegible]		SEE ER-354		FB	
[illegible] 76		SEE ER-842		FB	

		CIR. NO.	NO. REQ.	PART NO.	PART NAME
		1	1	30121-B	COVER, COMPL RF
		2	S	STD	JUMPER WIRE
		3	1	5422-A	SOCKET, TRANSISTOR
T-2	T-1	4	2	3012-A	TRANSFORMER R.F
	C25	5	1	2516-B	VARIABLE CAPACITOR
		6		24213-A	INSULATING [illegible]
C-12	C-11	7	2	2-01M-0040	CAPACITOR .01
	C-13	8	1	2-1500P-0032	CAPACITOR FEED THRU 1500PF
	R-10	9	1	10-YPY-3-2	RESISTOR 470 K 1/4W
	R-11	10	1	10-TBG-3-2	RESISTOR 1MEG. 1/4W
	R-12	11	1	10-YPO-3-2	RESISTOR 47K 1/4W
	R-13	12	1	10-OOT-3-2	RESISTOR 330Ω 1/4W
	R-14	13	1	10-TBO-3-2	RESISTOR 10K 1/4W
		14	1	24-9-6-6-2½	WIRE
		15	1	7000-A	RG 196/U COAX 2"
	C 27	16	1	2-68P-0058	CAPACITOR 68 PF

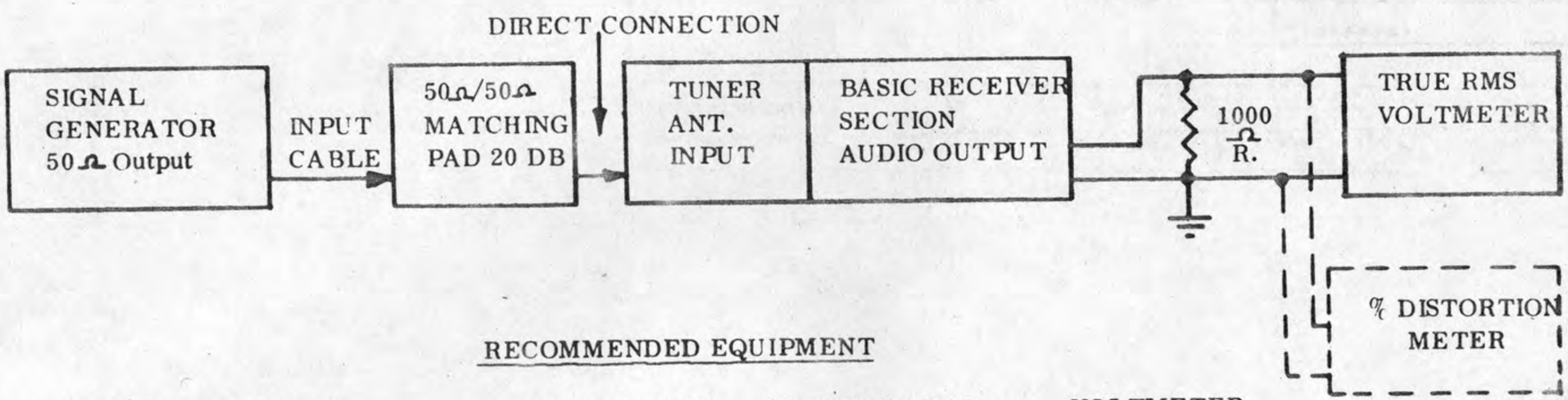
NOTE:
FOR SCHEMATIC WIRING DIAGRAM SEE SWD 4024-B

FIGURE 12.9

USED ON	1 30115-C
TOLERANCES (EXCEPT AS NOTED)	DECIMAL ± ~ ; FRACTIONAL ± ~ ; ANGULAR ± ~
	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.
SCALE	2:1
DRAWN BY	ALS
APPROVED BY	[illegible]
TITLE	COVER ASS'Y R.F. TA3-2
DATE	9-5-68
DRAWING NUMBER	30117-B
ISSUE	4

ER-100-D

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.



RECOMMENDED EQUIPMENT

SIGNAL GENERATORS

TEST RF RANGE	MFG.	MODEL
2 - 80 KHz	HP	651 B
.08 - 40 MHz	HP	606 B
	or Measurements	82
40 - 450 MHz	HP	608 E
450 - 900 MHz	HP	612 A
900 - 1600 MHz	HP	8614 A

INPUT CABLE

HP MODEL 11500 A CABLE ASS'Y (TYPE UG-21 D/U CABLE)

MATCHING PAD

MEASUREMENTS MODEL M342 20 DB PAD

OR

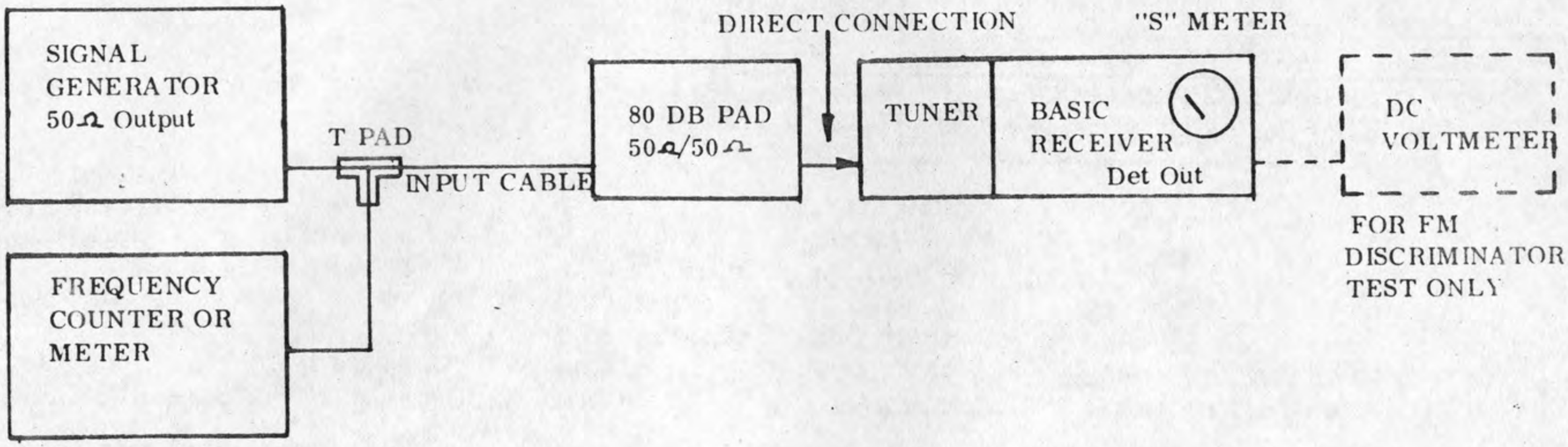
TEXCAN MODEL FP 50 20 DB PAD

VOLTMETER

HP MODEL 3400 A TRUE RMS VOLTMETER

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
DECIMAL ±		SCALE	DRAWN BY / APPROVED BY
FRACTIONAL ±	TITLE TEST SET UP FOR AM AND FM SENSITIVITY, DIAL ACCURACY, % DISTORTION, SIGNAL METER, TES		
ANGULAR ±	DATE	DRAWING NUMBER FIG-13.1	ISSUE 1

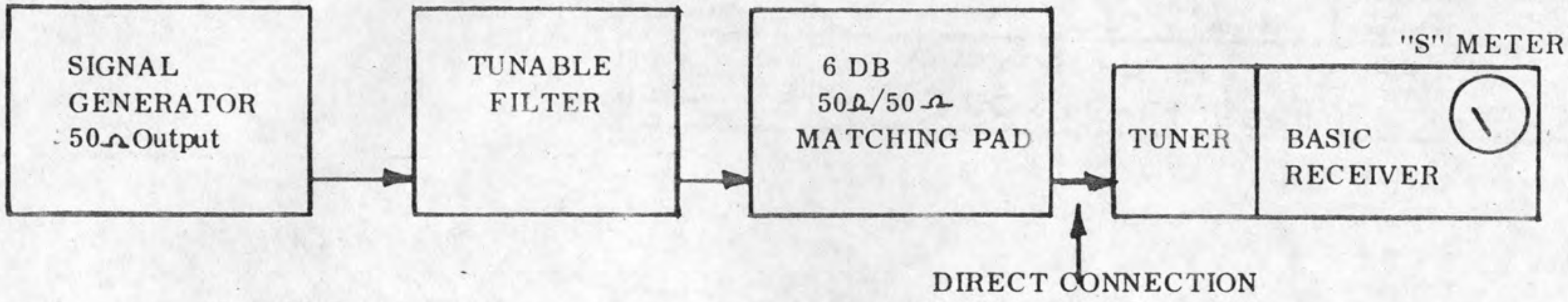
DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.



RECOMMENDED "T" PAD: MEASUREMENTS MODEL # M-501 (6 DB LOSS)

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.			
DECIMAL ±		SCALE	DRAWN BY / APPROVED BY	
FRACTIONAL ±	TITLE: TEST SETUP FOR BANDWIDTH AND SLOPE FACTOR FM DISCRIMINATOR, BANDSPREAD, TESTS			
ANGULAR ±	DATE	DRAWING NUMBER: FIG-13.2		ISSUE: 1

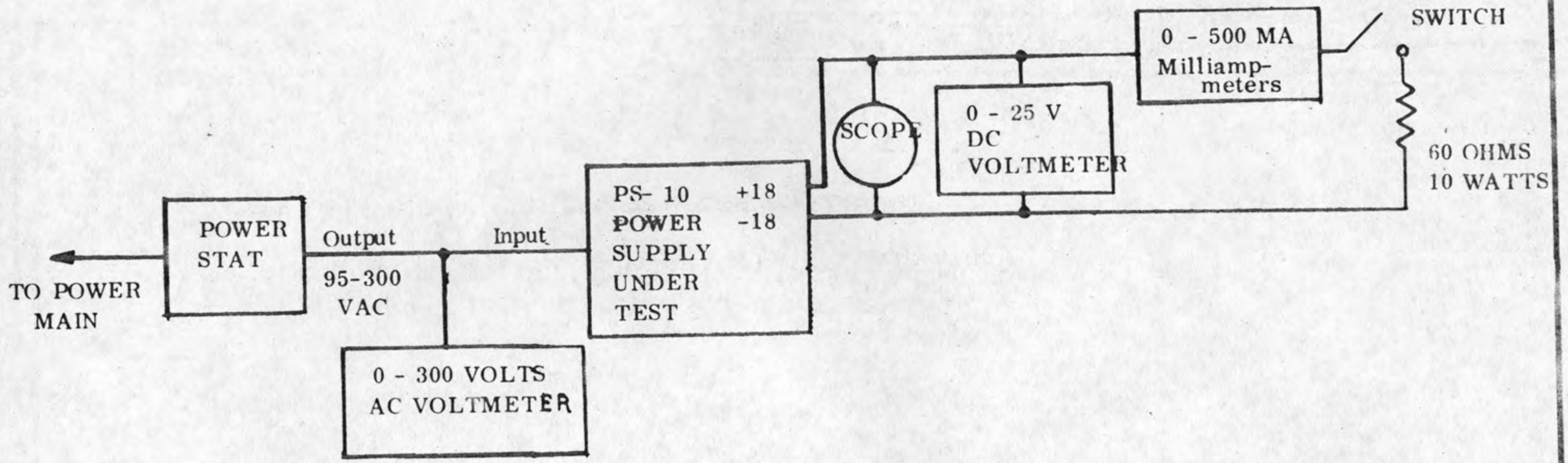
DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.



RECOMMENDED TUNABLE FILTER MANUFACTURERS:
KHRONHITE, TELONIC, RADIO FREQUENCY LABORATORIES.

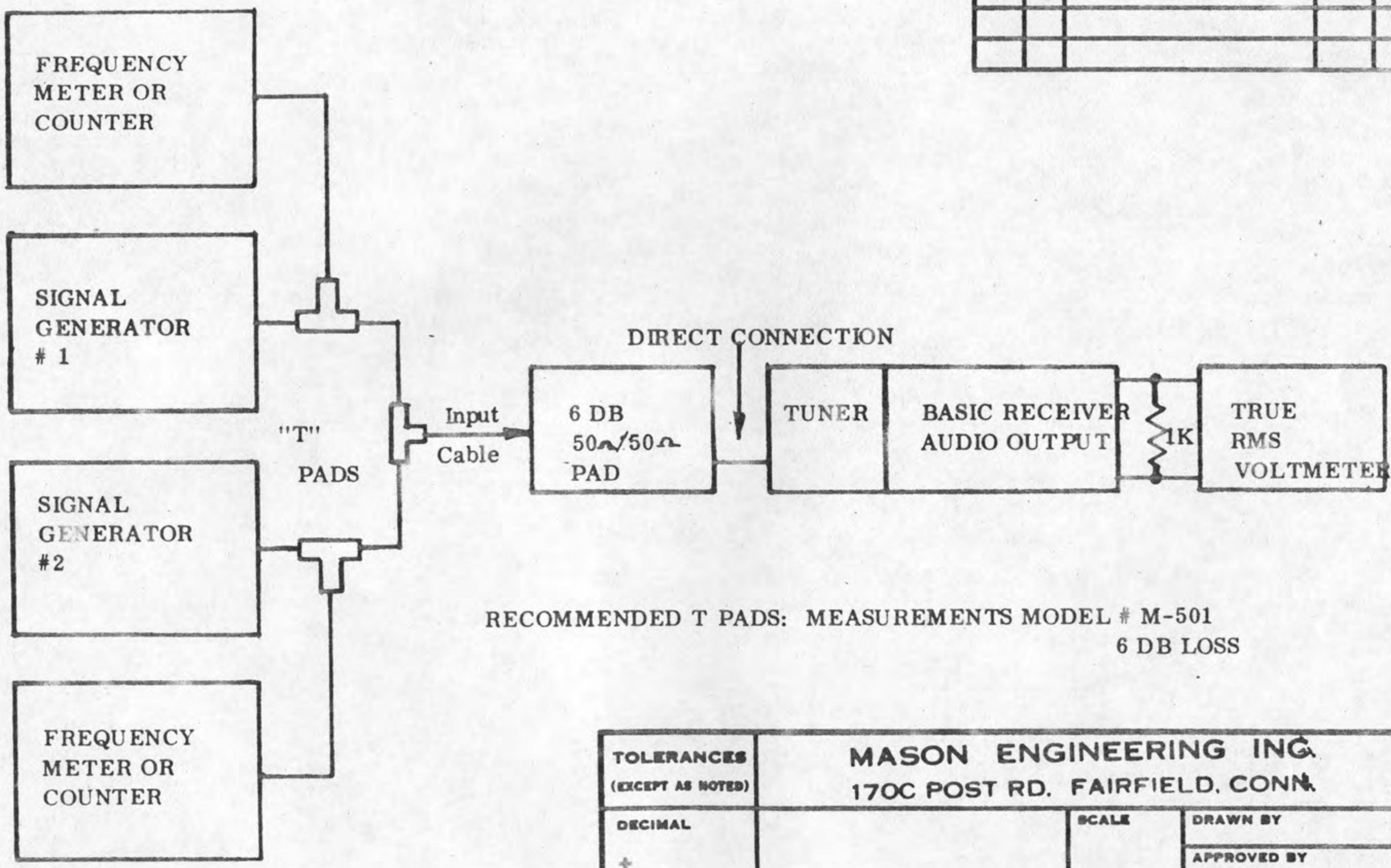
SEE FIGURE 13.1 FOR OTHER RECOMMENDED EQUIPMENT.

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
DECIMAL ±		SCALE	DRAWN BY / APPROVED BY
FRACTIONAL ±	TITLE: TEST SETUP FOR SPURIOUS RESPONSE TESTS		
ANGULAR ±	DATE	DRAWING NUMBER: FIG-13.3	ISSUE 1



DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 1700 POST RD. FAIRFIELD, CONN.		
DECIMAL ±		SCALE	DRAWN BY APPROVED BY
FRACTIONAL ±	TITLE TEST SET UP FOR POWER SUPPLY TESTS		
ANGULAR ±	DATE	DRAWING NUMBER FIG-13.4	ISSUE 1



RECOMMENDED T PADS: MEASUREMENTS MODEL # M-501
6 DB LOSS

DATE	SYM	REVISION RECORD	AUTH.	DR.	CK.

TOLERANCES (EXCEPT AS NOTED)	MASON ENGINEERING INC. 170C POST RD. FAIRFIELD, CONN.		
DECIMAL ±		SCALE	DRAWN BY / APPROVED BY
FRACTIONAL ±	TITLE TEST SET UP FOR CW DESENSITIZATION TEST		
ANGULAR ±	DATE	DRAWING NUMBER FIG-13.5	ISSUE 1

BY DATE S/N

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A3 DATA SHEET 14-A

		AM SENSITIVITY 10 DB $\frac{S+N}{N}$ 8.1			FM QUIETING 20 DB 8.2			DIALS * 8.1	
TUNER	RF MHz	IF BW KHz	REQ AM SENS UV	MEAS. SENS. UV	IF BW KHz	REQ FM SENS UV	MEAS. SENS UV	REQ ± KHz	MEAS.
T 03	.002	.2	1.5/¼M		NA			1/8"	
	.100	2	1.5		2	3		1.5	
	.300	2	1.5		2	3		4.5	
T 1	.3	20	1.5		20	5		4.5	
	.6	20	1.5		20	5		9	
	1.0	20	1.5		20	5		15	
T 2	1.0	20	1.5		20	5		MHz .015	
	2.0	20	1.5		20	5		.03	
	3.5	20	1.5		20	5		.05	
T 3	3.5	20	1.5		20	5		.05	
	8.0	20	1.5		20	5		.12	
	12.0	20	1.5		20	5		.18	
T 4	12	20	1.5		90	7		.18	
	20	20	1.5		90	7		.3	
	43	20	1.5		90	7		.6	
T 5	43	20	1.5		90	7		.6	
	80	20	1.5		90	7		1.2	
	130	20	1.5		90	7		1.9	
T 6A	130	20	2		90	7		1.9	
	160	20	2		90	7		2.4	
	230	20	2		90	7		3.4	
T 6B	230	20	2		90	7		3.4	
	300	20	2		90	7		4.5	
	420	20	2.5		90	7		6.3	
T 7	420	90	2.5		90	10		6.3	
	600	90	2.5		90	10		9.0	
	800	90	2.5		90	10		12.0	
T 8	800	90	3.5		90	15		12	
	1200	90	3.5		90	15		18	
	1600	90	3.5		90	15		24	
EXT	111	90	1.0						

* or 1/8 inch dial displacement. T1 dial measured in 2 KHz BW position

BY DATE S/N

	TUNER	03	1	2	3	4	5	6A	6B	7	8
	RF MHz	.100	.6	2	8	20	80	160	300	600	1200
	MIN. BS REQ. KHz	NA	1.2	4	16	40	160	320	600	120	240
8.3	BS	NA									
	SPUR. REJ. REQ. DB	50	80	80	80	50	50	40	40	40	40
	IF FREQ.	455	23.5	23.5	23.5	111	23.5	111	111	111	111
8.4	IF REJ.										
	IMAGE FREQ.	1.01	47.6	49	55	242	127	382	522	822	1422
8.5	IMAGE REJ.										

		Test	FM Dev. Set	RF	IN	Level IN	Audio Out	Leve
8.6	FM OUTPUT	20 KHz BW FM NAR	4 KHz	10 MHz	T-3	10 uv	.3 v	
		90 KHz BW FM NAR	20 KHz	23.5	Wide B1	1 mu	1.0 v	
		90 KHz BW FM WIDE	20 KHz	23.5	Wide B1	1 mu	.5 v	
		1 MHz BW FM WIDE	65 KHz	23.5	Wide B1	1mu	1.0 v	

8.7 IF BANDWIDTH

LFR .2 KHz IF, 60 KHz RF, between 180 and 250 Hz ____________
LFR 2 KHz IF, 60 KHz RF, between 1.8 and 3.5 KHz ____________
LFR 10 KHz IF, 60 KHz RF, between 9 and 13 KHz ____________
HFR, 2 KHz, 600 KHz RF, between 1.8 and 3.5 KHz ____________
HFR, 20 KHz, 600 KHz RF, between 18 and 24 KHz ____________
HFR, 90 KHz, IF output wide jack, between 70 and 120 KHz____________
HFR, 1 MHz, IF output wide jack, between 1 and 2 MHz____________

8.8 SWEEP WIDTH PANADAPTER MODE

SWEEP WIDTH POSITION	SWEEP WIDTH TEST			CENTERING TEST		
	RF TEST FREQ.	SWEEP WIDTH LIMITS	SWEEP WIDTH	RF TEST FREQ.	BW	CENTERED
500 KHz/Div.	50 MHz	450 - 550 KHz/Div.		50 MHz	2 KHz	
120 KHz/Div.	50 MHz	100 - 140 KHz/Div.		50 MHz	2 KHz	
30 KHz/Div.	50 MHz	25 - 35 KHz/Div.		50 MHz	2 KHz	
6 KHz/Div.	600 KHz	5 - 7 KHz/Div.		50 MHz	2 KHz	
1 KHz/Div.	600 KHz	.5 - 1.5 KHz/Div.		50 MHz	2 KHz	
.3 KHz/Div.	600 KHz	.2 - .5 KHz/Div.		50 MHz	2 KHz	

8.8 (Cont.) SWEEPWIDTH T-03 MODE

25 Kc/Div.	100 KHz	20-30 KHz		100 KHz	2 KHz	
6.5 Kc/Div.	100 KHz	5.0 - 7.5 KHz		100 KHz	2 KHz	
2 Kc/Div.	100 KHz	1.0 - 2.5 KHz		100 KHz	2 KHz	
.350 Kc/Div.	100 KHz	250 - 450 Hz		100 KHz	.2 KHz	
.090 Kc/Div.	100 KHz	'50 - 100Hz		100 KHz	.2 KHz	

8.9 SWEEP RATE

SWEEP RATE POSITION	FREQUENCY REQUIREMENTS		FREQUENCY
1.5/6 us	66.6	16.6 KHz	
6/30 us	16.6	3.3 KHz	
30/135 us	3.3	.74 KHz	
135/700 us	740	143 Hz	
.7/4 ms	143	25 Hz	
4/20 ms	25	5 Hz	
20/100 ms	5	1 Hz	

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BY	DATE	S/N	A3 DATA SHEET 14-D

CHECK LIST

8.

	ITEM	
10	S3	VERT SENS (1 MV/DIV)
11	S3	SIG GAIN CONTROL (50 dB)
12	S3	SIG BW (1 Hz - 1.8 MHz)
13	S3	Z AXIS SENS (40 V PP)
14	S3	BRIGHTNESS CONTROL
15	S3	FOCUS CONTROL
16	S3	SWP. CENTERING CONTROL
17	S3	SIG. CENTERING CONTROL
18	S3	SYNC CONTROL
19	S3	EXT SYNC INPUT JACK
20	S3	SWP GAIN CONTROL
21	LFR	HI-LOW METER SWITCH
22	LFR	IF GAIN CONTROL
23	LFR	AGC TEST JACK(+4.2/5.2 V. No Sig, > +3.0V at .1V sig)
24	LFR	DET OUT JACK
25	LFR	AUDIO OUTPUT (2.5 V out/ 5 uv in)
26	LFR	IF OUT JACK
27	LFR	BFO
28	HFR	HI-LOW METER SWITCH
29	HFR	IF GAIN CONTROL
30	HFR	AGC TEST JACK(+4.2/5.2V No sig, > +3.0V at .1V sig)
31	HFR	DET. OUT AND SWP JACK
32	HFR	AUDIO OUT (2.5 V out/ 5 uv in)
33	HFR	BFO
34	BP-7	ONE & TWO OPERATE
35	ACCESSORY CHECK OUT	

Quantity	Item	Quantity	Item
1	Earphone with cord	1	Remote Tuner Cable
1	Whip Antenna	1	Manual
1	Bow Tie Antenna with extenders	1	Tool, common screwdriver
1	Ferrite Rod Antenna #1 (2-300 KHz)	1	Tool, Phillips Screwdriver
1	Ferrite Rod Antenna #2 (.3-30 MHz)	1	Allen wrench
1	Long Wire Antenna	1	Spline Key
1	Blocking Capacitor	1	Attache Case
2	20 dB Attenuator Pad	1	Attache Case insert #1 Lower
1	BNC Male/Male adapter	1	Attache Case insert #2 Lid, large
1	BNC Female/Female adapter	1	Attache Case insert #3 Lid, small
1	European Power plug adapter #1	2	Attache Case insert #4 (S3 Pads)
1	European Power plug adapter #2	1	Interconnecting harness
1	Five foot BNC cable	1	Spinner knob
1	One foot BNC cable	1	Antenna Mast
1	Power Cable		
1	2 to 3 wire ac adapter		