RCA

Broadcast Equipment

BW-75A
FM Monitor

MI-560735

IB-8027548

EQUIPMENT LOST OR DAMAGED IN TRANSIT

When delivering the equipment to you, the truck driver or carrier's agent will present a receipt for your signature. Do not sign it until you have (a) inspected the containers for visible signs of damage and (b) counted the containers and compared with the amount shown on the shipping papers. If a shortage or if evidence of damage is noted, insist that notation to that effect be made on the shipping papers before you sign them.

Further, after receiving the equipment, unpack it and inspect thoroughly for concealed damage. If concealed damage is discovered, immediately notify the carrier, confirming the notification in writing, and secure an inspection report. This item should be unpacked and inspected for damage WITHIN 15 DAYS after receipt. Report all shortages and damages to RCA, Commercial Electronics Systems Division - Camden, New Jersey 08102.

RCA will file all claims for loss and damage on this equipment so long as the inspection report is obtained. Disposition of the damaged item will be furnished by RCA.

FIELD ENGINEERING SERVICE

RCA Field Engineering Service is available at current rates. Requests for field engineering service may be addressed to your RCA Broadcast Field Representative or the RCA Service Company, Incorporated - Broadcast Service Division - Camden, New Jersey 08102. Telephone 609-963-8000.

REPLACEMENT PARTS

When ordering replacement parts, please give Stock or Master Item (MI) Number, Description, and Symbol of each item ordered.

The part which will be supplied against an order for a replacement item may not be an exact duplicate of the original part. However, it will be a satisfactory replacement differing only in minor mechanical or electrical characteristics. Such differences will in no way impair the operation of the equipment.

Emergency Service

For emergency service after working hours, contact RCA Parts and Accessories, Telephone 609-963-8000.

LOCATION	ORDERING INSTRUCTIONS
Continental United States, including Alaska and Hawaii	Replacement Parts bearing a STOCK NUMBER should be ordered from RCA Parts and Accessories - 2000 Clements Bridge Road - Deptford, New Jersey 08096. Replacement Parts bearing a MASTER ITEM (MI) NUMBER should be ordered from RCA, Commercial Electronic Systems Division - Attention Commercial Service - Camden, New Jersey 08102 or your nearest RCA Regional Office. Replacement Parts with NO STOCK or MASTER ITEM (MI) NUMBER are standard components. They are not stocked by RCA and should be obtained from your local electronics distributor.
Dominion of Canada	Order from your local RCA Sales Representative or his office or from: RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec.
Outside of Continental United States, Alaska Hawaii, and the Dominion of Canada	Order from your local RCA Sales Representative or from: RCA International Division, Clark, New Jersey - U.S.A. - Wire: RADIOINTER **Emergency:** Cable RADIOPARTS, DEPTFORD, N.J.

RETURN OF ELECTRON TUBES

If for any reason, it is desired to return tubes, please return them through your local RCA tube distributor, RCA Victor Company Limited, or RCA International Division, depending on your location.

Please do not return tubes directly to RCA without authorization and shipping instructions.

It is important that complete information regarding each tube (including type, serial number, hours of service and reason for its return) be given. When tubes are returned, they should be shipped to the address specified on the Return Authorization form. A copy of the Return Authorization and also a Service Report for each tube should be packed with the tubes.

LOCATION	ORDERING INSTRUCTIONS
Continental United States, including Alaska and Hawaii	Local RCA Tube Distributor.
Dominion of Canada	Order from your local RCA Sales Representative or his office or from: RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec
Outside of Continental United States, Alaska Hawaii, and the Dominion of Canada	Local RCA Tube Distributor or from: RCA International Division, Clark, New Jersey, U.S.A., Wire: RADIOINTER **Emergency:** Cable RADIOPARTS, DEPTFORD, N.J.

Broadcast Equipment

Instructions

BW-75A
FM Monitor

MI-560735

Commercial Electronic Systems Division/Front and Cooper Streets/Camden, New Jersey, U.S.A., 08102

DL679M

IB-8027548

EMERGENCY FIRST AID INSTRUCTIONS

WARNING

VOLTAGES THAT ARE DANGEROUS TO LIFE ARE INVOLVED IN THE OPERATION OF THIS ELECTRONIC EQUIPMENT. OPERATING PERSONNEL MUST AT ALL TIMES OBSERVE ALL SAFETY REGULATIONS. DO NOT CHANGE TUBES OR MAKE ADJUSTMENTS INSIDE THE EQUIPMENT WITH VOLTAGES APPLIED. DANGEROUS CONDITIONS MAY EXIST IN CIRCUITS WITH POWER CONTROLS IN THE OFF POSITION DUE TO CHARGES RETAINED BY CAPACITORS, ETC. ALWAYS DISCHARGE AND GROUND CIRCUITS PRIOR TO TOUCHING THEM TO AVOID PERSONAL INJURY OR LOSS OF LIFE.

Personnel engaged in the installation, operation, or maintenance of this equipment or similar equipment are urged to become familiar with the following rules both in theory and practice. It is the duty of all operating personnel to be prepared to give adequate Emergency First Aid and thereby prevent avoidable loss of life.

RESCUE BREATHING

GENERAL INFORMATION

A. START IMMEDIATELY, SECONDS COUNT

Do not move victim unless absolutely necessary to remove from danger. Do not wait or look for help or stop to loosen clothing. Warm the victim or apply stimulants. The main purpose is to GET AIR INTO THE VICTIM'S LUNGS.

B. WIPE OUT VICTIM'S MOUTH

Wipe out quickly any mucus, food, or any foreign matter in the victim's mouth using your fingers or a cloth wrapped around your fingers.

C. LOOSEN CLOTHING - KEEP WARM

Do this when the victim is breathing by himself or help is available. Keep him quiet as possible and from becoming chilled. Otherwise, treat him for shock.

D. DON'T GIVE UP

Continue emergency rescue breathing without interruption until victim is breathing without help or until all hope of reviving him as determined by a physician is gone.

E. CALL A PHYSICIAN

Have someone summon medical aid since respiratory and other disturbances may develop as a aftermath. A physician is necessary during the recovery period.

PROCEDURE

FIG. A

FIG. B

FIG. C

TILT HEAD BACK - Lift neck and point chin up to open air passage.

EXTEND JAW - Pull or push jaw into jutting out position (Fig. A).

PINCH NOSE - Close nostrils to prevent air leakage, or close mouth when using mouth-to-nose breathing.

BLOW - Seal victim's mouth or nose with your mouth. (Fig. B) Blow until chest rises.

REMOVE MOUTH - Listen for exchange of air; if none, check throat for obstruction. To remove it, place victim in position shown in Fig. C, and slap sharply between shoulder blades.

REPEAT - 12 times per minute for adults; at least 20 times per minute for children.

BURNS

SKIN REDDENED: Apply ice cold water to burned area to prevent burn from going deeper into skin tissue. Cover area with clean sheet or cloth to keep away air. Consult a physician.

SKIN BLISTERED OR FLESH CHARRED: Apply ice cold water to burned area to prevent burn from going deeper into skin tissue. Cover area with clean sheet or cloth to keep away air. Treat victim for shock and take to Hospital.

EXTENSIVE BURN-SKIN BROKEN: Cover area with clean sheet or cloth to keep away air. Treat victim for shock and take to hospital.

SECTION 1
GENERAL INFORMATION

1–1 GENERAL DESCRIPTION

The RCA Type BW-75A Frequency and Modulation Monitor, Figure 1-1, [FCC Type Approval Number 3–129] is a wideband, all solid state FM monitor designed to meet FCC requirements for measuring the center frequency and total modulation characteristics of monaural as well as multiplexed FM transmitters having a center frequency range of 88 to 108 MHz. In addition, the BW-75A may be used as a low distortion and low noise FM demodulator for driving audio monitor amplifiers and the companion RCA Type BW-85A Stereo Monitor and BW-95A SCA Monitor. The BW-75A incorporates a deviation type modulation calibrator to insure the accuracy of the modulation readings at any time.

1–2 PHYSICAL DESCRIPTION

The BW-75A, shown in Figure 1–2, is constructed on a standard 5¼ x 19 inch rack mount. Seldom used controls and test points are located under the hinged front cover bar. Factory adjustments are located within the shielded compartments of the monitor. The AC power input, RF input, and monitor outputs are located at the rear of the BW-75A chassis on individual connectors or on rear terminal blocks as shown in Figure 1–3. The BW-75A is completely solid state utilizing all silicon transistors for long trouble free life. The individual circuits are constructed on three military grade, glass-epoxy, plated printed circuit boards. High reliability industrial and military grade components are used throughout.

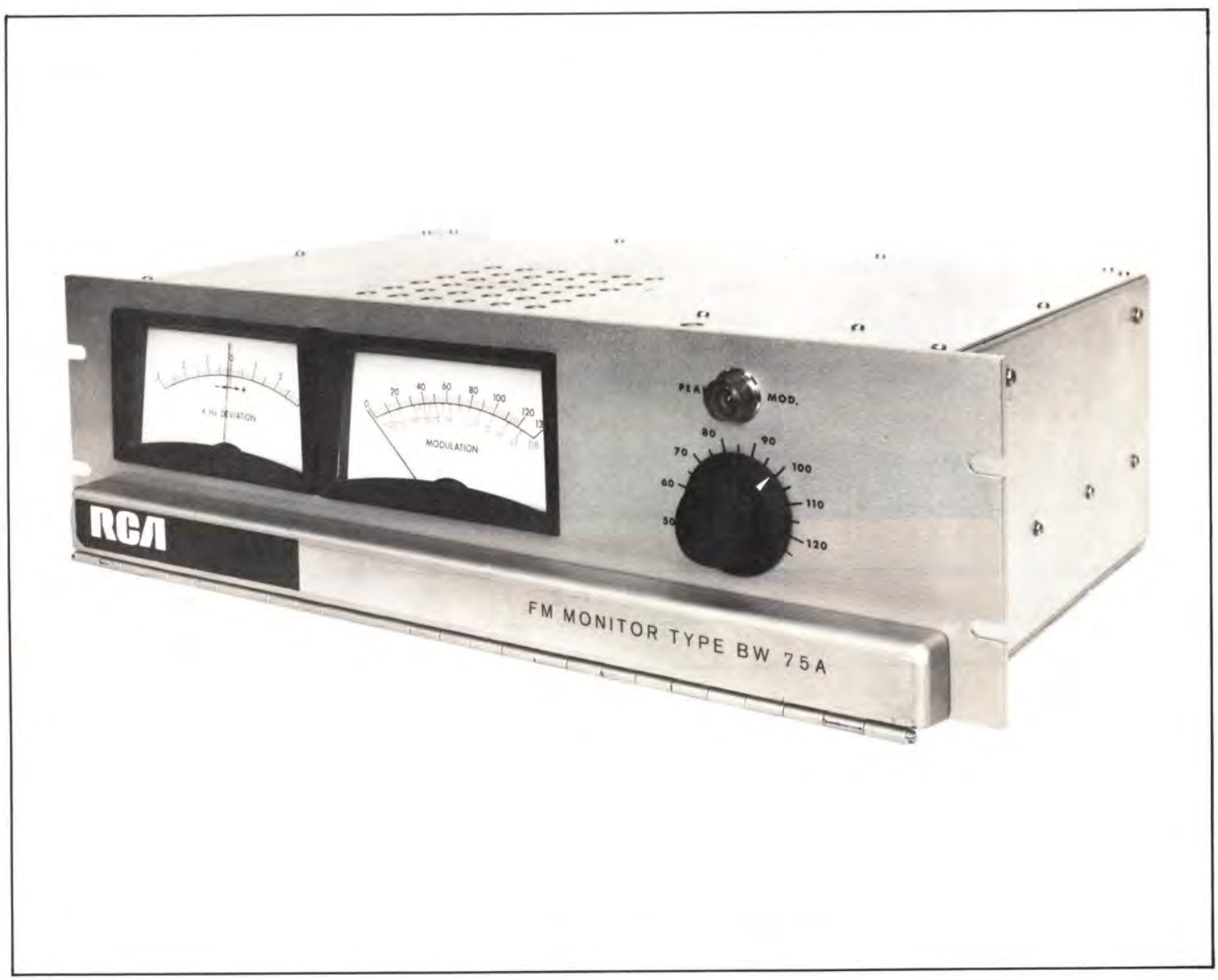


Figure 1–1

1–3 ELECTRICAL DESCRIPTION

The BW-75A is a solid state, low sensitivity, crystal controlled, superheterodyne, FM receiver incorporating a highly linear and stable pulse counting discriminator that measures the center frequency deviation and demodulates the FM transmission. Various metering and testing provisions are contained within the monitor to measure transmitter output characteristics. These provisions include a center frequency deviation meter; a peak reading total modulation meter, switchable to either positive or negative modulation polarity; a peak modulation light, independent of modulation polarity, that responds to both positive and negative directions; metering circuits to set the incoming RF level and to standardize the center frequency deviation meter with the calibrating oscillator; a deviation type modulation calibrator to standardize the modulation level. Outputs obtained from the monitor include a monaural output for aural monitoring, a distortion meter test output [both monaural output and distortion meter output have front panel switched de-emphasis], a wideband test output, four wideband outputs for driving associated multiplex demodulators, an AM noise diode output, and an incidental AM noise diode output. FCC Type Approved remote metering of the BW-75A may be externally provided for the center frequency deviation meter, modulation meter, and peak light.

1–4 ELECTRICAL SPECIFICATIONS

RF Input Sensitivity ..... 0.2 to 10 volts RMS.
RF Input Impedance ..... 50 ohms.
RF Frequency Range ..... 88-108 MHz.
Deviation Meter Range ..... 3 kHz.
Modulation Meter Range ..... 133% [100% at 75 kHz].
Modulation Calibrator ..... 100% at 75 kHz.
Modulation Meter Accuracy .. Better than 5% over entire scale.
Peak Modulation Indicator ..... 50 to 120%.
Frequency Response ..... 0.1 db, 50-75,000 Hz, 3 db down at 180 kHz.
Distortion ..... 0.1% max. 50-75,000 Hz.
Signal-to-Noise Ratio ..... 75 db with 75u sec de-emphasis.
Outputs ..... 4 wideband isolated outputs to drive the BW-85A stereo unit and one or more BW-95A SCA units, wideband test output, distortion meter output, aural monitoring output, AM noise output, and Incidental AM noise output.
Remote Metering ..... Both carrier deviation and modulation meters may be remotely metered—5000 ohms external loop resistance.

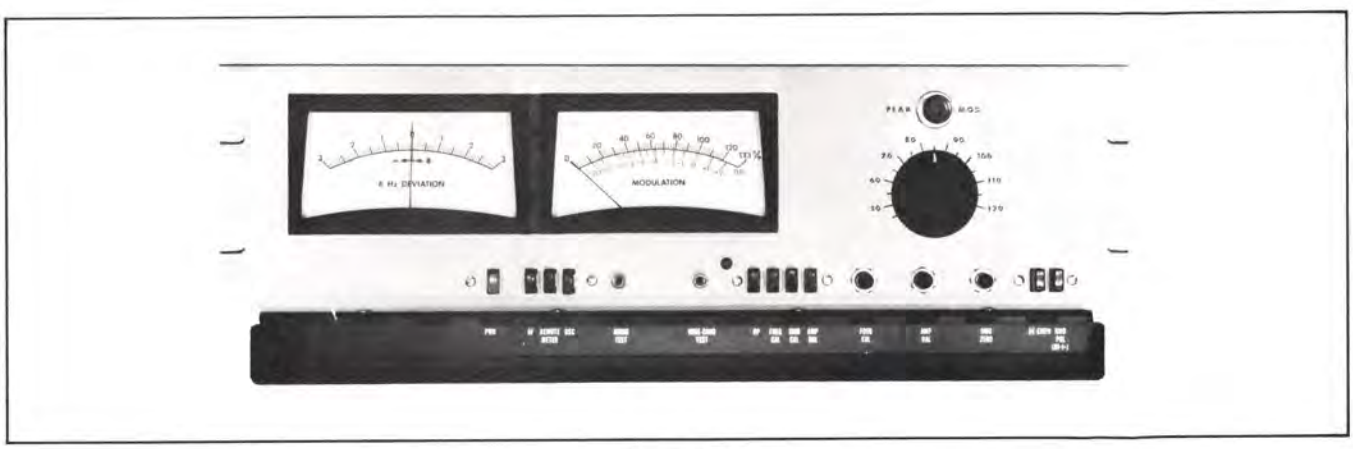


Figure 1–2

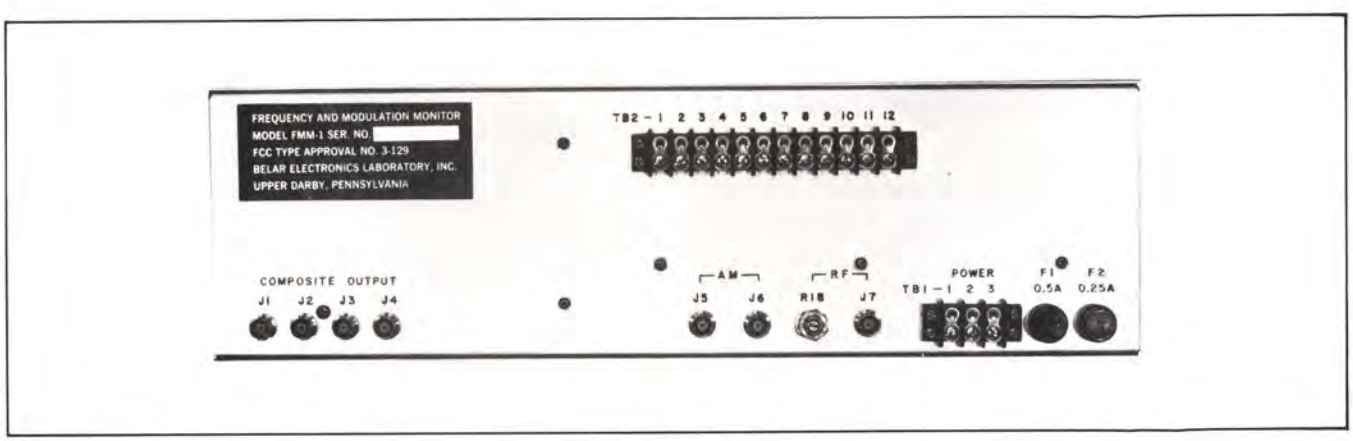


Figure 1–3

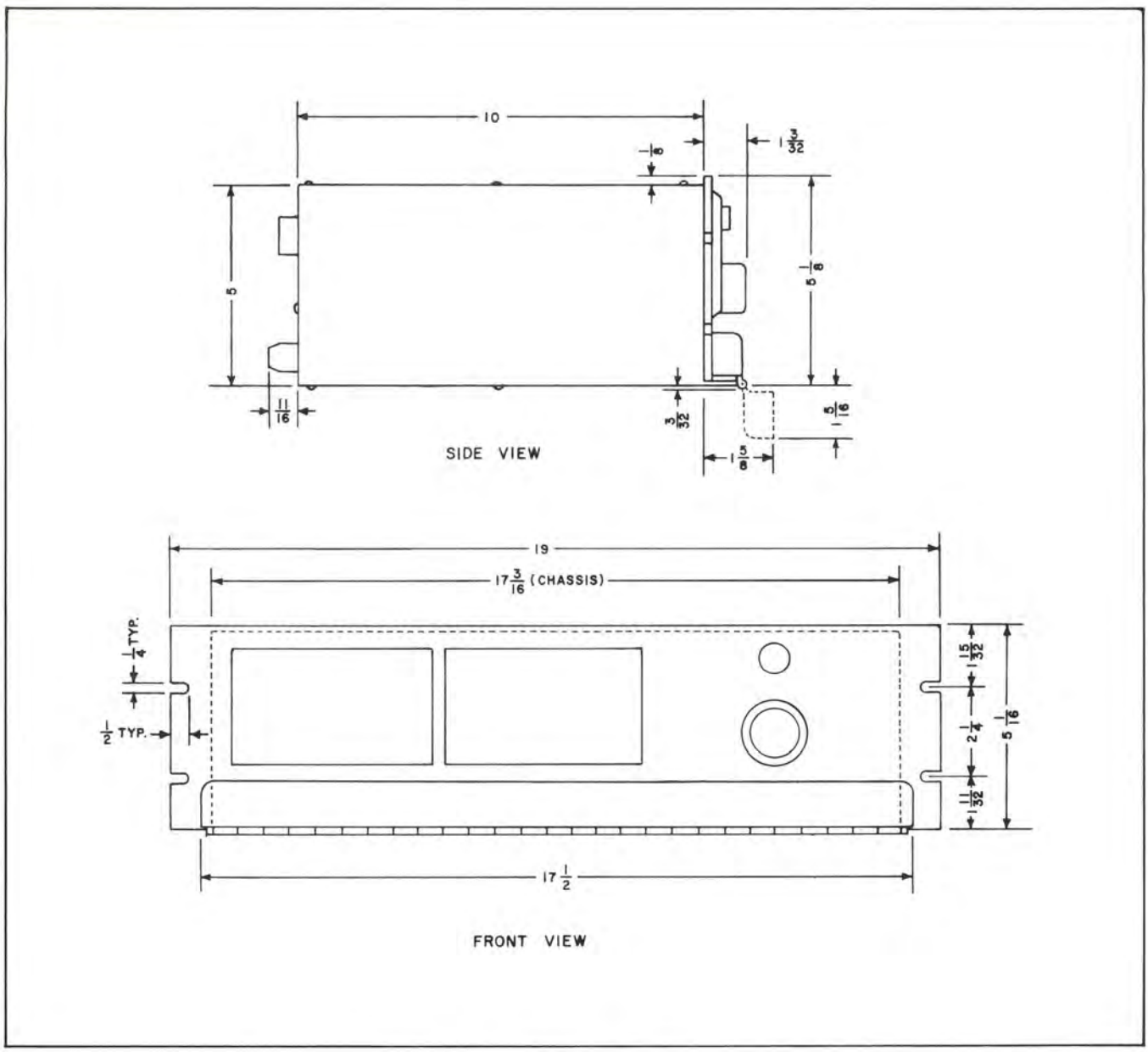


Figure 1– 4

1–5 MECHANICAL SPECIFICATIONS

Dimensions . . . . . 5¼ x 19 x 11 7/8 inches overall.
Detailed Dimensions . . . . . Figure 1–4.
Net Weight . . . . . 15 pounds.
Shipping weight . . . . . 19 pounds.

1–6 INSTRUMENT IDENTIFICATION

The instrument is identified by the type number and a six digit serial number. The type number and serial number appear on a plate located on the rear panel, Figure 1–3. All correspondence to your RCA representative or to the factory in regard to the instrument should reference the type number and complete serial number.

1–7 ACCESSORIES

The RCA Type BW-75A FM Monitor may be used for the remote monitoring of an FM transmitter with either the Remote Meter Panel (MI-560736) or the BW-100B RF Amplifier (MI-560738). The Meter Panel contains a peak indicator lamp, a carrier frequency deviation meter and a modulation meter, both designed for 5000 ohms loop resistance. The RF amplifier provides pre-amplification and selectivity to permit direct off-air monitoring with the BW-75A.

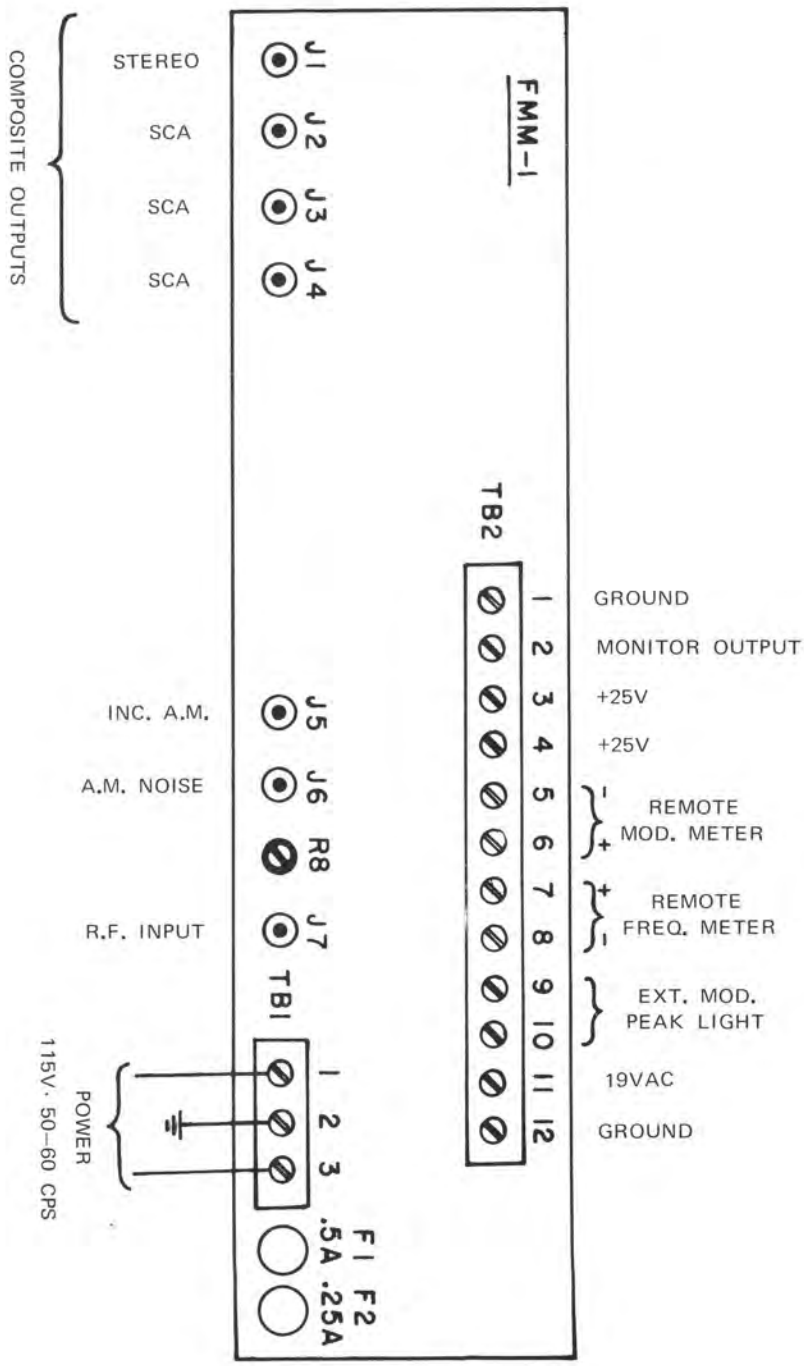


Figure 2–1

SECTION 2
INSTALLATION

2–1 INITIAL INSPECTION

Check the shipping carton for external damage. If the carton exhibits evidence of abuse in handling [holes, broken corners, etc.], ask the carrier's agent to be present when the unit is unpacked. Carefully unpack the unit to avoid damaging the equipment through use of careless procedures. Inspect all equipment for physical damage immediately after unpacking. Bent or broken parts, dents and scratches should be noted. If damage is found, refer to Paragraph 2–2 for the recommended claim procedure. Keep all packing material for proof of damage claim or for possible future use.

2–2 CLAIMS

If concealed damage is apparent, notify the carrier immediately in writing, and insist upon an inspection and report. File a claim for the damage. All shipping papers, letters, and invoices should be saved until certain that the equipment was delivered in good condition or until any damage claim has been adjusted satisfactorily.

2–3 REPACKING FOR SHIPMENTS

If the unit is to be returned to RCA, contact the RCA representative for shipping instructions. Before repacking the unit, attach a tag to it showing owner and owner's address. A description of the service required should be included on the tag. The original shipping carton and packaging materials should be used for reshipment. If they are not available or reusable, the unit should be repackaged in the following manner:

a. Use a double-walled carton with a minimum test strength of 275 pounds.

b. Use heavy paper or sheets of cardboard to protect all surfaces.

c. Use at least 4 inches of tightly packed, industry approved, shock absorbing material such as extra firm polyurethane foam or rubberized hair. Newspaper is not sufficient for cushioning material.

d. Use heavy duty shipping tape to secure the outside of the carton.

e. Use large FRAGILE LABELS on each surface.

f. Return the unit by air freight where possible. Be sure to insure the unit for full value.

2–4 PREPARATION FOR USE

The BW-75A FM Frequency and Modulation Monitor is designed to be mounted in a standard 19-inch rack mount. When mounted in a rack, a slight air space should be provided above and below the unit as the heat generated by the crystal oven should be dissipated. When the monitor is mounted above high heat generation equipment such as vacuum-tube power supplies, consideration should be given to cooling requirements which allow a free movement of cooler air through and around the BW-75A. In no instance should the ambient chassis temperature be allowed to rise above 50 degrees C [122 degrees F]. Mount the BW-75A to the rack mount panel using four No. 10 screws and four No. 10 countersunk finishing washers.

The BW-75A requires a 105 to 125 VAC single phase, 50 to 60 Hz power source. Consult RCA for operation with other sources. Attach a three wire, grounded line cord to TB–1 with the ground wire to terminal 2 and the AC line wires to terminals 1 and 3.

Connect a 50 ohm coaxial cable [RG–58] between the monitor probe on the transmitter [or RF amplifier] and the RF input connector J7, at the rear of the main chassis.

CAUTION

DO NOT APPLY MORE THAN 10 VOLTS RF TO THE MONITOR OR THE RF INPUT LEVEL CONTROL MAY BE DAMAGED.

If desired, connect external aural monitoring amplifier to terminal 1 and 2 on TB2. Note that this is an unbalanced 600 ohms output with termianl 1 grounded. A remote center frequency deviation meter and remote modulation meter may be connected to terminals 7, 8 and 5, 6 respectively, if desired. Observe the proper polarities [terminals 6 and 7 are positive] and note that the external loop resistance not including meters must be 5000 ohms. These meters must be obtained from RCA in order to comply with FCC regulations on remote metering. A remote peak modulation lamp may be connected to terminals 9 and 10. CAUTION: DO NOT SHORT TERMINAL 9 TO GROUND. The remote meters and lamp are contained in the Remote Meter Panel (MI-560736).

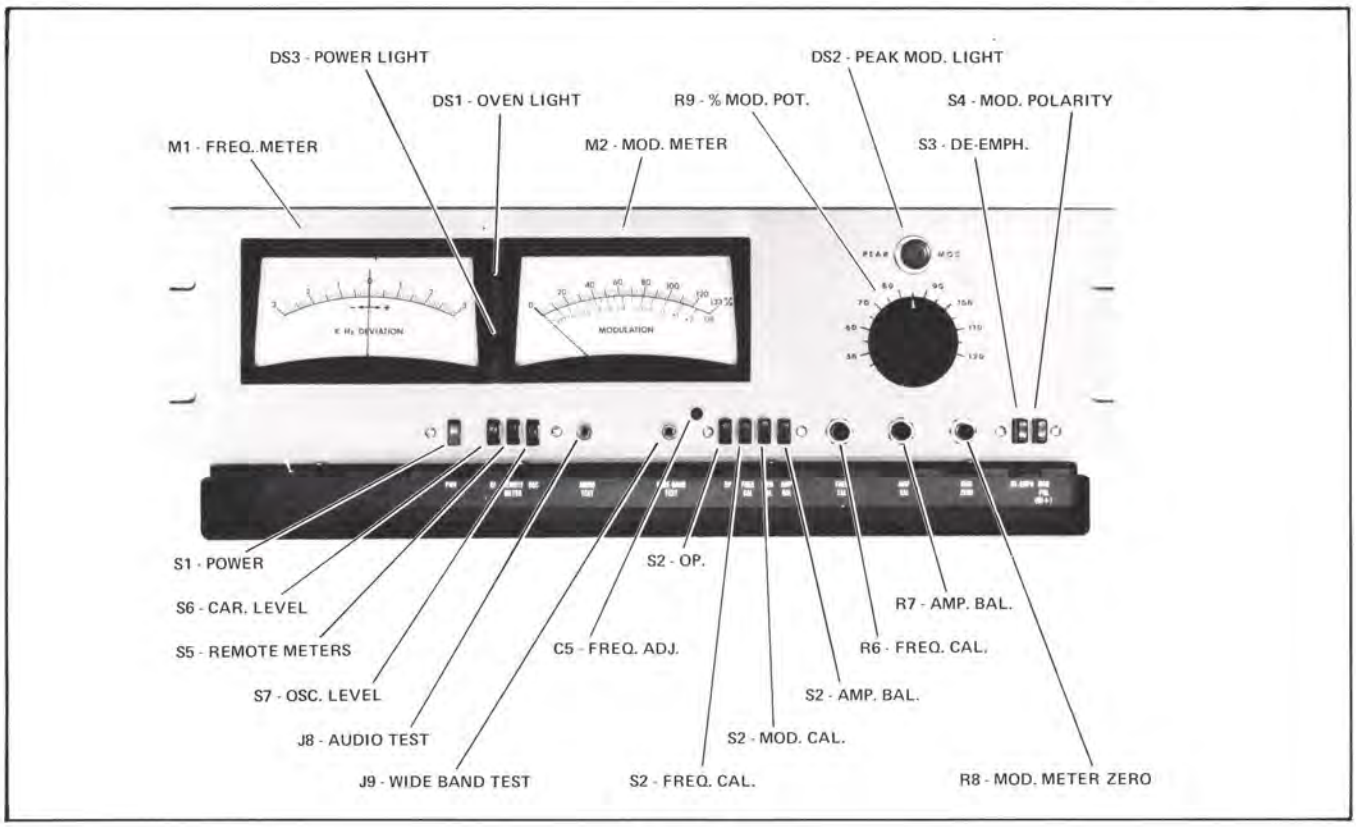


Figure 3–1

1. POWER SWITCH–Turns the unit on. Power is applied to the crystal oven from the line and is independent of the power switch.

2. POWER INDICATOR–Lower amber light between the meters indicates that the unit is turned on.

3. OVEN INDICATOR–Upper red light between the meters indicates that heat is being applied in the crystal oven.

4. RF SWITCH–When depressed indicates the RF level on the percentage modulation meter.

5. REMOTE SWITCH–When in off [released] position removes both metering circuits from the remote metering terminals and substitutes the equivalent resistances.

6. OSCILLATOR SWITCH–When depressed indicates the oscillator level on the percentage modulation meter.

7. FUNCTION SWITCH–When in operate position disables all calibration circuits and places the unit in operation for measuring frequency deviation and total modulation.

8. FUNCTION SWITCH–When in AMP BAL position, the inputs to the frequency differential amplifier are shorted, allowing it to be calibrated.

9. FUNCTION SWITCH–When in FREQ CAL position, the 650 KC calibrating oscillator is turned on and applied to the pulse counter frequency discriminator allowing it to be calibrated.

10. FUNCTION SWITCH–When in MOD CAL position applies a standard deviation to the monitor to check modulation calibration.

11. FREQ ZERO POTENTIOMETER–Standardizes the width of the pulse of the pulse counter discriminator to read zero in function 9 above.

12. AMP BALANCE POTENTIOMETER–Adjusts the DC balance of the frequency differential amplifier in function 8 above.

13. MOD METER BALANCE–Adjusts the percentage modulation meter to read zero with no modulation.

14. DE-EMPHASIS SWITCH–When released removes the 75u second de-emphasis from the monitoring amplifier. This is also effective on the audio test output jack.

15. POLARITY SWITCH–Allows the percentage modulation meter to read either positive or negative modulation polarities. Depressed it reads positive, released it reads negative polarities.

16. PERCENT–MODULATION POTENTIOMETER–Pre-sets the peak modulation lamp to flash at the indicated modulation setting. This circuit is independent of modulation polarity and can be activated by either a positive or negative modulation peak or both.

17. WIDEBAND TEST JACK–Parallels the wideband outputs to the Add-On BW-85A Stereo and BW-95A SCA units. Permits tests to be made on the output of the counter-discriminator such as linearity and stereo composite waveform tests.

18. AUDIO TEST JACK–Test output from the monitoring amplifier. Permits linearity tests, frequency response tests, and FM noise tests to be made from the front panel, with de-emphasis in or out according to function 14.

19. FREQ ADJUST–Adjusts the frequency of the local oscillator. THIS MUST BE ADJUSTED WITH AN INSULATED ALIGNMENT SCREWDRIVER.

SECTION 3
OPERATION

3–1 INITIAL OPERATION

The following procedure should be followed for placing the unit into initial operation. Refer to Figure 1–3 for location of the control functions:

1. Before turning the unit on, turn function switch to AMP BAL and the REMOTE METER switch to off [released].

2. Turn the POWER switch to on [depressed] and allow a 15 minute warm-up.

3. Depress the OSC switch; the reading on the percentage modulation meter should be approximately 100% or more.

4. Turn the RF level control on the back of unit maximum counterclockwise. Apply RF input to the RF input jack. Depress the RF switch and adjust the RF level control until the percentage modulation meter reads 100%. The monitor will operate with as little as 20%, but for AM noise calibration, the 100% level is used.

5. With the FUNCTION switch in AMP BAL, adjust AMP BAL POTENTIOMETER to read center zero on the carrier deviation meter and adjust the MOD ZERO POTENTIOMETER to read zero on the modulation meter.

6. With the FUNCTION switch in FREQ, adjust FREQ CAL POTENTIOMETER to read center zero on the carrier deviation meter.

7. Depress the MOD CAL switch; the modulation meter will read 100% to verify the accuracy of the calibration.

8. Depress OP switch to operate and the monitor is now ready for operation.

3–2 NORMAL OPERATION

For normal operation, leave the BW-75A in OP [operate] position. Changes in RF level will not affect the accuracy of the unit. If may be necessary to occasionally adjust the FREQ CAL POTENTIOMETER as in step 3–1–6 above.

The PEAK MOD POTENTIOMETER is usually set to 100% so that the PEAK LIGHT will flash at a modulation peak of 100% or greater. Since this indicator is independent of modulation polarity [i.e., it responds to both positive and negative peaks], it may flash when the modulation meter does not indicate the peak. The modulation meter polarity is switched by S4.

Note that when the MOD CAL switch is depressed, the calibrating signal is not only applied to the metering circuit, but also to the peak light and monitoring amplifier. Hence the 60 Hertz square wave tone will be heard in an aural monitoring amplifier.

3–3 LOCAL OSCILLATOR FREQUENCY CALIBRATION

The BW-75A is furnished adjusted to the customer's frequency. The monitor may be calibrated against an external frequency standard as follows: The transmitter is first set exactly to the assigned frequency using an outside frequency measuring service. Measure transmitter frequency as per steps 5, 6 and 8 under OPERATION, Paragraph 3–1. If the indicated center frequency deviation is not zero, the local oscillator frequency may be adjusted with the crystal tuning capacitor C5 [through the front panel] to bring the deviation to zero.

3–4 TRANSMITTER MEASUREMENTS

Normal transmitter proof-of-performance measurements may be made with the BW-75A. Frequency response, distortion, and noise measurements may be made through the front panel AUDIO TEST jack J8. Five volts RMS is available at 100% modulation so that most distortion and noise analyzers may be used. Measurements may be made with or without de-emphasis by activation of S–3. The modulation meter has a flat frequency response characteristic so that with a pre-emphasized transmitter, the audio input level will have to be adjusted according to the standard 75u sec pre-emphasis curve.

AM noise measurements may be made at J6 on the back panel. With the RF level at 100%, the normal output of J6 for 100% AM is 0 DB [0.78 volts] into a high impedance [500K or greater]. Hence a standard AC voltmeter such as contained in a distortion analyzer may be used.

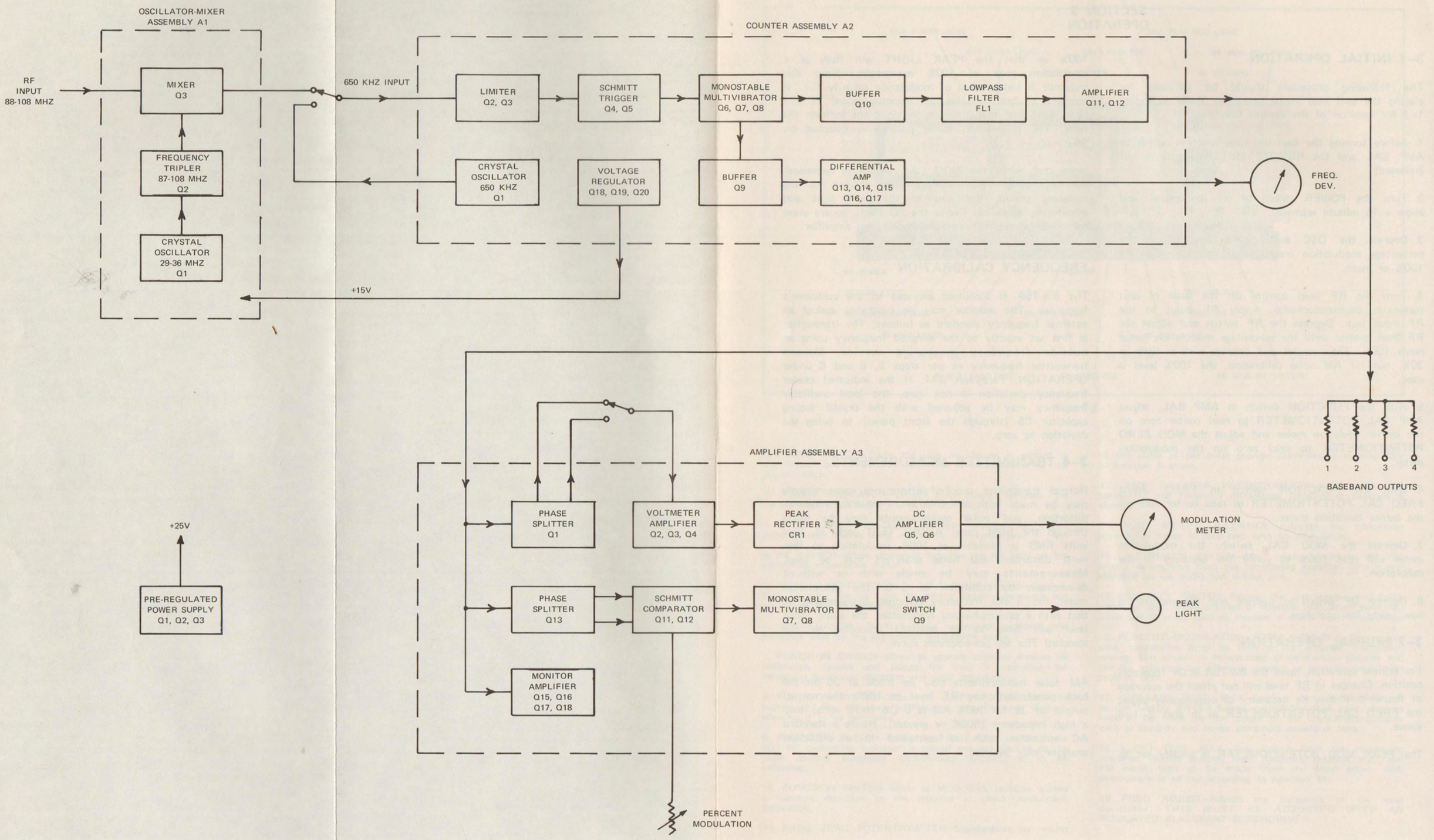


Figure 4–1

SECTION 4
PRINCIPLES OF OPERATION

4–1 BLOCK DIAGRAM DESCRIPTION

Figure 4–1 is a simplified block diagram of the BW-75A FM Frequency and Modulation Monitor. The signal paths are shown but the detailed switching circuitry has been omitted for clarity.

The incoming RF sample is applied to the mixer, A1Q3, along with the tripled local oscillator frequency to form an intermediate frequency [IF] of 650 kHz. This signal is a fully modulated FM signal [Figure 4–2–1] centered around 650 kHz and is applied to the pulse-counter discriminator assembly Card A2.

The limiter amplifies and removes any AM component from the IF signal. The signal is squared by the Schmitt trigger, whose output is differentiated to form a sharp trigger [Figures 4–2–2 and 6] to drive the monostable multivibrator, A2Q6, 7 and 8. The monostable multivibrator generates a pulse of fixed length and amplitude [Figure 4–2–3] each time it receives a trigger. Thus the output of the multivibrator is a series of pulses with a fixed length and amplitude whose spacing depends on the incoming frequency. Figure 4–2–7 illustrates this output with an FM modulated signal. Note how the spacing increases and decreases as the frequency is deviated about 650 kHz. This output is integrated by the low-pass filter whose average AC output is equivalent to the original FM modulation. The output of the monostable multivibrator is also applied to the buffer amplifier A2Q9 and integrated by an RC network to provide an average DC signal proportional to the carrier center frequency.

This DC signal is amplified by the differential amplifier and applied to the carrier deviation meter. The output of the integrating filter is amplified and applied to the modulation metering and peak flasher circuits on Card A3.

The modulation metering circuit consists of a phase splitter to allow either the positive or negative modulation polarity to be selected, a feed-back amplifier, a peak diode detector circuit, and current amplifier to drive the modulation meter. The peak diode detector circuit has a very short charging time constant to allow the modulation meter to accurately respond to complex waveforms of multiplex signals as well as short duration bursts of program material.

The flasher circuit consists of an amplifier, phase splitter, Schmitt voltage comparator, and monostable multivibrator. The signal is split by the phase inverter and both phases are applied to the Schmitt comparator which has a dual input. The comparator will only respond to positive levels that exceed a given value determined by the setting of the percent modulation control. But since the phase inverter inverts the negative modulation, each input of the comparator receives a positive going signal-one corresponding to the positive modulation and one corresponding to the negative modulation, thus making it independent of modulation polarity. Each time the level exceeds the pre-set level, the Schmitt comparator supplies a pulse to the monostable multivibrator. The width of the pulse formed by the multivibrator is set to 3 seconds duration as required by the FCC. The multivibrator turns on the transistor switch A3Q9 to allow the peak lamp to flash.

The monitoring amplifier is a feedback amplifier with push-pull output to provide a low distortion signal for aural monitoring and audio tests. De-emphasis is accomplished by controlling the frequency response of the internal gain and feedback loop.

The supply voltage is regulated to 25 volts by the pre-regulator [Q1, Q2, and CR6]. The supply to the pulse counter and oscillator mixer circuits is further regulated by the precision 15 volt regulator [A2Q18, A2Q19, A2Q20, and A2CR9].

4–2 DETAILED CIRCUIT DESCRIPTION

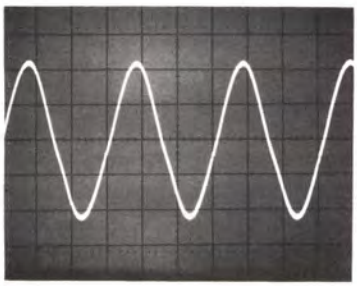
4–2–1 OSCILLATOR, TRIPLER AND MIXER CIRCUIT

The incoming RF is attenuated by R18 [RF level] and applied to pin 5 of the Oscillator, Tripler and Mixer Card. Diodes A1CR1 and A1CR2 prevent excessive RF levels from overloading the FET mixer A1Q3. Diode A1CR3 is used to measure the RF level and its DC output is applied to the modulation meter when S6 [CARRIER LEVEL] is depressed.

The crystal oscillator is a modified Clapp-Gouriet oscillator. This type of oscillator circuit is known for its frequency stability. The feedback ratio is determined by the ratio of A1C3 and A1C4. Since these capacitors are large in comparison to the transistor A1Q1 capacities, the transistor has little effect on the frequency. The crystal is connected to pins 7 and 8.

The series tuned circuit A1C1, A1L1 forces the crystal to operate in the third overtone mode. The crystal is stabilized at a temperature of 75 degrees C by the oven Y1. Variable Capacitor C5 [FREQUENCY ADJUST] adjusts the crystal frequency to that required by the channel frequency.

The output of the crystal oscillator is multiplied by 3 in the tripler stage A1Q2. Its final frequency is then 650 kHz above the incoming RF carrier frequency and is mixed in A1Q3 to produce a difference frequency



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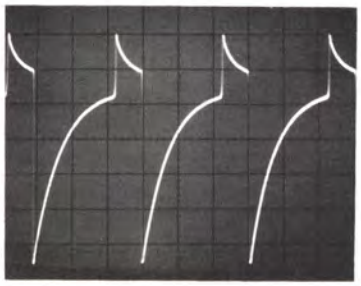

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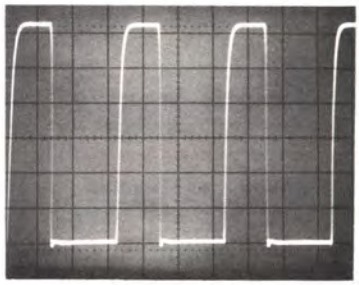

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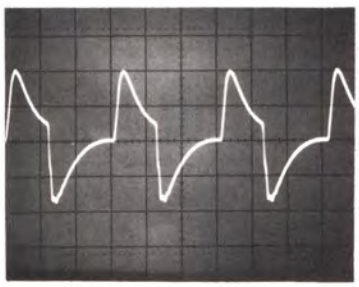

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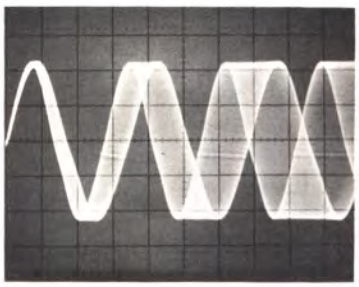

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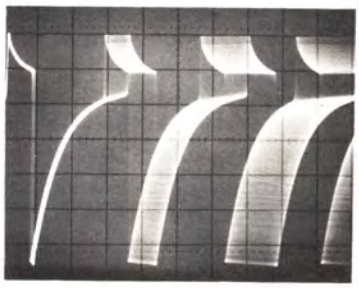

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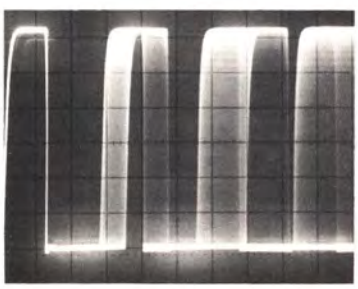

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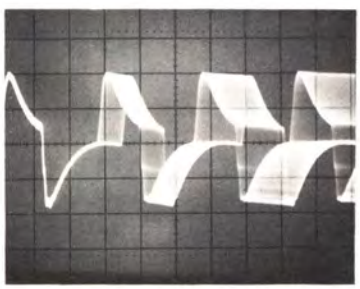

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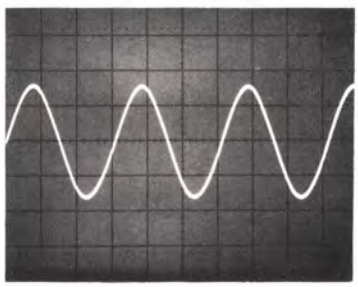

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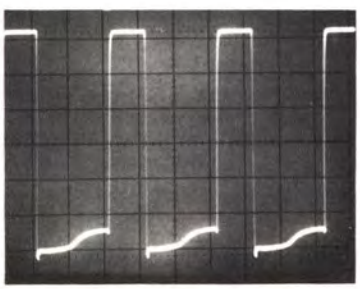

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Figure 4–2

of 650 kHz. The output of the mixer is filtered by the low-pass filter A1C12, A1RFC5, and the cable capacity interconnecting pin 2 to the input of Card A2.

4–2–2 OSCILLATOR, COUNTER DISCRIMINATOR AND AMPLIFIER CIRCUITS

When the operate [OP] switch S2 is depressed, 15 VDC from pin 7 is applied to pin 4 to turn on diode A2CR1 so that the 650 kHz intermediate frequency, Figure 4–2–1, is applied to the limiter, A2Q2 and Q3. This stage amplifies and removes any amplitude modulation component that may be present on the signal. The Schmitt trigger A2Q4 and Q5 squares the signal by developing a pulse each time the signal crosses the zero axis in the positive direction. The output of the Schmitt trigger is differentiated, Figure 4–2–2, and applied to the monostable multivibrator, A2Q6, 7, and 8 through diode A2CR4.

The monostable multivibrator differs from the conventional multivibrator in that the timing capacitor A2C16 is charged through a constant current source, A2Q7, instead of a resistor. Zener Diode A2CR5 regulates the voltage to the base of transistor A2Q7, and silicon diode A2CR6 provides temperature compensation for the emitter-base junction of A2Q7. Potentiometer, R6 [FREQ CAL], in series with R5 [COARSE FREQUENCY CAL] connects the pins 9 and 10 to set the current through A2Q7. The current through A2Q7 sets the slope of the charging current of the timing capacitor A2C16 which determines the pulse width of the multivibrator. This modification of the multivibrator greatly increases both its stability and linearity when used as a pulse counter discriminator.

The output of the monostable multivibrator, Figure 4–2–3, is buffered by an emitter follower A2Q10 and is integrated by the low-pass filter FL1, Figure 4–2–4. This filter counts (averages) the number of pulses over a unit time interval by filtering out the 650 kHz pulses and only passing the modulation, Figure 4–2–9. The output of the low-pass filter is amplified by A2Q11 and buffered by the emitter follower A2Q12. The modulation output [baseband output] is taken off pin 12 to drive subsequent portions of the monitor.

The output of the monostable multivibrator is also buffered by transistor A2Q9. The emitter of A2Q8 is direct coupled to the base of A2Q9. The emitter of the A2Q8 is direct coupled to the base of A2Q9. Diodes A2CR7 and 8, form the emitter load so that the linearity of the multivibrator is preserved. This type of coupling decreases the rise time of the pulse output of A2Q9 and enables transistor A2Q9 to be driven between cut-off and saturation to form a precisely defined rectangular pulse of maximum stability for frequency measurements.

The output of transistor A2Q9 is integrated by the RC network A2R50 and A2C27 to provide a DC that is proportional to frequency. This DC is compared with the reference DC from the precision voltage divider, A2R40 and A2R41, by the differential amplifier A2Q13–17. Any difference in voltage then corresponds to a frequency deviation and is amplified by the differential amplifier and applied to the carrier deviation meter through pins 16 and 20. A2C26 couples the unfiltered modulation to the reference input of the differential amplifier to prevent low modulating frequencies from affecting the frequency reading. The reference DC voltage is derived from the same 15 volt supply that powers the monostable multivibrator to form a bridge circuit so that the frequency measurement is relatively independent of supply voltage.

The 15 volt regulator is the series type to provide both voltage regulation and a low impedance to power the A2 Card. A2Q18 is the pass transistor and A2Q19 and 20 amplify the error difference between the output and reference zener diode, A2CR9, A2R52 sets the output to 15 volts.

The calibrating oscillator A2Q1 is a conventional Colpitts crystal oscillator. When the FREQ CAL switch S2 is depressed, 15 VDC from pin 7 is applied to pin 3 which supplies power to the calibrating oscillator and also turns on diode A2CR2 so that the 650 kHz calibrating signal is applied to the limiter, A2Q2 and A2Q3. Note that diode A2CR1 is now turned off in this mode of operation. The calibrating signal allows the pulse width of the monostable multivibrator to be standardized to correspond with the DC reference level of the differential amplifier.

Modulation calibration is accomplished by gating the 650 kHz calibrating signal on and off through the limiter. When the MOD CAL switch S2 is depressed, the calibrating oscillator is turned on as before. 19 volts, 60 Hertz is also applied to pin 2 to gate the limiter stage A2Q3 on and off at a 60 Hertz rate. The effective FM frequency deviation is from 0 to 650 kHz or 650 kHz peak to peak, the 650 kHz deviation is reduced to 150 kHz by the precision resistance divider A2R38 and A2R39. The square wave output from pin 13, through switch S2, is applied to the Amplifier Card Assembly A3 and the Composite Output Jacks J1–4. Capacitor A2C22 removes the overshoot from the leading edge of the square wave.

25 VDC is supplied to pin 1 through R4, on the main chassis, and to pin 11 to power the buffer A2Q10. R4 drops the 25 volts to pin 1 to approximately 21 volts to reduce the power dissipated in the series regulator A2Q18.

4–2–3 AMPLIFIER, METERING AND FLASHER CIRCUITS

The inputs to the monitoring amplifier, metering circuit, and peak flasher circuit are individually calibrated, the modulation metering circuit consists of a phase splitter to allow either the positive or negative modulation polarity to be selected, a feed-back amplifier, a peak diode detector circuit, and current amplifier to drive the modulation meter. The baseband signal is applied to the phase splitter A3Q1 to allow either the positive or negative modulation to be selected by switch S4 (MOD POLARITY) on main chassis. Potentiometer A3R5 adjusts the gain on the negative polarity to exactly match the positive polarity. The wideband feedback amplifier consists of three transistors A3Q2, 3 and 4. Potentiometer A3R15 adjusts the gain of the amplifier to that value required for calibration. Diode rectifier A3CR1 rectifies the positive half of the signal to charge the capacitor A3C7 to a DC level corresponding to peak value of the signal. The charging time constant is extremely short and is determined by the low output impedance of the feedback amplifier, diode resistance and A3C7. This short time constant allows the modulation meter to accurately respond to complex waveforms of multiplex signals as well as short duration bursts of program material. Resistor A3R20 controls the discharge time of A3C7.

Field-effect transistor A3Q5 provides a high impedance to the rectifier circuit and transistor A3Q6 provides the current gains to drive the modulation meter. Note that pins 12, 13 and 14 are connected to the MOD METER ZERO potentiometer, R8, on the main chassis to form a bridge circuit. R8 balances the bridge for zero current with no signal. With a signal, the voltage increases on the emitter of transistor A3Q6 to inbalance the bridge and current flows through resistors A3R24 and 25. A sample of the current through A3R24 is applied to the internal modulation meter M2 in series with A3R23, pins 10 and 11 connect to the modulation meter via switches S6 and S7. Resistor A3R23 controls both the damping and the rise time of the modulation meter. When a remote meter is used to read modulation, a sample of the current through A3R25 is applied to the remote meter. Pins 11 and 13 connect the remote modulation meter via the REMOTE METER switch S5. An external 6.2K OHM resistor must be used in series with the remote meter for correct damping and rise time. This resistance may include the line resistance.

The peak flasher circuit consists of an amplifier, phase splitter, Schmitt voltage comparator and monostable multivibrator. The baseband signal is applied to the low gain amplifier A3Q14 which is direct coupled to the phase splitter A3Q13. Potentiometer A3R49 sets the span for the PERCENT–MODULATION potentiometer R9 on the front panel. The Schmitt comparator has a dual input, A3Q11 and 12 to accept both negative and positive modulations respectively. The PERCENT–MODULATION potentiometer R9 is connected to pins 15, 16, and 17 to set the firing level of the comparator. Hence, each time the modulation exceeds the preset level, the Schmitt comparator fires and develops a pulse to trigger the monostable multivibrator. The monostable multivibrator A3Q7 and 8 produces a rectangular pulse of three seconds duration which drives the lamp switch A3Q9. The PEAK MOD light DS2 is the collector load for transistor A3Q9. The power for the light is supplied by rectifier CR1 and capacitor C1. A remote PEAK MOD light is driven by the same power supply and switch and may be connected to terminals TB2-9 and 10.

The monitoring amplifier is a three stage feedback amplifier to provide a low distortion signal for both aural monitoring and audio tests. The baseband signal is applied to the input stage A3Q18 which both amplifies the signal and sums the feedback voltage in the emitter. Transistor A3Q17 provides additional amplification to drive the output transistors A3Q15 and 16. Since the output transistors are a complementary pair, they operate in push-pull. Diodes A3CR4 and 5 provide forward bias to operate class AB.

Feedback is taken from the output and applied to the emitter of the input stage through A3R57. When terminals 24 and 26 are connected and terminals 23 and 27, the feedback follows a 75u second pre-emphasis curve so that the resultant output is de-emphasized according to a 75u second curve. A3C22 controls the gain and phase of the amplifier so that it is unconditionally stable. The DE–EMPHASIS switch S3 makes the necessary connections. A3R51 provides the 600 ohm output impedance to drive an aural monitoring amplifier and A3R52 provides the 10K ohm output impedance for audio tests.

The main power supply consists of a full wave bridge rectifier followed by a voltage regulator. Transistor Q1 is the pass transistor and is driven by the current amplifier Q2 which has its base referenced to zener diode CR6. Diode CR7 provides short circuit protection along with R3. When excessive current is drawn from the regulator, the voltage drop accross R3 along with the emitter-base voltages of Q1 and Q2, exceeds the voltage drop across CR7 and the current is limited to a safe value to prevent damage to the transistors. Diode CR1 and capacitor C1 provides power to operate the PEAK MOD light.

SECTION 5
MAINTENANCE

5–1 INTRODUCTION

This section contains maintenance and service information for the BW-75A Frequency and Modulation Monitor. Included are Performance Checks, Adjustments and Calibration Procedures and Troubleshooting Techniques.

5–2 PERFORMANCE CHECKS

The BW-75A is self-checking to a degree. Before performing the check procedure, release all push buttons [out position] depressing or leaving depressed the AMP BAL switch S2 and the MOD POL switch S4. No connections should be made to the back terminals or connectors except for the line cord to TB1.

5–2–1 POWER AND OVEN CHECK

With AC power connected to the BW-75A and the power switch off [released], the oven light DS1 should cycle on and off approximately every 30 seconds after initial warm-up. When on, heat is applied to the oven. Depressing the POWER switch S1 turns the unit on, and power light DS3 indicates that the power is on.

5–2–2 OSCILLATOR LEVEL CHECK

Depressing the OSC level switch S7 indicates the oscillator level on the MODULATION meter M2. The reading of the level should be greater than 100% and should be noted for future reference.

5–2–3 FREQUENCY METER AMPLIFIER CHECK

Depress the AMP BAL switch S2 and adjust AMP BAL potentiometer R7 maximum clockwise to maximum counterclockwise; the FREQUENCY meter M1 pointer should go off scale in the positive and negative direction respectively. Return the pointer to zero for normal operation.

5–2–4 FREQ METER DISCRIMINATOR CHECK

Depress the FREQ CAL switch S2 and adjust the FREQ CAL potentiometer R6 maximum clockwise to maximum counterclockwise; the FREQUENCY meter M1 pointer should go off scale in the positive and negative direction respectively. Return the pointer to zero for normal operation.

5–2–5 MOD METER AMPLIFIER ZERO CHECK

Depress the AMP BAL switch S2 and adjust the MOD ZERO potentiometer R8 maximum clockwise to maximum counterclockwise; the MODULATION meter M2 pointer should move in a positive and negative direction about zero. Return the pointer to zero for normal operation.

5–2–6 MODULATION CALIBRATOR CHECK

Depress the MOD CAL switch S2. The MODULATION meter M2 should read 100%. The FREQUENCY meter M1 may move off from zero to plus or minus a few hundred cycles.

5–2–7 REMOTE METER SWITCH CHECK

Depress the MOD CAL switch S2. The MODULATION meter M2 should read 100%. Adjust the FREQ CAL potentiometer R6 to a reading of plus 1 kHz. Depress the REMOTE METER switch S5. This MODULATION meter M2 reading should decrease approximately 6% and the FREQUENCY meter M1 should return to zero. Release the REMOTE METER switch S5 and the meters should return to the previous readings. Return the FREQ CAL potentiometer R6 to normal as in step 5–2–4.

5–2–8 PERCENT MOD POTENTIOMETER CHECK

Depress the MOD CAL switch S2. Adjust the PERCENT MODULATION potentiometer R9 to just turn on the PEAK MODULATION light DS2. The light should turn on at 100%. The light will continue to flash on and off at a rate of 3 seconds on to a fraction of a second off.

5–2–9 MODULATION POLARITY CHECK

Depress the MOD CAL switch S2. The MODULATION meter M2 should read 100%. Release the MOD POL switch S4 and the MODULATION meter should continue to read 100%.

5–2–10 CARRIER LEVEL CHECK

Turn RF level control R18 maximum counterclockwise. Apply RF carrier to the RF INPUT connector J7 [40 milliwatts is more than sufficient to drive the monitor to 100% carrier level indication]. Depress RF switch S6 and adjust RF level control R18 until the MODULATION meter M2 reads 100%. If considerable range remains on R18, the RF output from the transmitter should be reduced by adjusting the coupling probe in the transmitter.

5–2–11 OPERATE CHECK

With the RF carrier applied as in step 11, depress the OPERATE switch S2. The FREQUENCY meter M1 will indicate the frequency deviation from the assigned channel frequency. The MODULATION meter M2 will indicate the presence of modulation. The PEAK MODULATION light DS2 will indicate positive and negative modulation peaks according to the setting of the PERCENT MODULATION potentiometer. It may be noted that the MODULATION meter M2 may not track at all times with the PEAK MODULATION light while monitoring program material.

This is due to the assymetrical nature of certain types of program material, i. e., the positive and negative peaks are not equal in amplitude. Since the PEAK MODULATION light circuitry automatically selects the higher of the two polarities, it can register a peak opposite to the polarity to which the MODULATION meter is set.

5–2–12 DE-EMPHASIS SWITCH CHECK

With a 15 kHz modulated signal applied to the monitor, the monitor amplifier output may be monitored at the AUDIO TEST jack J8. Depressing the DE-EMPHASIS switch S3 will cause a 17 db decrease in output level, and releasing S3 will return the amplifier to a flat response. Note that the 600 ohm monitoring amplifier output on TB2 is also de-emphasized by this switch.

5–3 ADJUSTMENTS, CALIBRATION AND TROUBLESHOOTING

The following guide for adjustments, calibration and troubleshooting follows the same numbering sequence as the PERFORMANCE CHECKS for ease of service.

5–3–1 POWER AND OVEN

a. If the oven light DS1 fails to light, check fuse F2 [0.25A].

b. If the oven light DS1 lights but fails to cycle on and off, remove oven from unit. If the oven is cold, check continuity of the heater winding between pins 3 and 4 of the oven. If the oven is hot, the thermostat circuit is stuck closed and the oven should be replaced with a new unit. Note that both malfunctions will result in an indicated carrier frequency error. The monitor oven should not be operated with a stuck thermostat as the crystal may be damaged from overheating. The monitor may be operated temporarily with the oven fuse removed.

c. If the oven light DS1 fails to light but the oven heats, check the oven light.

d. If the power light DS3 fails to light, check fuse F1 [0.5A].

e. If the power light DS3 lights but the monitor is inoperative, check the voltage on terminal 3 of TB2 to ground. Normal voltage is 26 VDC. If the voltage is high [37 VDC], Q2 or CR6 is defective. If the voltage is 0, Q1 is open or a malfunction exists in the pre-regulator.

f. If the power light DS3 fails to light and the monitor functions normally, check the power light.

5–3–2 OSCILLATOR LEVEL

a. If the oscillator level reads 0, transistor A1Q1 is malfunctioning.

b. If the oscillator level reads above 80% but not the normal peak, adjust A1L1 for an indicated peak on M2.

c. If the oscillator level will not peak with the adjustment of A1L1, the crystal Y1 [in oven] may be defective.

5–3–3 FREQUENCY METER AMPLIFIER

a. If the FREQUENCY meter M1 pointer fails to go off scale in both the positive and negative direction, transistors A2Q14 and 15 are saturated and A2R47 should be replaced with the next higher value [9.1K or 10K ohms].

b. If the FREQUENCY meter M1 pointer fails to move and the rest of the monitor functions normally, release REMOTE METER switch S5. Note that if remote meters are used and the malfunction is cleared when the switch S5 is released, a malfunction exists on the remote meter lines.

c. If releasing the REMOTE METER switch S5 does not clear the malfunction, A2Q13 and 17 are malfunctioning.

5–3–4 FREQ METER DISCRIMINATOR

a. If the FREQUENCY meter M1 pointer fails to go off scale in both the positive and negative directions, return the FREQ CAL potentiometer R6 to its midpoint and adjust the coarse frequency potentiometer R5 to zero M1.

b. If the FREQUENCY meter M1 is off scale and cannot be brought on scale with R6, as in step (a) above, but the modulation calibrator functions normally as in step 5–2–6, check the waveform on the collector of transistor A2Q9. A low capacity probe should be used with the oscilloscope to preserve the waveshape and the waveshape should be as shown in Figure 4–2–3. If the waveshape does not have a straight base-line as in Figure 4–2–10, transistor A2Q9 is not driven into full saturation and should be replaced. Note that this malfunction can also cause excessive frequency drift in the discriminator.

c. If the FREQUENCY meter M1 is off scale and the modulation calibrator does not check as in step 5–2–6, but the unit functions normally in the OPERATE position, the calibrating oscillator is not functioning or the diode switch A2CR2 is open. Check also that 15 VDC is applied to the diode anode.

d. If the unit does not function in the OPERATE position in step (c) above, the counter-discriminator circuits are malfunctioning, and the signal may be traced with the aid of the waveforms in Figure 4–2. A low capacity probe should be used with the oscilloscope to preserve the waveshape.

5–3–5 MOD METER AMPLIFIER ZERO

a. If the MODULATION meter M2 will not zero, and the modulation calibrator functions but does not indicate accurately, the bias on transistor A3Q3 is off. Increasing the value of A3R16 will decrease the meter reading by shifting the zero to the negative direction, and decreasing A3R16 will increase the meter reading by shifting the zero to the positive direction. A3R16 should range between 24K and 30K ohms and if it does not, replace A3Q5 or A3Q3.

b. If the MODULATION meter M2 reads off scale, check resistors A3R24 and 25 for an open circuit.

5–3–6 MODULATION CALIBRATOR

a. If the MODULATION meter M2 reads in error but is within ± 20% for positive polarity [MOD POL switch S4 depressed] and the PERCENT MOD checks as in step 5–2–8, adjust potentiometer A3R15 for the correct reading of 100% after zeroing the meter as in step 5–2–5.

b. If both the MODULATION meter M2 and the PERCENT MOD potentiometer R9 read in error, check the voltage output of the 15 volt regulator on card A2 and adjust A2R52 for 15 volts output if necessary. Usually the FREQ METER DISCRIMINATOR CHECK will be off in step 5–2–4 with the 15 volt regulator out of adjustment.

5–3–7 REMOTE METER SWITCH

a. With remote meters connected to the monitor, the readings of the FREQUENCY meter M1 and the MODULATION meter M2 should remain unchanged with the REMOTE METER switch S5 depressed or released. If the readings do change, check for faults on the remote meter lines. When the remote meters are not connected to the monitor, the readings will change as in step 5–2–7.

5–3–8 PERCENT MOD POTENTIOMETER

a. If the PERCENT MOD potentiometer R9 reads in error, the knob may be slipped to the correct reading by loosening the two set screws and retightening after adjusting.

b. The span of the PERCENT MOD potentiometer may be checked by applying a 400 cycle modulated signal to the monitor and checking the tracking at the 50% and 100% modulation points. Adjust A3R49 so that the percentage difference on the PERCENT MOD potentiometer is 50% when the modulation level is changed from 100% to 50%. Slip the knob as in step (a) above if it is necessary to correct the reading at 100% after the span has been adjusted.

5–3–9 MODULATION POLARITY

a. With a 400 cycle, 100% modulated signal, adjust A3R5 to obtain equal reading on MODULATION meter M2 when the MOD POL switch S4 is cycled from positive to negative. Note that the adjustment can be observed in the negative polarity position.

b. If the negative polarity is off seriously and the monitor is noisy, check the pre-regulated power supply as in step 5–3–1–e.

5–3–10 CARRIER LEVEL

a. If no RF level is observed and the monitor is functioning normally in the OPERATE position, check diode A1CR3.

5–3–11 OPERATE

a. If the monitor fails to function in the OPERATE position and all other functions are correct, check diode switch A2CR1. Check also that 15 VDC is applied to the diode anode.

b. If the FREQUENCY deviation is off scale and the MODULATION meter is normal in the OPERATE position, check local oscillator peaking as in step 5–3–2.

c. If the FREQUENCY deviation is off scale and the MODULATION meter is normal in the OPERATE position, check the oven cycling as in step 5–3–1–b. If the oven is cycling and the transmitter frequency is correct, crystal Y1 [in oven] is defective.

d. If the monitor fails to function in the OPERATE position and the diode switch circuit is functioning, check transistors A1Q2 and A1Q3.

5–3–12 DE-EMPHASIS SWITCH

a. If DE-EMPHASIS switch S3 does not function normally, check capacitors A3C20 and 22. In the DE-EMPHASIS position, capacitor A3C20 is connected to the circuit by S3 switch contacts connecting pins 24 and 26, and capacitor A3C22 is connected to the circuit by S3 switch contacts connecting pins 23 and 27.

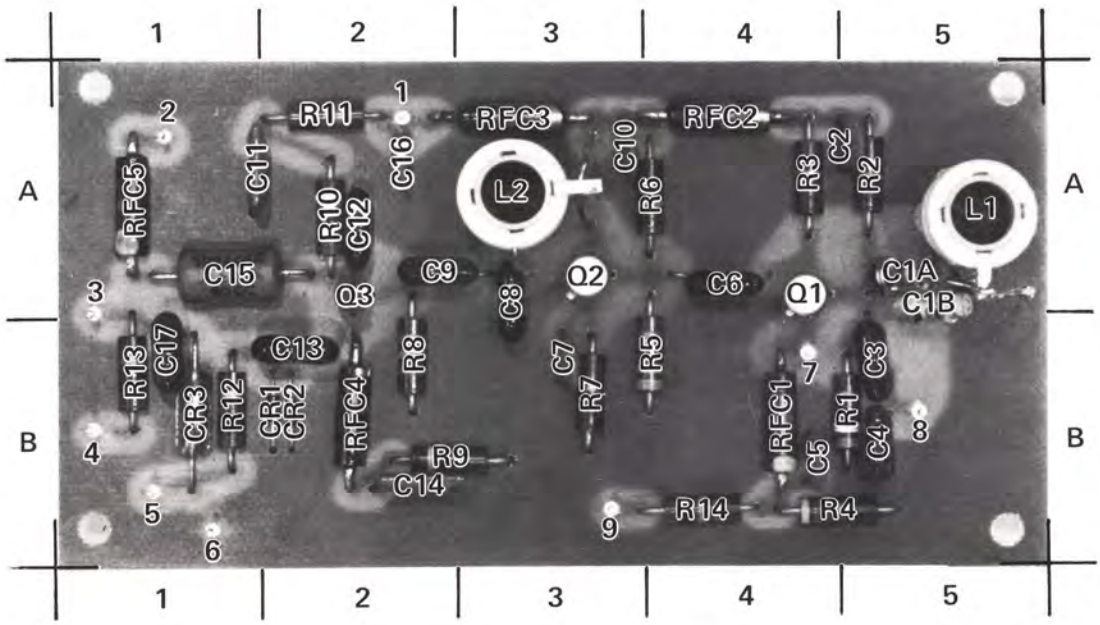


Figure 5–1

REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC
R1	B5	R10	A2	C4	B5	C13	B2	RFC5	A1	PINS	
R2	A5	R11	A2	C5	B4	C14	B2	CR1	B2	1	A2
R3	A4	R12	B1	C6	A4	C15	A1	CR2	B2	2	A1
R4	B4	R13	B1	C7	B3	C16	A2	CR3	B1	3	A1
R5	B4	R14	B4	C8	A3	C17	B1	Q1	A4	4	B1
R6	A4	C1A	A5	C9	A2	RFC1	B4	Q2	A3	5	B1
R7	B3	C1B	A5	C10	A3	RFC2	A4	Q3	A2	6	B1
R8	B2	C2	A5	C11	A1	RFC3	A3	L1	A5	7	B4
R9	B2	C3	B5	C12	A2	RFC4	B2	L2	A3	8	B5

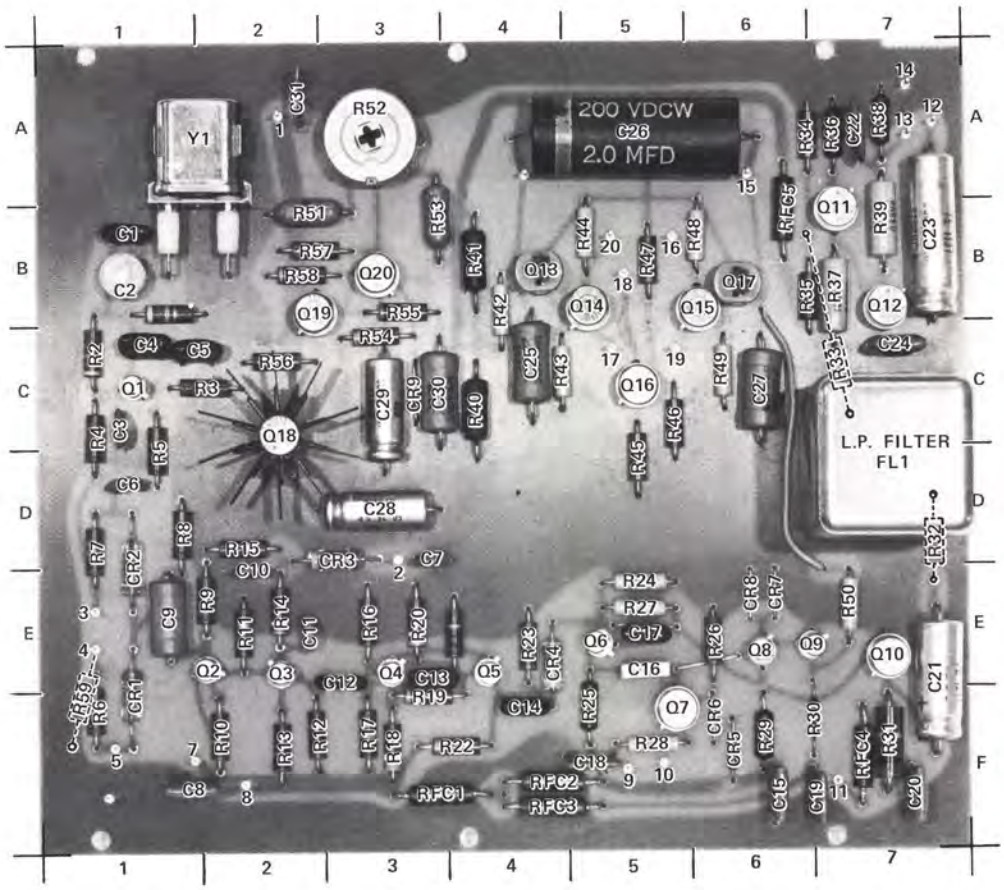


Figure 5–2

REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC
R1	B1	R22	F4	R43	C4	Q5	E4	C6	D1	C27	C6	PINS	
R2	C1	R23	E4	R44	B5	Q6	E5	C7	D3	C28	D3	1	A2
R3	C2	R24	E5	R45	D5	Q7	F5	C8	F1	C29	C3	2	D3
R4	C1	R25	F5	R46	C5	Q8	E6	C9	E1	C30	C3	3	E1
R5	C1	R26	E6	R47	B5	Q9	E6	C10	D2	C31	A2	4	E1
R6	F1	R27	E5	R48	B6	Q10	E7	C11	E2	CR1	E1	5	F1
R7	D1	R28	F5	R49	C6	Q11	B7	C12	E3	CR2	D1	6	F1
R8	D1	R29	F6	R50	E7	Q12	B7	C13	E3	CR3	D3	7	F1
R9	E2	R30	F6	R51	B2	Q13	B4	C14	F4	CR4	E4	8	F2
R10	F2	R31	F7	R52	A3	Q14	B5	C15	F6	CR5	F6	9	F5
R11	E2	R32	D7	R53	B3	Q15	B6	C16	E5	CR6	F6	10	F5
R12	F2	R33	C7	R54	C3	Q16	C5	C17	E5	CR7	E6	11	F7
R13	F2	R34	A6	R55	B3	Q17	B6	C18	F5	CR8	E6	12	A7
R14	E2	R35	B6	R56	C2	Q18	C2	C19	F6	CR9	C3	13	A7
R15	D2	R36	A7	R57	B2	Q19	B2	C20	F7	RFC1	F3	14	A7
R16	E3	R37	B7	R58	B2	Q20	B3	C21	E7	RFC2	F4	15	A6
R17	F3	R38	A7	R59	F1	C1	B1	C22	A7	RFC3	F4	16	B5
R18	F3	R39	B7	Q1	C1	C2	B1	C23	B7	RFC4	F7	17	C5
R19	F3	R40	C4	Q2	E2	C3	C1	C24	C7	RFC5	B6	18	B5
R20	E3	R41	B4	Q3	E2	C4	C1	C25	C4	FL1	D7	19	C5
R21	E4	R42	B4	Q4	E3	C5	C1	C26	A5	Y1	A1	20	B5
												21	A4

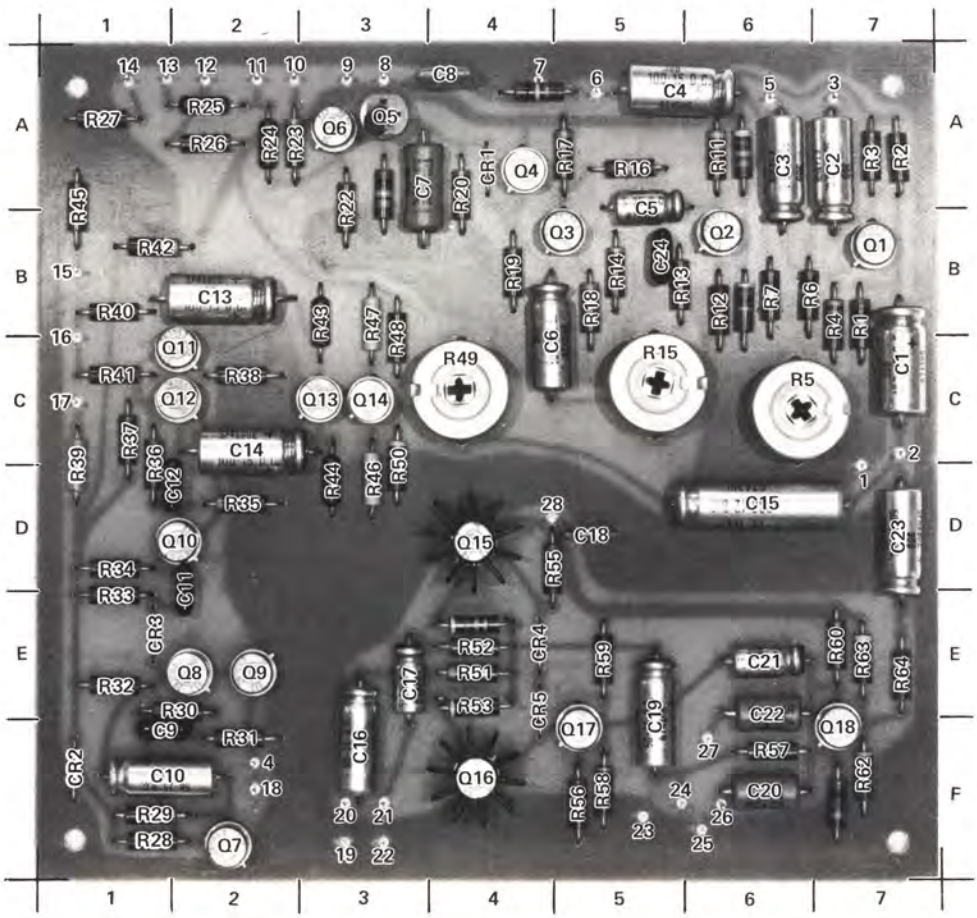


Figure 5–3

REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC	REF DESIG	GRID LOC
R1	B7	R21	A3	R41	C1	R61	F7	C17	E3	Q13	C3	9	A3
R2	A7	R22	B3	R42	B1	R62	F7	C18	D5	Q14	C3	10	A2
R3	A7	R23	A2	R43	B3	R63	E7	C19	E5	Q15	D4	11	A2
R4	B7	R24	A2	R44	D3	R64	E7	C20	F6	Q16	F4	12	A2
R5	C6	R25	A2	R45	B1	C1	C7	C21	E6	Q17	E5	13	A1
R6	B6	R26	A2	R46	D3	C2	A7	C22	E6	Q18	F7	14	A1
R7	B6	R27	A1	R47	B3	C3	A6	C23	D7	CR1	A4	15	B1
R8	A4	R28	F1	R48	C3	C4	A5	C24	B5	CR2	F1	16	C1
R9	B6	R29	F1	R49	C4	C5	B5	Q1	B7	CR3	E1	17	C1
R10	A6	R30	E2	R50	D3	C6	C4	Q2	B6	CR4	E4	18	F2
R11	A6	R31	F2	R51	E4	C7	A3	Q3	B5	CR5	E4	19	F3
R12	B6	R32	E1	R52	E4	C8	A4	Q4	A4	PINS		20	E3
R13	B5	R33	E1	R53	E4	C9	F1	Q5	A3	1	D7	21	F3
R14	B5	R34	D1	R54	E4	C10	F1	Q6	A3	2	C7	22	F3
R15	C5	R35	D2	R55	D4	C11	E2	Q7	F2	3	A7	23	F5
R16	A5	R36	D1	R56	F5	C12	D2	Q8	E2	4	F2	24	F5
R17	A5	R37	C1	R57	F6	C13	B2	Q9	E2	5	A6	25	F6
R18	B5	R38	C2	R58	F5	C14	C2	Q10	D2	6	A5	26	F6
R19	B4	R39	D1	R59	E5	C15	D6	Q11	C2	7	A4	27	F6
R20	A4	R40	B1	R60	E7	C16	F3	Q12	C2	8	A3	28	D4

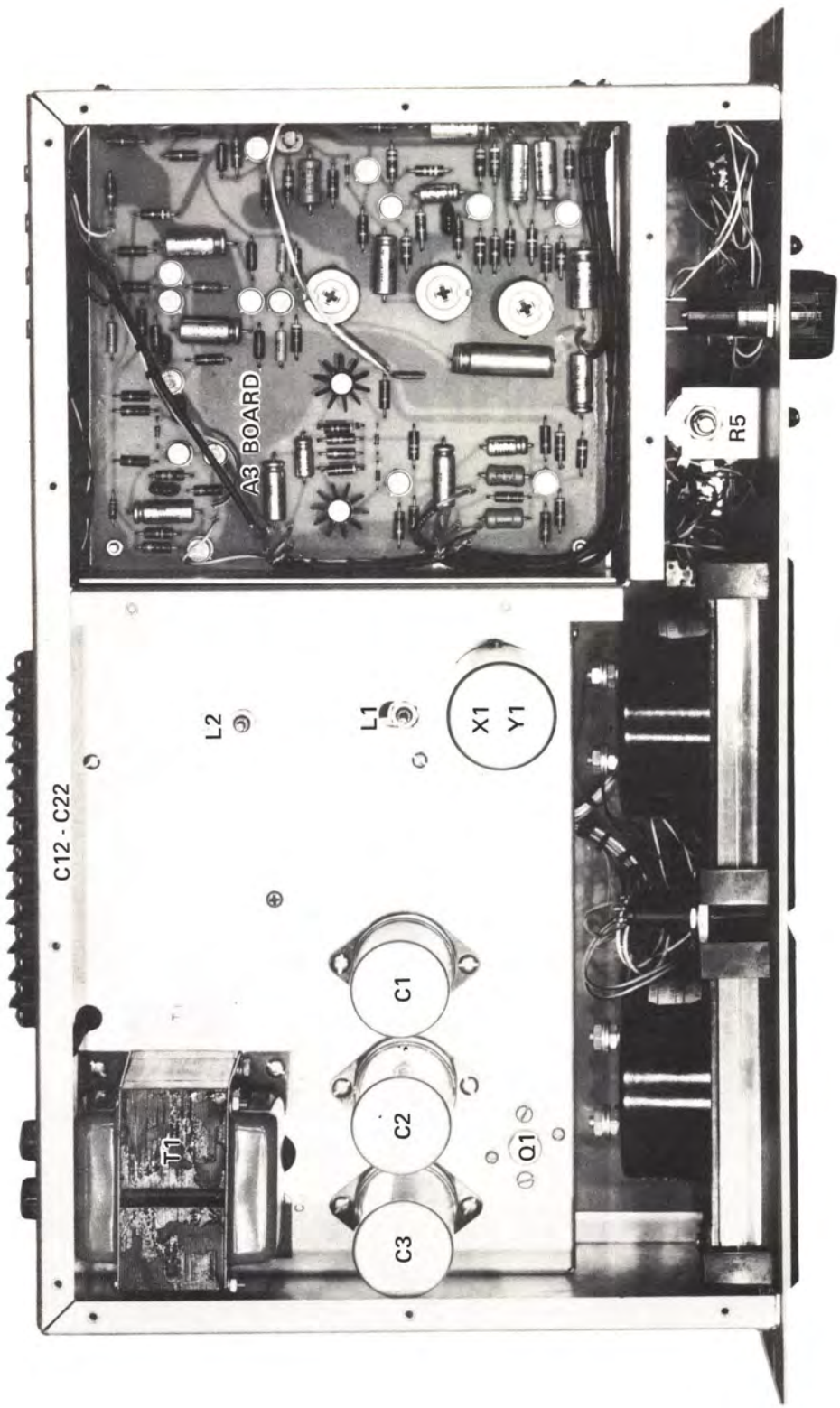


Figure 5–4

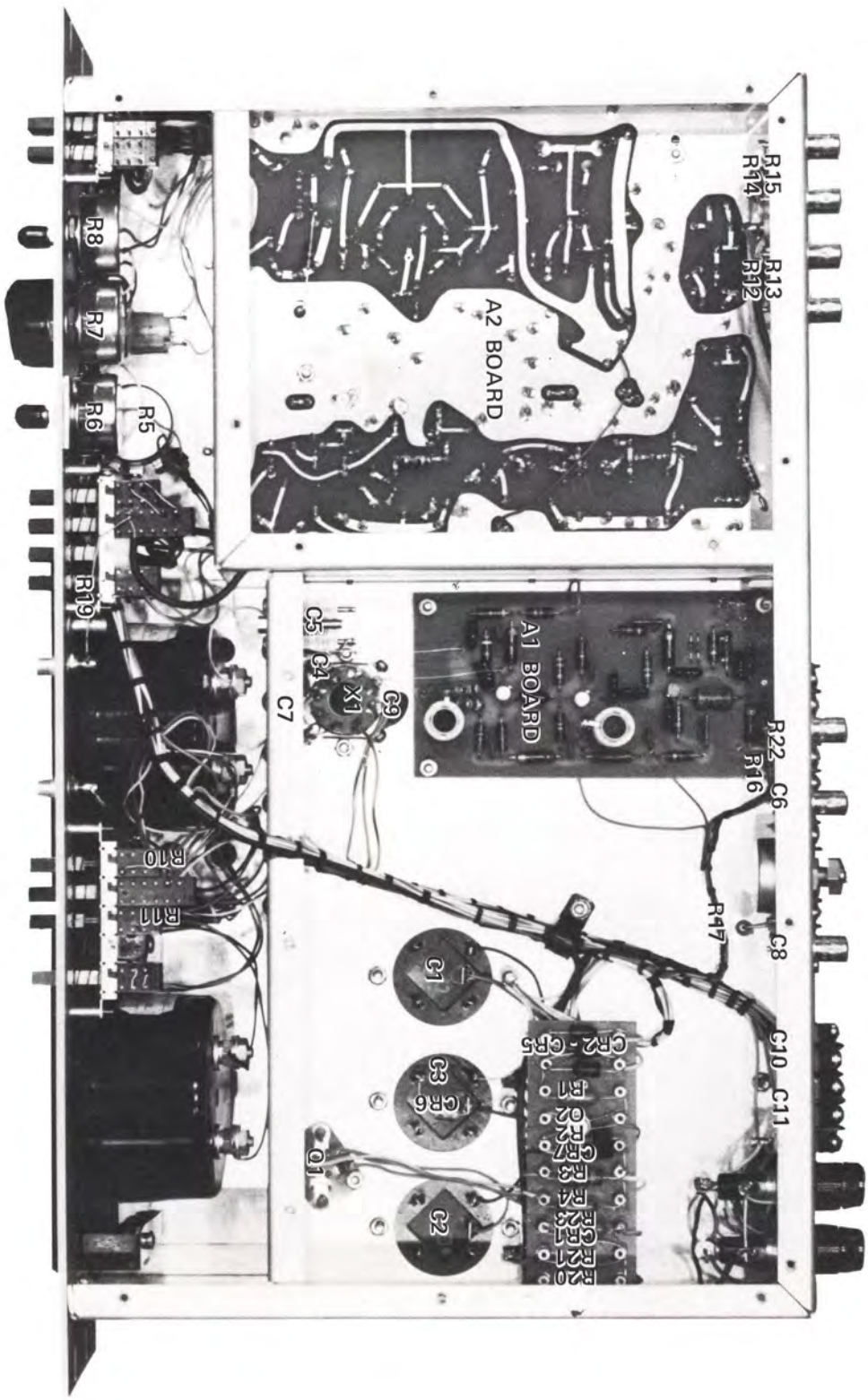


Figure 5–5

SECTION 6
REPLACEABLE PARTS

6–1 INTRODUCTION

This section contains information for ordering replaceable parts for the monitor. The table lists the parts in alpha-numerical order of their reference designations and provides a description of the part and the RCA stock number.

6–2 ORDERING INFORMATION

To order a replacement part from RCA, address the order according to the information on the inside cover of this instruction book and supply the following information:

a. Type number and serial number of unit.

b. Description of part including the reference designation and location.

c. RCA Stock or Master Item (MI) Number.

REFERENCE DESIGNATORS

A	= assembly	J	= jack	S	= switch
C	= capacitor	L	= inductor	T	= transformer
CR	= diode	M	= meter	TB	= terminal board
DS	= device signaling(lamp)	P	= plug	W	= cable
F	= fuse	Q	= transistor	X	= oven
FL	= filter	R	= resistor	Y	= crystal

ABBREVIATIONS

CER	= ceramic	MEG	= 1,000,000	POT	= potentiometer
COMP	= composition	METFLM	= metal film	SEMICON	= semiconductor
CONN	= connector	MY	= mylar	SI	= silicon
ELECT	= electrolytic	PC	= printed circuits	U	= micro
F	= farads	PIV	= peak inverse voltage	VDCW	= dc working volts
FXD	= fixed	POLY	= polystyrene	W	= watts
GE	= germanium	PORC	= porcelain	WW	= wirewound
K	= kilo = 1000				

Symbol	Stock No.	Drawing No.	Description
			MI-560735 BW-75A FM MONITOR
			MAIN CHASSIS
			CAPACITORS
C1	227721		ELECTROLYTIC, 500 MF 50 V DC
C2	246926		ELECTROLYTIC, 1000 MF 50 V DC
C3	246926		ELECTROLYTIC, 1000 MF 50 V DC
C4	248433		CERAMIC, 15 PF 2%
C5	248434		VARIABLE AIR, 3.2 PF-50 PF
C6	248406		FILM, .0047 MF 10% 80 V DC
C7	267478		CERAMIC, .01 MF 1000 V
C8	241252		MICA, 250 PF 5% 500 V DC
C9	267478		CERAMIC, .01 MF 1000 V
C10	267478		CERAMIC, .01 MF 1000 V
C11	267478		CERAMIC, .01 MF 1000 V
C12 TO C22	240846		CERAMIC, .001 MF 1000 V
CR1 TO CR5	921608		DIODE - SILICON, TYPE 1N2070
CR6	232946		DIODE - ZENER, TYPE 1N3030B
CR7	248418		DIODE
DS1	248419		LAMP - INDICATOR ASSEMBLY
DS2	212721		LAMP - INCANDESCENT, 28 V., 0.07A
DS3	248420		LAMP - INDICATOR ASSEMBLY
F1	003748		FUSE - CARTRIDGE, 1/2 AMP, 250 V
F2	300123		FUSE - CARTRIDGE, 1/4 AMP, 250 V
M1	248421		METER - FREQUENCY, 3 KHZ
M2	248422		METER - MODULATION, 0 TO 133%
Q1	262116		TRANSISTOR - SILICON, TYPE 2N3054
Q2	232841		TRANSISTOR - SILICON, TYPE 2N3053
			RESISTORS - FIXED COMPOSITION, UNLESS NOTED
R1	260951		WIREWOUND, 1.5 OHMS 5% 3 W
R2	502210		1000 OHMS 5% 1/2 W
R3	238135		WIREWOUND, 0.33 OHMS 5% 2 W
R4	302215		WIREWOUND, 33 OHMS 5% 3 W
R5	248401		VARIABLE, WIREWOUND, 500 OHMS 10% 2 W
R6	248400		VARIABLE, WIREWOUND, 50 OHMS 10% 2 W
R7	248399		VARIABLE, WIREWOUND, 100 OHMS 10% 2 W
R8	248399		VARIABLE, WIREWOUND, 100 OHMS 10% 2 W
R9	248401		VARIABLE, WIREWOUND, 500 OHMS 10% 2 W
R10	502262		6200 OHMS 5% 1/2 W
R11	502251		5100 OHMS 5% 1/2 W
R12	502222		2200 OHMS 5% 1/2 W
R13	502222		2200 OHMS 5% 1/2 W
R14	502222		2200 OHMS 5% 1/2 W
R15	502156		560 OHMS 5% 1/2 W
R16	502315		15,000 OHMS 5% 1/2 W
R17	512110		100 OHMS 10% 1 W
R18	300035		VARIABLE, 100 OHMS 10% 2 W
R19	502210		1000 OHMS 5% 1/2 W
R20	502120		200 OHMS 5% 1/2 W
R21	502120		200 OHMS 5% 1/2 W
R22	502347		47,000 OHMS 5% 1/2 W
R23	217145		WIREWOUND, 100 OHMS 5% 3 W
S1	248423		PUSHBUTTON - POWER METER
S2	248424		PUSHBUTTON - FUNCTION
S3	248425		PUSHBUTTON - DE EMPHASIS POLARITY
S4	248425		PUSHBUTTON - DE EMPHASIS POLARITY
S5	248423		PUSHBUTTON - POWER METER
T1	248426		TRANSFORMER - POWER
TB1	248427		BOARD - TERMINAL
TB2	248428		BOARD - TERMINAL
X1	248436		OVEN - CRYSTAL, 117 V., 75 C

Symbol	Stock No.	Drawing No.	Description
Y1	248429		CRYSTAL - FREQUENCY 29-36 MHZ
			A1 CARD, OSCILLATOR, TRIPLER AND MIXER
			CAPACITORS
A1C1A	204704		CERAMIC, 22 PF 2% NPO
A1C1B	077686		CERAMIC, 5 PF N750
A1C2	261542		CERAMIC, 0.01 MF 100 V DC
A1C3	241252		MICA, 250 PF 5% 500 V DC
A1C4	300184		MICA, 120 PF 5% 500 V DC
A1C5	261542		CERAMIC, 0.01 MF 100 V DC
A1C6	300181		MICA, 51 PF 5% 500 V DC
A1C7	261542		CERAMIC, 0.01 MF 100 V DC
A1C8	099162		MICA, 20 PF 5% 500 V DC
A1C9	218098		MICA, 27 PF 5% 500 V DC
A1C10	261542		CERAMIC, 0.01 MF 100 V DC
A1C11	239051		CERAMIC, 0.1 MF 50 V DC
A1C12	099162		MICA, 20 PF 5% 500 V DC
A1C13	246145		MICA, 500 PF 5% 500 V DC
A1C14	239051		CERAMIC, 0.1 MF 50 V DC
A1C15	247979		FILM, 0.1 MF 10% 80 V DC
A1C16	261542		CERAMIC, 0.01 MF 100 V DC
A1C17	241252		MICA, 250 PF 5% 500 V DC
A1CR1	248403		DIODE - SILICON, TYPE 1N4446
A1CR2	248403		DIODE - SILICON, TYPE 1N4446
A1CR3	248402		DIODE - GERMANIUM, TYPE 1N541
A1L1	248415		INDUCTOR - VARIABLE OSCILLATOR
A1L2	248416		INDUCTOR - VARIABLE TRIPLER
A1Q1	236039		TRANSISTOR - SILICON, TYPE 2N3478
A1Q2	236039		TRANSISTOR - SILICON, TYPE 2N3478
A1Q3	248417		TRANSISTOR - SILICON FET
			RESISTORS - FIXED COMPOSITION, UNLESS NOTED
A1R1	502239		3900 OHMS 5% 1/2 W
A1R2	502311		11,000 OHMS 5% 1/2 W
A1R3	502122		220 OHMS 5% 1/2 W
A1R4	502147		470 OHMS 5% 1/2 W
A1R5	502233		3300 OHMS 5% 1/2 W
A1R6	502315		15,000 OHMS 5% 1/2 W
A1R7	502122		220 OHMS 5% 1/2 W
A1R8	502327		27,000 OHMS 5% 1/2 W
A1R9	502224		2400 OHMS 5% 1/2 W
A1R10	502215		1500 OHMS 5% 1/2 W
A1R11	502110		100 OHMS 5% 1/2 W
A1R12	502110		100 OHMS 5% 1/2 W
A1R13	502210		1000 OHMS 5% 1/2 W
A1R14	502310		10,000 OHMS 5% 1/2 W
A1RFC1	248431		CHOKE - R.F., 47 UH
A1RFC2	248432		CHOKE - R.F., 5.6 UH
A1RFC3	248432		CHOKE - R.F., 5.6 UH
A1RFC4	248432		CHOKE - R.F., 5.6 UH
A1RFC5	248431		CHOKE - R.F. 47 UH
			A2 CARD, OSCILLATOR, COUNTER DISCRIMINATOR
			CAPACITORS
A2C1	300546		MICA, 12 PF 5% 500 V DC
A2C2	248405		VARIABLE CERAMIC, 5.5 PF-18 PF
A2C3	261542		CERAMIC, 0.01 MF 100 V DC
A2C4	300444		MICA, 620 PF 5% 500 V DC
A2C5	241252		MICA, 250 PF 5% 500 V DC
A2C6	261542		CERAMIC, 0.01 MF 100 V DC
A2C7	261542		CERAMIC, 0.01 MF 100 V DC

Symbol	Stock No.	Drawing No.	Description
A2C8	248409		CERAMIC, 1.0 MF 25 V DC
A2C9	247949		FILM, 0.1 MF 10% 80 V DC
A2C10	261542		CERAMIC, 0.01 MF 100 V DC
A2C11	261542		CERAMIC, 0.01 MF 100 V DC
A2C12	218098		MICA, 27 PF 5% 500 V DC
A2C13	241252		MICA, 250 PF 5% 500 V DC
A2C14	300186		MICA, 180 PF 5% 500 V DC
A2C15	248409	8549206 069	CERAMIC, 1.0 MF 25 V DC
A2C16	248407		PORCELAIN, 130 PF 2%
A2C17	219668		MICA, 10 PF 5% 500 V DC
A2C18	239051		CERAMIC, 0.1 MF 50 V DC
A2C19	248409		CERAMIC, 1.0 MF 25 V DC
A2C20	248409		CERAMIC, 1.0 MF 25 V DC
A2C21	231027	8959154 114	ELECTROLYTIC, 100 MF 25 V DC
A2C22	267478		CERAMIC, 0.01 MF 1000 V DC
A2C23	231920		ELECTROLYTIC, 200 MF 12 V DC
A2C24	248409		CERAMIC, 1.0 MF 25 V DC
A2C25	23804		FILM, 0.22 MF 10% 80 V DC
A2C26	234802		FILM, 2.0 MF 200 V DC
A2C27	238046		FILM, 0.22 MF 10% 80 V DC
A2C28	300092		ELECTROLYTIC, 50 MF 25 V DC
A2C29	300092		ELECTROLYTIC, 50 MF 25 V DC
A2C30	238046		FILM, 0.22 MF 10% 80 V DC
A2C31	239051		CERAMIC, 0.1 MF 50 V DC
A2CR1 TO A2CR4	248402		DIODE - GERMANIUM, TYPE 1N541
A2CR5	238407		DIODE - ZENER, TYPE 1N825
A2CR6	248403		DIODE - SILICON, TYPE 1N4446
A2CR7	248403		DIODE - SILICON, TYPE 1N4446
A2CR8	248403		DIODE - SILICON, TYPE 1N4446
A2CR9	236201		DIODE - ZENER, TYPE 1N753A
A2FL1	248408		FILTER - LOWPASS
A2Q1	248404		TRANSISTOR - SILCION, TYPE 2N914
A2Q2	248412		TRANSISTOR - SILICON, TYPE 2N914 MATCHED PAIR
A2Q3	248412		TRANSISTOR - SILICON, TYPE 2N914 MATCHED PAIR
A2Q4	248404		TRANSISTOR - SILICON, TYPE 2N914
A2Q5	248404		TRANSISTOR - SILICON, TYPE 2N914
A2Q6	248404		TRANSISTOR - SILICON, TYPE 2N914
A2Q7	241012		TRANSISTOR - SILICON, TYPE 2N4037
A2Q8	248404		TRANSISTOR - SILICON, TYPE 2N914
A2Q9	248404		TRANSISTOR - SILICON, TYPE 2N914
A2Q10	241012		TRANSISTOR - SILICON, TYPE 2N4037
A2Q11	232841		TRANSISTOR - SILICON, TYPE 2N3053
A2Q12	232841		TRANSISTOR - SILICON, TYPE 2N3053
A2Q13	248411		TRANSISTOR - TYPE FET, MATCHED PAIR
A2Q14	248410		TRANSISTOR - SILICON, TYPE 2N2102 MATCHED PAIR
A2Q15	248410		TRANSISTOR - SILICON, TYPE 2N2102 MATCHED PAIR
A2Q16	230214		TRANSISTOR - TYPE 2N2102
A2Q17	248411		TRANSISTOR - SILICON FET, MATCHED PAIR
A2Q18	232841		TRANSISTOR - SILICON, TYPE 2N3053
A2Q19	232841		TRANSISTOR - SILICON, TYPE 2N3053
A2Q20	230214		TRANSISTOR - SILICON, TYPE 2N2102
			RESISTORS - FIXED COMPOSITION, UNLESS NOTED
A2R1	502347		47,000 OHMS 5% 1/2 W
A2R2	502347		47,000 OHMS 5% 1/2 W
A2R3	502312		12,000 OHMS 5% 1/2 W
A2R4	502122		220 OHMS 5% 1/2 W
A2R5	502220		2000 OHMS 5% 1/2 W
A2R6	502310		10,000 OHMS 5% 1/2 W
A2R7	502310		10,000 OHMS 5% 1/2 W
A2R8	502251		5100 OHMS 5% 1/2 W

Symbol	Stock No.	Drawing No.	Description
A2R9	502251		5100 OHMS 5% 1/2 W
A2R10	502310		10,000 OHMS 5% 1/2 W
A2R11	502151		510 OHMS 5% 1/2 W
A2R12	502210		1000 OHMS 5% 1/2 W
A2R13	502239		10,000 OHMS 5% 1/2 W
A2R14	502239		3900 OHMS 5% 1/2 W
A2R15	502212		1200 OHMS 5% 1/2 W
A2R16	502222		2200 OHMS 5% 1/2 W
A2R17	502320		20,000 OHMS 5% 1/2 W
A2R18	502139		390 OHMS 5% 1/2 W
A2R19	502239		39,000 OHMS 5% 1/2 W
A2R20	502039		39 OHMS 5% 1/2 W
A2R21	502222		2200 OHMS 5% 1/2 W
A2R22	502162		620 OHMS 5% 1/2 W
A2R23	502218		1800 OHMS 5% 1/2 W
A2R24	238522		FILM, 2210 OHMS 1% 1/8 W
A2R25	263972		FILM, 1000 OHMS 1% 1/8 W
A2R26	502211		1100 OHMS 5% 1/2 W
A2R27	264844		FILM, 10,000 OHMS 1% 1/8 W
A2R28	238522		FILM, 2210 OHMS 1% 1/8 W
A2R29	263972		FILM, 1000 OHMS 1% 1/8 W
A2R30	248430	8542356 301	WIREWOUND, 1000 OHMS 1% 1/2 W
A2R31	512210		1000 OHMS 10% 1 W
A2R32	263972		FILM, 1000 OHMS 1% 1/8 W
A2R33	502068		68 OHMS 5% 1/2 W
A2R34	502213		1300 OHMS 5% 1/2 W
A2R35	502251		5100 OHMS 5% 1/2 W
			A3 CARD, AMPLIFIER, METERING AND FLASHER
			CAPACITORS
A3C1	227419		ELECTROLYTIC, 100 MF 15 V DC
A3C2	300092		ELECTROLYTIC, 50 MF 25 V DC
A3C3	300092		ELECTROLYTIC, 50 MF 25 V DC
A3C4	227419		ELECTROLYTIC, 100 MF 15 V DC
A3C5	231493		ELECTROLYTIC, 5 MF 25 V DC
A3C6	300092		ELECTROLYTIC, 50 MF 25 V DC
A3C7	238046		FILM, 0.22 MF 10% 80 V DC
A3C8	248409		CERAMIC, 1.0 MF 25 V DC
A3C9	241252		MICA, 250 PF 5% 500 V DC
A3C10	300092		ELECTROLYTIC, 50 MF 25 V DC
A3C11	300184		MICA, 120 PF 5% 500 V DC
A3C12	241252		MICA, 250 PF 5% 500 V DC
A3C13	227419		ELECTROLYTIC, 100 MF 15 V DC
A3C14	227419		ELECTROLYTIC, 100 MF 15 V DC
A3C15	231920		ELECTROLYTIC, 200 MF 12 V DC
A3C16	300092		ELECTROLYTIC, 50 MF 25 V DC
A3C17	231493		ELECTROLYTIC, 5 MF 25 V DC
A3C18	239051		CERAMIC, 0.1 MF 50 V DC
A3C19	300092		ELECTROLYTIC, 50 MF 25 V DC
A3C20	259471		FILM, 0.047 MF 10% 200 V DC
A3C21	231493		ELECTROLYTIC, 5 MF 25 V DC
A3C22	247949		FILM, 0.1 MF 10% 80 V DC
A3C23	300092		ELECTROLYTIC, 50 MF 25 V DC
A3C24	227692		MICA, 360 PF 5% 500 V DC
A3CR1	248403		DIODE - SILICON, TYPE 1N4446
A3CR2	225315		DIODE - ZENER, TYPE 1N965B
A3CR3	248403		DIODE - SILICON, TYPE 1N4446
A3CR4	248403		DIODE - SILICON, TYPE 1N4446
A3CR5	248403		DIODE - SILICON, TYPE 1N4446
A3Q1 TO A3Q4	232841		TRANSISTOR - SILICON, TYPE 2N3053
A3Q5	248417		TRANSISTOR - SILICON FET
A3Q6 TO A3Q15	232841		TRANSISTOR - SILICON, TYPE 2N3053

Symbol	Stock No.	Drawing No.	Description
A3Q16	241012		TRANSISTOR - SILICON, TYPE 2N4037
A3Q17	232841		TRANSISTOR - SILICON, TYPE 2N3053
A3Q18	232841		TRANSISTOR - SILICON, TYPE 2N3053
			RESISTORS - FIXED COMPOSITION, UNLESS NOTED
A3R1	502310		10,000 OHMS 5% 1/2 W
A3R2	502320		20,000 OHMS 5% 1/2 W
A3R3	502151		510 OHMS 5% 1/2 W
A3R4	502136		360 OHMS 5% 1/2 W
A3R5	236910		VARIABLE, WIREWOUND, 300 OHMS
A3R6	502410		100,000 OHMS 5% 1/2 W
A3R7	502410		100,000 OHMS 5% 1/2 W
A3R8	502410		100,000 OHMS 5% 1/2 W
A3R9	502247		4700 OHMS 5% 1/2 W
A3R10	502347		47,000 OHMS 5% 1/2 W
A3R11	502233		3300 OHMS 5% 1/2 W
A3R12	502124		240 OHMS 5% 1/2 W
A3R13	502215		1500 OHMS 5% 1/2 W
A3R14	502247		4700 OHMS 5% 1/2 W
A3R15	237943		VARIABLE, WIREWOUND, 3000 OHMS
A3R16	502324		24,000 OHMS 5% 1/2 W
A3R17	502233		3300 OHMS 5% 1/2 W
A3R18	502133		330 OHMS 5% 1/2 W
A3R19	502210		1000 OHMS 5% 1/2 W
A3R20	502582		8.2 M OHMS 5% 1/2 W
A3R21	502310		10,000 OHMS 5% 1/2 W
A3R22	502215		1500 OHMS 5% 1/2 W
A3R23	502262		6200 OHMS 5% 1/2 W
A3R24	263972		FILM, 1000 OHMS 1% 1/8 W
A3R25	263972		FILM, 1000 OHMS 1% 1/8 W
A3R26	502151		510 OHMS 5% 1/2 W
A3R27	502151		510 OHMS 5% 1/2 W
A3R28	502222		2200 OHMS 5% 1/2 W
A3R29	502382		82,000 OHMS OHMS 5% 1/2 W
A3R30	502310		10,000 OHMS 5% 1/2 W
A3R31	502222		2200 OHMS 5% 1/2 W
A3R32	502222		2200 OHMS 5% 1/2 W
A3R33	502222		2200 OHMS 5% 1/2 W
A3R34	502210		1000 OHMS 5% 1/2 W
A3R35	502275		7500 OHMS 5% 1/2 W
A3R36	502315		15,000 OHMS 5% 1/2 W
A3R37	502210		1000 OHMS 5% 1/2 W
A3R38	502156		560 OHMS 5% 1/2 W
A3R39	248435	990478 339	FILM, 2490 OHMS 1% 1/8 W
A3R40	502227		2700 OHMS 5% 1/2 W
A3R41	502227		2700 OHMS 5% 1/2 W
A3R42	502139		390 OHMS 5% 1/2 W
A3R43	263972		FILM, 1000 OHMS 1% 1/8 W
A3R44	263972		FILM, 1000 OHMS 1% 1/8 W
A3R45	502051		51 OHMS 5% 1/2 W
A3R46	245280		FILM, 499 OHMS 1% 1/8 W
A3R47	238522		FILM, 2210 OHMS OHMS 1% 1/8 W
A3R48	502318		18,000 OHMS 5% 1/2 W
A3R49	237943		VARIABLE, WIREWOUND, 3000 OHMS
A3R50	502243		4300 OHMS 5% 1/2 W
A3R51	502162		620 OHMS 5% 1/2 W
A3R52	502310		10,000 OHMS 5% 1/2 W
A3R53	502247		4,7 OHMS 5% 1/2 W
A3R54	502247		4,7 OHMS 5% 1/2 W
A3R55	502182		820 OHMS 5% 1/2 W
A3R56	502110		100 OHMS 5% 1/2 W
A3R57	502216		1600 OHMS 5% 1/2 W
A3R58	502230		3000 OHMS 5% 1/2 W
A3R59	502327		27,000 OHMS 5% 1/2 W
A3R60	502215		1500 OHMS 5% 1/2 W
A3R61	502110		100 OHMS 5% 1/2 W
A3R62	502247		4700 OHMS 5% 1/2 W
A3R63	502347		47,000 OHMS 5% 1/2 W
A3R64	502224		2400 OHMS 5% 1/2 W

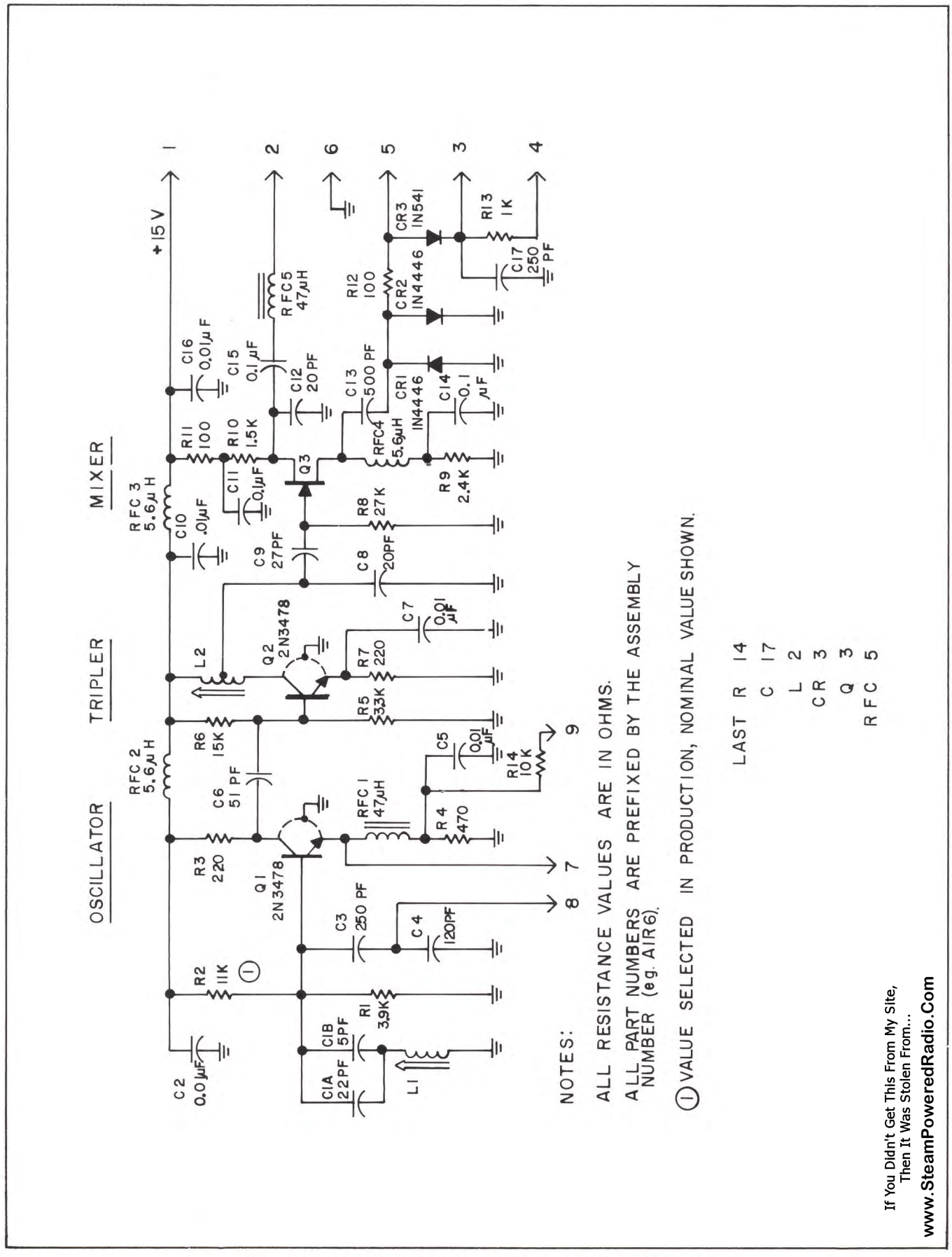
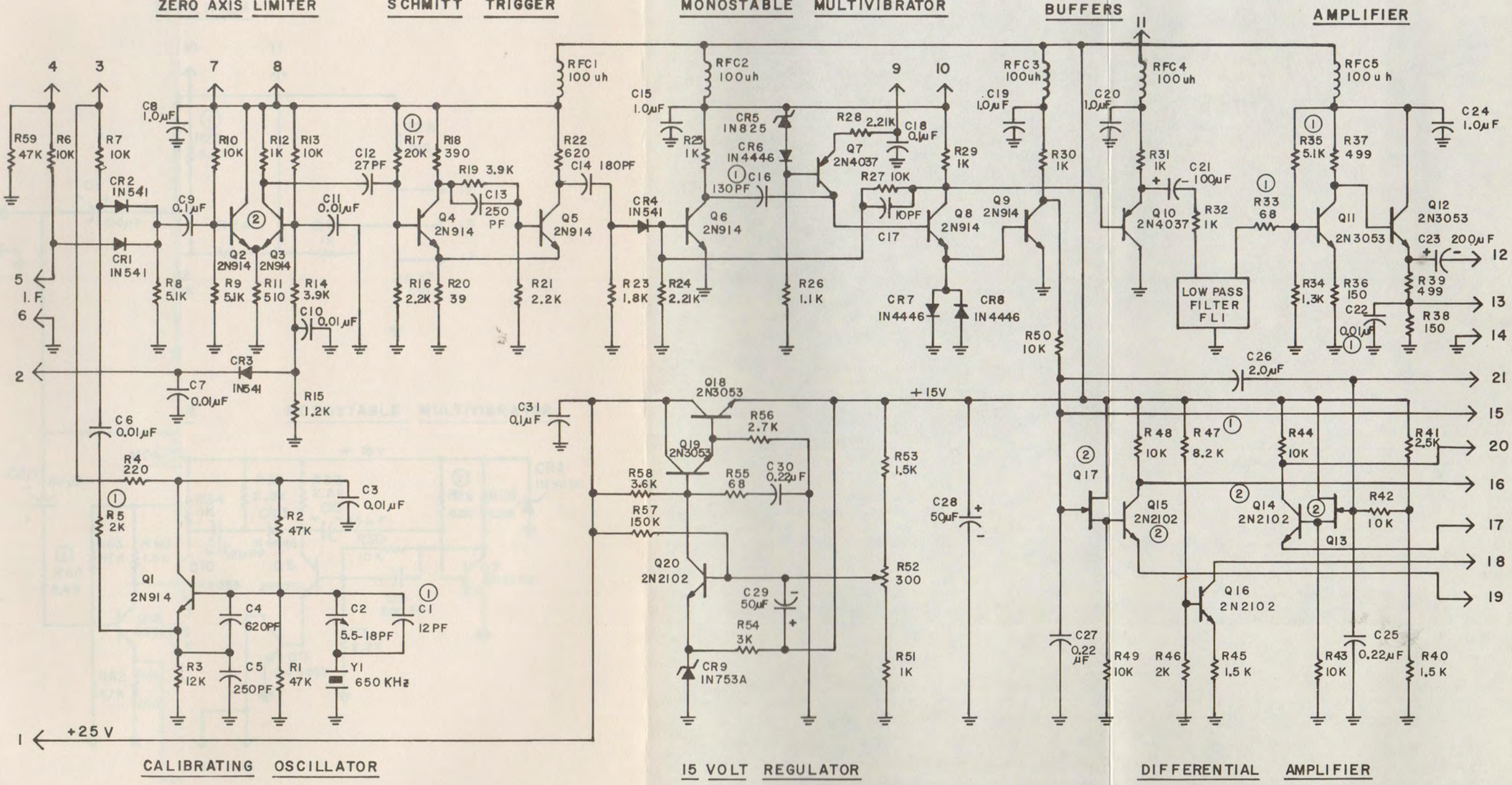


Figure 7-1. Oscillator, Tripler and Mixer Card A1, Schematic



NOTES:

ALL RESISTANCE VALUES ARE IN OHMS.

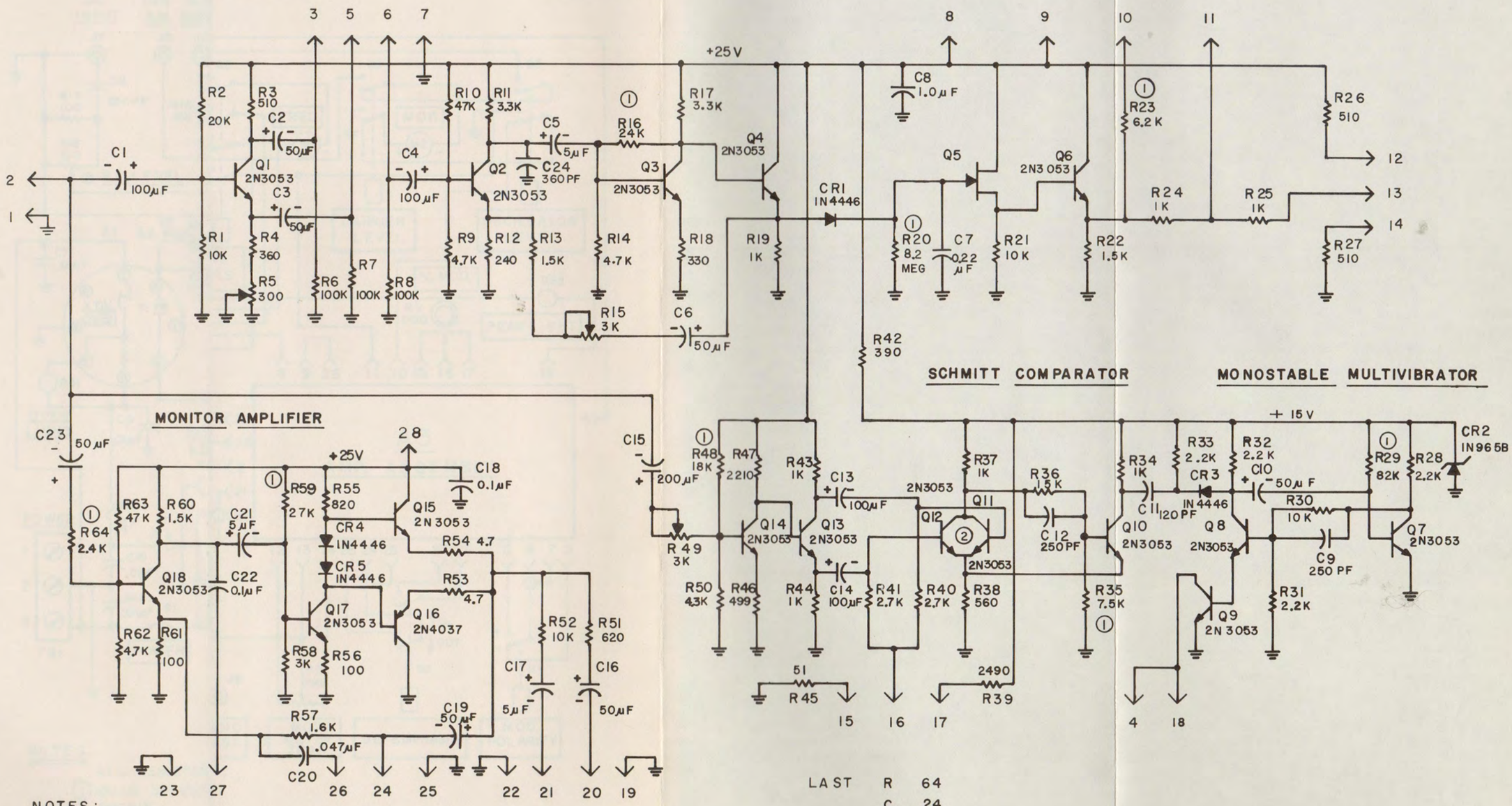
(1) VALUE SELECTED IN PRODUCTION, NOMINAL VALUE SHOWN.

(2) MATCHED PAIR.

ALL PART NUMBERS ARE PREFIXED BY THE ASSEMBLY NUMBER (eg. A2R34).

LAST R 59
C 31
RFC 5
CR 9
Q 20
FL 1
Y 1

Figure 7-2. Oscillator, Counter and Amplifier Card A2 Schematic



NOTES:

ALL RESISTANCE VALUES ARE IN OHMS.

① VALUE SELECTED IN PRODUCTION, NOMINAL VALUE SHOWN.

② MATCHED PAIR.
ALL PART NUMBERS ARE PREFIXED BY THE ASSEMBLY NUMBER (eg. A3C12)

Figure 7-3. Amplifier, Metering and Flasher Card A3, Schematic

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