



**A-2 MANUAL**

**F. G. MASON ENGINEERING, INC.**

**GRAYSTONE LANE WESTON, CONNECTICUT**



SCRAP OUT  
MAIN REAR  
Panel

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INSTRUCTION MANUAL

FOR

MODEL A-2 RECEIVER AND VISUAL MONITOR

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F.G. MASON ENGINEERING INC.  
WESTON, CONNECTICUT



GUARANTEE-- MODEL A-2 RECEIVER SYSTEM

The guarantee on this equipment covers a period of 90 days counted from the shipping date shown on the shipping notice and below. This guarantee does not apply in case of obviously abusive handling in shipment or in use of the equipment.

SERIAL NO. 18

GUARANTEE STARTS Feb 22 1964

GUARANTEE ENDS May 22 1964

AUTHORIZED SIGNATURE

Francis G. Mason

A-2

T-5

T-18

T-25

T-340

T-900

S-1

AC-1

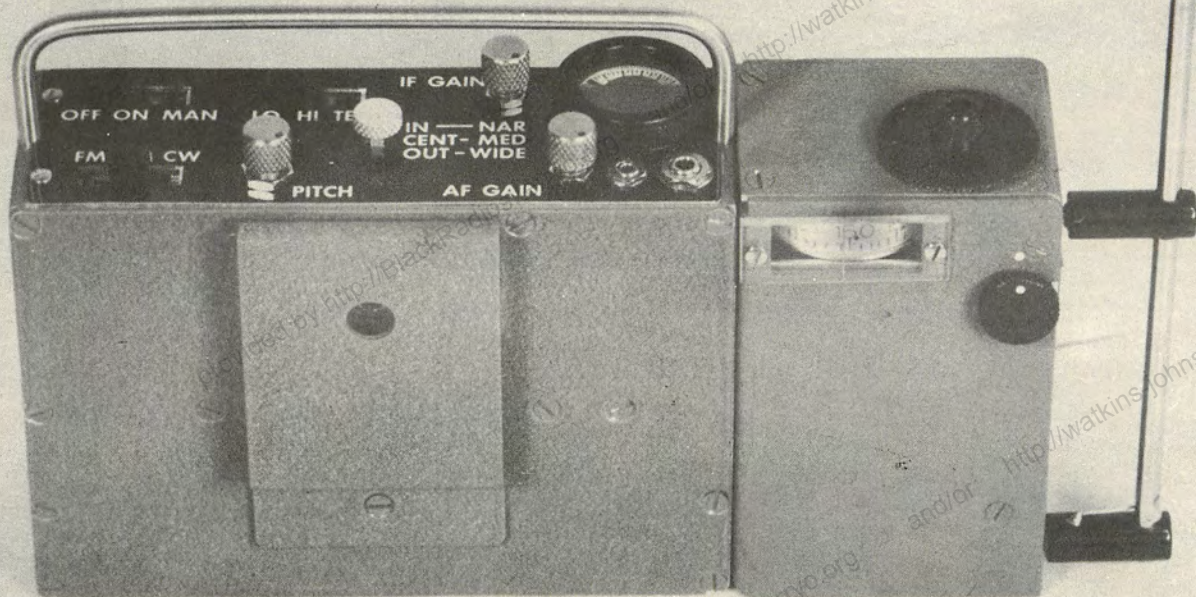
PS-2

BP-2

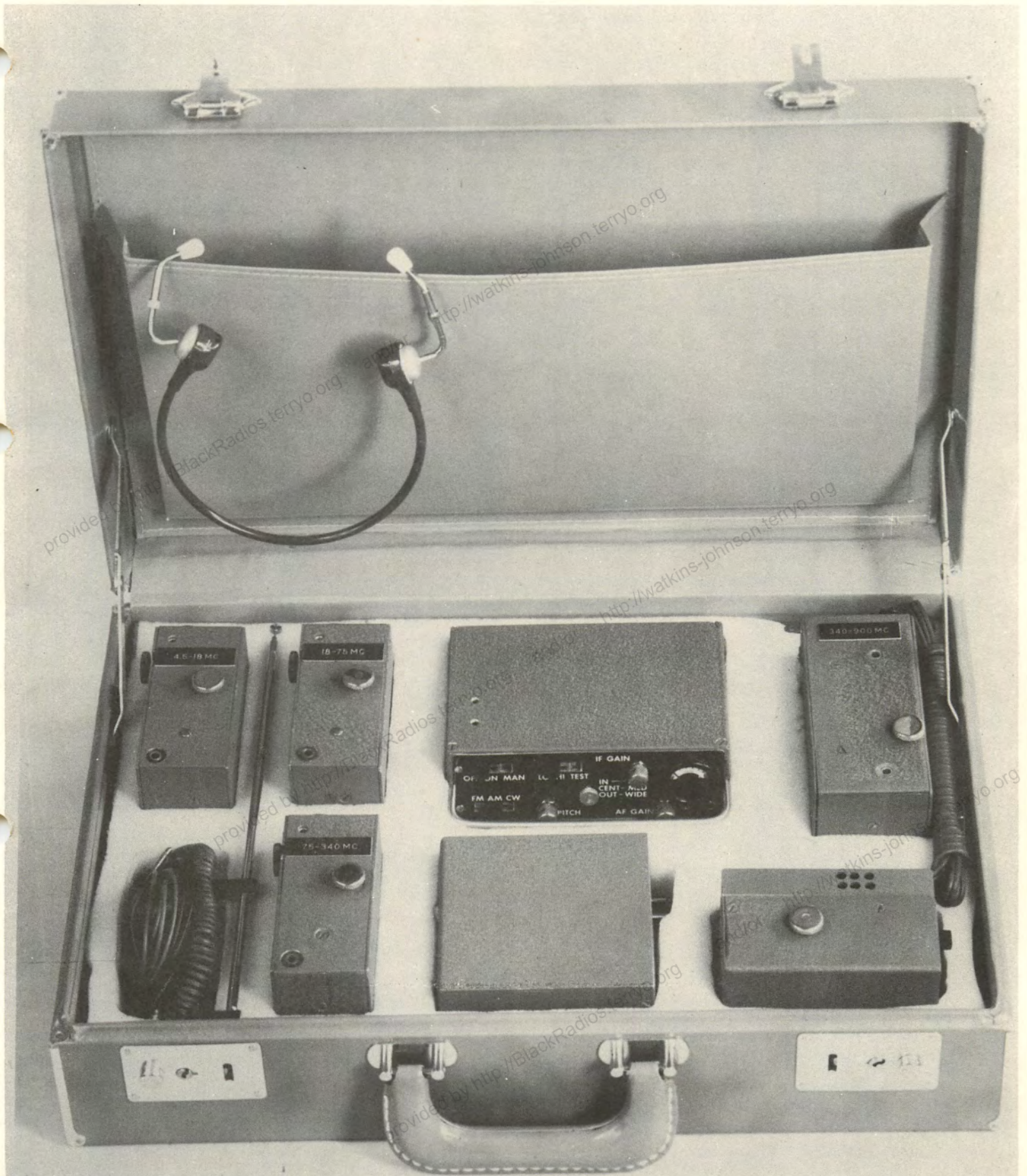


A-2 BASIC RECEIVER WITH ONE TUNER ATTACHED

F. G. MASON ENGINEERING INC.  
Weston, Connecticut







A-2 RECEIVER COMPONENTS IN CASE

F. G. MASON ENGINEERING INC.  
Weston, Connecticut



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## SECTION I GENERAL DESCRIPTION

### 1.1 PURPOSE OF EQUIPMENT

The Mason Engineering A-2 Receiver System was designed primarily to answer the need for a truly portable, wide range, communications receiver. Because it consists of a basic unit with small-plug in tuning modules, many special types of tuning heads can be designed, such as wide range tuning, crystal-controlled fixed-frequency, or crystal-controlled discrete channels. Also any type of power supply--battery, AC/DC converter, or DC/DC inverter, can be used and can be easily changed in the field. Its light weight and small size make it ideal for use in remote areas, aircraft, vehicles, and ships. Many special features were incorporated without increasing the size or weight to unreasonable proportions. The unit was engineered with versatility being one of the prime objects thus allowing many users to benefit.

The MODEL S-1 attachment to the A-2 Receiver provides a swept visual display of the signals received, in a small battery operated package.



## 1.2 GENERAL DESCRIPTION

### 1.2.1 MAJOR COMPONENTS

The A-2 receiver system that is currently available is composed of the following components:

- 1) A-2 BASIC RECEIVER ( contains 35 hrs. battery)
- 2) T-5 TUNER COVERING 100 KC. to 4.5 MC. ( Plugs into A-2)
- 3) T-18 TUNER COVERING 4.5 MC. to 18 MC. ( Plugs into A-2)
- 4) T-75 TUNER COVERING 18 MC. to 75 MC. ( Plugs into A-2)
- 5) T-340 TUNER COVERING 75 MC. to 340 MC. ( Plugs into A-2)
- 6) T-900 TUNER COVERING 340 MC. to 900 MC. ( Plugs into A-2)
- 7) BP-1 120 HOUR EXTERNAL BATTERY PACK ( Plugs into A-2)  
( required for extra running time only)  
(60 hours when S-1 is used)
- 8) PS-1 AC POWER SUPPLY 100 to 250 VOLTS 50/60  
CYCLES INPUT, -18 VOLTS OUTPUT REGULATED  
( required for AC operation only) ( plugs into A-2)
- 9) AC-1 ACCESSORIES: Headset, 3 whip antennas,  
remote tuner cable, carrying  
case, manual, screwdriver, 1 power-  
line antenna.
- 10) S-1 VISUAL MONITOR ( Provides scanned signal display)



1.2.2 MODES OF OPERATION

The A-2 receiver system can be operated using its internal batteries for power. Thirty-five (35) hours of operation will be obtained before battery replacement will be necessary.

An external battery pack (BP-1) is supplied and can be attached to the basic receiver, providing a total of 120 hours of operation. ( 60 hours when S-1 is used )

If AC operation is desired the AC power supply is attached to the basic unit. The AC range of 100 to 250 volts 50/60 cycles can be used.

For maximum ease of portable operation, the A-2 basic receiver can be fastened to the belt by threading the belt through the loop supplied on the front surface of the unit. The tuner is then hand held while tuning. A cable is supplied to connect the tuner to the basic unit. The belt loop can be removed by removing two mounting screws, and replacing the screws.

S-1 Monitor may be either mounted on back of A-2 with thumbscrews or operated as a separate unit alongside receiver with joining cables.



### 1.3 SPECIFICATIONS A-2 BASIC RECEIVER UNIT

Size - 5 5/8" by 4" by 1 13/16".

Weight - Less than 3 lbs.

Battery - Supplies 35 hrs. continuous operation.  
Batteries easily replaced.

IF Frequency- 23.5 mc.  
15 Hrs. with S-1 in operation.

Output - 1000 ohms audio. 30 milliwatts.

- Jacks -
- 1) Audio output.
  - 2) Tuner input. For direct tuner plug-in or remote.
  - 3) External power pack either AC or battery.
  - 4) Second detector output.
  - 5) Minus 18 volt output

- Controls -
- 1) FM-AM-CW Output Function Switch
    - FM - FM operation
    - AM - AM operation
    - CW - CW operation
  - 2) OFF-ON-MANUAL Operation Switch
    - OFF - All power off
    - ON - Power on, AGC on
    - MANUAL - AGC off, manual IF gain control operable
  - 3) LO-HI-TEST Meter Switch
    - LO - Low signal operation
    - HI - High signal operation
    - TEST - Power source test
  - 4) NAR-MED-WIDE IF Bandwidth Switch
    - NAR - 12kc bandwidth (crystal filter)
    - MED - 90kc bandwidth (crystal filter)
    - WIDE - 350kc bandwidth
  - 5) AF GAIN Audio Gain Control. Varies audio gain.
  - 6) IF GAIN IF Gain Control. Varies IF gain. Operates only with Operation Switch in MANUAL position.
  - 7) PITCH BFO Pitch Control. Varies pitch of CW signal.

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## 1.4 SPECIFICATIONS T-18,T-75,T-340 Tuners

Size - Each Tuner 4" by 1-13/16" by 2-3/8".

Weight - .75 lbs.

Dial -25 inch calibrated dial

Tuning motion -33 turns of tuning knob covers each band.

Band Spread -Electrical band spread employed.

Frequency range

-T-18	45 to 18 mc.
T-75	18 to 75 mc.
T-340	75 to 340 mc.

Sensitivity -Less than 3 microvolts for 10DB S+N/N

Antenna -Plugs into Tuner

Tuner mounting -Tuner plugs into A-2 unit and is fastened with thumb screw, or is hand held with cable joining A-2 to tuner.

-----  
1.5 SPECIFICATIONS T-900 TUNER

Size -5" by 2-1/4" by 2-1/2".

Weight -Less than 1 lb.

Dial -25" calibrated dial.

Frequency range -340 to 900 mc.

Sensitivity -Less than 3 microvolts for 10DB S+N/N.

Mounting -Thumb screws to A-2 unit or can be remotely operated. Antenna plugs into Tuner.

Tuning Motion -12 turns covers band.

Band Spread -Electrical Bandspread employed.



## 1.5.1 SPECIFICATIONS T-5 TUNER

Size 4 inches by 1 13/16 inches by 2 3/8 inches

Weight .75 pounds

Dial 25 inch calibrated dial

Tuning motion 33 turns of tuning knob covers the band

Frequency range 50 KC. to 4.5 MC.

Bandspread Electrical bandspread employed- 28 KC.

Sensitivity Less than 3 microvolts for 10 DB S+N/N

Image rejection 60 DB

Antenna Adaptor plugs into tuner for using power lines as antenna. Spool of wire is also supplied and can be used as long wire antenna when possible.

Tuner mounting Plugs into A-2 unit and is fastened with thumb screws, or is hand held with cable joining to A-2 tuner.

Selectivity 4 KC.

Operation Use with basic A-2 in narrow band width position only.

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1.5.2 SPECIFICATIONS T-1100 TUNER

Size 5" by 2 1/4" by 2 1/2"

Weight less than 1 pound

Dial 10" calibrated dial

Frequency range 700 - 1200 mc

Sensitivity 3 microvolts or less 800-1100 mc  
5 microvolts or less 700-800 and 1100-1200 mc

Mounting Thumb screws to A-2 Unit or can be remotely operated. Antenna plugs into tuner.

Tuning motion 6 1/2 turns covers band.

Band spread 500 kc

Sweep range 12 mc min. (S-1 monitor required)



## 1.6 BP-1 BATTERY PACK SPECIFICATION

Size -4½" by 4½" by 1-13/16".

Weight -2 lbs.

Mounting -Plugs into A-2 unit on left side and locks on with thumbscrew.

Batteries -Takes 14 of any of the following cells or equivalents:

Burgess Hg-12	Mercury
Burgess Hg-12R	Mercury
Burgess Hg-9	Mercury
Eveready N46	Nickel-Cadmium
Eveready E 91	Alkaline
Eveready 915	Carbon

Battery life -120 Hours continuous with Hg-12 cells when using A-2 receiver, 60 hours when using both A-2 and S-1.

Connection -Connection is made through mounting plug which disables A-2 internal battery.

Battery Replacement - Batteries are replaced by removing two covers and placing cells in clip type holders.

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## 1.7 PS-1 AC SUPPLY SPECIFICATION

Size -4" by 3-1/8" by 1-13/16"

Weight -1.2 lbs.

Mounting -Plugs into A-2 on left side and locks on with thumbscrew. Plug connects power to A-2 and disables A-2 internal battery.

AC Input -90 to 250 volts, 50/60 cycles, with three position switch.

Position #1	95 to 128 volts
Position #2	128 to 170 volts
Position #3	170 to 250 volts

DC Output-Minus-18 volts, 60 ma. provides power for A-2 receiver alone or with S-1 Monitor.

Operation -Both PS-1 switch and A-2 switch must be on to operate receiver. Lamp indicates PS-1 on.

Regulation -90 to 250 volts, 50/60 cycle input, output regulated 100% from 0 to 60 ma. at minus 18 volts DC.



## 1.8 S-1 MONITOR SPECIFICATIONS

- Size -10" by 2" by 5 $\frac{1}{4}$ ".
- Weight -Less than 5 lbs.
- Viewing Area -2  $\frac{3}{4}$ " by 1 $\frac{1}{4}$ ".
- Sweep Width -Not less than 2.5% of center frequency.
- Resolution -12 kc at frequencies of 4.5 mc to 900 mc.  
2 kc at frequencies of 50 kc to 4.5 mc.
- Sensitivity -Three microvolts.
- Sweep Rate -20 cycles and 75 cycles.
- Auxiliary Outputs -Sweep output jack and signal output jack so that an auxiliary scope can be used. Three cables with miniature output plugs for connecting to A-2 receiver.
- Power Requirements -Power is supplied by A-2 power source except for self-contained filament battery. Filament battery life - 50 hours. A-2 internal battery life when operating both S-2 and A-2 - 12 hours. Battery pack life when operating both S-1 and A-2 - 60 hours.
- AC Power Supply -AC operating range 90 to 250 volts using three position switch. Maximum input - 20 watts. S-1 power consumption - less than one watt.
- Operating Controls
- INTENSITY -Controls intensity of display.
- SWP. WIDTH -Controls portion of spectrum scanned by tuner.
- SWP. GAIN -Controls height of display.
- SIG. GAIN -Controls amplitude of signal seen on display.
- POWER switch -Applies and disables power.
- SWEEP switch -OFF - Sweep disabled allowing operator to listen without hearing sweep. (modulation display only)
- ON - Sweep operating allowing operator to hear and observe signal.
- FILT. - Video filter operative allowing operator to view signal with less noise.



SWP. RATE -Controls frequency of display sweep.

#### Auxiliary Controls

SIG. Centering -Positions display in direction of displayed signal.

SWP. Centering -Positions display in direction of sweep.

FOC. -Focuses display beam.

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## SECTION II OPERATION OF RECEIVER

## 2.1 ASSEMBLY OF COMPONENTS TO BASIC UNIT

Any one of the five tuners is assembled to the basic unit by plugging it into the right hand end of the basic unit and tightening the thumbscrew. See Fig. 1. Make certain that the tuner is flush against the mounting surface and that the alignment screw is seated in the hole before tightening the thumbscrew.

The external battery pack or AC power supply can be mounted by plugging into the left hand end of the basic unit and tightening the thumbscrew. See Fig. 1. Make certain that the chassis is flush against the mounting surface and that the alignment screw is in the hole before tightening the thumbscrew.

The whip antenna is plugged into the right hand end of the tuner. See Fig. 1. Long wire antenna or power line antenna is used with the T-5 tuner. Antenna #1 is used with the T-18 for 4.5 mc. to 10 mc. operation. Antenna #2 is used with the T-18 for 10 mc. to 18 mc. operation. Antenna #3 is used from 18 mc. to 900 mc. It should be noted that the loaded coil antennas, #1 and #2, are a compromise with portability and that  $\frac{1}{4}$  or  $\frac{1}{2}$  wave wire antennas (such as the long wire provided for the power line antenna) would be more effective. The power line antenna should be polarized for maximum signal. Any of the tuners can be operated remotely from the basic unit by employing the extension cable. When operating remotely, the thumbscrew must be removed from the tuner to prevent the screw from causing electrical noise.



## 2.2 OPERATION OF A-2 RECEIVER

To operate the receiver follow the steps listed below and refer to Fig. 1.

- 1). Assemble the tuner with appropriate antenna, battery pack, or power supply - whichever units are to be used. Assembly instructions are given in paragraph 2.1.
- 2). Place OFF-ON-MAN switch in ON position. (If AC supply is being used place both power supply switch and ON-OFF-MAN switch in ON position) See Step 19.
- 3). Place LO-HI-TEST switch in TEST position. Meter should indicate between 75 and 90. This procedure tests the condition of batteries or AC supply output. If the meter does not indicate the correct voltage, batteries should be replaced.
- 4). Place HI-LO-TEST switch in LO position. Do not leave on TEST.
- 5). Plug headphones in jack on extreme right of basic unit.
- 6). Rotate AF GAIN knob until noise is heard.
- 7). Tune in signal by rotating tuning knob on top of tuner. Tune for maximum deflection of S meter.
- 8). Place LO-HI-TEST switch in either LO or HI, whichever gives convenient meter deflection (LO-low signal level; HI-high signal level)
- 9). If signal is frequency modulated place FM-AM-CW switch in FM position.
- 10). If signal is amplitude modulated place FM-AM-CW switch in AM position.
- 11). If signal is unmodulated place FM-AM-CW switch



in CW position and rotate PITCH knob until desired tone is heard.

- 12). Select bandwidth by placing NAR-MED-WIDE switch in desired position (NAR - 12kc.; MED - 100kc.; WIDE - 350kc.)
- 13). If manual operation of IF gain is desired place OFF-ON-MAN switch in MAN position.
- 14). The IF GAIN control is now operative and can be adjusted for desired gain.
- 15). For ease of tuning signal use bandsread control located on front surface of tuner (top surface on T-900 tuner)
- 16). Second detector AC and DC outputs are available at the IF test point jack directly under the meter. Use high impedance load only.
- 17). The spurious CW signal at 23.5mc. will beat with any incoming signal at 23.5mc. By detuning slightly at this point, the incoming signal can be received.
- 18). The T-5 tuner must be operated in the NARROW bandwidth position of the A-2 unit below 2 mc.
- 19). If AC power supply is used and line voltage is not known, place line voltage switch located on top of power supply to the "200-250" position. Set A-2 meter switch to "TEST". Turn power supply on and A-2 receiver on. If meter reads 75 or more, do not readjust line voltage switch. If meter reads less than 75, set voltage switch to next lower voltage position until meter reaches 75. Voltage switch is then in proper position. Always start at highest voltage position when line voltage is unknown, or line fuses will burn out.



## 2.3 OPERATION OF S-1 VISUAL MONITOR

- 1). The S-1 visual monitor is required only if scanned visual display of r.f. signals is desired.
- 2). For portable operation, mount S-1 on rear of A-2. Orient viewing screen so that it is on same end as tuner. Tighten the two thumbscrews.
- 3). If portable operation is not important the S-1 can be operated on a table or desk in any position. The connecting cables supplied are long enough to allow this method of operation.
- 4). Insert red miniature plug into miniature jack on surface of tuner near antenna. Insert miniature black plug into miniature jack near "S" meter on A-2 chassis. Insert miniature aluminum plug into miniature jack next to IF GAIN knob on A-2 Chassis.
- 5). Operate receiver as described in section 2.1 and 2.2. Apply S-1 power by placing power switch in ON position. (A-2 receiver power switch must be in ON position when operating S-1 monitor)
- 6). Always adjust INTENSITY control for minimum brightness required for comfortable viewing. (using minimum brightness will conserve battery life considerably)
- 7). Adjust SWP. GAIN control until display fills viewing area.
- 8). Adjust SWP. CENTERING and SIG. CENTERING until display is centered in viewing area.
- 9). Adjust FO. for clearest display.
- 10). Place SWEEP Switch in ON position.



11). Adjust SWP. WIDTH to maximum clockwise position.

In this position the largest portion of the spectrum will be viewed. In the crowded signal areas of the frequency spectrum, more detail can be observed with less sweep width. This is accomplished by adjusting the SWP WIDTH control counterclockwise. Maximum sweep width is useful for signal seeking in areas of the spectrum that are not crowded with signals. After acquiring some experience in operating the S-1 monitor the operator can quickly determine the sweep width that is optimum. When the SWP WIDTH control is in the maximum counterclockwise position the sweep width will be zero. The system will now accept only the one frequency to which it is tuned. The modulation of the signal can be viewed on the S-1 as well as heard.

12). Place A-2 band width switch in NAR position for frequencies of 50 kc to 50 mc, MED position for 50 mc to 500 mc and WIDE position for 500 mc up. Other settings than these are useful for special conditions and will become apparent after some skill is acquired.

13). Place A-2 FM AM CW switch in AM position for AM signals and FM position for FM signals. (Am setting appears as the IF band pass curve on one side of base line. FM setting appears as FM "S" curve on both sides of line) See Figure 10.

14). Place SWP. RATE switch in SLOW (AUDIO) position. In this position a bright indicating spot will appear in the center of the screen. When it is desired to listen to the modulation of a particular signal, center that



signal on the spot by tuning the tuner. The modulation of the signal will be heard. Some sweep rate noise will also be heard. If the signal must be heard clearly with no sweep noise, place SWEEPswitch in OFF position. When viewing intermittent pulse modulation it may be advantageous to use a faster rate of sweep to reduce the possibility of missing the signal. The faster sweep rate can be obtained by placing the SWP RATE switch in the FAST position. When using the fast sweep rate it will be difficult to listen to the modulation. When listening, place desired signal in center of screen over bright spot and place SWP RATE switch in OFF position.

15). The FILT position of the SWEEP switch provides background noise filtering of the signal and is useful in wide and medium band width positions of the A-2 receiver. Though this filter is useful in defining very low level signals against background noise, caution must be used as some signal detail is lost.

16). If a larger viewing area is desired an external oscilloscope can be used. Connecting cables should be used to connect the jack marked EXT. SCOPE SWP. to horizontal input of oscilloscope. Internal sweep of oscilloscope should be disabled. Connecting cable should be used to connect EXT. SCOPE SIG. to vertical input of oscilloscope. The oscilloscope can then be used for viewing the display in the same manner as when using the S-1 monitor.



## SECTION III MAINTENANCE

## 3.1 BATTERY REPLACEMENT - BASIC UNIT

- 1). Place OFF-ON-MAN switch in OFF position.
- 2). Remove four screws in rear panel of basic unit and remove panel.
- 3). Remove the two 9.8 volt batteries from holders. The inner battery is provided with a loop for ease of removal.
- 4). Install fresh batteries in holders, replacing loop. Observe polarity.  
Burgess H137R, Eveready E137, or Mallory TR-137R may be used. *#3,61 ea.*
- 5). Replace cover with screws.

## 3.2 BATTERY REPLACEMENT - BATTERY PACK

- 1). Remove eight screws from front and back covers.
- 2). Remove covers.
- 3). Remove batteries from holder.
- 4). Install new batteries. Observe polarity. Any of the following batteries may be used:

Burgess Hg-12	Mercury	1.4V
Burgess Hg-12R	Mercury	1.35V
Burgess Hg-9	Mercury	
Eveready N46	Nickel-Cadmium	
Eveready E91	Alkaline	
Eveready 915	Carbon	

- 5). Replace covers.

## 3.3 REPLACEMENT OF DIODES -BASIC UNIT.

- 1). Remove 13 screws in front cover and remove cover.



- 2). Replace defective diode, observe polarity. FM diodes are located in upper left corner. AM diode (which is also the meter diode) is located in lower left center.
- 3). Replace cover.

#### 3.4 REPLACEMENT OF TRANSISTORS - BASIC UNIT

- 1). Remove four screws in rear cover and remove cover.
- 2). Replace transistor. Use illustration located on inside of cover as a guide. NOTE: Small alignment tab on transistor must be in proper position.

#### 3.5 REPLACEMENT OF FUSES - AC SUPPLY

- 1). Push fuses out of AC plug from line cord side with pencil or pointed tool.
- 2). To replace, insert fuses in holes next to plug prongs until recessed.

#### 3.6 COMPONENTS

It is highly recommended that any defective component that is not corrected by the above replacements, be sent directly to F.G. Mason Engineering, Inc. for repair and alignment.

#### 3.7 BATTERY REPLACEMENT OF S-1 MONITOR

- 1). Remove two screws in battery cover. Battery cover is located on top of unit near INTENSITY and SWP. GAIN controls.
- 2). Remove the two batteries from holders and replace with new ones observing polarity. The same batteries as listed under BATTERY REPLACEMENT - BATTERY PACK can be used.
- 3). Replace battery cover.



## SECTION IV THEORY

## 4.1 GENERAL THEORY OF OPERATION -Refer to Fig.8

The modulated carrier received at the antenna is coupled through a tuned RF filter section and is applied to a transistor mixer (in the T-340 and T-900 a diode is used). The local oscillator produces a signal tracked at 23.5 mc. above the incoming RF signal which is also applied to the mixer. The resultant 23.5 mc. IF signal is coupled out of the tuner to the first IF stage in the basic unit.

The signal is amplified in three transformer-coupled IF stages and is applied to a switching circuit which selects either a narrow (12KC) band crystal filter, a medium (90KC) band crystal filter, or for wide bandwidth operation, no crystal filter. In wideband operation the bandwidth would equal the selectivity of the IF strip (about 350KC). The signal is amplified through two additional IF stages and coupled simultaneously to the FM discriminator and the AM-CW detector. A switching circuit then selects the output of either the discriminator, for FM operation, or the diode detector, for AM and CW operation, for application to the audio amplifier. The signal meter, obtaining its current through the detector, indicates relative signal strength in any case. In CW operation, power is applied to the beat-frequency oscillator, whose output is loosely coupled back to the first IF stage.



The detected IF signal is fed through two stages of audio amplification and is transformer coupled out to the phones.

Operating power for the receiver is provided either from batteries within the Basic Unit, the BP-1 Battery Pack, or from the PS-1 AC supply. A switching circuit in the power jack disconnects the internal batteries if either of the external power sources are being used. The S meter, with the meter switch in TEST position, measures the output under load of the power source employed.

#### 4.2 S-1 MONITOR THEORY OF OPERATION

Refer to Figure 11. The S-1 monitor receives demodulated signals from the A-2 receiver and converts them so that they are adapted for display on a cathode ray tube. As shown in Figure 11, the S-1 monitor consists of four basic units - sweep generator, signal amplifier, high voltage supply, and display tube.

The sweep generator provides a sweep voltage which is applied to the deflection plates of the cathode ray tube. A portion of the sweep voltage is supplied to the tuner for sweeping the oscillator. The sweep voltage is shaped so as to give a bright spot in the center of the display. The bright spot indicates the point in the band to which the tuner is tuned. The signal amplifier increases the amplitude of the signal from the A-2 receiver to a level sufficient to drive the cathode ray tube.

The high voltage supply supplies the anode voltage for the



cathode ray tube.

The low voltage supply supplies minus 18 volts dc to the transistor circuitry. This is not located in the S-1 monitor but is the same power source used to power the A-2 receiver.

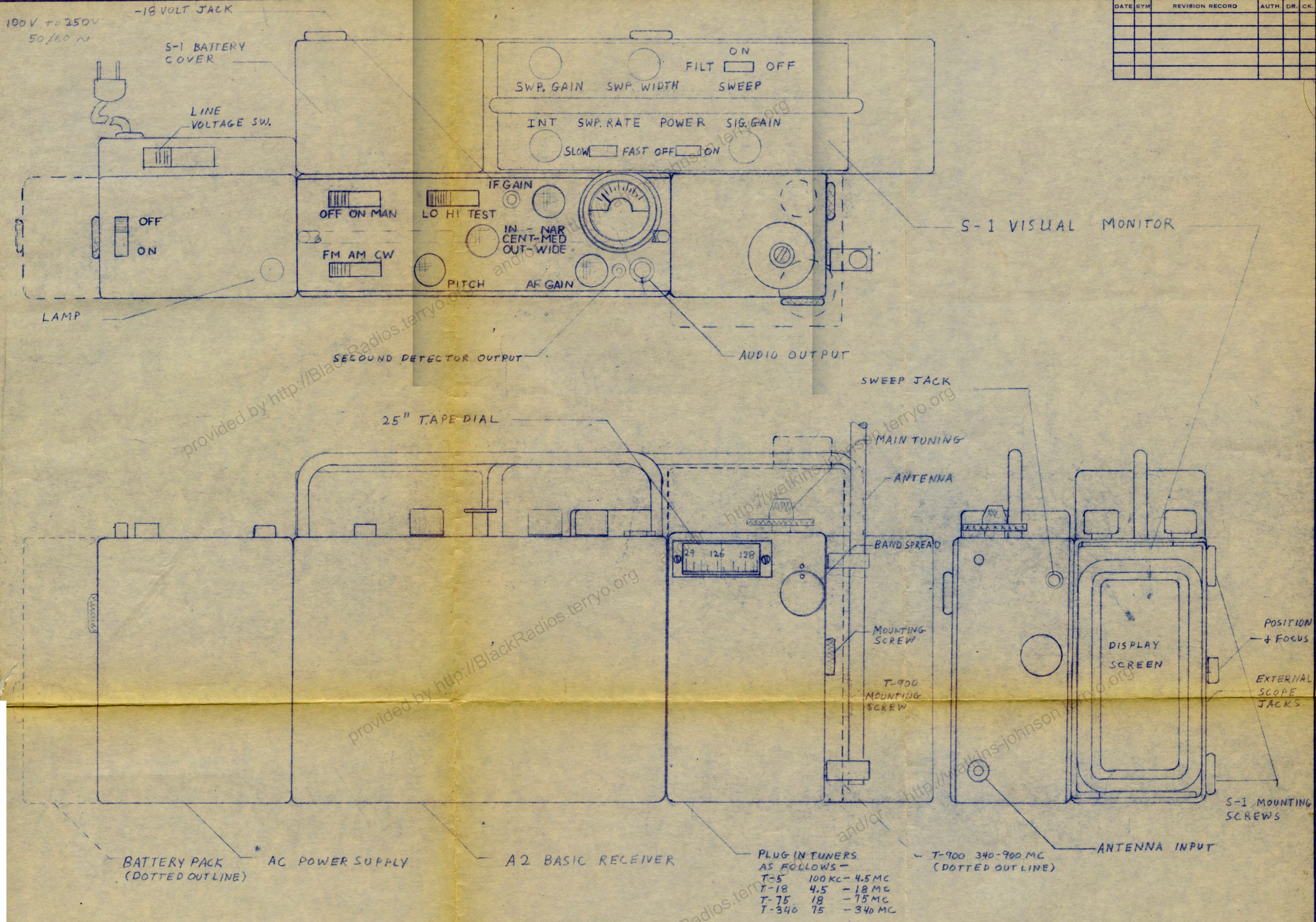
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ACTUAL SIZE  
FIG 1

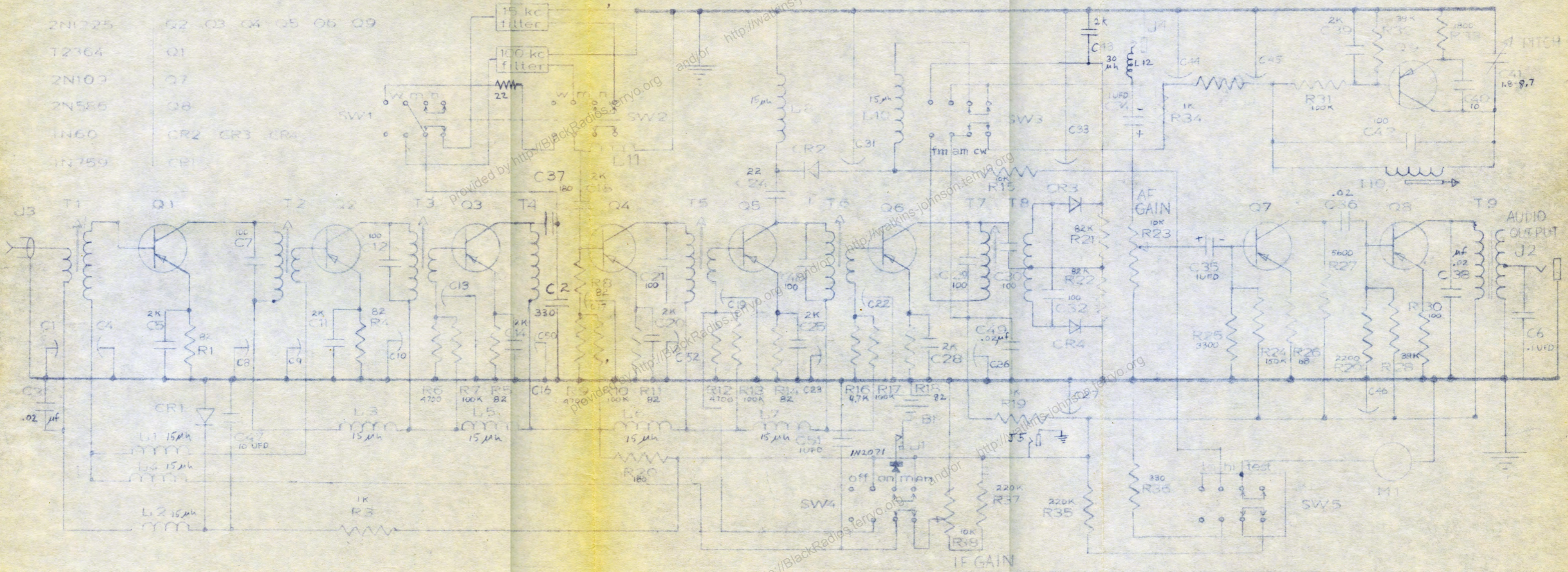
TOLERANCES (EXCEPT AS NOTED)	F. G. MASON ENGINEERING, INC. GREY STONE LANE WESTON, CONNECTICUT	
DECIMAL	SCALE	DRAWN BY
±		APPROVED BY
FRACTIONAL	TITLE	
±	SCHEMATIC A2 ASSY.	
ANGULAR	DATE	DRAWING NUMBER
±		



A 2 BASIC RECEIVER

F. G. MASON ENGINEERING, INC.  
GREY STONE LANE  
WESTON, CONNECTICUT

All capacitor values are in  $\mu\text{f}$  unless otherwise specified  
all feedthroughs are 1500  $\mu\text{f}$



- 2N1225 Q2 Q3 Q4 Q5 Q6 Q9
- T2364 Q1
- 2N107 Q7
- 2N586 Q8
- 1N60 CR2 CR3 CR4
- 1N759 CR1

FIG 2



OSC RANGE 27.7-41.7 MC  
 RF RANGE 4.2-18.2 MC

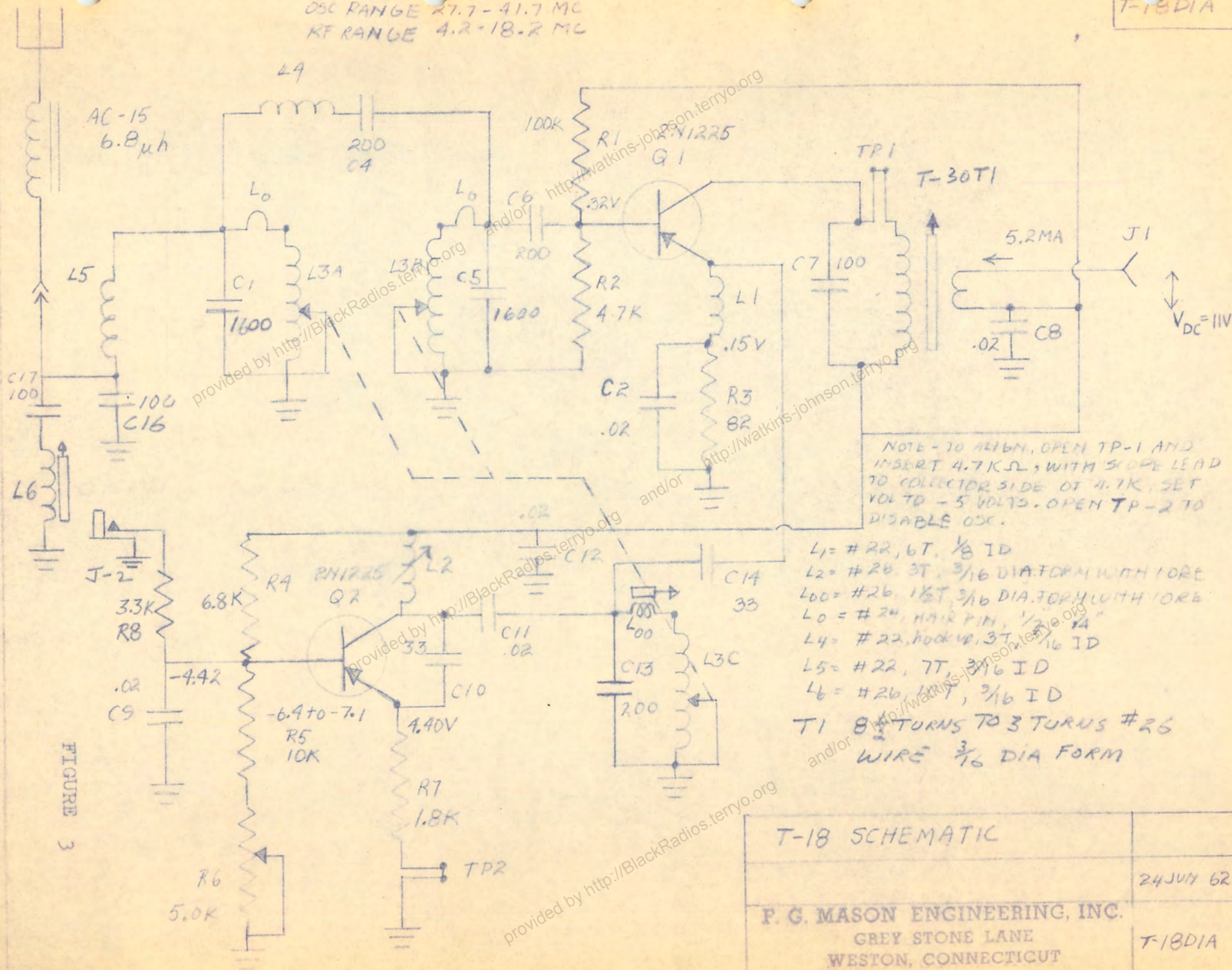


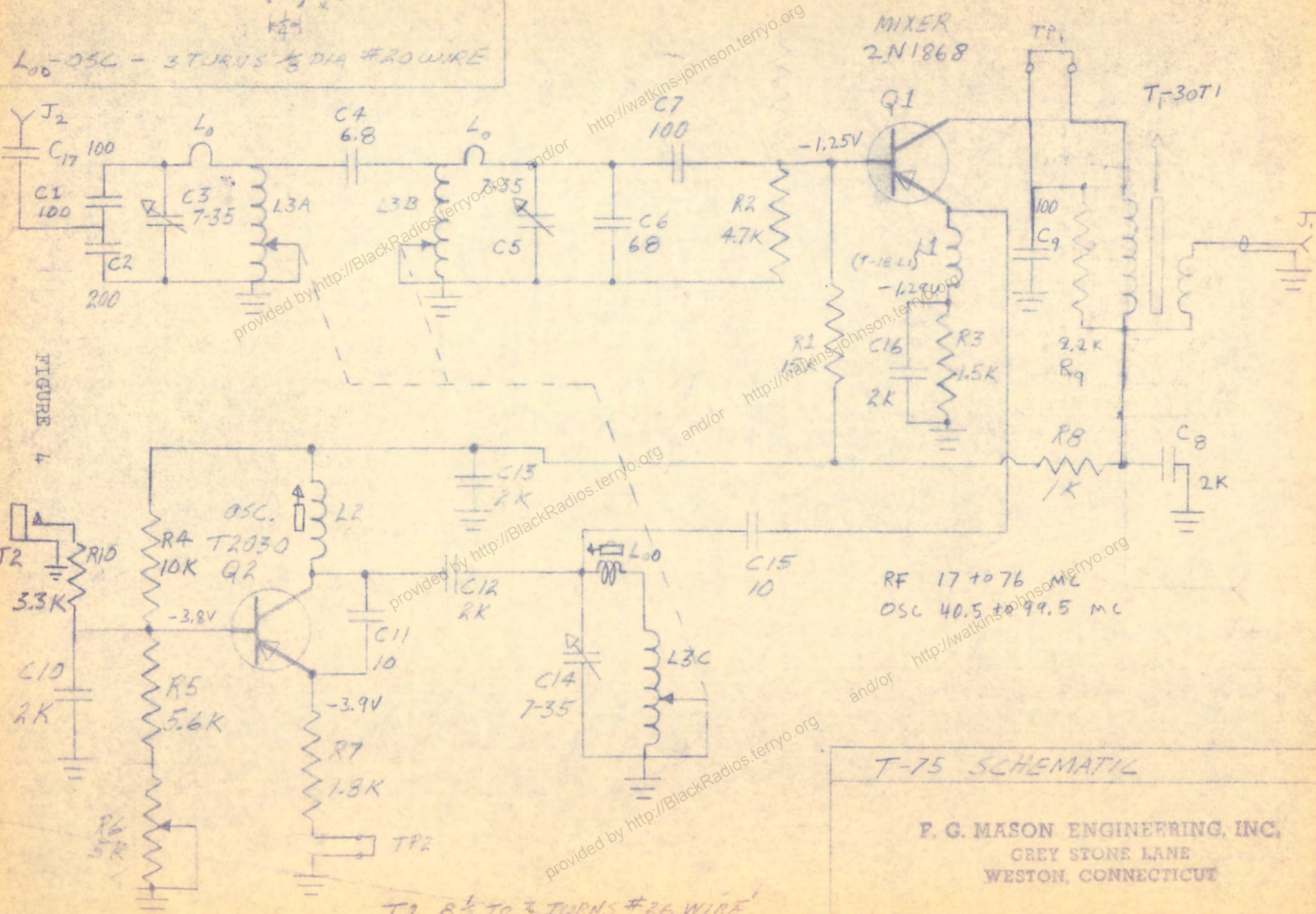
FIGURE 3



L1 - 6 TURNS  $\frac{1}{8}$  DIA #20 WIRE  
 L2 - 8 TURNS #26 WIRE  $\frac{3}{16}$  DIA. FORM  
 L0 - K.F. AND MIX  $\frac{1}{2}$  #20 WIRE  
 L00 - OSC - 3 TURNS  $\frac{1}{8}$  DIA #20 WIRE

TO ALIGN - FEEL TP1 AND INSERT 4.7K RES.  
 REPLACE R1 WITH 100K. CONNECT SCOPE  
 TO COLLECTOR SIDE OF 4.7K  
 OPEN TP2 TO DISABLE OSC

T-75 DIA



RF 17 to 76 MC  
 OSC 40.5 to 99.5 MC

T-75 SCHEMATIC

F. G. MASON ENGINEERING, INC.  
 GREY STONE LANE  
 WESTON, CONNECTICUT

T1 8 1/2 TO 3 TURNS #26 WIRE  
 3/16 DIA FORM

T-75 DIA



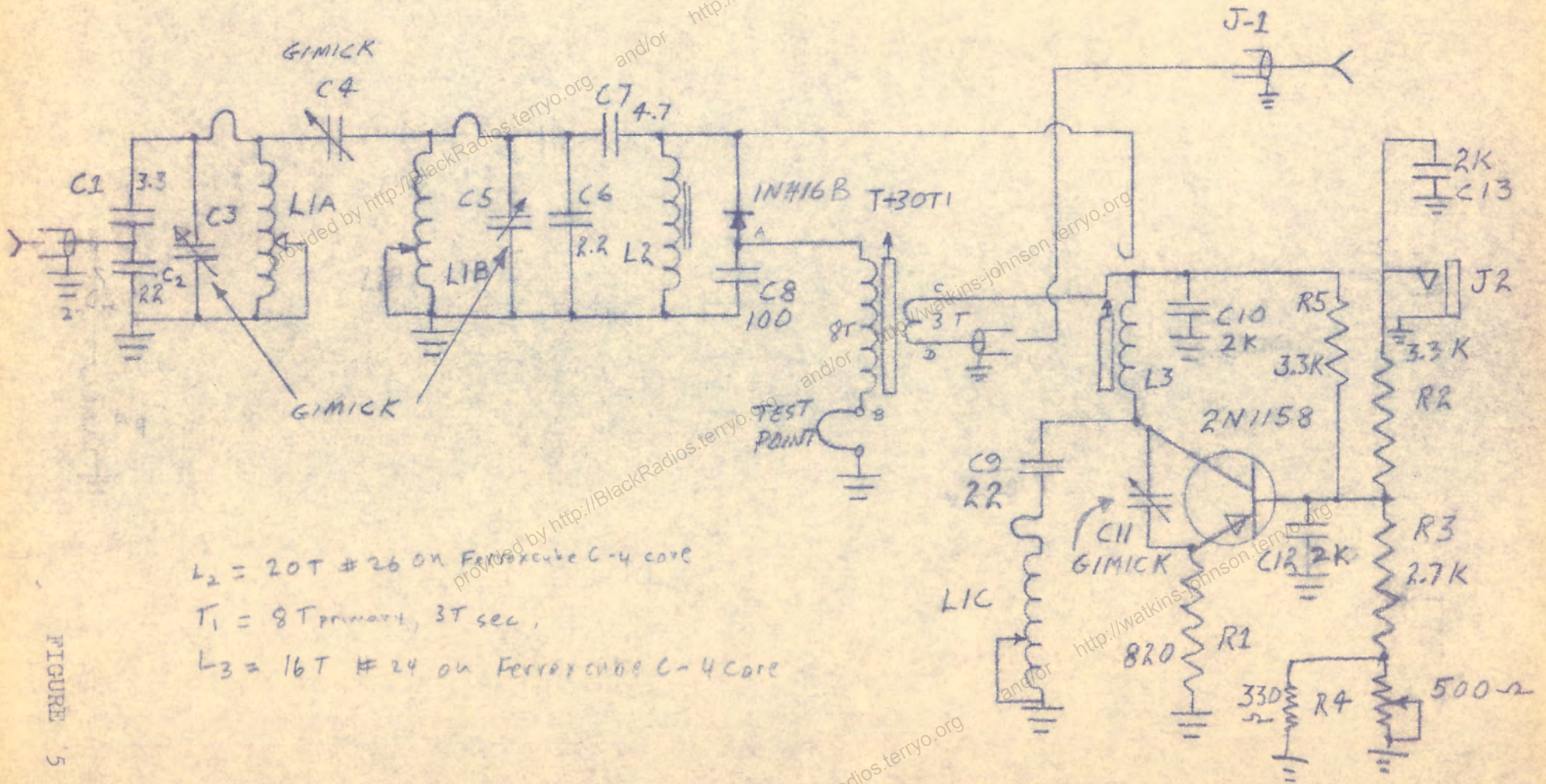


FIGURE 5

T340 SCHEMATIC DIAGRAM

F. G. MASON ENGINEERING, INC.  
 GREY STONE LANE  
 WESTON, CONNECTICUT







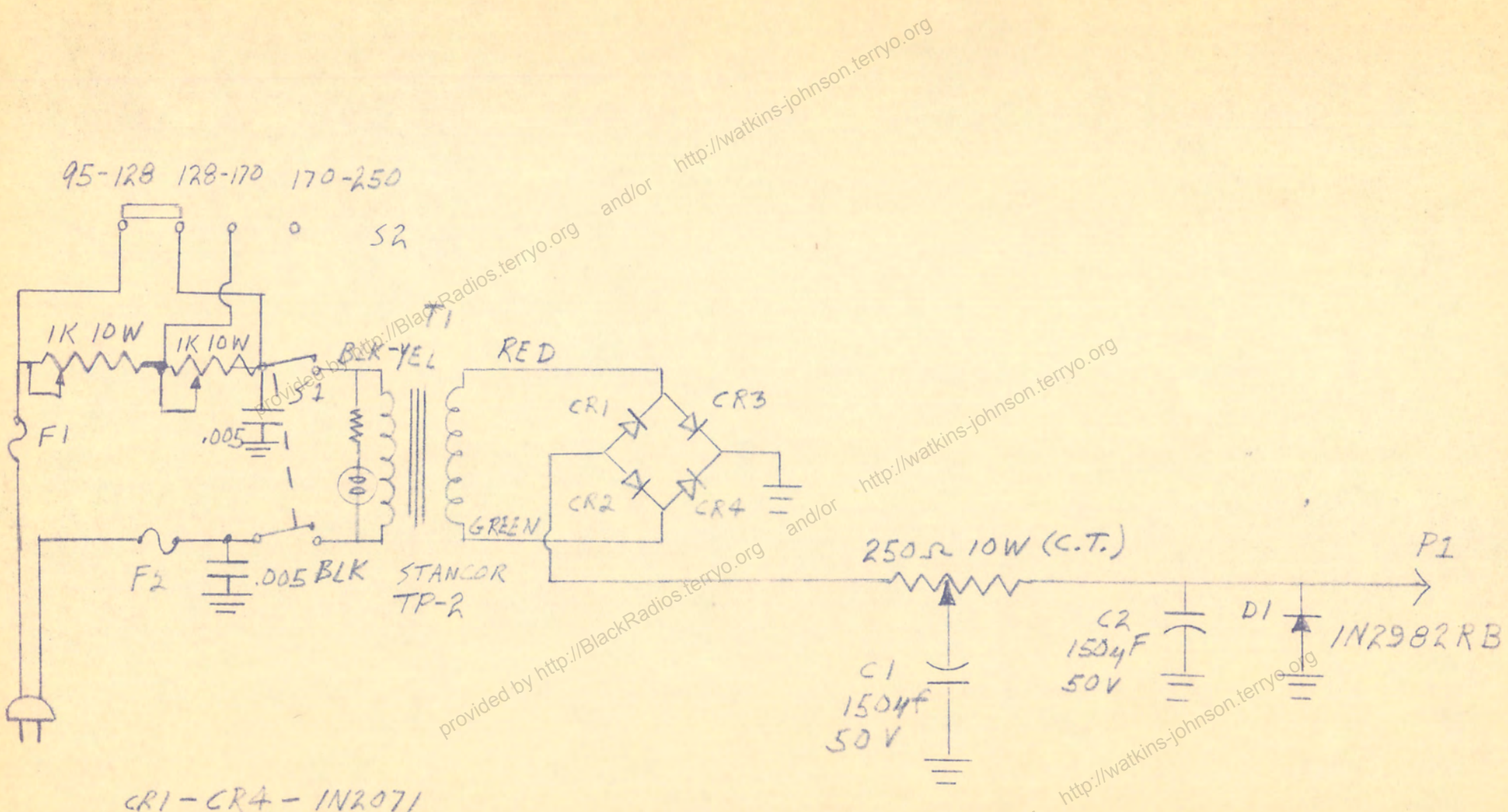


FIGURE 7.

POWER SUPPLY SCHEMATIC	KWJ
	30 OCT 63
F. G. MASON ENGINEERING, INC. GREY STONE LANE WESTON, CONNECTICUT	PS2-D1A



S-1 MONITOR

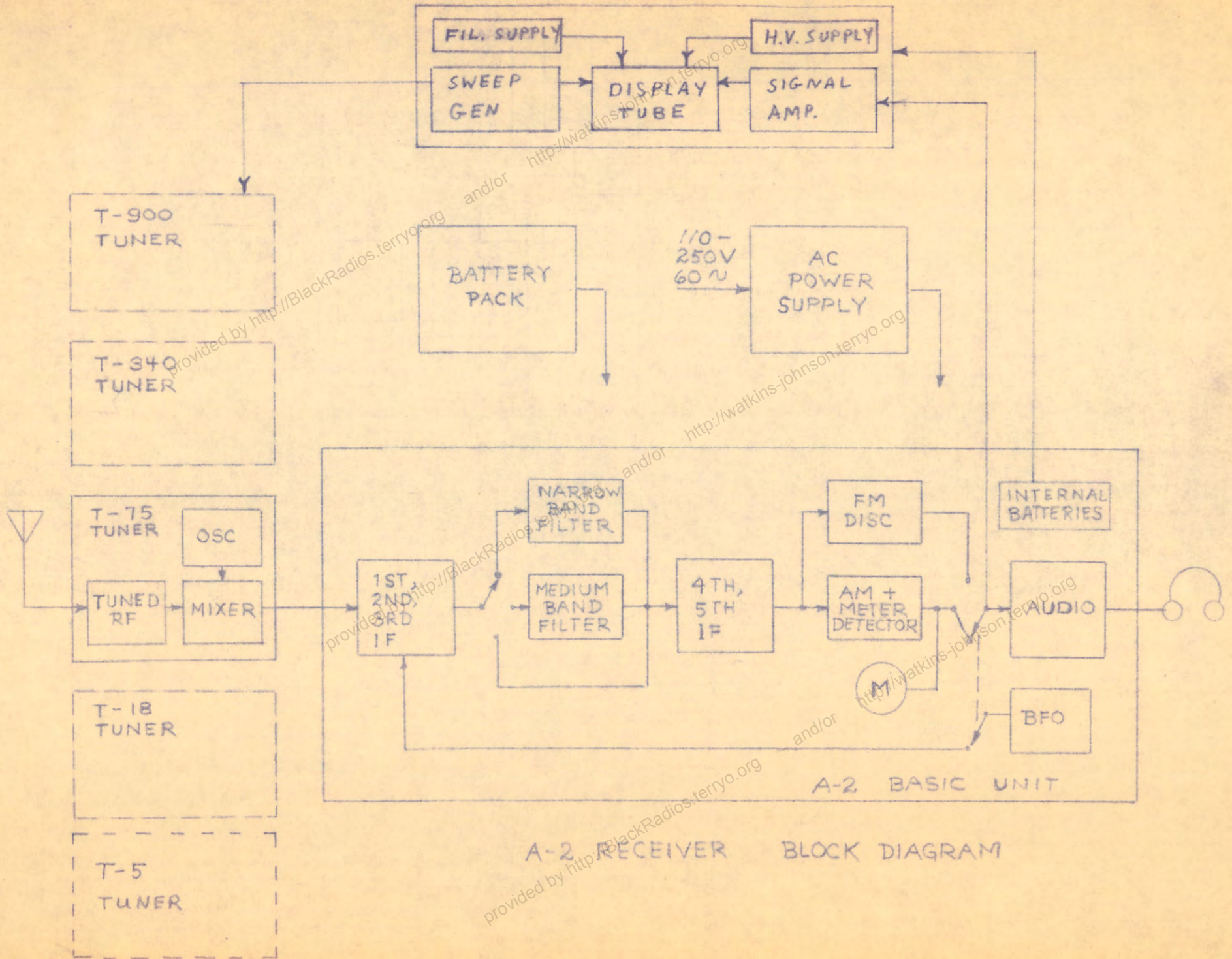


FIGURE 8

A-2 RECEIVER BLOCK DIAGRAM



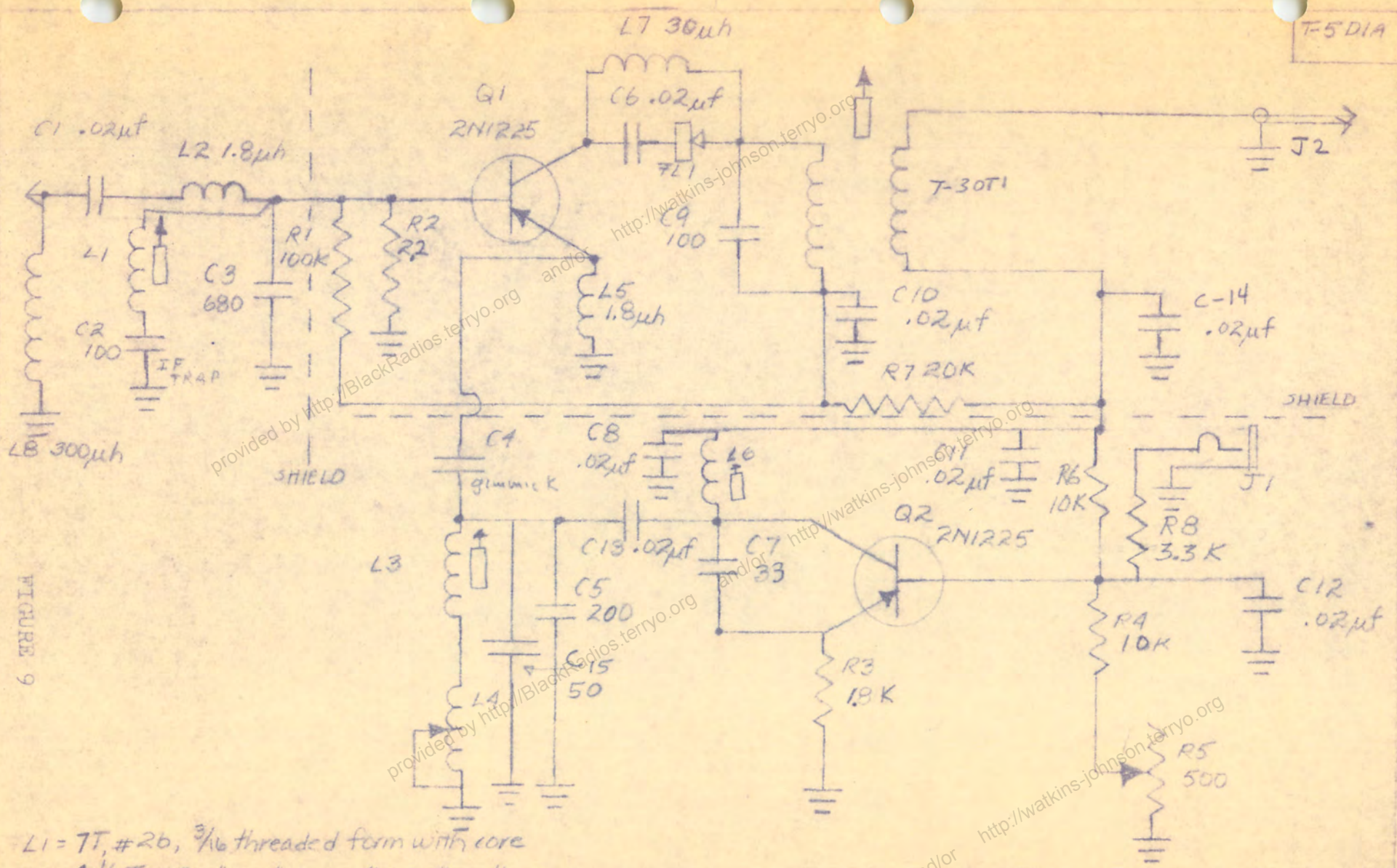


FIGURE 9

- L1 = 7T, #26, 3/16 threaded form with core
- L3 = 4 1/2 T, #26, " " " "
- L6 = 4 1/2 T, #26, " " " "
- T1 = 8 1/2 T primary #26, " " " "
- 3 T, secondary #26, " " " "

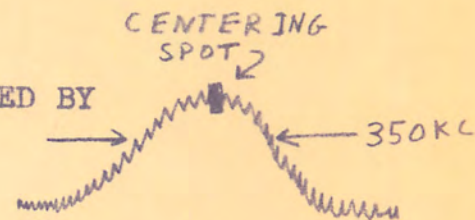
T-5 SCHEMATIC	
18 JUN 69	
F. G. MASON ENGINEERING, INC. GREY STONE LANE WESTON, CONNECTICUT	
T-5 DIA	



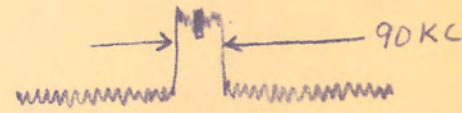
MONITOR DISPLAYS:

1) DISPLAYS OF CONTINUOUS WAVE SIGNALS AS VARIED BY CONTROL POSITIONS.

1.1 Wide position, AM, Max. sweep width-



1.2 Medium " " " " " -



1.3 Narrow " " " " " -



1.4 Wide position, FM, Max. sweep width-



1.5 Medium " " " " " -

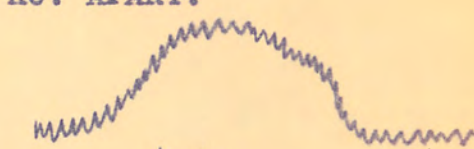


1.6 Narrow position, AM, 1/2 sweep width-

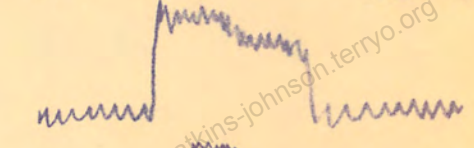


2) DISPLAYS OF TWO CONTINUOUS WAVE SIGNALS 15 Kc. APART.

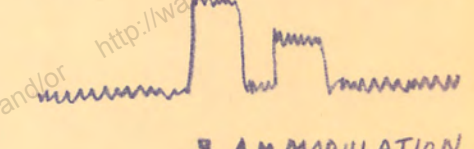
2.1 Wide position, AM, Max. sweep width-



2.2 Medium position, " " " " " -

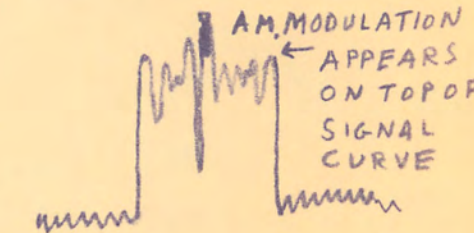


2.3 Narrow position, AM, 1/2 sweep width -



3) DISPLAYS OF AMPLITUDE MODULATED CARRIER.

3.1 Medium position, AM, sweep on -  
(To listen, center spot on curve)



3.2 Medium position, AM, sweep off-  
(Modulation only is seen and heard)

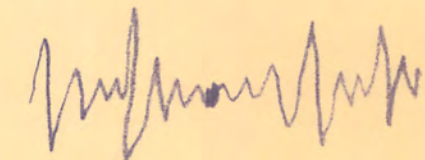


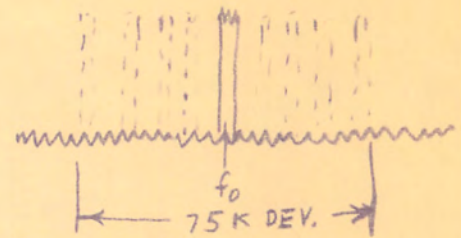


FIGURE 10-B

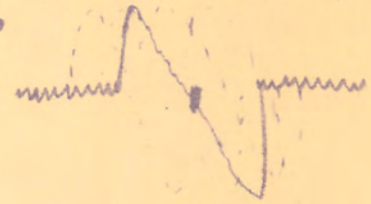
MONITOR DISPLAYS CONTINUED:

4) DISPLAYS OF FREQUENCY MODULATED CARRIER. (75 Kc. Deviation) ( $F_0$  150mc.)

4.1 Narrow position, AM, sweep width approx. 150 kc.



4.2 Listening purposes, Medium position, sweep rate slow, sweep width. (place center spot on crossover.)



5) DISPLAY OF KEYED CONTINUOUS WAVE SIGNAL.

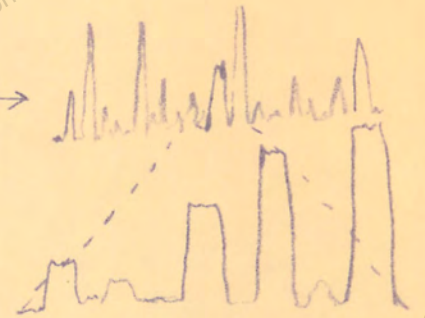
5.1 Narrow position, AM, sweep width fast rate. Curve intermittently appears and disappears as keyed.



6) DISPLAYS OF CROWDED SIGNAL AREAS.

6.1 Narrow position, Max. sweep width, AM-

18 SIGNALS  
SHOWING

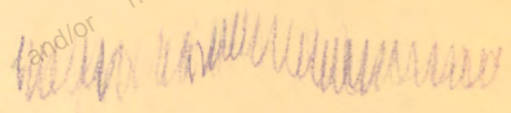


6.2 Center area of above signals expanded by lowering the sweep width.

EXPANDED TO SHOW ONLY 7 SIGNALS

7) DISPLAYS USING FILTER POSITION. (FILT.)

7.1 Wide position, AM, Max sweep width, low level incoming signal, sweep switch in "ON" position.



7.2 Same as above only sweep switch in "FILT" position.





FIGURE 10-C

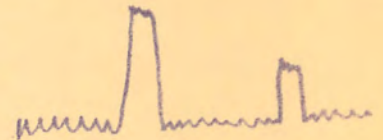
MONITOR DISPLAYS CONTINUED:

8) HIGH LEVEL SIGNAL DISPLAYS.

8.1 Narrow position, AM, Max. signal gain-

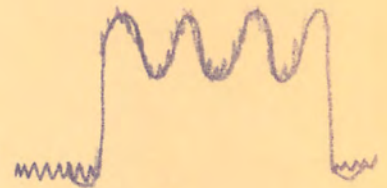


8.1 Same as above only signal gain lowered to avoid clipping.

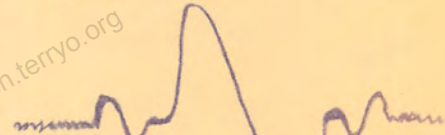


9) SOME OTHER TYPICAL DISPLAYS.

9.1 Carrier with single tone modulation (AM)-



9.2 FM MULTIPLEX, receiver in FM position-



9.3 Television picture carrier with modulation. Receiver in AM, Wide, Max sweep width.

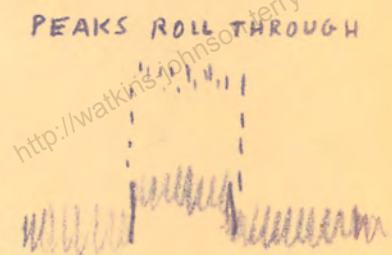


9.3 Same as above with sweep in "OFF" position to show modulation only

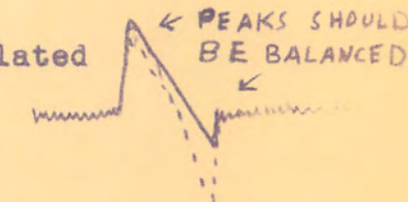


10) USING MONITOR TO TROUBLE SHOOT RECEIVER. (CORRECT CURVES SHOWN DOTTED.)

10.1 Medium position, AM, 5 uv signal applied at antenna unmodulated. Noise shows gain OK but signal to noise ratio poor. TUNER or first stage IF is defective.



10.2 Medium position, FM, 5 uv signal, unmodulated shows unbalanced FM detector curve. Tune "T 8" in Basic unit, A-2. for balance.



10.3 Medium position, AM, 5 uv signal, unmodulated shows IF amplifier strip missaligned. Tune T-2 through T-6 for correct curve.



TOP SHOULD BE AS LEVEL AS POSSIBLE



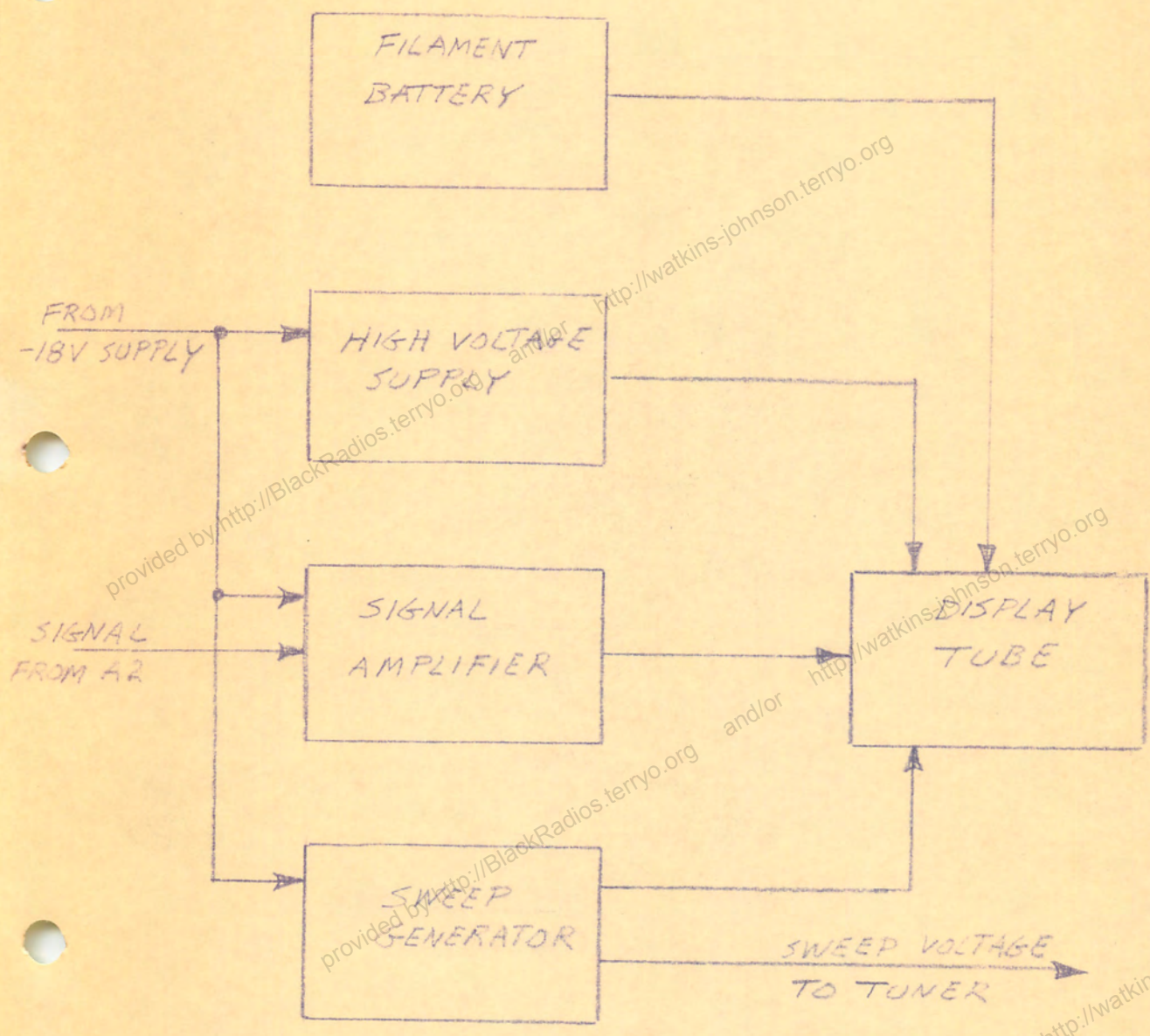
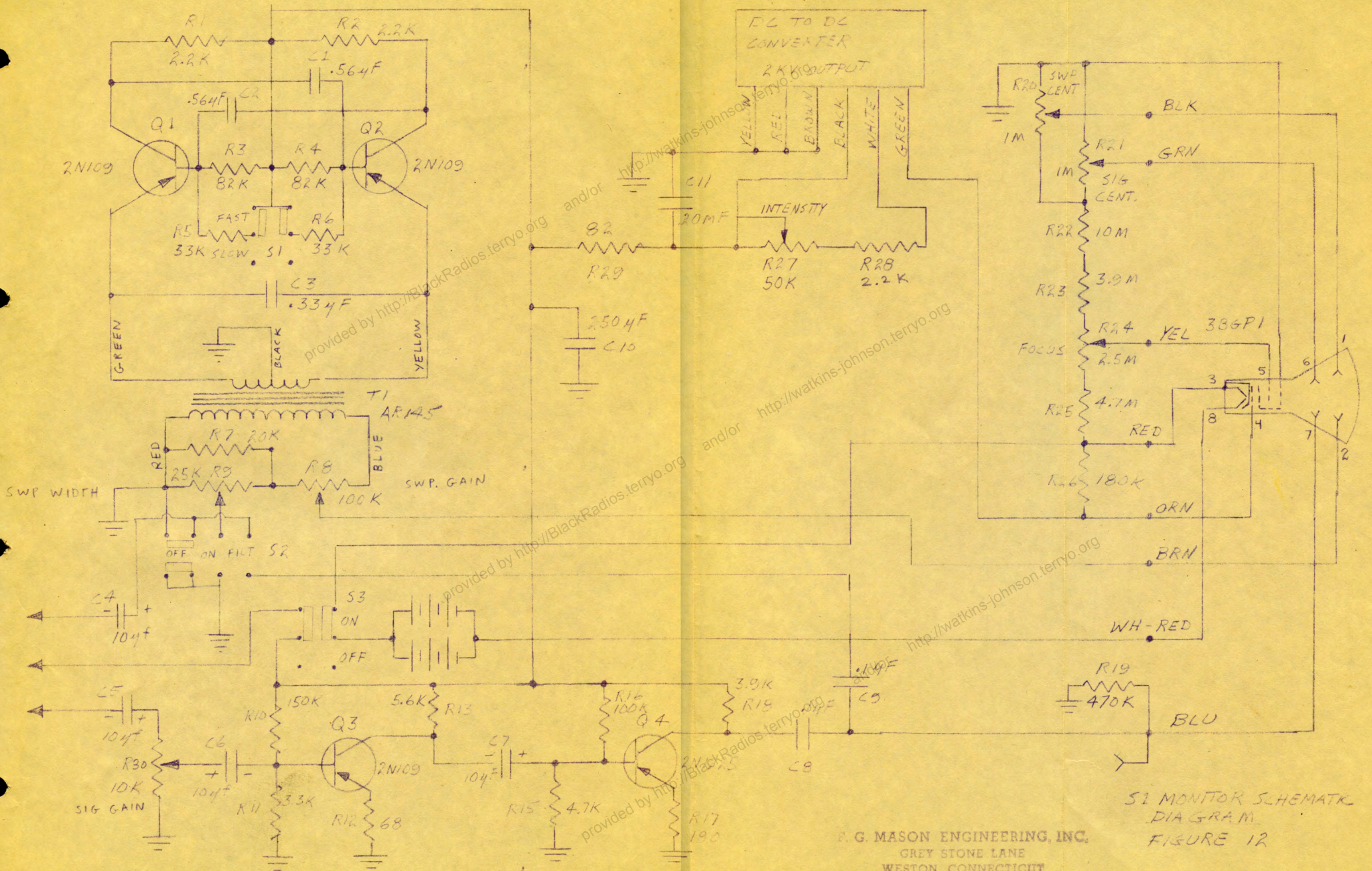


FIGURE 11 SI MONITOR BLOCK DIAGRAM





S1 MONITOR SCHEMATIC  
DIAGRAM  
FIGURE 12

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