MARTI ELECTRONICS
P. O. Box 661
Cleburne, Texas 76031

645 - 4091
(Area 817)

INSTRUCTION MANUAL

RECEIVER

Model MR-30/150-170

MARTI ELECTRONICS
Cleburne, Texas

MR- 30/150-170 RECEIVER

SPECIFICATIONS

Application	Remote Pick-up
Sensitivity	0.6 microvolts or less for 20 db quieting.
Frequency Range.....	150 - 172 megacycles.
Selectivity	Minus 100 db at plus or minus 32 kc; minus 6 db or less at plus or minus 15 kc.
Spurious Response...	All spurious and image responses attenuated at least 100 db.
Overall Response ...	Plus or minus 2 db, 60 to 7500 cycles with matching transmitter.
Frequency Stability..	Plus or minus 0.0005% with crystal oven.
Temperature Range..	Minus 40 degree Centigrade to plus 70 degree Centigrade.
Audio Output........	Plus 8 VU at 600 ohms.
Metering...........	Signal strength and VU brought out to test Jacks. Visual metering optional.
Tube Complement...	15 required. 8 tube types.

6DS4 - 1st RF Amp. (Nuvistor)	6BH6 - 1st Limiter
6DS4 - 2nd RF Amp. (Nuvistor)	6BH6 - 2nd Limiter
6DS4 - 1st Mixer (Nuvistor)	6AL5 - Discriminator
6HS6 - 1st IF Amp.	12AT7- Noise Rect. & Relay Amp.
6DS4 - HF Osc. Trip. (Nuvistor)	
12AT7 - 2nd Mixer & LF Osc.	12AX7 - Noise Amp.
6HS6 - 2nd IF Amp.	6CG7 - Audio Amp.
6HS6 - 3rd IF Amp.	OB2 - Voltage Reg.

Dimensions.........	10-1/2" high, 19" wide; 9" deep. Panel Finish -WEhammertone grey.
Weight (net).........	20 pounds.

NOTE: Extended frequency response to 12,000 cycles available upon special order for $25.00 additional.

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INSTALLATION OF MR-30/150-170 RECEIVER

Connect terminals 1 and 3 to the remote input of your Console.

Connect terminal 2 to a good ground.

Terminals 4 and 5 are used only on two frequency models.

Terminals 6 and 7 may be used to operate another relay on a signal lamp. These terminals are connected to the contacts of K-1 and are closed when a signal is received.

Connect the antenna to the coaxial connector marked "antenna." The input connector is a SO-239 and mates with a PL-259.

The received should be installed in a standard 19" rack that is adequately ventilated for best operation and tube life.

Connect the Power Cord to a 117-123 Volt 50-60 cycle source.

MR-30/150-170 RECEIVER

Instruction Book

The MR-30/150-170 VHF Receiver is a crystal controlled dual conversion superheterodyne receiver designed for operation in the 150 - 172 megacycle band. Each receiver incorporates 4 nuvistors, 10 tubes, and an OB2 voltage regulator. The MR-30/150-170 Receiver has a pass band of plus or minus 15 Kcs and will reject all signals plus or minus 32 Kcs. by at least minus 100 db. The receiver features two nuvistor RF stages, a lst mixer, a lst IF amplifier, a 2nd mixer, two 2nd IF stages, two limiters, a dual diode discriminator, an audio amplifier, and a two tube squelch system. The squelch system operates a sensitive relay for squelching the audio and also provides auxiliary contacts for visual signaling of a received signal.

CIRCUIT OPERATION - General

RF Amplifiers: The carrier signals received at the antenna are coupled through a 52 ohm coaxial transmission line to the Antenna Input of the MR-30/150-170 Receiver. This Antenna Input is fed to the cathode of the lst RF Amplifier V-1, a 6DS4 Nuvistor, operating as a grounded grid amplifier. The first RF Amplifier provides some amplification but primarily it provides an impedance matching device and associated with L-1, L-2, and L-3 provides a band pass filter system. The output of V-1 is capacitive coupled to V-2, a 6DS4 Nuvistor, via the band pass filter L-1, L-2, and L-3. L-3 is capacitive coupled at a low-impedance point and this signal is fed to the cathode of V-2 operating as a grounded grid amplifier. The output of V-2 is fed to the mixer V-3 through a second band pass filter consisting of L-4, L-5, and associated capacitors.

HF Oscillator and Tripler: The HF (high Frequency) oscillator V-4, a 6DS4 Nuvistor, is a crystal-controlled triode oscillator utilizing the cathode and the grid of the 6DS4 (V-4) as an oscillator and the plate load being tuned to the third harmonic of the crystal oscillator frequency. The control crystal frequency is between 45.6666 Mcs and 55.6666 Mcs. depending upon the exact carrier frequency assigned to the receiver. L-5 and L-6 and associated capacitors provide a band pass filter in the plate of V-4 and are coupled to the lst mixer V-3 with a small capacitance.

First Mixer: The output of the 2nd RF amplifier is capacitive coupled to the grid of the lst mixer (V-3) a 6DS4, as well as to the output of the HF oscillator V-4. Heterodyning occurs within the first mixer and the difference between the carrier frequency and the HF oscillator output frequency is used as the first mixer output. The lst IF frequency is 7.0 mcs.

Crystal and Carrier Frequency Determination: When the exact carrier frequency assigned to the receiver is known, the high-frequency oscillator carrier frequency can be calculated as follows:

$$f_1 = \frac{f_c - 7.0 \text{ mc}}{3}$$

where: f_1 = crystal frequency 7.0 mc. = 1st IF frequency

f_c = carrier frequency 3 = multiplication

First IF Amplifier: The output of the first mixer is applied to a high "Q" Filter consisting of L-8, L-9, then to the control grid of V-6, a 6HS6, then L-10 to the grid of the 2nd Mixer. L-8, L-9, and L-10 form a very selective band pass filter at 7.0 mcs.

LF Oscillator: The LF (low frequency) oscillator, V-7A, is a modified Pierce crystal-controlled oscillator. The frequency of this oscillator is approximately 7.455 Mcs. The output of this oscillator is capacitive coupled to the 2nd Mixer Grid, V-7B. V-7 is a 12AT7, one half of which is utilized as the LF Oscillator and the other triode section as the 2nd Mixer.

Second Mixer: Both the 7.455 Mcs. output of the LF Oscillator and the 7 Mcs. output of the first IF Amplifier are applied to the grid of the second mixer tube, V-7B. Heterodyning occurs within the second mixer and the difference (455Kcs) is used as the second mixer output. The output of the second mixer is capacitive coupled to Fl-1, a very selective band-pass filter, and then to the grid of V-8, a 6HS6, the 2nd IF Amplifier. Fl-1 is a fixed tuned band-pass filter, with the center frequency being 455 Kcs., and is the prime determinate of the pass band of the MR-30/150-170 Receiver.

Second IF Amplifiers: The output of Filter Fl-1 is applied to the Grid of V-8, and 1st in a series of two IF Amplifiers at 455 Kcs. The output of V-8, a 6HS6, is fed to the grid of V-9, a 6HS6, via the filter consisting of L-12, a double-tuned filter. The output of V-9, a 6HS6, is fed to the grid of the 1st limiter, V-10, via L-13, another band-pass filter at 455 Kcs.

Limiters and Discriminators: The two limiter stages, V-10, and V-11 (both 6BH6) clip the tops and the bottoms of the incoming signals thereby eliminating noise peaks in the form of amplitude modulation. The output of these limiters are 455 Kcs.

The output of the second limiter, V-1, is applied to the discriminator, V-12, a 6AL5 through Transformer L-14 which is tuned to 455 Kcs for plus or minus 15 Kcs. acceptance. The discriminator circuitry transforms the frequency deviations into corresponding amplitude variations, thereby detecting the audio signal.

Limiters & Discriminators (continued): Following an isolation resistor and coupling capacitor is a de-emphasis network which attenuates the high frequencies while emphasizing the low frequencies; this attenuation of the high frequencies is necessary because of the inherent pre-emphasis characteristic of the phase modulator in the FM transmitter being received.

Audio Amplifier: The audio amplifier tube V-13 (a 6CG7) is connected as a two stage amplifier with inverse feedback to lower distortion. The normal output level is plus 8 VU, into a 600 ohm line. The output plate of V-13 is connected to Audio Transformer T-3 to a 600 ohm output. The 600 ohm output is connected to Terminals 1 and 3 on the receiver terminal board via the 4.5Kcs LP Filter Switch and the 20 DB Pad Filter Switch. With the 4.5Kcs. LP Filter and the 20 DB pad switches in the "OFF" position, the full plus 8 VU with a response up to 7.5Kcs. is available at terminals 1 and 3 on the Receiver Terminal strip. If the output of the Receiver is to be connected to a local Audio Console, we suggest placing the 20 DB Pad Switch in the pad in "IN" position so as to provide the proper level for the console. This will provide a better signal to noise ratio than would lowering the audio gain control. The audio output level of the receiver should always be between plus 4 VU and plus 8 VU and the necessary level at the input to the load (such as an Audio Console) be by fixed pads.

When signals are being received by the MR-30/150-170 Receiver below three (3) microvolts, approximately 8 DB of signal-to-noise improvement can be obtained by placing the 4.5Kcs. LP Filter Switch in the "IN" position. This will attenuate audio frequencies above 4500 cycles but will still be equal to a very good class telephone lines and will improve reception very noticeably (approx. 9 DB).

Squelch Circuit: The squelch circuit is designed to operate when a signal is received. The squelch circuit consists of two noise amplifiers, V-14A and V-14B, a 12AX7, a noise rectifier, V-15A and a relay amplifier tube V-15B. V-15A and V-15B are the two sections of a 12AT7. With no carrier received, the noise voltages appearing at the discriminator are amplified by the noise amplifiers and applied to the cathode of noise rectifier V-15A. The rectified current flows through V-15A; develops a negative grid bias which cuts off relay amplifier V-15B and thus prevents the relay in the plate of V-15B from operating. The squelch control (P-3) adjusts the bias on the cathode of noise amplifier V-14B; thereby setting the level at which noise peaks drive V-14B into conduction.

When a signal is received, noise quieting occurs and the noise amplifier (V-14B) drops below the level required to drive this tube into conduction. With V-14B cut off, noise rectifier V-15A also ceases to conduct; causing negative bias to disappear at the grid of V-15B allowing the tube to conduct and thus operate the squelch relay in the plate of V-15B. A filter network in the grid circuit of noise amplifier V-14A rejects voice frequencies from the noise amplifier circuit.

Receiver Alignment Procedure - General: The receiver is shipped from the factory with all tuning adjustments pre-set to the exact frequency (or frequencies) for which it was ordered and will require no further alignment under normal operating conditions. However, a periodic check of the receiver sensitivity should be made using the procedure outlined in the receiver alignment chart.

A Change in operating frequency, major repair work, or damage during shipment may necessitate re-alignment of the entire receiver. The following paragraphs and the receiver alignment chart present a complete alignment procedure.

Tool and Equipment Required

1. Insulated tuning tool.
2. Signal Generator - Measurement Corp. Model 560-FM; or equivalent.
3. Calibrated frequency indicator or crystal - controlled oscillator covering 455 Kcs and 7.0 mc with an accuracy of at least 0.005%.
4. AC VTVM or Noise and Distortion Equipment.
5. VTVM - RCA Senior Voltohmist.

ALIGNMENT PROCEDURE

1. Remove crystal X-2. Then, connect a 455 Kcs. Signal Source to the input of FL BP. (Junction of FL BP and C-39). This Signal Source should have an accuracy of at least .005%. The Signal Source should be connected to the FL BP input through a small capacitor. (A Typical value -- 47 uuf).

   With a VTVM connected to the WHITE Test Point (1st Limiter Grid), adjust the signal source output so the indicated voltage on the VTVM will be at least 3 volts. Now, adjust L-12, top & bottom slugs, and L-13 TOP slug only, for maximum indicated voltage. In the tuning process the output of the signal source should be reduced to keep the indicated voltage within the 3 to 5 volt limits. The bottom slug of L13 is not used in this model receiver. The adjustment of the bottom slug will have very litt le effect on the measured voltage on the WHITE Test Point.

2. Adjust the top slug of L-14 (Discriminator Secondary) until it is near the top of the can. Then, with the VTVM connected to the GREEN Test Point (Discriminator Primary) adjust the Bottom Slug of L14 for maximum indicated voltage. This should be between 12 and 17 volts.

3. With the VTVM connected to the BLUE Test Point (Discriminator Secondary) adjust the top slug of L-14 for zero voltage as indicated on the VTVM. The 455 KC IF and the Discriminator are now properly adjusted for sensitivity.

4. Install crystal X-2 in the crystal socket. Then, connect a 7.0 Mc. Signal Source to the junction of L-5, C-19 and C-20 through a small capacitor with a typical value of 5 uuf. With the VTVM connected to the WHITE Test Point, adjust the signal source output so the indicated voltage will be between 3 and 5 volts. The frequency of the 7.0 Mc source can be checked by connected the VTVM to the BLUE Test Point. All adjustments made in the alignment of the receiver from this point on should always have the signal on exact frequency. The signal source can always be checked by checking the VTVM voltage on BLUE Test Point. It will be zero volts with an "ON" frequency signal. With the VTVM on the WHITE Test Point, adjust L-8, L-9 and L-10 (both top and bottom slugs) for maximum indicated voltage, being certain to adjust the signal source output to maintain the indicated voltage between 3 and 5 volts. The adjustment of L-8, L-9 and L-10 should be repeated at least two times.

5. Now, with the VTVM on the RED Test Point and the variable capacitor C-68 adjusted to approximately 50% capacity, adjust L-6 and L-7 for maximum indicated voltage. After L-6 and L-7 have been adjusted for maximum voltage, then C-68 (a 4 to 30 uuf trimmer) can be adjusted for maximum voltage as indicated on VTVM. The indicated voltage on VTVM should be between .6 Volts and 1.0 Volts.

ALIGNMENT PROCEDURE (continued)

6. Now connect an "ON" frequency signal source to the Antenna Input Connector J-1, a coaxial connector SO-239. Then, with the VTVM connected to the WHITE Test Point, adjust L-1, L-2, L-3, L-4 and L-5 for maximum indicated voltage being certain to adjust the output of the "ON" frequency signal source to maintain between 3 and 5 volts on VTVM and frequently checking the Signal Source frequency by checking voltage on BLUE Test Point. With the "ON" frequency signal source connected to J-1 and the VTVM on WHITE Test Point, now re-check adjustment of L-8, L-9 and L-10 for maximum indicated voltage on VTVM. Be certain the signal source is exactly on frequency. Now P-1, a voltage control in the screen of V-6, can be adjusted so with an input signal of .5 microvolts the VTVM when connected to the WHITE Test Point will indicate 3 volts.

7. The ORANGE Test Point is used only in the event of strong signals. This test point is used for signal level indication only. With a VTVM or a 50 microampere meter connected between ORANGE Test Point and GROUND, a convenient method of indication of signal strength is available.

8. Now apply an "ON" frequency signal, within .0002% of desired frequency, from an external source such as a frequency meter on a transmitter with a known frequency. The measured voltage with the VTVM on the BLUE Test Point should be within one volt. The receiver can then be adjusted to exact frequency by a slight adjustment of C-68 (a 4 -30 ceramic trimmer located under chassis on the crystal socket for 0-1).

9. Then, apply a modulated signal from the desired transmitter such as a Marti Electronics Model M-30B that is adjusted for 7.5 Kcs. deviation with a 1000 cycle tone. Then with noise and distortion equipment across the output of the MR30/150-170 terminals #1 & #3, adjust the primary and secondary of L-14 for minimum distortion, being certain that the voltage indicated on the VTVM at BLUE Test Point is zero voltage. Be certain the transmitter is on the exact desired frequency before any adjustments are attempted.

10. Now, with a signal source such as an adjustable signal generator, adjust the squelch adjustment (P-3) so the squelch will operate on .4 microvolts.

11. The receiver is now properly aligned and adjusted for best operation.

12. All readings on the VTVM are made with the common probe to ground and all readings are negative except on BLUE Test Point and the voltage at this point could be either positive or negative according to frequency of the received signal.

PARTS LIST

MARTI ELECTRONICS
Cleburne, Texas

MR 30/150-170 RECEIVER

FILTERS

BP1	Filter, Band-Pass, fixed tuned, 455 kcs, Motorola SK-9484W.

CAPACITORS

C1	Capacitor, filter, 80-80-60mfd, 300 V.
C2	Capacitor, discap, .001mfd, 500V.
C2A	Capacitor, discap, 47mmfd, 600 V.
C3	Capacitor, discap, .001mfd, 500 V.
C4	Capacitor, feed-thru, .001mfd, 500 V., Aerovos #7523.
C5	Same.
C6	Capacitor, tubular, 3.9 mmfd, 5%, 500 V.
C7	Capacitor, discap, 5mmfd, 5%, 500 V.
C8	Capacitor, tubular, 3.9mmfd, 5%, 500 V.
C9	Capacitor, discap, 10mmfd, 10%, 500 V.
C10	Capacitor, discap, .001mfd, 500 V.
C11	Capacitor, feed-thru, .001mfd, 500 V., Aerovox #7523.
C12	Same.
C13	Capacitor, tubular, 3.9mmfd, 5%, 500 V.
C14	Capacitor, tubulars, 7.8mmfd, 5%, (Two 3.9mmfd in parallel.)
C15	Capacitor, discap, .001mfd, 500 V.
C16	Same.
C17	Capacitor, tubular, .27mmfd, 5%, 500 V.
C18	Same.
C19	Capacitor, tubular, .12mmfd. 10%, 500 V.
C20	Capacitor, tubular, 1.0mmfd, 5%, 500 V.
C21	Capacitor, discap, 22mmfd, 5%, 500 V.
C22	Capacitor, tubular, 3.9mmfd, 5%, 500 V.
C23	Capacitor, discap, .001mfd, 500 V.
C24	Not used in this model.
C25	Capacitor, tubular, 3.9mmfd, 5%, 500 V.
C26	Capacitor, tubular, 12mmfd, 10%, 500 V.
C27	Capacitor, discap, .001mfd, 500 V.
C28	Capacitor, discap, 5mmfd, 5%, 500 V.
C29	Capacitor, feed-thru, .001mfd, 500 V, Aerovox #7523.
C30	Same.
C31	Capacitor, discap, .005mfd, 1000 V.
C32	Capacitor, discap, .001mfd, 500 V.
C33	Same.
C34	Capacitor, discap, 22mmfd, 5%, 500 V.
C35	Capacitor, tubular, 1.0mmfd, 5%, 500 V.
C36	Capacitor, discap, .01mfd, 1000 V.
C37	Capacitor, discap, 47mmfd, 600 V.
C38	Same.
C39	Capacitor, discap, .01mfd, 1000 V.
C40	Same.
C41	Same.
C42	Same.

MARTI ELECTRONICS
Cleburne, Texas

CAPACITORS (continued)

C43	Capacitor, discap. 22mmfd, 5%, 500 V.
C44	Capacitor, discap, 47mmfd, 600 V.
C45	Capacitor, discap, .001 mfd, 500 V.
C46	Capacitor, discap, .01mfd, 1000 V.
C47	Same
C48	Capacitor, discap, 47 mmfd, 600 V.
C49	Capacitor, discap, .01mfd, 1000 V.
C50	Capacitor, discap, .001 mfd, 600 V.
C51	Capacitor, discap, .01 mfd, 1000 V.
C52	Same
C53	Capacitor, discap, 22mmfd, 5%, 500 V.
C54	Capacitor, discap, .01 mfd, 1000 V
C55	Same
C56	Capacitor, discap, 470 mmfd, 10%, 1000 V.
C57	Same
C58	Same
C59	Capacitor, discap, .02 mfd, 20%, 1000 V.
C60	Capacitor, .05 mfd, 400 V
C61	Same
C62	Capacitor, discap, .005 mfd, 1000 V
C63	Capacitor, 25 mfd, 15 V
C64	Capacitor, discap, 10 mmfd, 500 V (Used on dual frequency model only)
C65	Capacitor, variable, 4-30mmfd, Reliance #TS2A (Used on D. F. Model o
C66	Capacitor, discap, .001 mfd, 500V (Used on dual frequency model only)
C67	Same
C68	Capacitor, variable, 4-30mmfd, Reliance #TS2A
C69	Capacitor, discap., .005 mfd, 1000 V
C70	Capacitor, discap, 10mmfd, 5%, 500 V
C71	Capacitor, discap, 3.9 mmfd, 5%, 500V (Omitted on dual frequency moc
C72	Capacitor, tubular, .27 mmfd, 5%, 500 V
C73	Capacitor, discap, 3.9 mmfd, 5%, 500 V
C74	Capacitor, discap, .001 mfd, 500 V
C75	Distributive capacity across coil in L7
C76	Capacitor, 6mmfd, 500V (One 5mmfd and one 1mmfd in parallel)
C77	Not used in this model
C78	Not used in this model
C79	Capacitor, tubular, .25mfd, 200 WVDC
C80	Capacitor, feed-thru, .001mfd, 500V, Aerovox #7523
C81	Same
C82	Same
C83	Same
C84	Capacitor, discap, 470 mmfd, 25%, 500 V
C85	Same
C86	Capacitor, discap, .01 mfd, 1000V

CAPACITORS (continued)

C87	Capacitor, discap, 47 mmfd, 600V.
C88	Capacitor, discap, 22mmfd. 5% 500V.
C89	Capacitor, discap, 470 mmfd, 5%, 500V.
C90	Same.
C91	Capacitor, .05 mfd, 500V.
C92	Capacitor, discap, .001 mfd, 500V.
C93	Capacitor, 5mfd, 25V., APD-016.
C94	Capacitor, discap, .001 mfd, 500V.
C95	Same.
C96	Same.
C97	Capacitor, feed-thru, .001 mfd, 500V., Aerovox #7523.
C98	Same.
C99	Same.
C100	Same.
C101	Same.

DIODE RECTIFIERS

D1	Rectifier, silicon, 800 PIV, 500 ma., Erie ED-3010
D2	Same.

FUSES

F1	Fuse, 3AG, 2.5 amp., slo-blow.

JACKS

J1	Jack, #SO-239.

RELAYS

K1	Relay, 3.1 MADC, 10K ohms, Cont. 1A, 29 VDC, American Zettler AZ420-408-4L.

INDUCTORS

L1	Filter, band-pass, 4 turns #20 wire, double-spaced on National Coil Form #PNCF-2-B with C809 slug.
L2	Same.
L3	Same, except with tap at 3/4 turn from ground side.
L4	Same as L1 and L2.
L5	Same as L1 and L2.
L6	Same as L1 and L2.
L7	Filter, band -pass, 3 turns #20 wire, double-spaced on National Coil form #PNCF-2-B with C809 slug.
L8	Filter, IF, 7 mc., Radio Industries EO-15382-1.
L9	Same.
L10	Same.
L11	Not used in this model.

INDUCTORS (continued)

L12	Filter, band-pass, 455 kcs., Radio Industries #EO-15695.
L13	Same.
L14	Filter, discriminator, 455 kcs., Radio Industries #EO-15694-RI.
L15	Filter, choke, 1.8 uh. 1000 ma. Ohmite #Z-144.
L16	Filter, choke, 1 uh. 900 ma., Delevan #1840-10.
L17	Same.
L18	Same.
L19	Filter, choke, 3.9 uh., 1130 ma., Delevan #1840-20. (Used on dual-frequency only.)
L20	Filter, choke, 3.9 uh., 1130 ma. Delevan #1840-20.
L21.	Filter, choke 3 hy., 110 ma. #2000.
L22	Same.

OVENS

O1	Oven, 12.6 volt, Ovenaire #SA-2.

POTENTIOMETERS

P2	Potentiometer, 500K ohms, ML-5545.
P3	Potentiometer, 25K ohms, ML-5544.

PILOT LAMPS

PL1	Pilot lamp, 12 volt, Drake #5100-182.
Note:	Use GE #756 replacement bulb.

RESISTORS

R1	Resistor, 10K ohm, 1 watt, 5%.
R2	Same.
R3	Resistor, 100K ohm, 1/2 watt, 5%.
R4	Resistor, 470K ohm, 1/2 watt, 5%.
R5	Resistor, 47K ohm, 1/2 watt, 5%.
R6	Resistor, 27K ohm, 1/2 watt, 10%.
R7	Resistor, 47K ohm, 1/2 watt, 5%.
R8	Same.
R9	Same.
R10	Resistor, 150K ohm, 1/2 watt, 10%.
R11	Resistor, 4700 ohm 1/2 watt, 5%.
R12	Resistor, 68 ohm, 1/2 watt, 10%.
R13	Resistor, 27K ohm, 1/2 watt, 10%.
R14	Resistor, 10K ohm, 1 watt, 5%.
R15	Resistor, 560 ohm, 1/2 watt, 5%.
R16	Resistor, 47K ohm, 1/2 watt, 5%.
R17	Resistor, 470K ohm, 1/2 watt, 5%.
R18	Resistor, 47K ohm, 1/2 watt, 5%.
R19	Resistor, 10K ohm, 1/2 watt, 5%.

PARTS LIST

MARTI ELECTRONICS
Cleburne, Texas

MR 30/150-170 RECEIVER

RESISTORS (continued)

R20	Resistor, 2200 ohm, 1/2 watt, 5%.
R21	Resistor, 4700 ohm, 1/2 watt, 5%.
R22	Resistor, 470K ohm, 1/2 watt, 5%.
R23	Resistor, 100K ohm, 1/2 watt, 5%.
R24	Resistor, 68 ohm, 1/2 watt, 10%.
R25	Resistor, 68K ohm, 1 watt, 10%.
R26	Resistor, 1800 ohm, 1/2 watt, 10%.
R27	Resistor, 22K ohm, 1/2 watt, 5%.
R28	Resistor, 47K ohm, 1/2 watt, 5%.
R29	Resistor, 150K ohm, 1/2 watt, 10%.
R30	Resistor, 22K ohm, 1/2 watt, 5%.
R31	Resistor, 68 ohm, 1/2 watt, 10%.
R32	Resistor, 68K ohm, 1/2 watt, 10%.
R33	Resistor, 22K ohm, 1/2 watt, 5%.
R34	Resistor, 1800 ohm, 1/2 watt, 10%.
R35	Resistor, 47K ohm, 1/2 watt, 5%.
R36	Resistor, 100K ohm, 1/2 watt, 5%.
R37	Resistor, 27K ohm, 1/2 watt, 10%.
R38	Same.
R39	Same.
R40	Resistor, 22K ohm, 1 watt, 10%.
R41	Resistor, 47K ohm, 1/2 watt, 5%.
R42	Same.
R43	Resistor, 15K ohm, 1 watt, 5%.
R44	Resistor, 4700 ohm, 1/2 watt, 5%.
R45	Resistor, 470K ohm, 1/2 watt, 5%.
R46	Resistor, 100K ohm, 1/2 watt, 5%.
R47	Same.
R48	Resistor, 470K ohm, 1/2 watt, 5%.
R49	Resistor, 100K ohm, 1/2 watt, 5%.
R50	Resistor, 470K ohm, 1/2 watt, 5%.
R51	Resistor, 2200 ohm, 1/2 watt, 5%.
R52	Resistor, 47K ohm, 1/2 watt, 5%.
R53	Resistor, 470K ohm, 1/2 watt, 5%.
R54	Resistor, 680 ohm, 1/2 watt, 5%.
R55	Resistor, 47K ohm, 1/2 watt, 5%.
R56	Resistor, 27K ohm, 1/2 watt, 5%.
R57	Same.
R58	Resistor, 4700 ohm, 1/2 watt, 5%.
R59	Resistor, 2.2 meg., 1/2 watt, 10%.
R60	Resistor, 47K ohm, 1/2 watt, 5%.
R61	Resistor, 1 meg., 1/2 watt, 10%.
R62	Resistor, 12K ohm, 1/2 watt, 10%.
R63	Resistor, 470K ohm, 1/2 watt, 5%.
R64	Resistor, 1 meg., 1/2 watt, 10%.
R65	Same.

MR-30/150-170 RECEIVER

	RESISTORS (continued)
R66	270K ohm, 1/2 watt, 10%
R67	470K ohm, 1/2 watt, 5%
R68	180K ohm, 1/2 watt, 10%
R69	270K ohm, 1 watt, 10%
R70	6800 ohm, 1/2 watt, 10%
R71	1.2 meg., 1/2 watt, 10%
R72	150 ohm, 1/2 watt, 5%
R73 & R74	560 ohm, 1/2 watt, 5%
R75	150 ohm, 1/2 watt, 5%
R76	10 ohm, 2 watt, 10%
R77	100K ohm, 1 watt, 5%
R78	1714 ohm, (One 12K, 1 W, 10% and one 2K, 5-8W. in parallel)
	SWITCHES
S1	Toggle, SPST
S2 & S3	3 amp., 125 V, DPDT
	TRANSFORMERS
T2	Power, primary 117 volt, secondary 290 volt C. T. @ 250ma, 12.6 volt C. T. @ 5 amps. #P60328
T3	Output, primary 20K ohm, C. T., secondary 150/600 ohms. #AT-141
	TERMINAL BOARDS
TB1	7-terminal
TB2	3-terminal
	TEST POINTS
TP1	Red, #119466-B
TP2	Orange, #119466-F
TP3	White, #119466-A
TP4	Green, #119466-E
TP5	Blue, #119466-G
	TUBES
V1 thru V4	Nuvistor, 6DS4
V5	Nuvistor, 6DS4 (Used on dual-frequency models only)
V6	6HS6
V7	12AT7
V8 & V9	6HS6
V10 & V11	6BH6
V12	6AL5
V13	6CG7
V14	12AX7
V15	12AT7
V16	Voltage regulator, OB2

MR-30/150-170 RECEIVER

CRYSTALS

X1	Piezo type 2001. (Specify channel frequency when ordering)
X1A	Piezo type 2001. (Used on dual frequency model only)
X2	International MX017G. (Specify channel frequency when ordering)

TRANSFORMER CONNECTION DATA:

T3

Output transformer:

Primary

20K ohm - Red and blue
C. T. -White

Secondary

600 ohm - Use Green & Blue - White
Tie Black to Red - White

150 ohm - Use Green & Black
Tie Green to Red-White & Black to Blue-White

MARTI ELECTRONICS
Cleburne, Texas

DUAL FREQUENCY OPERATION of MR-30/150-170 RECEIVER

Connect a single-pole, double-throw switch or relay to the receiver terminals 2, 4 and 5. Connect the center leg of the switch to terminal number 2 and the other sections of the switch to terminals 4 and 5. This switch can be mounted up to 40 feet from the receiver if a two-conductor, shielded cable is used. Switch function is to ground the cathode of the oscillator of the desired frequency. See diagram below and schematic diagram.

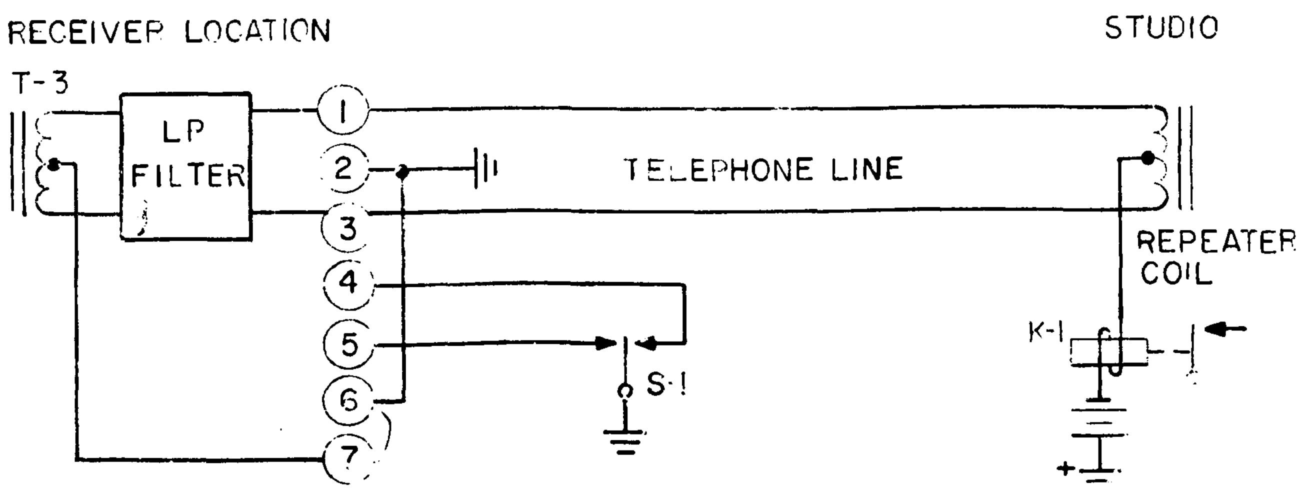
REMOTE OPERATION of MR-30/150-170

Connect telephone line to terminals numbered 1 and 3.
Connect terminal number 2 to a good earth ground.
Connect telephone line at Studio to Remote Input Terminals.

REMOTE OPERATION of MR-30/150-170 RECEIVER WHEN AUXILIARY RELAY IS USED.

Connect telephone line to terminals numbered 1 and 3.
Connect terminal number 2 to a good earth ground.
Connect a jumper from terminal number 2 to terminal number 6.
Remove the center-tap of T-3 (black & white wires) under chassis from ground and solder to terminal number 7 of receiver terminal strip under chassis.
Connect the telephone line to Repeater Coil at Studio. The output of the repeater coil should be connected to the Audio Input of the Console.

WHEN USING THE MR-30/150-170 RECEIVER IN REMOTE OPERATION, THE 20 DB PAD SHOULD BE IN THE "OUT" POSITION.



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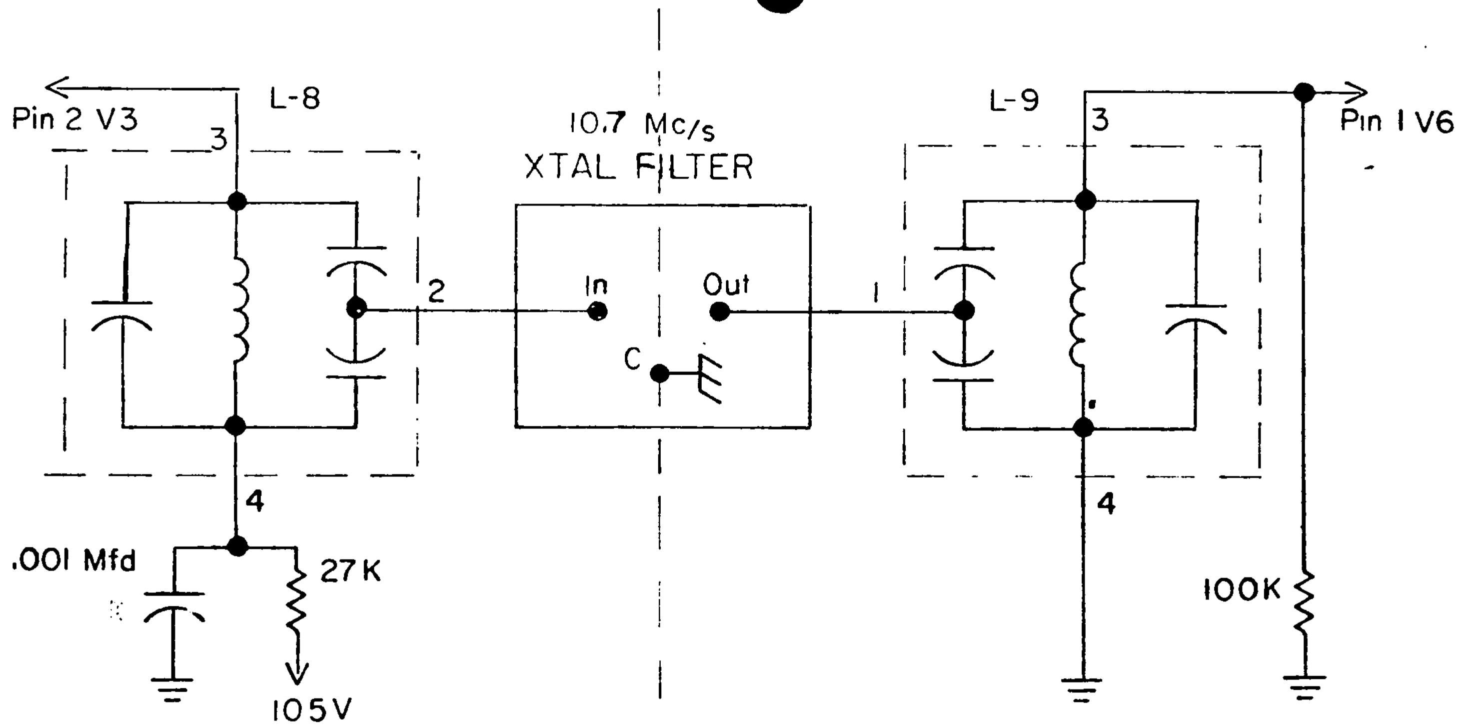
Cleburne, Texas

TYPICAL METER READINGS MR-30 Series of Receivers:

Tube No. & Type	Pin No.	Reading	Special Notes
V-1 6DS4	2	48 Volts	Measured at terminal 1 of L-1.
	4	0 Volts	
	8	0 Volts	
	10	6.3 Volts AC	
	12	0 Volts	
V-2 6DS4	2	48 Volts	Measured at terminal 3 of L-4.
	4	0 Volts	
	8	0 Volts	
	10	6.3 Volts AC	
	12	0 Volts	
V-3 6DS4	2	52 Volts	Measured at terminal 2 of L-8.
	4	- 1.4 Volts	Varies with crystal activity.
	8	0 Volts	
	10	0 Volts	
	12	6.3 Volts AC	
V-4 6DS4	2	84 Volts	Measured at terminal 2 of L-7.
	4	- 2.3 Volts	Varies with crystal activity.
	8	0 Volts	
	10	6.3 Volts AC	
	12	0 Volts.	
V-5 6DS4	Same as V-4 when used in dual frequency models.		
V-6 6HS6	1	0 Volts	
	2	0 Volts	
	3	0 Volts	
	4	6.3 Volts AC	
	5	100 Volts	
	6	75 Volts	
	7	.66 Volts	
V-7 12AT7	1	92 Volts	
	2	4.2 Volts	
	3	5.8 Volts	
	4	0 Volts	
	5	12.6 Volts AC	
	6	72 Volts	
	7	0 Volts	
	8	1.5 Volts	
	9	6.3 Volts AC	

TYPICAL METER READINGS MR-30 Series of Receivers:

Tube No. & Type	Pin No. & Reading		Special Notes
V-8 6HS6	1	0 to - 2.0 Volts	Normally 0 Volts but with a strong signal - 2.0 Volts.
	2	0 Volts	
	3	0 Volts	
	4	6.3 Volts AC	
	5	175 Volts	Measured at terminal 1 of L
	6	70 to 86 Volts	Varies with signal.
	7	.42 to .50 Volts	Varies with signal.
V-9 6HS6	1	0 to - 6.5 Volts	Varies with signal.
	2	0 Volts	
	3	0 Volts	
	4	6.3 Volts AC	
	5	175 Volts	
	6	70 to 100 Volts	Varies with signal.
	7	.36 to .50 Volts	Varies with signal.
V-10 6BH6	1	.80 to 15 Volts	Varies with signal.
	2	0 Volts	
	3	0 Volts	
	4	6.3 Volts AC	
	5	100 Volts	
	6	75 Volts	
	7	0 Volts	
V-11 6BH6	1	- .45 Volts	
	2	0 Volts	
	3	0 Volts	
	4	6.3 Volts AC	
	5	110 Volts	
	6	92 Volts	
	7	0 Volts	
V-12 6AL5	1	0 Volts	0 Volts when on exact frequen Could vary + or - 10 Volts.
	2	-9 to - 17 Volts	Varies with adjustment of Primary of L-14.
	3	0 Volts	
	4	6.3 Volts AC	
	5	0 Volts	
	6	0 Volts	
	7	Same as Pin Number 2.	



Delete all circuitry from Pin No. 2 of V-3 (6DS4) to Pin No. 1 of V-6 (6HS6) and insert above circuitry ....

L-8, L-9, and L-10 are changed from 7.0 Mcs. to 10.7 Mcs.

X-1 Frequency is $\dfrac{\text{Carrier Frequency - 10.7 Mcs.}}{3}$

X-2 Frequency is 11.155 Mcs.

1st IF Frequency was changed from 7.0 Mcs. to 10.7 Mcs.

L-8 ----- Marti L-8 (X) Special
L-9 ----- Marti L-9 (X) Special
L-10 ---- Miller 1457

Xtal/Filter -- 10.7 - 30

On MR-25/150-170 C ----
Delete R-13

On MR-30/150-170 ----
Delete C-24, R-13 & R-16.

Marti Electronics
Modification on
MR-30/150-170 DWG 102 to
become MR-30/150-170 (X).
&
Modification on
MR-25/150-170 C on DWG 120
to become MR-25/150-170 C (X).

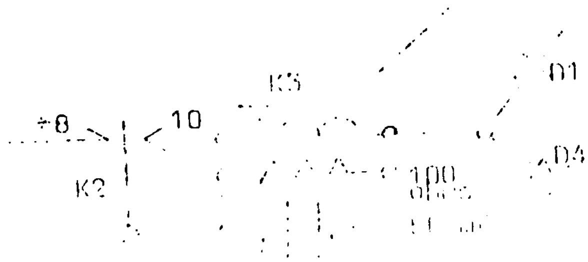
TYPICAL METER READINGS MR-30 Series of Receivers:

Tube No. & Type	Pin No. & Reading		Special Notes
V-13 6CG7	1	56 Volts	
	2	0 Volts	
	3	2.2 Volts	
	4	6.3 Volts AC	
	5	0 Volts	
	6	165 Volts	
	7	0 Volts	
	8	4.7 Volts	
	9	0 Volts	
V-14 12AX7	1	62 to 170 Volts	Varies with squelch and signal.
	2	0 to - 4.0 Volts	Varies with squelch and signal.
	3	0 to 17 Volts	Varies with squelch adjustment.
	4	0 Volts	
	5	12.6 Volts AC	
	6	116 Volts	
	7	0 Volts	
	8	1.7 Volts	
	9	6.3 Volts AC	
V-15 12AT7	1	126 to 170 Volts	Varies with squelch adjustment.
	2	0 to - 9.0 Volts	Varies with squelch and signal.
	3	0 to .8 Volts	Varies with squelch and signal.
	4	0 Volts	
	5	12.6 Volts AC	
	6	0 to - 10 Volts	Varies with squelch and signal.
	7	0 to - 10 Volts	Varies with squelch and signal.
	8	1.7 Volts	
	9	6.3 Volts AC	

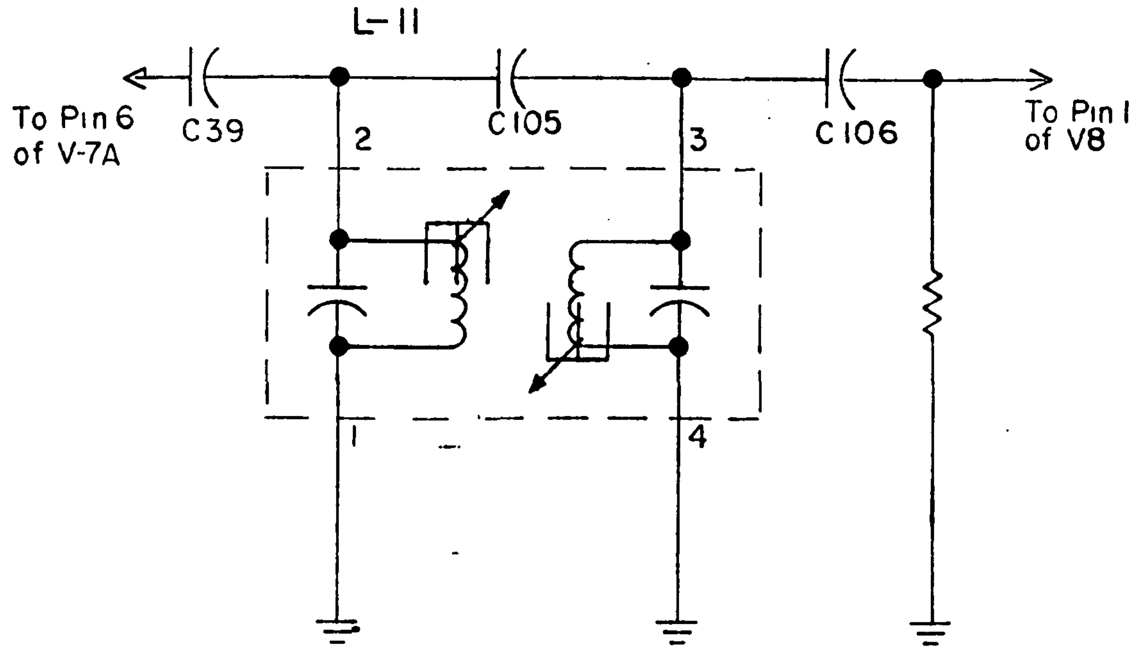
All readings with a Vacuum Tube Voltmeter except AC Voltage Readings.
AC Voltage Readings with AC Volt Meter.

All DC readings are considered normal if within plus or minus 20% of typical readings.

A-25-C MODIFICATION FOR 100 ohm ANTENNA RELAY



Connect wire between D1 and D4 in place of old relay coil.



Delete FL-BP

Add L-11 Same as L-12 Radio Industries EO-15694-R1

Add C-105 Discap, 5.0 mmfd, 5%, 500 Volts.

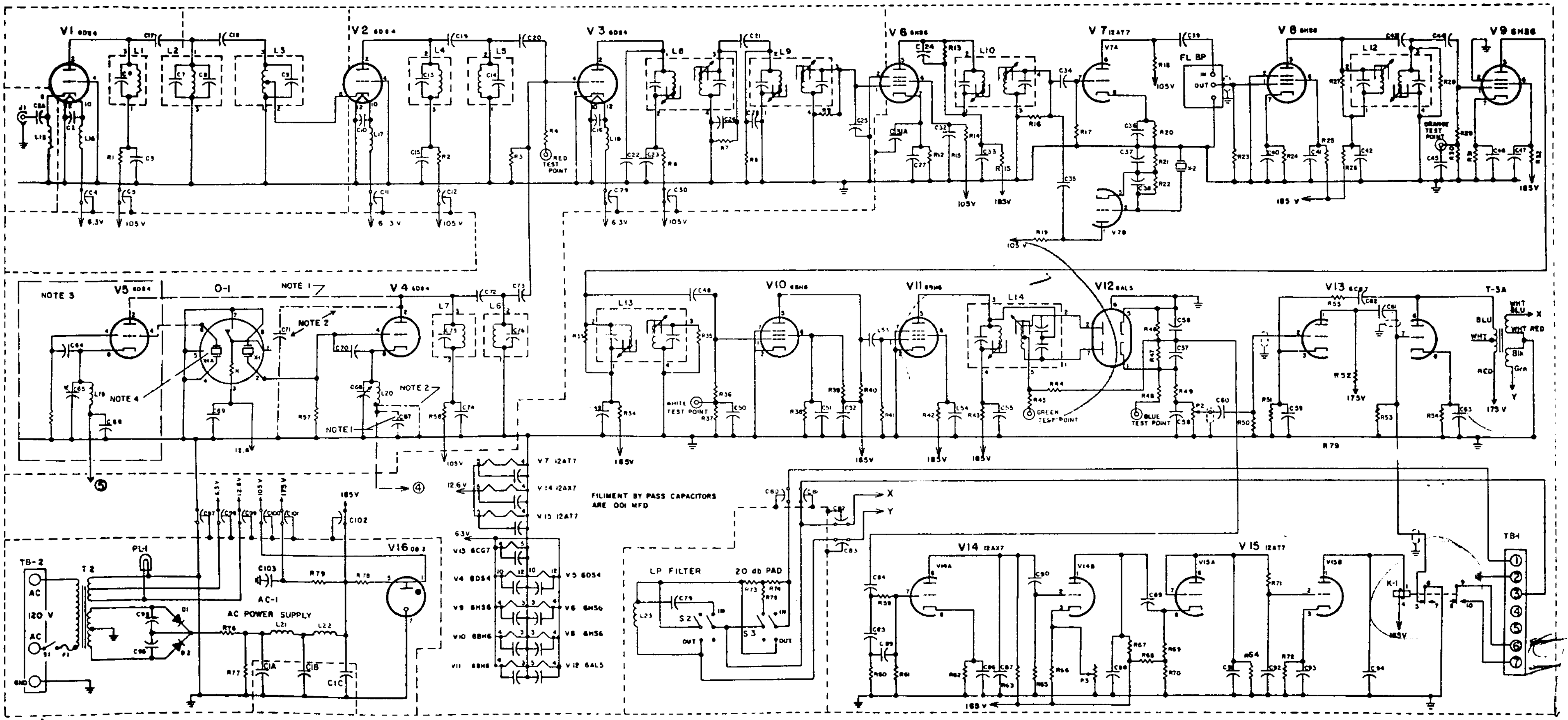
Add C-106 Discap, 47 mmfd, 5%, 500 Volts.

Replace FL-BP with L-11, C-105 & C-106.

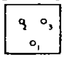
Marti Electronics
Modification on
MR-30/150-170 DWG 102
to become MR-30/150-170 (X).

MARTI O-1A SOLID STATE OVEN

THIS EQUIPMENT IS SUPPLIED WITH THE MARTI O-1A SOLID STATE PROPORTIONAL TEMPERATURE CONTROLLED CRYSTAL OVEN AND SPECIAL HIGH ACCURACY CRYSTAL. THIS OVEN-CRYSTAL COMBINATION PROVIDES FREQUENCY STABILITY OF .0005% FROM $-30^{\circ}C$ to $+60^{\circ}C$. DO NOT USE THIS CRYSTAL IN CONVENTIONAL HIGH TEMPERATURE OVENS OR USE CONVENTIONAL CRYSTALS IN THIS SOLID STATE OVEN. THE O-1A OVEN DOES NOT PRODUCE TEMPERATURES HIGH ENOUGH TO DETECT BY TOUCHING THE ALUMINUM HOUSING.



L-1 Thru L-7

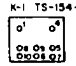


L-8 Thru L-14

TERMINAL 5 ON L14 ONLY

NOTE 1 On Single Frequency Models Dash Lines Are Omitted
NOTE 2 " " " " Dot-Dash Lines Are Connected
NOTE 3 " " " " Circuit In Dash Box Omitted
NOTE 4 " " " " X-1A Is Omitted

K-1 TS-154-C-C



Production Changes Serial No 25 & Up
Delete R-7 R-8
Change C-21 from 2.2 to 1uufd
" R-15 " 560 " 3.9K
Add C103 20ufd 250V in Pwr Supply
" C102 .001 Feed Thru " " "
R79 1K 1W 5% " " "

MARTI *ELECTRONICS* *A Divn of* MARTI *Inc. Cleburne, Texas*		
REMOTE PICK-UP RECEIVER MODEL MR-30/150-170		
DWN. E. SMITH	CKD. A. BAST	APPD. G. MARTI
DRAWING NO 102		9/17/63