

ELECTRONIC MANUFACTURING
BROADCAST TV
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3600 RICHARDSON STREET
NEW BRIGHTON
ST. PAUL 12, MINNESOTA
MEIrose 3-1742



INSTALLATION AND OPERATING MANUAL



Television Monitor

Model no. Air Alert I



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NOTE:

When replacing V4 or V5 check the relay drop-out time by removing the signal after the relay has pulled in. If the relay does not release within two seconds or fails to release altogether, lower the value of the resistor in series with the relay coil (see schematic). Conversely, if the relay fails to hold-in after being reset on a strong signal, raise the value of the resistor mentioned above. Again check to be sure that the relay releases properly when the signal is removed.

When changing resistance values in the above mentioned circuit, observe wattage ratings, as an open resistor in this circuit will cause the relay to fail to release, even under no signal conditions, after it has been "reset."

(The above is now accomplished by adjusting the "relay threshold" pot installed at the rear of the set.)

WARNING

ALARM CIRCUIT LIMITS IN AA 1 RECEIVER

External bell voltage is 6.3 volts and the alarm circuit load must not exceed 1 amp. If heavy duty alarm bell is used and may ring for long periods of time, this external voltage should be used to operate a relay and the bell voltage should be supplied by suitable bell transformer. Not observing this load limit, may cause power transformer failure.

Description:

The Air Alert I receiver is a very sensitive Conelrad receiver designed to operate on carrier interrupt during a conelrad signal. The Receiver tube line-up consists of a 6x4 rectifier 6BA6 RF amplifier, 6BE6 mixer, 6AM8 IF amplifier and detector, 12AT7 audio and DC amplifier, and a 6AQ5 output.

Installation:

The line voltage on which the receiver was designed to operate is between 105 and 120 volts. Very high line voltage will prevent alarm operation and too low voltage will prevent hold-in on normal signal.

Connect to antenna terminal #2 approximately 15 feet of antenna wire.

After the station to be monitored has been located on the dial, tune carefully through the signal, stopping on each side. Return knob to exact center. It is important to stable operation that careful tuning be observed. Push the alarm switch to reset position and hold in the reset position for a fraction of a second. Then release to allow the switch to return to the alarm position. The receiver should now be silent and ready for a Conelrad signal.

A rough check of alarm circuit can be made by shorting between antenna and ground on terminal board (this may not be reliable where monitored station is very strong and leakage pick-up may occur).

If after several hours of operation a test alert has not been received, sign off of the monitored station should be observed to determine that possible skywave signals on same channel are holding in the alarm circuit. If this trouble is encountered, the length of the antenna should be reduced until only sufficient signal from monitored station is received to hold-in alarm relay. A small series capacitor variable from 25 - 100 mmfd., will serve as an excellent antenna adjustment.

When alarm operates, the speaker returns to normal operation and the panel indicator light and rear terminals are energized. The alarm circuit must be reset after any interruption.

The alarm will operate on failure of any receiver component or momentary power interruption to the receiver.

Available between terminals #1 and #3 is 6.3 volts at 1 amp for operating external relay to control additional warning lights or bells if desired.

Operation:

The Air Alert I is a high quality superhet receiver. Its operation ahead of the 2nd detector is typical of any superhet including an RF stage, mixer, and IF amplifier. This portion will not be discussed here.

The signal from the secondary of the last IF transformer feeds two detector circuits, one of which is the diode section of the 6AM8 for audio & AVC, the other being the IN34-alarm control diode. Note the polarities of the two diodes are such that the IN34 conducts on the positive cycles of the intermediate frequencies and the other on the negative portion of the cycles. The diode section of the 6AM8 produces the detected audio signal across the 470K resistor connected to its diode plate. This 470K resistor is the take off point for a typical AVC circuit, biasing the receiver RF stage and mixer stage. The detected audio signal is coupled to the audio gain control thru a 47K and .005 mfd., capacitor in series. This applies audio signal to one triode section of the 12AT7 which serves as the 1st audio voltage amplifier. At this point note the function of switch S-1 in the "listen" position. Section 1 of the switch returns the cathode of the 1st audio amplifier section (12AT7) to ground thru a 1200 ohm cathode resistor and also returns the cathode of the 6AQ5 output tube to ground thru 330 ohm and 6.8K resistors in parallel. Section 2 returns the grid of the 6AQ5 output tube to ground thru a 1 meg resistor. Section 3 shorts out the relay coil in the 6AQ5 plate circuit. Thus, it is noted that in the "listen" position, 1/2 of the 12AT7 and 6AQ5 operate as normal audio amplifiers. Therefore, the receiver functions as a typical superhet receiver in the "listen" position of switch SI.

The second triode section of the 12AT7 serves as a DC boot-strap amplifier for the voltage from the IN34 detector. The amplified DC output is taken from the 10K cathode load resistor and is applied across the voltage dividing network consisting of 100K resistor, NE-2 neon lamp and the 200K resistor to ground. The neon serves to apply the total amplified change in DC voltage across the 200K resistor and eliminating most of the residual component. In other words, if the voltage changes from 90 to 160 volts across the 10K load resistor, the voltage appearing across the 200K resistor, after the NE-2, will go from 30 to 100 volts showing the full 70 volts change. This would not be the case if just a resistor dividing network were used. As shown in the diagram this output voltage serves no purpose when the receiver is in the "listen" position.

Now, taking the case where the receiver is switched from "listen" to "alarm". At this point the relay contacts are still closed as they were

in the "listen" position. (The relay is a normally closed type; contacts closed when no power is applied to the relay.) The voltage from the DC amplifier is shorted to ground by one of the relay contacts, the cathodes of the 1st audio amplifier and 6AQ5 are returned normal thru another set of relay contacts, and the relay coil is shorted out by one section of the switch thru a set of contacts on the relay. Thus, it is seen that the receiver is still operating normally.

When the switch S-1 is now turned to the "reset" position, the short across the relay coil is removed, the relay becomes energized, and opens its contacts. The switch in this position keeps the cathode and grid circuit of the 6AQ5 normal, so this tube will continue to conduct and keep the relay energized.

The switch S-1 is a spring return to the "alarm" position from the "reset" position. Thus upon releasing the switch it will return to the "alarm" position. This time in the "alarm" position the relay contacts are open. Here we are assuming a station has been tuned-in. This will provide a positive DC voltage from the DC amplifier circuit, previously discussed, to be applied to the grid of the 6AQ5 thru one switch contact. This positive voltage is sufficient to overcome the fixed cathode bias, which has been increased due to removing the 330 ohm resistor from across the 6.8K resistor in the cathode of the 6AQ5. (This fixed bias results from voltage divider network off of B plus composed of an 82K resistor in series with this 6.8K cathode resistor to ground.) The plus voltage across the 6.8K resistor is now also applied to the cathode of the first audio amplifier and is sufficient to cut this triode off; making the speaker silent.

If the station interrupts its carrier signaling an alert, the rectified voltage from the IN34 drops, and the amplified positive DC voltage applied to the grid of the 6AQ5 drops considerably. Since the 6AQ5 conduction is now greatly decreased the relay in its plate circuit will not hold-in and closes its contacts. This automatically returns the receiver to normal operation allowing the audio section to function and also applied voltage to the external alarm thru one switch contact and one relay contact.

The 10 mfd capacitor from the top of the NE-2 to ground provides a 1 to 2 second delay in the control voltage change to the 6AQ5. This prevents the receiver from tripping on momentary carrier interruptions of the station being monitored.

AIR ALERT I RECEIVER VOLTAGE CHART

Conditions: Function switch set as specified below, all reading taken with V.T.V.M., receiver tuned to strong signal, volume at normal listening level.

LISTEN

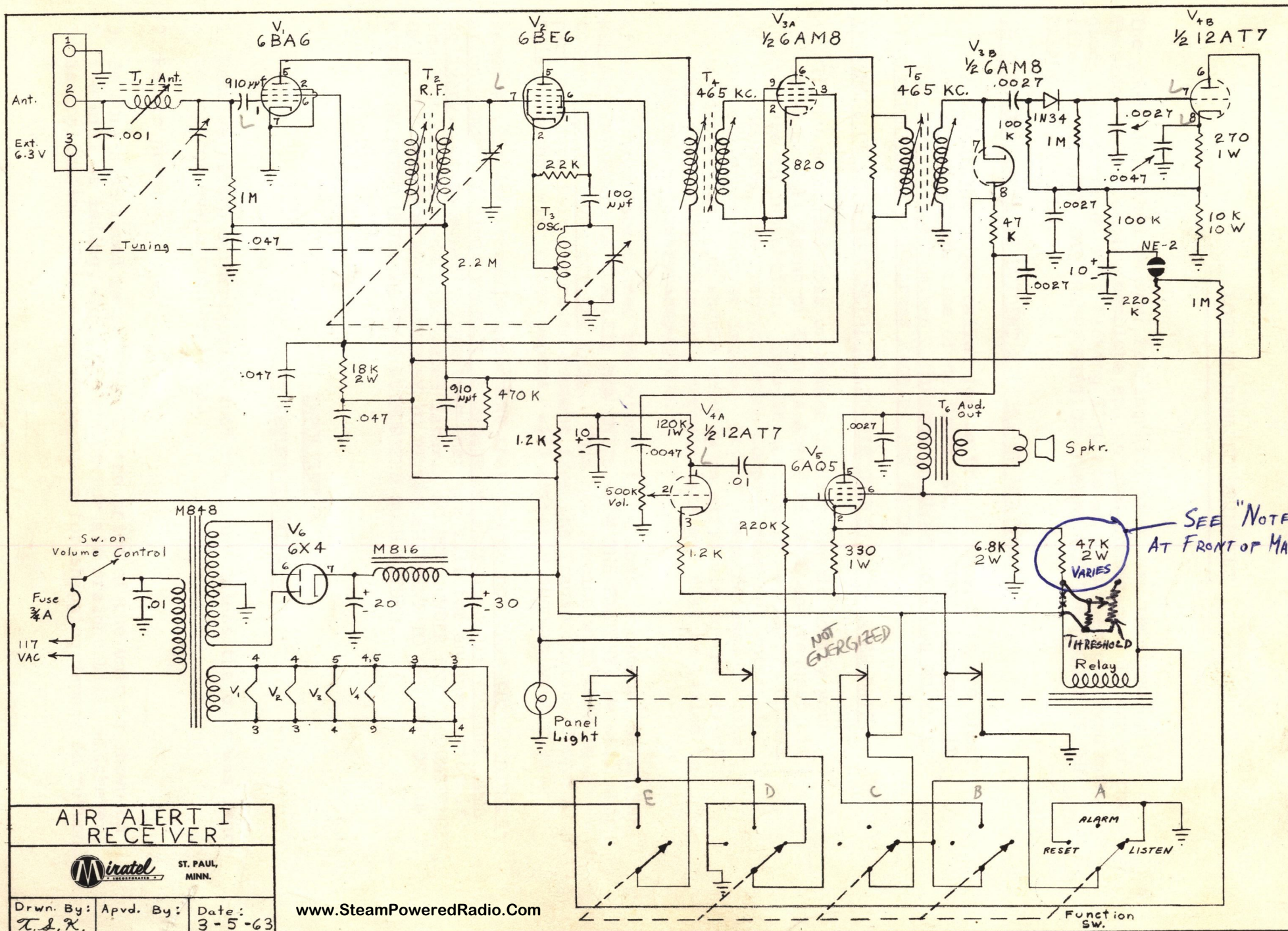
	#1	#2	#3	#4	#5	#6	#7	#8	#9
V1-6BA6	-6.2V 2.6	0	0	6.3VAC	270V. 285	94V. 95	0		
V2-6BE6	-8.4V 5.8	0	0	6.3VAC	270V. 285	94V. 95	-4.6V. 2	-2.2	
V3-6AM8	2.6V 2.4	0	94V 95	0	6.3VAC	270V. 286	N.R.	-5.0V. 0	
V4-12AT7	106V 103	0	1.7V 1.65	6.3VAC	6.3VAC	270V 280	116V 121V	90 0	
V5-6AQ5	0	15V	6.3VAC	0	265V	260V.	N.R.		
V6-6X4	245VAC	N.R.	6.3VAC	0	N.R.	245VAC	270V		

ALARM (SPKR. CUT OFF)

	#1	#2	#3	#4	#5	#6	#7	#8	#9
V1-6BA6	-6.5V	0	0	6.3VAC	305V	104V	0		
V2-6BE6	-9.4V.	0	0	6.3VAC	305V	104V	-5.2V		
V3-6AM8	2.8V.	0	104V.	0	6.3VAC	305V	N.R.		
V4-12AT7	300V.	0	67V	6.3VAC	6.3VAC	305V	134V.		
V5-6AQ5	47V	68V	6.3VAC	0	240V	235V	N.R.	-5.5V. 0	
V6-6X4	250VAC	N.R.	6.3VAC	0	N.R.	250VAC	305V	139V. 0	

RESET

	#1	#2	#3	#4	#5	#6	#7	#8	#9
V1-6BA6	-6.8V.	0	0	6.3VAC	295V.	100V.	0		
V2-6BE6	-9V.	0	0	6.3VAC	295V.	100V.	-4.9V.		
V3-6AM8	2.7V.	0	100V.	0	6.3VAC	295V.	N.R.	-5.3V. 0	
V4-12AT7	115V.	0	1.9V.	6.3VAC	6.3VAC	295V.	128V. 133V.	0	
V5-6AQ5	0	7V.	6.3VAC	0	135V.	130V.	N.R.		
V6-6X4	250VAC	N.R.	6.3VAC	0	N.R.	250VAC	295V.		



AIR ALERT I RECEIVER



ST. PAUL,
MINN.

Drwn. By: T.L.X. Apvd. By: Date: 3-5-63

www.SteamPoweredRadio.Com

LOST OR DAMAGED EQUIPMENT

The goods described on your Packing Slip have been received by the Transportation Company complete and in good condition. If any of the goods called for on this Packing Slip are short or damaged, you must file a claim WITH THE TRANSPORTATION COMPANY FOR THE AMOUNT OF THE DAMAGE AND/OR LOSS.

IF LOSS OR DAMAGE IS EVIDENT AT TIME OF DELIVERY:

If any of the goods called for on this Packing Slip are short or damaged at the time of delivery, ACCEPT THEM, but only if the Freight Agent makes a damaged or short notation on your Freight Bill or Express Receipt and signs it.

IF DAMAGE OR LOSS IS CONCEALED AND DISCOVERED AT A LATER DATE:

If any concealed loss or damage is discovered, notify your local Freight Agent or Express Agent AT ONCE and request him to make an inspection. This is absolutely necessary. Unless you do this, the Transportation Company does not entertain any claim for loss or damage. If the agent refuses to make an inspection, you should draw up an affidavit to the effect that you notified him on a certain date and that he failed to make the necessary inspection.

After you have ascertained the extent of the loss or damage, ORDER THE REPLACEMENT PARTS OR COMPLETE NEW UNITS FROM THE FACTORY. We will ship to you and bill you for the cost. This new invoice will then be a part of your claim for reimbursement from the Transportation Company. This, together with other papers, will properly support your claim.

Remember, it is extremely important that you do not give the Transportation Company a clear receipt if damage or shortages are evident upon delivery. It is equally important that you call for an inspection if the loss or damage is discovered later. DO NOT, UNDER ANY CIRCUMSTANCES, ORDER THE TRANSPORTATION COMPANY TO RETURN SHIPMENT TO OUR FACTORY OR REFUSE SHIPMENT UNTIL WE HAVE AUTHORIZED SUCH RETURN.

IMPORTANT

EQUIPMENT RETURN TO MIRATEL

1. Receive return authorization from the plant unless the unit was sent to you for evaluation or rental.
2. Return prepaid.
3. Be sure a declared value equal to the price of the unit is shown on the bill of lading, express receipt, or air freight bill, whichever is applicable. This would cover claim for shipping damage on return.

FACTORY WARRANTY

October 1, 1964

The factory will replace any faulty component or repair any faulty workmanship on their equipment at no charge within one year from date of delivery to user, except 90 days on receiving type tubes. Picture tubes carry the standard one year warranty.

The above applies where the equipment is returned to factory, prepaid, for repair. After repair, factory will return unit or parts, prepaid to user. If parts are requested to repair units in the field that are still in warranty, the parts will be shipped, prepaid, on a memo billing which will be cancelled upon receipt of the defective components.

When equipment is received with shipping damage, the claim must be filed immediately by the recipient. See enclosed instructions.



MALFUNCTION
REPORT

MINNESOTA RADIO AND TELEVISION

Dear Customer:

We are trying to manufacture the most reliable product possible. You would do us a great courtesy by completing this form should you experience any failures.

1. Type Unit _____ Serial No. _____

Module (if applicable) _____

2. Part failed (Name and Number) _____

3. Cause of failure (if readily available)

4. Approximate hours/days of operation to failure _____

5. Failure occurred during:

☐ Final Inspection

☐ Customer Installation

☐ Field Use

6. Personal Comment:

Signed _____

Date _____

MAIL TO:

Miratel Electronics, Inc.
3600 Richardson Street
New Brighton 12, Minnesota
Attn: Quality Control Reliability Dept.



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