AIR-GROUND RADIO
PRIVATE SYSTEMS
ECHO-FOX UHF RADIO SYSTEM
BASE RECEIVER GE-MASTR PROGRESS LINE ALIGNMENT

This section provides alignment procedures for the Echo-Fox UHF receiver. The Echo-Fox receiver is operated on a 24-hour per day basis with primary power applied. A release must be obtained from the control office before maintenance may be performed that interrupts or impairs service.

This section is reissued to reflect the deletion of wideband service.

Equipment Test Lists are affected.

It is assumed that the tests in Section 406-116-505 have been performed and the requirements not met. ***If the minor alignment requirements in this section cannot be met, consideration should be given to returning the unit to the factory for depot maintenance.***

Maintenance performed should be entered in the maintenance log similar to Fig. 1.

CHART **PAGE**

APPARATUS:

The following test apparatus is required for the performance of alignment procedures outlined in this section. Before performing any of the adjustments, ensure that each item of test apparatus is properly calibrated in accordance with the manufacturer's specifications.

1—Volt-Ohm-Milliameter KS-14510

1—IF Signal Generator capable of supplying 455 kHz

1—RF Signal Generator capable of supplying 406 to 470 MHz

2—39 kΩ resistors

APPARATUS (Cont):

1—Test Cable Set, Amphenol C133-216

1—Transmission Measuring Set J94021 (21A TMS)

1—Oscilloscope

1—Frequency Counter capable of counting the station frequency

CHART 1

PRELIMINARY ADJUSTMENTS

STEP	PROCEDURE
1	Insert dummy plugs in the following LINE jacks: TC1, RC1, and receive audio.
2	On the station power supply, set the VOLUME control fully counterclockwise (minimum) and the SQUELCH control fully clockwise (unsquelched).
3	On the RECEIVER meter switching panel, set the control to J (see Table A).
4	Observe the RECEIVER meter indication. ***Requirement:*** 10 $\pm$0.1 volts.
5	If the requirement in Step 4 is not met, adjust R11 on the rear of the station power supply until the requirement is met.
6	On the RECEIVER meter switching panel, set the control to G.
7	Observe the RECEIVER meter indication. ***Requirement:*** 0.65 volt.
8	If the requirement in Step 7 is not met, adjust potentiometer R47 on the audio and squelch board.
9	Set the VOLUME control on the station power supply to midrange.

CHART 2

MINOR ALIGNMENT

SQUELCH

In setting the squelch, the objective is to determine the RF carrier signal input level that produces a 25-dB difference between the receiver output when the carrier is unmodulated (noise only) and the receiver output level when the carrier is modulated (tone plus noise). The squelch is set so that the receiver becomes unmuted when the RF carrier equals this determination.

STEP	PROCEDURE
1	Connect the RF signal generator to the FM deviation meter through a 6-dB pad.
2	Set the RF signal generator output sufficient to drive the deviation meter to proper operation.
3	Set the deviation of the signal generator to $\pm$10 kHz at 1000 Hz (Fig. 2).
4	Remove the RF signal generator from the deviation meter and connect the RF signal generator output through the 6-dB pad to the receiver input.
5	Set the RF signal generator output to -80 dBm.
6	Set the RECEIVER meter switching panel control to position A. ***Note:*** It is important to check the discriminator periodically throughout the procedure to determine there is no drift in the equipment.
7	Adjust the signal generator frequency (if necessary) to obtain discriminator zero.

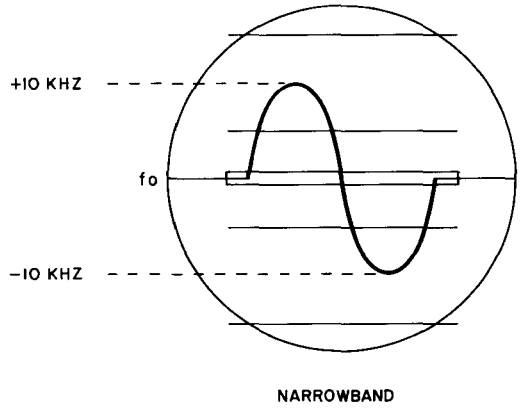


Fig. 2—Deviation Pattern

CHART 2 (Cont)

STEP	PROCEDURE
20	Slowly increase the signal generator output until the receiver output is unmuted. ***Requirement:*** The carrier level at the signal generator is the same as the level set in Step 17. ***Note:*** This is a critical adjustment and may require repeated operation to meet the requirements. **VOLUME**
21	Repeat Steps 1 through 7 in this chart.
22	Set the RECEIVER meter switch to position C.
23	Reduce the signal generator output to −100 dBm. Slowly increase the signal generator output until the limiter saturates. This is indicated by no further increase in the meter indication when the signal generator output is increased.
24	Set the RECEIVER meter switch to position A.
25	Adjust the signal generator frequency to obtain discriminator zero.
26	Connect the TMS 600-ohm input to the receiver audio EQPT jacks.
27	On the station power supply, set the VOLUME control to the position where the receiver output is +3 dBm (indicated on the RECEIVER meter).
28	This completes the minor alignment procedure. Remove all test equipment and return the receiver to service.

CHART 3

MAJOR ALIGNMENT

DISCRIMINATOR

It is important to establish the proper frequency and linearity of the discriminator before proceeding with the other procedures in this chart. Two frequency adjustments appear in the major alignment; one refers to the IF frequency of the discriminator and the other relates to the RF frequency of the station receiver.

CHART 3 (Cont)	
STEP	**PROCEDURE**
14.	Set the RECEIVER meter switch to position E.
15	Adjust L5, T410/T412, and T411/T413 for a maximum meter indication.
16	Adjust capacitor C423 to a position where a small change in meter indication is evident.
	Note: Capacitor C423 is located in the second multiplier.
17	Set the RECEIVER meter switch to position A.
18	Adjust the frequency of the signal generator for a zero indication on the meter (discriminator zero).
19	Set the RECEIVER meter switch to position C.
20	Adjust the output of the signal generator for limiter saturation.
21	Recheck the frequency of the signal generator (discriminator zero).
22	Set the RECEIVER meter switch to position B.
23	Adjust capacitors C423 and C424 for a maximum meter indication.
	RF AMPLIFIERS AND SELECTIVITY
24	Set the RECEIVER meter switch to position A.
25	Apply an RF signal from the RF signal generator to hole H411 on the RF section of the receiver and adjust for discriminator zero.
26	Set the RECEIVER meter switch to position C.
27	Adjust the signal generator output for first limiter saturation.
28	Set the RECEIVER meter switch to position B.
29	With the signal generator output applied to hole H411, adjust C3, C418, and C417 for maximum meter indication.
30	Change the signal generator output to hole H410 and recheck discriminator zero and first limiter saturation.
31	Return the meter switch to B.
32	With the signal generator output applied to hole H410, adjust C415, C416, and C417 for maximum meter indication.

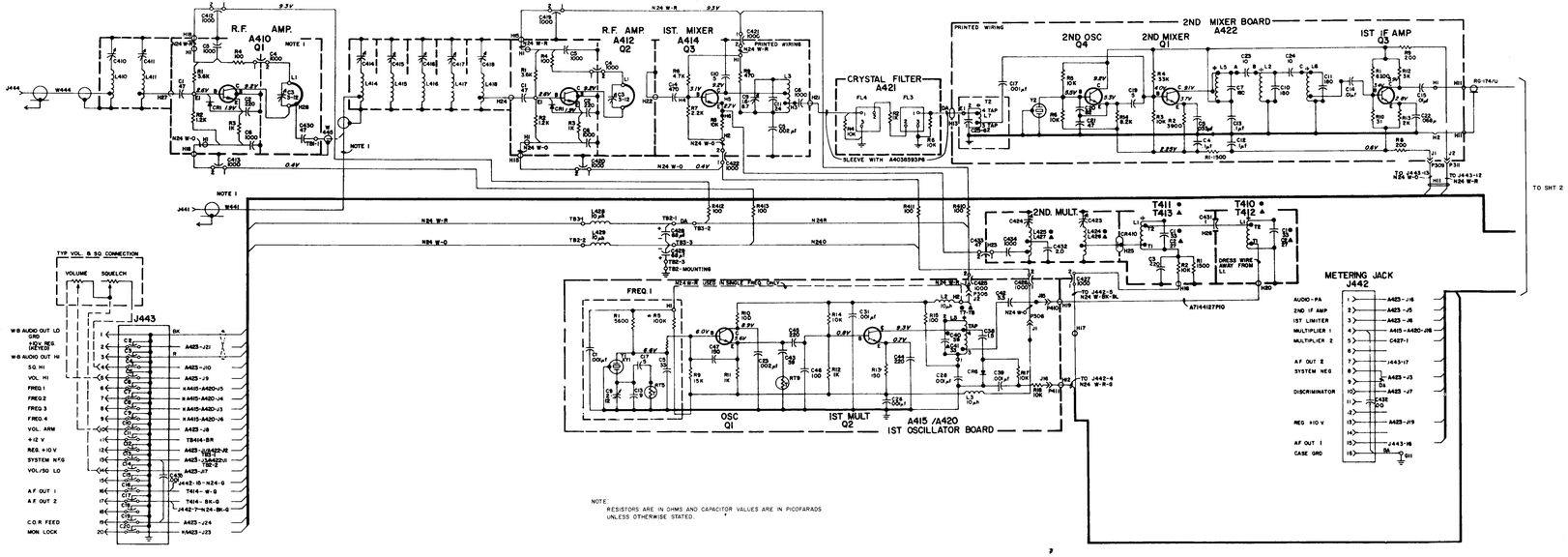
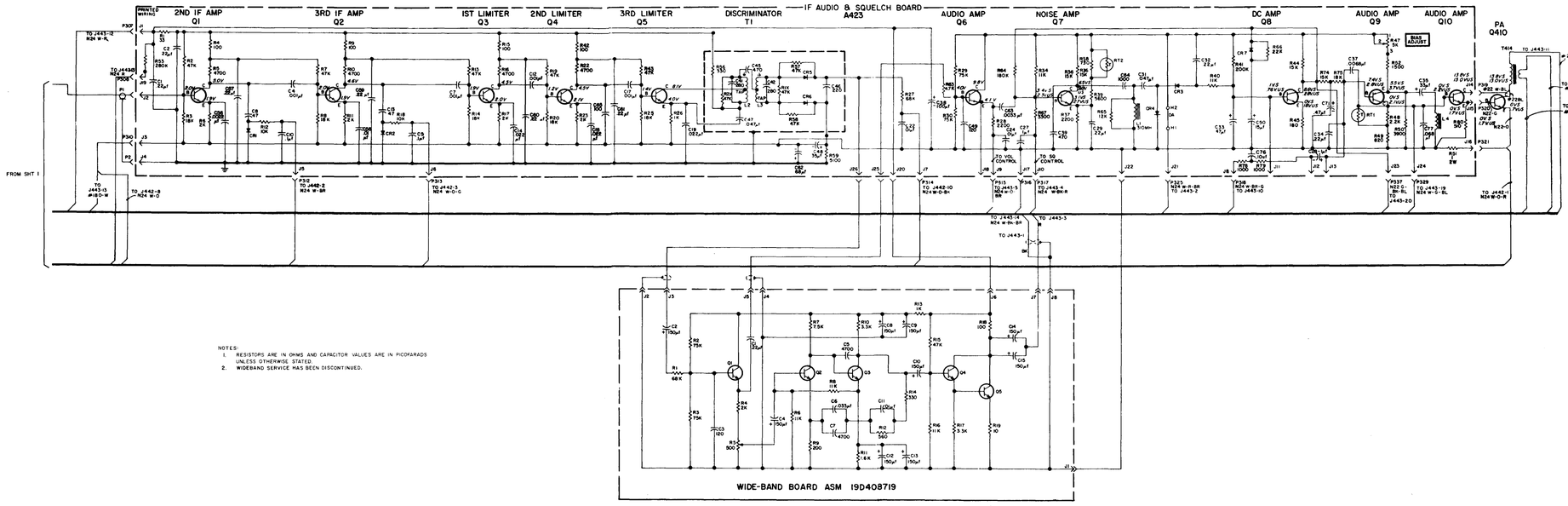


Fig. 3—Echo-Fox Receiver—Schematic Diagram (Sheet 1 of 2)



NOTES:
1. RESISTORS ARE IN OHMS AND CAPACITOR VALUES ARE IN PICOFARADS UNLESS OTHERWISE STATED.
2. WIDEBAND SERVICE HAS BEEN DISCONTINUED.

Fig. 3—Echo-Fox Receiver—Schematic Diagram (Sheet 2 of 2)

CHART 3 (Cont)	
STEP	**PROCEDURE**
49	Adjust L6 for a peak meter indication.
50	Load L5 (as in Step 48) from point A to ground and L6 from point C to ground, adjust L2 for a maximum meter indication.
51	Load L2 at point B and adjust L6 for maximum.
52	Remove all test equipment and return the receiver to service.