



communications

DATAFILE BULLETIN

FILE UNDER: Receivers
ER-42-B
BULLETIN NO: 1086-1
DATE: March 1965

Equipment: 406—470 MC MASTR Progress Line Receivers

Symptom:

- AUDIO HOWLING
- SPURIOUS RESPONSE ± 455 KC FROM CENTER FREQ.

Cause:

Feedback within receiver cabling. Spurious response most apt to be noticed when meter panel or test set is used.

Factory
Solution:

Model Number
4ER42B10 thru 45

Revision
B

This revision eliminated the feedback by adding capacitor C435 across pins 13 and 19 of J443 and capacitor C436 from J442-4 to ground.

Field
Solution:

This revision can be made in the field by soldering a .001-uf capacitor from pin 13 to pin 19 of J443 inside the receiver. Also, solder a .002-uf capacitor from J442-4 to ground G11.

Ordering
Info:

Capacitors C435 and C436 are available from Service Parts.

<u>Qty.</u>	<u>Symbol Number</u>	<u>G-E Part No.</u>	<u>Description</u>
1	C435	7774750-P4	Capacitor, fixed ceramic disc: .001 uf +100% -0%, 500 VDCW.
1	C436	7774750-P6	Capacitor, fixed ceramic disc: .002 uf +100% -0%, 500 VDCW.



communications

DATAFILE BULLETIN

FILE UNDER: Receivers

ER-42-B

BULLETIN NO: 1086-2

DATE: June 1965

Equipment: 406-470 MC MASTR Progress Line Receivers

Symptom: RUMBLE AT LOW VOLUME SETTING

This condition is noticed as a low rumble when the VOLUME control is set at a low level and the SQUELCH control is set at critical.

Cause: Excessively sharp voltage variations on DC amplifier output which were coupled into audio amplifier.

Factory Solution:

Model NumbersRevision

4ER42B10-15 and 22-27

D

4ER42B16-21 and 28-45

E

This revision provided decoupling between the output of the DC amplifier and the input of the first audio stage to reduce rumble at low volume settings. Resistor R46 was replaced by decoupling network R74-R75-C71 on the IF/Audio & Squelch Board.

This revision also reduced discriminator output variations from receiver to receiver by changing Q4 and Q5 on the IF/Audio & Squelch Board from part 19A115123-P1 to part 19A115552-P1. Temperature compensation for the low IF circuits was improved by changing the temperature coefficient of C10, C11 and C22 from -470 PPM to -330 PPM.

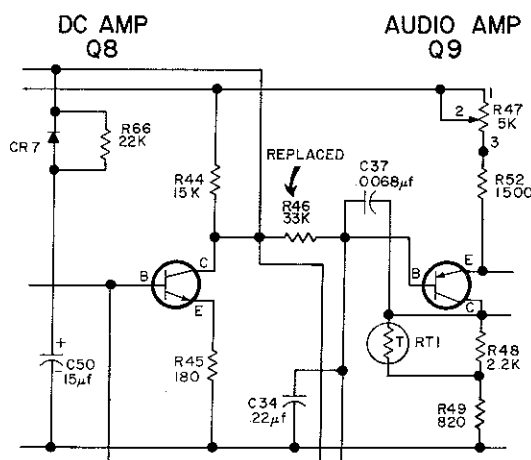


Fig. 1 - Old Circuit

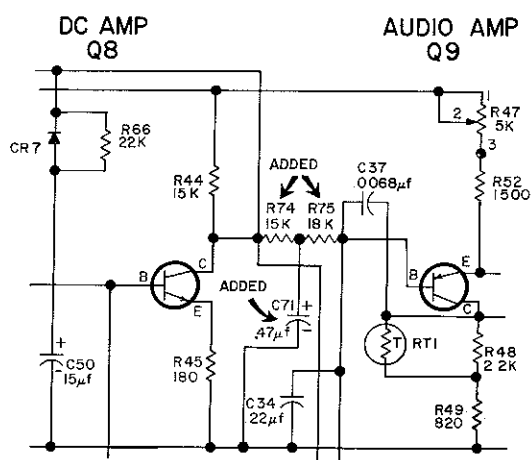


Fig. 2 - New Circuit

Field Solution: If rumble is noticed at low volume settings, it can be eliminated by adding the decoupling network on the IF/Audio & Squelch Board as follows:

1. Remove R46 (33K ohms $\pm 10\%$, 1/2 watt) from the IF/Audio Board.
2. Mount R74 (15K ohms $\pm 10\%$, 1/2 watt) and R75 (18K ohms $\pm 10\%$, 1/2 watt) in the holes from which R46 was removed. See Figure 3.

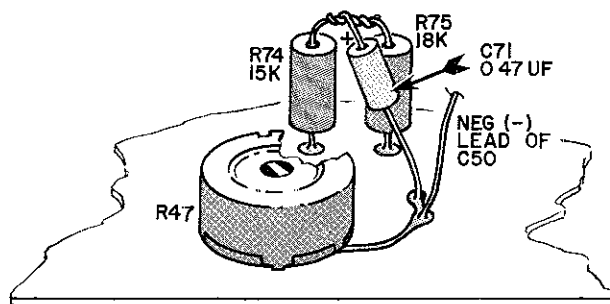


Fig. 3 - Decoupling Network

3. Solder the leads of R74 and R75 together with the positive (+) lead of C71 (0.47 μf $\pm 20\%$, 35 VDCW), as shown.
4. Solder the negative (-) lead of C71 into the unused hole next to the negative lead of C50, as shown in Figure 3.

Ordering Info: To eliminate rumble at low volume settings as described above, only R74, R75 and C71 are required. These components are available from Service Parts.

Symbol Number	G-E Part No.	Description
C10 and C11	5496219-P566	Capacitor, ceramic: 130 pf $\pm 5\%$, 500 VDCW, -330 PPM temp coef.
C22	5496219-P564	Capacitor, ceramic: 110 pf $\pm 5\%$, 500 VDCW, -330 PPM temp coef.
C71	5496267-P28	Capacitor, tantalum: 0.47 μf $\pm 20\%$ 35 VDCW.
Q4 and Q5	19A115552-P1	Transistor, silicon: NPN, sim to Type 2N2714.
R74	3R77-P153K	Resistor: 15,000 ohms $\pm 10\%$, 1/2 watt.
R75	3R77-P183K	Resistor: 18,000 ohms $\pm 10\%$, 1/2 watt.

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DATAFILE BULLETIN

FILE UNDER: Receivers

ER-42-B

BULLETIN NO: 1086-3

DATE: December 1965

Equipment: 406—470 MC MASTR Progress Line Receivers

Symptom: OSCILLATION PRODUCES UNSTABLE TUNING AND QUIETING

Oscillation in the RF amplifier or first multiplier circuit has been found in some receivers, giving high limiter or 2nd IF readings with no signal input. When listening to the speaker and tuning the multiplier, this oscillation may appear to quiet the receiver. The tuning is unstable, however, and the receiver may be microphonic.

Cause: Oscillation in RF Amplifier A412 was due to a poor ground connection between the chassis on which the circuit is constructed and the casting. In first multiplier transformer T411/T413, capacitor C3 was self-resonant at the frequency of oscillation.

Factory Solution:	Model Number	Revision
	4ER42B10—15 and 22—27	F
	4ER42B16—21 and 28—45	G

This revision eliminated oscillation in RF Amplifier A412 by improving the ground connection between the chassis of A412 and the inside of the casting. Oscillation in the first multiplier circuit was eliminated by changing C3 in transformer T411/T413.

This revision also improved the receivers' IF response by changing resistors R3 and R4 in crystal filter assembly A421 and by changing tap T1 on coil L3 in first mixer assembly A415.

Field Solution: If oscillation is experienced, determine first whether it is in RF amplifier A412 or in 1st multiplier transformer T411/T413. This can be done by temporarily disconnecting the orange-white supply lead to A412 from feed-thru capacitor C420 on top of the receiver chassis. If the oscillation stops, it is originating in the RF amplifier. Both of the following modifications should be made in the receiver.

If disconnecting the orange-white wire does not stop the oscillation, the oscillation is probably in the 1st multiplier transformer. Modification "B" which follows should then be made.

Field
Solution:
(cont'd)

A - To improve chassis ground in RF amplifier A412:

1. Remove the screws holding the circuit boards beneath the receiver and swing the boards out.
2. Remove the screws holding the metal wrap-around and pull it away from the receiver chassis.
3. Remove the 21 screws holding the cover plate over the receiver RF circuits. Remove the plate.
4. Disconnect the input, output and supply leads from the RF amplifier circuit.
5. Remove the two screws holding the chassis of A412 in the casting. Remove the chassis.
6. Thoroughly abrade an area at least 1/2 inch in diameter around both mounting holes on the chassis to provide a good ground connection to the casting. A Fiberglass brush is recommended for scrubbing off any oxidation and lacquer on the chassis.
7. Replace the chassis and re-connect the circuit.

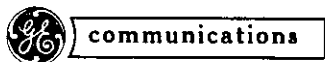
B - To change C3 in 1st multiplier transformer T411/T413:
If modification "A" was not made, perform steps 1—3 above.

8. From the top of the receiver, remove the two screws holding coil L1 in T411/T413.
9. Replace capacitor C3 with a 220-pf $\pm 20\%$ capacitor.
10. Reassemble the receiver.

Ordering
Info:

C3 is available from Service Parts:

<u>Qty.</u>	<u>Symbol No.</u>	<u>G-E Part No.</u>	<u>Description</u>
1	T411/T413-C3	5494481-P3	Capacitor, ceramic: 220 pf $\pm 20\%$, 1000 VDCW; sim to RMC Type JF Discap.



DATAFILE BULLETIN

FILE UNDER: Receivers
ER-42-A, B & C
BULLETIN NO 1086-4
DATE: November 1967

Equipment: 406—470 MHz MASTR Professional Receivers

Symptom: AUDIO OUTPUT TRANSISTOR FAILS

Cause: Negative voltage spikes, induced in the supply lead by external transients.

Factory Solution:	Model Number	Revision
	19E500866-G1—4 (used in 4ER42A10—45)	A
	" (used in 4ER42C10—45)	A
	19E500866-G5—8 (used in 4ER42B10—45)	A
	" (used in 4ER42D10—45)	A

This revision added a diode in series with the +12 VDC supply lead to prevent negative spikes from reaching the output transistor. See Figure 1.

Field Solution: The diode should be added to receivers which do not have it, as shown in Figure 1. Connect the anode lead to J443-11 and the cathode lead to the brown wire from the audio output transformer. Use sleeving where necessary.

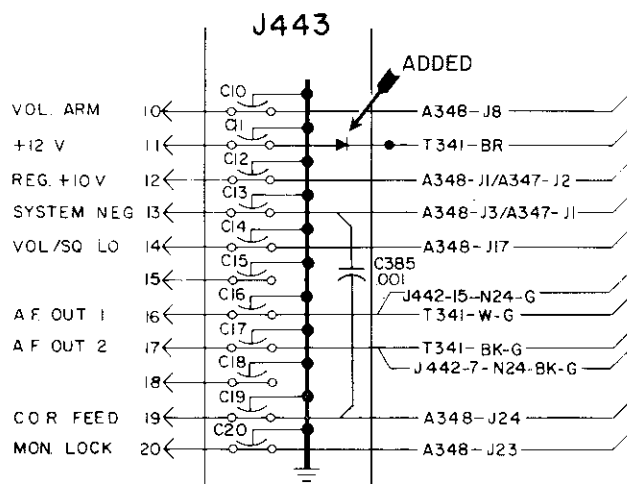


Figure 1 - Showing Diode Added

Ordering Info:	Symbol Number	GE Part No.	Description
	CR401	4037822-P1	Diode, silicon: PIV 400, sim to SC4.



communications

DATAFILE BULLETIN

FILE UNDER: Receivers

ER-42-A, B & C

BULLETIN NO: 1086-5

DATE: February 1968

Equipment 406-470 MHz MASTR Professional Receivers

Symptom: **INSTABILITY OF AUDIO POWER AMP USING TRANSISTOR F115527**

Cause: Variations in transistor characteristics between vendors.

Factory Solution:	<u>Model Number</u>	<u>Revision</u>
	19D402327-G5 (IF/Audio Board A423)	H
	19D402327-G6 (IF/Audio Board A424)	H
	19D402327-G11 (IF/Audio Board A430)	A
	19D402327-G12 (IF/Audio Board A431)	A

This revision added by-pass capacitor C78 on the IF/Audio Board to eliminate the instability. The capacitor was added between the emitter of power amplifier transistor Q410 and ground.

Field Solution: If a Fairchild output transistor (identified by the marking "F115527") is used, add capacitor C78 on the IF/Audio Board between the solder side of J16 and the adjacent ground pattern.

Ordering Info:	<u>Symbol</u>	<u>GE Part No.</u>	<u>Description</u>
	C78 on IF/Audio Board	5494481-P114	Capacitor, ceramic disc: 2000 pf $\pm 10\%$, 1000 VDCW; Sim to RMC Type JF Discap.

DATAFILE BULLETIN

FILE UNDER: Receivers
ER-42-A, B & C
BULLETIN NO 1086-6
DATE March 1968

Equipment: 406--470 MHz MASTR Professional 2-watt receivers with Channel Guard, when used in station combinations

Symptom: 60-CYCLE HUM ON AUDIO OUTPUT (ESPECIALLY IN STATIONS EQUIPPED WITH COMPRESSORS)

Cause: Magnetic coupling between power transformer T501 on Station Power Supply EP-38-A and choke L1 on Channel Guard Board 19C303550-G1 (Rev. E or later), 19C303550-G2 (Rev. D or later), or 19C303550-G3.

Factory Solution: Kit 19A122382-G4 is being added to all stations which use 2-watt receivers with Channel Guard. This kit replaces choke L1 of the tubular type (19A115690-P2) with a choke of pot-core construction (19B204554-G1).

Field Solution: If hum is objectionably high in a station which uses a 2-watt receiver with Channel Guard, install kit 19A122382-G4 as follows:

1. Remove and discard the tubular choke L1 (19A115690-P2).
2. Drill two 1/8" holes in the Channel Guard board at the locations shown in Figure 1.

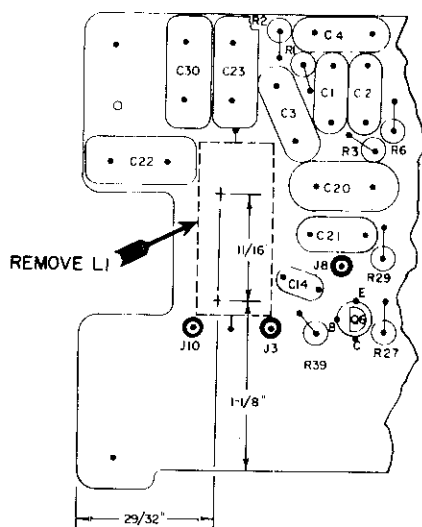


Fig. 1 - Before Modif.

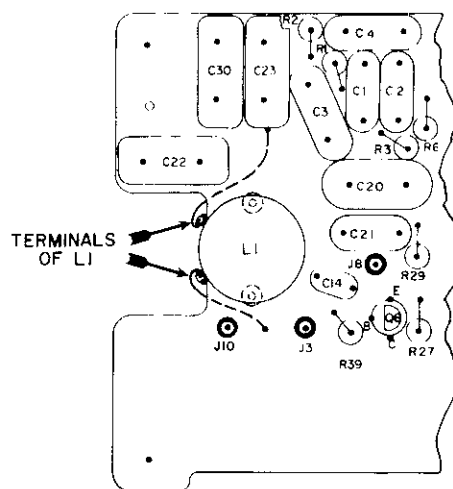


Fig. 2 - After Modification

Field
Solution:
(Cont'd)

3. Install eyelets in the two 1/8-inch holes.
4. Mount the new pot-core choke (19B204554-G1) in the eyelets so that the two terminals of the choke hang over the edge of the board. See Figure 2.
5. Using sleeved #22 bus wire, connect the choke terminals to the holes from which the old choke was removed.
6. Remove and discard the bracket used to fasten the back cover to the receiver. Otherwise, L1 will hit the bracket when the receiver is reassembled.

Ordering
Info:

To change L1 to the pot-core type choke, order kit 19A122382-G4. This kit provides:

<u>Qty.</u>	<u>GE Part No.</u>	<u>Description</u>
1	19B204554-G1	Coil: 1.37 henries \pm .03 henries.
2	N330-P1203F22	Eyelet: 1/8" diameter x 3/32"

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DATAFILE BULLETIN

FILE UNDER: Receivers
ER-42-A, B, C & D
BULLETIN NO: 1086-7
DATE: October 1968

Equipment: 406-470 MHz MASTR Professional receiver (2-watt)

Symptom:

INSTABILITY OF AUDIO POWER AMPLIFIER USING TRANSISTOR
F115527.

Cause:

Parameter variations in transistors from different vendors.

Factory
Solution:

PL Number

Revision

19E500866-G1-4 (used in 4ER42A10-45)
(used in 4ER42C10-45)

C
C

19E500866-G5-8 (used in 4ER42B10-45)
(used in 4ER42D10-45)

C
C

This revision added capacitor (C437) from collector of audio PA transistor (Q410) to ground and eliminated the instability.

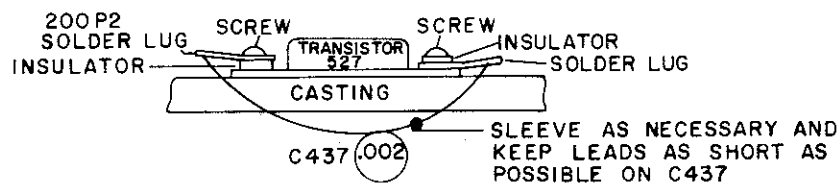


FIG 1

Field
Solution:

Make this revision in the field if the audio PA transistor oscillates:

1. Solder C437 in circuit as shown in Fig. 1.
2. Stamp or mark unit with "Rev. C".

Ordering
Info:

<u>Quantity</u>	<u>Symbol</u>	<u>GE Part No.</u>	<u>Description</u>
1	C437	5494481-P13	Ceramic disc: 2000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
2		4035200-P2	Solder lug.



DATAFILE BULLETIN

FILE UNDER: Receivers
ER-42-A, B, C
BULLETIN NO. 1086-8
DATE April 1969

Equipment: Early models of 450-MHz MASTR Professional Receivers (ER-42-E, F, G, & H) with 5-watt audio 19D413129-G3 (no Rev.) 19D413129-G2 (Rev. A & Earlier)

Purpose:

TO OFFER A FIELD MODIFICATION TO REPLACE THE AUDIO OUTPUT TRANSISTORS FROM 19A115948-P1 (no longer available) to 19A116203-P2

Field Change:

The 19A116203-P2 transistor can be used in place of the 19A115948-P1 but the following changes have to be made: (Refer to Figure 1, 2, & 3)

1. Change R64 from 18 ohms to 12 ohms.
2. Change C40 from 0.22 μ F to 0.47 μ F.
3. Add C53 and C54 (2.2 μ F) in series. Solder the can (Neg.) sides together. Connect the positive side of C53 to J13 pad and the positive side of C54 to system negative near T1.
4. Unsolder and carefully remove C28 (0.68 μ F). Solder the positive (+) side of C28 in the pad that connects to C43 & R64.
5. Solder one side of R101 (16 ohms) to the pad connecting J13. Solder the other side of R101 to the negative (-) side of C28.
6. Replace the two audio output transistors with 19A116203-P2. (see Fig. 3) Mount each transistor with a 19A116023-P2 insulator plate and a 19A116022-P1 bushing. Use silicon grease on both sides of the insulator plate.

NOTE

The lead connections are different from the 19A115948-P1 transistor.

7. TEST PROCEDURE CHANGE: Turn the squelch control fully counterclockwise. Connect a milliammeter in series with the +12 volt lead at P443-11. With no signal in, adjust the PA bias adjust (R43) for a reading of approximately 20 milliamps.

(over)

Ordering
Info:

FEB Kit 581 A & B contain the following parts:

Qty.	Symbol	GE Part Number	Description
1	C40	5496267-P28	Capacitor, Tantalum: 0.47 μ F \pm 20%, 35 VDCW; Sim to Sprague Type 150D.
1	C53	5496267-P213	Capacitor, Tantalum: 2.2 μ F \pm 10%, 20 VDCW; Sim to Sprague type 150D.
1	C54	5496267-P213	Same as above
2	Q301/Q302 Q341/Q342 Q410/Q411	19A116203-P2*	Transistor, Silicon; NPN
2		19A116023-P2*	Insulator Plate
2		19A116022-P1*	Bushing
1	R64	C3R77-P120J	Resistor, Composition: 12 ohms \pm 5%, 1/2 watt
1	R101	C3R77-P160J	Resistor, Composition: 16 ohms \pm 5%, 1/2 watt

* These parts are not supplied with FEB Kit 581 B

IF-AUDIO & SQUELCH BOARD

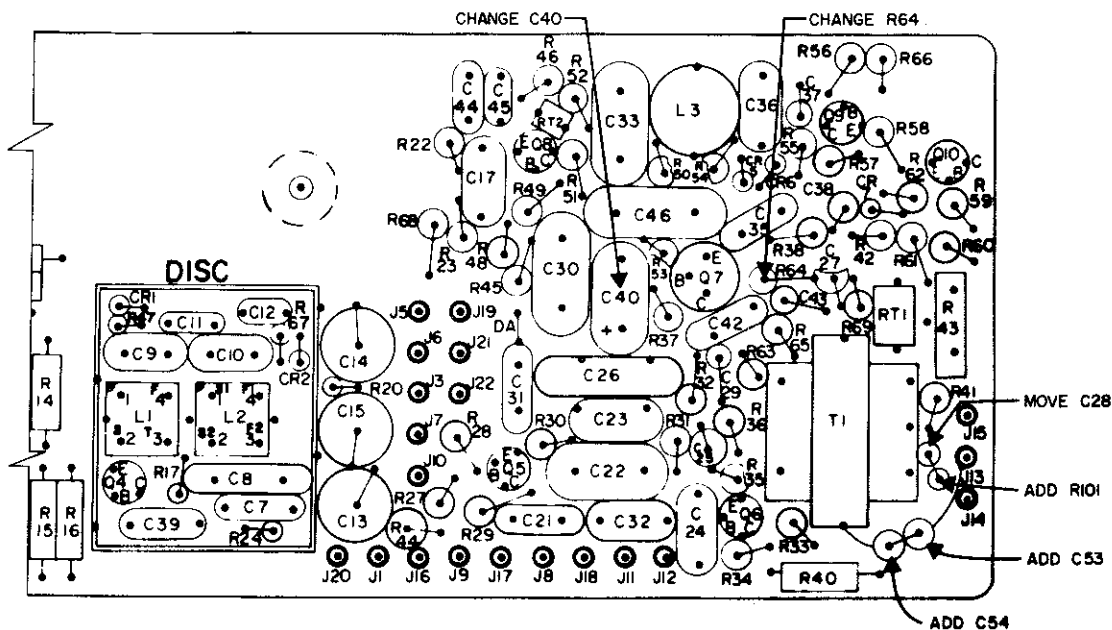
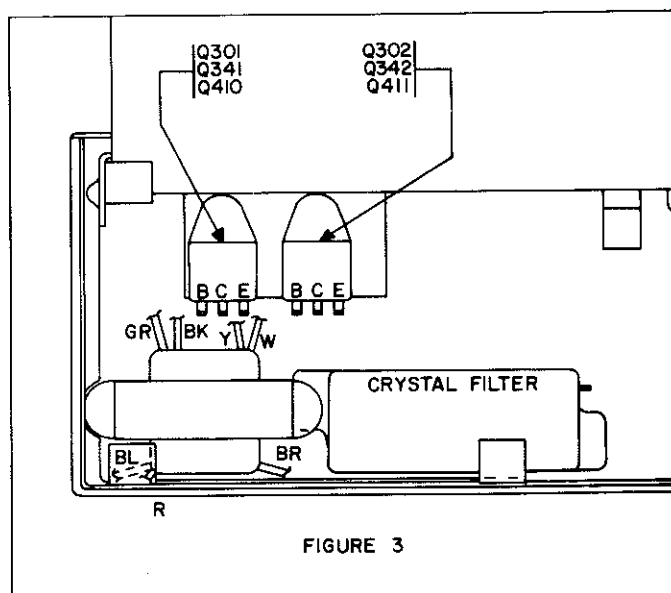
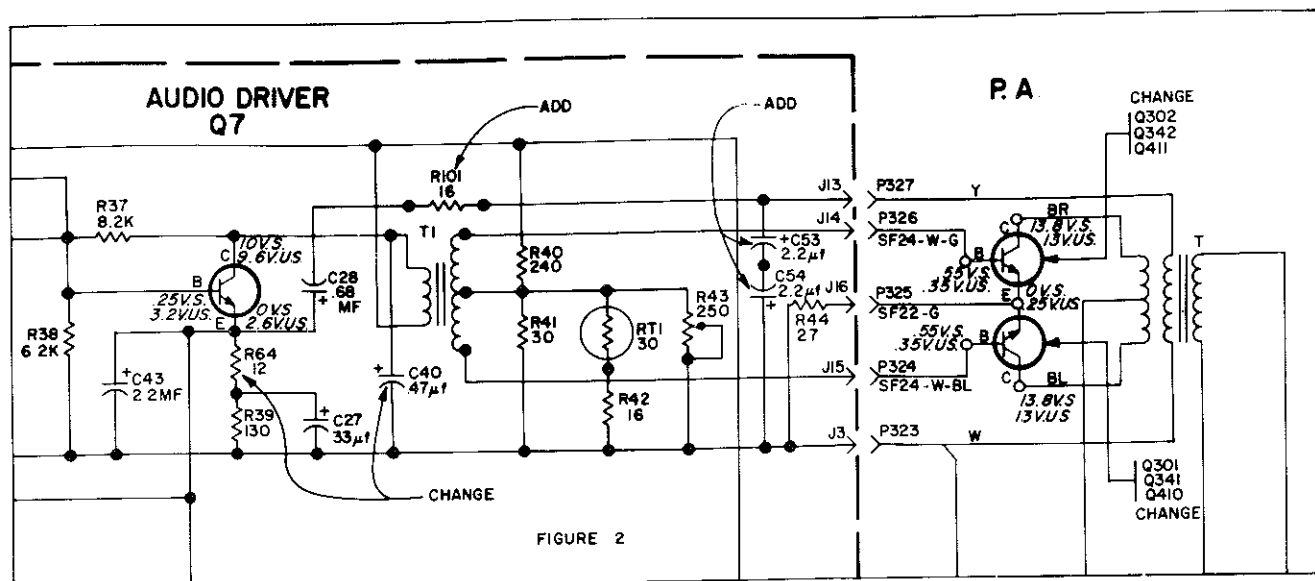


FIGURE 1



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DATAFILE BULLETIN

FILE UNDER: Receivers
ER-42-A thru H
BULLETIN NO: 1086-9
DATE: May 1969

Equipment 450-MHz MASTR Professional Receivers with Channel Guard
4ER42E16-21,28-33; 4ER42G16,17,20,21,28,29,32,33

Symptom: EXCESSIVE SQUELCH OPENING THUMP

Cause: Ringing in the tone reject filter

Factory	Model Number	Revision
Solution:	19E500881-G1-8(chassis & RF assembly)	D

This revision removed a ground loop in the receiver wiring harness.

Field Solution: Make this revision in the field if the above symptom occurs and the units are not to the revision listed above:

1. Unsolder and remove #24 white-orange wire between J443-13 and TB2-1.
2. Add a length of #24 stranded wire between TB2-1 and P312 (connected to J17 on IF Audio & Squelch Board). Dress wire into harness.
3. Use a 4029840-P3 Electrical Contact to terminate the two wires on P312.

Ordering	Qty.	Symbol	GE Part Number	Description
Info:	1	P312	4029840-P3	Contact, electrical; Sim to Amp 42827-2

DATAFILE BULLETIN

FILE UNDER:

RECEIVERS

ER-42-A thru H

BULLETIN NO:

1086-10

DATE:

February 1972

EQUIPMENT: 450 MHz MASTR Professional Receivers Models 4ER42E10-33,
4ER42G10-13, 4ER42F10-27, 4ER42H10-27

SYMPTOM:

SQUELCH OPENS AT LOW TEMPERATURE WHEN PSLM OR SLM IS USED

CAUSE:

Excessive H_{fe} fall-off of Q10 at low temperature.

FACTORY
SOLUTION:Model NumberRevision

19D413129G2 (IF Audio & Squelch board)

G

19D413129G3 (IF Audio & Squelch board)

H

This revision changed Q10 from a 19A115123P1 to a
19A116774P1.

FIELD
SOLUTION:

Make this revision in the field if the above symptom is
apparent.

1. Change Q10 on the IF Audio and Squelch board.
2. Stamp or mark the unit with the revision letter listed
above.

ORDERING
INFO:Symbol No.GE Part No.Description

Q10

19A116774P1

Silicon transistor,
NPN.

DATAFILE BULLETIN

FILE UNDER: RECEIVERS

ER-42-A thru H

BULLETIN NO: 1086-11

DATE: March 1972

EQUIPMENT: 406-470 MHz MASTR Professional Receivers
Models 4ER42E10-33, F10-27, G10-33, H10-27.

PURPOSE: 19A116203P2 AUDIO PA TRANSISTORS REPLACED BY 19A116741P1

FACTORY
SOLUTION:

Model NumberRevision

19E500881G1,3,5,7 (Chassis & RF Assembly)
19E500881G2,4,6,8 " " " "

K
L

This revision changed the Audio PA transistors Q410 and Q411 from a 19A116203P2 to a 19A116741P1.

FIELD
SOLUTION:

Make this revision in the field if the Audio PA transistors have to be replaced for any reason. New mounting hardware is supplied with the new 19A116741P1 transistors.

1. Replace Q410 and Q411 with the new transistors.
2. Stamp or mark the unit with the appropriate revision letter listed above.

ORDERING
INFO:

<u>Qty</u>	<u>Symbol</u>	<u>GE Part No.</u>	<u>Description</u>
2	Q410 & Q411	19A116741P1	Transistor, Silicon NPN.

DATAFILE **BULLETIN**

FILE UNDER: Receivers

ER-42-A thru H

BULLETIN NO: 1086-12

DATE: August, 1972

EQUIPMENT: 406-470 MHz MASTR Professional Receiver Types ER-42-A thru H.

SUBJECT:

TWEET FREQUENCIES

A tweet frequency is a receiver operating frequency at which a spurious signal generated by the receiver oscillators falls near or within the passband of the receiver.

All tweet frequencies involve two (or more) oscillators. Some harmonic of one oscillator mixes with some harmonic of the other to produce the spurious signal. It may be on or near the operating frequency, the high intermediate frequency or the low intermediate frequency.

Depending upon the tweet level and where it falls in relation to the passband, its effect can range from saturation of the receiver to giving only the symptoms of desensitization. It may capture the receiver from a weak desired signal or it may heterodyne with the desired signal if they are at approximately the same level. Squelch operation may or may not be affected. Limiter and discriminator readings will be steady.

The solution depends upon the receiver involved. For single frequency receivers operating at a tweet frequency, the second oscillator crystal is changed as indicated on the following page. For tweets in multi-frequency units, consult the factory for the proper solution to the problem.


- over -

The following are known tweet frequencies in MASTR Pro UHF Band Receivers, ER-42-A thru H, which use the Standard Second Oscillator crystal 19A110398P1 (11945 kHz). For operation at any of these frequencies this crystal must be replaced with the Alternate Second Oscillator crystal 19A110398P2 (12855 kHz).

461.650 MHz

469.700 MHz

If the second oscillator crystal is changed to the alternate, fill out the appropriate information on the NP 257777 self adhesive tab shown below and stick this tab on a conspicuous place on the receiver. This NP 257777 self adhesive tab can be ordered from Service Parts.

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SPECIAL CRYSTAL FORMULA	
<input type="checkbox"/> OPERATING FREQUENCY	_____
<input type="checkbox"/> SPECIAL 1st OSC CRYSTAL FREQUENCY	_____
<input type="checkbox"/> SPECIAL HIGH IF FREQUENCY	_____
<input type="checkbox"/> SPECIAL 2nd OSC CRYSTAL FREQUENCY	_____
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