communications

DATAFILE BULLETIN

FILE UNDER: Receivers

ER-41-A

BULLETIN NO: 1085-1

DATE: March 1965

Equipment: 132—174 MC MASTR Progress Line Receivers

Symptom: AUDIO HOWLING

Cause: Feedback within receiver cabling.

Factory Solution:

Model Number	Revision
4ER41A10—15	G
4ER41A34—39	H
4ER41A16, 18—27, 40—45	J
4ER41A17, 28—33	K

This revision eliminated the feedback by adding capacitor C318 across pins 13 and 19 of J443.

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.

Ordering Info: Capacitor C318 is available from Service Parts.

Qty.	Symbol Number	G-E Part No.	Description
1	C318	7774750-P4	Capacitor, fixed ceramic disc: .001 uf +100% -0%, 500 VDCW.

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DATAFILE BULLETIN

FILE UNDER: Receivers
ER-41-A

BULLETIN NO: 1085-2

DATE: June 1965

Equipment: 132--174 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 Numbers	Revision
4ER41A10 thru 15	J
4ER41A16, 18-21 and 40-45	N
4ER41A17 and 28-33	P
4ER41A22-27 and 34-39	M

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 C7, C10 and C11 from part 5496219-P666 (130 pf ±5%, 500 VDCW, -470 PPF temp coef) to

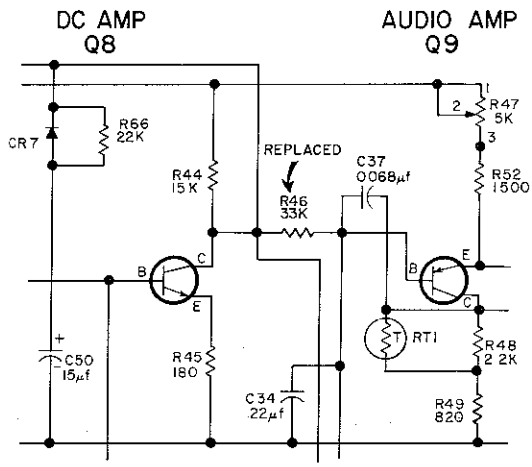

Fig. 1 - Old Circuit

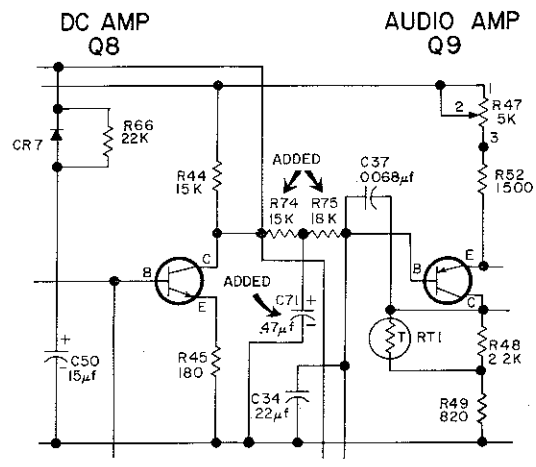

Fig. 2 - New Circuit

part 5496219-P566 (130 pf ±5%, 500 VDCW, -330 PPM temp coef).

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

1. Remove R46 (33K ohms ±10%, 1/2 watt) from the IF/Audio Board.

2. Mount R74 (15K ohms ±10%, 1/2 watt) and R75 (18K ohms ±10%, 1/2 watt) in the holes from which R46 was removed. See Figure 3.

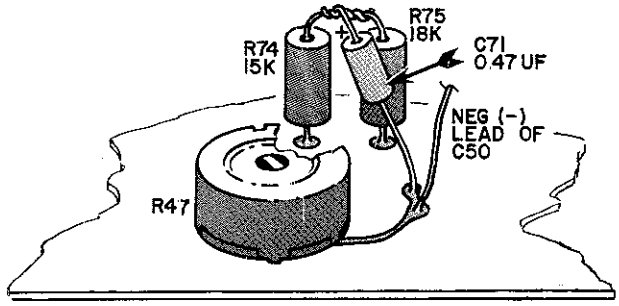

Fig. 3 - Decoupling Network

3. Solder the leads of R74 and R75 together with the positive (+) lead of C71 (0.47 µf ±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
C7, C10 and C11	5496219-P566	Capacitor, ceramic: 130 pf ±5%, 500 VDCW, -330 PPM temp coef.
C71	5496267-P28	Capacitor, tantalum: 0.47 uf ±20%, 35 VDCW.
Q4 and Q5	19A115552-P1	Transistor, silicon, NPN, sim to Type 2N2714.
R74	3R77-P153K	Resistor: 15,000 ohms ±10%, 1/2 watt.
R75	3R77-P183K	Resistor: 18,000 ohms ±10%, 1/2 watt.

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DATAFILE BULLETIN

FILE UNDER: Receivers

ER-41-A

BULLETIN NO: 1085-3

DATE: September 1965

Equipment: 130—174 MC MASTR Progress Line Receivers

Purpose: CRYSTAL ORDERING INFORMATION

Factory Change:

Model Numbers	Revision
4ER41A10 thru 45	C

Revision C changed the high IF frequency of high-band MASTR receivers from 5.26 MC to 5.30 MC in order to minimize the possibility of encountering interference. This required that the 1st oscillator crystal, the 2nd oscillator crystal and the high IF crystal filter be changed. The frequencies were changed as follows:

Crystal Type	Crystal Frequency	
	Before Revision C	After Revision C
1st Osc Crystal ..	$\frac{\text{Op Freq} - 5.26 \text{ MC}}{9}$	$\frac{\text{Op Freq} - 5.30 \text{ MC}}{9}$
2nd Osc Crystal ..	4805 KC	4845 KC
High IF Crystal Filter A314	5.26 MC	5.30 MC

Ordering Info: When ordering replacement crystals, specify the part number listed below and the receiver's operating frequency:

Crystal Type	G-E Part No.	
	Before Rev. C	After Rev. C
1st Oscillator Crystal		
132—150.8 MC	19B206176-P4	19B206576-P4
150.8—174 MC	19B206176-P5	19B206576-P5
2nd Oscillator Crystal	19A110192-P1 (4805 KC)	19A110192-P3 (4845 KC)
Hi-IF Crystal Filter A314...	19B204616-G1 (5.26 MC)	19B204616-G3 (5.30 MC)

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DATAFILE BULLETIN

FILE UNDER: Receivers

ER-41-A & B

BULLETIN NO 1085-4

DATE: March 1966

Equipment: 132—174 MC MASTR Receiver Type ER-41-A

Symptom: RECEIVER SQUELCHES (NO AUDIO) ON VERY STRONG SIGNALS

Cause: 2nd mixer squegging (too high time constant in emitter circuit of mixer).

Factory Solution:

Model Number	Revision
4ER41A10--15	P
4ER41A16, 18--21, 28—33	V
4ER41A17	W
4ER41A22--27	S
4ER41A34--45	U

This revision reduced the 2nd mixer time constant by replacing .033-uf capacitor C5 on 2nd Mixer Board A347 (PL-19B204438-G1) with .0047-uf capacitor C26.

Field Solution: This revision can be made in the field by replacing .033-uf capacitor C5 on 2nd Mixer Board A347 with .0047-uf capacitor C26. Stamp the receiver with the appropriate revision letter listed above.

Ordering Info: C26 is available from a local radio parts distributor or from Service Parts:

Symbol Number	G-E Part No.	Description
C26	19A115028-P104	Capacitor, polyester: .0047 uf ±20%, 200 VDCW.

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DATAFILE BULLETIN

FILE UNDER: Receivers
ER-41-A & B

BULLETIN NO: 1085-5

DATE: July 1966

Equipment: 132—174 MC MASTR receivers without noise blankers

Purpose: TO IMPROVE INTERMODULATION PERFORMANCE

A very significant improvement in intermodulation performance can be obtained by removing the RF amplifier stage in Receiver Type ER-41-A or -B. Since the first non-linear element in the receiver (the first mixer) is protected by additional selectivity, intermodulation response is reduced by about 5 db (measured by the EIA 3-signal method).

Even more improvement results from the reduction in sensitivity as the RF amplifier is removed. If the gain is reduced by 6 db, the intermodulation response of 3rd order products will be reduced by 6 x 3= 18 db. 5th order products will be reduced 6 x 5 = 30 db.

After returning, the 20-db quieting sensitivity of recent revision receivers should be 0.6 microvolt or better. In effect, a 4.7-db loss in sensitivity is traded for a 20-db improvement in intermodulation response. Remember, however, that in most situations where intermodulation is a problem, the original 0.35-microvolt sensitivity of the receiver cannot be used, because of the high ambient noise level. A sensitivity reduction to 0.6 microvolt will be insignificant in most large metropolitan areas.

Field Change: This modification can be applied to receivers with the following revisions or later:

4ER41A10 thru 15	Revision M
4ER41A16	Revision S
4ER41A17	Revision T
4ER41A18 thru 21	Revision S
4ER41A34 thru 39	Revision R
4ER41B10 thru 15	Revision B

The receivers to which the modification can be applied can be identified by the absence of slug-tuned circuit L1 on the 1st RF Amplifier board (A301/A302). A similar modification can be made on earlier revision receivers, if an additional 3-db loss in sensitivity is permissible. The sensitivity will be reduced to about 0.85 microvolt. The only difference in the modification is that the tap in step 4 should be moved from 1/4 turn from ground to 1/2 turn from ground.

Field Change: (cont'd)

NOTE

This modification cannot be applied to receivers with noise blankers (Models 4ER41A22 thru 33 and 4ER41A40 thru 45).

1. Remove the cover over the RF circuits.
2. Disconnect and remove the 1st RF Amplifier (A301/A302).
3. Using a large soldering iron, slide the tap on the coil associated with C303 up (away from ground) until the tap is located exactly opposite the point where the coil is connected to the chassis wall. This moves the tap from 3/16 turn from ground to 1/2 turn from ground.
4. Slide the tap on the coil associated with C304 down (toward ground) until the tap is located exactly opposite the point where the coil is connected to the chassis wall. This moves the tap from 3/4 turn from ground to 1/2 turn from ground.
5. Connect an 8-pf NPO or N80 capacitor between the two new taps established in steps 3 and 4. Place the capacitor body in the compartment from which the 1st RF Amplifier was removed. Keep the leads as short as possible and sleeve both leads.
6. Replace the cover over the RF circuits.
7. Retune the 5 front-end tuned circuits. After retuning, the receivers's 20-db quieting sensitivity should be 0.6 microvolt or better.

Ordering Info: Either one of the following capacitors can be used to make this modification:

Qty.	G-E Part No.	Description
1	5496218-P39	Capacitor, ceramic disc: 8 pf ±0.25 pf, 500 VDCW, 0 temp coef.
	or	
	5496218-P239	Capacitor, ceramic disc: 8 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.

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DATAFILE BULLETIN

FILE UNDER: Receivers
ER-41-A & B

BULLETIN NO: 1085-6

DATE: May 1967

Equipment: 132—174 MC MASTR Professional narrow-band receivers of the following revisions:

Model Number	Revisions
4ER41A10—15	C thru P
4ER41A16, 18—21 and 28—33	C thru W
4ER41A17	C thru XA
4ER41A22—27	C thru U
4ER41A34—45	C thru V

Subject: 5.3-MC HI-IF CRYSTAL FILTERS 19C304094-G4 ARE NO LONGER AVAILABLE; REPLACED BY FILTER 19B206692-G1

Factory Change:

Model Number	Revision
4ER41A10—15	R
4ER41A16, 18—21 and 28—33	XA
4ER41A17	XB
4ER41A22—27	V
4ER41A34—45	W

This revision replaced Hi-IF crystal filters FL5 and FL6 (GE Part No. 19B304094-G4) with single-unit filter 19B206692-G1 to improve selectivity and simplify manufacturing. The old and new filters are shown in Figures 1 and 2. Note that the filter-loading resistors were also changed, and R15 was deleted on 2nd Mixer Board A316.

Several additional improvements were also made as a part of this revision: C26 on the 2nd Mixer Board was changed from .0047 µf to .01 µf to improve 2nd mixer stability. On receivers without noise blankers, the first mixer board was changed from A305 (19B204430-G1) to A335 (19B204430-G11) to improve intermodulation performance of the receiver. L315, L316, C319 and C320 were added; C315 and C316 were deleted; and power supply leads were re-routed to reduce receiver spurious response in models without noise blankers.

Field Change: This revision will not normally be made in the field unless filter FL5 or FL6 fails. It will then be necessary to replace both filters with the new single-unit filter:

1. Remove FL5 and FL6 with their loading resistors. Mounting screws for the filters are accessible by removing the Multiplier Selectivity

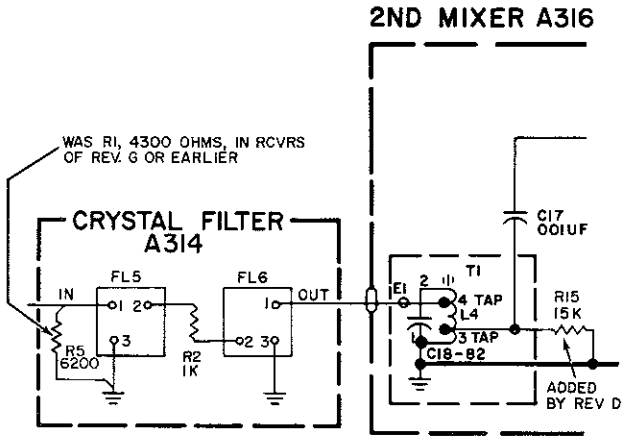

Fig. 1 - 2-Section Crystal Filter

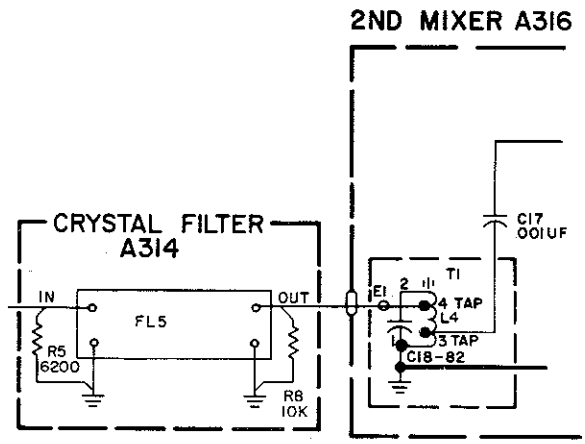

Fig. 2 - New Single-Unit Filter

Field Change: (cont'd)

2. Connect R5 (6200 ohms ±5%) across the input and R8 (10K ohms ±10%) across the output of the new filter.

3. If a mounting hole is not already present, drill a hole for the new filter at the point indicated in Figure 3. Using a #4-40 x 1/4" self-tapping screw, mount one end of the filter at this point. Mount the other end under the mounting screw of T301.

4. Make the input and output connections to the filter.

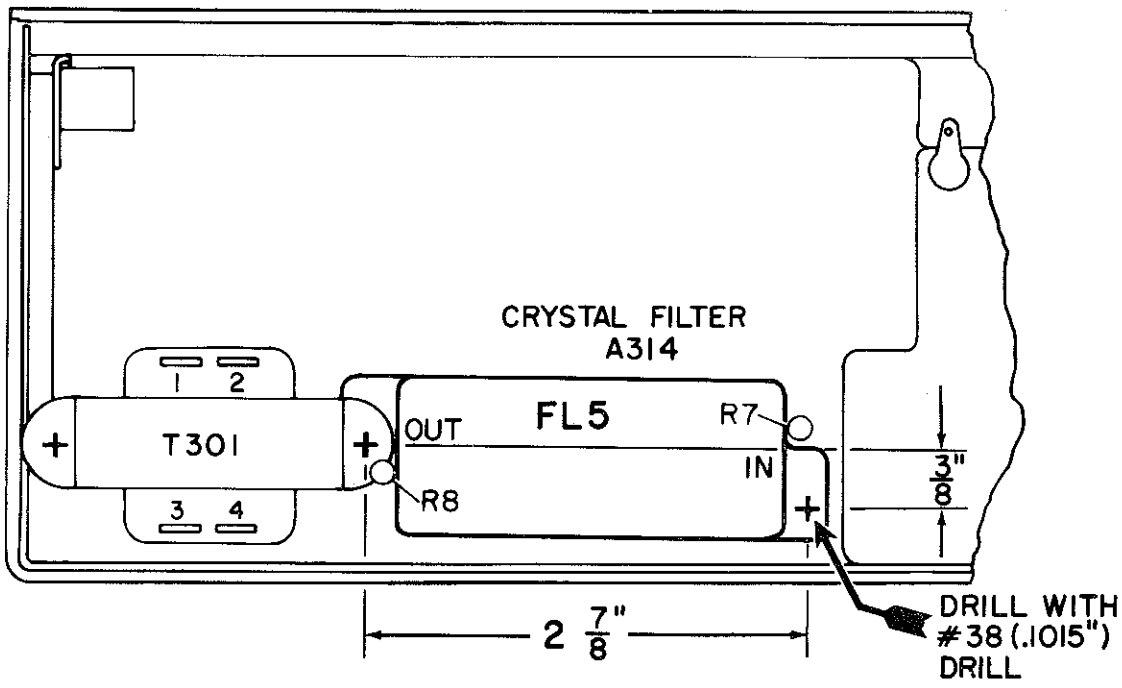

Figure 3 - Installation of New Single-Unit Crystal Filter

Field Change: (cont'd)

5. On 2nd Mixer Board A316, clip out 15K-ohm resistor R15, if it is present.

6. Realign the receiver's Lo-IF and Hi-IF stages.

Ordering Info: If it is necessary to replace crystal filter FL5 or FL6 in one of the receivers listed under "Equipment" on page 1, order the following components:

Symbol	GE Part Number	Description
FL5	19B206692-G1	Crystal filter: 5.3 MC.
R5	3R152-P622J	Resistor: 6200 ohms ±5%, 1/4 watt.
R8	3R152-P103K	Resistor: 10K ohms ±10%, 1/4 watt.
---	19B201074-P204	Screw, self-tapping: Phillips pan head, #4-40 x 1/4".

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DATAFILE BULLETIN

FILE UNDER: Receivers
ER-41-A & B
BULLETIN NO: 1085-7
DATE: November 1967

Equipment: 132—174 MHz MASTR Professional Receivers

Sympton: AUDIO OUTPUT TRANSISTOR FAILS

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

Factory Solution:

Model Number	Revision
4ER41A10—15	U
4ER41A16, 18—21 and 34—39	XD
4ER41A17	XE
4ER41A22—27	XA
4ER41A28—33 and 40—45	XC
4ER41B10—15	K

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.

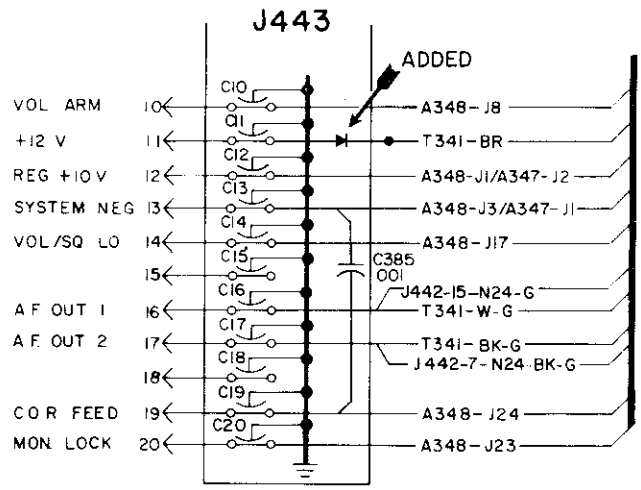

Fig. 1 - Showing Diode Added

Ordering Info:

Symbol Number	GE Part No.	Description
CR301	4037822-P1	Diode, silicon: PIV 400, sim to SC4.

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DATAFILE BULLETIN

FILE UNDER: Receivers

ER-41-A
ER-41-B

BULLETIN NO 1085-8

DATE February 1968

Equipment: 132—174 MHz MASTR Professional receivers

Symptom: INSTABILITY OF AUDIO POWER AMP USING TRANSISTOR F115527

Cause: Variations in transistor characteristics between vendors.

Factory Solution:

Model Number	Revision
4ER41A10—15	V
4ER41A16, 18—21 and 34—39	XE
4ER41A17	XF
4ER41A22—27	XB
4ER41A28—33 and 40—45	XD
4ER41B10—15	L

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 Q301 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:

Symbol	GE Part No.	Description
C78 on IF/Audio Board	5494481-P114	Capacitor, ceramic disc: 2000 pf +10%, 1000 VDCW; sim to RMC Type JF Discap.

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DATAFILE BULLETIN

FILE UNDER: Receivers

ER-41-A & B

BULLETIN NO 1085-9

DATE: March 1968

Equipment: 132—174 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.

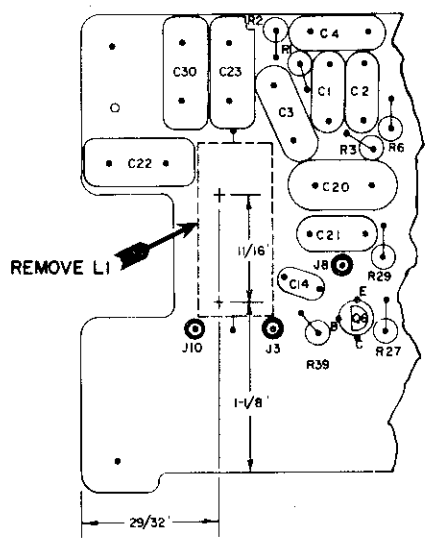

Fig. 1 - Before Modif.

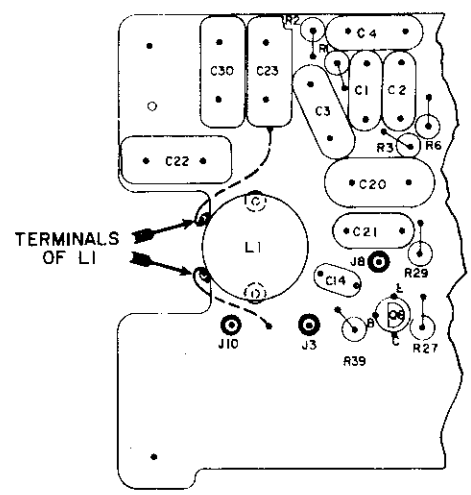

Fig. 2 - After Modification

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:

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

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MOBILE RADIO

DATAFILE BULLETIN

FILE UNDER: Receivers

ER-41-A&B

BULLETIN NO: 1085-10

DATE: August, 1972

EQUIPMENT: 132-174 MHz MASTR Professional Receiver Models 4ER41A10-45

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.

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DATAFILE Bulletin 1085-10

The following are known tweet frequencies in MASTR Pro High Band Receivers, ER-41-A, which use the Standard Second Oscillator crystal 19A110192P3 (4845 kHz). For operation at any of these frequencies this crystal must be replaced with the Alternate Second Oscillator crystal 19A110192P4 (5755 kHz).

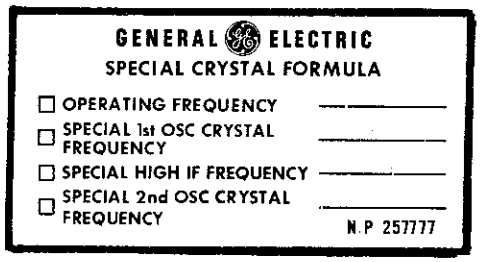
138.200 MHz	152.150 MHz
149.235	152.180
151.985	152.200
152.030	155.820
152.060	158.520
152.090	158.670
152.120	159.960

The following are known tweet frequencies in receivers using the Alternate Second Oscillator crystal 19A110192P4 (5755 kHz). For operation at this frequency this crystal must be replaced with the Standard Second Oscillator crystal 19A110192P3 (4845 kHz).

156.600 MHz	156.700 MHz

156.800 MHz is a tweet frequency with both the Standard and Alternate Second Oscillator crystals. Consult the factory for proper crystals to use at this frequency.

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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