MOBILE RADIO

INSTALLATION INSTRUCTIONS

FOR

CHANNEL GUARD MODIFICATION KITS 19A122313 AND FEB-743

(For MASTR® Professional tubed combinations using crystals.)

TABLE OF CONTENTS

DESCRIPTION

Channel Guard Modification Kits 19A122313 and FEB-743 provide the necessary components for installing Channel Guard in MASTR® Professional tubed Mobile and Station combinations using crystals.

The FEB-743 Kit includes the 4EK16A10 Encoder/Decoder Board with 19A127178G3 Installation Kit and the 19C311802G1 Low-Pass Filter with 19A127174G2 Installation Kit.

The 19A122313 Exciter Modification Kits contain the appropriate parts to add Channel Guard modulation capability to the transmitter exciter.

NOTE

Channel Guard Encoder Tone Network FL1 is not included in the Modification Kit. The Tone Network must be ordered separately.

The application of the different kits is shown in the following chart:

APPLICATION

MASTR PRO SOLID STATE CHANNEL GUARD

NARROW BAND APPLICATION ONLY

Application of encode/decode (2-way; single tone) Channel Guard to a standard MASTR Pro combination requires:

A. Exciter mod kit (from table below).
B. FEB 743 encoder/decoder mod kit.
C. Appropriate 19B205280 network.

Application of different tone encode/decode Channel Guard to a standard MASTR PRO combination requires:

A. Exciter mod kit (from table below).
B. FEB 743 encoder/decoder mod kit.
C. FEB 744 encoder mod kit.
D. Appropriate 19B205280 networks (2 required)

NOTE

Application of Solid State Channel Guard encode/decode to radios using 2 watt receivers (ER-39-A, ER-40-A, ER-41-A, ER-42-A) requires FEB 742 in addition to kits listed above.

FREQUENCY RANGE	FOR TRANSMITTERS SHOWN BELOW	EXCITER MOD KIT
25-33 MHz	4ET54A10, 13, 16 Rev. D and earlier 4ET55A10, 13, 16 Rev. D and earlier	19A122313G1
	4ET54A10, 13, 16 Rev. E and later 4ET55A10, 13, 16 Rev. E and later all other models of ET-54 and ET-55 in this freq. range.	19A122313G7
33-42 MHz	4ET54A11, 14 Rev. C and earlier 4ET54A17, Rev. B and earlier 4ET55A11, 14 Rev. D and earlier 4ET55A17, Rev. C and earlier	19A122313G2
	4ET54A11, 14, Rev. D and later 4ET54A17, Rev. C and later 4ET55A11, 14, Rev. E and later 4ET55A17, Rev. D and later all other models of ET-54 and ET-55 in this freq. range.	19A122313G8
42-50 MHz	4ET54A12, 15, 18, Rev. B and earlier 4ET55A12, 15, 18, Rev. C and earlier	19A122313G3
	4ET54A12, 15, 18, Rev. C and later 4ET55A12, 15, 18, Rev. D and later all other models of ET-54 and ET-55 in this freq. range.	19A122313G9
66-88 MHz	4ET56A10-15, Rev. C and earlier	19A122313G4
	4ET56A10-15, Rev. D and later all other models of ET-56	19A122313G10

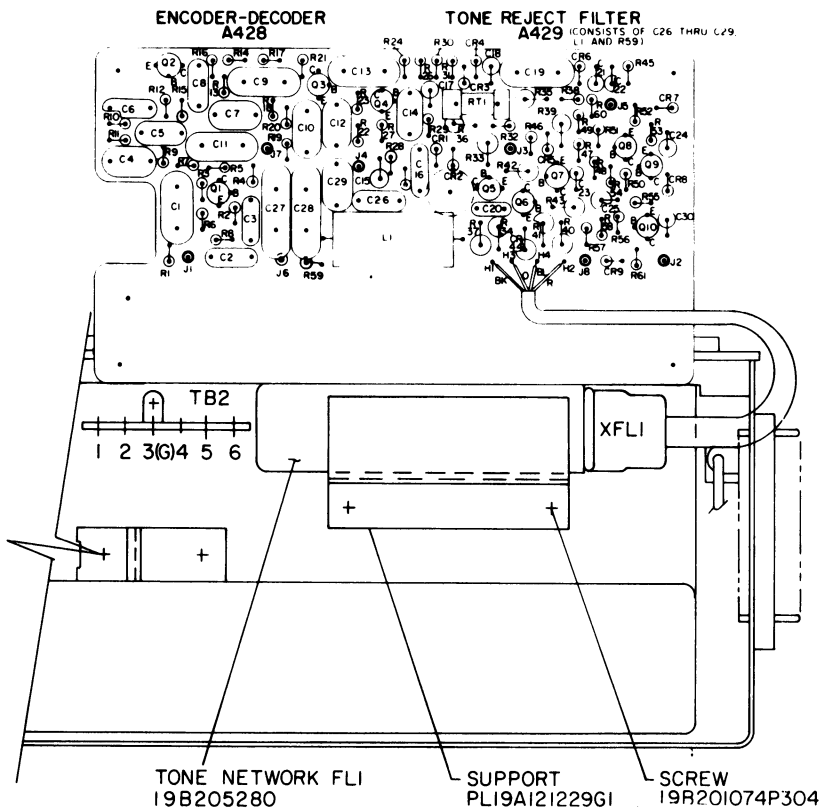
FREQUENCY RANGE	FOR TRANSMITTERS SHOWN BELOW	EXCITER MOD KIT
132-150.8 MHz	4ET57A10, 12, 14 4ET58A10, 12, 14 All other models of ET-57 and ET-58 in this freq. range with Rev. C or earlier exciter	19A122313G5
	4ET57A10, 12, 14 4ET58A10, 12, 14 Rev. B and later All other models of ET-57 and ET-58 in this freq. range with Rev. D or later exciter	19A122313G11
150.8-174 MHz	4ET57A11, 13, 15 4ET58A11, 13, 15 Rev. B and later All other models of ET-57 and ET-58 in this freq. range with Rev. C or earlier exciter	19A122313G6
	4ET57A11, 13, 15 4ET58A11, 13, 15 All other models of ET-57 and ET-58 in this freq. range with Rev. D or later exciter	19A122313G12
406-420 MHz	All models of ET-59 and ET-60 in this freq. range with Rev. C or earlier exciter	19A122313G5
	All models of ET-59 and ET-60 in this freq. range with Rev. D or later exciter	19A122313G11
450-512 MHz	All models of ET-59 and ET-60 in this freq. range with Rev. C or earlier exciter	19A122313G6
	All models of ET-59 and ET-60 in this freq. range with Rev. D or later exciter	19A122313G12

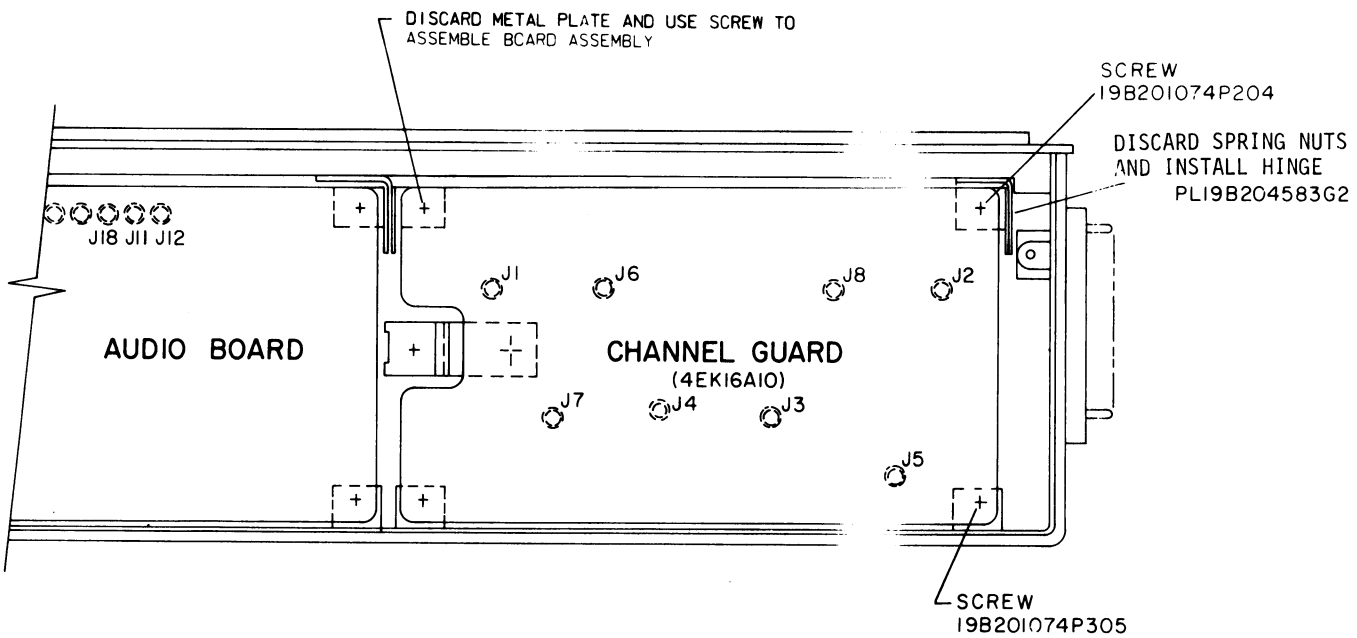
INSTALLATION

ENCODER/DECODER

Encoder/Decoder Model 4EK16A10 mounts on the underside of the receiver next to the audio board (see Figure 1). The Parts List for the Encoder/Decoder board is found in the applicable receiver Maintenance Manual. Install the Encoder/Decoder board using Installation Kit 19A127178G1, G3 as follows:

		✓
1.	Remove and discard the spring nut and replace with the hinge supplied in the kit (see Figure 1). Use existing hardware for mounting	☐
2.	Install the Tone Network and support as shown	☐
3.	Mount the 4EK16A10 board to the hinges as shown	☐
4.	In station combinations only; remove L1 from the Channel Guard board and replace with coil 19A115690P3 supplied in the kit	☐





(19C311824, Rev. 4)

Figure 1 - Installation Diagram

5. Use the wiring harness supplied with this kit to make the interconnection between the Channel Guard board, the Audio board and TB2 as shown in the chart below:

WIRE COLOR	FROM	TO CHANNEL GUARD BOARD	FUNCTION	
W-O-BL	J18-Audio Bd.	J1	Decoder Input	
W-BK-BL	J11-Audio Bd.	J2	Squelch Control	
W	TB2-6	J3	Encode Tone	
W-R	TB2-2	J4	+10 V	
W-BR-R	TB2-4	J5	Rec. Mute (+10 V)	
W-R-G	J12-Audio Bd.	J6	Tone Filter	
W-O	TB2-1	J7	System Negative	
W-BK-G	TB2-5	J8	CG On-Off (HS)	

6. Swing the channel guard board into the receiver frame and fasten with the screws provided ..... ☐

LOW-PASS FILTER

Low-Pass Filter Model G101 mounts on the underside of the transmitter underneath the exciter board (see Figure 2). The Parts List for the Low-Pass Filter board is found in the applicable transmitter Maintenance Manual. Install the Low-Pass Filter using Installation Kit 19A127174G2 as follows: ☑

1. Install the wiring harness 19B205480G2 as shown in Figure 2. Connect the wiring as follows:

   a. Solder the black lead (ground) to J101-1 ..... ☐

   b. Solder the white-red lead (+10 volts) to J101-6 ..... ☐

   c. Solder the orange lead (system negative) to J101-13 ..... ☐

   d. Connect the center conductor of shielded wire to J8, and shield to J7 on exciter board. (See Exciter Decal) ..... ☐

   e. Solder the green lead (Tone In) to J101-10 ..... ☐

   f. Tie the wiring harness to the main harness ..... ☐

2. Install Low-Pass Filter Board G101 as shown in Figure 2. Connect the wiring as follows:

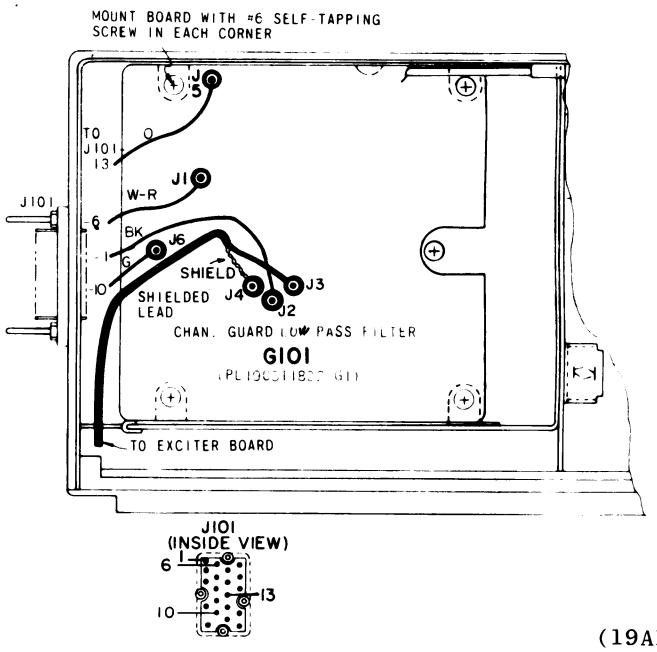
   a. Connect the plug on the white-red lead to J1 ..... ☐

   b. Connect the plug on the black lead to J2 ..... ☐

   c. Connect the plug on the orange lead to J5 ..... ☐

   d. Connect the center conductor of the shielded wire to J3, and shield to J4. When used in a repeater control station (Y combination) sleeve J3 and J4 and tie back in harness ..... ☐

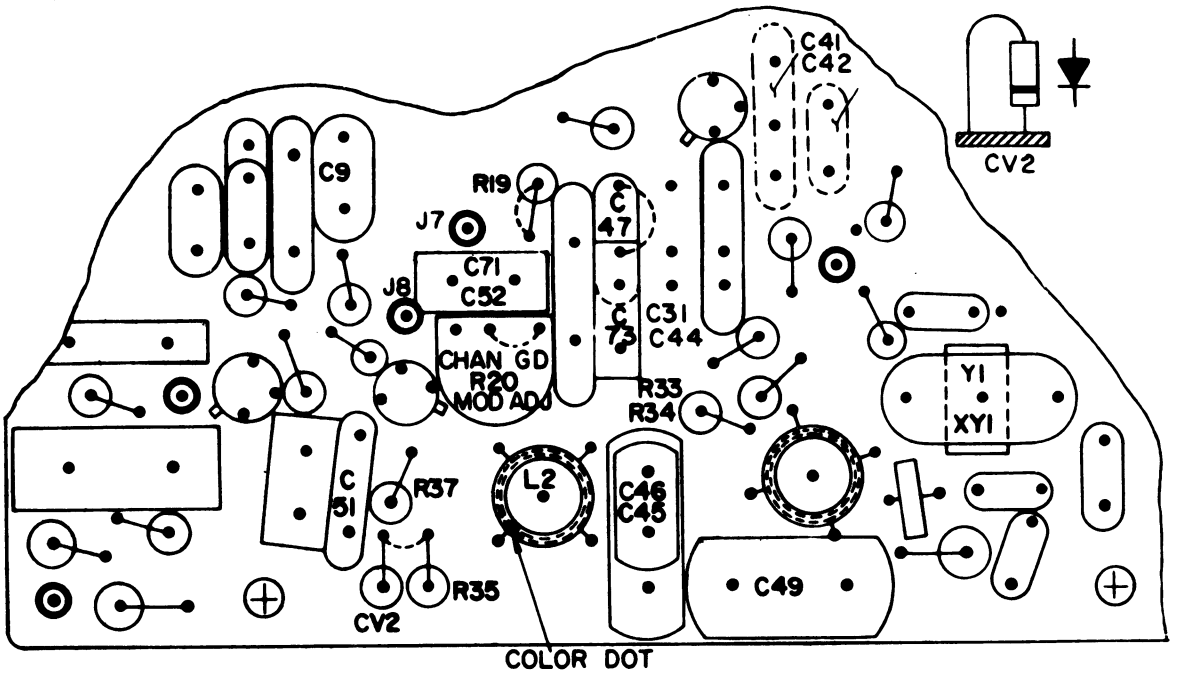
   e. Connect the plug on the green lead to J6 ..... ☐



(19A127175, Sh. 2, Rev. O)

Figure 2 - Installation Diagram

25-50MHZ EXCITER BOARD MODIFICATION

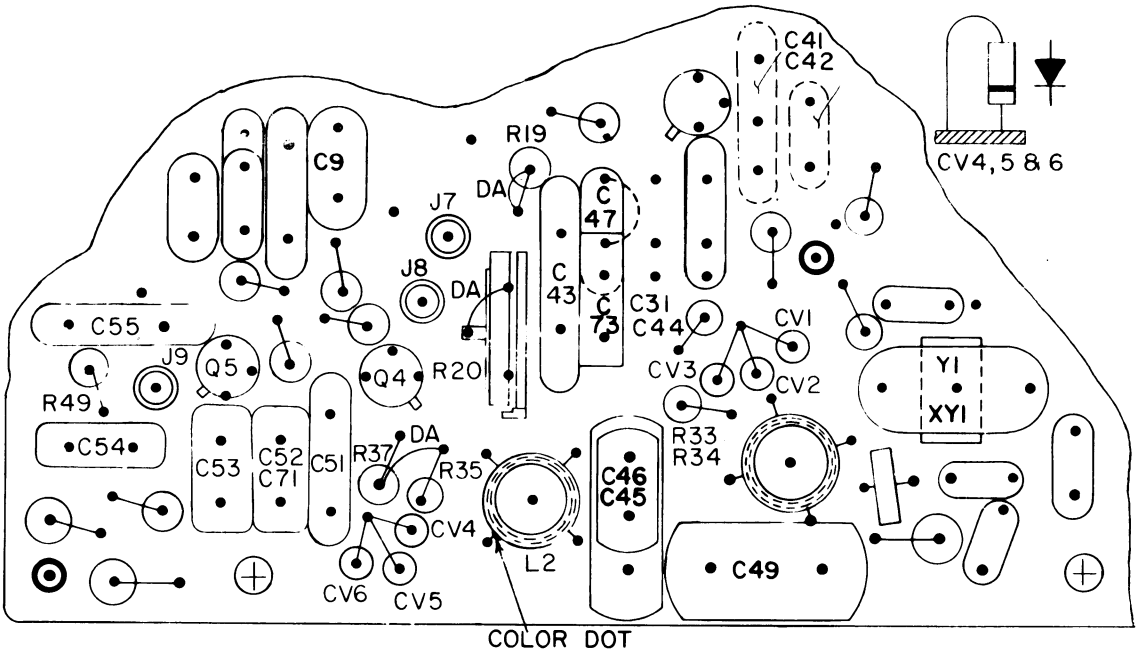


(19B205440, Sh. 1, Rev. 3)

For Frequency Range Of:	25 - 33 MHz	33 - 42 MHz	42 - 50 MHz
Use Exciter Modification Kit:	19A122313G1	19A122313G2	19A122313G3
Apply to Exciter Board:	19D402385G1, 6, 11	19D402385G2, 7, 12	19D402385G3, 8, 13
1. Remove Jumper From:	C51 to R35	C51 to R35	C51 to R35
2. Remove Jumper From Location Of:	C47	C47	C47
3. Remove Jumper From Location Of:	R20	R20	R20
4. Remove:	C9, C45A, C71A, C73A, R19, R33A	C9, C45B, C71A, C73A, R19, R33B	C9, C41B, C44B, C45B, C71B, C73B, R19, R33C
5. Insert Jumper in Place Of:	R19	R19	R19
6. Insert:	C46A, C47, C49, C52A, R20, R34A, C35A, R37	C46B, C47, C49, C52A, R20, R34B, R35A, R37	C31, C42, C46B, C47, C49, C52B, R20, R34C, R35B, R37
7. Insert:	CV2 and L2A	CV2 and L2B	CV2 and L2C
8. Change Board Number From:	G1 to G16 G6 to G21 G11 to G26	G2 to G17 G7 to G22 G12 to G27	G3 to G18 G8 to G23 G13 to G28

NOTE: Refer to Wiring Diagram 19R620712

25-50MHZ EXCITER BOARD MODIFICATION

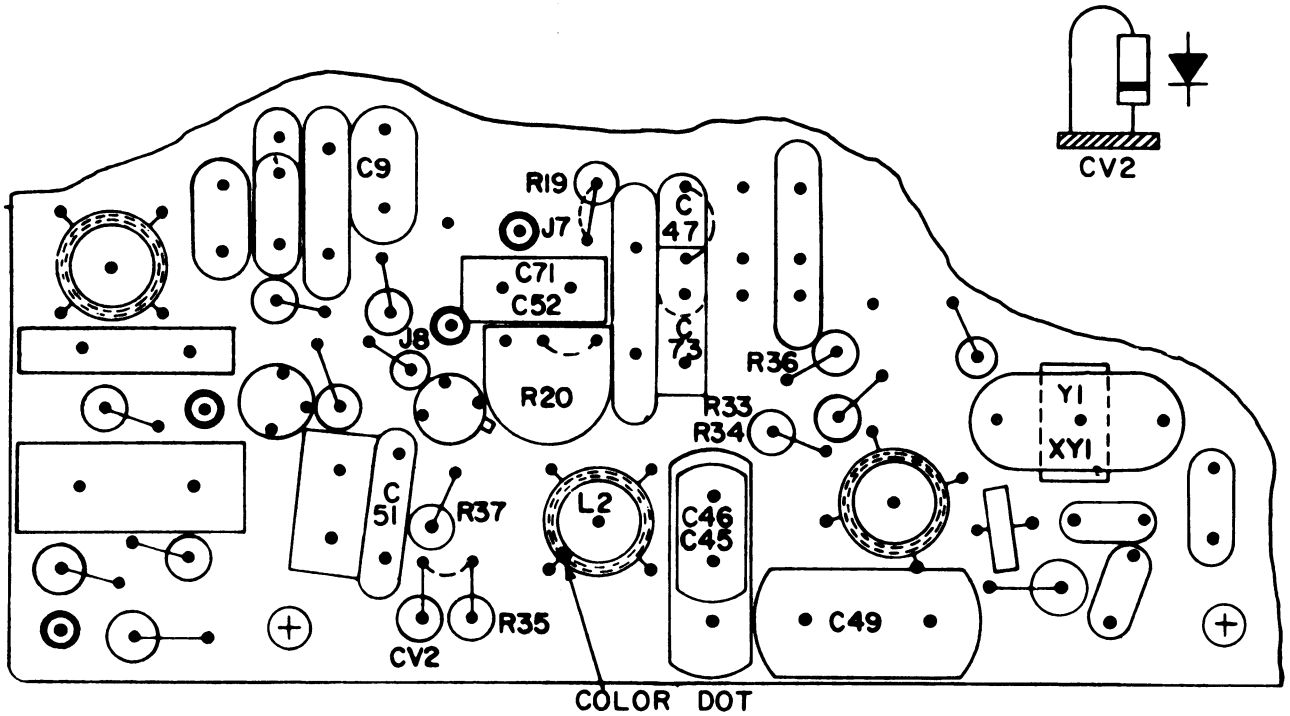


(19B205583, Sh. 1, Rev. 2)

For Frequency Range of:	25 - 33 MHz	33 - 42 MHz	42 - 50 MHz	
Use Exciter Modification Kit:	19A122313G7	19A122313G8	19A122313G9	
Apply to Exciter Board:	19D402385G1, 6, 11	19D402385G2, 7 19D402385G12	19D402385G3, 8, 13	
1. Remove Jumper From:	R37 to R35	R37 to R35	R37 to R35	
2. Remove Jumper From Location Of:	C47	C47	C47	
3. Remove Jumper From Location Of:	R20	R20	R20	
4. Remove:	C9, C45A, C71A, C73A, R19, R33A,	C9, C45B, C71A, C73A, R19, R33B	C9, C41B, C44B C45B, C71B, C73B, R19, R33C	
5. Insert Jumper in place of:	R19	R19	R19	
6. Insert:	C46A, C47, C49, C52A, R20, R34A, R35A, R37	C46B, C47, C49, C52A, R20, R34B, R35A, R37	C31, C42A, C46B, C47, C49, C52B, R20, R34C, R35B, R37	
7. Insert:	CV4, CV5, CV6, and L2A	CV4, CV5, CV6, and L2B	CV4, CV5, CV6, and L2C	
8. Change Board Number From:	G1 to G16 G6 to G21 G11 to G26	G2 to G17 G7 to G22 G12 to G27	G3 to G18 G8 to G23 G13 to G28	

NOTE: Refer to Wiring Diagram 19R620712

66-88MHZ EXCITER BOARD MODIFICATION

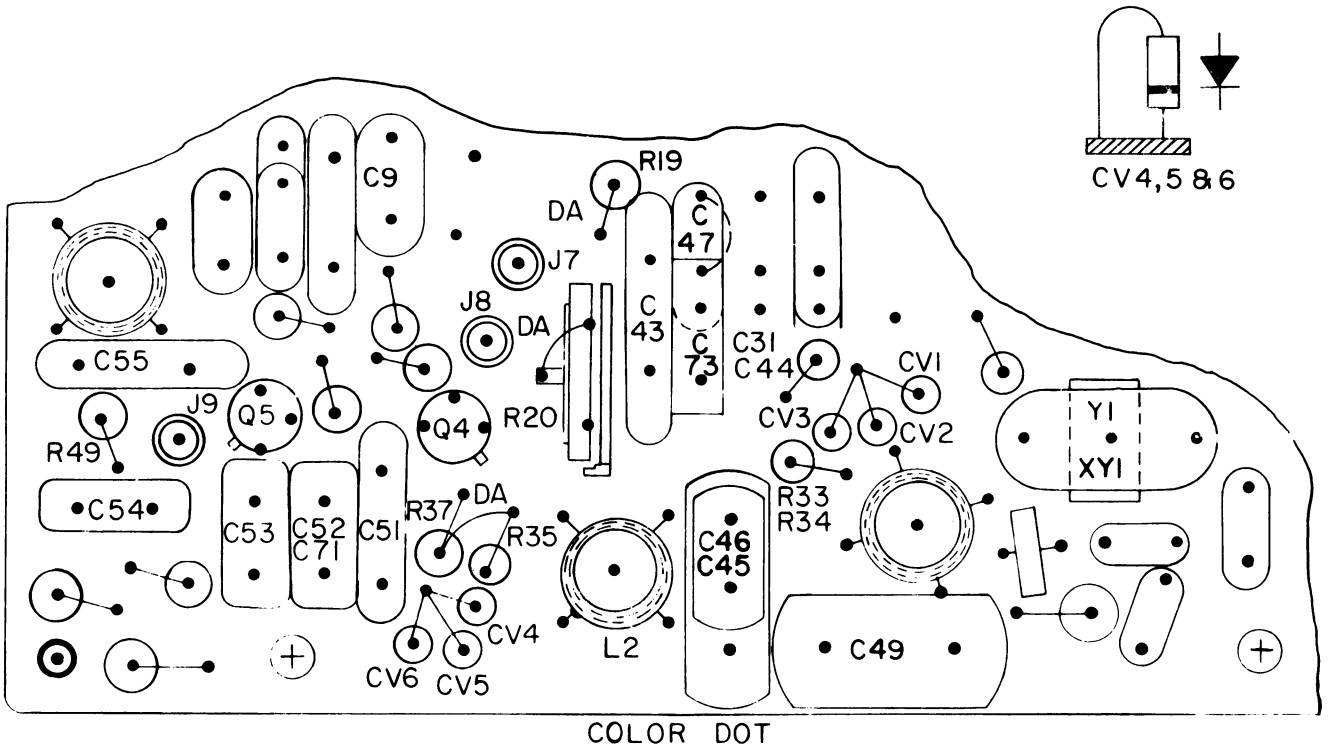


(19B205440, Sh. 2, Rev. 2)

For Frequency Range Of:	66 - 88 MHz	
Use Exciter Modification Kit:	19A122313G4	
Apply to Exciter Board:	19D402385G4, 5, 9, 10, 14, 15	
1. Remove Jumper From:	C51 to R35	
2. Remove Jumper From Location Of:	C47	
3. Remove Jumper From Location Of:	R20	
4. Remove:	C9, C45B, C71B, C73C, R19, R33D	
5. Insert Jumper in Place Of:	R19	
6. Insert:	C46B, C47, C49, C52B, R20, R34C, R35B, R37	
7. Insert:	CV2 and L2D	
8. Change Board Number From:	G4 to G19 G10 to G25 G5 to G20 G14 to G29 G9 to G24 G15 to G30	

NOTE: Refer to Wiring Diagram 19R620714

66-88MHZ EXCITER BOARD MODIFICATION

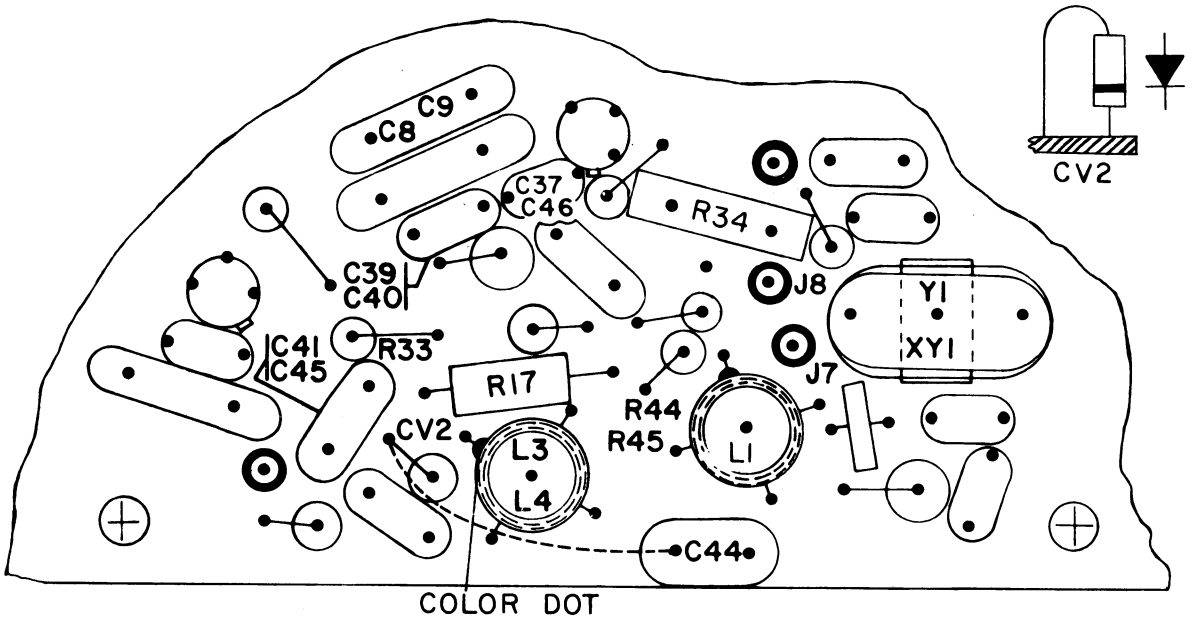


(19B205583, Sh. 2, Rev. 2)

For Frequency Range Of:	66 - 88 MHz	
Use Exciter Modification Kit:	19A122313G10	
Apply to Exciter Board:	19D402385G4, 5, 9, 10, 14, 15	
1. Remove Jumper From:	R37 to R35	
2. Remove Jumper From Location Of:	C47	
3. Remove Jumper From Location Of:	R20	
4. Remove:	C9, C45B, C71B, C73C, R19, R33D	
5. Insert Jumper in place of:	R19	
6. Insert:	C46B, C47, C49, C52B, R20, R34C, R35B, R37	
7. Insert:	CV4, CV5, CV6 and L2D	
8. Change Board Number From:	G4 to G19 G10 to G25 G5 to G20 G14 to G29 G9 to G24 G15 to G30	

NOTE: Refer to Wiring Diagram 19R620714

132-470MHZ EXCITER BOARD MODIFICATION



(19B205440, Sh. 3, Rev. 2)

For Frequency Range Of:	132-150.8 MHz 406-420 MHz	150.8-174 MHz 450-470 MHz	
Use Exciter Modification Kit:	19A122313G5, 11 (See Note 2)	19A122313G6, 12 (See Note 2)	
Apply to Exciter Board:	19D402308G1, 3, 5	19D402308G2, 4, 6	
1. Remove Jumper From:	R44 to C41	R44 to C41	
2. Remove Jumper From Location Of:	R34	R34	
3. Remove:	C9, C37, C39, C41 R44, R53, C77	C9, C37, C39, C41, R44, R53, C77	
4. Insert:	C8, C40, C44, C45, C46, R33, R34, R45	C8, C40, C44, C45, C46, R33, R34, R45	
5. RELOCATE:	R17	R17	
6. Insert:	CV2 and L4	CV2 and L3	
7. Change Board Number From:	G1 to G7 G3 to G9 G5 to G11	G2 to G8 G4 to G10 G6 to G12	

NOTES: 1. For 132-174 MHz Refer to 19R620703 Exciter (19D402308) Rev. C or earlier.
For 406-470 MHz Refer to 19R620707 Use Modf. Kit 19A122313G11, G12 on
2. Use Modf. Kit 19A122313G5, G6 on Exciter (19D402308) Rev. D or later.

ALIGNMENT

After the Channel Guard has been installed, proceed as follows:

1. In MASTR Professional Series transmitters (without ICOMS) repeat Step 1 of the applicable Transmitter Alignment Procedure.

2. In all MASTR Professional transmitters, the modulation level must be readjusted. Refer to the Modulation Level Adjustment section of the transmitter alignment procedure as found in the applicable transmitter maintenance manual.

ORDERING SERVICE PARTS

Each component appearing on the schematic diagram is identified by a symbol number to simplify locating it in the parts list. Each component is listed by symbol number, followed by its description and GE Part Number.

Service parts may be obtained from Authorized GE Communication Equipment Service Stations or through any GE Radio Communication Equipment Sales Office. When ordering a part, be sure to give:

1. GE Part Number for component
2. Description of part
3. Model number of equipment
4. Revision letter stamped on unit

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired, or should particular problems arise which are not covered sufficiently for the purchaser's purposes, contact the nearest Radio Communication Equipment Sales Office of the General Electric Company.

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

GENERAL ELECTRIC

Printed in U.S.A

ECP-824