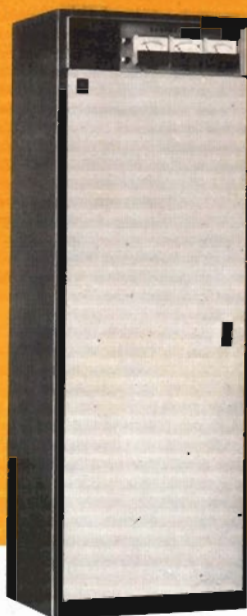
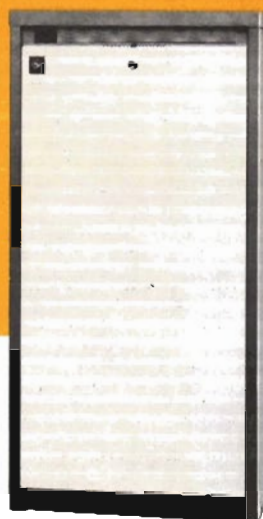


**MASTR® II****FM RADIO  
HIGH BAND****REPEATER AND BASE STATIONS**

"P" Cabinet

Standard "V" Cabinet  
(shown with  
optional meters)

"S" Cabinet



"D" Cabinet

Intermittent or Continuous Duty  
Simplex or Duplex Operation  
Models Available Up to 300 Watts

**GE'S FIRST FAMILY**

The MASTR II line of base stations is a complete family of FM radio fixed stations. Approximately 50,000 practical combinations may be selected from standard catalog listings. The utility of each of these combinations may be further enhanced by adding one or more of the 80 options and accessories available.

MASTR II Base and Repeater Stations are offered in 3 RF power ratings and all are adjustable—low power (40 watts), medium power (65 and 110 watts) and high power (250 and 300 watts). Stations in all ratings may be ordered for simplex or duplex operation and be equipped for one of nine different control systems.

**ALL SOLID STATE**

MASTR II solid-state base stations have benefited from contemporary technology and use a large number of custom-designed integrated circuits and many unique components. In DC control systems, Opto-couplers provide for maximum control line isolation and the virtual elimination of hum. A ferro-resonant transformer in the power supply minimizes the effect of line voltage transients and closely maintains line regulation.

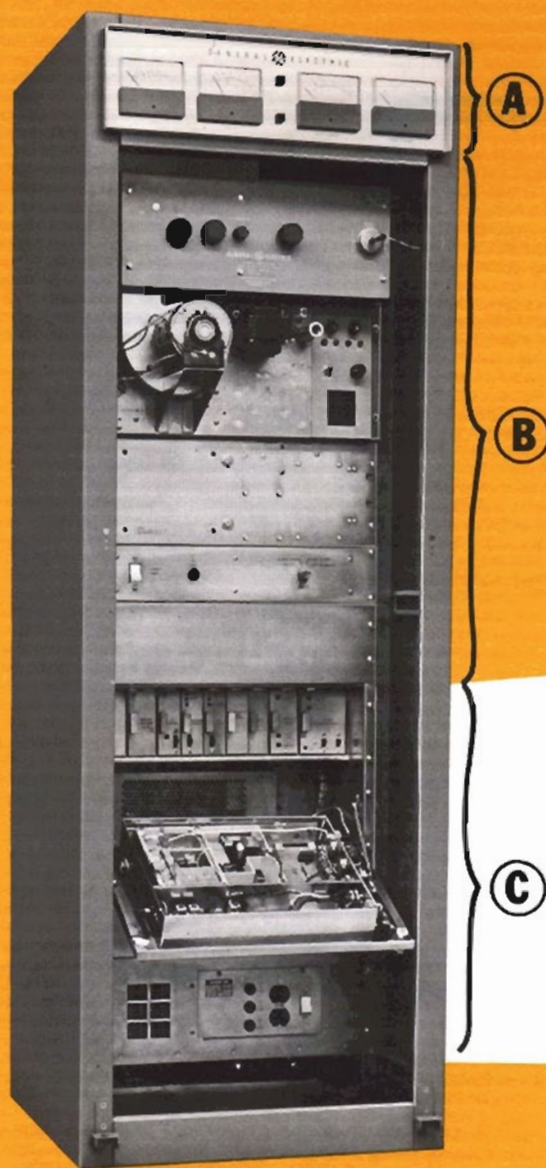
Low and medium power stations are all solid state using conservatively rated silicon semiconductors. High power stations also are fully transistorized right up to the final power amplifier which incorporates a time proven ultra-reliable tube in the output stage.

**GENERAL**  **ELECTRIC**

# MASTR II STATION HIGHLIGHTS

## HIGH POWER MODEL

- (A) Built-in panel meters are standard.
- (B) The top portion of a high power station contains the power amplifier, PA power supply interface panel and supply power distribution panel. Rack space also is available for extra options.
- (C) The bottom section consists of the same chassis (transmitter, receiver, power supply and control shelf) as described for low and medium power models. In this case, however, the transmitter is used to drive the PA.



## LOW AND MEDIUM POWER MODELS

- (1) **UNITIZED CONSTRUCTION**  
Channelled sides and bottom are formed from a single sheet of 16 gauge steel. ("D" cabinet shown with front and rear key-locked panels removed.)
- (2) **RADIO AND CONTROL SECTIONS**  
Assembled as a unit into an integral frame which is suitable for either cabinet or open-rack mounting.
- (3) **RACK SPACE FOR OPTIONS**  
Larger cabinets will have proportionately more rack space available.
- (4) **COMPUTER-QUALITY POWER SUPPLY**  
Totally enclosed and capable of either cabinet or open-rack mounting.
- (5) **CONTROL AND OPTION SHELF**  
Accepts up to nine plug-in option and/or function modules. With an optional extender board, modules can be "in-circuit" tested. (Control shelf not included on Extended Local Control models rated for intermittent duty.)
- (6) **LED INDICATORS**  
Provide visible status of important operational modes *at the station*.
- (7) **TRANSMITTER POWER AMPLIFIER**  
Front cover is spring-fitted for fast removal without tools. (Illustration shows 100 watt continuous duty PA.)
- (8) **VERTICAL FRONT DOOR**  
Swings down from its normal upright position for convenient servicing of receiver and exciter. (Shown with compartment cover removed.)
- (9) **FUSE, AC OUTLET AND LINE SWITCH PANEL**  
Swings down and open for reconnecting the transformer terminal strip for 242 VAC.
- (10) **Single conversion receiver with monolithic crystal filters and quadrature detector assures stable, interference-free reception.**





## GENERAL DATA

CABINET Combination 1st Digit	INDOOR CABINETS (floor mount)			INDOOR/OUTDOOR CABINET (wall or pole/crossarm mount)		
	"D"		"S"	"V"		"P"
<b>SIZE [ in. (cm) ]</b>						
Height:	30-1/4 (76.8)	44-1/4 (113)	69-1/16 (175)	46 (114)		
Width:	21-1/2 (54.6)	21-1/2 (54.6)	23-3/16 (59)	21-1/2 (54.6)		
Depth:	15.5 (39.4)	15.5 (39.4)	21 (53.3) Lo & Med. Pwr. 25-1/2 (64.8) Hi Pwr.	21 (53.3)		
<b>WEIGHT (min.) [lb. (kg)]</b>						
Intermittent Duty:	152 (69)	172 (78)	280 (127)	217 (98.5)		
Continuous Duty:	160 (72.5)	180 (81.8)	288 (131) Lo & Med. Pwr. 403 (184) Hi Pwr.	225 (102)		
Packed for Domestic Shipping:	175 (79.3)	195 (88.4)	305 (139) Lo & Med. Pwr. 493 (192) Hi Pwr.	240 (109)		
<b>NUMBER OF RACK UNITS:</b>	14		22	33		22

Note: One Rack Unit equals 1.75 inches. 40, 65 & 110 W station combinations occupy 11 rack units and 250 & 300 W station combinations occupy 27 rack units of cabinet space.

**SERVICE SPEAKER:**  
(Optional on Ext. Local Stations)

1.5 Watts @ 18 ohms

**LENGTH OF AC POWER CABLE:** 10 ft. (305 cm)

**SERVICE MICROPHONE:**  
(Optional)

Transistorized dynamic

**METERING:** Centralized metering sockets for GE Test Set (4EX3A11 or equivalent).

## PERFORMANCE DATA

### DUTY CYCLE (EIA)

Intermittent: Transmit - 20%; Receive - 100%  
Continuous: Transmit/Receive - 100%

### AMBIENT TEMPERATURE:

(for full spec performance per EIA)

-30°C to +60°C  
(-22°F to +140°F)

### HUMIDITY (EIA):

90% @ 50°C (122°F)

### INPUT POWER SOURCE:

121 VAC (±20%), 60 Hz  
• (Lo & Med. Pwr - convertible to 242)  
100/110/123.5 VAC  
• (Lo & Med. Pwr - convertible to 200/220/247 VAC)

Optional 50 Hz Source:

Optional Standby Battery Source:

13.8 VDC, 55 AH (min.)

\*High power stations require external stepdown transformer for use on 220 VAC, 50 or 60 Hz power source.

### ALTITUDE

#### Operable

Low & Med. Pwr: Up to 15,000 ft. (4,570 m.)  
High Power: Up to 10,000 ft. (3,250 m.)

#### Shippable:

Up to 50,000 ft. (15,250 m.)

### SOURCE POWER DRAIN

@ 121 VAC

@ 12 VDC

#### Receiver

Standby: 65 W (max.) 176 W (max.) 5 W (Av.)  
Rated Audio: 105 W (max.) 200 W (max.) 25 W (Av.)

#### Transmitter

##### (typical models)

	@ 121 VAC	@ 12 VDC
DC56----	270 W (max.)	110 W (Av.)
DC66----	270 W (max.)	150 W (Av.)
DC76----	560 W (max.)	255 W (Av.)
VC86----	750 W (max.)	110 W (Av.)
VC96----	810 W (max.)	110 W (Av.)

## tone & DC Remote Controlled Stations

### AUDIO (line to transmitter)

Line Terminating Impedance: 600 ohms (150 and 900 ohms optional)  
Line Level (adjustable): -20 dBm to +11 dBm  
Output Level to Transmitter (max):  
Remote Station: 400 mV (adjustable)  
Remote/Repeater Station: 200 mV (adjustable)  
Frequency Response: ±3 dB @ 300-3000 Hz  
Line Bridging Impedance: 3K ohms @ 300 Hz

### tone CONTROL

Function Tones: 1050, 1150, 1250, 1350, 1450, 1550, 1650, 1750, 1850, 1950 & 2050 Hz  
Secur-it Tone & Transmit Tone: 2175 Hz  
Transmitted 2175 Hz Tone Level: 65 dB below voice  
Permissible Control Line Loss @2175 Hz: 30 dB

### AUDIO (receiver-to-line)

Audio Amplifier Input Impedance: 40 K ohms  
Input Level: 1 V rms (330 mV per kHz deviation)  
Output Impedance to Line: 600 ohms (150 and 900 ohms optional)  
Output Level to Line Voice (1 kHz ref.): 0 VU (adjustable)  
Tone (1 kHz ref.): +11 dBm (adjustable)  
Frequency Response: +1 dB and -3 dB @ 300-3000 Hz

### Hum and Noise

Noise Squelch: -55 dB (ref. 11 dBm)  
Tone Squelch: -30 dB (ref. 11 dBm)

### DC CONTROL

Control Currents: -2.5, ±6 & ±11 mA  
Line Loop Resistance (maximum): 11 K ohms (includes 3 K termination)



# REPEATER & BASE STATION OPERATING SPECIFICATIONS

(PC67)  
HIGH BAND

138 to 174 MHz

## TRANSMITTER

MODEL SERIES	DUTY CYCLE (EIA)	POWER OUTPUT RANGE	POWER INPUT (Maximum)	FCC FILING DATA (150 to 174 MHz)			APPLICABLE TO PART NUMBERS (FCC Rules)
				TYPE ACCEPTANCE NUMBER			
				Standard Exciter		PLL Exciter	
		5 ppm	2 ppm	0.05 ppm			
(f) I56E . . . .	Intermittent	10 to 40 W	85 W	KT-41-B	—	KT-41-J	21, 89, 91 & 93
(f) I66E . . . .	Intermittent	10 to 65 W	130 W*	KT-42-A	KT-42-C	KT-42-J	
(f) I76E . . . .	Intermittent	20 to 110 W	255 W**	KT-43-A	KT-43-C	KT-43-J	
(f) I56 (K, J, R or T) . . .	Intermittent	10 to 40 W	85 W	KT-44-B	—	KT-44-J	
(f) I66 (K, J, R or T) . . .	Intermittent	10 to 65 W	130 W*	KT-45-A	KT-45-C	KT-45-J	
(f) I76 (K, J, R or T) . . .	Intermittent	20 to 110 W	255 W**	KT-46-A	KT-46-C	KT-46-J	
(f) C56 . . . .	Continuous	10 to 40 W	85 W	KT-47-B	—	KT-47-J	
(f) C66 . . . .	Continuous	10 to 65 W	130 W*	KT-48-A	KT-48-C	KT-48-J	
(f) C76 . . . .	Continuous	20 to 100 W <sup>o</sup>	255 W**	KT-49-A	KT-49-C	KT-49-J	
VC86 (144 to 174 MHz)	Continuous	200 to 250 W	450 W	KT-78-A	KT-78-E	KT-78-J	
VC96 (144 to 174 MHz)	Continuous	250 to 300 W	465 W	KT-79-A	KT-79-E	KT-79-J	89 & 91

† Cabinet Style (1st Digit D, S, P or V)

<sup>o</sup>FCC Type Accepted for 110 W

\*Adjustable to 120 watts (35 W output)

\*\*Adjustable to 180 watts (70 W output)

### RATED RF OUTPUT

#### Continuous Duty

Typical Models	DC56	DC66	DC76	VC86	VC96
138 to 174 MHz:	40W	65 W	100 W	—	—
144 to 174 MHz:	—	—	—	250 W	300 W

#### Intermittent Duty

Typical Models	D156	D166	D176
138 to 174 MHz:	40W	65 W	110 W

### CONDUCTED SPURIOUS AND HARMONIC EMISSION:

40 to 110 W	200 to 300 W
85 dB	80 dB

### MODULATION DEVIATION:

0 to ±5 kHz  
(16F3, 15F2, 16F9)

### FM NOISE:

-55 dB (std. exciter)  
-70 dB (PLL exciter)

### AUDIO RESPONSE (EIA RS152B):

Within +1 and -3 dB of  
6 dB/octave pre-emphasis  
300 to 3000 Hz per EIA

### AUDIO DISTORTION:

Less than 2% @ 1000 Hz

### RF OUTPUT IMPEDANCE:

50 ohms

### FREQUENCY STABILITY

10th Digit "A" or "C": ±0.0005% (-30°C to +60°C)  
±0.0002% (0°C to +55°C)  
10th Digit "B" or "D": ±0.0002% (-30°C to +60°C)

### MULTICHANNEL PERFORMANCE W/STANDARD EXCITER (Optional 2 to 4 frequency)

	Maximum Freq. Spread (MHz)		
	Lo & Med Pwr.		Hi Pwr
	Full Specs	1 dB (Pwr) Degrad	Full Specs
Tx Freq. Range 138-155:	1.8	2.75	—
Tx Freq. Range 150.8-174:	2.0	3.0	0.60
Tx Freq. Range 144-150.8:	—	—	0.55

### MULTICHANNEL PERFORMANCE W/PLL EXCITER (Optional 2 to 4 frequency)

	Maximum Freq. Spread (MHz)
Tx Freq. Range 138-155:	Up to 17 MHz
Tx Freq. Range 150.8-174:	Up to 24 MHz

## RECEIVER

Receiver Type:	Standard	UHS	Noise Blanker
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### SENSITIVITY

EIA 12 dB SINAD:	0.35 μv	0.175 μv	0.175 μv
20 dB Quieting:	0.50 μv	0.25 μv	0.25 μv
Noise Squelch:	0.20 μv	0.10 μv	0.10 μv
Channel Guard:	6 dB SINAD		

### SELECTIVITY, EIA SINAD

@±30 kHz:	-100 dB	-100 dB	-100 dB
@±25 kHz:	-95 dB	-95 dB	-95 dB

INTERMODULATION: -85 dB -80 dB -75 dB

SPURIOUS & IMAGE REJECTION: -100 dB -95 dB -95 dB

RF INPUT IMPEDANCE: 50 ohms

CHANNEL SPACING: 30 kHz/25 kHz

MODULATION ACCEPTANCE: ±7.0 kHz

### FREQUENCY STABILITY

10th Digit "A" or "G": ±0.0005% (-30°C to +60°C)  
±0.0002% (0°C to +55°C)  
10th Digit "B" or "D": ±0.0002% (-30°C to +60°C)

### AUDIO RESPONSE:

Within +1 and -8 dB of  
6 dB/octave de-emphasis  
300 to 3000 Hz per EIA

### AUDIO DISTORTION:

Less than 3%

### AUDIO OUTPUT:

5 watts into 8 ohm load

### MULTICHANNEL PERFORMANCE (Optional 2 to 4 frequency)

	Maximum Freq. Spread (MHz)	
	Full Specs	3 dB Sensitivity Degradation
Rx Freq. Range 138-155:	0.9	1.6
Rx Freq. Range 150.8-174:	1.0	1.8

### FCC MODEL NUMBER:

ER-64-A

# MASTR II STATION FEATURES

## CABINET STYLES

MASTR II stations are offered in four sizes of indoor cabinets for floor mounting and one indoor/outdoor cabinet for pole, wall or floor mounting. Low and high power (intermittent or continuous duty) station combinations may be housed in whatever cabinet type best suits the user's present or projected needs. High power stations are available only in a "V" cabinet which is 4-1/2 inches deeper than the standard "V" cabinet.

## INDOOR CABINET FEATURES

**Double Rails** – All cabinets have a set of mounting rails located alongside both the front and back openings. This makes it practical to rack mount equipment from either side, or secure a deep piece of equipment on the front and rear, or to mount shallow equipment back-to-back.

**Baked-on Paint Finish** – Provides an attractive and protective coating which resists stains, burns and abrasion. If the finish is accidentally damaged, it can easily be restored with a little paint.

**Color** – Moonstone brown and ash beige.

**Blowerless Operation** – in power ratings up to 110 watts, neither the continuous nor the intermittent duty stations require forced cooling when operated within published specifications. The 300 watt station uses a small fan to cool the final amplifier tube and requires a cabinet blower when operated continuously above 104°F (40°C) ambient temperature.

**Cabinet Doors** – The front and back doors of a "V" cabinet are reversible so that either or both may be hinged to open from the right or left side. The back door has grilled openings near the top and bottom.

The front and rear panels of a "D" or "S" cabinet have a full length lip at the bottom and a key-operated cam at the top to retain them in place. The rear panel is louvered to provide convection cooling.

## INDOOR/OUTDOOR CABINET FEATURES

The indoor/outdoor, "P" style, cabinet is a weather-proof enclosure suitable for full outdoor exposure. It is supplied with a thermostatically controlled blower to circulate air within the cabinet when needed.

The front and rear doors are hinged on the same side of the cabinet so that one opens from the right and the other from the left. Both doors are gasketed and have provisions for locks.

Universal brackets are furnished to accomplish wall, pedestal or crossarm/pole mounting. Optional brackets may be specified for mounting on a pole without crossarms.

The illustrations on the right show typical mounting arrangements. Note also that the cabinet may be mounted on the opposite side.

## POWER LEVELS, OPERATING TYPES & CONTROL

The 50,000 or more stations available in the MASTR II Base Station and Repeater line actually evolve from only 23 basic combinations. They are grouped, for reference purposes, according to operating duty cycle, power level and the type of control for which each is capable. These are identified in the Table below along with the choice of cabinets available for the two power groups.

Duty Cycle	Continuous		Intermittant
Power Level	Up to 100 (110) Watts†	250 to 300 Watts	Up to 110 Watts
Control Capability (5th Digit of Combination Ordering Number)	E, K, J, R, T, N, U, V or Y	E, K, J, R, T, N, U, V or Y	E, K, J, R or T
Choice of Cabinet	30" & 44" Indoor 44" Indoor/Outdoor (Standard) 69" Indoor	(Deep) 69" Indoor	30" & 44" Indoor 44" Indoor/Outdoor (Standard) 69" Indoor

†FCC Type Accepted for 110 Watts.

## KEY AND EXPLANATION OF 5TH DIGIT REFERENCES

**E** – Extended Local Control Provides circuits and an interface panel for a multi-conductor cable connection to a separately furnished MASTR Local Controller. With the appropriate control, full operation of the station including frequency selection up to four channels may be performed at the station location or 100 feet away. (See Note A)

**K** – Extended Local/DC Remote Control Same as "E" control plus provisions for connecting an optional MASTR (DC Remote) Controller via a telephone line. (See Note A)

**J** – Extended Local/Tone Remote Control Same as "E" control plus provisions for connecting an optional MASTR (Tone Remote) Controller via a telephone line. (See Note A)

### NOTE A

*A station with "E", "K" or "J" Control must always be connected to a MASTR Local Controller. When a station with either "K" or "J" Control is also connected to a Remote Controller, the remote is incapable of changing frequency or controlling any function other than push-to-talk and monitoring the channel selected by the Local Controller.*

**R** – DC Remote Control Provides circuitry and an interface panel for connection via telephone lines to an optional MASTR (DC

Remote) Controller. With the properly equipped Controller, full operation of the station with up to 6 functions including 2 frequency control, may be accomplished from many miles away.

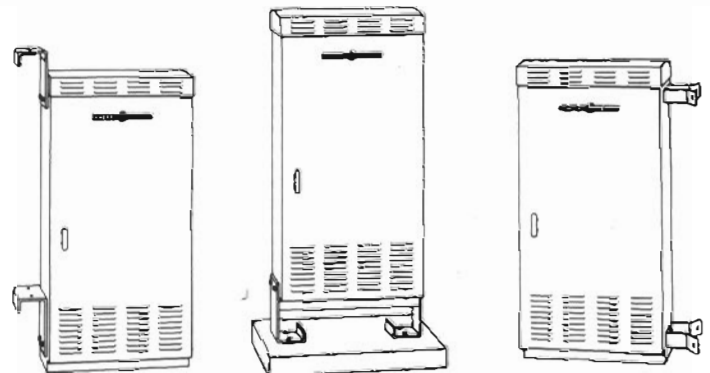
**T** – Tone Remote Control Similar to "R" control except up to 14 functions including 4 channel selection may be tone controlled with a properly equipped MASTR (Tone Remote) Controller. (Tone Remote control is required wherever telephone lines lack DC continuity.)

**Y** – Repeater Control Transmitter and receiver are interconnected to operate full duplex (receiver signals are automatically retransmitted). Two antennas are required unless an optional duplexer is specified.

**U** – Repeater/DC Remote Control Same as "Y" control plus provisions for single channel "R" control when connected to an optional MASTR (DC Remote) Controller.

**V** – Repeater/Tone Remote Control Same as "Y" control plus provisions for up to 4 channel "T" control when connected to an optional MASTR (Tone Remote) Controller.

**N** – Repeater/Extended Local Control Same as "Y" control plus provisions for single channel "E" control when connected to an optional MASTR Local Controller.



# MASTR II STATION OPTIONS

## ACCESSORIES

**MASTR Local Controller** — Required for all Extended Local Stations. Furnished with a Desk Microphone and an 8 foot, multi-conductor, interconnecting cable.



The basic unit has a volume control, Push-To-Talk bar and LED indicators for "power-on" and "transmit". Selector switches and function status LEDs are supplied, as needed, when specified to control other station functions. Optional 50 and 100 foot cable lengths are also available.

**MASTR Local Control Extension** — Similar to a Local Controller except without selector switches. For use in parallel with a Local Controller.

**Remote Control Console** — Required for all DC and Tone Remote Stations. Typical console may be a MASTR Remote Controller, a DESKON, a Command Control Center or equivalent.

**Service Speaker** — Rated 1.5 watts and supplied with ON-OFF switch, two receiver selector switch and volume control. (Furnished as standard with Remote, Repeater, and Remote/Repeater Stations.)

**Service Microphone** — Provides a MASTR II military microphone where needed.

**Blowers** — With thermostat are available for continuous duty stations operating in unusually hot locations.

**Meters** (for low and medium power stations)

- Up front panel-mounted meters for "V" cabinets.
- Plug-in, shelf-mounted module meters.

**Pole Mount Brackets** — Enables an outdoor cabinet to be mounted on a telephone pole without crossarms.

**Antenna Multi-coupler** — Used for connecting up to 4 receivers in the same band to a single antenna.

**Duplexer** — Enables a Repeater or duplex station to operate on a single antenna.

## FUNCTIONAL OPTIONS

**Multi-frequency** — DC Remote Stations may have 2 transmit and receive frequencies; Tone Remote and Extended Local Stations may have up to 4 channels.

**Channel Guard** — Solid-state, available in 4 configurations; encode/decode, encode only, decode only or encode and decode with different tone frequencies. Features plug-in networks and Squelch Tail Elimination.

**Noise Blanker** — Essentially eliminates impulse noise and improves reception. (Not offered in Repeater Stations).

**Ultra High Sensitivity (UHS)** — Provides a preamplifier for the receiver. (Not offered in Repeater Stations).

**Phase Lock Loop Exciter** — An alternate exciter with FM ICOMs for widely spaced transmitter frequencies.

**2 PPM Frequency Stability** — Provides all transmitter and receiver channels with  $\pm 0.0002\%$  frequency stability.

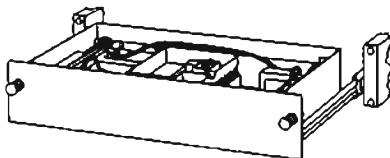
**Priority Search Lock Monitor (PSLM)** — Enables two selected channels of a multi-frequency receiver to be alternately monitored with priority established for one.

**Carrier Control Timer** — Prevents excessively long transmissions and sends an alert tone on cut-off. (Not needed on repeaters.)

**Intercom** — Enables the station audio circuit to be used for intercommunication by appropriately equipped Remotes. (Intercom is standard on Extended Local/Remote Stations.)

**Battery Standby & Alert Tone** — Provides a relay panel, battery charger and tone generator. When there is an AC power failure, automatic transfer is made to a customer-furnished 12 VDC source and an audible alarm signal is produced. The alarm will stop and the station will revert when AC power is restored. The power output of 250 or 300 W station will be reduced to approximately 15W on loss of AC power and will automatically return to full power on resumption of the AC source.

**Auxiliary Receiver** — For use as a second station receiver and/or a satellite receiver in a receiver voting system. A slide-out drawer assembly which occupies 2 rack units.



**Duplex Operation** — May be added to (non-repeater) continuous duty stations for simultaneous transmit and receive operations on duplex channels. (Requires an optional duplexer if operation on one antenna is intended.)

## CONTROL OPTIONS

**Remote Squelch** — Enables a station to be operated on one of two preset noise squelch levels.

**Repeater Disable** — Applies to a Remote/Repeater Station and may be used to disable the repeat function.

**Squelch Operated Relay** — Consists of a relay with Form "C" contacts which operates when the receiver unsquelches.

**Multiple Channel Guard Encoder** — A plug-in module to provide 1) independent selection of tones on Extended Local Stations, or 2) certain tones dedicated to specific channels on multifrequency Remote Stations.

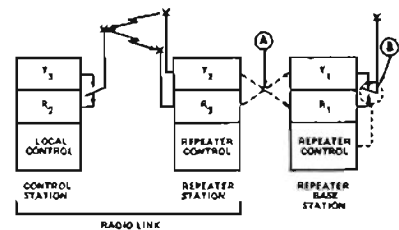
**Tone Decoders** — Several types are available with up to 5 functions. Each will respond to a certain tone or tone pulses to initiate a specified action. Included are Digital, DTMF, Type 90 and Type 99 Tone Decoders.

**Channel Guard Disable** — Provides for the on-off control of the decoder on Remote Channel Guard Stations.

**Auxiliary Control** — Available with or without relays for up to four control functions.

**Four Wire Audio** — Converts the control capability of a Remote Station from 2 to 4 wire. (Standard on stations equipped for duplex operation.)

**Radio Link Application Kit** — Provides a harness and control as indicated by "A" and "B" in the drawing below; for stations operating back-to-back in a radio link application.



**DC Interface Panel** — For low and medium power stations when operated from a 12 VDC source. Deletes the regular AC power supply.

**Voting Kit** — Adds a tone circuit to a station receiver which enables it to function as part of a GE receiver voting system.

**Shared Repeater Panel** — A 3 rack unit with up to 10 plug-in tone modules which enables a Repeater Station to be shared by up to 10 user groups.

**Other Options include** — 48 VDC Power Supply, Line Protection Kits, Line Compensation Kit, extra AC outlet strip, Extender Board for in circuit testing of control modules and stepdown transformer for high power stations.

MOBILE RADIO DEPARTMENT

WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502

GENERAL  ELECTRIC