GENERAL ELECTRIC

MASTR Mobile Controls

FOR SYSTEMS APPLICATIONS

MASTR II and
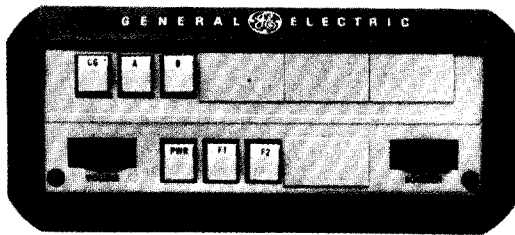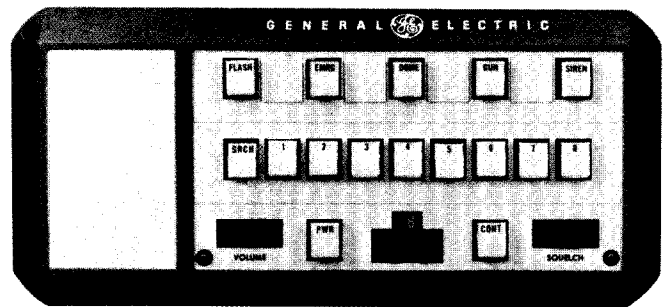Executive II Mobile Radios

Figure 1. C-800 Series

Figure 2. C-900 Series

MULTI-FUNCTION CAPABILITY

The C-800 and C-900 Control units are alternate control units for MASTR II and Executive II ("S" Series) mobile radios. Each combines the required operational controls with one or more extra-function "options" which might otherwise be unavailable or require one or more separate control devices. Integrating many functions in a single package also provides great convenience for the operator. No special installation or wiring is necessary because these "system" control units can be plugged into the radio's standard control/power cables. Furthermore, extremely flexible mounting brackets enable the control to be installed almost any where and be positioned for the best visibility and ease of operation.

RUGGED DESIGN

Both units exceed US Forest Service vibration requirements as well as EIA shock and vibration standards. They will also operate at:

    -40°C to +70°C

    95% RH at 50°C

    ±15% variation of nominal supply voltage

PLUG-IN MODULES

A choice of four plug-in "control" modules provide sufficient range to match either a C-800 or C-900 control to the operating requirements of a given mobile. Space is also available on most control modules for additional "options".

Any one of eleven plug-in "options" modules may be added to the Option Deck of the C-800 Control. The C-900 can be equipped with any two different "options" selectable from the same group of modules.

Any "Control" or "Option" module supplied with less than its full complement of switches may be expanded to its full capacity at a later date.

BACK-LIGHTED CONTROLS

The pushbutton selectors on the "Option" or "Control" modules are clearly identified as to function and they are individually back-lighted with low power-consuming LEDs to provide visible status information. Unselected pushbuttons will be at a lower light intensity than selected pushbuttons.
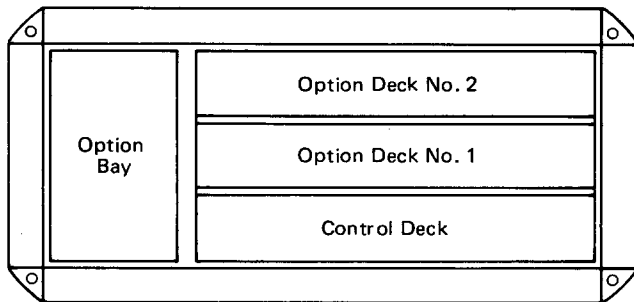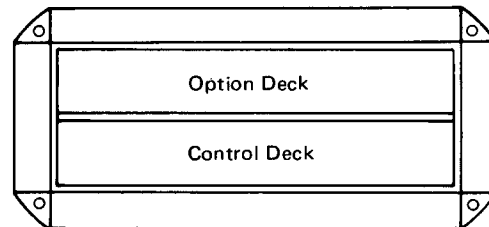
Figure 3. C-900 Module Positions

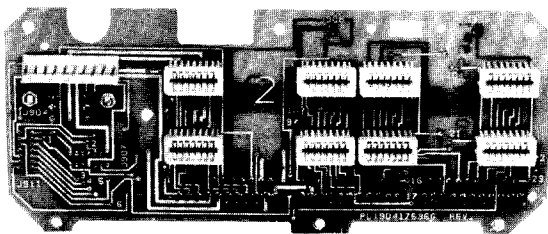Figure 4. C-800 Module Positions

PLUG-IN MODULES
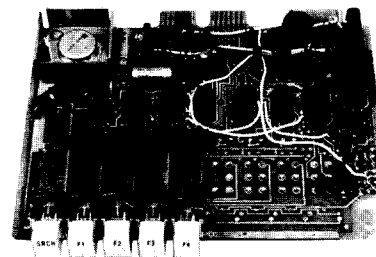

Figure 5. Internal Backplane

Figure 6. Typical Option Module

The "Option" and "Control" modules are assembled on plug-in circuit boards (see Figures 6 and 7). The connectors or card edges at the back of these boards mate with pins or Molex connectors on a vertical back plane (Figure 5) located inside and at the back of the control unit's housing. Multiple pins extend out through the rear of the housing for connections to the radio's standard power cable (see "a" in Figure 8 on the back page).

A "Control" module must always be installed in the lower deck of the system control unit for proper connection (see Figures 3 and 4 above). For the same reason, "Option" modules plug into the upper deck (or decks). In a C-900 control, either Option Deck may be used for a suitable "Option" module.
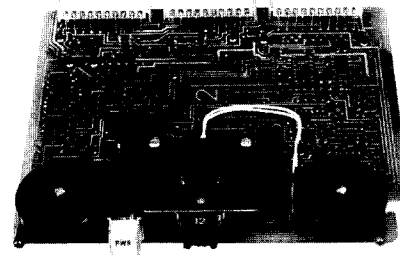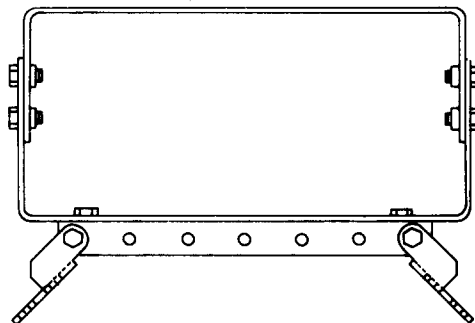

Figure 7. Typical Control Module

MOUNTING PROVISIONS

(a)
(b)
(c)

The bracket assembly illustrated is furnished with a C-800 or C-900 control unit. Normally, it would be installed on the transmission hump. The legs on base (c) can be swiveled up or down to conform to the contour of the hump.

The control unit is bolted on top of the bracket assembly through curved slots in section (a). Section (b) is also fastened through curved slots to the base (c) and to section (a). This permits the control unit to be rotated up to 120° in either the vertical or horizontal plane, or both.
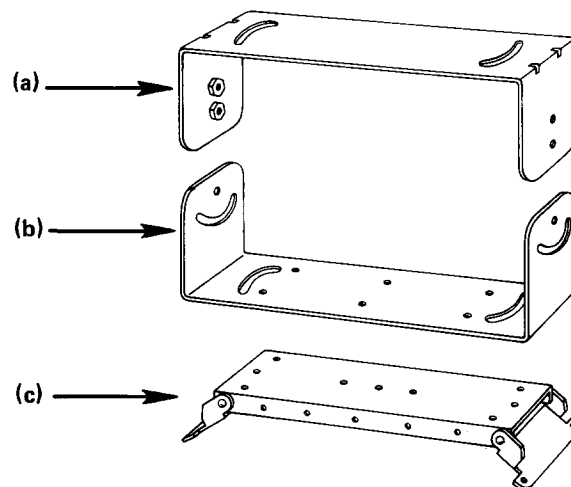
Under-the-dash installation may be accomplished by attaching section (b) to the top of the control unit and section (a) underneath the dash. Even in this location, the control can be fully rotated in two planes for best orientation.

IC MASTR Mobile "Systems" Control Units

CONTROL DECK MODULES

Four basic "Control" modules are offered to provide a choice of control capability. Selection is dictated by the number of channels available in the mobile radio (MASTR II or Executive II) and the need for one or more control deck options.

All modules are provided with variable squelch, volume control, separate on/off power switch, channel selector (except single channel module), transmit indicator and channel busy indicator. The volume and squelch control wheels are recessed and have fluted edges to facilitate adjustment. The power (PWR) switch is a push-push control which is backlighted by a yellow LED when depressed. The channel selectors (rotary wheel or pushbuttons), channel busy indicator and option pushbuttons also use yellow LEDs. The transmit LED is red. The unused positions on the single channel, two channel and the rotary control modules are covered with snap-out inserts to enable function switches to be added. The same is true for vacant positions on Option modules.

(1) PUSHBUTTON CONTROL — One Channel
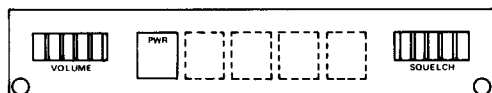
The single channel module, of course, should only be used for a single channel radio. The four vacant switch positions (shown by dashed lines in the illustration) may be occupied by any one or all of the Control Deck Options listed below.
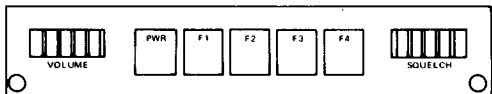
(2) PUSHBUTTON CONTROL — Two Channel
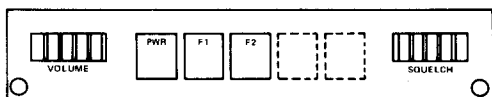
Two-channel module has two interlocking pushbuttons. Each is back-lighted by a yellow LED which will brighten when its button is pushed in. This module has space for the addition of one or two Control Deck Options.
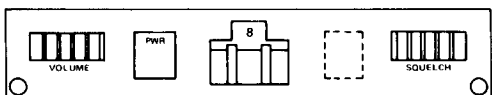
Note that this module may not be expanded to the three channels. To increase channel capacity, the two-pushbutton assembly must be replaced by a set of four.

(3) PUSHBUTTON CONTROL — Four Channel

The four channel module is equipped with four interlocking push-buttons and each is illuminated by a clear LED. Since all switch positions are full, there is no space available for options. If a control option is required, the rotary control module should be specified, instead.

(4) ROTARY CONTROL
Up to Twelve Channels

The "rotary" module has space for any one of the regular Control Deck Options or it may be used for Priority Search Lock Monitor (PSLM) to monitor two channels. (This PSLM Option is exclusive to the rotary module).

Three PSLM versions are offered. One version has a fixed priority channel; the second has the non-priority channel fixed; and the third alternates the priority and non-priority selection between two channels. In either case, the SRCH pushbutton enables or disables the monitoring function. A LED indicator behind the SRCH pushbutton appears brighter when selected. It increases in brillance when a signal is present on one of the channels being monitored. The light will be steady if it's the priority channel. It will blink on the non-priority channel.

The rotary control module may be used for any number of channels, up to 12. However, the rotary channel wheel will be "stopped" so that it may not be moved beyond the number of channels specified. The "stop" may be advanced if additional positions are needed later.

CONTROL DECK OPTIONS

The following Options may be applied only to the single and two channel "pushbutton" or "rotary" control modules, space permitting. Each provides a back-lighted (LED) pushbutton which brightens when activated.

CHANNEL GUARD MONITOR — used to provide monitoring of Channel Guard protected receivers in lieu of a microphone or handset hookswitch.

FIXED SQUELCH — for application involving a radio modified for fixed squelch operation. The variable squelch wheel is replaced with an on/off rotary switch for channel monitoring.

INTERNAL/EXTERNAL SPEAKER — in addition to the pushbutton, an outdoor reentrant speaker, mounting hardware and speaker cable are furnished. With the pushbutton depressed, 70% of the receiver audio goes outside; the remaining 30% can be heard by the internal speaker. This Option is redundant when the (Option Deck) PA module is used.

DUAL CONTROL — provides a switch only. Enables a C-800 or C-900 control unit to be used in a dual control installation.

A. For MASTR II and Executive II Mobile Applications (continued):

• TYPE 90 TONE MODULES
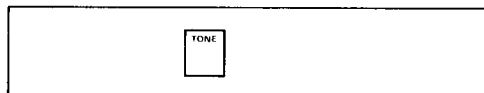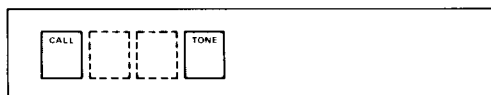#### Decoder or Encoder

The Type 90 Encoders and Decoders utilize a single pulse tone system for signalling or control purposes. The circuit is all solid state and uses a single replaceable tone determining element. It may utilize any one of the following tone frequencies: 1050, 1200, 1350, 1500, 1650, 1800, 1950, 2100, 2250 or 2400 Hz.

The Decoder — will respond to one discreet Type 90 tone and will unmute the radio's receiver. At the same time an alert tone will sound and the LED behind the CALL pushbutton will brighten and flash. Pushing the CALL button resets the circuit. The CALL pushbutton also can be used to monitor the channel. If automatic reset or monitoring is desired, a microphone or handset hookswitch may be added. Also, one or two optional relays and pushbuttons can be added to the module to activate external alarm devices such as a horn or light.

The Encoder — will automatically send a burst of tone each time the transmitter is keyed (PTT Switch closed). Pushing the momentary action TONE button on the module will also key the transmitter and send the desire tone.

• TYPE 90 TONE MODULE
Combined Decoder/Encoder

This module combines the functions of both the Type 90 Encoder and Decoder. It performs and can be operated like both of the modules described in the foregoing paragraphs. Similarly, one or two relays and pushbuttons may be added as an option for the decoder for external alarm.

• TYPE 99 TONE DECODER MODULE
For Selective Signalling

The basic Type 99 Tone Decoder module responds to one discrete pair of tone frequencies as an Individual Call. An expanded version provides Individual, Group and Super-Group by responding to two discrete pair of tones.
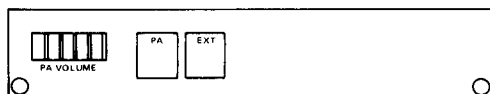
In all cases, the decoder keeps the receiver muted until the proper set of tones is received. Then, the CALL LED will flash and an alert tone is sounded.

The decoder may also be equipped with optional relays and pushbuttons to operate external alarms such as a horn and/or a light.

Type 99 solid state tone decoders are used primarily for Selective Calling. Up to 900 individual codes are available using a two sequential tone system. The tones range in frequency from 517.5 to 952.5 Hz.

The CALL pushbutton is used to reset the decoder after a call or to monitor the channel. Automatic reset or channel monitor may be accomplished by adding an optional hookswitch to the radio's microphone circuit.

B. For MASTR II Mobile Applications Only:
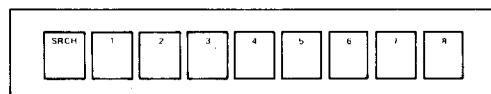
• PUBLIC ADDRESS & EXTERNAL SPEAKER

The "EXT" and the "PA" pushbuttons control four modes of operation. Depressing the "EXT" pushbutton causes the receiver audio to be heard through both the internal and external speakers. Pushing the "PA" button enables the radio's microphone to key just the PA system through the external speaker. Incoming messages can be heard through the internal speaker.

With both buttons depressed, the individual modes are combined except the microphone will key just the PA system. When both pushbuttons are not engaged the radio operates in its normal mode.

The module's volume control allows the PA audio output to be set independently of the radio's volume and vice versa. Full PA audio output is 12 watts.

The PA module is furnished complete with an outdoor speaker, mounting hardware and 20' of speaker cable.

• EIGHT CHANNEL PSLM

This module operates the same as the four frequency PSLM module except it has the capability of monitoring any combination of channels from 2 to 8. Therefore, it is more properly applied to MASTR II mobile combinations equipped with five or more channels.

MASTR Mobile "Systems" Control Units

OPTION DECK MODULES

Any one of the following eleven modules may be added to the Option Deck of a C-800 control unit. Except for duplicate functions or decoder options, any two of the eleven option modules may be applied to a C-900 control unit and bw located in either Option Deck.

A control unit with any of these Options if fully compatible with MASTR II mobile radios. However, control units with the Public Address or 8 frequency PSLM should not be applied to Executive II mobile radios; all others would be fully applicable.

A. For MASTR II and Executive II Mobile Applications:

● MULTI-TONE CHANNEL GUARD ENCODERS

Eight Tone Module

| CG | A | B | C | D | E | F | G | H |
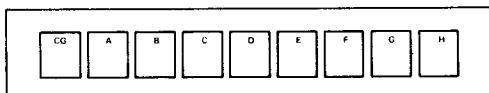
The eight tone, solid state Channel Guard encoder module will continuously generate any one of eight pre-set EIA squelch tone frequencies. The tone is selected by depressing the desired pushbutton and it is sent out each time the transmitter is keyed. At the end of a transmission, a reversed pulse is generated to eliminate the "squelch tail" which would otherwise be heard.

The choice of tone is completely independent of the position of the RF channel selector switch.

Changing a tone frequency on any position, entails only a simple mechanical change on the module's logic board. There are no tone elements to replace.

Two Tone Module

| CG | A | B |

The pushbutton marked "CG" enables or disables the encoder and turns the LEDs (behind the other pushbuttons) on or off. When a tone pushbutton is selected, its LED becomes brighter. The tone pushbuttons are interlocked to prevent more than one tone being selected. If less than eight tones are desired, the unwanted switches can be blocked open.

The two-tone CG module is similar to the eight tone module except only two selector switches are provided.

● FOUR CHANNEL PSLM

| SRCH | 1 | 2 | 3 | 4 |
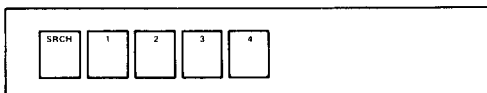
The module above provides four frequency Priority Search Lock Monitor (PSLM). It operates like, and offers the same performance characteristic as any other General Electric PSLM Option. In addition, it has the ability to search a variable number of channels up to the maximum provided by the module; in this case . . . four.

The pushbutton labeled "SRCH" turns the PSLM function on or off. When it is depressed, all the channel selector buttons will be dimly lit. Pushing any one or more of the channel selectors will cause its LED to appear brighter.

A signal on one of the monitored channels will cause the LED associated with that position to attain full brightness. If it is a non-priority channel, the light will flicker. On the priority channel, the light will be steady. The audio on the priority channel will also sound louder.

The priority channel is selected by the channel selector rotary wheel or pushbutton. Of course, it also selects the transmit frequency (and the receive frequency when the PSLM switch is off).

● "WILD CARD" MODULE
Five Auxiliary Functions

| FLASH | EMRG | DOME | GUN | SIREN |
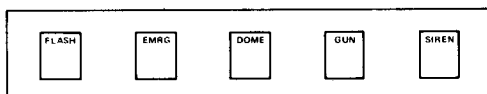
The two outboard pushbuttons are momentary action switches. The other three pushbuttons are two position switches. All pushbuttons are back-lighted with LEDs which increase in light level when activated.

This module is useful in performing extra or auxiliary functions. The option is supplied with:

Five single pole, double throw, unmarked pushbuttons.

A wiring harness that terminates in a plug in the backplane on the control unit housing (see "d" in Figure 9).

15 color coded wires, 12-feet long, with a mating plug for the wiring harness.

A sheet of peel-off labels for switch identification.

APPLICATION and GENERAL DATA

DIMENSIONS

	C-800	C-900	Bracket (Assembled)
Height (ins./cm.)	3.25/8.26	4.31/10.95	4.5/11.4 (min)
Width (ins./cm.)	7.25/18.45	9.31/23.65	7.5/19.2 (min)
Depth (ins./cm.)	7.0/17.8	7.0/17.8	3.0/7.6
Weight* (lbs./kg.)	3.13/1.42	4.75/2.15	1.5/0.68

*Less modules. Typical module weighs 0.5 lbs. (0.23 kg.)

COLORS

Case:	Moonstone Brown
Front Panel:	Ash Beige
Rotary Controls:	Black
Mounting Bracket:	Grey

CONTROL CABLES: For system voltages of −12, +12, ±12 or ±24 to 48 VDC.

ACCESSORY OPTIONS

The basic C-800 or C-900 Control unit is supplied with only a mounting bracket and swivel base. By selecting other digits in its Ordering Nomenclature, the following accessories can be included:

- Transistorized mobile microphones, standard military or noise cancelling.
- Handset and/or hookswitch.
- 8 ohm (indoor) mobile speaker.

- Power/Control cable for a MASTR II or Executive II mobile.
- Adaptor cable or plug for connecting external tone devices or GE-STAR units.

COMPATIBILITY

For proper and complete operation, the control capability of the C-800 or C-900 control module must match the requirements of the radio with which it is used. The radio itself must be modified slightly when used with either the Fixed Squelch, multi-tone Channel Guard, Noise Blanker disable switch and/or Public Address Options.

Because of control conflicts, only one decode option may be specified for C-900 controls.

The multi-tone CG Encoder module is compatible with either a non-CG mobile or a mobile with CG decode only.

The C-900 series has an Option Bay into which customized devices or controls may be incorporated. A portion of the internal interface circuit board within the Option Bay is prewired and has a set of pin terminals for a ready connection of add-on equipment in the field.

BACK PANEL CONNECTIONS
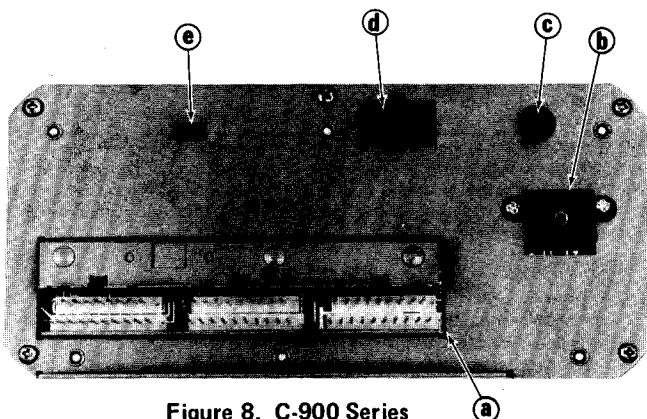

Figure 8. C-900 Series

Figure 9. C-800 Series

Figures 8 and 9 show the rear connection panel of a C-900 and C-800 control unit, respectively. A standard mobile power/control cable plugs into terminal "a". Lugs over the two rows of pins are used to anchor connector hooks for strain relief and to hold the connectors in place.

The microphone cable plugs in to receptacle "b". It is retained by a captive threaded screw running through its center.
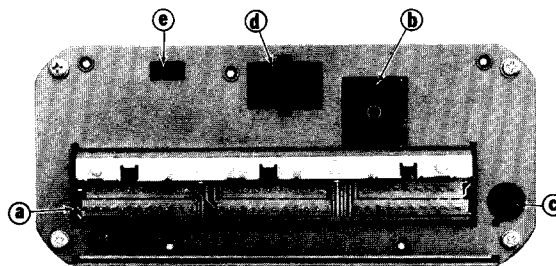
The optional 9-pin Winchester Plug for external tone or signalling devices mounts in location "c".

Cutout "d" is used for the receptacle supplied with the "wild card" module and/or the external alarm options on a decoder.

The optional Noise Blanker switch installs in the rectangular slot "e".