MM101030V1 R1A

Operator's Manual

PANTHER™ 300M Mobile Radio

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MAXIMUM PERMISSIBLE EXPOSURE (MPE) LIMITS

RADIO OPERATOR WARNING

Do not transmit with this radio and antenna when persons are within the MPE Radius of the antenna, unless such persons (vehicle occupants or bystanders, for example) are shielded from the antenna field by a grounded metallic barrier (such as the user's vehicle rooftop). The MPE Radius is the minimum distance from the antenna axis that ALL persons should maintain in order to avoid RF exposure higher than the allowable MPE level set by the FCC.

FAILURE TO OBSERVE THESE LIMITS MAY ALLOW THOSE WITHIN THE MPE RADIUS TO EXPERIENCE RF RADIATION ABSORPTION WHICH EXCEEDS THE FCC MAXIMUM PERMISSIBLE EXPOSURE (MPE) LIMIT. IT IS THE RESPONSIBILITY OF THE RADIO OPERATOR TO ENSURE THAT THE MAXIMUM PERMISSIBLE EXPOSURE LIMITS ARE OBSERVED AT ALL TIMES DURING RADIO TRANSMISSION. THE RADIO OPERATOR IS TO ENSURE THAT NO BYSTANDERS COME WITHIN THE RADIUS OF THE MAXIMUM PERMISSIBLE EXPOSURE LIMITS SHOWN BELOW.

Determining MPE Radius

THE MAXIMUM PERMISSIBLE EXPOSURE RADIUS HAS BEEN ESTIMATED TO BE A RADIUS OF ABOUT 55 INCHES (OR 138 CM) FOR THE VEHICULAR MOUNTED ANTENNA SYSTEMS, AND 77 INCHES (OR 195 CM) FOR BASE STATION MOUNTED ANTENNA SYSTEMS PER OET BULLETIN 65 OF THE FCC. THIS ESTIMATE IS MADE USING THE MAXIMUM CAPABLE POWER OF THE RADIO, ANTENNAS WITH A MAXIMUM GAIN OF 3 dBd (FOR VEHICULAR MOUNTED SYSTEMS) OR 6 dBd (FOR BASE STATION SYSTEMS), AND A MAXIMUM 50% TRANSMIT DUTY CYCLE (DUE TO THE PUSH-TO-TALK STATUS OF THIS MOBILE).

SAFETY TRAINING INFORMATION

YOUR COM-NET ERICSSON PANTHER 300M MOBILE RADIO GENERATES RF ELECTROMAGNETIC ENERGY DURING TRANSMIT MODE. THIS RADIO IS DESIGNED FOR AND CLASSIFIED AS "OCCUPATIONAL USE ONLY" MEANING IT MUST BE USED ONLY DURING THE COURSE OF EMPLOYMENT BY INDIVIDUALS AWARE OF THE HAZARDS AND THE WAYS TO MINIMIZE SUCH HAZARDS. THIS RADIO IS NOT INTENDED FOR USE BY THE "GENERAL POPULATION" IN AN UNCONTROLLED ENVIRONMENT. IT IS THE RESPONSIBILITY OF THE RADIO OPERATOR TO ENSURE THAT THE MAXIMUM PERMISSIBLE EXPOSURE LIMITS DETERMINED IN THE PREVIOUS SECTION ARE OBSERVED AT ALL TIMES DURING TRANSMISSION. THE RADIO OPERATOR IS TO ENSURE THAT NO BYSTANDERS COME WITHIN THE RADIUS OF THE MAXIMUM PERMISSIBLE EXPOSURE LIMITS.

This radio has been examined and complies with the FCC RF exposure limits when persons are beyond the MPE radius of the antenna. In addition, your Com-Net Ericsson radio complies with the following Standards and Guidelines with regard to RF energy and electromagnetic energy levels and evaluation of such levels for exposure to humans:

- FCC OET Bulletin 65 Edition 97-01 Supplement C, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.

- American National Standards Institute (C95.1-1992), IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

- American National Standards Institute (C95.3-1992), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave.

TO ENSURE THAT YOUR EXPOSURE TO RF ELECTROMAGNETIC ENERGY IS WITHIN THE FCC ALLOWABLE LIMITS FOR OCCUPATIONAL USE, ALWAYS ADHERE TO THE FOLLOWING GUIDELINES:

- DO NOT operate the radio without a proper antenna attached, as this may damage the radio and may also cause you to exceed FCC RF exposure limits. A proper antenna for installation on a vehicle has a maximum gain of 3 dBd. A proper antenna for installation on a rooftop or tower in a desktop base station setup has a maximum gain of 6 dBd.

Transmitter Hazards

The operator of any mobile radio should be aware of certain hazards common to the operation of vehicular radio transmitters. **A list of several possible hazards is given:**

1. **Explosive Atmospheres** - Just as it is dangerous to fuel a vehicle with the motor running, similar hazards exist when operating a mobile radio. Be sure to turn the radio off while fueling a vehicle. Do not carry containers of fuel in the trunk of a vehicle if the radio is mounted in the trunk.
    Areas with potentially explosive atmosphere are often, but not always, clearly marked. Turn OFF your radio when in any area with a potentially explosive atmosphere. It is rare, but not impossible that the radio or its accessories could generate sparks.
2. **Interference to Vehicular Electronics Systems** - Electronic fuel injection systems, electronic anti-skid braking systems, electronic cruise control systems, etc., are typical electronic systems that may malfunction due to the lack of protection from radio frequency energy present when transmitting. If the vehicle contains such equipment, consult the dealer and enlist their aid in determining the expected performance of electronic circuits when the radio is transmitting.
3. **Dynamite Blasting Caps** - Dynamite blasting caps may be caused to explode by operating a radio within 500 feet of the blasting caps. Always obey the **"Turn Off Two-Way Radios"** signs posted where dynamite is being used.
    When transporting blasting caps in your vehicle:
    a. Carry the blasting caps in a closed metal box with a soft lining.
    b. Leave the radio **OFF** whenever the blasting caps are being put into or removed from the vehicle.
4. **Liquefied Petroleum (LP) Gas Powered Vehicles** - Mobile radio installations in vehicles powered by liquefied petroleum gas with the LP gas container in the trunk or other sealed-off space within the interior of the vehicle must conform to the **N**ational **F**ire **P**rotection **A**ssociation standard **(NFPA) 58** requiring:
    a. The space containing the radio equipment shall be isolated by a seal from the space containing the LP gas container and its fittings.
    b. Outside filling connections shall be used for the LP gas container.
    c. The LP gas container shall be vented to the outside of the vehicle.

SAFE DRIVING RECOMMENDATIONS
(Recommended By AAA)

- Read the literature on the safe operation of the radio.

- Keep both hands on the steering wheel and the microphone in its hanger whenever the vehicle is in motion.

- Place calls only when vehicle is stopped.

- When talking from a moving vehicle is unavoidable, drive in the slower lane. Keep conversations brief.

- If a conversation requires taking notes or complex thought, stop the vehicle in a safe place and continue the call.

- Whenever using a mobile radio, exercise caution.

OPERATING RULES AND REGULATIONS

Two-way FM radio systems must be operated in accordance with the rules and regulations of the local, regional, or national government.
In the United States, the PANTHER 300M mobile radio must be operated in accordance with the rules and regulations of the Federal Communications Commission (FCC). As an operator of two-way radio equipment, you must be thoroughly familiar with the rules that apply to your particular type of radio operation. Following these rules helps eliminate confusion, assures the most efficient use of the existing radio channels, and results in a smoothly functioning radio network.
When using your two-way radio, remember these rules:

- It is a violation of FCC rules to interrupt any distress or emergency message. As your radio operates in much the same way as a telephone **"party line"**, always listen to make sure that the channel is clear before transmitting. Emergency calls have priority over all other messages. If someone is sending an emergency message - such as reporting a fire or asking for help in an accident - ***KEEP OFF THE AIR!***

- The use of profane or obscene language is prohibited by Federal law.

- It is against the law to send false call letters or false distress or emergency messages. The FCC requires that you keep conversations brief and confine them to business. To save time, use coded messages whenever possible.

- Using your radio to send personal messages (except in an emergency) is a violation of FCC rules. You may send only those messages that are essential for the operation of your business.

- It is against Federal law to repeat or otherwise make known anything you overhear on your radio. Conversations between others sharing your channel must be regarded as confidential.

- The FCC requires that you identify yourself at certain specific times by means of your call letters. Refer to the rules that apply to your particular type of operation for the proper procedure.

- No changes or adjustments shall be made to the equipment except by an authorized or certified electronic technician.

IMPORTANT

Under U.S. law, operation of an unlicensed radio transmitter within the jurisdiction of the United States may be punishable by a fine of up to $10,000, imprisonment for up to two years, or both.

OPERATING TIPS

The following conditions tend to reduce the effective range of two-way radios and should be avoided whenever possible:

- Operating the radio in areas of low terrain, or while under power lines or bridges.

- Obstructions such as mountains and buildings.

- In areas where transmission or reception is poor, some improvement may be obtained by ensuring that the antenna is vertical. Moving a few yards in another direction or moving to a higher elevation may also improve communication.

INTRODUCTION

This manual describes the operation for the Com-Net Ericsson PANTHER™ 300M mobile radio. The PANTHER 300M mobile radio is a high performance FM mobile radio providing reliable two-way communication in a Conventional radio system.

The PANTHER 300M mobile radio can be programmed with six channels. The PANTHER 300M mobile radio includes a 7-segment, two character, numeric display for channel display.

The PANTHER 300M mobile radio operates on any of the following Conventional platforms:

- Channel Guard Encode/Decode
  [Squelch Tail Elimination (STE) optional]

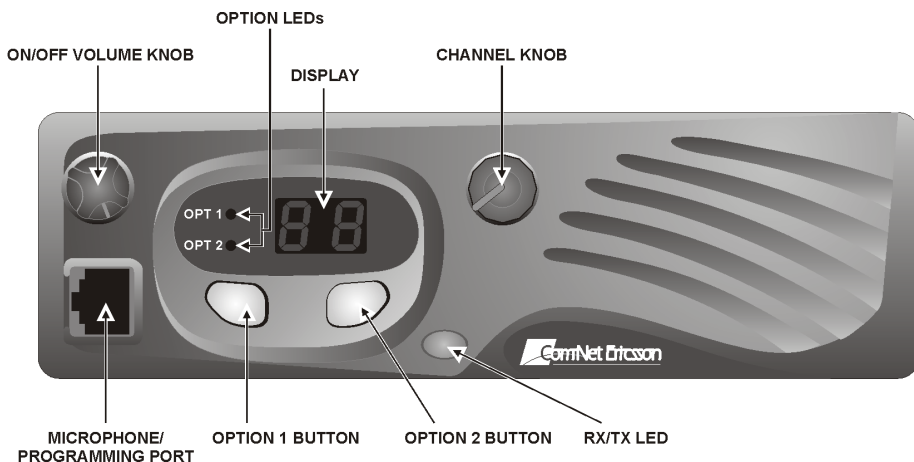- Digital Channel Guard Encode/Decode

- Type 99 Decode

RADIO INDICATORS

Figure 1 – PANTHER 300M mobile radio Front View

Controls

All the controls for the PANTHER 300M mobile radio are located on the front of the control unit and described below:

ON/OFF Volume Knob

This knob powers the radio ON/OFF and controls the volume level of the received audio at the speaker. When the knob is in the OFF position, rotate the knob clockwise until the knob clicks to turn the power to the radio ON. To turn the power to the radio OFF, rotate the knob counterclockwise until it clicks and stops. Rotate the knob clockwise to increase the volume of receive audio. Rotate the knob counterclockwise to decrease the volume of receive audio.

Typically, mobile radio installations require a vehicle ignition switch to be in the Accessory or Run position before the radio will power ON. In some applications, the radio is wired directly to the battery and the radio will power ON regardless of the vehicle ignition switch setting.

Channel Knob

This six position rotary knob selects the desired channel from a programmed list of channels. Rotate the **Channel Knob** clockwise or counterclockwise until the raised rib aligns with the desired channel number. The displayed channel number is consistent with the **Channel Knob** position.

Option 1 Button

This button can be programmed with a programmable function. The default function is "Monitor/Clear".

Option 2 Button

This button can be programmed with a programmable function. The default function is "Disabled".

Option Status LEDs

The two **Option Status LEDs** (Light Emitting Diodes) indicate the state of the radio. The upper LED indicates the state of function assigned to the **Option 1** button. The lower LED indicates the state of the function assigned to the **Option 2** button.

Option Button Functions

The following functions can be assigned to the **Option 1** or **Option 2** buttons.

NOTE

Press and hold the **Option 1** or **Option 2** buttons to execute the programmed function.

Table 1: Programmed Functions States

Function	1 Short High Tone Option Status LED ON	2 Short High Tones Option Status LED OFF
Local/Distant Squelch	Local	Distant
Type 99 ON/OFF	ON	OFF
Home Channel	Home Channel	Selected Channel
Horn Alert ON/OFF	ON	OFF
Public Address ON/OFF	ON	OFF
External/Internal Speaker	External	Internal

Disabled

No function is assigned to the **Option** button. When pressed, the radio will emit a Denied Alert Tone.

Local/Distant Squelch

The Local/Distant Squelch function toggles the channel squelch setting between "Local" and "Distant". "Local" squelch reduces the number of received degraded transmissions. "Distant" squelch increases the number of received transmissions.

Type 99 ON/OFF

The Type 99 function toggles the state of the Type 99 Decoder between "ON" and "OFF". Type 99 mutes receive audio until a valid Type 99 call is received. "ON" indicates the radio is operating in Selective Call mode. "OFF" indicates the radio is operating in Monitor mode.

If an invalid or no Type 99 decode is programmed on a channel, the Type 99 function is programmed for an **Option** button and the **Option** button is pressed, the radio will emit a Denied Alert Tone.

Home Channel

The Home Channel function toggles the channel setting between "Home Channel" and "Selected Channel". "Home Channel" is a programmed channel that allows direct communication with a selected individual. "Selected Channel" is the channel frequency selected by the user. Changing the channel selection knob or power cycling the radio will cancel the Home Channel function.

Horn Alert ON/OFF

The Horn Alert ON/OFF function toggles the operation of the Horn Alert of the Type 99 decoder between "ON" and "OFF". "ON" will activate the horn alert relay when a Type 99 Individual Call is received. "OFF" will not activate the horn alert relay when a Type 99 Individual Call is received.

If an invalid or no Type 99 decode is programmed on a channel, and the Horn Alert ON/OFF function is programmed for an **Option** button, and the **Option** button is pressed, the radio will emit a Denied Alert Tone.

Enabling the Horn Alert ON/OFF function will enable the Type 99 function. Disabling the Horn Alert ON/OFF function will not disable the Type 99 function.

Public Address ON/OFF

The Public Address function toggles the operation of the Public Address operation between "ON" and "OFF". "ON" will send the microphone audio through the receive amplifier to the external speaker. "OFF" will send the microphone audio through the transmitter.

External/Internal Speaker

The Internal/External Speaker function toggles the receive audio between the "Internal" and "External" speaker. "External" activates the speaker relay so the receive audio goes to the external speaker. "Internal" does not activate the speaker relay so the receive audio goes to the internal speaker.

Hookswitch Functions

Hookswitch functions are programmable and vary according to the radio personality.

Table 2: Related Hookswitch Functions

Microphone	Channel Guard	Squelch	Type 99	Horn Alert Function
On-Hook	Enabled	Enabled	Enabled (Selective Call Mode)	Resets the Horn Alert function for the next Type 99 Individual Call
Off-Hook	Disabled	Enabled	Disabled (Monitor Mode)	Deactivates the Horn Alert function to answer a Type 99 Individual Call

NOTE

Horn Alert and Internal/External Speaker options are mutually exclusive of one another.

DISPLAY STATUS AND ERROR CODES

Table 3: Radio Status Indicators

LED Indicators: ● continuous ❀ flashing

Display	TX/RX LED	Tone	Status	Description
		3 mid tones	Power-up complete	
		1 short mid tone	Action Denied	
		1 short high tone	Programmed function toggled	
		2 short high tones	Programmed function toggled	
		continuous low tone	Fatal error	
	❀ green	1 short tone	Receiving Type 99 Individual Call	Mid tone – CNE Type 99 High tone – Other Type 99
	❀ green	2 short tones	Receiving Type 99 Group Call	Mid tone – CNE Type 99 High tone – Other Type 99
	❀ green	3 short tones	Receiving Type 99 Super Group/Quick Call	Mid tone – CNE Type 99 High tone – Other Type 99
	● red		Transmitting	
	● green		Receiving or channel in use	
1 - **6**			Channel	
C			CopyCat™ Mode	
CC		continuous high tone	Carrier Control Timer Timeout	Release the PTT.
EC			Empty Channel	Select another channel or reprogram the radio.
LC		continuous mid tone	Locked Channel	The channel is busy.
nA			No Ignition Sense	The Ignition A+ pin is not receiving DC power.
P	❀ green		Programming Mode	
PA			Public Address	Microphone audio is routed through the receiver audio PA to the external speaker.

LED Indicators: ● continuous ❀ flashing

Display	TX/RX LED	Tone	Status	Description
Pd			Power Down	Software thermal protection feature has disabled the transmitter.
PE	❀ amber		Power Error	Antenna failure or PA failure.
UL		continuous mid tone	Synthesizer Unlocked	Radio can not transmit or receive transmissions on a particular frequency. Return the radio for service from a qualified radio technician.
E1	❀ amber		Personality Checksum Error	Reprogram the radio with a valid personality. If the error persists, return the radio for service from a qualified radio technician.
E2	❀ amber		Tracking Data Error	Return the radio for service from a qualified radio technician.
E3	❀ amber		RF Power	RF power is sensed when the radio should not be transmitting. Return the radio for service from a qualified radio technician.
E4	❀ amber	continuous mid tone	Synthesizer Unlocked At Power-Up	No lock on the receive channel frequency during power-up. Reprogram the radio with a valid personality. If the error persists, return the radio for service from a qualified radio technician.
E5	❀ amber		CopyCat Error	Cloning operation failed. If the error persists, return the radio for service from a qualified radio technician.
E6	❀ amber		Flash Software Checksum Error	Operating software has been corrupted. Return the radio for service from a qualified radio technician.

BASIC OPERATION

Selecting A Channel

Rotate the **Channel Knob** clockwise or counterclockwise until the raised rib aligns with the desired channel number.

Transmitting A Basic Call

1. Power ON the radio.

2. Select a channel.

3. Ensure there is no activity on the channel by:

   - checking the **TX/RX LED**.

   - pressing and holding the **Monitor/Clear** button. Squelch noise will be heard if the channel is clear of traffic.

4. Remove the microphone from the hookswitch. Holding the microphone approximately 2 inches from your mouth, press the **PTT** button on the side of the microphone and speak in the microphone.

NOTE

> Speak in a normal volume. Shouting will degrade your transmission.

5. Release the **PTT** button after you have finished speaking.

Public Address Message

1. Verify that the **Option Status LED** for the **Option** button assigned with the Public Address function is ON. If it is not, press the **Option** button.

2. Set the **ON/OFF Volume Knob** to the desired public address volume level. (Generally maximum volume.)

3. Remove the microphone from the hookswitch. Holding the microphone approximately 2 inches from your mouth, press the **PTT** button on the side of the microphone and speak in the microphone.

4. When finished, replace the microphone on its hookswitch.

5. Set the **ON/OFF Volume Knob** to the desired receive volume level.

6. Verify that the **Option Status LED** for the **Option** button assigned with the Public Address function is OFF. If it is not, press the **Option** button.

Channel Guard

Channel Guard is a method of reducing "channel chatter" by equipping receivers with tone-responsive devices, which only allow calls with the correct sub-audible tones to be heard by the user. Channel Guard options and parameters are defined in the radio personality.

The radio can be programmed on a per-channel basis to encode and/or decode Channel Guard tones. Squelch Tail Elimination (STE) can be enabled or disabled on a channel programmed with a Channel Guard tone.

Channel Guard Monitor Function

The radio can be programmed, on a per-channel basis to transmit with or without Channel Guard tones. STE can optionally be enabled on a per-channel basis.

Ensure there is no activity on the channel by:

- checking the **TX/RX LED**.

- pressing and holding the **Monitor/Clear** button. Squelch noise will be heard if the channel is clear of traffic.

Digital Channel Guard

Digital Channel Guard performs similar to Channel Guard except sub-audible codewords are decoded and/or encoded. STE is standard with Digital Channel Guard operation.

Sending DTMF With The DTMF Microphone

The optional DTMF microphone allows the radio to send DTMF signaling. DTMF may be used in a radio system to access a telephone line or to perform system control functions.

1. Select a channel. DTMF must be enabled on the channel.

2. Ensure there is no activity on the channel by:

    - checking the **TX/RX LED**.

    - pressing and holding the **Monitor/Clear** button. Squelch noise will be heard if the channel is clear of traffic.

3. Remove the microphone from the hookswitch.

4. "Dial" the required DTMF digits from the telephone keypad on the microphone. Do not hold the **PTT** button on the microphone down while dialing. The DTMF microphone will automatically key the transmitter.

5. Use the **PTT** button to transmit voice using the DTMF microphone.

SELECTIVE SIGNALING

Selective signaling controls the muting and unmuting of the receive audio. This allows a user or dispatcher to selectively call an individual radio or group of radios. The PANTHER 300M mobile radio supports selective signaling in Type 99 decode format.

In a selective signaling environment, the PANTHER 300M mobile radio operates in one of two states, Monitor mode or Selective Call mode.

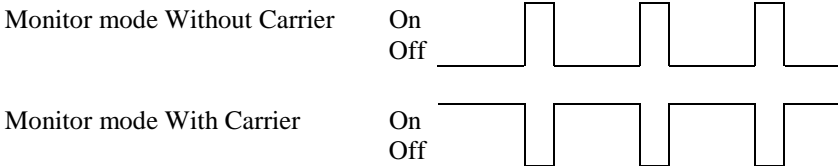In the Monitor mode, the decoder is disabled and all calls are heard by the user.

In the Selective Call mode, the decoder is enabled and only calls intended for the user will be heard.

Selective signaling operates with or without Channel Guard. If Channel Guard is enabled, the radio can be programmed with an "And" or an "Or" option.

If the "And" option is programmed, only calls with the correct selective signaling **AND** correct Channel Guard tones are heard by the user.

If the "Or" option is programmed, calls with the correct Channel Guard **OR** calls with the correct selective signaling and Channel Guard tones are heard by the user.

A radio operating in Selective Call mode that receives a selective call switches to the Monitor mode and the **TX/RX LED** flashes green. The **TX/RX LED** indicates whether the channel has a carrier signal. The following graphic depicts the flashing pattern of the **TX/RX LED**.

Monitor mode Without Carrier   On
                                       Off

Monitor mode With Carrier   On
                                       Off

Type 99 Operation

Type 99 is Com-Net Ericsson's proprietary method for in-band, two-tone sequential signaling. Type 99 is a conventional signaling protocol that controls the muting and unmuting of a radio. Type 99 encoded base stations, mobiles, or portable radios can selectively call individual units or groups of units in a conventional system. Type 99 is used in paging operations; a dispatcher has the ability to selectively call a radio or a group of radios.

If Type 99 is enabled in the radio personality, the radio can decode Individual, Group and Supergroup Type 99 calls. See Table 3 for radio indicator information for each of these types of calls.

Resetting Type 99 After A Call

After decoding a Type 99 call, the radio operates in Monitor mode and all traffic on the channel is audible. If the channel has Channel Guard, only the traffic with the radio's Channel Guard tone will be heard.

To reset Type 99 operation, use one of the following methods:

- Press the **Monitor/Clear** button.

- Press the **Option** button, only if **Option** button is programmed with Type 99 ON/OFF function.

- Allow the "Auto-Reset" timer to reset the Type 99 decoder (only if the "Auto-Reset" timer in enabled in the radio personality).

PROGRAMMABLE PTT FUNCTIONS

Channel Busy Lockout

The radio may be programmed with the Channel Busy Lockout feature, which denies the use of the transmitter when the channel is busy with traffic.

If the **PTT** button is pressed while the **TX/RX LED** is ON, the radio will emit an alert tone until the **PTT** is released.

Channel Guard Channel Busy Lockout

The radio may be programmed with the Channel Guard Busy Lockout feature, which denies the use of the transmitter when the channel is busy with another Channel Guard tone. The radio will transmit when the channel is busy with the radio's Channel Guard tone.

If the **PTT** button is pressed while the **TX/RX LED** is ON and the radio is muted because of an incorrect Channel Guard tone, the radio will emit an alert tone until the **PTT** is released.

Type 99 Disable After PTT

The radio may be programmed with the Type 99 Disable After PTT feature, which automatically disables the Type 99 decoder after a transmission.

Use one of the methods outlined in the "Resetting Type 99 After A Call" section to reset Type 99 operation.

Ignition Sense Tx Disable

The radio may be programmed to deny the use of the transmitter if there is no voltage on the Ignition A+ line. This feature prevents unauthorized use of the radio and accidental high current battery drain.

PROGRAMMABLE HORN ALERT FUNCTION

External Alarms

The Car Horn Alert feature may be programmed to give one of three alarms:

1. Single 1 second alarm
2. Three half second alarm pulses
3. Continuous alarm

Resetting the Car Horn Alert

Programmable features to reset the Car Horn Alert:

- Reset the Car Horn Alert after the Type 99 is reset.
- Automatically reset the Car Horn Alert.

Car Horn Alert Ignition Sense Option

The radio can be programmed to ignore the Car Horn Alert function when Ignition A+ is present. Ignition A+ is usually connected to the vehicle's ignition switch and indicates that the vehicle's engine is running, or in the Accessory position.

The Car Horn Alert option provides notification to somebody outside the vehicle that a Type 99 Individual Call has been received. When the person is inside the vehicle, the Ignition A+ option automatically disables the Car Horn Alert function.

CLONING

CopyCat™ Technology, a cloning feature, allows supervisor radios to duplicate radio personalities into subordinate radios on-site without a technician or PC. For more information about the CopyCat Technology and configuration refer to the Panther 300 Series Maintenance manuals, the On-Line Help in ProGrammer, or contact your system administrator.