P5100

P5150
Scan

P5130
Select

Overview

The P5100 is a software-defined digital radio that can operate on a variety of networks to meet the needs of Public Service, Utility, and Industrial users. The P5100 features durable and lightweight construction and is designed to deliver exceptional voice quality and high performance in demanding environments. A companion radio to the P7100^{IP} portable, the P5100 offers a subset of features at an exceptional value.

The P5100 portable is available in Scan (P5150) and Select (P5130) models. Both models have a variety of software options and accessories. The software-based design of the P5100 makes it readily configurable and easily expandable. The same P5100 hardware packages can be ordered with multiple software applications including

- Project 25 (M/A-COM's P25^{IP}) Unencrypted Digital Conventional
- P25 Unencrypted Trunking
- ProVoice™ Unencrypted Digital Trunking
- Enhanced Digital Access Communications System (EDACS®) Unencrypted Trunking
- Conventional Analog Unencrypted Communications included with all applications listed above (no separate conventional analog-only model)

Design Features

Ergonomically Designed Controls
The knobs and buttons of the P5100 portables are designed to maximize ease of use. The large push-to-talk (PTT) button and talkgroup and volume knobs can be easily identified and operated by touch, avoiding the need to visually check the individual knobs. In addition, the talkgroup and volume knobs are specially shaped to minimize contact with items such as clothing and belt straps, thus minimizing the risk of accidental switching. The central location of the recessed emergency button maintains accessibility in case of emergency while preventing accidental activation.

Large Speaker
The large 50-mm speaker is particularly useful in high-noise environments. Its high volume capabilities allow it to overcome background noise and emit a clear message. In addition, the speaker grill is designed to allow for rapid drainage should the radio become immersed in liquid. Finally, the grill design for the speaker and the microphone reduces the likelihood of puncture damage to the speaker or microphone because no direct line through the grill exists. Their unique design also allows water to drain quickly after immersion.

No-Slip Grips
The unique pyramid texture of the no-slip grips on the P5100 makes the radio easier to handle in wet conditions or when wearing gloves.

Multifunctional Display
The large 3-line alphanumeric liquid crystal display (LCD) supports system and group information, status icons, and menu operation. The display for the P5100 also includes a battery "gas gauge." A backlight illuminates the display and the keypad for low-light environments. In addition, an LCD cover minimizes the risk of damage to the LCD and increases the clarity of the LCD.

Durability Standards
The P5100 operates reliably even in demanding environments. It meets the drop, temperature and pressure extremes, solar radiation, blowing rain, humidity, salt fog, blowing dust, and vibration requirements stated in MIL-STD-810F, TIA/EIA-603 1-meter drop test, as well as U.S. Forest Service vibration requirements.

Weight
The P5100 weighs only 21 ounces, the same as the P7100^{IP}, LPE-200, or M-RK. In addition, an enhanced back plate improves the weight balance of the radio, making it more comfortable to wear.

Control Functions

The P5100 features two rotary control knobs and an emergency button mounted on the top of the radio. Push-to-talk, option, and clear/monitor buttons are mounted on the side. The Scan model has a front-mounted keypad with 6 buttons.

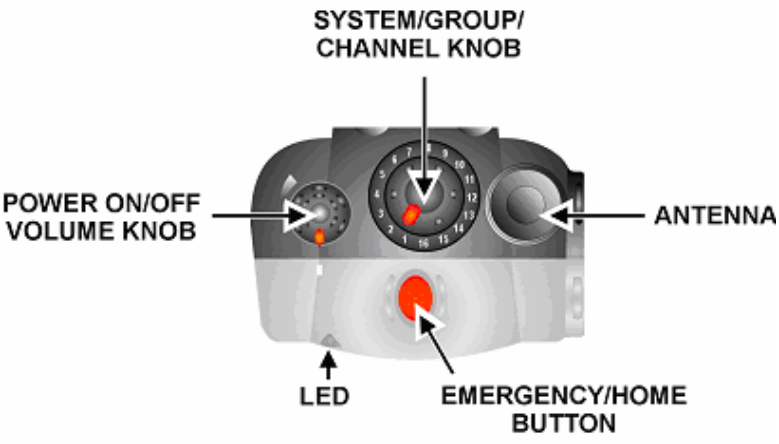


Figure 1 – Top View of Controls

1. **Power ON/OFF/Volume Knob**
   Turns the radio on and off and adjusts audio listening level. Minimum volume levels may be programmed into the radio to prevent missed calls due to a low volume setting. The volume ranges from a minimum programmed level of zero (shown as OFF in the display) to a level of 31.

2. **System/Group/Channel Knob**
   Selects systems or groups/channels (depending on programming) when rotated to one of its 16 positions. Included is a knob-stop ring to allow users with fewer groups/channels to restrict rotation to fewer than 16 positions.

3. **Emergency/Home Button**
   The emergency button is used to declare an emergency by pressing and holding it for a programmed duration. This centrally located large red button is recessed to prevent accidental activation. Alternatively, it can be programmed as a "home button" which automatically selects a pre-programmed Group/System when pressed and held for a programmed duration. The button must be pre-programmed for one of these operations, but not both.

4. **LED**
   The LED changes color to indicate transmitting/receiving status. It is green when receiving and red when transmitting, and is visible from the top and front of the radio for clear signaling. For covert applications, the LED, display, keypad lights, and tones may all be disabled.

Figure 2 – Front Panel of P5150 Model

Key	Function
▲ ▼	**Primary function:** Allows users to select system, groups, or channels, depending on personality programming. The buttons act as STEP UP or STEP DOWN. Pressing one of these buttons displays the next or previous stored system, group, or channel. **Secondary function:** Changes the selection for an item within a list.
M	**Primary function:** Accesses the pre-stored menu. The menu can include high/low power setting, keypad lock, LCD contrast, and keypad backlighting. **Secondary function:** Activates a selected item within a list. After a menu list is accessed, scroll through the list using the STEP UP or STEP DOWN keys and then activate specific items with the MENU key. This is similar to an "Enter" key.
A/D	Adds/Deletes selected groups or channels from the *SCAN* list of the currently selected system.
SCN	Turns the *SCAN* operation On and Off.
OPT	Activates one of a number of programmable software options, selected during the PC programming.

NOTE: All keys can be programmed or mapped to any option key or macro.

Figure 3 – Side View of Controls

1. **PTT Button**
   The Push-To-Talk (PTT) button must be pressed before voice transmission begins. In trunked mode, the radio ID is transmitted automatically upon depression of the button. The large PTT button is designed with no "dead spots" to ensure ease of use.

2. **Clear/Monitor Button**
   This button is programmable, but the default setting is the Clear/Monitor function.

   In the trunked mode, the weather-sealed Clear/Monitor button is used to

   - Exit the current operation, removing all displays associated with it, and return the radio to the selected talkgroup.
   - Disconnect individual and telephone interconnect calls.

   In the conventional mode, the Clear/Monitor button is used to

   - Unsquelch the receiver and allow channel monitoring prior to transmission.
   - Remove Channel Guard decoding from a channel.

3. **Option Button**
   The option button activates one of a number of programmable software options selected during PC programming. Programmable options include high/low power setting, keypad lock, LCD contrast, and LCD and keypad backlighting.

Operational Features

The P5100 uses a high-speed digital signal processor and the latest RF components to support multiple applications in one package:

- P25 Unencrypted Digital Conventional
- P25 Unencrypted Trunking
- ProVoice Unencrypted Digital Trunking
- EDACS Unencrypted Trunking
- Conventional Analog Communications included with all applications listed above (no separate conventional analog-only model)

With the software-based design, the P5100 is readily configurable and easily expandable with software upgrades using the EDACS trunking feature set.

- Stores up to 128 trunked system/group combinations and up to 255 conventional channels
- Stores 99 individual call numbers and 99 telephone numbers in memory
- Includes Emergency as a standard feature
- ProFile™ offers easy over-the-air programming for efficient updates
- ProScan™ provides smooth, automatic roaming between sites
- Includes full conventional feature set, with dual priority scan and various tone signaling formats
- EDACS Security Key (ESK) prevents unauthorized users from programming radios or accessing the system

When used in a M/A-COM trunked system, the P5100 automatically monitors a digital control channel. When the user initiates a call, the unit sends a digital request via the control channel. The system then assigns the calling radio and all members of the talkgroup to an available working channel. The portables operate in all M/A-COM trunked system configurations from single-site systems to wide-area trunking networks.

Data Capable
The P5100 offers optional capabilities for high-performance mobile data communications. An internal Radio Data Interface (RDI) allows the same radio to be used for trunked voice and data. Data or voice communication is utilized transparently by the operator through normal usage of the radio.

Programmable Personality
With the P5100, changing personalities is as simple as connecting to a personal computer. This arrangement offers the flexibility of programming system and radio parameters as requirements change without interchanging parts or opening the radio case.

Over-the-air programming for trunked radios is available with ProFile.

Digital Voice Capable
The P5100 can be programmed to support P25 CAI digital voice and ProVoice, M/A-COM's trunked digital voice offering.

Additional individual software options are as follows:

Status/Message
This feature allows users to deliver short data messages on the control channel with the press of a single button.

ProScan
ProScan determines the site within the trunked network that will provide the user with the clearest and most reliable communications. ProScan makes roaming within a multisite trunked network completely transparent to the user.

Priority System Scan
This feature sets the priority scan system in ProScan operation.

ProFile
ProFile provides over-the-air programming of frequencies and radio personalities.

EDACS/ProVoice Emergency ID and Alarm
Emergency ID allows the user to quickly summon assistance from the dispatcher and other group members by pressing the emergency button (recessed red button located on the top of the radio). Pressing this button transmits a unique unit ID with the emergency signal so that all radios in the talkgroup will receive the ID or alias of the unit initiating the emergency.

Trunked Scan
This feature allows trunked system users to scan multiple talkgroups.

Unit Enable/Disable
This capability allows a lost or stolen radio to be disabled to prevent unauthorized monitoring of or interfering with radio communications.

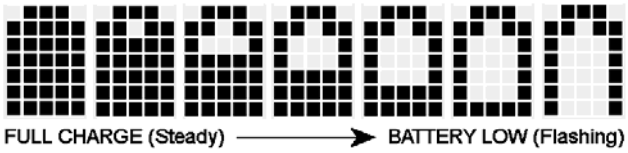
Telephone Interconnect Calls and Individual Calls
This feature enables the P5100 to initiate or receive telephone calls. In addition, the individual call feature allows individual addressing within the trunked system for unit-to-unit calls. The P5100 can store 99 individual call numbers and 99 telephone interconnect numbers in memory per system (up to maximum memory use).

EDACS Security Key (ESK)
The ESK prevents unauthorized users from programming radios for use on an EDACS/ProVoice System and from accessing the system.

Indicators and Display Messages
The radio display is made up of 3 lines (see below). Lines 1 and 2 contain eight alphanumeric character blocks and are used primarily to display system and group names. Line 1 also displays radio status messages. Line 3 is essentially a radio status icon display. When the radio is in menu mode, all three lines are used to display menu options. If programmed, the display backlighting will illuminate upon power up or when radio controls are operated.

Figure 4 – Display

Battery Charge Icons
The battery charge icons shown below indicate approximate level only, based on battery voltage.



LED
The color displayed on the LED also presents information on the operation of the radio. It glows green when receiving and red when transmitting. The LED is visible from the top and front of the radio for clear signaling. For covert applications, the LED, display, keypad lights, and tones can all be disabled.

Error Messages

If either of the Error Messages shown below is displayed, the radio is programmed incorrectly or needs servicing.

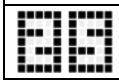
DSP ERR ERR=XXXX (Power Up only)	or	DIG V ERR ERR

Where: xxxx is the error code and DSP ERR or DIG V ERR is the message.

P5100 Display Icons

Status icons indicate the various operating characteristics of the radio. The icons show operating modes and conditions and appear on the third line of the display.

Icon Descriptions

	**Steady** – "Busy" transmitting or receiving **Flashing** – Call queued
	**Steady** – Special call mode (individual or telephone)
	**Steady** – During all radio transmissions
	**Steady** – Transmit at low power **If icon is not visible** – Transmit at high power
	**Steady** – Battery charge indicator
	**Flashing** – Low battery indicator
	**Steady** – Indicates the current channel is set up as an analog channel
	**Steady** – Trunked system in Failsoft mode
	**Steady** – Group or channel in scan list
	**Steady** – Priority 2 group or channel
	Steady – Priority 1 group or channel
	**Steady** (*rotates clockwise)* – Scan mode enabled **If icon is not visible** – scan is disabled
	**Steady** – ProVoice digital call
	**Steady** – Channel Guard enabled **If icon is not visible** – Channel Guard disabled
	**Steady** – Indicates the current channel is set up as a Project 25 (P25) channel.

Status Messages

During radio operation, various radio status messages can be displayed. These messages are described below.

MESSAGE	NAME	DESCRIPTION
QUEUED	Call Queued	Trunked mode only. Indicates the system has placed the call in a request queue.
SYS BUSY	System Busy	Trunked mode only. Indicates the system is busy, no channels are currently available, the queue is full or an individual call is being attempted to a radio that is currently transmitting.
DENIED	Call Denied	Trunked mode only. Indicates the radio or talkgroup is not authorized to operate on the selected system and/or talkgroup.
CC SCAN	Control Channel Scan	Trunked mode only. Indicates the control channel is lost and the radio has entered the Control Channel Scan mode to search for the control channel. (Usually out of range indication.)
WA SCAN	Wide Area Scan	Trunked mode only. Indicates the radio has entered the Wide Area Scan mode to search for a new system (if enabled through programming).
TALKARND	Talkaround	Conventional mode only. Indicates the radio is operating on conventional channels in talkaround mode (no repeater).
SYSC ON	System Scan Features On	Trunked mode only. Indicates the System Scan features are enabled.
SYSC OFF	System Scan Features Off	Trunked mode only. Indicates the System Scan features are disabled.
LOW BATT	Low Battery	Battery voltage has dropped below the point to where the radio is no longer able to transmit. The radio will still be able to receive calls until the battery is discharged beyond the point of operation upon which the radio will automatically shutdown.
RXEMER	Receive Emergency	Trunked and P25 modes only. Indicates an emergency call is being received. This message will be flashing on line 2.
TXEMER	Transmit Emergency	Trunked and P25 modes only. Indicates an emergency call has been transmitted on this radio. This message will be flashing on line 2.
VOL=31	Volume Level	Indicates the current volume level. The volume level display ranges from OFF (silent) to 31 (loudest).
WHC	Who Has Called	Trunked and P25 modes only. Indicates an individual call has been received, but not responded to. The indicator turns OFF if the individual call mode is entered, the system is changed, or the radio is turned off and then back on.
UNKNOWN	Unknown ID	Trunked and P25 modes only. Indicates an individual call is being received from an unknown ID

Options and Accessories

The P5100 portables use the same accessories as the P7100^{IP} and Jaguar™ 700Pi/700P, making it easy for users to interchange them between models.

- Multiple antenna options
- High Capacity or Extra High Capacity Batteries (Nickel Cadmium and Nickel Metal Hydride)
- Intrinsically Safe accessories available in the future
- Quick release ¼ turn fastener for UDC accessories
- Desk chargers
- Two desktop battery chargers are available. Both are powered by 120V/60 Hz or 230V/50 Hz and include a red charging light indicator. In addition, both chargers feature a controlled charge rate to prevent battery damage.

  1. Single-unit rapid rate charger – recharges a single battery in approximately 1 hour
  2. Multi-unit rapid rate charger – recharges up to six batteries in approximately 1 hour

- Vehicular charger
- Carrying case (black leather and nylon, blaze orange available)
- Swivel mounts or belt clips
- Variety of speaker microphones
- Surveillance kit
- Earpiece
- PC programming software and cables
- Data cable for connecting data devices or PCs to the radio

Conclusion

The P5100 provides efficient two-way communications for multi-agency systems. The portable provides digital voice and Internet Protocol (IP) data to meet a wide range of user applications and requirements. Its software-based design allows the portable to operate in multiple applications: ProVoice or EDACS trunked modes, Project 25 digital conventional or digital trunked modes, and conventional analog mode. Its durable and lightweight construction ensures that the P5100 will provide reliable performance in demanding environments.

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