# RadioPro™ IP Gateway

## Installation Guide
### for

# Motorola APX 4500 P25 Radios

**For Version 9 Software**

**Contact Us**

Support, replacement part ordering, and service may be arranged by contacting our Cincinnati office.  Parts for service can be returned following a request of a Return Material Authorization.

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**Fonts used in this document:**

***Technical terms***

*Cross-references within this document*

*Hyperlinks to other documents or web pages*

**Warnings**

**Software menus, menu options, folders, pages, and parameters**

**Software parameter values**

## Contents

# 1 OVERVIEW

This Manual will focus on configuring and using the *Motorola APX 4500 Radio* with the RadioPro System.

Please Refer to the *RadioPro IP Gateway Installation Guide* for general installation information relevant for all radio system types.

## 1.1 System Planner Document and Template

Use the System Planner Template on page *12* of this document in the planning phase of a project to record IP addresses, usernames, passwords, serial numbers, and device names.

## 1.2 Required Items

### 1.2.1 Radio Interface Cable

A radio interface cable must be ordered for each IP Gateway from the following table:

| Control Station Radio | Cable Part # |
|---|---|
| Motorola APX 4500 | S2-61927 |

### 1.2.2 Control Station Radio

Each Control Station radio used for voice requires one IP Gateway.

| Control Station Radio |
|---|
| Motorola APX 4500 |

### 1.2.3 Radio Programming Cable

The Motorola programming cable must be used with the CPS software to configure the Control Station radio. **The RadioPro Interface cable cannot be used to program the APX 4500 radio.**

# 2. FEATURE AVAILABILITY

### Motorola P25 Systems

Depending on the P25 System Type, some features may not be available.  Use the following table to determine if a feature discussed in this document is not available.

| System Type<br><br>Feature | P25 |
|---|---|
| Voice Dispatch | ✓ * |
| Text Messaging | - |
| GPS Mapping | - |
| ARS | - |
| Private Call | - |
| Remote Monitor | - |
| Remote Enable/Disable | - |
| Telephone interconnect Rec/Mon | - |

\* Voice Dispatch is talk/listen only with no PTT ID.

## 3. CONFIGURATION AND INSTALLATION

Use the steps in the following table to install a RadioPro System. Each step is discussed in detail starting on page **7.** Following installation of the IP Gateway in Step 5, at least one Client must be installed from Step 6.
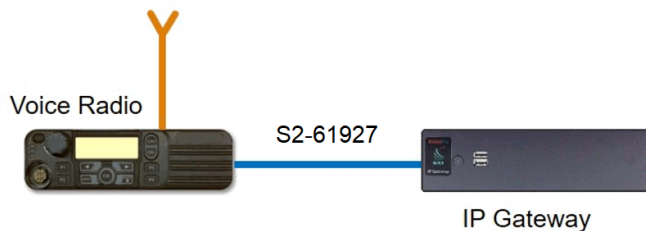
| Step # | Description | Motorola MOTOTRBO |
|--------|-------------|-------------------|
| 1 | Configure the APX 4500 for Voice | page 7 |
| 2 | Connect RadioPro IP Gateway to Control Station Radio | page 7 |
| 3 | Configure RadioPro IP Gateway(s) using ICU.exe | page 8 |

Please Refer to the *RadioPro IP Gateway Installation Guide* for additional installation steps relevant for all radio system types.

## Step 1. for Motorola APX 4500 (Voice):

### *Configure Control Station Radio (For Voice)*

The RadioPro IP Gateway connects to the APX 4500 through an intercom interface.  This interface uses the COR / PTT functionality that is always available through the accessory connector of the APX 4500 radio.  Therefore, no special radio programming is required to connect to the APX 4500.

**NOTE: The APX 4500 Radio does not offer GPS functionality accessible to the Gateway. Therefore, the Data-revert operation cannot be utilized when using this model radio.**

## Step 2. for Motorola APX 4500 systems:

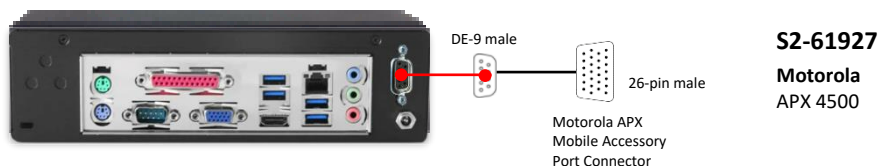### *Connect the RadioPro IP Gateway to the Control Station Radio*



**Note: Before continuing, ensure that the programming cable has been disconnected**

See Section *4.1 Appendix – Radio Interface Cables*

Motorola APX 4500 on Page *10* for interface cable details

Connect the IP Gateway to the Control Station Voice radio using the following steps:

1.  Connect the DE-9 side of cable S2-61927 to the DE-9 connector on the rear of the RadioPro IP Gateway module.

2.  Connect the other end of the cable to the Rear Accessory Connector on the APX Voice radio.



**Note: Since the IP Gateway has not yet been configured with appropriate IP parameters, do NOT connect the IP Gateway to an IP network.**

## Step 3. Configure RadioPro IP Gateway



Control Station Radio         Ethernet Cable        ICU.exe

**Note: Before continuing, ensure that Wi-Fi connection has been disabled in the PC or Laptop being used to configure the IP Gateway.**

The RadioPro ICU (**IP C**onfiguration **U**tility) must be used to configure each RadioPro IP Gateway with the necessary parameters. Configuration of each RadioPro IP Gateway must be performed before connecting the IP Gateway to a local area network.

Configure RadioPro IP Gateway settings:

> Please Refer to the *RadioPro IP Gateway Installation Guide* for information about how to connect to the IP Gateway and for settings that apply to all radio systems.

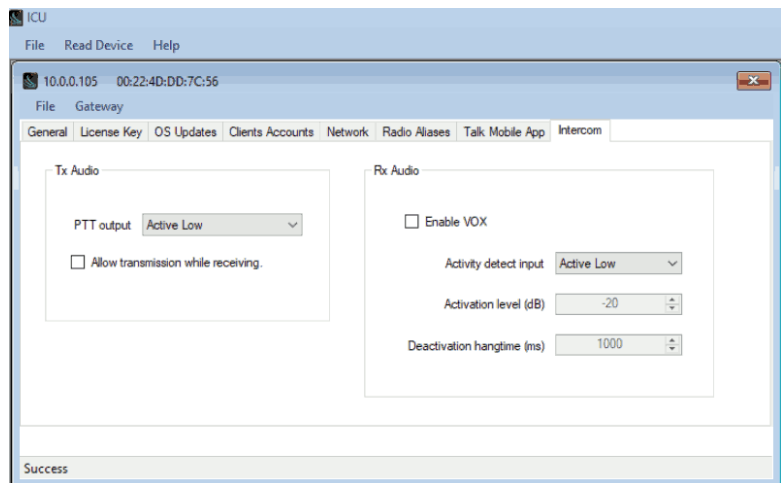Configure APX 4500 specific settings: (Once connected to the IP Gateway with the ICU Utility)

> *Intercom tab*
>
> > *Tx Audio*

**PTT output** must be set based on radio model.

An **Active Low** PTT radio expects the voltage on the PTT line to be high when not transmitting and to be pulled low, or to ground when transmitting.

An **Active High** PTT radio expects the voltage on the PTT line to be low, or ground, when not transmitting and to be pulled high when transmitting.



The APX 4500 PTT line is **Active Low**.

**Allow transmission while receiving** can be set if the control station radio is programmed to operate in full duplex mode with the ability to transmit and receive simultaneously.

With this setting **Enabled**, a client connected to the RadioPro IP Gateway will be able to transmit even when the radio is receiving. **Warning: This setting should only be checked for radios that have full duplex functionality.**

With this setting **Disabled**, a client connected to the RadioPro IP Gateway will get a bonk if trying to transmit when currently receiving a call.

The APX 4500 does not have full duplex capability, therefore, this setting should be **Disabled**.

*Rx Audio*

**Activity detect input** must be set based on radio model.

An **Active Low** COR (Carrier operated relay) radio will maintain a high voltage on the COR line when not in a call and pull the voltage low, or to ground when a transmission is received.

An **Active High** COR radio will maintain a low, or grounded voltage on the COR line when not actively in a call and will pull the voltage high when receiving a transmission.

The APX 4500 COR line is **Active Low**.

**Enable VOX** can be set to have the IP Gateway operate as a voice operated switch.

When **Enabled** the gateway determines a receive call by the Activation Level.

When **Disabled** the gateway determines a receive call by the COR signal from the radio.

**Activation level (dB)** is the audio level in decibels that will trigger the voice-operated exchange.

**Deactivation hangtime (ms)** is the time in milliseconds the VOX will keep the incoming audio transmission up after the last "good" audio level is received.

Refer to the *RadioPro IP Gateway Installation Guide* for instructions on how to connect the RadioPro IP Gateway to an IP Network, configure Port Forwarding, and installing RadioPro Clients.

# 4. APPENDIX

## 4.1 Appendix – Radio Interface Cables

### Motorola APX 4500

#### Voice Radio

**Interface Cable # S2-61927**

| Signal Name | IP Gateway DE-9 Pin # | APX 4500 Radio HLN6961 Accessory Connector |
|---|---|---|
| Digital Gnd | 3 | 1 (Org) |
| Serial Rx/Cor | 1 | 13 (Brn) |
| Radio Mic - | 5 | 14 (Grn)* |
| Radio Spkr - | 9 | 15 (Blk)* |
| Serial Tx/PTT | 6 | 16 (Blu) |
| Radio Spkr + | 8 | 21 (Gry) |
| Radio Mic + | 4 | 23 (Yel) |
| 12v Acc | 2 | 25 (Red) |

**\*  These signal wires are pinned together.**

This interface cable requires DE-9 Male to connect to the IP Gateway female connector.

# 5. INDEX

## 6. SYSTEM PLANNER TEMPLATE          PAGE 1 OF 2

### *RadioPro IP Gateways*

**Parameters Common to all IP Gateways**

| ICU.exe Admin Password<br>for ICU.exe, default is "admin" | Dispatch Client Password<br>for Dispatch client connections | NTP Server IP Address<br>Network Time Protocol |
|---|---|---|
|  |  |  |

**Parameters Unique to each IP Gateway**

| GPS = GPS Data Revert.<br>Each IP Gateway supports 1<br>Voice & 1 GPS Data Radio. | Name<br>IP Gateway name has max 2<br>lines, 24 chars per line | Serial # | IP Address | Subnet Mask | Default Gateway |
|---|---|---|---|---|---|
| IP Gateway A | Example Gateway Name | 1234 | 192.168.56.22 | 255.255.255.0 | 192.168.56.1 |
| Voice Radio A0 | Example Radio VR A0 |  | 192.168.10.1 | 255.255.255.0 |  |
| GPS Radio A1 | Example Radio GPS A1 |  | 192.168.11.1 | 255.255.255.0 |  |
| IP Gateway B |  |  |  |  |  |
| Voice Radio B0 |  |  |  |  |  |
| GPS Radio B1 |  |  |  |  |  |
| IP Gateway C |  |  |  |  |  |
| Voice Radio C0 |  |  |  |  |  |
| GPS Radio C1 |  |  |  |  |  |
| IP Gateway D |  |  |  |  |  |
| Voice Radio D0 |  |  |  |  |  |
| GPS Radio D1 |  |  |  |  |  |
| IP Gateway E |  |  |  |  |  |
| Voice Radio D0 |  |  |  |  |  |
| GPS Radio D1 |  |  |  |  |  |
| IP Gateway F |  |  |  |  |  |
| Voice Radio D0 |  |  |  |  |  |
| GPS Radio D1 |  |  |  |  |  |
| IP Gateway G |  |  |  |  |  |
| Voice Radio D0 |  |  |  |  |  |
| GPS Radio D1 |  |  |  |  |  |
| IP Gateway H |  |  |  |  |  |
| Voice Radio D0 |  |  |  |  |  |
| GPS Radio D1 |  |  |  |  |  |
| IP Gateway J |  |  |  |  |  |
| Voice Radio E0 |  |  |  |  |  |
| GPS Radio E1 |  |  |  |  |  |

If additional IP Gateways are needed, copy this page.

See next page for System Planner Template Page 2 of 2

## 6. SYSTEM PLANNER TEMPLATE        PAGE 2 OF 2

### *RadioPro Dispatch Clients*

See *RadioPro Dispatch Installation and Configuration Guide* for more information.

**Parameters Common Parameters Unique
to all Dispatch clients to each Dispatch client**

| *Administrator Password* *for Edit Mode* |
| --- |
| |

| PC Name | IP Address | License # | Licensed IP Gateway Connections |
| --- | --- | --- | --- |
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### *RadioPro Solo, Talk, and Mobile Clients*

See *RadioPro Solo Client Installation Guide* for more information.

**Parameters Common to all Talk Clients**

| *Administrator Login Name* Not Editable | *Administrator Password* default is "admin" |
| --- | --- |
| admin | |

| *User Login Name* default is "user" | *User Password* default is "user" |
| --- | --- |
| | |
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If additional Solo, Talk, or Mobile client logins are needed, copy this page.