P Y R A M I D
C O M M U N I C A T I O N S

Programming Instructions for:
Motorola M1225
W/ Scholer-Johnson PassPort/LTR Option Board
For use with:
Pyramid Communications
Model 2012/2016/Merlin

Revision C
November 14, 2002

Introduction

Before you begin, you will need to have a copy Scholer-Johnson RSS software, Motorola M1225 RSS software and a Motorola RIB available to program the mobile radio. Also, you will need a copy of the Pyramid 2012 programming software and FY-1 programming cable to program the 2012.
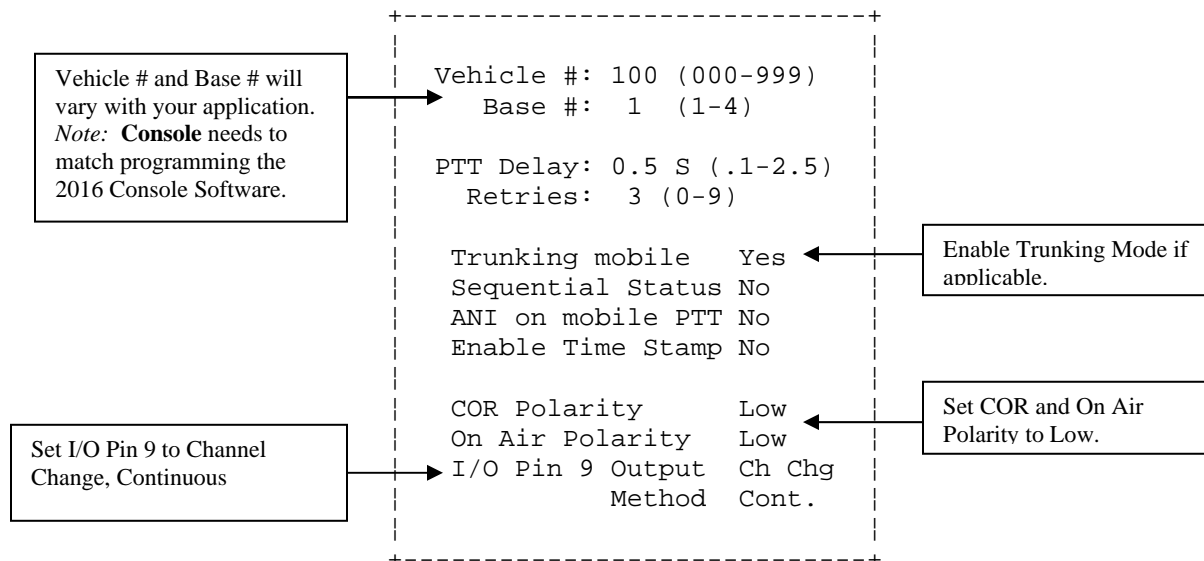
Note: You will need to contact Scholer-Johnson to obtain the firmware for use with Pyramid Communications mobile data products.

Programming the Pyramid 2012/Merlin

The mobile data terminal needs to be programmed to accommodate the polarities of signal that the Motorola M1225 will provide it.

If you have not already done so, install the programming software on to your PC by following the instructions in the 2012/Merlin service manual.

Start running the Pyramid 2012/Merlin programming software on your PC. From the *Data* pull down menu, under the *System Data* screen, program the unit as shown the figure below.
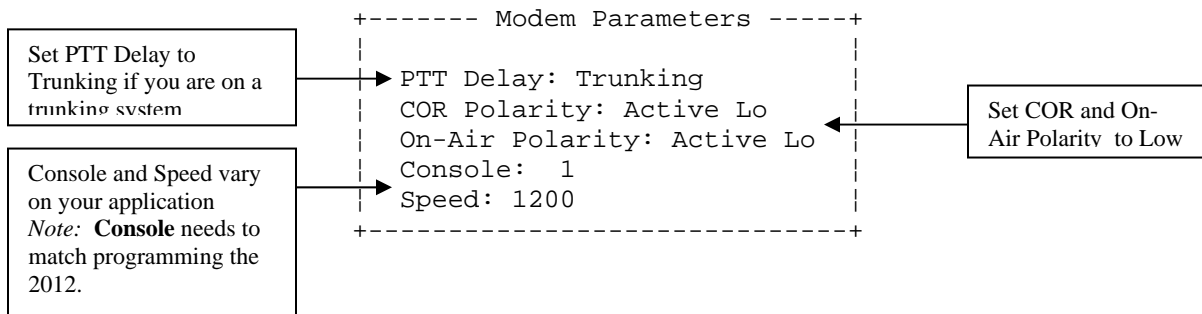
```
                          +-----------------------------+
                          ¦                             ¦
  Vehicle # and Base # will ¦  Vehicle #: 100 (000-999)   ¦
  vary with your application.¦    Base #:  1  (1-4)        ¦
  Note: Console needs to     ¦                             ¦
  match programming the      ¦  PTT Delay: 0.5 S (.1-2.5)  ¦
  2016 Console Software.     ¦    Retries:  3 (0-9)        ¦
                          ¦                             ¦
                          ¦   Trunking mobile    Yes  ◄──  Enable Trunking Mode if
                          ¦   Sequential Status No        applicable.
                          ¦   ANI on mobile PTT No       ¦
                          ¦   Enable Time Stamp No       ¦
                          ¦                             ¦
                          ¦   COR Polarity       Low  ◄──  Set COR and On Air
                          ¦   On Air Polarity    Low      Polarity to Low.
  Set I/O Pin 9 to Channel ──► I/O Pin 9 Output  Ch Chg ¦
  Change, Continuous        ¦          Method  Cont.    ¦
                          ¦                             ¦
                          +-----------------------------+
```

From the *Data* pull down menu, select your *Data Format* in the *Format Screen*. There are three signaling format choices. Chose the format to fit your application.

More programming instructions are available in the 2012/Merlin Service Manual.

Programming the Pyramid 2016

Programming of the Pyramid 2016 base modem is done through the console interface. Typically, the parameters are set in the Pyramid Console software, and then automatically sent to the 2016.

The figure below shows how a typical Pyramid Console software would be set up when connected to a 2016 and M1225 radio. To access the *Modem Parameters* menu, select *Configure* from the pull down menu.

```
                        +------- Modem Parameters -----+
                        |                              |
Set PTT Delay to        |  PTT Delay: Trunking         |
Trunking if you are on a |  COR Polarity: Active Lo     |          Set COR and On-
trunking system         |  On-Air Polarity: Active Lo  |          Air Polarity to Low
                        |  Console:  1                 |
Console and Speed vary  |  Speed: 1200                 |
on your application     +------------------------------+
Note: Console needs to
match programming the
2012.
```

See the Pyramid 2016 service manual for further Pyramid Console software information.

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Programming the Pyramid 2016 (Continued)

The figures below shows how Street Smarts modem parameters will be set up when connected to a 2016 and M1225 radio. To access this configuration screen, select the *Configure* pull down menu in Street Smarts. Then click ***Modem Parameters*** to configure the 2016.

Set COR and PTT to Low

Set PTT Delay to 0.5 Seconds. This is the delay after the handshake if trunking is selected. If using conventional, this is the PTT lead in delay before sending data.

Modem Parameters

Com Port
1

Properties
9600,N,8,1

COR Polarity   High   Low
                 ○   ◉

On Air Polarity   High   Low
                   ○   ◉

Encode Test Tone   Encode MSK

Speed   1200

Console   1

Radio Type   Trunking

PTT Delay   0.5

Number of Retries   1

Save

Console and Speed will vary with your application. *Note:* **Console** needs to match programming the 2012.

Select Trunking if you are using a Trunking Radio

The figures below shows how a typical RasTrac I/O processor will be set up when connected to a 2016 and M1225 radio. To access the I/O configuration, select the *Edit* pull down menu from the RasTrac I/O Processor. From the *Input/Output Configuration* screen, select the *Protocol* to be **PYRAMID**. Then click *Properties* to configure the 2016.

Set COR and PTT to Low

Console and Speed will vary with your application.

Set PTT Delay to 0.5 Seconds. This is the delay after the handshake if trunking is selected. If using conventional, this is the PTT lead in delay before sending data.

Select Trunking if you are using a Trunking Radio

Note: **Console** needs to match programming the 2012.

PYRAMID Properties

COR
○ HI
● LO
Set

PTT
○ HI
● LO
Set

Speed
● 1200
○ 2400
Set

PTT Delay
0.5 Seconds ▼
Set

Console
1 ▼
Set

Trunking
☑ Trunking
Set

Encode

Hardware
○ 2012 MDT/GPS Modems
○ 2017 Merlin GPS Modems
● Both 2012 and 2017 Merlin Modems

OK   Cancel

Note: **If your I/O Processor does not include a "check box" parameter for enabling trunking, contact Manning Navcomp to obtain the latest version of I/O Processor.**

Note: You will need to contact Scholer-Johnson to obtain the firmware for use with Pyramid Communications mobile data products.

Initial programming of the M1225 Mobile – Motorola RSS

Follow any instructions for installing the Scholer-Johnson PassPort/LTR option board into the Motorola M1225 radio. It is important to follow the next programming step in order to get RX audio onto the Accessory connector for the data system to operate properly. You will need to perform the following to **ALL** radios that will be connected to any Pyramid Communications equipment.

Access the External Accessories menu by first reading the personality out of the M1225 radio with the **Motorola 1225 RSS** software. Select the *Radio* pull down menu and click on *External Accessories*.
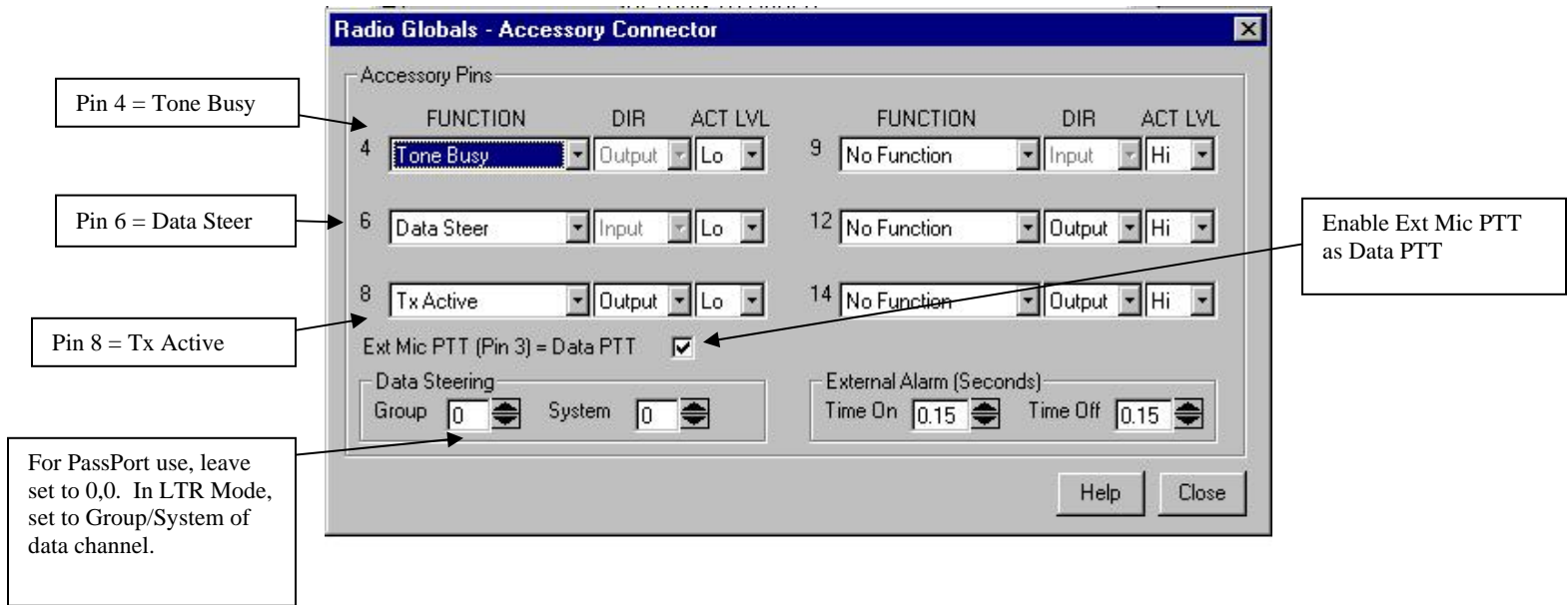
External Accessories

Acc External	General I/O	Acc Custom	Yes
Power-up Delay (s)	2.5	External Mic.	External Mic. Audio
Rx Audio Output	Unmuted/Flat	Tx Flat Audio Input	Pre

Set RX Audio Output to "Unmuted/Flat".

PIN	FUNCTION	DIRECTION	DEBOUNCE	ACT LEVEL
04	Null	Output	Off	High
06	Null	Input	On	Low
08	Null	Output	Off	Low
09	Null	Input	On	Low
12	Null	Input	On	Low
14	Null	Input	On	Low

Close   Print   Help

Set the *Rx Audio Output* to "**Unmuted/Flat**". This will enable all RX audio from the discriminator of the radio to be available on the accessory connector of the radio.

Programming Option Board – Scholer-Johnson RSS

Using the Scholer-Johnson Option board RSS software, select the *Radio* pull down menu, and then select *Globals*. Click on *Accessory Connector* to access the Accessory Connector configuration screen. From this screen, you will need to program the I/O configuration of the Scholer-Johnson Accessory Connector controls.

Pin 4 = Tone Busy

Pin 6 = Data Steer

Pin 8 = Tx Active

For PassPort use, leave set to 0,0. In LTR Mode, set to Group/System of data channel.

Enable Ext Mic PTT as Data PTT

Radio Globals - Accessory Connector

Accessory Pins

	FUNCTION	DIR	ACT LVL		FUNCTION	DIR	ACT LVL
4	Tone Busy	Output	Lo	9	No Function	Input	Hi
6	Data Steer	Input	Lo	12	No Function	Output	Hi
8	Tx Active	Output	Lo	14	No Function	Output	Hi

Ext Mic PTT (Pin 3) = Data PTT ☑

Data Steering
Group [0] System [0]

External Alarm (Seconds)
Time On [0.15] Time Off [0.15]

Help Close

1. Program *pin 4* of the accessory connector for *"Tone Busy" Active low*.
2. Program *pin 6* of the accessory connector for *"Data Steer" active low*.
3. Program *pin 8* of the accessory connector for *"Tx Active" Output* as *active low*.
4. Check the *Ext Mic PTT (Pin 3) = Data PTT* box.
5. If LTR mode, set Data Steering the Group/System of LTR data talk group.

Programming Option Board – Scholer-Johnson RSS (continued)

Programming the *Base* Radio - PassPort

Program the Site information as you normally would for you PassPort trunking system.

In the base radio, you will be setting the radio to receive all inbound messages from mobile units on the **primary group id** code. This primary group id code will also be used to send acknowledge messages back to the mobile units.

When the dispatch software sends outbound messages (e.g. GPS Poll, Text Message, Horn Honk, etc.) the radio will switch to a voice group to send these messages. Normally, this is where all mobile units will be monitoring for traffic.

See Appendix A for details on the Base Channel Change scheme.

This is the main **voice** group id code for the fleet.

This is the Group ID code used to receive data from the mobile units. It is also used to send acknowledgements to mobile units. This should be the Primary Group ID as programmed in your NTS system for the PassPort Fleet.

Example:
When the 2016 base modem receives a message on group 59999, it will assert the external PTT of the accessory connector and the radio will key on Group 59999 to send the acknowledgment.

If the dispatcher sends text message or GPS poll, the 2016 will assert the external PTT and the Data Steer pin to switch the radio to group id 60000 (main voice group). Since the mobile radios normally are listening to the voice group 60000, the MDT's will receive the message and reply back on the data group 59999.

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Programming the *Mobile* Radio - PassPort

Program the Site information as you normally would for you PassPort system.

In the mobile radio, you will be setting the radio to receive all inbound messages and voice traffic on the voice group id.   All data transmitted by the mobile data terminal will be sent out on the **primary group id** code. This primary group id code will also be used to send acknowledge messages back to the base unit.

When a transmission is initiated by the mobile unit, the radio will switch to the defined data group id code send the data, then revert to the voice group id to listen for other voice traffic. If the message initiated by the mobile requires and acknowledgement from the base modem, the radio will remain on the data group id until the acknowledgement is received or a timeout has occurred.

This is the Group ID code used to receive data from the base unit. It is also used to send acknowledgements to the base unit. This should be the Primary Group ID as programmed in your NTS system for this PassPort Fleet.

This is the main **voice** group id code for the fleet.

Programming the *Base* Radio - LTR

Program the Site information as you normally would for you LTR trunking system.

In the base radio, you will be setting the radio to receive all inbound messages from mobile units on the **Data LTR ID** code. This Data LTR ID code will also be used to send acknowledge messages back to the mobile units.

When the dispatch software sends outbound messages (e.g. GPS Poll, Text Message, Horn Honk, etc.) the radio will switch to a Voice LTR Group ID to send these messages. Normally, this is where all mobile units will be monitoring for traffic.

See Appendix A for details on the Base Channel Change scheme.

This is the main **Voice LTR Group ID** code for the fleet, but it is actually where the base modem will send outbound data to the mobile units on

Do not check Data Priority

This is the Data Group ID code used to receive data from the mobile units. It is also used to send acknowledgements to mobile units.

This is the Voice Group ID code used to send data to the mobile units if the dispatcher initiates data such as GPS Poll.

Example:
When the 2016 base modem receives a message on LTR Data Group 1, it will assert the external PTT of the accessory connector and the radio will key on LTR Data Group 1 to send the acknowledgment.

If the dispatcher sends text message or GPS poll, the 2016 will assert the external PTT and the Data Steer pin to switch the radio to LTR Talk Group 2 (the main voice group). Since the *mobile* radios normally are listening to LTR Talk Group 2, the MDT's will receive the message and reply back on the Group 1.

Programming the *Mobile* Radio - LTR

Program the Site information as you normally would for you LTR trunking system.

In the mobile radio, you will be setting the radio to receive all inbound messages and voice traffic on the voice group id.   All data transmitted by the mobile data terminal will be sent out on the **Data LTR ID** code. This Data LTR ID code will also be used to send acknowledge messages back to the base unit.

When a transmission is initiated by the mobile unit, the radio will switch to the defined data group id code send the data, then revert to the Voice LTR Group ID to listen for other voice traffic. If the message initiated by the mobile requires and acknowledgement from the base modem, the radio will remain on the data group id until the acknowledgement is received or a timeout has occurred.

This is the Group ID code used to send data to the base unit. This should be the **Data LTR Group.**

Do not check Data Priority

This is the main **Voice LTR Group ID** code for the fleet.

This is **Data LTR Group ID** code for the fleet. It is best to assign the Data group as the last group in the list.

Radio Modes

| Passport | LTR | Conventional |

System 1 - LTR Site

Home 5

Data ID 97   Block Decode Start 0 Stop 0

Fixed IDs
Rx ID 1 0   ☐ Call Light   ☐ Ext Alarm
            ☐ Transpond

Priority Group 0

Private Group 0   Transmit Inhibit 0   0

Rx ID 2 0   ☐ Call Light   ☐ Ext Alarm
            ☐ Transpond

☑ Acquisition Alert ☑ Busy Alert ☐ Data Priority
☑ Busy Display

System Scan Lists   1 ☐

Group 1
Rx ID 98   Tx ID 98
☐ Scan List   ☐ Talk Around   ☐ Transpond
☐ Call Light ☐ Interconnect ☐ Ext Alarm

Group 2
Rx ID 97   Tx ID 97
☐ Scan List   ☐ Talk Around   ☐ Transpond
☐ Call Light ☐ Interconnect ☐ Ext Alarm

Help | Edit Site | Add System | Delete System | Add Group | Delete Group | Close

Connecting the Pyramid to the M1225

Once all of the programming has been completed, it is time to connect the units to the radios.

Connecting the 2012/Merlin MDT to the M1225

The following are the pin outs for 16 Pin Accessory Connector located on the rear of the M1225 Mobile. These connections must be made to the corresponding color-coded cable from the 2012/Merlin.

Connections: 2012/Merlin	Function	M1225 16 Pin Accessory Connector
Black/Shield	Ground	Pin 7
White	Tx Audio Out	Pin 2
Blue	On-Air Detect	Pin 8
Green	PTT Out	Pin 3
Red	Switched B+	Pin 13
Yellow	Rx Audio In	Pin 11
Violet	COR	Pin 4
Brown	Audio Mute Out	N/C
Grey	Mic Mute/Channel Select	Pin 6

Jumper Settings in the 2012/Merlin/2016

J1	[Out]	Tx audio level
J2	[Out]	Local PTT Loop

Connecting the 2016 base to the M1225

Connections: 2016	Function	M1225 16 Pin Accessory Connector
Black/Shield	Ground	Pin 7
White	Tx Audio Out	Pin 2
Blue	On-Air Detect	Pin 8
Green	PTT Out	Pin 3
Red	Switched B+	Pin 13
Yellow	Rx Audio In	Pin 11
Violet	COR	Pin 4
Brown	Audio Mute Out	N/C
Grey	Mic Mute/Channel Select	Pin 6
Teal	Base Group Enable	Ground (Pin 7)

Alignment

Follow the alignment procedures located in your Pyramid Communications service manual for the product installed. It is important to align all of the Pyramid equipment prior to installing in field.

The easiest way to align the Pyramid units it to add an extra conventional/simplex channel into the mobile radio. Use this channel, in conjunction with the service equipment to perform the alignment.

Appendix A

In order to understand the operation of data channel change you have to realize that the mobile units are using a dedicated PassPort/LTR ID code for *data* and a separate PassPort/LTR ID code(s) for *voice* communication. When the MDT sends a message, the mobile radio is switched to the defined *data* PassPort/LTR ID; after the transmission is complete, the radio reverts back to the *voice* ID code. The 2016 base unit receives and responds on the *data* PassPort/LTR ID code.

A problem arises when the dispatcher needs to send an outbound message (e.g. GPS Poll, Text Message, Horn Honk, etc.). At most times, the mobile units are idle and therefore on the *voice* PassPort/LTR ID code. When a message from the base is sent, it is sent on the *data* PassPort/LTR ID code, thus the targeted mobile unit does not receive the command from the dispatcher because it is listening on a different PassPort/LTR ID code.

To overcome this obstacle, the 2016 can be configured to change to the *voice* PassPort/LTR ID code when sending outbound, base originated messages. As with all base modem installations, a dedicated radio is required for the 2016 base modem.

Enabling your 2016 for Voice Channel Change

There is a simple wiring harness change is needed to enable the 2016 to activate the channel change line out of the 2016 Base Modem. From the 2016 wiring harness, connect the Teal wire ground. This activates the Grey wire as the Voice Channel Select line.

If not already done, crimp a pin onto the Grey wire from the Pyramid Communications Model 2016 wiring harness and connect it to the 16 pin accessory connector pin 6.