PYRAMID
COMMUNICATIONS

Programming Instructions for:

Motorola CDM1550LS+
LTR or Conventional

For use with:

Pyramid Communications
Model 2017 Merlin/2012/3012 MDT

Revision A
August 2, 2006

Introduction

Before you begin, you will need to have a copy of the Professional Radio CPS software **R06.06.00** or newer, and a Motorola RIB available to program the mobile radio. Also, you will need a copy of the Pyramid programming software and FY-1 programming cable to program the Pyramid device.

Important Note: Ensure you use firmware version R05.05.17 or newer in the CDM1550LS+ radio. This firmware supports Data Revert for data channel steering.

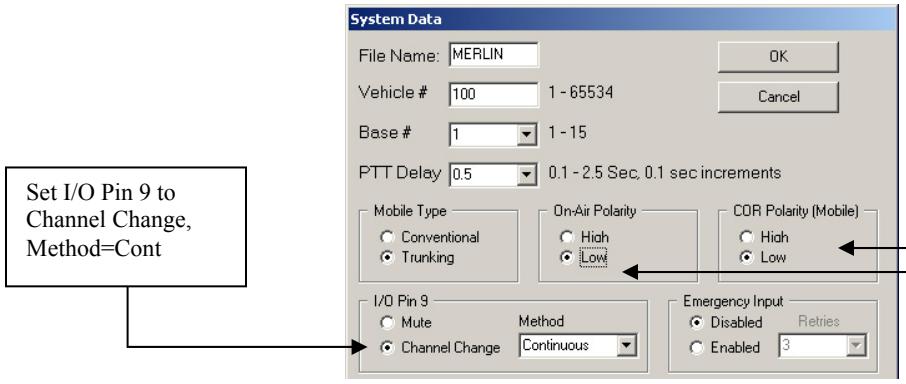
Programming the Pyramid Merlin or 2012/3012 MDT

The Pyramid AVL unit needs to be programmed to accommodate the polarities of signal that the Motorola CDM1550LS+ will provide it.

If you have not already done so, install the programming software on to your PC by following the instructions in the Merlin/2012/3012 MDT service manual.

Start by running the Pyramid Merlin/2012/3012 MDT programming software on your PC. From the ***Data*** pull down menu, under the ***System Data*** screen, program the unit as shown the figure below.

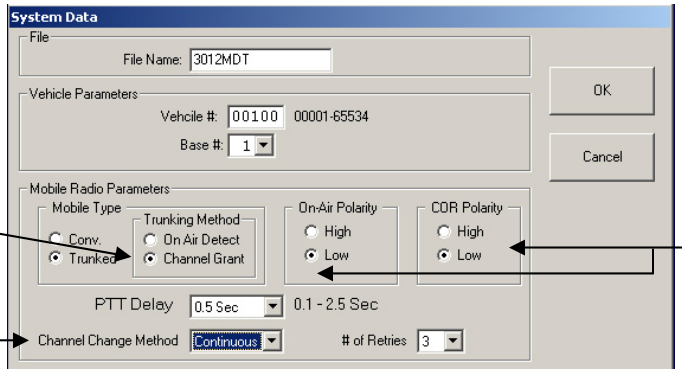
Note: Examples are from Merlin and 3012 MDT Programming. Other pyramid products are programmed with a similar layout.



Example:
Merlin System Data Screen

Set I/O Pin 9 to Channel Change, Method=Cont

Set COR and On-Air Polarity to Low



Example:
3012 MDT System Data Screen

If Trunking, Set Trunking Method to Channel Grant

Set COR and On-Air Polarity to Low

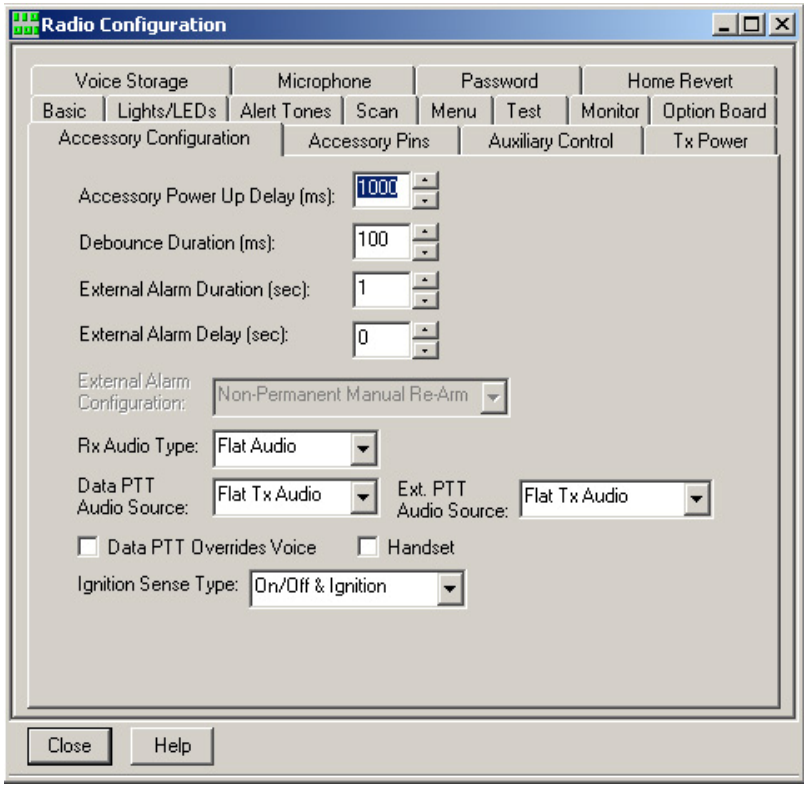
Set I/O Pin 9 to Channel Change, Method=Cont

Programming the CDM1550LS+ Mobile – Motorola CPS

Follow normal procedures for programming an LTR or Conventional System into the CDM1550LS+ radio.

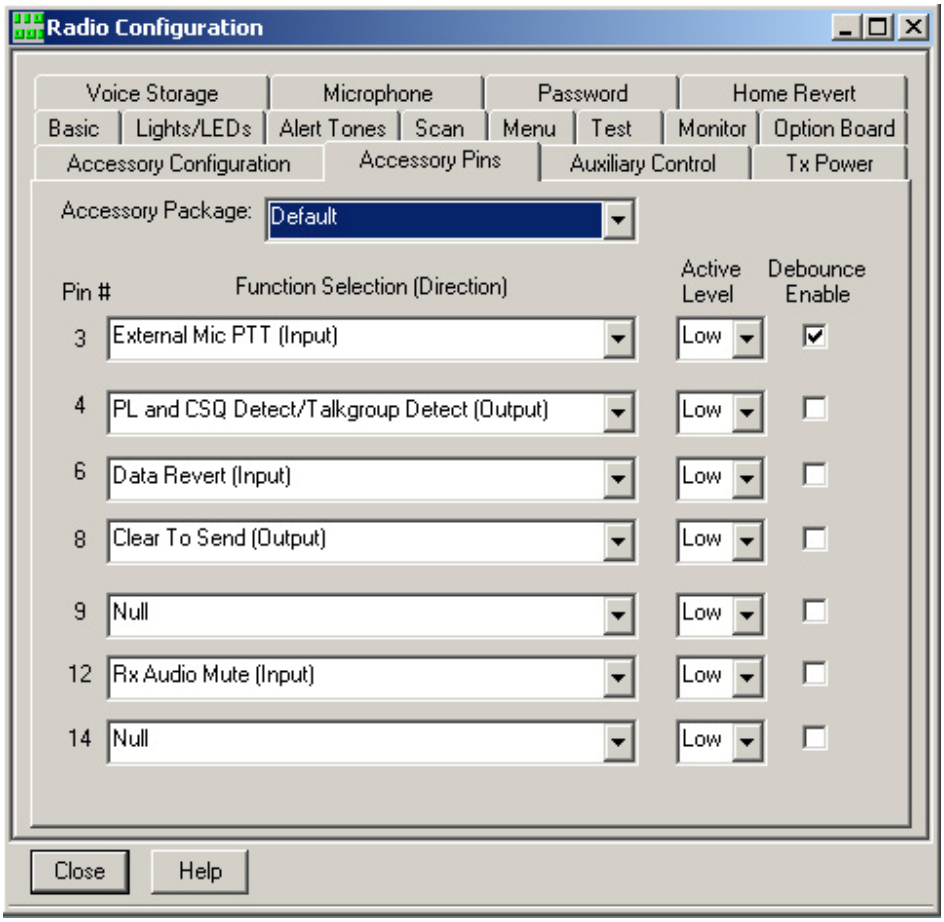
There are two objectives to programming the radios for mobile data or AVL usage. First, the Accessory port must be programmed to accommodate the Pyramid device. Second, the LTR or Conventional groups must be programmed for Data Revert (channel change) to enable the Pyramid device to steer the radio to a separate group to send and receive data.

CDM1550LS+ Accessory Port Configuration



1. Set the ***Rx Audio Output*** to "**Flat Audio"**. This will enable all RX audio from the discriminator of the radio to be available on the accessory connector of the radio.
2. Set the ***Data PTT Audio Source*** to **"Flat TX Audio"**. This ensures that the radio will not filter or distort any of the data audio.
3. Set the ***Ext. PTT Audio Source*** to **"Flat TX Audio"**. This ensures that the radio will not filter or distort any of the data audio.

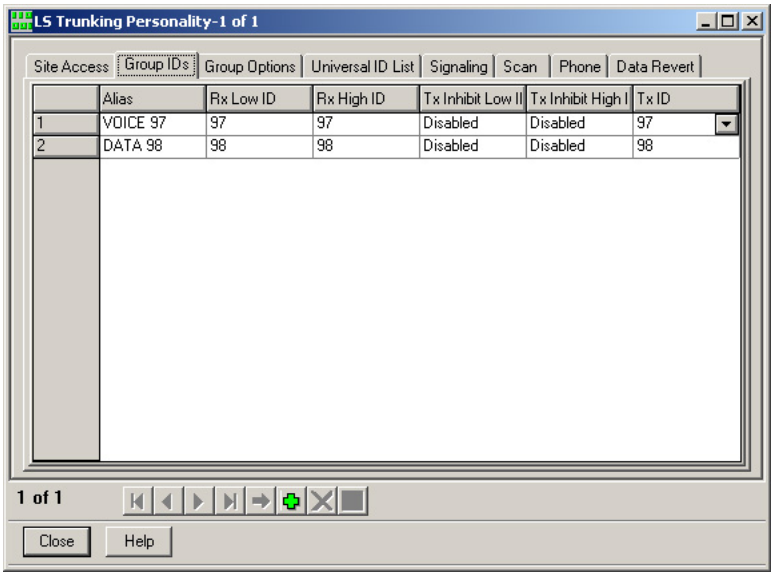
Access the Accessories Pins menu by first reading the personality out of the CDM1550LS+ radio with the **Motorola Professional CPS** software. Select the ***Radio Configuration*** menu and click on ***Accessory Pins*** tab.



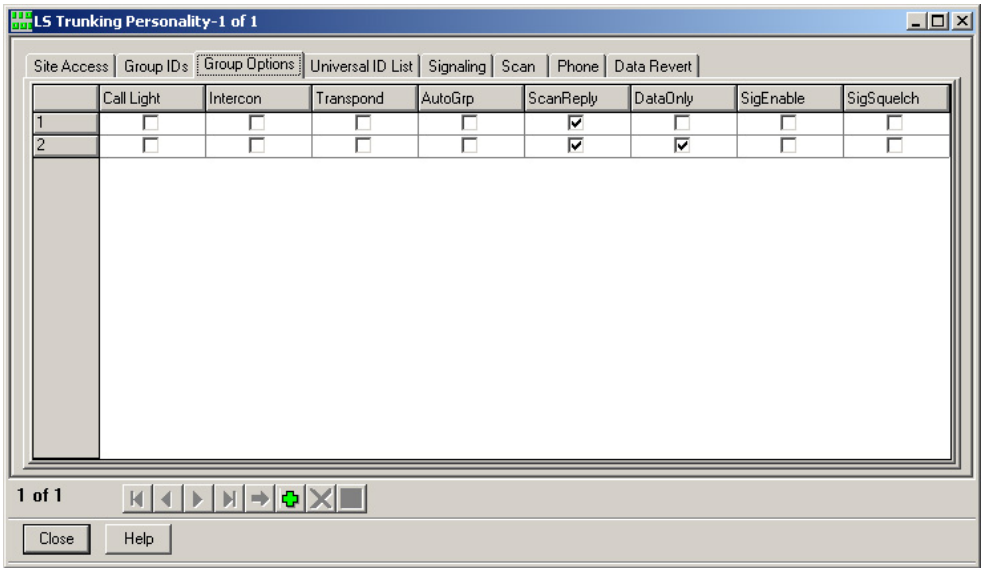
1. Program ***Pin 3*** of the accessory connector for ***"External Mic PTT(Input)" Active Low***
2. Program ***Pin 4*** of the accessory connector for ***"PL and CSQ Detect/Talkgroup Detect (Output)" Active Low***
3. Program ***Pin 6*** of the accessory connector for ***"Data Revert (Input)" Active Low***
4. Program ***Pin 8*** of the accessory connector for ***"Clear To Send (Output)" Active Low***
5. Program ***Pin 12*** of the accessory connector for ***"RX Audio Mute (Input)" Active Low***

CDM1550LS+ LTR and Conventional Group Programming

Access the LS Trunking or Conventional Personality programming from the main tree view of the CPS program. Generally, you will have two (or more) groups programmed into your mobile radio. The first group will be for Voice use, while the second (or last in the list) is for Data usage by the Pyramid unit.



Once an additional talk group had been added for data, you must access the ***Group Options*** tab of the ***Personality*** screen to enable this group as Data by checking the **DataOnly** box.

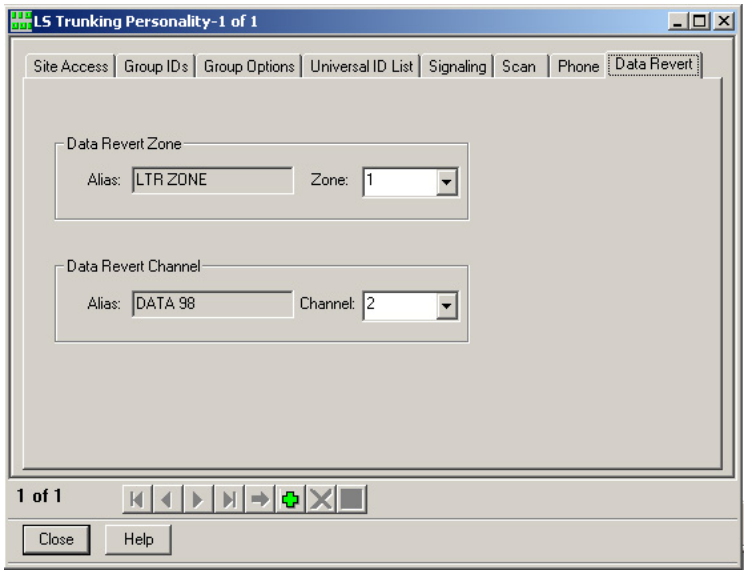


CDM1550LS+ LTR and Conventional Group Programming (continued)

After all the group data has been set, you must assign a talk group in the personality to revert to whenever the Pyramid unit asserts the Data Revert input of the radio. Set the Data Revert Zone/Channel as shown below:

1. **Data Revert Zone:** Set to the current or desired zone you want the radio to switch to whenever a data call is initiated by the Pyramid unit.

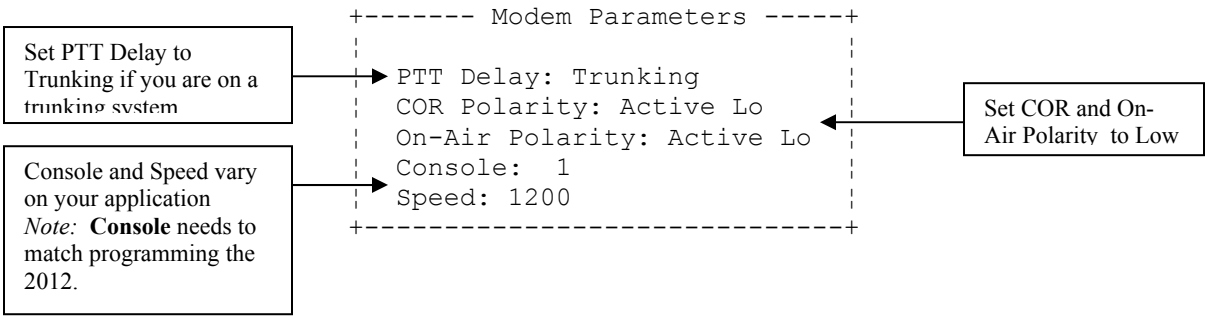
2. **Data Revert Channel:** Set to the group in the desired zone that you want the radio to switch to whenever a data call is initiated by the Pyramid unit.



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.

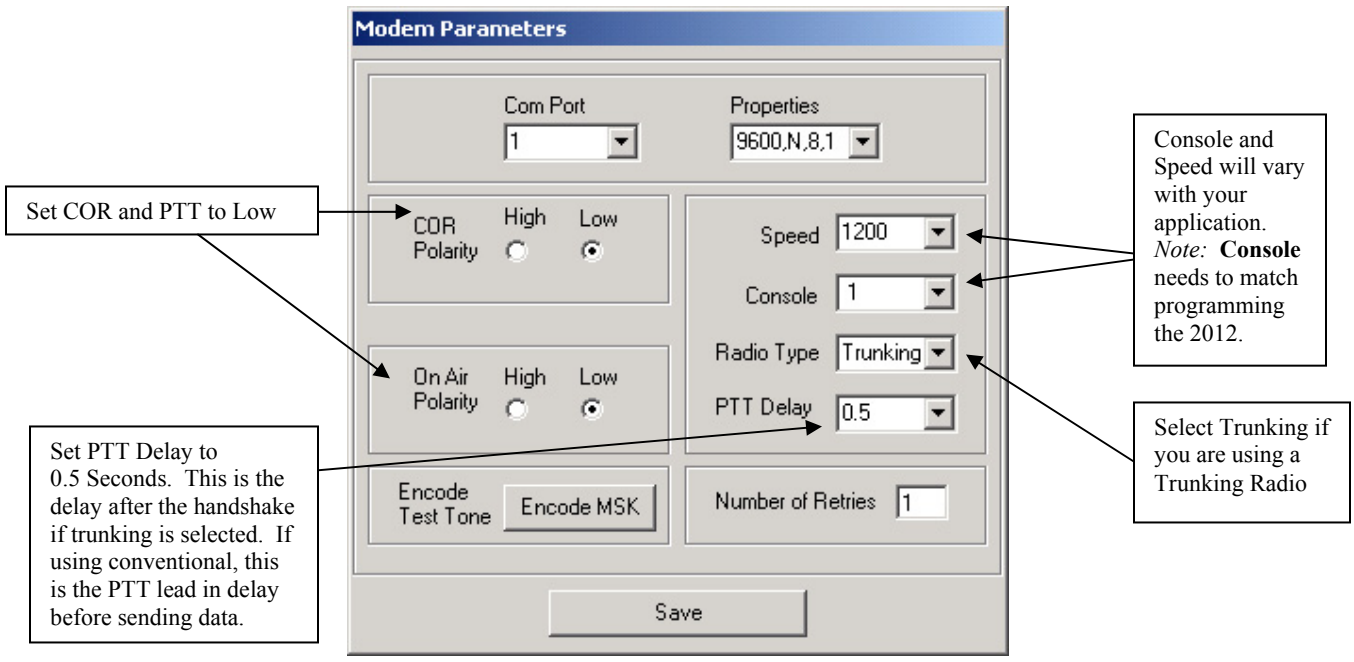
The figure below shows how a typical Pyramid Console software would be set up when connected to a 2016 and CDM1550LS+ radio. To access the ***Modem Parameters*** menu, select ***Configure*** from the pull down menu.



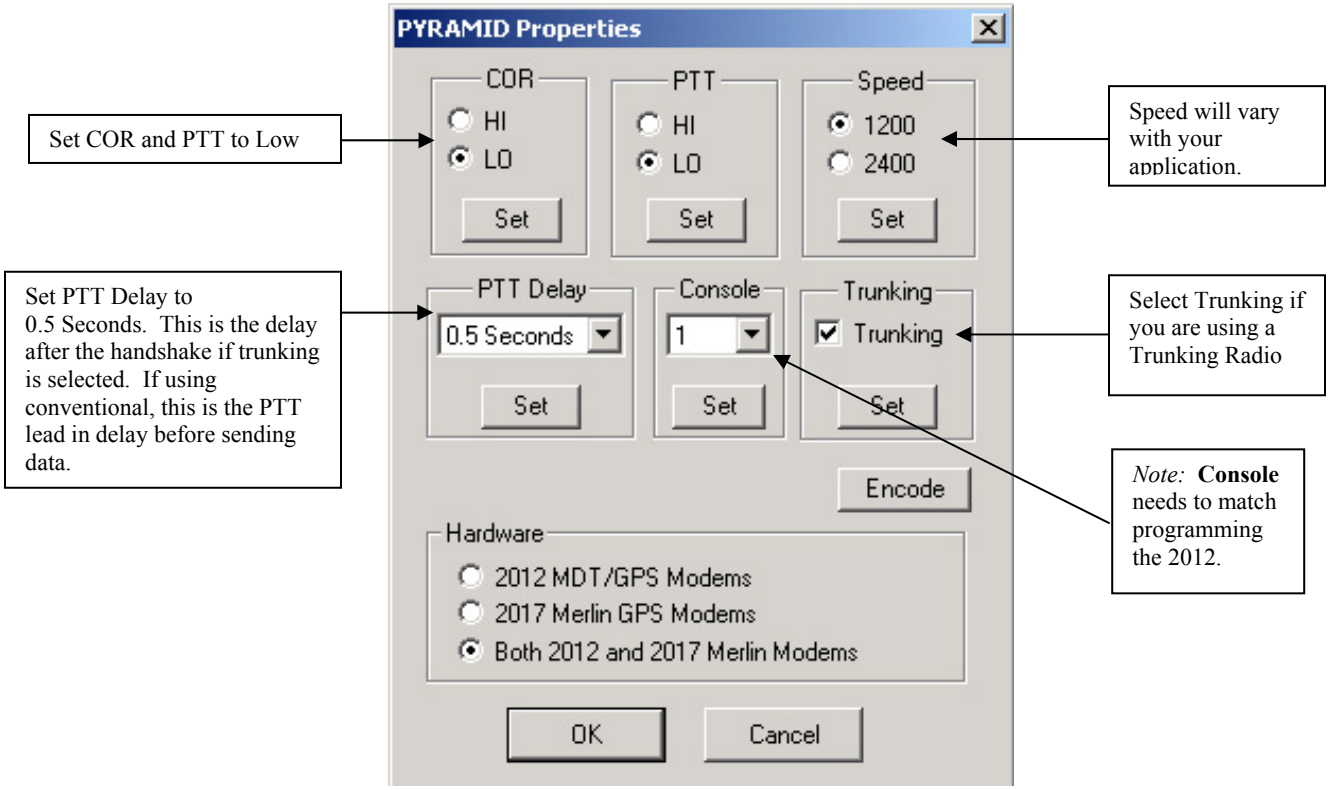
See the Pyramid 2016 service manual for further Pyramid Console software information.

Programming the Pyramid 2016 (Continued)

The figures below shows how Street Smarts modem parameters will be set up when connected to a 2016 and CDM1550LS+ radio. To access this configuration screen, select the ***Configure*** pull down menu in Street Smarts. Then click ***Modem Parameters*** to configure the 2016.



The figures below shows how a typical RasTrac I/O processor will be set up when connected to a 2016 and CDM1550LS+ 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.



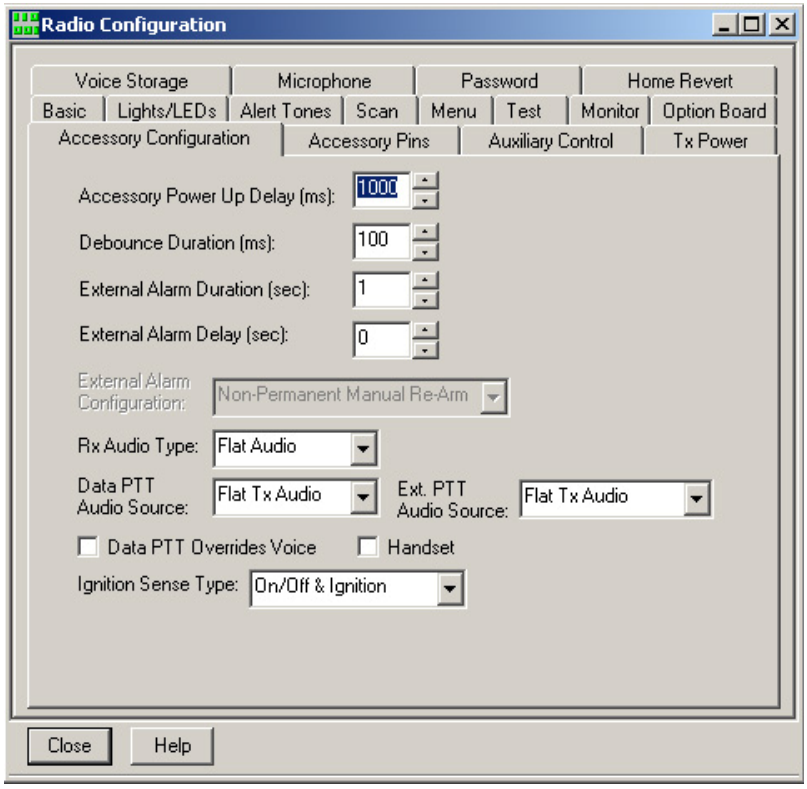
Note: If your I/O Processor does not include a "check box" parameter for enabling trunking, contact Manning Navcomp to obtain the latest version of I/O Processor.

Programming the CDM1550LS+ Base – Motorola CPS

The base radio is programmed almost identically like the mobile radio. The ***Accessory Configuration***, ***Group Options*** and ***Data Revert*** do no change from base to mobile programming. There are, however, differences on how the groups are programmed into the radio.

When programming the groups into the base radio, always make the group used for data the first group list. The second group in the radio will be the voice group. See the examples that follow:

CDM1550LS+ Accessory Port Configuration



1. Set the ***Rx Audio Output*** to "**Flat Audio"**. This will enable all RX audio from the discriminator of the radio to be available on the accessory connector of the radio.
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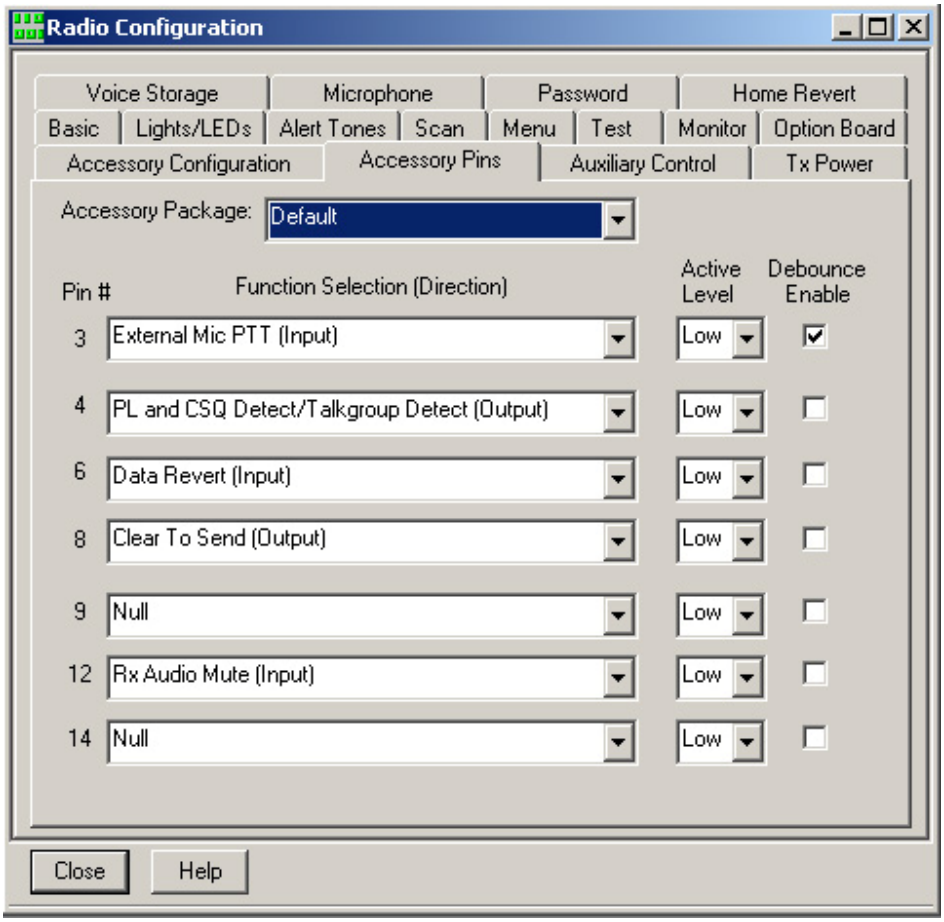
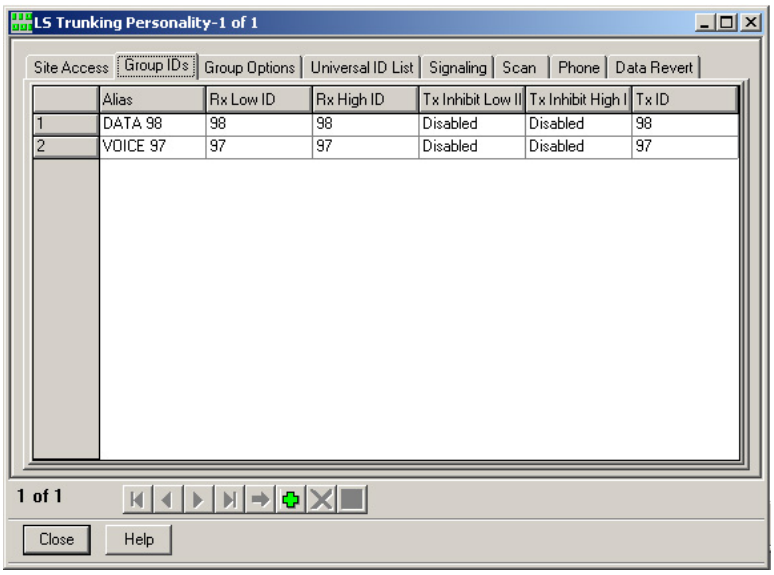
Access the Accessories Pins menu by first reading the personality out of the CDM1550LS+ radio with the **Motorola Professional CPS** software. Select the ***Radio Configuration*** menu and click on ***Accessory Pins*** tab.



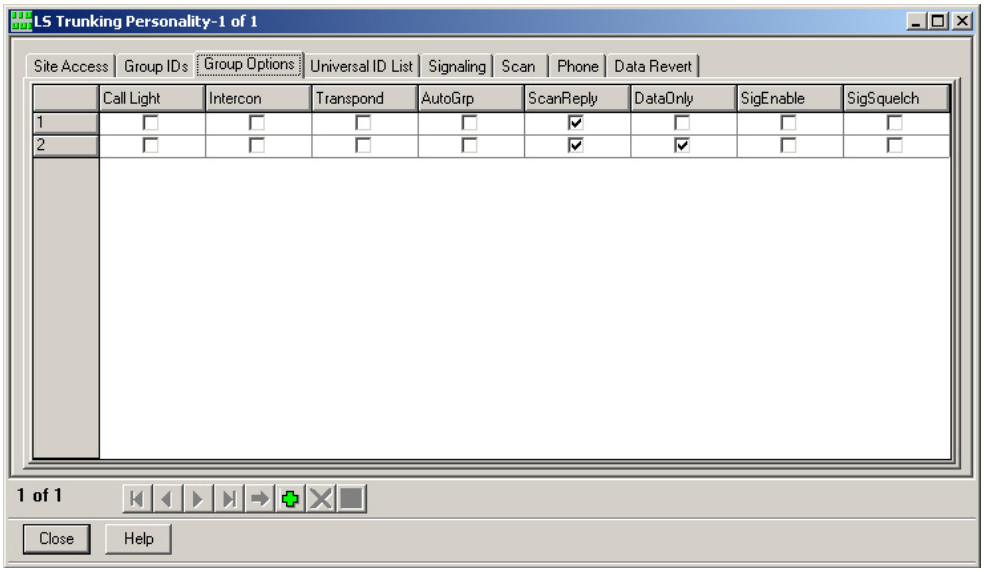
1. Program ***Pin 3*** of the accessory connector for ***"External Mic PTT(Input)" Active Low***
2. Program ***Pin 4*** of the accessory connector for ***"PL and CSQ Detect/Talkgroup Detect (Output)" Active Low***
3. Program ***Pin 6*** of the accessory connector for ***"Data Revert (Input)" Active Low***
4. Program ***Pin 8*** of the accessory connector for ***"Clear To Send (Output)" Active Low***
5. Program ***Pin 12*** of the accessory connector for ***"RX Audio Mute (Input)" Active Low***

CDM1550LS+ LTR and Conventional Group Programming

Access the LS Trunking or Conventional Personality programming from the main tree view of the CPS program. In the **Base** radio, you will have two groups programmed. The first group will be primarily for **Data** use by the Pyramid base modem, while the second is also for Data usage by the Pyramid unit, but is only used on dispatch originated messages (See Appendix A).



Once both talk groups have been added to the list, you must access the ***Group Options*** tab of the ***Personality*** screen to enable group 2 (the voice group) as Data by checking the **DataOnly** box. This will allow the base modem to Revert the radio to this voice group when sending dispatch originated messages.

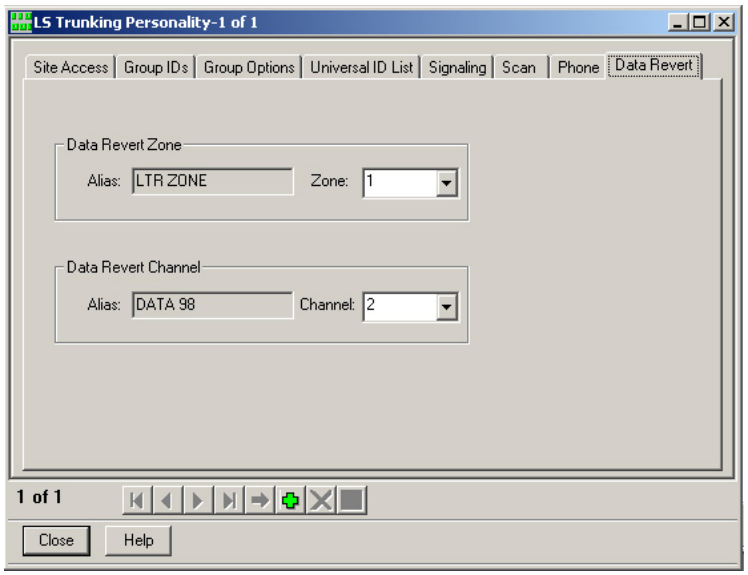


CDM1550LS+ LTR and Conventional Group Programming (continued)

After all the group data has been set, you must last assign a talk group in the personality to revert to whenever the Pyramid base modem asserts the Data Revert input of the radio. Set the Data Revert Zone/Channel as shown below:

1. **Data Revert Zone:** Set to the desired zone that the Pyramid base modem will be sending Dispatch Originated Messages.

2. **Data Revert Channel:** Set to the group in the desired zone that the Pyramid base modem will be sending Dispatch Originated Messages.



Connecting the Pyramid to the CDM1550LS+

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

Connecting the Merlin/2012/3012 MDT to the CDM1550LS+

The following are the pin outs for 16 Pin Accessory Connector located on the rear of the CDM1550LS+ Mobile. These connections must be made to the corresponding color-coded cable from the Merlin/2012/3012 MDT.

Connections:	**Merlin/2012/3012**	**Function**	**CDMLS+ 16 Pin Accy. Connector**
	Black/Shield	Ground	Pin 7
	White	Tx Audio Out	Pin 5
	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	Pin 12
	Grey	Mic Mute/Channel Select	Pin 6

Connecting the 2016 base to the CDM1550LS+

Connections:	**2016**	**Function**	**CDMLS+ 16 Pin Accessory Connector**
	Black/Shield	Ground	Pin 7
	White	Tx Audio Out	Pin 5
	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	Pin 12
	Grey	Mic Mute/Channel Select	Pin 6
	Teal	**Base Group Enable**	**Ground (Pin 7)**

Jumper Settings in the Merlin/2012/3012 or 2016

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

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 a Pyramid unit it to add an extra conventional simplex channel to the mobile radio. Use this channel, in conjunction with the service equipment to perform the alignment.

Full service manuals are available at www.pyramidcomm.com/support.

Appendix A

Base Channel Change

In order to understand the operation of data channel change you have to realize that the mobile units are using a dedicated Conventional/LTR ID code for ***data*** and a separate Conventional/LTR ID code(s) for ***voice*** communication. When the MDT sends a message, the mobile radio is switched to the defined ***data*** Conventional/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*** Conventional/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*** Conventional/LTR ID code. When a message from the base is sent, it is sent on the ***data*** Conventional/LTR ID code, thus the targeted mobile unit does not receive the command from the dispatcher because it is listening on a different Conventional/LTR ID code.

To overcome this obstacle, the 2016 can be configured to change to the ***voice*** Conventional/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 (which Motorola calls Data Revert).

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**.