

**Motorola
CDM/GM/PRO Series Radios
to 223 Series Adapter Panels**



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Motorola CDM/GM/PRO Series Radios to 223 Adapter Panels

1.0 General

This application note is intended to assist technical staff with cable assembly and hardware setup of different 223 series adaptor panels (TRA-223, DSP-223 and IP-223) to a Motorola CDM, GM and PRO series mobile radio.

NOTE: The Motorola Accessory Connector kits P/N HLN9242A or HLN9457A are required to support remote control of the CDM/GM/PRO mobile radios. Contact your local Motorola dealer to purchase this connector kit.

2.0 Interconnect Cable Assembly

A cable assembly is required to connect to the various 223 series adapter panels to the CDM's 20-pin accessory connector.

Telex cable, P/N 301969000 IP-223/Motorola CDM 1250 Mobile Interface Cable Assembly is available for purchase; alternatively, use the following chart to manufacture this cable assy.

TABLE 1. Interconnect Cable Assembly

TRA-223 DB-25 Pin	DSP-223 DB-25 Pin	IP-223 DB-25 Pin	CDM 20-Pin	Signal
25	25	25	2	MIC +
24	24	24	11	RX +
14	14	14	3	PTT
7	7	7	7	DGND
10	10	20	4	COR
	8	8	6	D0
	21	21	8	D1
	9	9	12	D2
	22	22	14	D3

NOTE: The pins in the gray shaded cells are for CDM frequency changes.

3.0 223 Series Panels

3.1 TRA-223 Setup

The TRA-223 requires the squelch feature to function correctly.

To **configure squelch in the TRA-223**, do the following.

> Configure Rx squelch for **Active Low** (R103 installed).

REFERENCE: For more information, see the TRA-223 Technical Manual P/N 803570, Rx Squelch section.

3.1.1 TRA-223 Dip Switch Settings

To **configure the TRA-223 front panel dip switch settings**, do the following:

> Set the TRA-223 dip switch as shown in Table 2.

REFERENCE: For more information, see the TRA-223 Technical Manual P/N 803570.

TABLE 2. TRA-223 Dip Switch Settings

Switch	Setting	Signal
1	As appropriate	2-Wire = On 4-Wire = Off
2	As appropriate	4-Wire = On 2-Wire = Off
3	As appropriate	Full Duplex = On Half Duplex = Off
4	On	Squelch
5	Off	Radio Rx Level Speaker = On High Impedance = Off
6	On	Radio Tx Level Low Level = On High Level = Off
7	On	Ground on PTT Relay Common
8	Off	Ground on Monitor Relay Common

3.2 DSP-223 Setup

No DSP-223 software configuration is required.

3.2.1 DSP-223 Jumper Settings

To set the **DSP-223 jumpers**, do the following:

1. Set the following jumpers to the **A position**:
 - J14, J15, J22, J23, J24, J25, J27.
2. Set the following jumpers to the **B position**:
 - J12 and J13.
3. Solder close **JP2**.
4. Set **J16** to the center pin (hanging).

NOTE: J19, J20 and J21 are for selecting 2- or 4-wire operation.

REFERENCE: For more information, see the DSP-223 Technical Manual (P/N 803274).

3.3 IP-223 Setup

Setup the IP-223 jumpers, COR, and per line options.

3.3.1 IP-223 Jumper settings

Set the IP-223 jumpers as shown in Table 3.

TABLE 3. Jumper Settings

Line 1	Jumper Setting	Line 2
J33, J34	B = 4-wire	J5, J6
J16, J21	A = Single Ended	J19, J20
J14	Hanging on center pin = 10K Ohm	J24
J3, J9, J11	A = Single Ended	J25, J28, J29
J13	B = High	J27
J17, J22	B = 600 Ohms	J10, J15
R377	Solder Bridge the pads together	R381

3.3.2 Per Line Setup

To **configure the digital output**, do the following:

1. Open **TSM**.
2. In the Processed Devices pane, select the **IP-223** to configure.
3. Click the **Per Line Setup** tab.
The Per Line Setup page appears.
4. Select a **mode** radio button for the channel to configure.
5. Click **Configure**.
The Per Line Setup notebook appears.
6. In the Digital Output drop down menu for Function Tone 1, select **1**.
7. In the Digital Output drop down menu for Function Tones 2–10, increment each function tone by a value of **1**.

Function Tone	Enable	Relay	Relay Group	Relay Time	Digital Output
1	<input checked="" type="checkbox"/>	None	1	0	1
2	<input checked="" type="checkbox"/>	None	1	0	2
3	<input checked="" type="checkbox"/>	None	1	0	3
4	<input checked="" type="checkbox"/>	None	1	0	4
5	<input checked="" type="checkbox"/>	None	1	0	5
6	<input checked="" type="checkbox"/>	None	1	0	6
7	<input checked="" type="checkbox"/>	R02	1	0	7
8	<input checked="" type="checkbox"/>	Both	1	0	8
9	<input checked="" type="checkbox"/>	None	1	0	9
10	<input checked="" type="checkbox"/>	R01	1	0	10

FIGURE 1. Per Line Setup—Function Tone Page

To **configure COR setup**, do the following:

1. From the Per Line Setup notebook, click the **Options** tab.
The Options page appears.
2. Select the **COR Enabled** check box.
3. Clear the **COR Active High** check box.

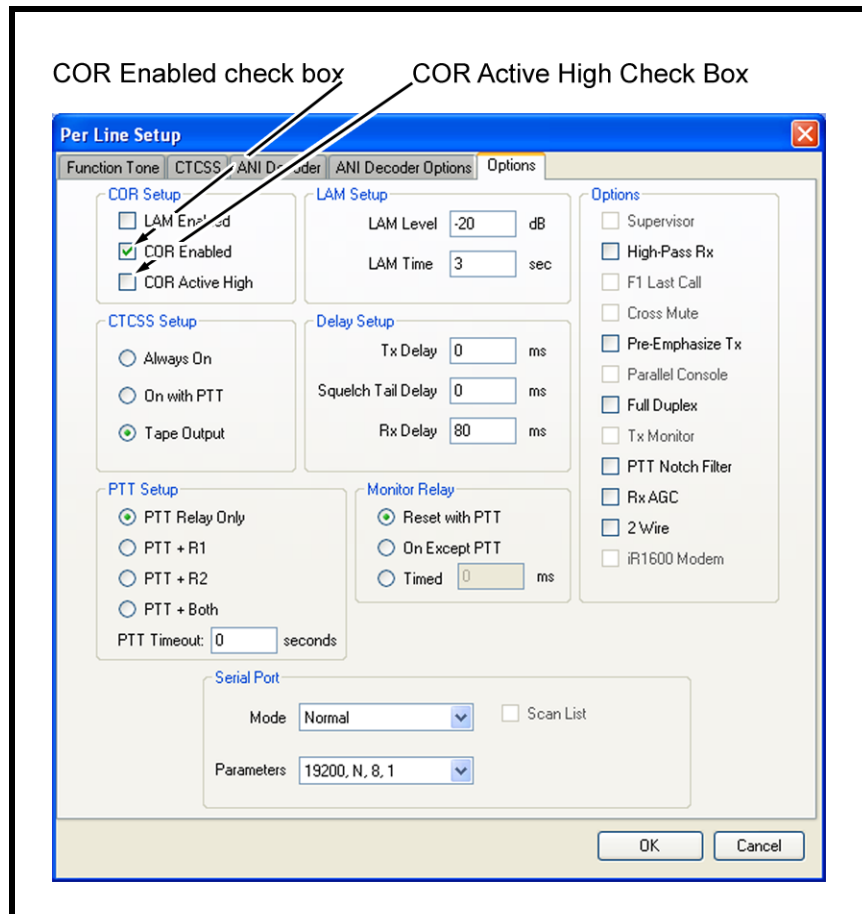


FIGURE 2. Per Line Setup—Options Page

4.0 Radio Information

4.1 Radio Accessory Pinout and Functionality

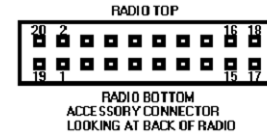


TABLE 4. Accessory Pinout and Functionality

Pin	Description	Direction	Comments
1	Speaker (-)		Not programmable
2	Extended mic Audio		Partially Programmable
3	Digital in #1	Input Only	Fully Programmable, 12 Active Low Only
4	Digital In #2	Output Only	Fully Programmable
5	Flat TX Audio Input		Partially Programmable
6	Digital In/Out #3	Input Only	Fully Programmable
7	Ground		Not Programmable
8	Digital In/Out #4	Selectable Input/Output	Fully Programmable
9	Analog In #5	Special Input	Fully Programmable, Tri-state Emergency Switch
10	Ignition Sense	Special Input	Not Programmable, Active High
11	Flat RX Audio		Partially Programmable
12	Digital In/Out #7	Selectable Input/Output	Fully Programmable
13	Switched Battery (+)		Not Programmable
14	Digital In/Out #8	Selectable Input/Output	Fully Programmable
15	RSSI (Radio Signal Strength Input)		Not Programmable
16	Speaker (+)		Not Programmable
17	BUS (+)*		Not Programmable
18	Boot Control ^a		Not Programmable
19	Unknown		Not Programmable
20	Unknown		Not Programmable

a. These pins are used in conjunction with the flash adapter cable.

4.2 Radio Personality Configurations

To **configure the radio**, do the following:

1. From the Radio Configuration window, set the Ext PTT Audio Source to **Flat Tx Audio**, to make sure that audio is routed to the Radio from the IP-223.
2. Set the **Function Selection (Direction)** field to:
 - Pin 3 External Mic PTT (Input).
 - Pin 4 to CSQ Detect (output).
 - Pin 6 to Channel Select 1 (Input).
 - Pin 8 to Channel Select 2 (Input).
 - Pin 9 to Null.
 - Pin 12 to Channel Select 3 (Input).
 - Pin 14 to Channel Select 4 (input).
3. Set the **Active Level** drop down menu for:
 - Pin 3 to Low.
 - Pin 4 to Low.
 - Pin 6 to High.
 - Pin 8 to High.
 - Pin 9 to Low.
 - Pin 12 to High.
 - Pin 14 to High.

NOTE: If the active level is set incorrectly, the radio may try to change to an unprogrammed channel and an error signal from the radio will result.

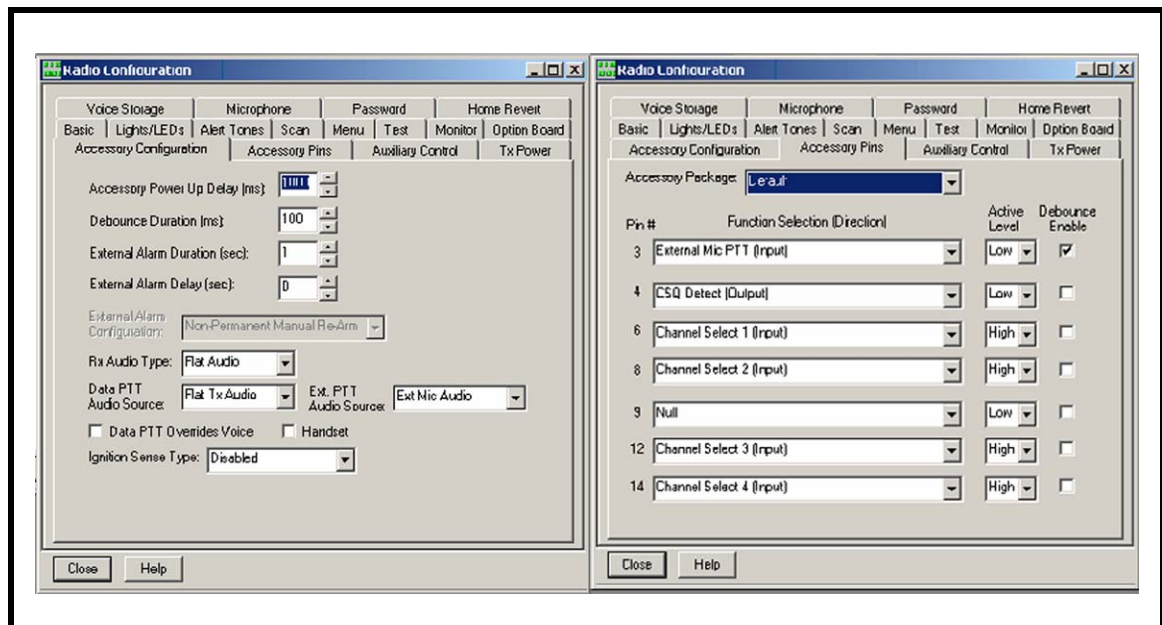


FIGURE 3. Radio Configuration Windows

Revision History		
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A	Update brand, format and new document number. (Reference rev C)	30-OCT-2009

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