TELEX Application Note

IP-223 to RTS Intercom System

VOIProven TELEX Radio Dispatch

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IP-223 to RTS Intercom Products

1.0 General

This application note demonstrates how to configure and connect the Telex Dispatch IP-223 Remote Adapter Panel panel to an RTS Intercom System. This interface provides **PTT** (Push To Talk) control and audio connections from most **LMR**s (Land Mobile Radio) to the operator keypanels.

All Telex Radio Dispatch reference documents are available at http://www.telex.com/Downloads/.

2.0 RTS Matrix to IP-223 Cabling

The RTS Matrix to IP-223 cabling diagram, shown in Figure 1, illustrates pinouts used to connect an RTS Intercom to a Telex IP-223 Adapter Panel.

NOTE: RTS documents are available at: http://www.rtsintercoms.com/manuals/php.

REFERENCE: For more information, see the appropriate technical manual:
ADAM CS System Installation Guide (P/N 9330-7517-000)
ADAM Installation Guide (P/N 9330-7467-000)
Cronus User Manual (P/N 9350-7770-000)
ZEUS/ZEUSII User Guide (P/N 9330-7634-000)
ZEUSIII User Manual (P/N/ 9350-7843-000

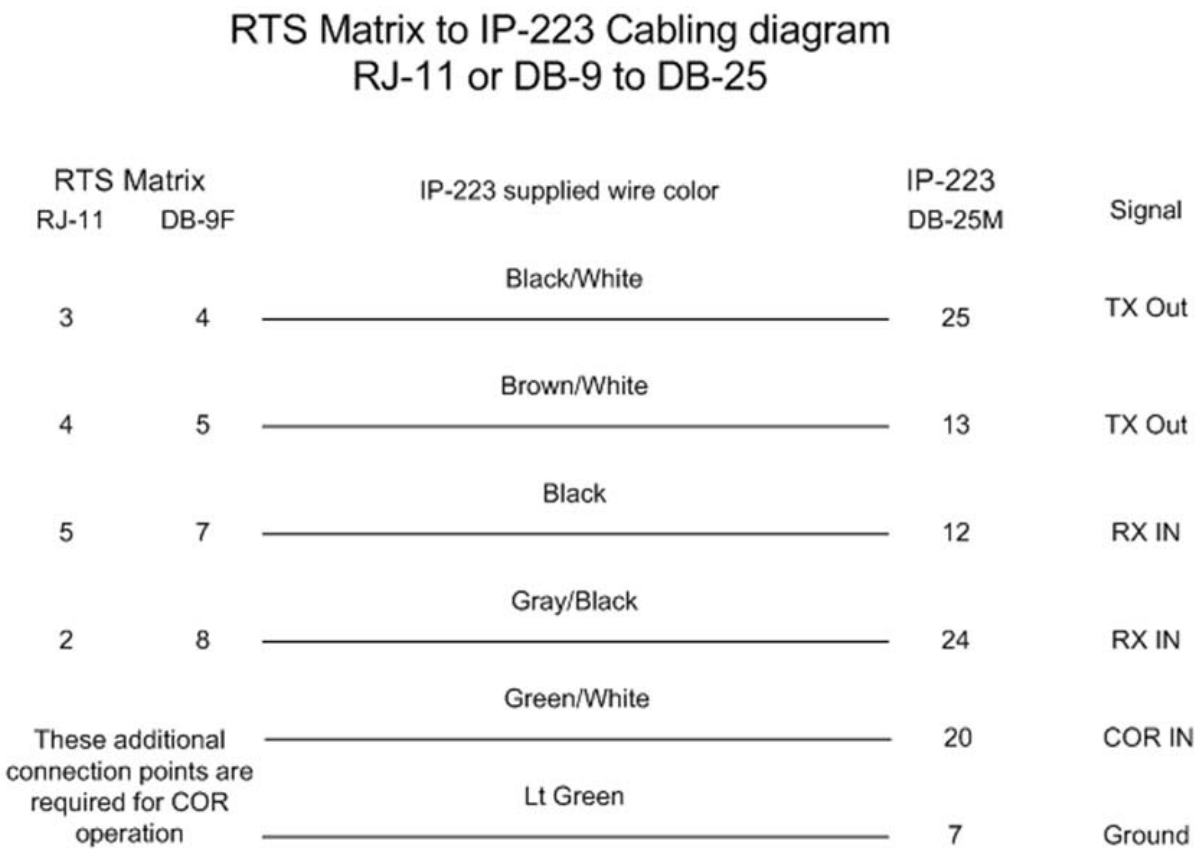

FIGURE 1. RTS Matrix to IP-223 Cabling Diagram

3.0 LMR Configuration Example

A line to line configuration example using an LMR is shown in Figure 2. The line to line crosspatch is enabled in the IP-223. Control logic and audio (6-wire E&M) are generated by the RTS system; these are connected to Line 2 I/O on the Ip-223 which is configured for local mode operation.

Line 1 I/O of the IP-223 is also configured for local mode operation and is directly connected to a LMR radio.

Receive audio from the LMR is connected to the IP-223's Line 1 I/O. Based on **COR** (Carrier Operated Relay) or **LAM** (Line Activity Monitor), the IP-223 passes this audio to the IP-223's Line 2 and out to the RTS Intercom System for playback at keypanels. PTT commands at the keypanel generate a relay closure that activates the COR logic at the IP-223. The IP-223 then accepts audio on its Line 2 input. The crosspatch transfers the audio from Line 2 to Line 1 and a relay closure is activated to key the LMR. Audio is passed from the IP-223 Line 1 to modulate the LMR.

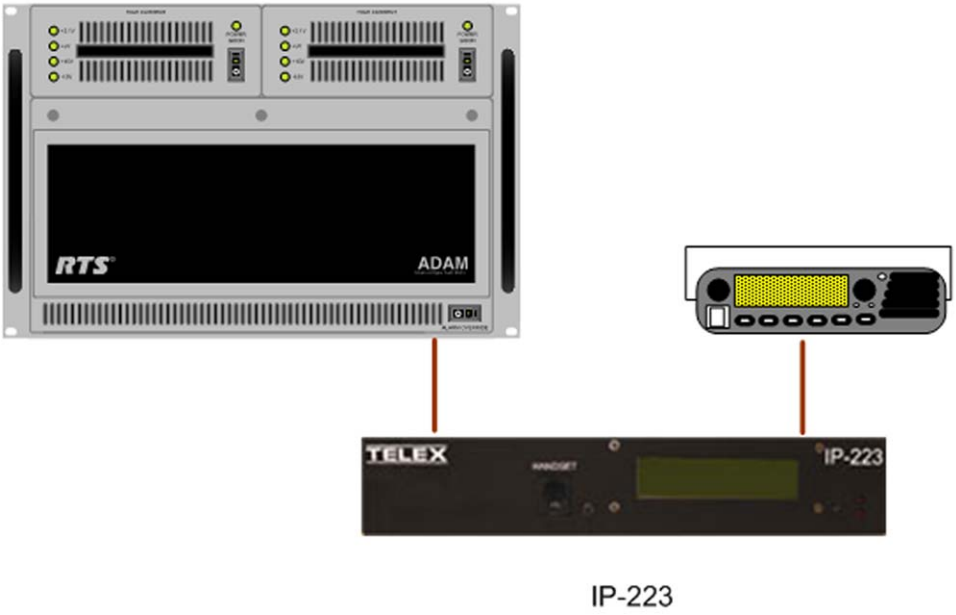

FIGURE 2. Line to Line Configuration Example

3.1 IP-223 Setup

The IP-223 is configured for local mode operation on both Line 1 and Line 2 and a line-to-line crosspatch is enabled.

NOTE: The IP-223's default username is *admin* and the password is blank.

3.1.1 Multicast Address Setup Window

The **Multicast Address Setup** window, shown in Figure 3, is used to configure the line type for Lines 1 and 2.

To **configure Lines 1 and 2 for an LMR configuration**, do the following.

1. Click **Multicast Address Setup**.
2. From Line 1's Line Type drop down menu, select **Local Mode**.
3. From Line 2's Line Type drop down menu, select **Local Mode**.
4. Click **Submit**.
   The Multicast Address Setup configuration is temporarily saved.
5. Click **Save to EEPROM**.
   The EEPROM window appears.
6. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

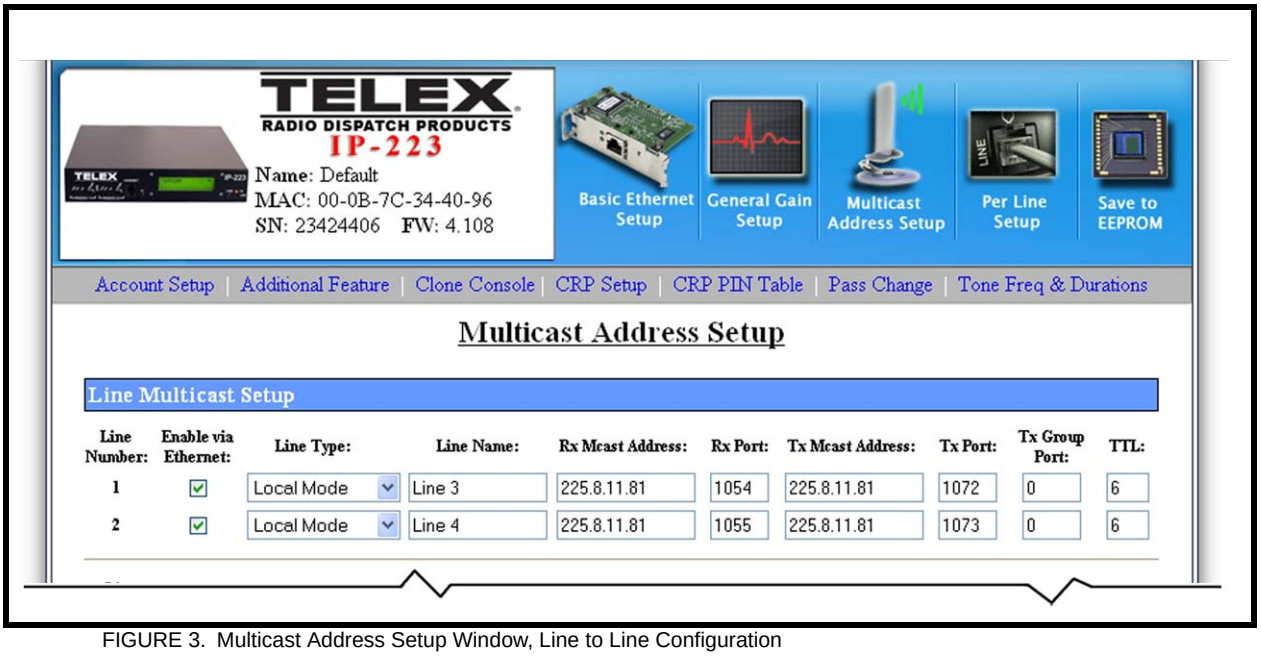

FIGURE 3. Multicast Address Setup Window, Line to Line Configuration

3.1.2 Crosspatch Setup Window

The **Crosspatch Setup** window, shown in Figure 4, is used to set up a crosspatch.

To **enable crosspatching**, do the following:

1. Click **CRP Setup**.
   The Crosspatch Setup window appears.
2. Select the **Enable Line-Line** check box.
   Crosspatching is enabled.
3. Click **Submit**.
   The Crosspatch Setup configuration is temporarily saved.
4. Click **Save to EEPROM**.
   The EEPROM window appears.
5. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

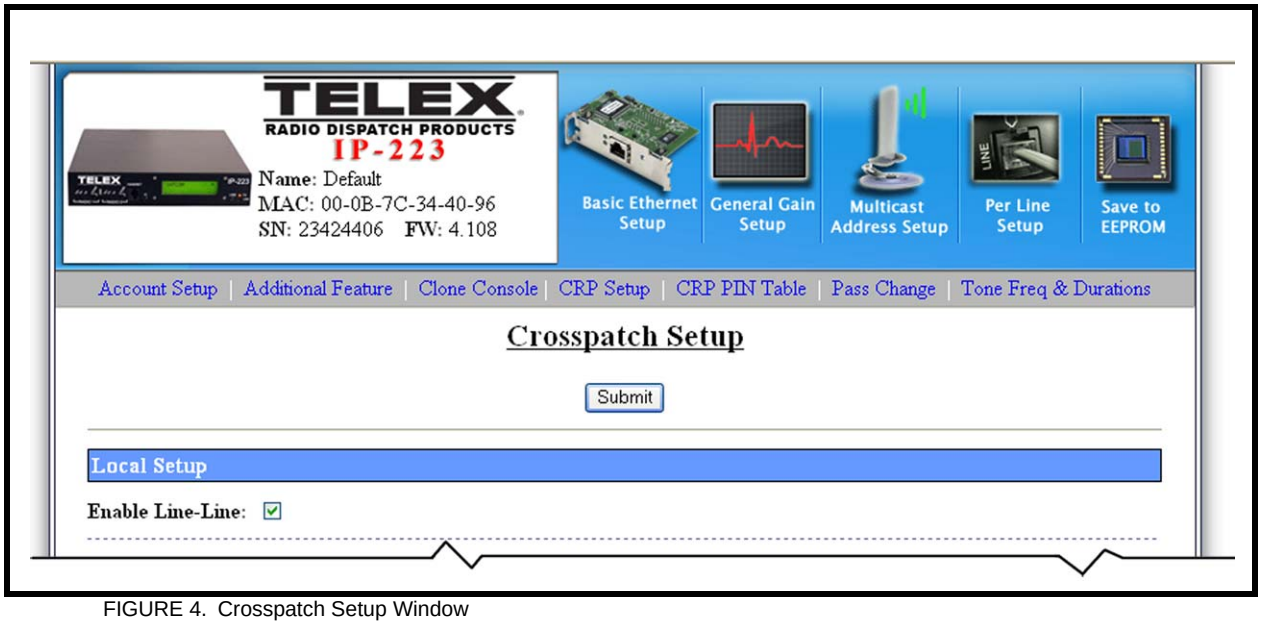

FIGURE 4. Crosspatch Setup Window

3.1.3 Per Line Setup Window Line 1

The **Per Line Setup** window is used to configure per line setup. Line 1 configuration depends on the type of radio interface.

REFERENCE: For more information about special configuration requirements on Line 2 for the type of radio connected, see the IP-223 Technical Manual (P/N 803641) or the appropriate application note.

3.1.4 Per Line Setup Window Line 2

The **Per Line Setup** window, shown in Figure 5, is used to setup the connection to the RTS equipment. Depending on the connection to the RTS equipment, VOX or COR triggering may be used.

To **configure an RTS supplied relay closure**, do the following:

1. Click **Per Line Setup**.
   The Per Line Setup window appears.
2. Click **Line Select 2**.
   The Per Line Setup window for Line 2 appears.
3. Select the **COR Enabled** check box on Line 2's Per Line Setup window.
   The RTS supplied relay is enabled.
4. Click **Submit**.
   The Per Line Setup configuration is temporarily saved.
5. Click **Save to EEPROM**.
   The EEPROM window appears.
6. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

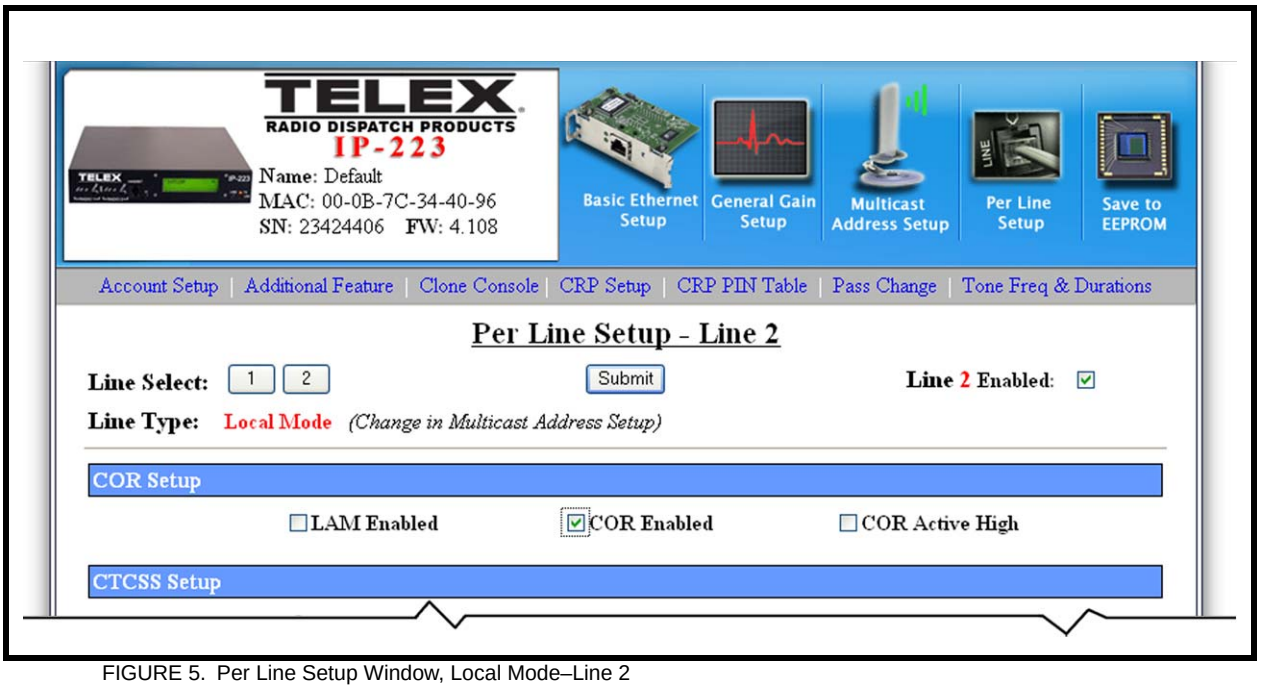

FIGURE 5. Per Line Setup Window, Local Mode–Line 2

4.0 iDEN Configuration Example

An iDEN configuration example is shown in Figure 6. Line-to-line Crosspatch is enabled in the IP-223. Control logic and audio (6-wire E&M) are generated by the RTS system; these are connected to Line 2 I/O which is configured for local mode operation. Line 1 I/O of the IP-223 is also configured for local mode operation with iDEN as the selected radio. A Telex NI-223 is required for this interface.

Receive audio from the iDEN is connected to the Line 1 I/O of the IP-223. Based on LAM levels, the IP-223 passes the audio to Line 2 and out to the RTS Intercom System for playback at keypanels. PTT commands at the keypanel generate a relay closure that activates the COR logic at the IP-223. The IP-223 then accepts audio on its Line 2 input. The crosspatch transfers the audio from Line 2 to Line 1, and a relay closure is activated to key the iDEN. Audio is passed from the IP-223 Line 1 to modulate the iDEN.

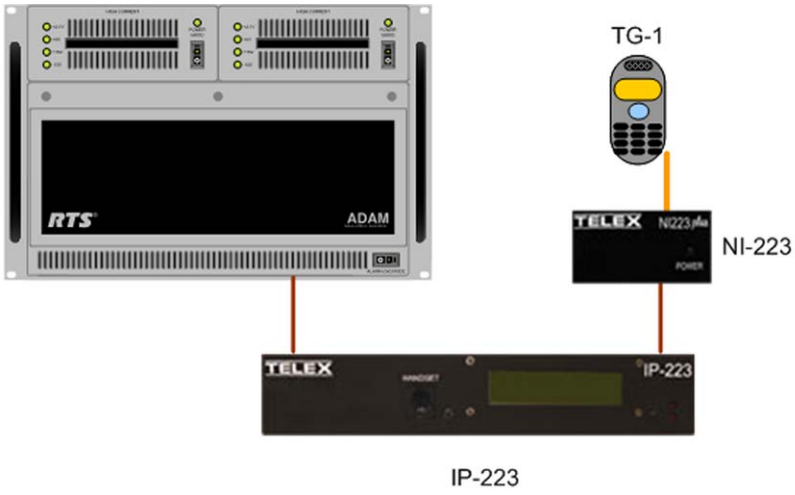

FIGURE 6. iDEN Configuration Example

4.1 IP-223 Setup

Configure the IP-223 for iDEN on Line 1 and local mode operation on line 2.

NOTE:

- The IP-223's default username is *admin* and the password is blank.
- The Line-Line check box on the Crosspatch window and F1 Last Call check box on the Per Line Setup for Line 1 must be selected.

4.1.1 Multicast Address Setup Window

The **Multicast Address Setup** window, shown in Figure 7, is used to configure the line type.

To **configure an iDEN type on Line 1**, do the following.

1. Click **Multicast Address Setup**.
   The Multicast Address Setup window appears.
2. From Line 1's Line Type drop down menu, select **iDEN Radio**.
3. From Line 2's Line Type drop down menu, select **Local Mode**.
4. Click **Submit**.
   The Multicast Address configuration is temporarily saved.
5. Click **Save to EEPROM**.
   The EEPROM window appears.
6. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

NOTE: No other Multicast Address Setup window changes are required for iDEN configuration.

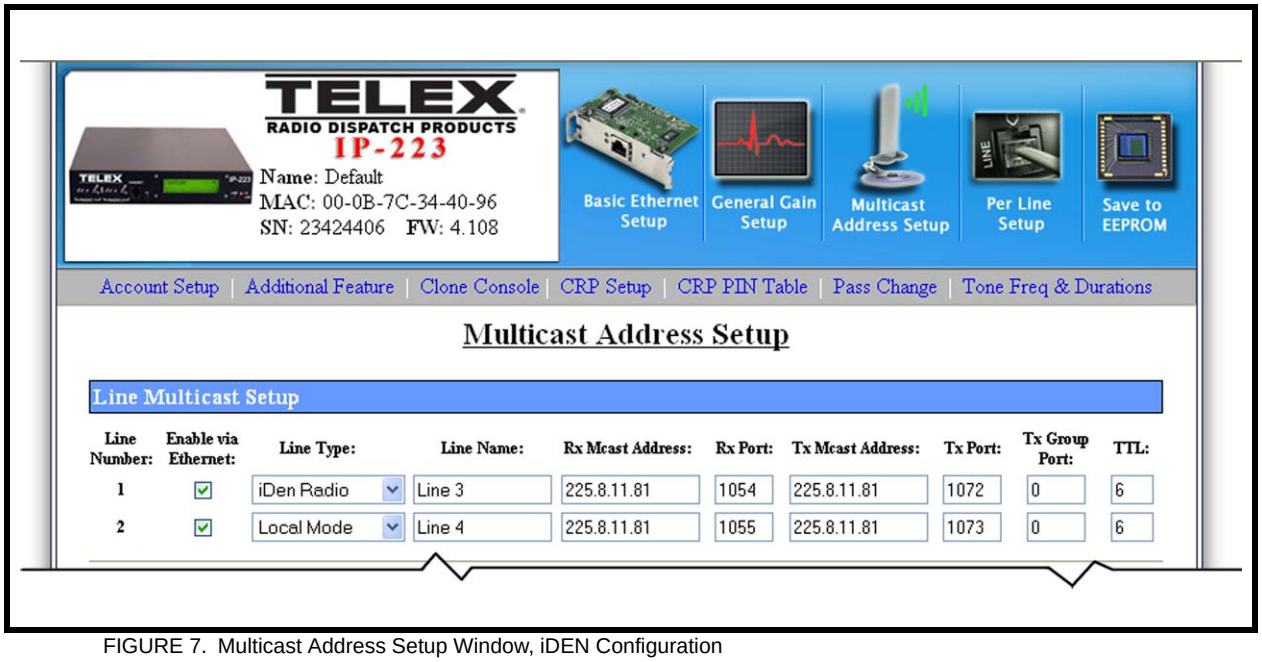

FIGURE 7. Multicast Address Setup Window, iDEN Configuration

4.1.2 Crosspatch Setup Window

The **Crosspatch Setup** window, shown in Figure 4, is used to enable line-to-line crosspatching.

To **enable a crosspatch for an iDEN radio**, do the following:

1. Click **CRP Setup**
   The Crosspatch Setup window appears.
2. Select the **Enable Line-Line** check box.
   Crosspatching is enabled.
3. Click **Submit**.
   The Crosspatch configuration is temporarily saved.
4. Click **Save to EEPROM**.
   The EEPROM window appears.
5. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

4.1.3 Per-Line Setup Window Line 1

The **Per Line Setup** window for Line 1, shown in Figure 8, is used to setup LAM and activate options such as F1 Last Call, Full Duplex, and RxACG.

The recommended LAM level is -25dB. However, the optimum level may vary depending on the terminal attachment (iDEN handset). Handset volume is adjusted to present clear receive audio and the LAM level is set to block unwanted noise. A LAM time of three (3) seconds is recommended to avoid continual switching of receive audio.

REFERENCE: For more information, see the NI-223+ Technical Manual (P/N 804165) for jumper settings and alignment procedures for Line 1.

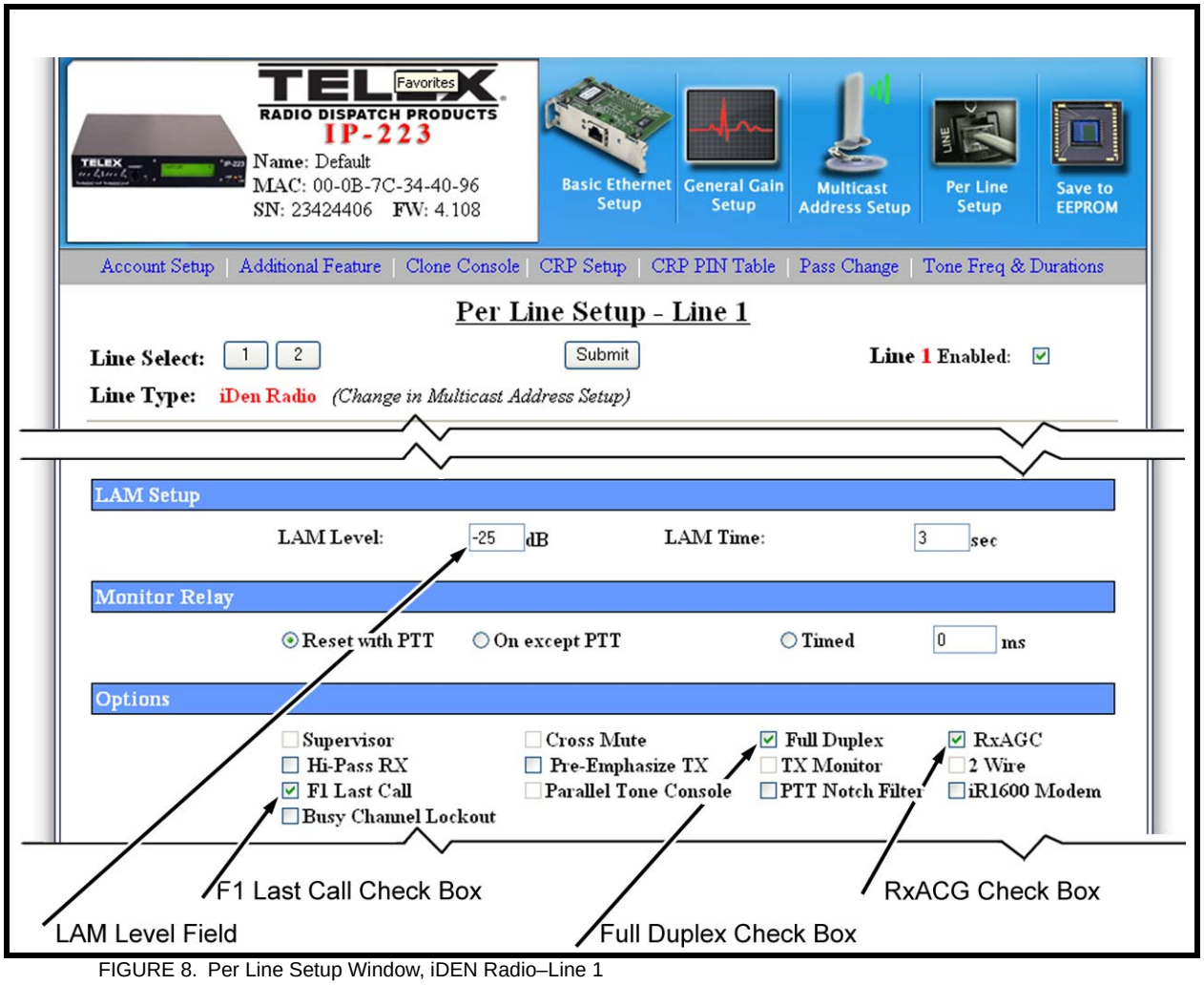

FIGURE 8. Per Line Setup Window, iDEN Radio–Line 1

4.1.4 Per Line Setup Window Line 2

The **Per Line Setup** window for Line 2, shown in Figure 9, is used to set up COR or VOX triggering and audio levels. Depending on the connection to the RTS equipment, VOX or COR triggering may be used.

To **configure an RTS supplied relay closure for an iDEN radio connection**, do the following:

1. Click **Per Line Setup**.
   The Per Line Setup window appears.
2. Click **Line Select 2**.
   The Per Line Setup window for Line 2 appears.
3. Select the **COR Enabled** check box.
4. Click **Submit**.
   The configuration is temporarily saved.
5. Click **Save to EEPROM**.
   The EEPROM window appears.
6. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

To **configure PTT with VOX for an iDEN radio connection**, do the following:

1. Click **Per Line Setup**.
   The Per Line Setup window appears.
2. Click **Line Select 2**.
   The Per Line Setup window for line 2 appears.
3. In the LAM Level dB field, enter the **level** in dB.
4. In the LAM Time field, enter **three (3) seconds**.
5. Click **Submit**.
   The configuration is temporarily saved.
6. Click **Save to EEPROM**.
   The EEPROM window appears.
7. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

NOTE: The recommended LAM level is -20dB to -25dB.

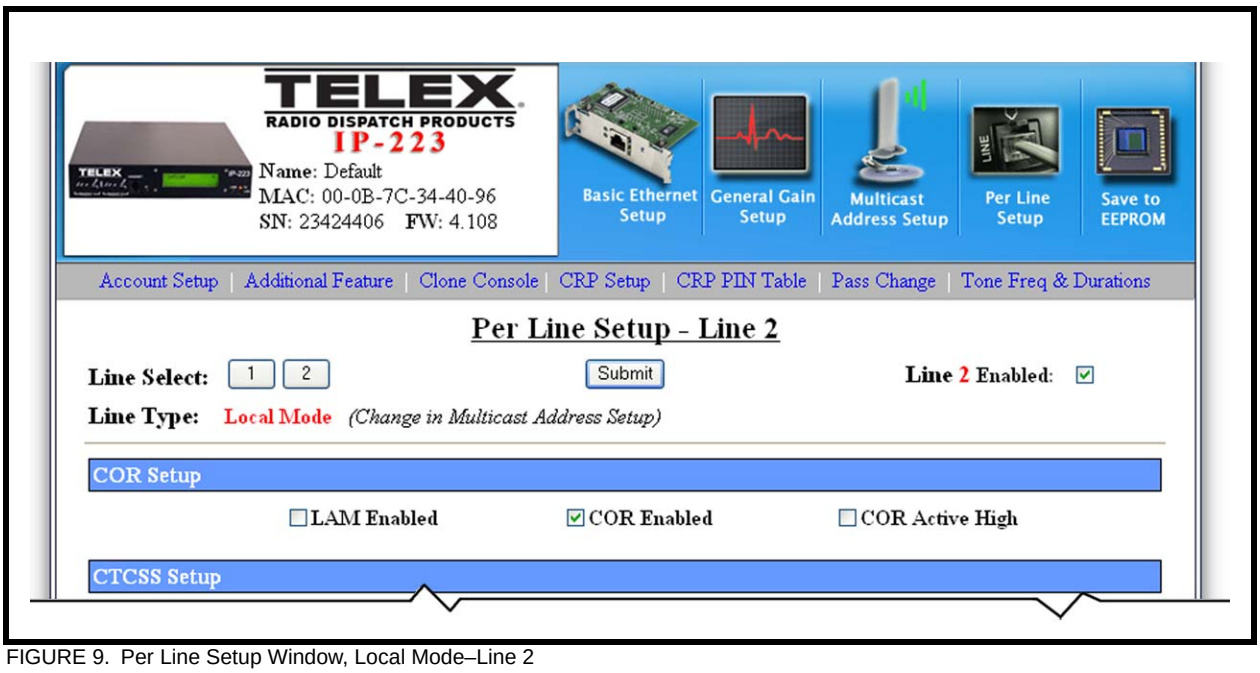

FIGURE 9. Per Line Setup Window, Local Mode–Line 2

5.0 WAN/LAN Remote Configuration Example

The Telex IP-223 Adapter Panel can be employed to provide access to remote radio devices over a LAN or WAN. See Figure 10.

Receive audio from the LMR, or iDEN handset, is connected to the line's I/O (DB-25) of the remote IP-223. This audio is passed, via the IP network, to the corresponding line I/O of the local IP-223. A PTT command, and audio, from the RTS keypanel, received at the local IP-223 line I/O, are passed across the IP network to the remote IP-223. The remote IP-223 keys the radio device and passes audio for transmission.

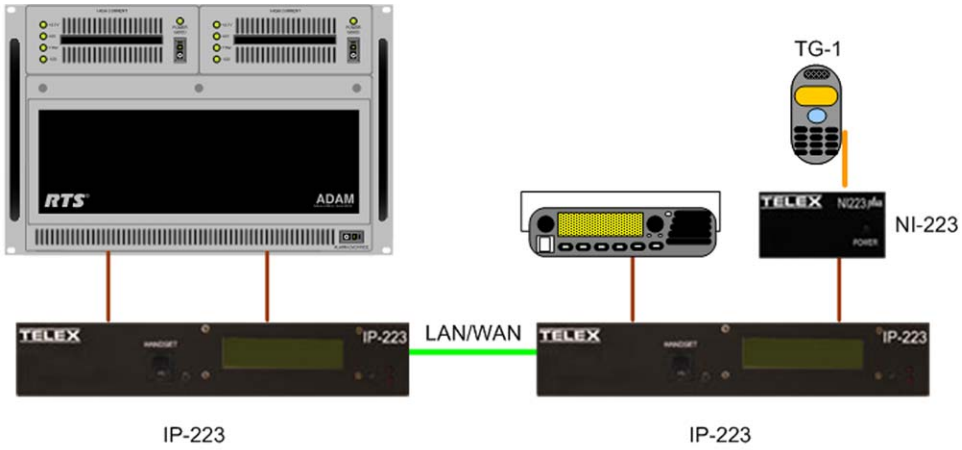

FIGURE 10. LAN/WAN Configuration Example

5.1 Local IP-223 Setup

The locally connected IP-223 must to be configured for local mode operation on both lines. The Line Type and jumper settings should be appropriately configured for the device being connected. The following example uses an iDEN handset.

NOTE: The IP-223's default username is *admin* and the password is blank.

REFERENCE: For more information, see the IP-223 Technical Manual (P/N 803641) for jumper settings relevant to the RTS equipment to be connected.

5.1.1 Local IP-223 Multicast Address Setup Window

NOTE: Both Unicast and Multicast are supported for this feature.

See examples shown in Figure 11 and Figure 13.

To **configure a unicast system**, do the following:

1. From the local IP-223 configuration webpage, click **Multicast Address Setup**.
   The Multicast Address Setup window appears.
2. Enter the **static IP Address** of the remote IP-223 in:

   Line 1's Rx and Tx Mcast Address fields.

   Line 2's Rx and Tx Mcast Address fields.
3. Click **Submit**.
   The Multicast Address Setup configuration is temporarily saved.
4. Click **Save to EEPROM**.
   The EEPROM window appears.
5. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

To **configure a multicast system**, do the following:

1. From the local IP-223 configuration webpage, click **Multicast Address Setup**.
   The Multicast Address Setup window appears.
2. Enter the same **Multicast Address** in:

   Line 1's Rx and Tx Mcast Address fields.

   Line 2's Rx and Tx Mcast Address fields.
3. Click **Submit**.
   The Multicast Address Setup configuration is temporarily saved.
4. Click **Save to EEPROM**.
   The EEPROM window appears.
5. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

NOTE: The range for Multicast Addresses is *224.0.0.2* to *239.255.255.255*.

To **configure the Rx and Tx port numbers**, do the following:

> From the local IP-223 Multicast Address Setup window, in:

- Line 1's Rx Port field, enter an **Rx port number for Line 1** (for example 1054).
- Line 1's Tx Port field, enter a **Tx port number for Line 1** (for example 1072).
- Line 2's Rx Port field, enter an **Rx port number for Line 2** (for example 1055).
- Line 2's Tx Port field, enter a **Tx port number for Line 2** (for example 1073).

NOTE: The range for the Tx and Rx port number fields is *1054* to *65535*.

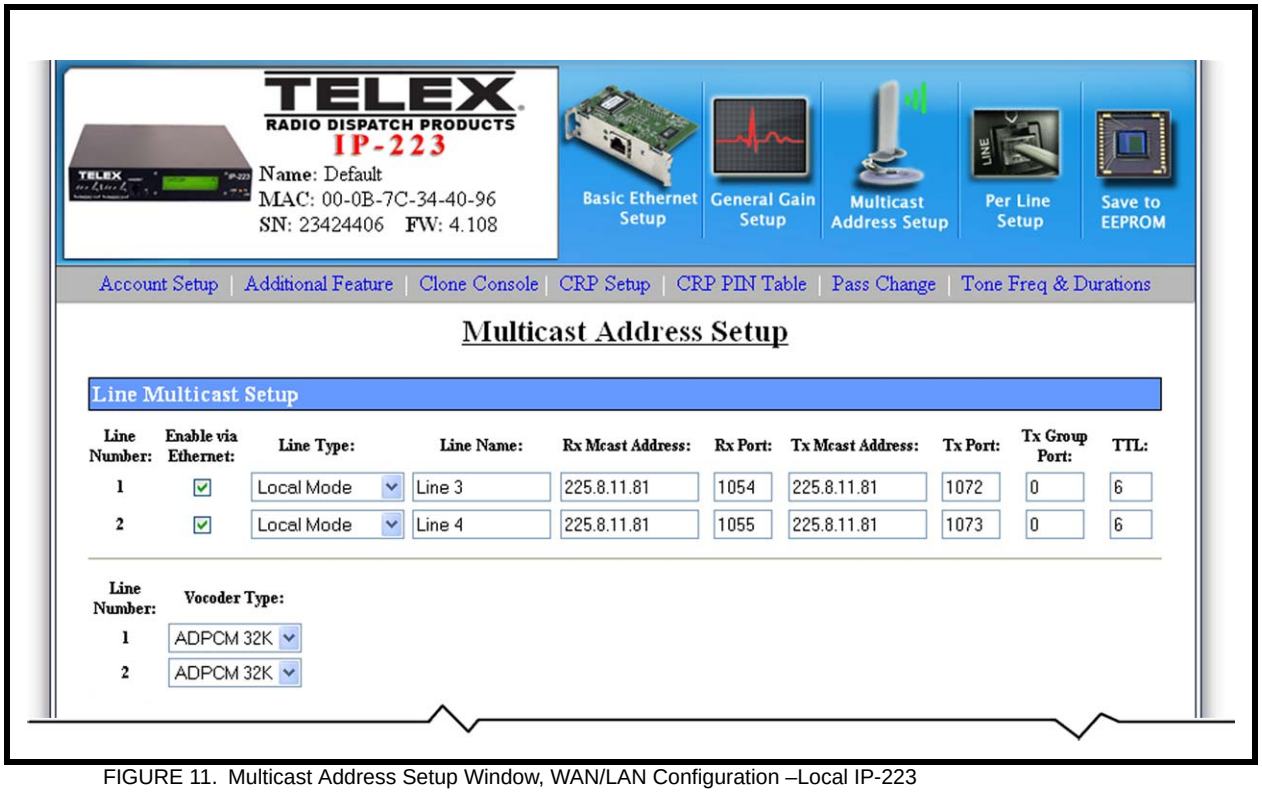

FIGURE 11. Multicast Address Setup Window, WAN/LAN Configuration –Local IP-223

5.1.2 Local IP-223 Per Line Setup Window Lines 1 & 2

Depending on the connection to the RTS equipment, VOX or COR triggering maybe used.

To **configure an RTS supplied relay closure for a WAN/LAN system**, do the following:

1. Click **Per Line Setup**.
   The Per Line Setup window appears.
2. Click **Line Select 2**.
   The Per Line Setup window for Line 2 appears.
3. Select the **COR Enabled** check box.
4. Click **Submit**.
   The Multicast Address Setup configuration is temporarily saved.
5. Click **Save to EEPROM**.
   The EEPROM window appears.
6. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

To **configure PTT with VOX for a WAN/LAN system**, do the following:

1. In the LAM Level dB field, enter the **level** in dB.
2. In the LAM Time field, enter **three (3) seconds**.
3. Click **Submit**.
   The Multicast Address Setup configuration is temporarily saved.
4. Click **Save to EEPROM**.
   The EEPROM window appears.
5. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

NOTE: The recommended LAM level is -20dB to -25dB.

FIGURE 12. Per Line Setup Window WAN/LAN, Local Mode–Line 2

5.2 IP-223 Remote Setup

The remote IP-223 must be configured for local mode operation on both lines.

NOTE: The IP-223's default username is *admin* and the password is blank.

REFERENCE: For more information, see the IP-223 Technical Manual (P/N803641) for jumper settings relevant to the RTS equipment to be connected.

5.2.1 Remote IP-223 Multicast Address Setup Window

NOTE: Both Unicast and Multicast are supported for this feature.

See examples shown in Figure 11 and Figure 13.

To **configure a unicast system**, do the following:

1. From the remote IP-223 configuration webpage, click **Multicast Address Setup**.
   The Multicast Address Setup window appears.
2. Enter the **static IP Address** of the local IP-223 in:

   Line 1's Rx and Tx Mcast Address fields.

   Line 2's Rx and Tx Mcast Address fields.
3. Click **Submit**.
   The Multicast Address Setup configuration is temporarily saved.
4. Click **Save to EEPROM**.
   The EEPROM window appears.
5. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

To **configure a multicast system**, do the following:

1. From the remote IP-223 configuration webpage, click **Multicast Address Setup**.
   The Multicast Address Setup window appears.
2. Enter the same **Multicast Address** used in the local IP Setup in:

   Line 1's Rx and Tx Mcast Address fields.

   Line 2's Rx and Tx Mcast Address fields.
3. Click **Save to EEPROM**.
   The EEPROM window appears.
4. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

NOTE: The range for Multicast Addresses is *224.0.0.2* to *239.255.255.255.*

To **configure the Rx and Tx port numbers**, do the following:

From the remote IP-223 Multicast Address Setup window, in:

1. Line 1's Rx Port field, enter the **same port number** as the local IP-223's Tx port number for Line 1 (for example 1072).
2. Line 1's Tx Port field, enter the **same port number** as the local IP-223's Rx port number for Line 1 (for example 1054).
3. Line 2's Rx Port field, enter the **same port number** as the local IP-223's Tx port number for Line 2 (for example 1073).
4. Line 2's Tx Port field, enter the **same port number** as the local IP-223's Rx port number for Line 2 (for example 1055).
5. Click **Save to EEPROM**.
   The EEPROM window appears.
6. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

NOTE: The range for the Rx Port field and Tx Port field is *1054* to *65535*.

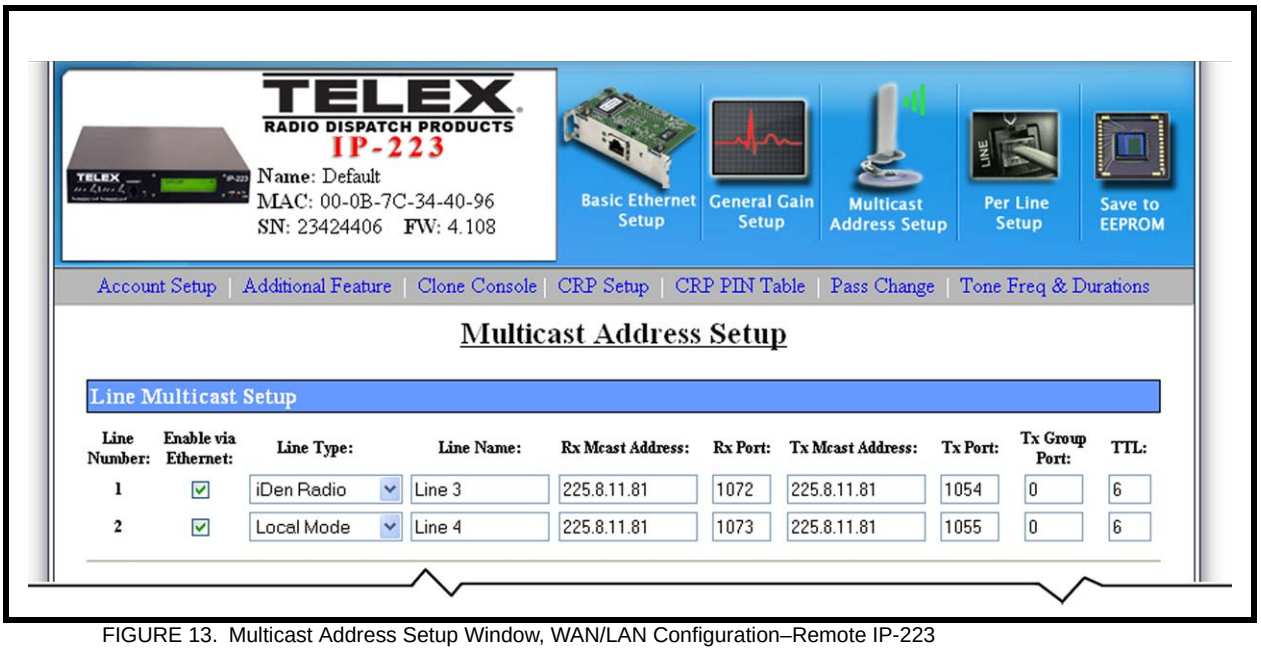

FIGURE 13. Multicast Address Setup Window, WAN/LAN Configuration–Remote IP-223

5.2.2 Remote IP-223 Per Line Setup Windows Line 1 and 2

REFERENCE: For more information, see the IP-223 Technical Manual (P/N 803641) or appropriate application note for any special IP-223 configuration requirements on Line 1 and Line 2 for the type of radio connected.

6.0 Remote Tone Control Configuration Example

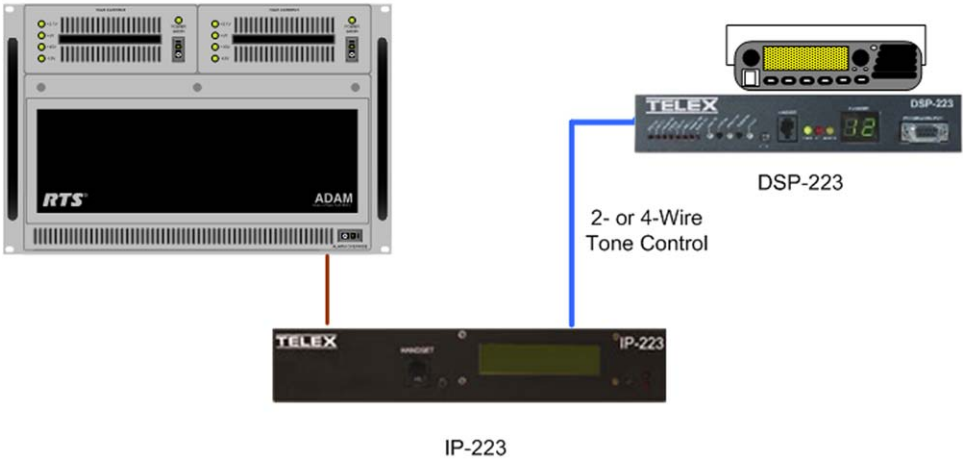

FIGURE 14. Remote Tone Control Example

Line to Line Crosspatch, see Figure 14, is enabled in the IP-223. Control logic and audio (6-wire E&M) are generated by the RTS system; these are connected to Line 2 I/O on the IP-223 which is configured for Local mode operation. Line 1 I/O of the IP223 is configured for Tone mode operation and is connected to a 2- or 4-wire lease line for Tone Remote operation of a LMR mobile radio. Industry standard radio control tones are generated and coupled with voice audio for control of distant radio locations. Control tones are decoded by either a Telex TRA-223 or DSP-223 Tone Remote Adaptor which is directly connected to the LMR radio.

Receive audio from the LMR is connected to the I/O of the DSP-223 and amplified down the 2- or 4-wire line to Line 1 I/O of the IP-223. The IP-223 based on LAM passes audio to Line 2 of the IP-223 and out to the RTS Intercom System for playback at keypanels. PTT commands on a keypanel generate a relay closure and audio is inserted on Line 2 of the IP-223 COR and audio inputs. This creates a PTT tone generation sent out Line 1 of the IP-223 onto the 2- or 4-wire line to the remote radio adaptor, the tone is decoded and a relay closure to key the LMR is generated, audio is coupled and passed to the radio.

6.1 IP-223 Setup

The IP-223 must be configured for tone mode operation on line 1 and local mode on Line 2.

NOTE: The IP-223's default username is *admin* and the password is blank.

REFERENCE: For more information, see the IP-223 Technical Manual (P/N 803641) for jumper settings relevant to the RTS equipment to be connected.

6.1.1 Multicast Address Setup Window

To **configure the IP-223 for remote tone control**, do the following:

1. Click **Multicast Address Setup**.
   The Multicast Address Setup window appears.
2. From the Line Type drop down menu for Line 1, select **Tone Mode**.
3. From the Line Type drop down menu for Line 2, select **Local Mode**.
4. Click **CRP Setup**.
   The Crosspatch Setup window appears.
5. Select the **Enable Line-Line** check box (full stop).
6. Click **Submit**.
   The Multicast Address Setup configuration is temporarily saved.
7. Click **Save to EEPROM**.
   The EEPROM window appears.
8. Click **Save Parameters**
   All configurations are permanently saved to the IP-223 console.

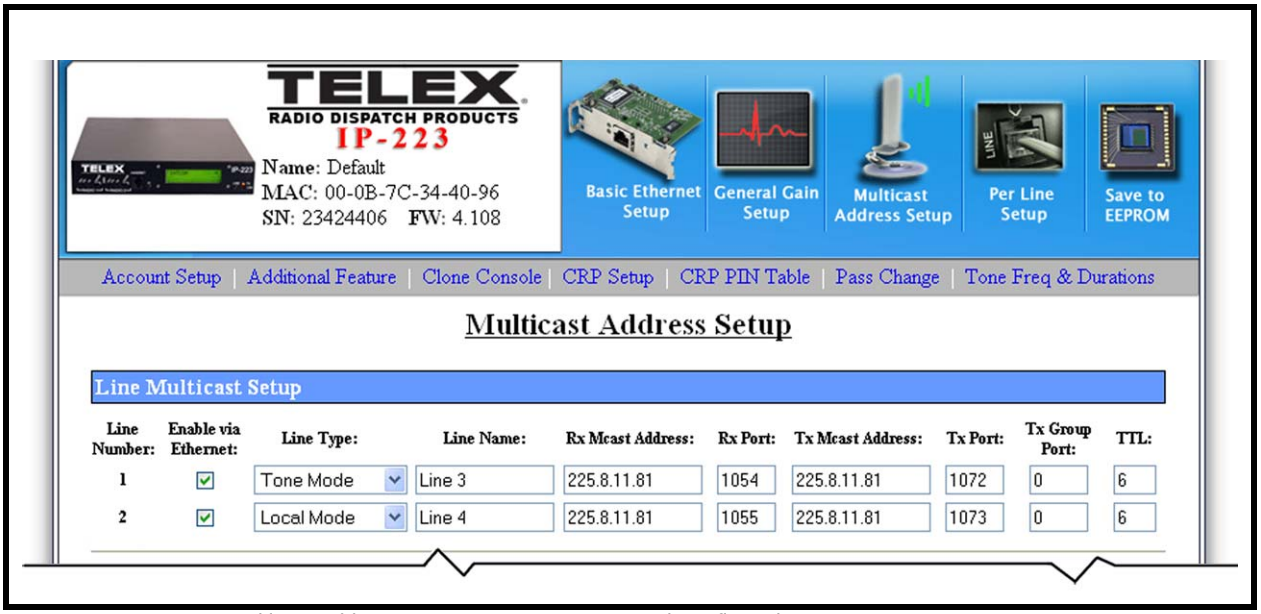

FIGURE 15. Multicast Address Setup, Remote Tone Control Configuration

6.1.2 Per Line Setup Window Line 1

The Per Line Setup window, shown in Figure 16, require no changes although, various fields and options can be set based on the line type being configured.

REFERENCE: For more information, see the IP-223 Technical Manual (P/N 803641).

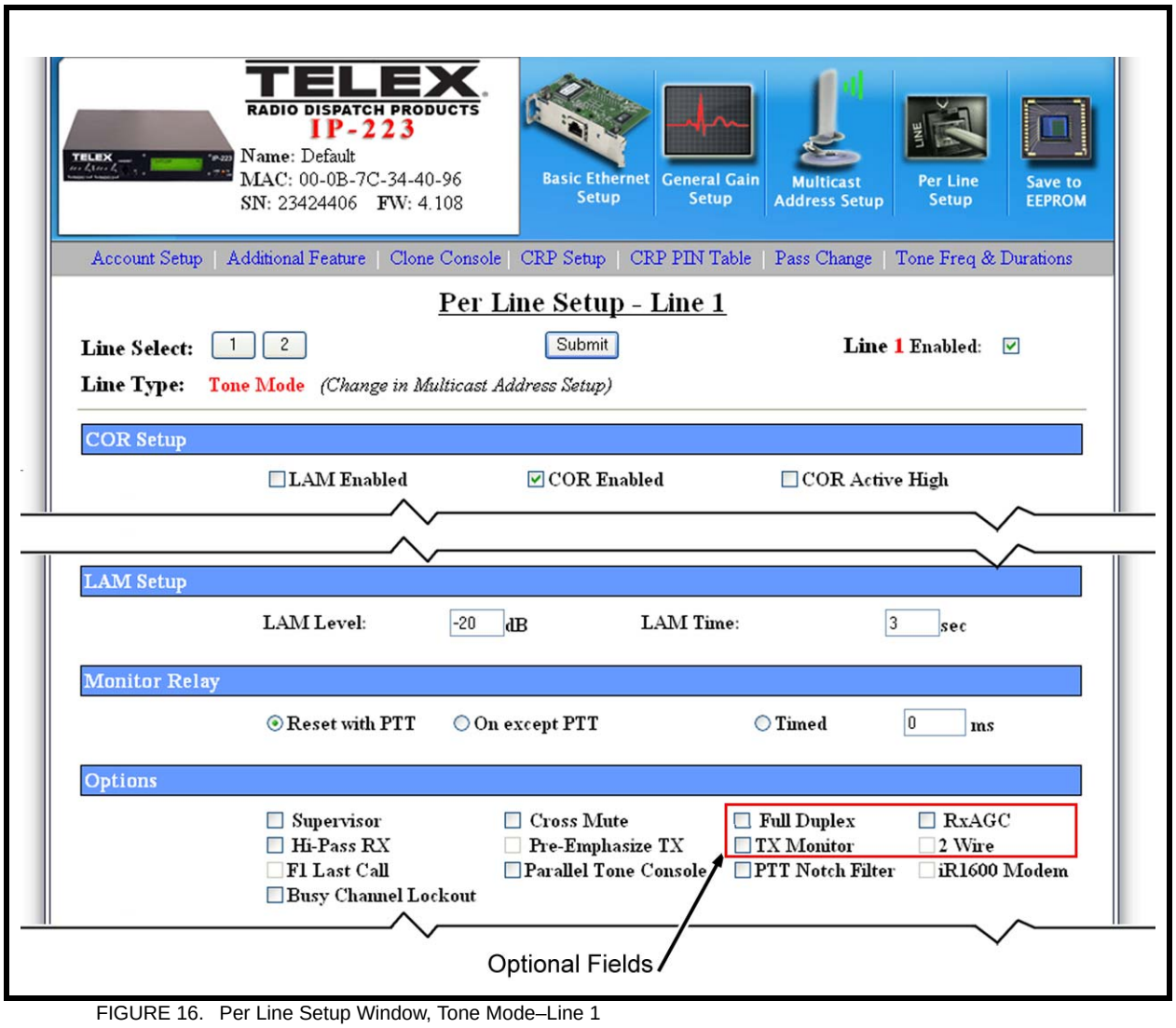

FIGURE 16. Per Line Setup Window, Tone Mode–Line 1

6.1.3 Per Line Setup Window Line 2

Depending on the connection to the RTS equipment, VOX or COR triggering may be used. If a relay closure from the RTS equipment is supplied, the COR Enabled check box must be selected on Line 2's Per Line Setup window. An example is shown in Figure 17.

To **configure an RTS supplied relay closure for a remote tone control system**, do the following:

1. Click **Per Line Setup**.
   The Per Line Setup window appears.
2. Select the **COR Enabled** check box. See Figure 17.
3. Click **Submit**.
   The Per Line Setup configurations are temporarily saved.

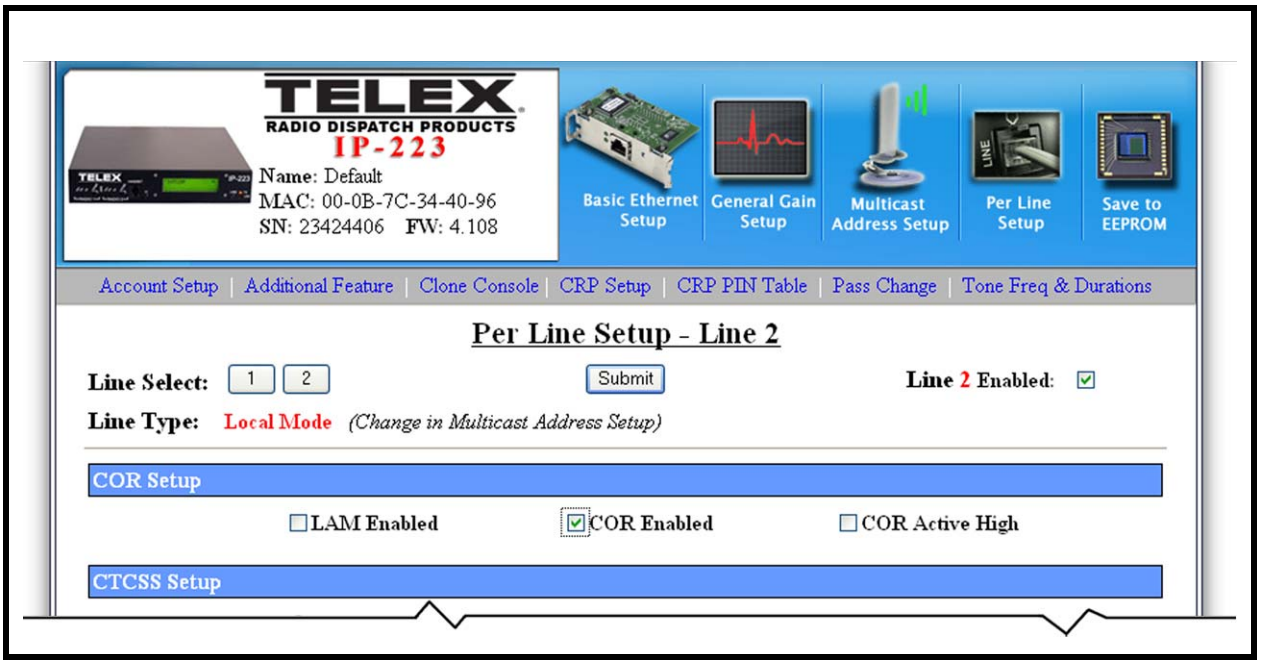

FIGURE 17. Per Line Set Window, Local Mode–Line 2

To **configure PTT with VOX for a remote tone control system**, do the following:

1. Click **Per Line Setup**.
   The Per Line Setup window appears.
1. In the LAM Level dB field, enter the **level** in dB.
2. In the LAM Time field, enter **three (3) seconds**.
3. Click **Submit**.
   The *Per Line Setup configurations are temporarily saved.*
4. Click **Save to EEPROM**.
   The EEPROM window appears.
5. Click **Save Parameters**.
   All configurations are permanently saved to the IP-223 console.

NOTE: The recommended LAM level is -20dB to -25dB.

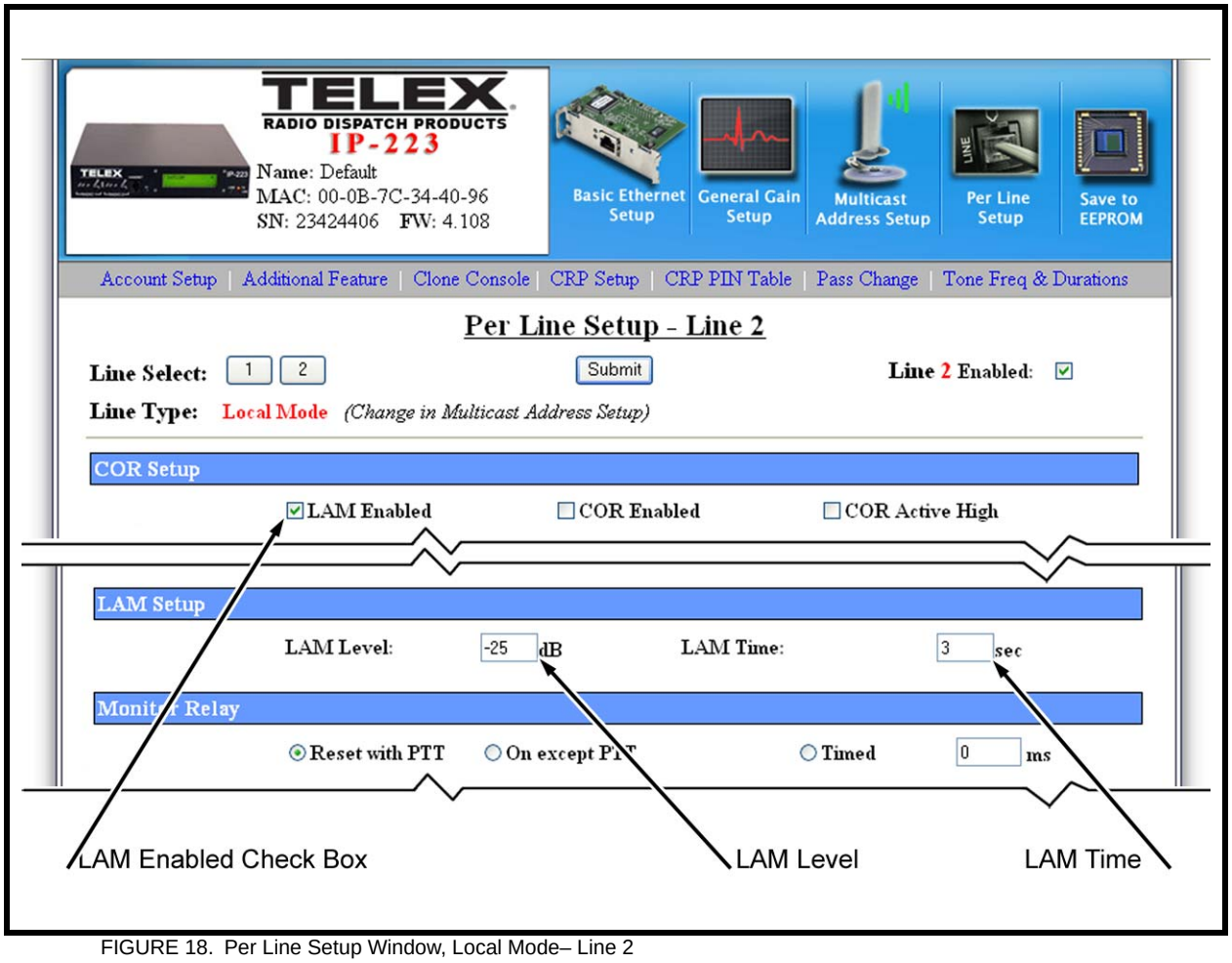

FIGURE 18. Per Line Setup Window, Local Mode– Line 2

7.0 Radio Connection Chart

Table 1 lists popular radios supported.by the IP-223.

Manufacturer	Manufacturer's Model Number	Line Qty	Telex Cable Assy P/N or Product	Telex Application Note
BK/Relm	GMH	1		AN-DISPATCH-017
BK/Relm	RM Series	1		AN-DISPATCH-019
Datron	Guardian	1		AN-DISPATCH-015
EF Johnson	RS-5300	100	IP-25300	
ICOM	F121/221	1		AN-DISPATCH-022
ICOM	A200	1		AN-DISPATCH-033
Kenwood	TK-863	1		AN-DISPATCH-008
Kenwood	TK-x80	100		AN-DISPATCH-001
Kenwood	TK-x90	100	301957000	AN-DISPATCH-001
Kenwood	TK-x150	100	301956000	AN-DISPATCH-001
Kenwood	TK-x180	100	301956000	AN-DISPATCH-001
Kenwood	TK-57/5810	100	301956000	AN-DISPATCH-001
Kenwood	TK-6110	1		AN-DISPATCH-023
Kenwood	TKR-x40	32		
Kenwood	TKR-x50	16		AN-DISPATCH-021
M/A Com-Ericsson GE	M7100	1		AN-DISPATCH-032
Midland	Base Tech II	16		
Motorola	Astro Spectra	1		
Motorola	CDM/PRO	16	301969000	AN-DISPATCH-009
Motorola	DIU-3000	1		
Motorola	MCS2000	1		AN-DISPATCH-020
Motorola	XTL Series	1		AN-DISPATCH-010
Motorola	Old mobiles	1		AN-DISPATCH-006
Raytheon/JPS	ACU DSP-1			
Raytheon/JPS	ACU-HSP-2			
Raytheon/JPS	NXU-2			
Sepura	SRM2000	100	301961000	AN-DISPATCH-011
Sprint/Nextel	Falcon Series	100	NI-223	
Tait	TB-7100	16		
Vertex	VX-4100/4200 VX-5500 VX-7200	16		AN-DISPATCH-016 AN-DISPATCH-031

Table 1: Radio Cable Part Numbers and Application Note References

Table 2 lists cable assemblies required to connect the specified device to a Telex V.I.P.E.R.

Manufacturer	Model	Line Qty	Cable Assembly or Product	Application Note
Tactical Radios	URC and PRC	1	400100161	
BK/Relm	LPX, LPU, LPH, 3142, LMH, EPU, EPH		400100093	
ICOM	F3/F4		400100144	
ICOM	F30GS/F40GS		400100156	
ICOM	A3		400100148	
ICOM	F11/F21/F3GS/ F4GS		400100159	
Kenwood	TK220, 320, 240, 248, 250, 350, 260, 270, TH91A, AT, E, TH25A		400100043	
Kenwood	TK280, 380, 290, 480, 481		400100150	
M/A-COM-Ericsson GE	MRK, Prism		400100139	
M/A-COM-Ericsson GE	KPC		400100143	
M/A-COM-Ericsson GE	LPE		400100154	
M/A-COM-Ericsson GE	Jaguar		400100160	
Motorola	SABRE, MX1000, ASTRO		400100069	
Motorola	HT750, 1250		400100152	
Motorola	EX500		400100162	
Motorola	GP300, GTx, P110, HT1225, P1225, SP50, GP1250, LTS2000		400100130	
Motorola	HT1000, MT2000, MTS2000, MTx838, MTx2000, MTx80000, MTx9000, XTx3000, GP1200, JT1000		400100135	
Vertex	VX210		400100155	
Vertex	VX800		400100153	

Table 2: Viper Cable Part Number Information

Revision History		
Document Title: IP-223 to RTS Intercom Products		
Document Number: AN-DISPATCH-035		
Revision	**Change Description**	**Date**
A	Initial Release	05-AUG-2009

Suggestions or comments:
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