TELEX
Radio Dispatch

IP-224 to RTS Intercom System

IP-224 to RTS Intercom Products

General

This application note demonstrates how to configure and connect the Telex Dispatch IP-224 Remote Adapter Panels to an RTS Intercom System. This interface provides **PTT** (Push to Talk) control and audio connections between **LMR** (Land Mobile Radio) and RTS operator keypanels.

RTS Matrix to IP-224 Cabling

The RTS Matrix to IP-224 cabling diagram, shown in Figure 1, illustrates pinouts used to connect an RTS Intercom to a Telex IP-224 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

RTS Matrix to IP-224 Cabling Diagram
RJ-11 or DB-9 to DB-37

RTS Matrix RJ-11	RTS Matrix DB-9F	Signal Direction	IP-224 DB-37M	Signal
3	4	←	1	TX Out
4	5	←	2	TX Out
5	7	→	20	RX IN
2	8	→	21	RX IN
These additional connection points are required for COR operation		→	15	COR IN
		↔	5	Ground

Figure 1 RTS Matrix to IP-224 Cabling Diagram

LMR Configuration Example

Using a single IP-224 allows connecting a single LMR channel as shown in Figure 2 to be connected to an RTS system. The line to line crosspatch is enabled in the IP-224 allowing communications between line 1 and 2 of the unit to cross communicate.

Control logic and audio (6-wire E&M) are generated by the RTS system; these are connected to Line 1 I/O on the IP-224 which is configured for local mode operation.

Line 2 I/O of the IP-224 is also configured for local mode operation and is directly connected to an LMR radio.

Receive audio from the LMR is connected to the IP-224's Line 2 I/O. Based on **COR** (Carrier Operated Relay) or **LAM** (Line Activity Monitor), the IP-224 passes this audio to the IP-224's Line 1 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-224. The IP-224 then accepts audio on its Line 1 input. The crosspatch transfers the audio from Line 1 to Line 2 and a relay closure is activated to key the LMR. Audio is passed from the IP-224 Line 2 to modulate the LMR.

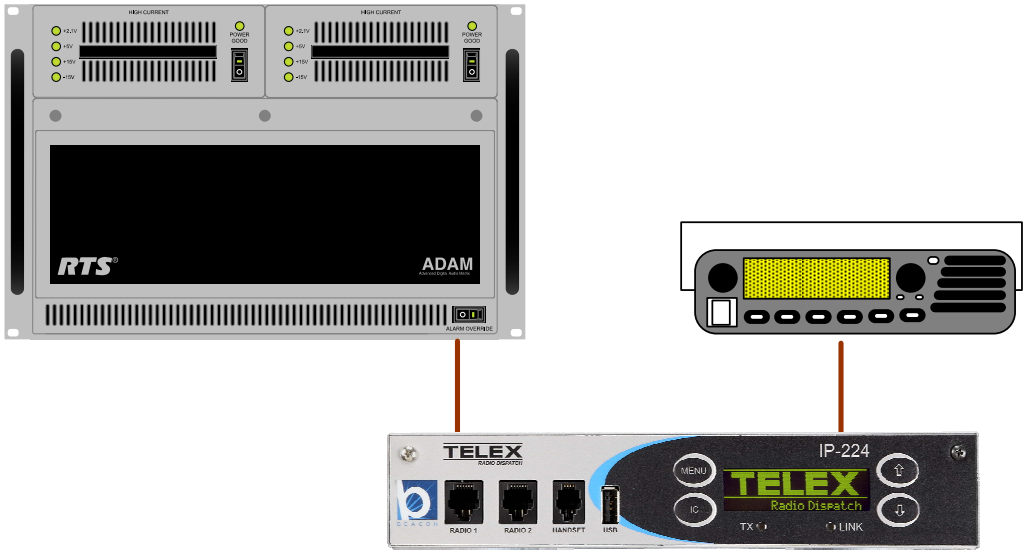

Figure 2 Line to Line Configuration example

IP-224 Setup

The IP-224 is configured for local mode operation on both Line 1 and Line 2 and the line-to-line crosspatch is enabled.

NOTE: The IP-224's default username and password are *admin*.

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.

Figure 3 Multicast Address Setup window, Line to Line configuration

Hardware Setup Window

By default IP-224 come new out of the box configured for 4-wire balanced interface for both Lines 1 and 2. Please make sure that any line being configured to interface with an RTS Intercom system is configured as shown in Figure 4, make any necessary changes.

1. Click **Submit**.
The Multicast Address Setup configuration is temporarily saved.

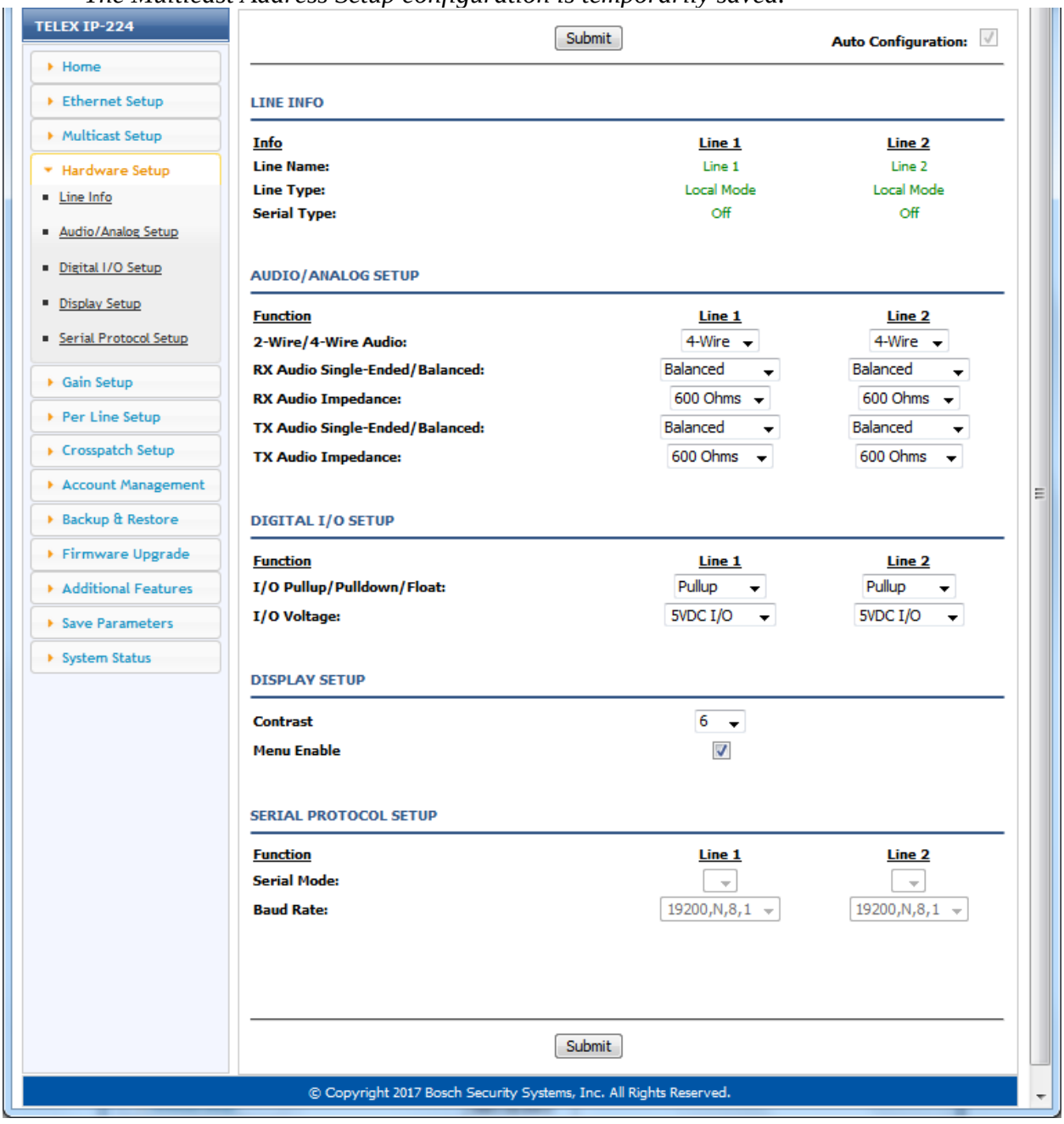

Figure 4 Hardware Setup view

Crosspatch Setup Window

The **Crosspatch Setup** window, shown in Figure 5**Error! Reference source not found.**, is used to set up a crosspatch.

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

1. Click **Crosspatch Setup**.
The Crosspatch Setup window appears.
2. Using the Line to Line Dropdown, Select **Bidirectional**.
Crosspatching is enabled.
3. Click **Submit**.
The Crosspatch Setup configuration is temporarily saved.

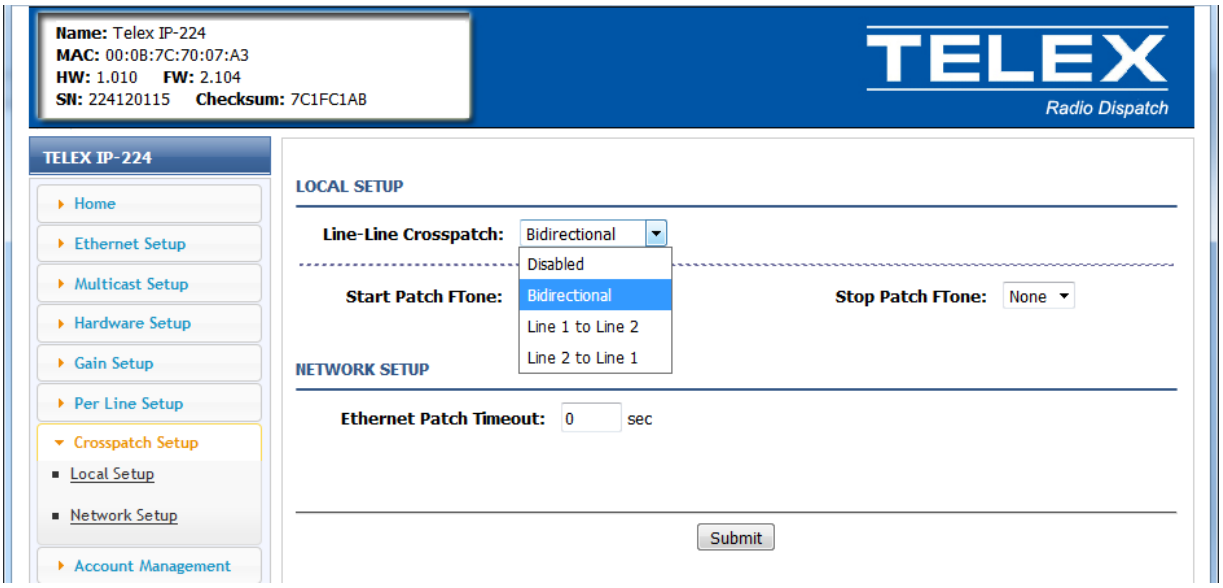

Figure 5 Crosspatch Setup Window

Per Line Setup Window Line 2

The **Per Line Setup** window is used to configure per line setup. Line 2 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-224 Technical Manual (P/N F01U218562) or the appropriate application note.

Per Line Setup Window Line 1

The **Per Line Setup** window, shown in Figure 6, is used to setup the connection to the RTS equipment. Depending on the connection to the RTS equipment, VOX (default) or COR (Preferred, Relay logic) triggering may be used.

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

1. Click **Per Line Setup**.

The Per Line Setup window appears.

2. Click **Line Select 1**.

The Per Line Setup window for Line 1 appears.

3. Select the **COR Enabled** check box on Line 1's Per Line Setup window.

The RTS supplied relay logic will now be sensed.

4. Click **Submit**.

The Per Line Setup configuration is temporarily saved.

5. Click **Save Parameters**.

The Save Parameters window appears.

6. Click **Save Parameters button**.

All configurations are permanently saved in the IP-224 adaptor.

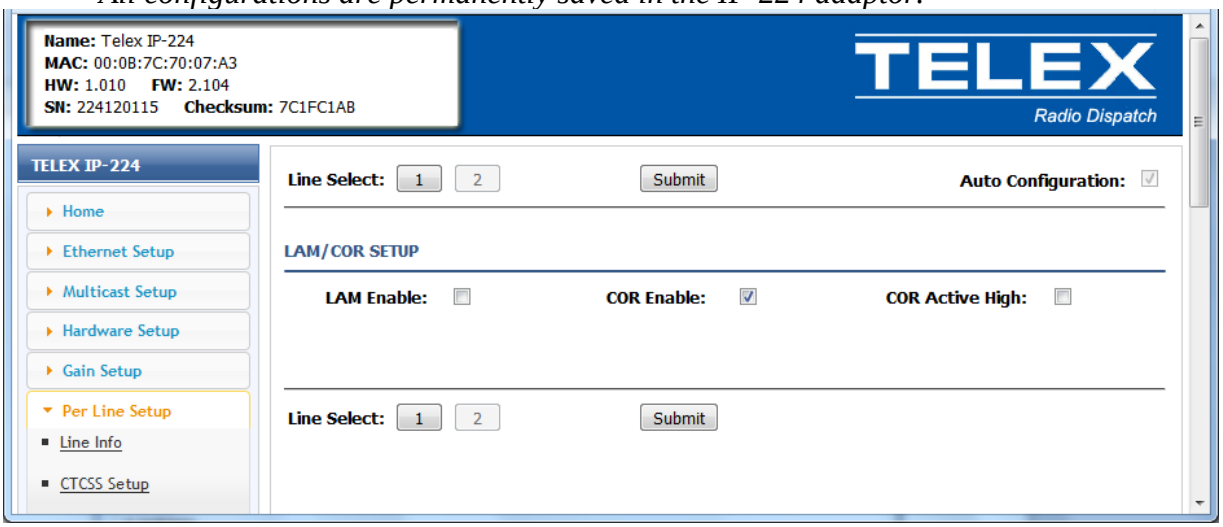

Figure 6 Per-Line Setup Window, Line 1 COR view

WAN/LAN Remote Configuration Example

The Telex IP-224 Adapter Panels can be employed to provide access to remote radio devices over a LAN or WAN. See Figure 7.

Receive audio from the LMR is connected to the line I/O (DB-37) of the remote IP-224. This audio is passed, via the IP network, to the corresponding line I/O of the local IP-224. A PTT command, and audio, from the RTS keypanel, received at the local IP-224 line I/O, are passed across the IP network to the remote IP-224. The remote IP-224 keys the radio device and passes audio for transmission.

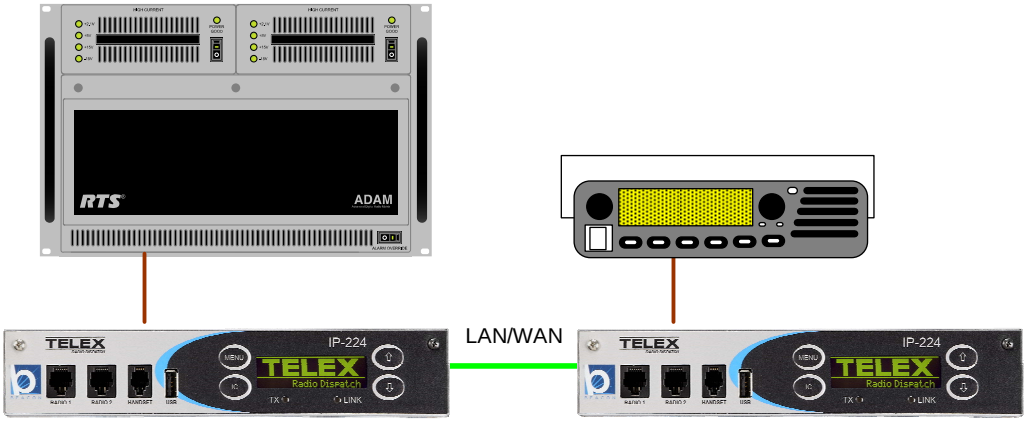

Figure 7 WAN/LAN Configuration Example

Local IP-224 Setup (RTS End)

The locally connected IP-224 must to be configured for local mode operation on line one. The Line Type and hardware settings should be appropriately configured for the device being connected, see instruction at Figure 4.

NOTE: The IP-224's default username and password are *admin*.

Local IP-224 Multicast Address Setup Window

NOTE: Both Unicast and Multicast addressing are supported for this configuration.

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

1. From the local IP-224 configuration webpage, click **Multicast Address Setup**.
The Multicast Address Setup window appears.
2. Enter the same **Multicast Address** in: See example shown in Figure 3

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.

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 as shown in Figure 3:

From the local IP-224 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*.

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

1. From the local IP-224 configuration webpage, click **Multicast Address Setup**.
The Multicast Address Setup window appears.
2. Enter the **static IP Address** of the REMOTE (radio end) IP-224 into:

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.

Local IP-224 Per Line Setup Window Lines 1 and 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 as shown in Figure 6:

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.

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 Parameters**.
The Save Parameters window appears.
5. Click **Save Parameters**.
All configurations are permanently saved to the IP-224 console.

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

IP-224 Remote Setup (Radio end)

The remote IP-224 must be configured for local mode operation on both lines.

NOTE: The IP-224's default username and password are *admin*.

REFERENCE: For more information, see the IP-224 Technical Manual (P/N F01U218562) for hardware settings relevant to the radio equipment to be connected.

Remote IP-224 Multicast Address Setup Window

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

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

1. From the remote IP-224 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 **Submit**.
The Multicast Address Setup configuration is temporarily saved.

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

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

1. From the remote IP-224 configuration webpage, click **Multicast Address Setup**.
The Multicast Address Setup window appears.
2. Enter the **static IP Address** of the local (RTS end) IP-224 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.

To **configure the RX and TX port numbers**, do the following as shown in Figure 8:

1. Line 1's Rx Port field, enter the **same port number** as the local IP-224'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-224'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-224'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-224's Rx port number for Line 2 (for example 1055).
5. Click **Submit**.
The Multicast Address Setup configuration is temporarily saved.
6. Click **Save Parameters**.
The Save Parameters window appears.
7. Click **Save Parameters**.

All configurations are permanently saved to the IP-224 console.

NOTE: The range for the RX Port field and TX Port field is *1054* to *65535*.

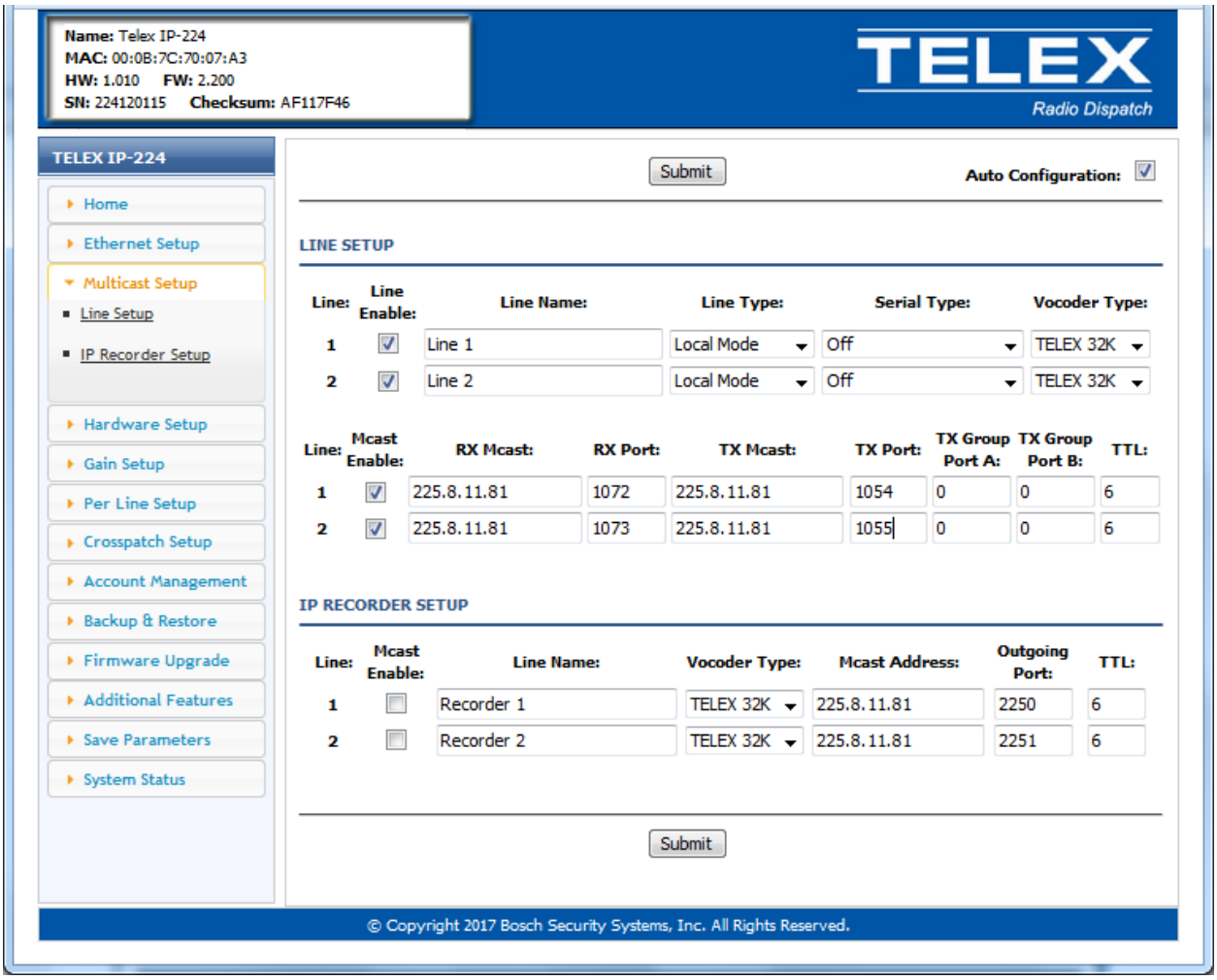

Figure 8 Multicast Setup, Remote end with Port numbers flipped

Remote Tone Control Configuration Example

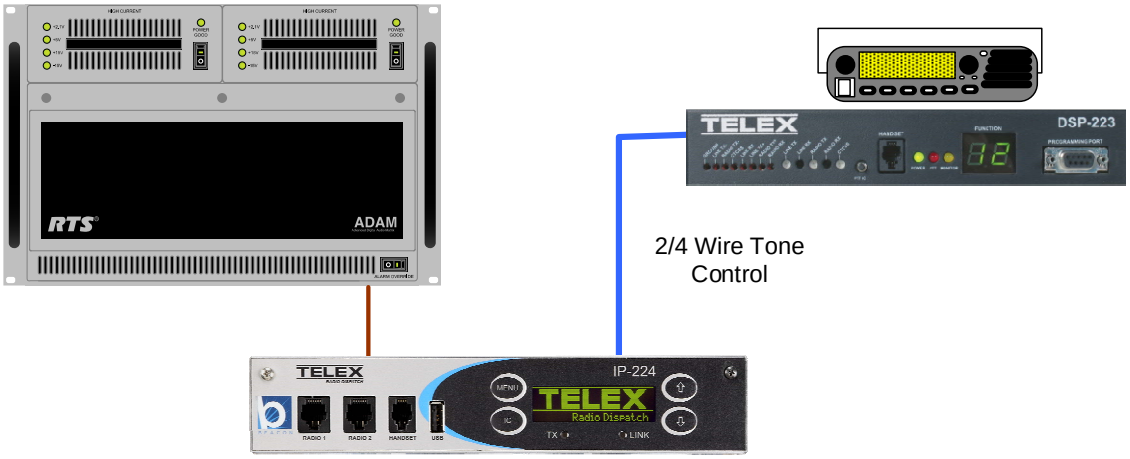

Figure 9 Remote Tone Control Example

The IP-224 can be configured to generate industry standard PTT tones (2175Hz) that operate on 2 or 4 wire copper lines. These tones can be decoded by the Telex TRA223 or DSP223 and other 3rd party Remote Tone adaptors along with base radio's having built-in tone decoders.

Using the previously discussed Line to Line Crosspatch or WAN/LAN deployments the only difference is the line connected to a radio resource is configured for Tone mode instead or Local.

PTT commands on a keypanel generate a relay closure and audio (6-wire E&M) are generated by the RTS system; these are connected to Line 1 I/O on the IP-224 which is configured for Local mode operation. Line 2 I/O of the IP224 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 2 I/O of the IP-224. The IP-224 based on LAM passes audio to Line 1 of the IP-224 and out to the RTS Intercom System for playback at keypanels.

IP-224 Radio cables

Telex offers interface cables to a number of popular mobile radios, using these will facilitate connecting the radio to IP-224 I/O port.

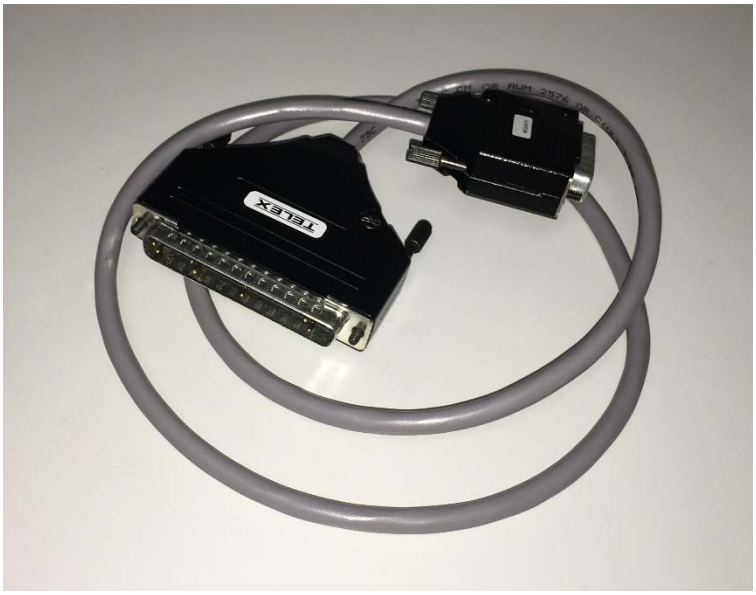

Figure 10 IP-224 radio cable, sample

F.01U.165.540	**IP-224 Cable - Kenwood TK-X150/X180, 5X10 and NXDN radios**
F.01U.165.541	**IP-224 Cable - Kenwood TK-X90 radio**
F.01U.165.544	**IP-224 Cable Assembly to 4-Wire Tone Cable**
F.01U.165.545	**IP-224 Motorola CDM/PRO Cable Interface**
F.01U.165.548	**IP-224 EFJ 5300 Radio Interface**
F.01U.165.542	**IP-224 to Sepura TETRA Interface Cable**
F.01U.306.539	**IP-224 to Hytera TETRA Interface Cable**
F.01U.306.540	**IP-224 to PowerTrunk TETRA Interface Cable**
F.01U.319.163	**IP-224 to Hytera DMR Interface Cable**
F.01U.306.543	**IP-224 to Tait P25 and DMR Interface Cable**
F.01U.306.546	**IP-224 to ICOM IDAS Interface Cable**
F.01U.306.549	**IP-224 to MOTOTRBO Interface Cable**

Part numbers and list subject to change, please contact Telex Dispatch sales.

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Revision	**Change Description**	**Date**
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