TELEX®

VEGA SIGNALING PRODUCTS

Model NI223*plus*
IP-223 iDen® Interface

Technical Manual

March 2008   **Telex P/N LIT000150000**
   **Revision C**

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1 General

The NI223*plus* is an iDen® interface product designed to connect the IP-223 Ethernet Adapter Panel to the iDen® network. The iDen® Radio Interface can be used to make Direct Connect, Group Call, Alert Calls or Emergency Group calls over the iDen® network. The IP-223 and the NI223*plus* makes the Nextel network an IP asset to any Telex/Vega IP base consoles (C-Soft, C-6200, IP-1616 or IP-2002).
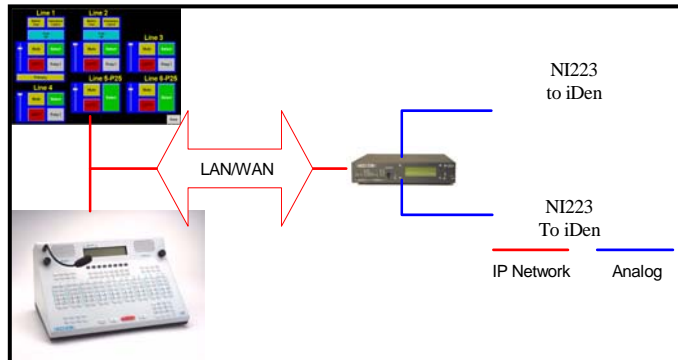
2 Front and Rear Panel Connections and Indicators

2.1 Front Panel LED

POWER: Green LED indicates power to the NI223*plus*.

2.2 Rear Panel Connectors

A DB25 connector terminates all connections on the rear of the NI223*plus*.

Pin #	Signal	Pin #	Signal
1)	+12VDC	14)	IP-223 Ground
2)	IP-223 Transmit Data	15)	MUTE (unused)
3)	IP-223 Receive Data	16)	Option 1 (unused)
4)	Option 2 (unused)	17)	Radio Transmit Data
5)	Radio Receive Data	18)	+5VDC
6)	Radio Audio IN	19)	Radio Audio OUT
7)	PTT Relay NO (unused)	20)	RTS (unused)
8)	Radio DGND	21)	CTS
9)	Radio Audio GND	22)	NC
10)	NC	23)	NC
11)	PTT Relay COM (unused)	24)	IP-223 RX+
12)	IP-223 RX-	25)	IP-223 TX+
13)	IP-223 TX-	Shield	Ground

Note
Connect the Earth Ground to reduce system noise.

3 IP-223/NI223*plus* Setup

3.1   IP-223 Setup

3.1.1   Jumper Settings

Jumper Position	Connection Type

Jumper Position

Connection Type

 "A"   Single Ended Tx/Rx Audio
Line 1: J3, J9, J11, J16, J21
Line 2: J19, J20, J25, J28, J29

"A"   600 Ohm Rx Termination
Line 1: J14
Line 2: J24

"B"   Serial Port Communications Jumpers (TTL)
Line 1: J35
Line 2: J26

"B"   4 Wire Interface
Line 1: J33, J34
Line 2: J5, J6

3.1.2   Web Page Configuration

The IP-223 must be placed in iDen® Radio Mode to control the NI223*plus*. The iDen® Radio Mode is selected from the Multicast Setup Screen of the IP-223 shown in Figure 1. The iDen® Radio Mode must be initially selected before the iDen® Radio Setup Page may be displayed.

Note
The iDen® Radio Mode is only available in IP-223 Software Versions 1.09 and higher.

Multicast Port Number Setup

Channel Number:	Enable via Ethernet:	Channel Type:	Channel Name:	Multicast Address:	RX Port:	Multicast Address:	TX Port:	Channel Hops:
1	☑	iDen Radio ▼	Channel 1	225.8.11.79	1054	225.8.11.79	1072	2
2	☑	iDen Radio ▼	Channel 2	225.8.11.79	1055	225.8.11.79	1073	2
Phone	☐	Ring Signal	Ring	225.8.11.81	2052			2

Submit

Figure 1 Multicast Setup Screen IP-223 Showing iDen® Radio Setup

Each line has a pull down menu that allows selection of the iDen® Radio Mode. The multicast address and port numbers are configured just as any other mode, with the exception of the ring signal. The Ring Signal is broadcast on a unique multicast address and must be known to all

listening consoles. Configuration of the ring multicast and port numbers must be unique and consistent with the IP-223 and any listening console. For console configurations, please refer to the specific User Manual for that product. After the iDen® Radio Mode has been set, the IP-223 must be reset.

Figure 2 shows the iDen® Radio Setup page. Each line in the "**Type**" column is a drop down menu that allows selection of the line as a Direct Connect, Group Call, Emergency Group Call or Alert Call. The "**iDen Number**" column holds the iDen® Radio Direct Connect and Group numbers. Other options are selected as required by the installation.

The Call Type and iDen Number placed in these fields will be associated with a console Function Tone. When a Console changes to that Function Tone and transmits, that Direct Connect or Group number will be sent to the iDen® Radio and, if available, a connection will be made. If using the iDen® Radio interface to make a phone call, the multicasts are unused, as a TCP/IP socket connection is made in the same manner as Phone Mode.

Per Line Setup – Line 2

[Line 1] [Submit] [Line 2]

Line Mode Status: iDen Radio   (Change in Multicast Address Setup)   **Port Enabled:** ☑

Delay Setup

TX Delay:	0 ms	RX Delay:	80 ms
Squelch Tail Delay:	0 ms		

Function Tone Setup

Jump to Entry: [1 to 10 ▼] [Update]

Function Tone Enable		Relay	Relay Group	Relay Time (ms)	Digital Output	Call Type	iDen Number
1	☑	▼	1 ▼	0	1	Direct Connect ▼	191*1843*1
2	☑	▼	1 ▼	0	3	Direct Connect ▼	191*1843*3
3	☑	▼	1 ▼	0	7	Direct Connect ▼	191*1843*4
4	☑	▼	1 ▼	0	15	Group Call ▼	#1
5	☑	▼	1 ▼	0	31	Group Call ▼	#2
6	☑	▼	1 ▼	0	63	Emerg Group Call ▼	#3
7	☑	R02 ▼	1 ▼	0	127	▼	
8	☑	BOTH ▼	1 ▼	0	0	▼	
9	☑	▼	1 ▼	0	1	▼	
10	☑	R01 ▼	1 ▼	0	3	▼	

Figure 2 iDen® Radio Setup Page

3.2   Connecting the IP-223 and the NI223*plus*

Figure 3 Connections between IP-223 and NI223plus

Connect the IP-223 and the NI223*plus* to the iDen® radio as shown in Figure 3. The power for the NI223*plus* will be obtained from the same power connector the IP-223 is using. Make sure the polarities are correct to avoid damaging the units. Figure 3 shows the iDen® Radio configured for use with IP-223 Radio 1. Radio 1, Radio 2 or both radio ports on the IP-223 may be used. If both ports are used, a DB9 splitter cable (Telex P/N 301953) is required to route serial channel one and two to the respective NI223*plus* devices.

3.3   IDen® Radio Setup

At power up or reset, with the iDen® radio properly connected, the display on the IP-223 should show "**iDen**" on the line that was enabled, either the top (line 1) or bottom (line 2) of the display. If after connecting and configuring the IP-223, "**iDen**" is not displayed, check the following items:

- Check all connections as described above.
- From the Multicast Port Setup page, check the iDen® Radio Mode, **then reset.**
- Check the Jumpers for TTL serial communications.
- Make sure the baud rate of the iDen® radio is set at 19200.

3.4   C-Soft Setup

Note
This example shows a basic setup for C-Soft. Please refer to the User manual for other Vega IP based consoles if necessary.

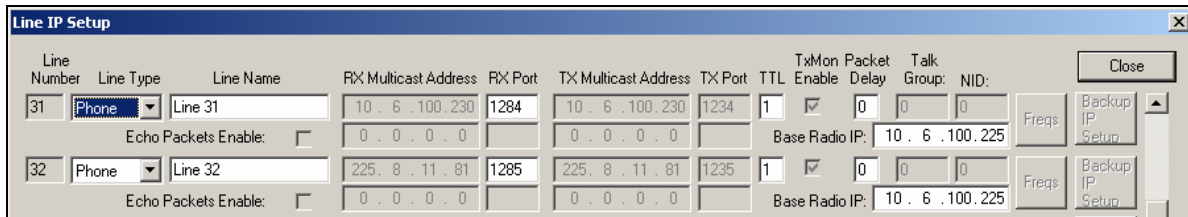### 3.4.1   Setup IP Multicast List

Figure 4 Setup IP Multicast List – iDen® Radio in Phone Mode operation

Figure 4 shows an example of setting two lines in Phone mode. In this example, the Line Type is selected as Phone mode. The Line Name is arbitrary and called Line 31 and Line 32 in this case. The Rx port numbers need to be unique; typically they are just the next number in a standard assignment sequence. The Base Radio IP address will be the IP address of the IP-223 that is connected to the NI223*plus*.

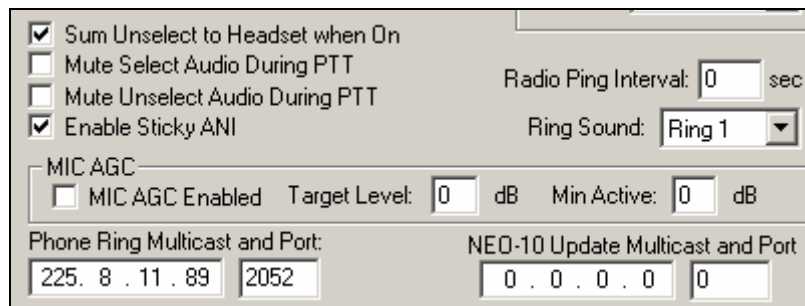### 3.4.2   Set Global Parameters

Figure 5 Setup Global Parameters - Phone Ring Multicast and Port

Figure 5 shows the Phone Ring Multicast and Port number setting. This value will be the same as that shown in Figure 1.
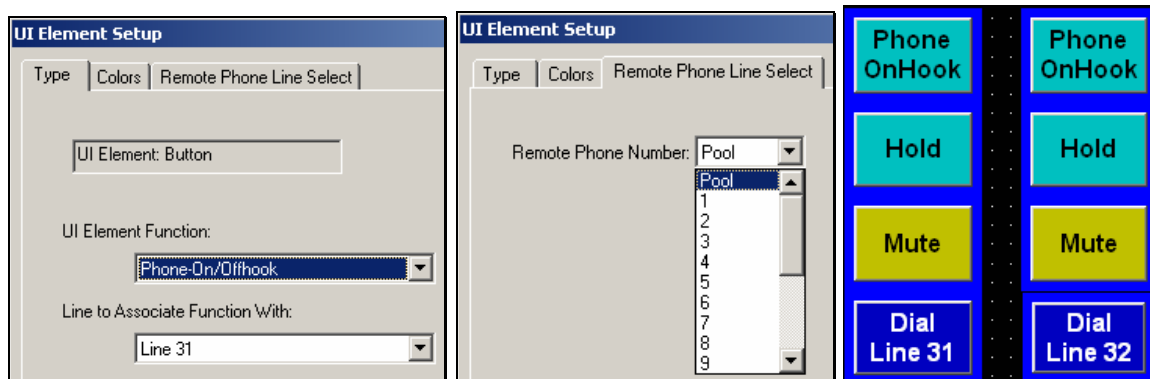
3.4.3 C-Soft Phone Control Buttons

Figure 6 C-Soft Phone Control Buttons Setup

Figure 6 shows a few of the basic C-Soft Phone Control buttons. Any button can be configured for a task by Right-Clicking on the button, then using the UI Element Function pull down menu. In this case, Phone – On/Offhook was selected. The Remote Phone Line Select tab shows that no specific line was selected as the Phone asset. Instead Pool was selected. In the case of the IP-223, Pool mode means that if both lines are setup as Phone Mode (PSTN or iDen® System), the open line will be selected for use when the console tries to connect. This is the same function as the multi-line telephone. Also shown is an example of a few phone control buttons. Please refer to the C-Soft manual for further details on the button configuration.

3.4.4 C-Soft Radio Line Types:

To use the IP-223 iDen® Radio interface in Direct Connect Mode, the line type will be the standard radio type. As shown in Figure 2, each Function tone entry will have a Direct Connect number association. Simply changing the Function Tone selection will steer the Direct Connect dial string. The same can be said for Group Call and Call Alert.

4 IDen® Network Calling

4.1 Console Selected Calling

As shown in Figure 2, each Function Tone entry is assigned a Direct Connect, Group, Emergency, or Alert number. Pressing the Function Tone on the console will route the dial string to the iDen® phone.

4.2 Manual Connections

The console DTMF keypad may be used to manually initiate Group, Emergency Group, Direct Connect, Direct Connect, Alert calls or dial a phone number. Using the standard keys, enter the dial string to be called. The A, B, C, or D keys are used to complete the calling function. C-Soft allows the user to customize the DTMF button labels. The A, B, C, and D buttons may then be labeled with the specific iDen® calling function.

4.2.1   A-Key, Alert

The 'A' key is used to send an Alert function over the iDen® system. Using the standard dialing keys, enter the ID of the radio. Press the "A" key to send the alert.

4.2.2   B-Key, Send

The "B" key is used as a send button when placing a manually dialed phone call. Take the phone line offhook, dial the number, and then press the "B" key to connect the call.

4.2.3   C-Key, Group Call

Enter the group number to be called followed by the "C" key. When the PTT button is pressed, a group call will be completed.

4.2.4   D-Key, Direct Connect Call

Enter the Direct Connect number then press the "D" key. When the PTT button is pressed, the Direct Connect call will be completed.

Figure 7 - Manual DTMF key layout with iDen® commands

5 Audio Alignment Procedure

5.1.1   Transmit Audio Alignment

The Transmit audio (Audio IN) to the iDen® Radio should not be overdriven. The levels to the radio should be at or near -5dBm as measured at the IP-223 radio test point on the front of the unit. The TX Pot on the front panel of the IP-223 will be near 9-12 o'clock depending on the microphone source. Alternatively, the Software Gains may be adjusted to gain more granularity in the pot setting to accommodate different microphones. Figure 8 shows an example Transmit Gain setting. From here a simple talk test will result in good audio levels.

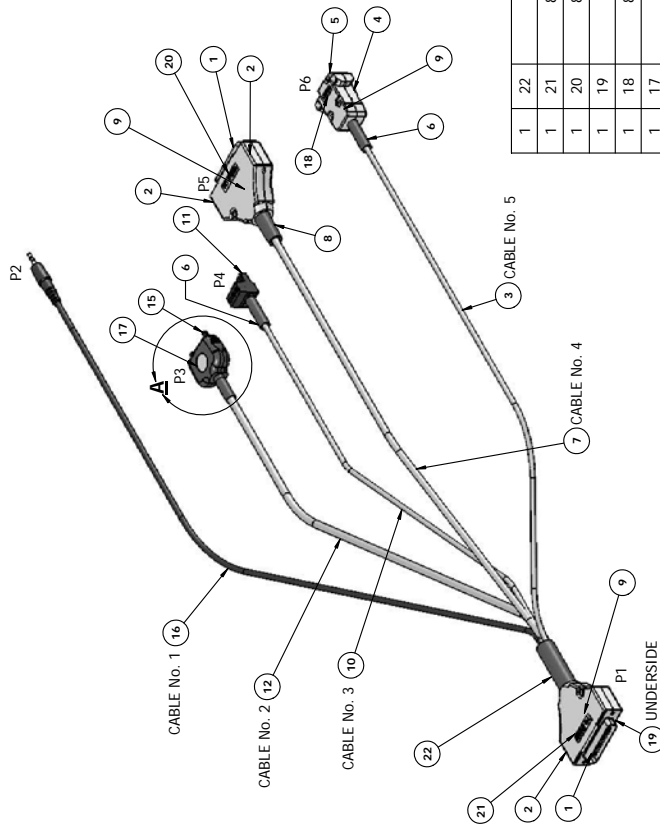*Figure 8 IP-223 Transmit Audio Gain Setup*

5.1.2   Receive Audio Alignment

The standard Receive audio alignment procedures should be followed for the NI223*Plus* installation. With AGC turned OFF, inject a 0dBm test tone into the IP-223 front end and measure the level at the Receive audio test points for line 1 or 2. (TP13 or TP1) The level should be near, but below 0dBm reference from the test point to ground (TP14, near TP13). This should result in audio levels from the iDen® Radio at –5dBm to –10dBm as shown in Figure 9. A meter can be used if the unit is on the bench top, or if installed, the front panel VU meter can be used. To access the VU meter Press and Hold the line button, then press the IC button three times. A general talk test is still the best mechanism for ensuring a quality connection. The system can be tested with a handset from the front panel as well. To purchase the handset, contact the Telex Vega Sales department.

Figure 9 IP-223 Receive Audio Alignment Example

6 Cable Assembly

-001 QTY.	ITEM No.	PART NUMBER	DESCRIPTION
1	22	66035J	TUBING, SHRINK, 1/2 ID
1	21	804142-7	LABEL, LARGE "TO NI223"
1	20	804142-6	LABEL, LARGE "TO IP-223"
1	19	803629	LABEL, TELEX KEY
1	18	804230-1	LABEL, SMALL, " TO IP223"
1	17	804147	LABEL, TELEX MONOGRAM
1	16	EML000050000	CABLE, 2.5MM STEREO, 2 FT.
1	15	539237000	CONNECTOR, iDEN 17 PIN DATA PLUG
1	14	750735	PC BOARD, iDEN INTERFACE CONNNECTOR
1	13	57082000	CLAMP,STRAIN RELIEF, .190,NAT-B
2	12	550252	CABLE, SHIELDED, 7 CONDUCTOR, GRAY
1	11	21-04-038986	TERMINAL STRIP CONNECTOR 3 POLE
2	10	58341001	CABLE,SHIELDED
.094	9	51379001	TUBING, 3/64 BLACK
1	8	63351004	BEND RELIEF
2	7	8800227356	CABLE, 3 PR 22 GA SHIELDED
.333	6	411829	SHRINK FIT 221 1/4 BLACK
1	5	8800102114	CONN, 9 PIN D-SUB MALE SOLDER
1	4	6503681	HOUSING, D-SUB METALIZE CONNECTOR
2	3	58341001	CABLE,SHIELDED
2	2	ITC000001	BACKSHELL, 25 PIN D-SUB
2	1	8800101954	CONN D 25 PIN MALE SOLDER

DETAIL A
SCALE 1 : 1

WIRING TABLE

PIN	TO	PIN	COLOR	CABLE No.
P1-1	-	P4-1	RED	3
P1-2	-	P6-9	RED	5
P1-3	-	P6-1	WHITE	5
P1-4	NC			
P1-5	-	P3-J5	ORANGE	2
P1-6	-	P2 RING	RED	1
P1-7	-	P5-14	BLK WITH GREEN	4
P1-8	-	P3-J10	BLACK	2
P1-9	-	P3-J9	BLUE	2
P1-10	NC			
P1-11	-	P5-2	GREEN	4
P1-12	-	P5-12	BLK WITH WHT	4
P1-13	-	P5-13	BLK WITH RED	4
P1-14	-	P4-2	WHITE	3
P1-15	NC			
P1-16	NC			
P1-17	-	P3-J4	BROWN	2
P1-18	-	P3-J3	RED	2
P1-19	-	P2 TIP	WHITE	1
P1-20	NC			
P1-21	NC			
P1-22	NC			
P1-23	NC			
P1-24	-	P5-24	WHITE	4
P1-25	-	P5-25	RED	4

CABLE No. 1
CABLE No. 2
CABLE No. 3
CABLE No. 4
CABLE No. 5

P1 UNDERSIDE

7 Warranty, Service, Repair, and Comments

Important! Be sure the exact return address and a description of the problem or work to be done are enclosed with your equipment.

Warranty (Limited)

All Telex Communications, Inc. manufactured Vega Signaling products are guaranteed against malfunction due to defects in materials and workmanship for three years, beginning at the date of original purchase. If such a malfunction occurs, the product will be repaired or replaced (at our option) without charge during the three-year period, if delivered to the Telex factory. Warranty does not extend to damage due to improper repairs, finish or appearance items, or malfunction due to abuse or operation under other than the specified conditions, nor does it extend to incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you. This warranty gives the customer specific legal rights, and there may be other rights which vary from state to state.

Factory Service Center

TELEX Communications, Inc.
Vega Signaling Products
8601 East Cornhusker Highway, Lincoln, Nebraska, 68507
Phone: (402) 465-7026 / (800) 752-7560 Fax: (402) 467-3279
E-mail: vega@telex.com

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Claims

No liability will be accepted for damages directly or indirectly arising from the use of our materials or from any other causes. Our liability shall be expressly limited to replacement or repair of defective materials.

Suggestions or Comments

We'd appreciate your input. Please send us your suggestions or comments concerning this manual, by fax (402-467-3279) or e-mail them to: **vega@telex.com**

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Technical Support:
acttechsupport@us.telex.com
Telephone: 1-800-898-6723

8 NI223*Plus* Specifications

Operating Temperature Range: • 0 to 55°C for full specifications **Power Requirements:** • +12 to +16 VDC, semi-regulated, 1A Max. **Dimensions:** • 2 ¾ ” W x 4 ¾ ” D x 1 ¾ ” H	**Front Panel Indicators:** • Green LED Power Indicator **Rear Panel Connections:** • DB25 • Earth Ground.

Specifications are subject to change without notice

Accessories:

- **DB9 Splitter Cable Assembly, Telex PN 301953**
- **19” Rack Mount Kit Telex P/N DSP223RACK (holds up to 4 NI223*Plus* boxes)**

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