GETTING STARTED WITH IP

First, you need a static public IP address at the studio with bandwidth hardwired and set aside for the Tieline codec. The very best way to do it is have a standalone DSL line with a static IP address so you don't have to mess with anything else.

Get it set up and you're done. Arrange for a minimum 128kbps upload speed (download will always be faster, probably around 512kbps). We recommend 256-512kbps for the best upload speeds. If you can get faster, go for it.

IF you MUST use an existing shared internet connection, have plenty of bandwidth AND have a really sharp IT person, you may be able to set it up for the Tieline usage. We must emphasize though that a stand-alone dedicated IP connection is strongly recommended. If you still must use the shared internet connection, give the following information to your IT person:

1. Set up a static public IP address.

2. Set up QoS in BOTH directions for a minimum of 128kbps (300-600kbps is recommended)

3. Open both ports 9000 and 9002 for both UDP and TCP (mandatory) in both directions.

TCP is the connection protocol and UDP is the audio transport. Extensive testing and proven field results show these settings will provide the best performance and reliability.

This document includes the following 4 sections:

- Steps for Programming Studio Codecs to Connect over a LAN

- Steps for Programming Remote Codecs connected to a wired LAN

- 10 Simple Steps to Connect Tieline Codecs over IP LANs

- Quick Start Procedure for Wireless 3G IP Connections (version 1.6.xx firmware or higher)

STEPS FOR PROGRAMMING STUDIO CODECS TO CONNECT OVER A LAN

- Order a high-speed broadband service from your Internet Service Provider (ISP) & do not share this connection with other devices. Order a 'static public IP address' from your ISP where possible.
- Get your network administrator to 'install' the static public IP address and perform Network Address Translation (NAT) between the public Internet and your Local Area Network (LAN).
- Connect an active RJ-45 LAN cable for the broadband service to the LAN port on the rear of the codec.
- If there is an active connection on the LAN cable, the green LED underneath the LAN port will illuminate and the orange LED will flash steadily.
- By default, the Tieline codec is set to DHCP. Reprogram static IP address settings on the codec by scrolling to the "IP1" connection on the main codec LCD screen.
- When the square brackets **[ ]** surround the connection press SOFTKEY 3 Wiz. Use the default settings of **[Algorithm →Music←] > [Audio Bitrate →9600←] > [Local FEC Percent →Off←] > [Remote FEC Percent →Off←] > [Jitter Buffer Type →Auto Jitter Adapt←] > [Auto Jitter Priority →Best Compromise←] > [TCP Session Port →9002 or 9012←] > [Audio Port →9000 or 9010←] > [Ethernet Link →Auto←] > [IP Setup →Static←] > [IP Address →Enter Number←] > [Subnet Mask →255.255.255.0←] > [Default Gateway→Enter Number←] > [Auto Reconnect →Disable←] > [RTP Configured →OK←]**
- Please note: press the **CLEAR** button on the codec keypad to delete the existing number and then enter a new static IP Address, Subnet Mask and Default Gateway (check with your IT administrator if you are unsure).
- Check the codec's IP Address by selecting **Menu > Unit Details > IP Address.** Please Note: Depending upon how your network is configured, it may also be possible to simply connect your Tieline Codec directly into your DSL/ADSL modem/router and receive a Public address from the router. A public address typically looks like 203.35.196.135 and is out of the ranges: 10.0.0.1 – 10.255.255.255, 169.254.0.0 – 169.254.255.255, 172.16.0.0 – 172.31.255.255 and 192.168.0.0 – 192.168.255.255.
- Once you are set up in the studio you are now ready to receive an incoming call from a remote codec over the Internet. Unless the remote codec has a public IP address assigned to it and you know what the number is, you will always have to dial the public IP address of the studio from the field codec.
- Once the settings have been configured on both the field and studio codecs use the following instructions to dial a new connection.

10 SIMPLE STEPS FOR PROGRAMMING REMOTE CODECS CONNECTED TO A WIRED LAN

If you are not connecting using wireless IP in the field (remote site) you will only need to attach your codec to a LAN with access to the internet to dial the studio. You will not need to know the public IP address at the remote codec or have to configure network address translation. Plug in the codec and check that it has been assigned a private IP address. Then you should be able to simply enter the static public IP Address of the studio codec and dial to connect.

PROGRAMMING FIELD CODEC NETWORK CONNECTIVITY

- Connect an active RJ-45 LAN cable for a broadband service to the LAN port on the rear of the codec.
- If there is an active connection on the LAN cable, the green LED underneath the LAN port will illuminate and the orange LED will flash steadily.
- By default, the codec is set to DHCP. In this mode a DHCP server (if available) usually assigns a private IP Address to connected devices automatically. Check to see if the codec has been allocated a DHCP IP Address by selecting **Menu > Unit Details > IP Address.** They are generally in the ranges: 10.0.0.1 – 10.255.255.255, 169.254.0.0 – 169.254.255.255, 172.16.0.0 – 172.31.255.255 and 192.168.0.0 – 192.168.255.255 and are assigned by network DHCP servers. Note: If an address has not been assigned, contact the venue's network administrator about programming a static IP address. The procedure for programming this is similar to programming a studio codec.
- If an IP address is visible then check settings on the codec by scrolling to the IP connection you wish to connect with on the main LCD screen.
- When the square brackets **[ ]** surround the connection press SOFTKEY 3 Wiz. Use the default settings of **[Algorithm →Music←] > [Audio Bitrate →9600←] > [Local FEC Percent →Off←] > [Remote FEC Percent →Off←] > [Jitter Buffer Type →Auto Jitter Adapt←] > [Auto Jitter Priority →Best Compromise←] > [TCP Session Port →9002 or 9012←] > [Audio Port →9000 or 9010←] > [Ethernet Link →Auto←] > [IP Setup →DHCP←] > [Auto Reconnect →Disable←] > [RTP Configured →OK←]**
- Double-check the codec's IP Address by selecting **Menu > Unit Details > IP Address.**
- Once the settings have been configured on both the field and studio codecs follow the instruction titled "10 Simple Steps to Connect Tieline Codecs" to create a new connection.

10 SIMPLE STEPS TO CONNECT TIELINE CODECS OVER IP LANS

This section outlines the Quick Start procedure for connecting codecs using IP. Unless the remote codec has a public IP address assigned to it and you know what the number is, you will always have to dial the public IP address of the studio from the field codec. I.e. always dial from the field codec to the studio codec over the Internet.

> **WARNING:** If you connect over IP and use auto jitter buffer then both codecs must have firmware v.1.6.xx installed.

Use the black rotary MENU SELECTOR (MS) to scroll through menus and press it to select menu items. If more detailed connection information is required, please see the 'Quick Start' section of each codec's reference manual for more information.

Step 1. Disconnect power from the codec before installing any module into it.

Step 2: Plug power into the codec an Ethernet line as required.

Step 3: Turn on power to the codec and select Menu by pressing SOFTKEY 4**.** Then select **[Load profile]** to choose the type of connection to connect with (i.e. default profiles or any Custom Profile). Select the profile you want from the menu and press SOFTKEY 2 to load the profile.

Step 4: Use the black rotary MS to scroll to the connection you are using, i.e. **[IP1 Enter#]**, until it is surrounded by the square brackets **[ ].** (Note: If "Unavailable" is displayed there is a connection issue that needs investigating.)

Step 5: Plug your microphones and/or music sources into the codec and adjust the input gain, phantom power (default is off) and other audio settings by pressing SOFTKEY 1 Aud. (If you are not using a microphone at the codec you are dialing from go to step 7).

Step 6: The default input level setting is Line Level. To adjust input gains press SOFTKEY 1 with Aud displayed above it and scroll to and select **[Input Gains].** Select the input gain setting you require for each individual input or select **[All Inputs]** to change all inputs simultaneously. Press the CLEAR button on the keypad twice to return to the main LCD screen. **WARNING:** Phantom power of 15 volts is always switched on for the TLR300B rack mount codec analog microphone input.

Step 7: Scroll until the square brackets **[ ]** surround the connection you will be dialing (e.g. IP1 Enter#) and type the number/IP address for the connection via the keypad. (Note: the "*" key on the codec keypad inserts a period into an IP address).

Step 8:   Press the ENTER DIAL button on the codec to dial and connect. To   negotiate higher bit-rates press "**F2**" then "**3**"; for lower bit-rates press "**F2**" then "**9**".

Step 9:   Repeat steps 7-8 if dialing a second connection.

Step 10:   On an i-Mix G3 press the yellow CUE button to send audio over the communications channel. If you are using a field unit Commander G3 codec, once both channels are connected hold down the MENU SELECTOR for 2 seconds and a secondary activation menu will appear along the bottom of the screen. You will see CUE1 and CUE2 above HOTKEYS 2 and 3**.** (Please note that rack unit codecs and the TLG3 GUI rack mount codec control software have dedicated CUE buttons so you will not need to do this). Pressing the CUE key on either of the 2 microphone inputs will route audio from these inputs to the off-air bi-directional communications channel only. Audio being sent will be heard in the right side of both headphone outputs. Communications audio will be displayed on PPM 2. To return to the main menu hold down the MS for 2 seconds, or it will automatically return to the main menu after two minutes. For more information on the *i*-**Mix** *G3* phone coupler, please see the codec reference manual.

If you are unable to achieve a connection using these instructions, contact your IT Network Administrator for assistance configuring your network or contact Tieline on support@tieline.com for support.

QUICK START PROCEDURE FOR CELLULAR IP CONNECTIONS (VERSION 1.6.XX FIRMWARE OR HIGHER)

Connecting your codec over 3G is very similar in principle to connecting over IP LANs. The only difference is that you are wirelessly connecting to your ISP instead of connecting via a LAN. Connect to your ISP/cell-phone provider and then use the Quick Start connection procedure for your preferred connection profile (i.e. mono, stereo, mono/IFB and dual mono program) over IP.

Very Important Warning:

Tieline CDMA EV-DO 3G modules don't use SIM cards and need to be activated and provisioned in order to connect to cell-phone networks in the U.S.A. Use the procedure outlined in this manual to program your module before use over these networks.

Important Note:

As a factory default, GSM/3G settings are programmed for AUTODETECT. If you plug a 3G or USB module (with a 3G phone connected) into your codec it will program it to operate in 3GIP mode by default.

If you use a GSM module or plug a GSM cell-phone into the serial port of your codec it will program it to operate in GSM CSD mode by default.

If you wish to use a 3G phone in GSM mode, you will need to change the Wireless Network setting in the GSM/3G Wizard to either GSM CSD or GSM HSCSD - depending on the connection you wish to use.

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1. Insert a Tieline 3G module (with a SIM card installed for UMTS/HSDPA networks or provisioned & activated for EV-DO networks) into your codec and then power up the codec.
2. Scroll to the 3GIP1 connection with the codec MENU SELECTOR and press SOFTKEY 3 Wiz and then select SOFTKEY 4 OK. Next select **[Wireless Network →3G/UMTS IP←] > [3G/UMTS IP Network →select your network←] > [Auto Reconnect →Disable←]**. Select SOFTKEY 4 OK to complete configuration and return to the main LCD connection screen.
3. If 3GIP1> Prs Entr is displayed, press ENTER/DIAL to connect to your 3G network. If 3GIP1> Enter # is displayed, dial the SIM card cell-phone number using the codec keypad and then press ENTER/DIAL to connect to your 3G network. This is because some cell-phone networks require you to dial this number to connect.
4. Once you have connected the codec connection will display 3GIP1> Cntd Goto IP
5. Now scroll to IP1 on the main codec LCD screen and connect using the Quick Start IP profile you have selected, i.e. mono, stereo, mono/IFB or dual mono. Type the IP address of the codec you are dialing. (Note: Use the * or # button on the codec keypad to enter the periods (.) in the IP address)**.**
6. Press the ENTER DIAL button on the remote codec's grey keypad to begin dialing. In many situations it is only possible to dial from the remote codec to the local codec with IP connections because only the studio codec is using a public IP address.

7. Try to maintain a link quality (LQ) reading for your connection of between 70% and 100%.To negotiate higher bit-rates press "**F2**" then "**3**"; for lower bit-rates press "**F2**" then "**9**". For best performance, the dialing codec should be used to renegotiate connection bitrates up and down. If you hear audio drop-outs the current bit rate cannot be sustained and should be renegotiated down. To disconnect, hang up your IP connection and then hang up the 3G connection.
8. To disconnect, hang up your IP connection and then hang up the 3G connection.
9. To change other 3GIP settings select SOFTKEY 4 $\boxed{\text{OK}}$ and scroll to **[Configuration] > [GSM/3G Setup] > [3G Module].**

Note on Cell-phone Use with Tieline USB Modules:

Turn on your 3G cell-phone and wait 30 seconds before you connect the phone to the USB module via its USB cable (this cable should be available from your cell-phone manufacturer). Within 30 seconds a $\boxed{\text{3GIP1}}$ connection should appear on the main codec connection LCD screen.

If you are unsure about the compatibility of a particular cell-phone, please contact Tieline at support@tieline.com for more information.

TIELINE CODEC TEST IP LINES

Please visit http://www.tieline.com/Support/Test-lines to view the IP addresses of Tieline's test lines for checking IP connections.

VERY IMPORTANT NOTE: PLEASE LEAVE AUTO RECONNECT OFF WHEN CONNECTING TO OUR TEST LINES!

Also, please connect for only 5-10 minutes at a time to leave plenty of time for others to use the test lines as well.

To learn more about Audio over IP click http://www.tieline.com/Transports/ip-Audio

To read more about IP Streaming download the IP and 3G Streaming reference manual from our website at http://www.tieline.com/Support/Documentation/User-Manuals

IMPORTANT NOTES:

- Music algorithm delivers 15kHz Mono audio @24kbps/15kHz Stereo @ 48kbps.

- MusicPLUS algorithm for higher bit rate connections of 48kbps for 20kHz Mono and 96kbps+ for 20kHz Stereo audio.