

# 8-Channel USB Logger



## Installation Guide

## Logger Features

- 8 channels of  $\mu$ -law companded digital recording
- All recordings are made at the legally required 64Kbps rate, using compression only when necessary, making this logger ideal for both commercial and E-911 applications.
- 60dB Manual gain control on all channels
- Digital signatures with the time, date, and recording details are included in audio files.
- Easy Plug and Play USB configuration under Windows 2000, 2003, and XP
- Maximum recording length is adjustable so large files are split into easily manipulated sections.
- Disk usage can be controlled on a line-by-line basis to conserve disk space
- Evidence Builder software produces evidentiary recordings rapidly
- Recordings can be searched by time, date, or by CID or DTMF signaling

## Server Requirements

- A **dedicated** PC is recommended, due to the high CPU usage required for real-time audio.
- A 1-GHz or faster processor with 256MB or more of RAM.
- Windows 2003, XP, 2008 or Vista. Compatibility with Windows 2000 is not guaranteed.
- A free, dedicated USB 2.0 port. Slower USB 1.1 ports are not recommended.

## Quick Installation

1. Run windows update from [windowsupdate.microsoft.com](http://windowsupdate.microsoft.com) to ensure you have the latest USB drivers available from Microsoft. This is essential under Windows 2000 and recommended for all versions of Windows.
2. Confirm that all line input levels are below +3dBm.
3. Connect inputs via Amphenol connectors.
4. Switch power on temporarily without the PC connected. Use the speaker or headphones to verify audio quality on all lines. Switch power off.
5. Attach the USB cable to a dedicated PC. Connect directly to a primary USB Full Speed or High Speed port on a *dedicated server*, not to a hub. We recommend that the logger is the only external USB device attached to your PC. Once attached, the USB configuration on this PC should not be changed. *Note: Low speed USB 1.1 ports and UHCI ports may not work well, particularly when shared with other devices. Long cables and USB extenders are not recommended. EHCI ports and OHCI ports work well.*
6. Switch power OFF to the logger. Switch power on to the PC.
7. After boot, insert the distribution CD and install the logging application.
8. Restart the PC. Switch power ON to the logger. Follow the prompts to install drivers.
9. Start the logging application.
10. Adjust the gain controls for each line. Levels should never reach the maximum of 0dBm to avoid distortion.
11. Map a network drive to the workstations used for playback. Use Windows file system security to limit access to authorized individuals.

12. Install “Evidence Builder” software on playback workstations. This program allows you to scan recordings and catalog calls by DTMF and Caller-ID.
13. Install “Real Time Player” as needed for remote monitoring.
14. Install “Call Detail Recorder” if desired for SMDR, ANI, or ALI recording from RS-232 sources.

## Included Hardware

The hardware installation kit includes:

- Qty 1 – F8 USB Capture Unit
- Qty 1 – High Speed USB “A” to USB “B” cable.
- Qty 1 – Power Cord

## Installation Accessories

Accessories are available from DLI at (408) 330-5599:

- Octopus cables – 8, 16, and 24 line configurations.
- Patch Panels (Amp to RJ-11 and RJ-45)
- “Y” connectors – RJ-11, RJ-45, and Handset
- “T” cables with Amphenol connectors
- Phone tools, connectors, cables, and test and measurement equipment.



## Power and USB Connections

### Power

Verify the input voltage is correct, and plug the IEC power cord into the wall outlet. Follow the power-up sequence described below in “quick start installation”.

### USB to PC connection

The USB cable provided has a rectangular “Type A” plug on one end and a square “Type B” connector on the other. The square connector is the only connector that can be plugged into the logger. Connect the USB cable between the PC and the logger *after* installing the drivers.

## Phone Line Connections

You can easily record from phone lines in three different ways: from the handset, from an outside analog phone line, or from an analog port on the PBX. If you are using a digital PBX, you may connect either to the handsets, to outside analog lines, or to an analog port, but not directly to the digital station set extensions. To record from digital set extensions, you’ll need a D/A converter which is specifically designed for your PBX.

Outside lines may be connected in two ways – looped or bridged.

#### **To bridge an outside line in VOX mode:**

- Verify that the line audio levels are within standard telecom specifications. Peak levels should not exceed +3dBm. Gain controls should be set so that recording levels do not exceed 0dBm.
- Use a punch-down block or RJ-11 octopus cable to connect each line to the logger.
- Set the line configuration mode to **VOX** using the Logger Config Utility.
- Set the VOX trigger threshold to a level slightly above the noise floor (background noise level) of each line.

#### **To bridge an outside line in Loop Start mode:**

- Measure the idle voltage on the line to confirm that 48VDC is present.
- Verify that the line audio levels are within standard telecom specifications. Peak levels should not exceed +3dBm. Gain controls should be set so that recording levels do not exceed 0dBm.
- Use a punch-down block or RJ-11 octopus cable to connect each outside line to the logger.
- Set the line configuration mode to **LOOPSTART** using the Logger Config utility.

## **Radio Connections**

Manufacturers use a wide variety of radio connectors, so you'll first need to locate a mating connector. After that, it's a simple two-wire connection from the receiver to the logger. You can directly bridge across the speaker, headset, or ear bud. Connect to a pair of input pins on the logger. A punch down block is usually the most convenient way to mix radio and phone lines.

If you're connecting a transceiver, and you'd like to record both the transmitted and received audio in the same recording file, you'll need a 4-wire to 2-wire converter.

## **Software Setup and Installation**

We highly recommend running a Microsoft Windows update before software installation. Visit [windowsupdate.microsoft.com](http://windowsupdate.microsoft.com) to upgrade. Microsoft has made several improvements in Windows USB drivers recently. Updating your PC improves operation with all USB devices. After updating, insert the logger installation CD into your CD-ROM drive. *Disconnect or turn power off to the logger during the software installation process.* Installation starts automatically on most machines.



DLI\_Audio\_Logger\_Setup\_3.0.242.60.exe

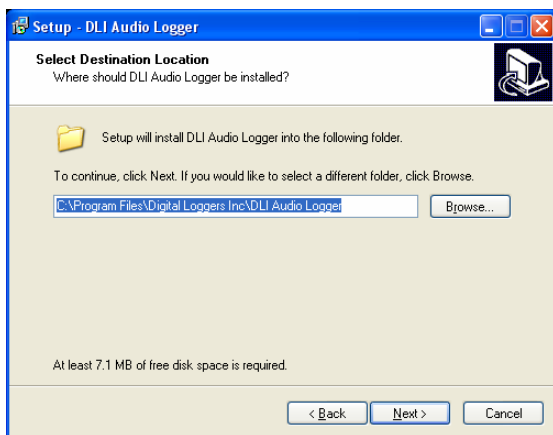
If the CD autorun feature is disabled on your machine, first explore the CD, then click on this icon to start the installation process.



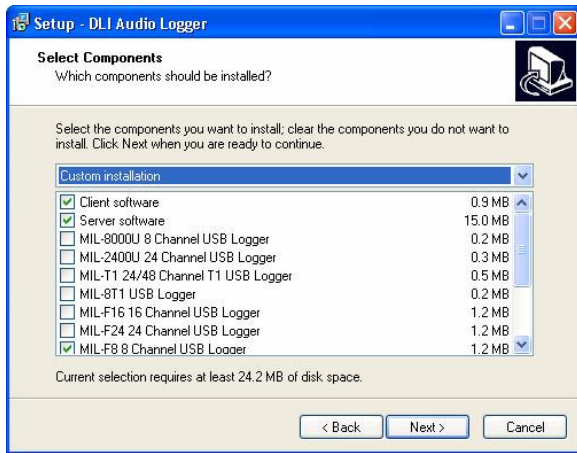
If this window appears, press Cancel and disconnect the logger until all the supporting software is installed.



After inserting the CD, this screen should automatically run. Click Next> to start the installation process.

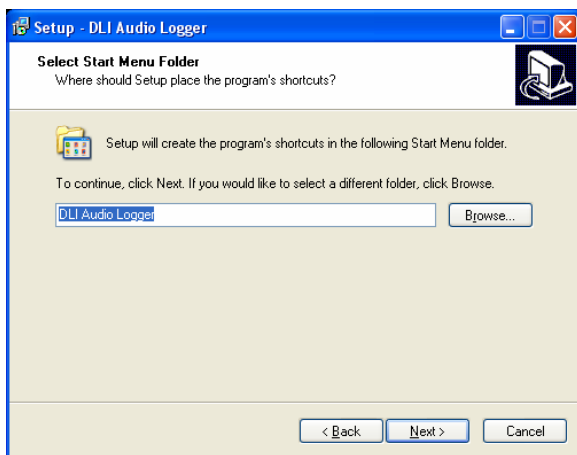


Select the installation directory for program files and the shortcut name. This is not the location for audio files, so a relatively small amount of disk space is required.

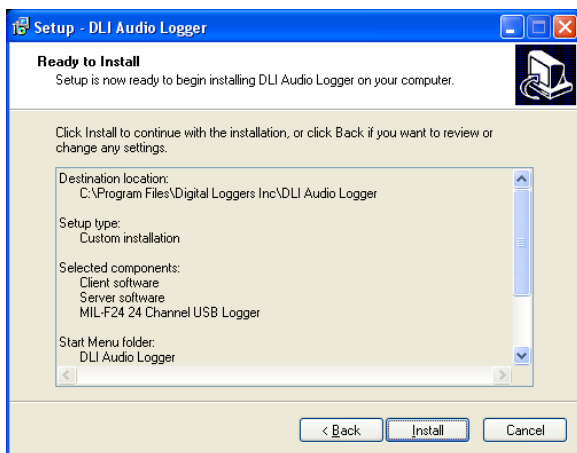


Next, select the components to install. Three components are critical: Server Software, Client Software, and the MIL-F8 USB Logger.

Scroll down using the slider bar and check the F8 driver. Ensure that all three options are checked, then click "Next".



Select a shortcut directory and click Next>

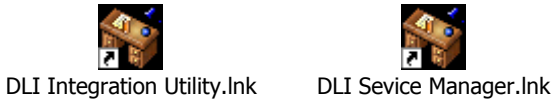


Confirm your selections, and then click Install to proceed.

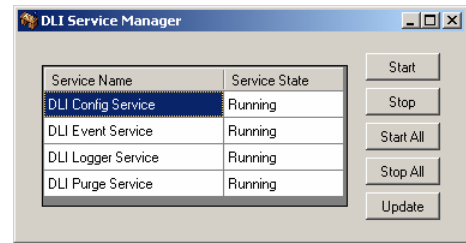
After installation completes power up the logger and reboot. The logging service can be set to start automatically.

# Starting the Integration Utility

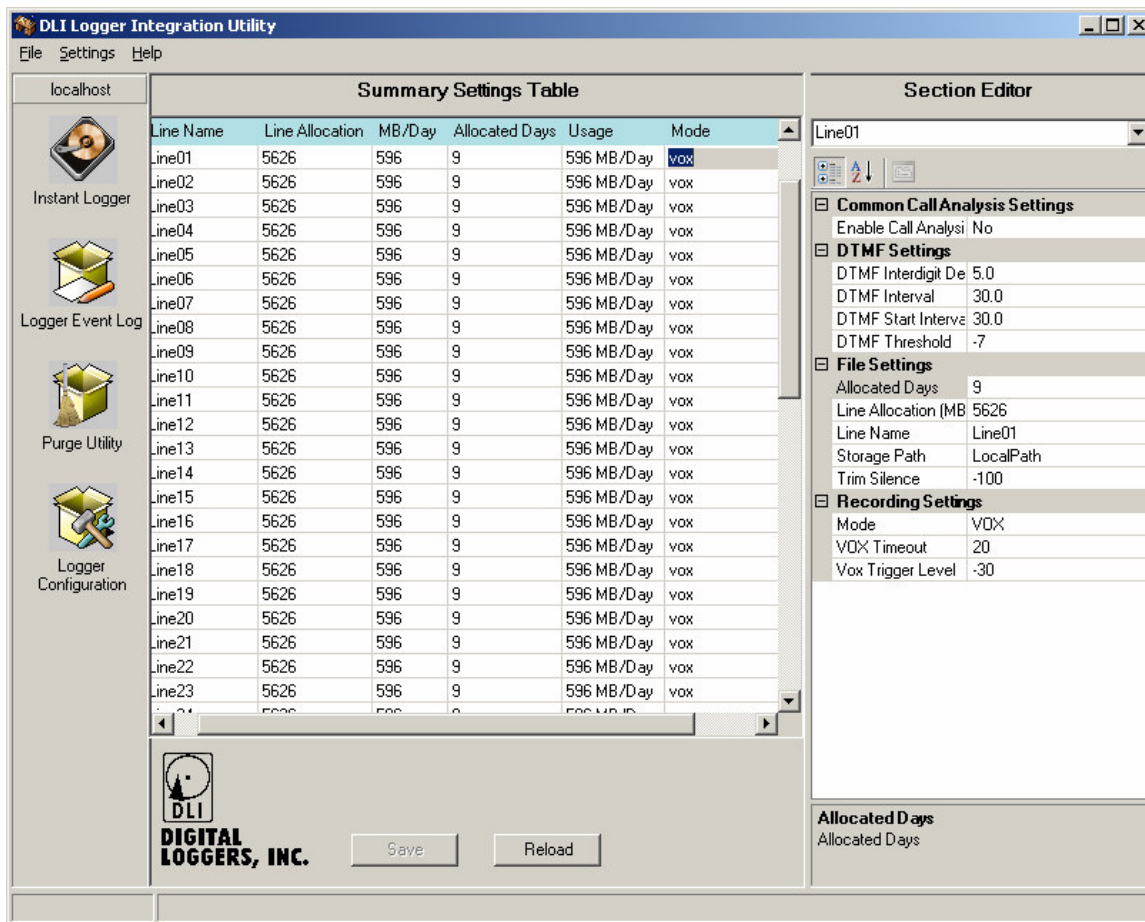
After installation completes, two desktop icons appear:



The service manager can be used to monitor the status of and to start and stop the logging software components.



The Integration Utility lets you monitor recording and set channel modes. Click on the Integration Utility icon to set up your logger. Click on the logger configuration toolbox icon on the lower left side. A screen similar to this appears:



To make changes to the settings for a particular line, first click on that line name, then edit the settings on the right side of the screen.

Each channel corresponds to one recording directory. Within each channel directory, the logger creates a subdirectory for each day.

To change settings for a particular channel, click the small + symbol to the left of the line name. The settings for that channel are displayed.

The most important recording settings are:

## Mode

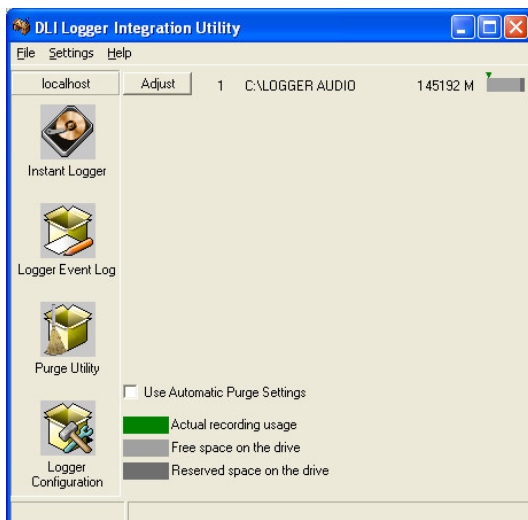
Set this to **VOX** for normal operation. Choose **LPS** for loopstart line voltage sensing on wet lines, or **EXT** to use the remote dry contact switch inputs. Choosing **CNT** will record continuously, and you may turn the line **OFF** to stop recording. To copy mode settings from one line to several others, right click on the settings.

## Voice Activated Recording (VOX) Trigger Level

If you are connected to dry lines, you'll be using either VOX or contact closure control. When using voice activated recording, it's important to set the VOX trigger level and timeout values correctly. Start by setting the input level to the logger so no clipping occurs during recording. You can verify this by looking at the digital files with an editor, or by checking that the VU meter does not reach the top bars. Allow yourself a few dB of "headroom" to prevent clipping distortion. Once the input level is set, you can set the VOX trigger level. Click the Instant Logger icon. While the phone or recording source is on-hook (silent), use the on-screen VU meter to slide the small triangular arrowhead over the meter. A setting of about 10dBm over the noise floor typically works well. Note that if you change the input level, you will need to reset the VOX trigger level. Try a VOX timeout of 30 seconds for telephone audio and 10 seconds for radio, then adjust it to your liking. Short timeout values will cause recordings to be broken into separate file segments. Excessively long timeout values may cause unrelated recordings to become concatenated.

## Line Name

Choose "PSAP Desk 1" or a similar name to describe the line. If you have a particular phone number assigned to that timeslot or channel, it may be useful to include the number in the line name, such as "DLI Main Hunt Group (408) 330-5599". If you are recording from an outside trunk, a separate program will allow you to search by Caller-ID or DTMF signaling after recording. *Since this Line Name will be used as a recording directory, be careful not to include characters disallowed in file names, such as "/" " " or "\".*



## Recording Space and Automatic Deletion

The logger can automatically delete old calls to conserve the amount of disk space used on each channel. Click on the Purge Utility icon to enable this and adjust the maximum amount of disk space used by each channel. Oldest calls are automatically deleted to free disk space.

To turn this feature on, click the "Use Automatic Purge Settings" checkbox. A bar graph shows the amount of



space used. When enabled, the logger will check disk space periodically. If recording size exceeds your setting, the logger will automatically delete files starting with the oldest day. The logger will continue deleting calls until disk usage reaches the setting. It's important to set this so that the total space used does not exceed the available disk space.

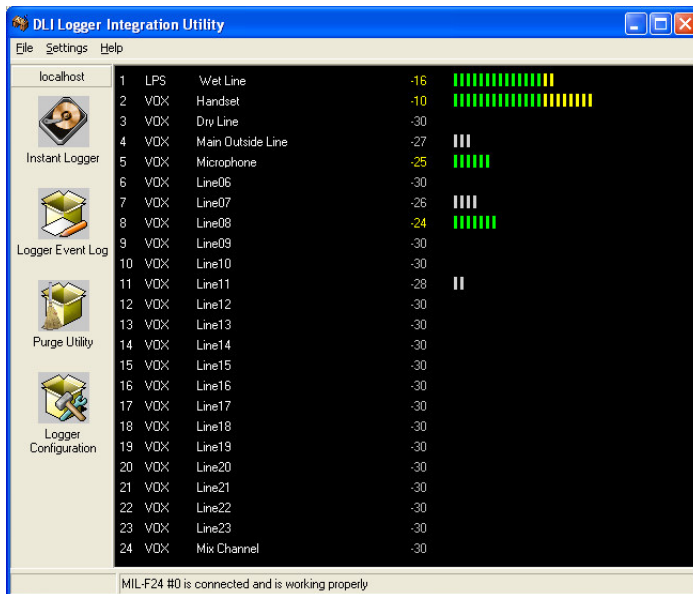
## Enable Call Analysis

The logger can automatically scan the audio in each recording to decode Caller-ID or DTMF dialed digits. First listen to the audio using the monitor. You will hear a modem tone between the first and second rings if Caller-ID is available. Touch tones should sound clear and undistorted. If the level is set too high, tones will be distorted and unrecognizable to the software. The recording level for touch tones should be below the peak level. Choose Yes to enable this feature.

## DTMF Settings

Leave these settings at default values unless you experience errors in decoding DTMF tones. If you experience errors in decoding tones on an outside line, first verify that the audio files are not clipping. Set the level a few bars below peak on the VU meter when a touch-tone dialing key is depressed. If you need to decode \*DNIS\*, Japanese DTMF, or other uncommon signaling format, you can adjust these settings from their defaults to allow decoding.

## Using Instant Logger



Click on the instant logger disk icon to monitor the status of the logger. This main screen appears.

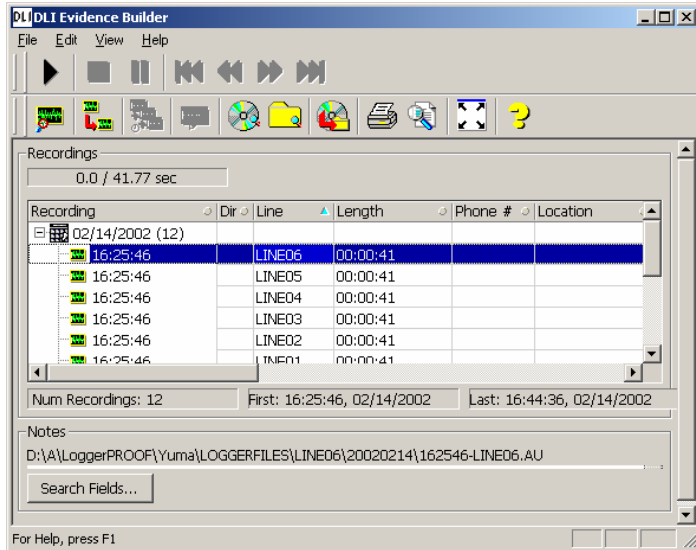
The recording mode for each line (for example VOX, LPS, CNT or OFF) is displayed to the left of the line name. Right click to change the line mode setting.

Click on the purge utility icon to control automatic deletion.

Click on the Logger Configuration icon to change either global settings or the configuration of a particular line.

## The 'Explore Calls' Function

Click on the VU meter to explore the recording directory for that line. Each line is stored in a separate folder, and each day is stored in a subfolder. The file names correspond to the recording start time. From here, you can edit, copy, or transfer files using Windows Explorer by clicking the right mouse button.



## Evidence Builder Call Analysis Software

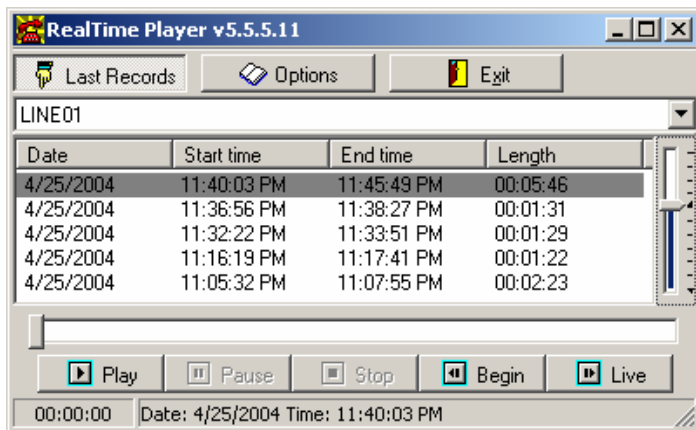
Evidence Builder Software is a powerful program used to locate and analyze recordings. It is provided on the workstation CD. Load this on a workstation and point it at the recording directories to analyze incoming calls, create call lists, sort calls, and search by DID.

To catalog files on a remote server, first create a path to the shared recording directory. Be sure to use proper security.

Map this to a drive letter on your workstation.

Next, choose the “Catalog Files From Hard Drive” button and select the recording directory. The screen display can be customized by in the “preferences” menu.

## Remote Monitoring of Live Audio



Remote users with access privileges to the recording server may monitor calls in real time via LAN or WAN connections.

A Real Time Player application is provided on the workstation CD. It's downloadable at: [www.digital-loggers.com/rtp.exe](http://www.digital-loggers.com/rtp.exe)

To remotely monitor calls, load the Real Time Player application on a workstation. Click on “options”. Use the browse

button to select a source directory with archived or incoming calls. Live calls are highlighted. Select a call and press “play”, or press “live” to continuously monitor calls. Windows security may be used to selectively control access to specific lines.

## Recording SMDR, ANI, and ALI Streams

Instance	Port	Status	Auto Start	Log File
1	COM1	Running	No	c:\E-911 ALI Log
2	COM2	Stopped	No	c:\PBX SMDR Reports

ANI, ALI, or SMDR data streams may be logged using our call detail recorder utility. This utility logs up to 8 RS-232 serial ports simultaneously.

Download the latest version from [www.digital-loggers.com/cdr.exe](http://www.digital-loggers.com/cdr.exe)

## Frequently Asked Questions

Read more at [www.digital-loggers.com/techtips.html](http://www.digital-loggers.com/techtips.html)

### Where do I connect the logger inputs?

There are three easy ways to link your logger to the outside world:

1. ***Record from incoming lines.***  
This lets you hear the recording from the outside party's perspective. It is commonly used for quality assurance recording. This type of connection is not commonly used in agent analysis or 911 call center recording. Most of these applications use a console output or handset tap (below). When recording from incoming lines, the level of the calling and answering voices may differ. For a more balanced recording level, use a handset connection or console output.
2. ***Tap the handsets, dispatch console, or analog station sets directly.***  
This method allows you to hear the recording from the agent's perspective. If you are recording in an E-911 dispatch environment, this connection will record things from the dispatcher's perspective, and the recording will typically include the phone conversation, radio dispatch, etc. Essentially, you will hear everything the dispatcher hears in the recording. Handset taps may be connected to the analog output of the phone, or run through a Digital to Analog (D/A) converter. They may also be connected by a digital tap card, such as those sold by Intel. When recording from a handset, Caller-ID will not be stored in the recording files.
3. ***Connect to a PBX port.***  
This is the most common method of connecting a logger in large installations (100+ channels). One advantage of this connection scheme is that the PBX can be used to switch the recorder to a large number of lines. Another is that the logger can be switched to any recorder outside trunk or inside extension. Think of this method as "conferencing in" the logger with either an outside caller or an inside extension. This method requires an installer familiar with your PBX.

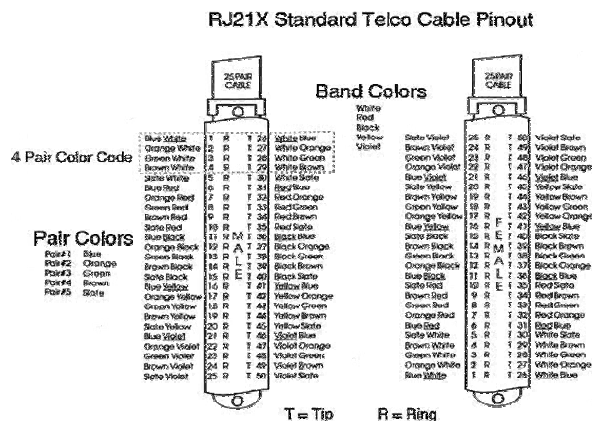
### What's a handset jack? How do I connect a logger to it?

A handset jack is a small 4 pin connector which carries the speaker and microphone signals from your telephone to your handset. This is a good place to bridge an audio logger, since all incoming and intercom conversations may be recorded at this point. The default VOX and ALC settings will work fine with the typical handset level of -20dBm. To record from a handset, "backhaul" the audio to the logger via either a "Y" connector or make the connection within the phone itself. This is commonly done with an unused pair on an existing cable.

## What's an octopus cable?

An Octopus cable is an adapter cable with an Amphenol 50 pin, 25 pair jack on one end and either 24 RJ-11 plugs, 12 RJ-12 plugs, or 6 RJ-45 plugs on the other end. The "female" equivalent is called a "harmonica", and it has sockets instead of plugs.

If you are connecting an RJ-21X to an RJ-11 jack, you can use either a rack mount patch panel with jacks, an octopus cable, or a harmonica.



## What's the RJ-21X color code?

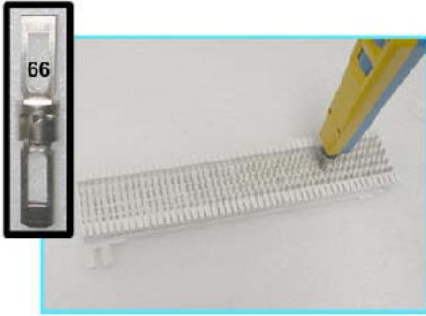
If you are connecting an RJ-21X to an RJ-11 jack, you can use either a rack mount patch panel with 24 RJ-11 jacks, or a "harmonica" or "octopus" cord pictured on the right. An Octopus cord has a single 50 pin AMP connector (RJ-21X type) on one end, and 24 RJ-11 type plugs on the other end. These optional cords are available directly from DLI.

## What is an RJ-21X, how do I connect to it?

An RJ-21X is a standard telephone interface which uses 50 wires to transmit up to 25 channels of digital or analog data. It is called an RJ-21x when it is used as a "demark" or attachment point for telcom equipment. The "demark" attachment point is commonly referred to as a "Network Interface Device". An RJ-21X can be attached to a standard KT-66 or 110 type punchdown block, and is typically installed by the phone company. In many installations, the customer is responsible for all wiring **after** the RJ-21X, and the phone company is responsible for all wiring **before** the RJ-21x. The circuits on an RJ-21x are provided on numbered tip and ring positions on a miniature 50 pin connector of the "Amphenol" or "telco" type. These are very common connectors on PBX, KSU, PBC, and distribution mainframes. The connector itself is sometimes called a "blue ribbon", or "grey L" connector, depending on the type of cable it's connected to. The connectors are polarized (male and female) to prevent an installer from accidentally connecting an internal extension to outside lines (or vice versa). Here's the pinout:

Pins 1 (ring) and 26 (tip) are considered position 1. Pins 2 (ring) and 27 (tip) are position 2 on thru twenty five pairs. Typically, only 24 pairs are used (48 wires). The last pair on pins 25 and 50 (slate-violet and violet-slate color) should be left as a spare pair. The spare pair keeps you from having to run a whole new cable if a single pair fails elsewhere. DLI Loggers use this pair as an earth ground connection. *Watch your polarity when wiring these cables.* Most modern phone equipment is polarity insensitive, but you can ruin a whole installation by reversing one pair of wires. There's also a single line version of the RJ-21X described above. It's called an RJ-31x.

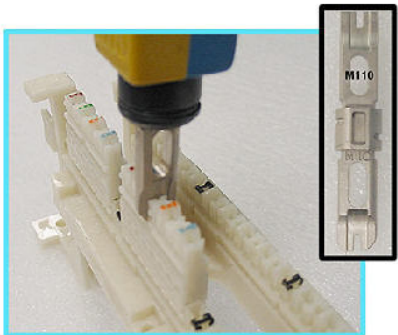
## What's a KT-66 Block? How do I connect to it?



The KT-66 block has been a standard "punch down" connector for telephone interconnects since 1958. It uses 200 bladed split contacts to make reliable connections on 28 gauge solid copper wire. It's one of the most common interconnects used in the telcom industry, and is often used to terminate an RJ-21x. KT-66 blocks, AKA "66 Blocks" use a plastic snap-on frame to mount on backboards or racks. They are "indoor only" interconnects which will fail if exposed to moisture.

KT-66 blocks come in several styles. Some are "split blocks" in which the two spade terminals on each end of the block are connected together, but the connection is "split" down the center of the block. Other KT-66 blocks may have 50 pin AMP connectors on either side of the block.

To make a reliable connection to a punch down block, you'll need a "punch down tool" as pictured below. Be sure to use the correct "66" style blade to make the connection. One side of the blade cuts the wire, the other is for "loop through" wiring.



## What's a 110 Block? How do I connect to it?

The 110 block has been a standard "punch down" connector for telephone interconnects since 1971. It was intended to be a high density replacement for the KT-66. It uses a plastic frame to which a series of 4 pin connectors may be attached. Up to 50 of these connectors may be attached to the block. With 110 blocks, connection density is 50% higher than connections made on a 66 frame. KT-66 blocks, AKA "66 Blocks" use a plastic snap-on frame to mount on backboards or racks. Like

the "66 Block", a 110 block is "indoor only" and should not be exposed to moisture. You must use the right tool with the right blade to make a reliable connection on a 110 block.

Jack Positions	USOC RJ61	T568A	T568B (AT&T)	100BT (LAN)
1	wht/brn	wht/grn	wht/org	wht/blue
2	wht/grn	grn/wht	org/wht	blue/wht
3	wht/org	wht/org	wht/grn	wht/org
4	blue/wht	blue/wht	blue/wht	
5	wht/blue	wht/blue	wht/blue	
6	Org/wht	org/wht	grn/wht	org/wht
7	Grn/wht	wht/brn	wht/brn	
8	Brn/wht	brn/wht	brn/wht	

## What is an RJ-45 jack? Which wire connects to each pin?

Although it's not technically correct, the term "RJ-45" is now used to refer to any standard 8 pin jack in telephony or networking applications. RJ-45 jacks are most commonly used in Ethernet applications. Eight pin jacks are often used to carry four analog circuits.

## What is a "Balanced Line"? What is an "Unbalanced Line"? How can I connect to them?

Balanced lines are lines used to cancel noise. In balanced phone lines, two wires are twisted together so that each wire picks up the same amount of noise. At the receiving end, the noise is subtracted, and the resulting output is the sent audio, minus the noise. A balanced line becomes "unbalanced" when unintentional leakage to ground occurs. Unbalancing a phone line causes noise. This can be a result of poor insulation somewhere along the line, or a bad connection. The problem is often worse in the winter, when outside lines are wet and leakage to ground occurs along the line.

Audio is usually sent down shorter unbalanced lines using Coaxial shielding. This shielding prevents electromagnetic noise from affecting a single wire. The inputs to all DLI loggers are balanced lines. These inputs may be connected directly to unbalanced (ie. Coaxial) lines, and the ground may be connected to either side of the logger input.

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## What is a D/A Converter? How do I connect it?

D/A stands for Digital-to-Analog. A D/A converter is installed between digital lines (usually station sets) and an audio logger. D/A converters work by converting the signal stream from a digital station set into the standard analog format used in an audio logger. They are available in single and multi-channel versions.

Since there is no "standard" for digital station set interconnects and line formats, single channel D/A converters are usually best purchased from the manufacturer of the PBX and station sets to which you are connecting.

Multi-channel D/A converters are available as stand-alone units or PCI cards. These cards are sold by Dialogic (now Intel) and others. Another common type is built into the base of a KT-66 punchdown block. Again, every phone system has a different format, so there are hundreds of D/A converters available. Make sure you are purchasing the right one for your PBX and station sets.

## Support

Please visit [www.digital-loggers.com](http://www.digital-loggers.com) for more frequently asked questions, free driver updates, manuals and accessories. If we haven't answered your questions here, please call (408) 330-5599 or send an email to [support@digital-loggers.com](mailto:support@digital-loggers.com). We'll be glad to help.

