DIGITAL LOGGERS, INC.

MIL-2400 Digital
Logging System

Users Guide

MIL-2400 Digital Logger Features

Congratulations on your purchase. The MIL-2400 Digital Audio Logger is a modular network-based hardware system used to produce archival recordings of audio signals. The MIL-2400 offers these features:

Universal Interface

The universal line interface allows connection to phone lines, voice mail systems, radio systems and remote microphones.

Digital Performance

Audio recordings are perfect. Multiple copies of recordings can be made without degradation. Digital recordings eliminate the loss of signal quality. Hard Disk loggers offer higher reliability than tape units.

Modular Configuration

DLI modules connect to expand capacity to hundreds of channels and thousands of hours. Digital quality gives you crystal clear audio.

Simple Operation

Creation of hard disk files automatic. Recording status are displayed at a glance. Calls may be accessed from any network connection.

Convenient Network Playback

Find calls instantly without searching through tapes. Calls can be sorted and accessed from any Windows PC. Digital files can be copied, emailed, encrypted, and backed up on any computer. No separate playback unit is required.

Disk Array Storage

Tape loggers require frequent tape replacement to prevent lost calls. The optional redundant hard disks on the MIL-

2400 store thousands of calls with selectable fault tolerance. Disks may be configured using standard Windows NT configuration utilities.

Call Analysis Software
Windows based call analysis software indexes and sorts call files for easy retrieval by phone number, company name, customer number, etc. Custom networked installations and database integration services are available.

Standard Package Contents

1. MIL-2400 modular capture chassis (One chassis is included for each 24 lines of capture capability)
2. Fibre Channel Arrays (Optional, one tray for each 288GB or 576GB of storage)
3. Optional Windows PC for network playback.
4. Software, Power and Network Cabling

Quick Setup

Use these shortcuts if you are an experienced installer. If you are unfamiliar with the installation of digital logging systems, please contact Digital Loggers for technical support and installation services. In either case, please read the entire manual before proceeding.

1. Remove the logger from its shipping crate. Save the crate and protective packing, in case the logger ever requires service.
2. Make sure that the rear-panel power switch is in the OFF position.
3. Attach the power cords to a redundant power source.
4. Ensure that nothing blocks either the ventilation holes on the sides of the chassis or the fan on the rear panel of the chassis.
5. Verify that the input levels are within range (up to +3dBm), then connect the 50 pin telco jack at the rear of the unit to any compatible audio source. Top and bottom jacks connect together for "loop through" operation.
6. Attach line voltage mute boards in series with the logger if external wet lines are connected. Dry lines, such as handset connections and radios do not require mute boards.
7. Note that pins 49 & 50 of the connector are grounded. All other pairs connect directly to standard telco equipment.
8. Configure the logger for your network. Set an IP address, or use DHCP to automatically assign one. If you have purchased a complete system with a

separate playback unit, you will need to do this on both machines.

9. Attach the logger and playback PC unit to your network. A crossover cable may help during initial configuration.

10. Edit the LOGGER.INI file located in the C:\WINNT directory to configure the logger as described below. This file may be edited by hand or using the LOGGERCONFIG.EXE program.

11. Start the logger by switching the power on. After approximately 2 minutes, the display will show a series of horizontal dashes, which indicate the status and VU level of each incoming line.

12. The logger will automatically separate calls into individual files with time stamps. If necessary, adjust the VOX timing parameters as needed for your application.

13. Adjust the disk usage parameters in the LOGGER.INI file to prevent disk overflow.

14. Set up a regular backup program additional protection against data loss.

15. Set Windows security as appropriate for your installation.

Basic Operation

After applying power and switching the unit on, the MIL-2400 will automatically perform a sequence of self-tests to ensure the reliability of the system. If any errors occur, they will be logged in the Windows NT error.log file.

After testing is completed, a status display will appear, displaying the current state of the logging system. Each of the 24 lines in the display corresponds to an incoming channel. A display of MAN indicates continuous recording which must be manually started or stopped. A display of VOX indicates sound activated recording on that channel. Inactive lines display OFF.

Logger.Ini File Format

The logger uses a Windows standard .INI file to control operation. This section describes the logger.ini fields.

The logger.ini file is required for proper operation of the logger. It is expected to be located in the directory specified by the GetWindowsDirectory API. C:/WINNT is the default directory for this file.

The logger will open the file at start-up, read the contents, close the file, then initialize the system based on the contents of the file. A typical file is shown below:

```
[system]
MaxCallDuration=300
LogDrive=D
DeleteOldDirectories=yes
LogLines=no
DebugMode=no
PurgeIntervalInSeconds=60
VuWindowUpdateRate=100
MinDiskFreeSpace=1000

[storage paths]
LocalPath=C:\CSC
CSC_logging=D:\CSC_logs
RemotePath=E:\CSC

[line01]
ChannelName=Line01
Mode=vox
Beep=disable
VoxTimeout=20
StoragePath=LocalPath
MaxMegaBytes=1000
Compress=0
```

MBNotCompress=0
DaysNotCompress=0

[line02]
ChannelName=Line02
Mode=vox
Beep=disable
VoxTimeout=20
StoragePath=LocalPath
MaxMegaBytes=1000
Compress=0
MBNotCompress=0
DaysNotCompress=0
…

The file starts with keys for the main logging system functions:

MaxCallDuration=300
Set **MaxCallDuration** to the maximum amount (in minutes) which may be recorded in a single file. **MaxCallDuration=74** will keep all call recordings in files of 74 minutes or less.

LogDrive=D
This key selects the target drive for the system log file. Log files are generally small in size.

DeleteOldDirectories
This key can be set to yes or no, depending on whether you want to delete old call directories. Old call directories will be removed only when the amount of free disk space is less than the number specified below. The normal setting is **DeleteOldDirectories=yes.**

LogLines, DebugMode
These keys are used for technical support, and should be set at **LogLines=no** and **DebugMode=no** by the installer.

PurgeIntervalInSeconds
This key controls the frequency at which the logger will check for free disk space. A setting of **PurgeIntervalInSeconds=3600** (once an hour) will suffice for most applications**.**

VuWindowUpdateRate
This key controls the frequency at which the graphic display will be updated. A setting of **VuWindowUpdateRate=100** will keep system GUI overhead at a reasonable level.

MinDiskFreeSpace=1000
This key is a trigger at which the purge system will be activated. When the amount of free space is below this setting, old directories will be deleted the **MaxMegabytes** settings are reached for each line.

The file continues with keys for each individual line. Line key descriptions are as follows:

ChannelName
The first key under each line is the line name. A directory will be created using this name to store files. Set the channel name to a human readable name, such as "Bobs Desk" or "PSAP1" to make call access easier.

Mode
There are three modes available, MAN, VOX, and OFF (disable). Each line may be set to operate manually in continuous recording mode, or use VOX for voice controlled recording. Unused lines should be set to **Mode=OFF** to prevent wasted disk space.

Beep

An optional record tone generator may be ordered from DLI. Setting **Beep=ON** will inject this tone when a line is being recorded.

VoxTimeout

This key controls the amount of silence which must be detected before recording is terminated. Set **VoxTimeout=12** for radio calls, or **VoxTimeout=20** for phone calls. Alter this timeout based on your preferences.

StoragePath

This key controls the target location in which audio files will be saved for each line. Set **StoragePath=D:\LoggerFiles** if you would like the recordings to be located on the local D: drive. Set it to the drive ID of a local disk array, such as E:\ for redundant storage.

MaxMegaBytes=1000

This key controls the maximum amount of storage (in megabytes) assigned to each line. It is critically important that this key be set correctly after an on-site evaluation of the amount of storage that is required for each line. **MaxMegaBytes=1000** is the default value, which is 1GB per line.

Compress, MBNotCompress, DaysNotCompress

These options control the compression used on each line. For most applications, recording quality is more important that disk space, so these options are typically set to **Compress=0,** **MBNotCompress=0**, and **DaysNotCompress=0.**

All options and keys in logger.ini are required. If any of them are not present or if any values are invalid, the logger mat not start recording. Blank lines, unrecognized keys, and lines beginning with # are ignored by the logger application.

Output File Format

Audio files are recorded to using the industry standard μ–law (pronounced "mew-law") format. Audio files are grouped in directories, with each channel and date corresponding to a single directory. The line number for each directory may be changed using the setup menu. File names are sorted by start time in ascending order. All time values are standard 24-hour military time. A separate subdirectory is created for each day. The following example shows how the time and date stamps are directly coded into the file names:

Channel Directory	Day Subdirectory	File Name
LINE01	19990403	212450da.au

In this example, a call arriving on line one, on April 3rd, 1999 was recorded starting at 21 hours, 24 minutes, and 50 seconds (9:24:50PM). Files are recorded at a 64kbps=8KBps data rate to ensure that complete fidelity is preserved. Conversion to other file formats such as .WAV can be easily made on any PC. The length of each file is directly proportional to the length of the call. Windows Media Player displays the exact elapsed recording time.

To play a call on any Windows PC, simply click on the file name. The Windows Media player will open, and the call will play through your sound card. Calls may be easily attached to emails, copied, or encrypted, since they are standard files. If the μ– law codec is not installed on your machine, please contact DLI for technical support.

MIL-2400 Call Analysis Software

The MIL-2400 Data Logger Call Analysis Software is an optional, easy-to-use Windows application that allows you to catalog, play, and sort recorded calls, including contents of a backup CD, or a network attached disk array. At the click of a button, you can send the catalog file, or even a an entire call via email. This software is not needed for normal logger operation, but is an accessory which provides convenient cataloging of recordings. To install this software, simply insert the CAS distribution CD in a Windows 95, 98, NT, ME, or XP PC.

Using the Catalog Utility

1) Select File | Catalog Folder, or press Ctrl + N, or Select the 'Catalog Folder' button from the toolbar .   Browse and select the folder of interest.

2) At this point, filtering options will appear. Select the date and time range, as well as the folders of interest. As the program analyzes the calls, the names of the files will be displayed in the status bar at the bottom of the window. To cancel the process, press ESC.

3) When all files are indexed, the list will display all the calls.

4) The information panel displays the number of phone lines the folder contains, the total number of calls and any call notes which have been saved.

Sorting by Columns

Calls scanned by the cataloging utility are sorted in several columns. Each column may be used to search for a particular call or calls. The default columns are listed below:

   1) Direction: The direction is shown in the 'In/Out' column. Incoming calls are 'In', Outgoing calls are 'Out', and calls whose direction cannot be determined are labeled 'Unknown'. This field is accurate if DTMF decoding has been selected and your recordings include dial tones.

   2) Line: The logger line name or number is shown in the 'Line' column.

   3) Phone #: This is the phone number dialed for outgoing calls, or the detected Caller ID (CID) for incoming calls.

   4) Date: The date this call started.

   5) Time: The time this call started (in 24-hour time).

   6) Length: This is how long the call lasted (displayed as hours:minutes:seconds).

   7) Call ID: Since you can catalog multiple sources, including backup CDs, DVDs, or hard drives, this field assigns a unique ID number to each call.

   8) Location: If you have the 'Demographics' option selected, this column shows you the location that the call either originated from or was placed to (this is determined by the area code of the call). If this column is not displayed, press the "demographics" button to add the column. Your own area code and dialing preferences must be entered for this column to accurately display.

You can change the width of a column by placing the mouse over the line between columns (like that black line between 'In/Out' and Line), holding down the left mouse button (the cursor will change), and dragging the mouse to how wide you want the column.

Settings Saved after Use

The application will remember your preferences. When you restart the application, most settings will be preserved.

Playing Calls from within the Utility

To play from within the cataloging utility, first select the call you want to play from the play list by clicking on it. The time display (below the player buttons) will show how many seconds are in the call.   Next, press the play button. There will be a short pause as the call is processed for playing.

As the call starts to play, the different buttons will stop being gray and the position slider will display what position in the call is currently playing. (You can see the name of the button by placing the mouse cursor over the button for more than 2 seconds.) These buttons become active during playback:

'Pause' - pauses playing of the call

'Stop' - stops the playing of the call

'Jump to start of call' - jumps to the start of the call and continues playing (the |<< button)

'Step back' - steps back 1/20 of the length of the call with each press (the << button)

'Step forward' - steps forward 1/20 of the length of the call with each press (the >> button)

You can jump to any position in the call by clicking on the slider handle (the rectangle that keeps moving) and dragging it left or right while the call is playing. When you let go of the mouse button, the call will begin playing from that position.

Sorting Calls

You can sort calls in ascending or descending order of the values in a particular column. To sort calls, press the header button above the column you want to sort

After sorting, the header you have sorted will have a (*) next to the name. The first time you sort a column, the values will be in ascending order (A to Z, 0 to 9), then the next time you press the header button, the values will be sorted descending (Z to A, 9 to 0).   Several sorting options are available:

- Sorting the 'In/Out' column will sort by direction (Unknown calls before Incoming calls), then by Line #, then Date, then Time.

- Sorting by 'Line' will sort calls by Line # , then by CD ID, then Date, then Time.

- Sorting by 'Phone #' will sort by Phone number, then by Date, then Time.

- Sorting by 'Date' will sort by Date, then Time.

- Sorting by 'Time' will sort by time, then by Date

- Sorting by 'Length' will sort by call length, then by Date.

- Sorting by 'CD ID' will sort by 'CD ID', then by Date.

- Sorting by 'Location' will sort by location (alphabetically), then by Date.

Filtering Calls

You can select which calls are displayed in the call list by selecting the 'Filter Calls…' button or when initially selecting a source directory.

The 'Display Filters' dialog is then displayed. This allows you to select particular time and date ranges, as well as certain channels. Results will be displayed quickly if your search criteria are as specific as possible.

NOTE: The application will filter based on <u>ALL</u> values you enter. If you select 'Filter by time' between 12:00:00 AM and 12:15:00 AM that contain "408", only those calls that were received or placed between those times AND contain "408" will be displayed. The values you enter are inclusive. If you entered times between 12:00:00 AM and 12:15:00 AM for filtering, the filters would include calls with a start time greater than OR EQUAL to 12:00:00 AM and less than OR EQUAL to 12:15:00 AM.

A Sorting Example:

Your 911 operator remembers the call you're interested in came in on Line 2 between 12:00 AM and 12:15 AM on January 12th, 2002 and remembers the call was from a person in San Jose, California. So, you will choose:

'Incoming' from the 'Call Direction' list

'Line Number' between 2 and 2

Select the 'Filter by date' check box and select January 12th, 2000 for BOTH calendars.

Select the 'Filter by time' check box and select '12:00:00 AM' in the 'From this time' box and '12:15:00 AM' in the 'To this time' box

Select the 'Filter by Phone Number' check box and enter "408" (without the quotes) in the text box.

If the operator couldn't remember what day the call came in, you could uncheck the 'Filter by date' check box.

When you press the 'Set' button, another dialog box will pop up confirming the values the program will use to filter. If you wish to alter these values, press 'No' and the program will send you back to the filter dialog.

Sending Calls and Catalog Files via Email

Another great feature of the utility is the ability to send both catalog files (.MIL files) and call files to other people via email right out of the application. To do this, you must have a MAPI-based email program like Microsoft's Outlook or Outlook Express, or Netscape Communicator installed.

Previewing, Checking, and Copying Calls to Disk

With thousands of calls to select from, sorting them one at a time can be very time consuming. To save time, we have added the ability to copy selected or checked calls to an

existing folder on the hard drive. After doing so, you can use SoundForge or other audio editing utilities to modify the recordings. To do this, follow these steps:

1) Use the filter controls to select a date and time range, as well as the channels (lines) of interest.

2) Select multiple calls on the list using either the CTRL, ALT, or SHIFT keys and your mouse.

3) Play the calls using the player controls. Listen for calls of interest.

4) Select only the calls of interest by clicking on the check boxes to the left of the calls.

5) Use the "Copy Checked Calls to HD" menu choice to make a duplicate copy of these calls on your local machine.

Setting up your e-mail program:

1) Select 'Start Menu | Settings… | Control Panel' from the Start Menu.

2) Double click on the 'Internet Options' selection. The following dialog box pops up… Click on the 'Programs' tab at the top.

3) The 'E-mail' list box should have something selected in it. If it doesn't, press the little down arrow and select one of the options from the list. This is the program the utility will use to email files.

4) Click the 'OK' button to make this dialog box go away.

Using the Utility to Send Calls via E-Mail

1) Create a catalog list (either from an attached logger, or from a CD backup).

2) Select one of the calls displayed on the call list. Make sure you're not playing the call when you try to send it. Windows won't let you play AND send the same file at the same time.

3) Select 'File | Send WAV file…'. This causes the utility to convert the call file on the CD to a standard WAV sound file, which can be played on almost any computer. Then the application will start your email client program and attach that file to an email message which you can send to multiple people.

Using the Utility to Send Catalog Files via E-Mail

To send a catalog file, first filter the calls of interest using the filter dialog box. Next, select 'File | Send MIL file…'. The application will start your email client program and attach that file to an email message which you can send to multiple people. The receiver will be able to open the file with another copy of the utility and filter/sort the catalog file, but won't be able to play calls without access to the CD or hard drive from which the files were cataloged

Setting Program Preferences

To do it's job correctly, the application must know some things about your installation are and how you dial phone numbers (whether you need to dial 10 digits for local calls, what your local area code is, whether you need to dial '9' to get an outside line, etc).

There are also some other personal settings, like what to print at the top of a printed report and what fonts you'd like to use in your reports. Follow these steps to set these options:

1) Select the 'Edit | Preferences…' menu choice.

2) Type in your local area code (if your phone company uses them), the numbers you must dial for local and long distance calls, the numbers you use to disable call waiting, and check the box if you need to dialog 10 digits to make local calls in your area. NOTE: If you do not have to dial anything to get an outside line, or don't have call waiting, don't enter anything in the corresponding text box.

3) When you call list reports, you will probably want information like your company name printed at the top of each page. The 'Header to place on reports' section allows you to select if you want the text justified to the left, right, or center, and the font to use for that header. If you select the 'Choose…' button, a font selection box will appear to allow you to choose the font to use. If you select 'OK', the text box will change to show you the font you have selected.

4) Select a new 'Font for the body of the reports' in the bottom section.

Saving Audio and Catalog Files

To save a .MIL file:

Press the 'Save' button on the toolbar, or select 'File | Save'. If you have not selected a name for the file, a

dialog box will pop up that allows you to type in a name and location for the file. The file name defaults to the CD ID of the CD, but you can change this name

To save a WAV file:

You can also save a call file to a file in WAV format, which allows them to be played on any Windows computer with a sound card (the calls are in a compressed format on the CD, and this uncompresses a call and saves it to WAV file format). To do this:

1) Catalog a CD or open a MIL file.

2) Select the call you wish to save from the call list

3) Select 'File | Save WAV file…' A dialog box will appear that allows you to select the name of the file and its location.

Previewing Printed Lists

To preview a list, first catalog a CD or open a MIL file, then select the Print Preview toolbar button or select the 'File | Print Preview…' menu choice. *Only the calls that are displayed on the call list will be printed.* If you have call filtering enabled, not all the calls on the CD may be displayed. The header at the top of each page, and all the call information, will be printed with the fonts selected in the Preferences dialog. If the columns run over onto one another, you may need to adjust the size of the fonts to make things look better. You can also switch to 'Landscape' mode by selecting 'File | Page Setup…' This will give more room for wider columns of information.

Printing a Catalog of Calls (Call Listing)

To print a catalog of calls, first Catalog a CD or open a MIL file. Then select the Print toolbar button or select the 'File | Print…' menu choice. A dialog box will pop up that allows you so select the printer to use, the number of copies, and other printing preferences.

As with Previewing, only the calls that are displayed in the call list will be printed. If you have call filtering enabled, not all the calls on the CD may be displayed. The header at the top of each page, and all the call information, will be printed with the fonts selected in the Preferences dialog. If the columns run over onto one another, you'll have to adjust the size of the fonts to make it look better, or switch to 'Landscape' mode by selecting 'File | Page Setup…' This will print the call lists the long way on a page and give more room for the columns of information.

Searching for Calls by Address

The cataloging application can determine what phone number was dialed on an outgoing call. You may couple this with a database of phone numbers and addresses to allow you to find the address of a called number.

To use this feature, press the 'Address' button . A dialog box will pop up showing the phone number and address of the selected call, if the phone number is in the database. You can select other calls from the call list to find out the address of other calls.

The address database is a standard Microsoft Access database. Feel free to add your own records to the .mdb file installed in the same directory as the application. Use the database that most suits your application. For example, corporations may use a customer, prospect, or vendor file. Law enforcement users may use a criminal database.

The address databases can be very large-- well over a million records. As you switch between calls, the lookups may take a few seconds.

We have added customizable fields to the database structure, so that you will be able to add your own data to the address database and have it displayed in this dialog box. Contact DLI at (408) 330-5599 for more information on this feature.

Line Terminology and Compatibility

This section briefly covers the types of phone lines typically encountered when connecting logging equipment. If you are unfamiliar with these terms, you may choose to refer installation to a qualified installer, contact DLI for free technical support, or request that a DLI installer schedule a site visit on a time and materials basis.

DECIBEL TRANSMISSION AND INPUT LEVELS

Telecommunications line levels are measured in decibels (dB). Decibels are a power ratio measurement. Voltage, sound intensity, and electrical power may be expressed in decibels. Telecommunications levels are typically expressed as a ratio of power in either dBm or dBv. The most common measurement is the dBm, which refers to a decibel level measured with respect to a one milliwatt signal (typically on a 600 ohm line). A change of three decibels is approximately double the power. A change of 60 decibels refers to a power ratio of 1,000,000 to 1. Typical phone line levels are –3dBm peak for bridging outside lines, and –13dBm for bridging handsets. The MIL-4000N logger will operate reliably with peak input levels in the range of –40dBm to +3dBm. Higher levels need to be attenuated, and lower levels need to be amplified prior to connection to the logger. A transmission impairment measurement (TIMS) set or true RMS voltmeter with differential input is useful for checking input levels prior to installation, and for troubleshooting logger connections.

NOISE FLOOR

Phone line noise floors may range between –84dBm for a very quiet line to –35dBm for a noisy line. Noise is typically worst on wet lines when all phones are on-hook and the

line is unterminated. Local telephone companies have noise specifications based on the line distance to the central office. Noise may be measured using a TIMS, and line distance is measured using a time domain reflectometer (TDR). The VOX circuitry in the MIL-4000N automatically compensates for varying noise floors. Additional circuitry in the logger is designed to eliminate on-hook noise when wet lines are detected. Noise floors can be significantly increased when analog pairs are located near digital pairs. An example would be a long run handset back-haul from a digital phone. If noise floors exceed acceptable levels, a separate cable with a tighter wire twist should be considered.

IMPEDANCE

Most phone lines are 600 Ohm impedance, although 135 and 120 ohm lines are also common. The MIL-4000N logger will directly connect to lines in this impedance range, as well as to high impedance sources, such as handsets.

HEADSETS

Most headset connections are in the range of 600 Ohm to 10K Ohm. These connections may be directly bridged using a "Y" connector, which ties to the logger. In call center applications, the connection to the headset may be made inside the telephone itself, and the audio may be back-hauled through an unused pair on the cable, or through a separate recording cable.

RADIOS

Most radio audio sources intended for connection to speakers are very low impedance (typically 4 to 8 ohms). If you are connecting to a radio receiver output that is intended for a speaker, bridge the line directly at the speaker connection. If you choose to disconnect the

speaker, a load resistor placed across the line may be necessary for the radio amplifier to function properly.

If the output level at the bridging point is over +3dBm, you should add a series resistor to bring it within the logger's input range of -40 to +3dBm. An example of a high level audio source is a 70-volt public address speaker system. Connecting a 470K ohm resistor in series with a 70-volt system will bring levels within the recording range of the logger. A transformer may also help to match impedance if the logger is located a long distance from the radios.

Keep in mind that the input impedance of the logger is over 10K ohm. The logger is "AC coupled", and "DC Blocked" with self-healing capacitors at the input stage, so you cannot measure the logger impedance directly with a DC meter.

WET LINES
Wet lines are phone lines that draw power from the central office, or from a PBX. Audio is superimposed upon the DC power. Power to the station set is direct current (DC), and is typically 48 volts. To determine if you have a wet line, you can connect a DC voltmeter across the line. A typical voltage range for a 48-volt wet line in on-hook state is 44-50VDC. A typical voltage range for a 48-volt wet line in the off-hook state is 5-15VDC. The MIL-4000N may be connected directly to either wet or dry lines due to the DC blocking within the logger.

ON HOOK NOISE
The MIL-4000N includes circuitry designed to eliminate on-hook noise on 48-volt wet lines. This minimizes noise input to the VOX circuitry. Line voltages over 41VDC cause the logger to reduce input sensitivity, minimizing false VOX trips when the line is on hook. An

additional circuit will detect rings, start recording, and allow caller-ID to pass to the recording. This on-hook control feature is automatically disabled when the logger is connected to a dry line.

DRY LINES

Dry lines are phone lines, which transmit audio, but not power. Dry lines measure 0VDC at all times when checked with a DC voltmeter. Dry lines may be connected directly to the logger. To connect a dry line, first verify that it is within the levels mentioned above, then bridge it directly to the logger input.

BALANCED AND UNBALANCED LINES

The inputs to the MIL-4000N 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.

2 WIRE vs. 4 WIRE (E&M) LINES

Four wire lines employ a separate path for both heard (ear) and spoken (mouth) audio. These lines are also called E&M or Ear and Mouth lines. An external transformer combiner is required to convert a four-wire E&M system into a two-wire output for the logger. Please contact DLI for technical support if you are recording from four-wire E&M lines. Four wire E&M lines should not be confused with single-pair lines in which a four-wire cable is used, but only the center pair carries audio.

DIGITAL SUBSCRIBER LINES (DSL)

The logger may be connected to DSL lines with an analog filter. These filters are usually provided by your local carrier when the ISDN line is installed.

CODE OVER VOICE LINES (COV)

Most code-over-voice (COV) lines use in-band signaling, typically DTMF to remotely control an attached set. The most common COV device is an analog voice-mail system. The logger will directly bridge this type of line and record DTMF. Call analysis software may be used to decode mail box numbers and other codes sent in DTMF format.

LOOP START CONTROL

Loop start lines use line current to control dial-tone and call progress. Loop start lines may be connected directly to the logger. Some loop start lines, commonly off-premise-extension, or OPX lines *may* use in-band signaling. In-band signaling is audio signaling such as DTMF which is sent in the voice band when the line is on-hook. To check if a line is using in-band signaling, listen to the line with a butt-set or TIMs while the line is on-hook. If lines with in-band audio signaling are connected, the logger will VOX start and record the signaling tones. If this is not desirable, contact DLI for an external loop start controller which will completely disconnect the logger from the line when loop current is not present. These controllers are available in four channel modules.

VOX NOISE CANCELLATION

The MIL-4000N employs an automatic voice operated switch (VOX) system that starts recording when sounds are detected and stops after a specified period of silence. This patented system automatically integrates the noise level on the line, and only starts recording when the audio level on the line shifts away from the baseline noise level. For this reason, the VOX will stop recording if a continuous tone (for example a dial tone) is detected. With the exception of the timeout value, this system is non-adjustable. It has been proven to be the most universally compatible VOX method in voice applications. If you have

a non-standard application that requires different VOX characteristics, please contact DLI technical support with your specific requirements.

LIGHTNING PROTECTION

In areas subject to extensive lightning activity, an additional lightning protector may be helpful. If you are connecting a logger to outside lines, choose a bridging location as close as possible to the carbon lightning arrestors provided by your local carrier. If you need additional lightening protection, please contact DLI. If you are connecting the logger to inside lines, providing a good ground source for the unit should be sufficient.

RECORDING FREQUENCY SPECTRUM

The MIL-4000N logger records audio in the frequency range of 50 to 4,000 Hz. Telephone audio is normally limited to the 300Hz-3KHz range. Noise above 4,000Hz may adversely affect the performance of the logger.

Governmental Approvals

FCC PART 15 – UNITED STATES

This equipment has been tested and found to comply with the limits of a class A digital device pursuant to part 15 of the FCC rules and regulations. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user may be required to correct the interference at his own expense.

FCC PART 68B AND ACTA – UNITED STATES

This equipment complies with Part 68 of the FCC Rules and the requirements adopted by ACTA. On the bottom of this equipment is a label that contains a product identifier in the format US:AAEQ##TXXX. If requested this information must be provided to your telephone company. A plug and jack used to connect this equipment to the premises wiring must comply with the applicable FCC Part 68 rules and requirements as adopted by ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a jack that is also compliant. The REN is used to determine the number of devices that may connect to a telephone line. Excessive RENS on the telephone line bay result in the devices not ringing in response to an incoming call. The sums of the RENS should not exceed 5.0. To be certain of the total REN specification in your area, contact your

local telephone company. For product approved after July 23, 2001, the REN equivalence is a part of the product identifier number.

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. Please contact DLI for support in this instance. Complaints may also be filed with the FCC. The telephone company may make changes to its facilities, equipment, operations or procedures that affect the function of your equipment. If they do, you should be notified in advance in order to make necessary modifications to maintain uninterrupted service.

Federal and state laws may require that both parties on the line consent to and be informed of recording prior to attaching and starting any recording device.

If trouble is experienced with this unit, or for repair or warranty information, please contact DLI customer service at the address and phone number listed below. If the equipment causes harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved. DO NOT DISASSEMBLE THIS EQUIPMENT. It does not contain user serviceable components, and hazardous voltages exist inside. Telephone companies report that electrical surges, typically lightning transients, are very destructive to customer terminal equipment connected to AC power sources.

FCC ORDER DOCKET NO. 20940
In accordance with the Federal Communications Commission (FCC) Order in Docket No. 20940, consent of all parties are required when conversations are recorded. Usage of this device requires you to obtain such consent.

Please contact your own legal counsel for clarification of this docket. Emergency dispatch centers and law enforcement offices may be exempt from this requirement in certain circumstances. For other information on current recording laws and regulations, visit www.digital-loggers.com/recordinglaws   This web site is provided for informational purposes only, and should not be used as a substitute for appropriate legal advice.

UL, CSA, GRE, BG APPROVALS
This equipment uses a power supply component that is separately rated by UL, CSA and GRE per the labels affixed to that component. Some components are rated by Bauert Gepruft. If you are in need of a specific power supply rating for European applications, please contact Digital Loggers, Inc and specify the rating required prior to ordering.

Technical Support

To save time and effort, please read this manual completely before calling for tech support. You may FAX questions to (408) 541-8459. To contact tech support, dial (408) 330-5595 and please have the following ready so we can better serve you:

- A copy of your invoice and customer number.
- The firmware revision level installed in the system. This information can be found using the About option.
- A description of the type of lines connected to your unit, for example, 600 Ohm Radio, dry line voice mail, etc.

Technical Specifications

Recording Electronics

ALC range	40dB
Input levels	-50dBm to +3dBm
Input DAA	balanced and isolated
Audio encoding format	υ–Law standard 8Kbps
Signal to noise ratio	better than 45dB
Input protection / isolation	5kV peak
Distortion	<.2% THD
Selectable warning tone	CCIT E180 standard

Standard Line Interface

Input Impedance	10K standard
R Equivalence	0.2
VOX time constant	<0.25s

Controls / Display

Monitor	Standard PC LCD
Controls	Keyboard, Mouse.
External interface	RS-232C, up to 115K baud
Metering	20 segment bar graph

Disk Storage

Hard disk format	NTFS or XP
Time clock accuracy	drift less than 2 secs / week, GPS optional
Time clock backup	10 year lithium battery
Time stamp accuracy	64ms internally, 1 sec to disc
Capacity	80GB standard, up to 5TB optionalal

Typical playback software	Microsoft Windows™ Media Player

Environmental / Power

Operating temperature	0 to +50 degrees C
Input electrical safety	UL, CSA approved power supply
Power requirements	110/220VAC switchable, 40-400Hz, 135W typical
Physical dimensions	7"x19"x16" 4U Height, 19" RETMA rack standard

Technical specifications are subject to change without notice as we continuously improve our products. UL and CSA ratings are current, FCC and European Telephone approvals are pending. Call DLI with your custom requirements.

Legal Warnings

Most states require the consent of at least one party before telephone recordings may legally be made. Federal wiretap regulations prohibit recording without informing the parties being recorded, except under specific circumstances, where there is "no legal expectation of privacy."

Police stations, 911 call centers, prisons, and public safety facilities may be exempt from the need to notify parties that they are being recorded. A recording or warning tone may provide appropriate notification. Most states allow the recording of voice mail calls without a monitoring tone. The user assumes all risks as to legal operation of this unit. If you are unclear as to the legality of recording, inform all recorded parties before starting to record. Contact your legal counsel to review state and federal laws before recording.

Limited One Year Warranty

The terms of this warranty may be legally binding. If you do not agree to the terms listed below, return the product immediately in original unopened condition for a full refund. Multiple, redundant logging units are highly recommended for critical applications. Loggers must be protected by Uninterruptable Power Supplies for maximum reliability. The software, firmware, and accompanying written materials are provided "AS–IS" without warranty of any kind. The purchaser assumes the entire risk as to the results and performance of the unit. DLI warrants this digital logger to be free from defects in materials and workmanship for a period of one year from the date of the DLI original invoice. DLI's entire liability and exclusive remedy as to defective hardware shall be, at DLI's option, either (a) return of the purchase price or (b) replacement or repair of the hardware that does not meet DLI's quality control standards and has been returned through proper RMA procedures. DLI's liability for repair or replacement is to DLI's customer ONLY. No warranty service will be provided without an original invoice from DLI and an RMA number provided by technical support. RMA material must be shipped prepaid to DLI. RMA numbers are valid for 15 days from date of issue. This warranty does not cover products modified, subjected to rough handling, or used in applications for which they were not originally intended. No oral advice or verbal warranties made by DLI's employees, dealers, or distributors shall in any way increase the scope of this warranty. DLI makes no warranty as to merchantability or fitness for any particular purpose. Due to the wide range of signal sources available, DLI cannot guarantee compatibility with all system configurations. DLI assumes no liability for incidental or consequential damages arising from the use or inability to use this product. This warranty gives you specific legal rights. You may also have other rights that vary from state to state. Since some states do not allow the exclusion of liability for consequential damages, some of the above limitations may not apply to you. DLI makes no representation as to the legality of recording conversations under any specific circumstances.

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FAX (408) 541-8459
www.digital-loggers.com

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