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at www.micro-aide.com*

**GEAB
GRAPHICAL
EVENT ANALYZER**

USER MANUAL

MICRO-AIDE
Rail Signal Products

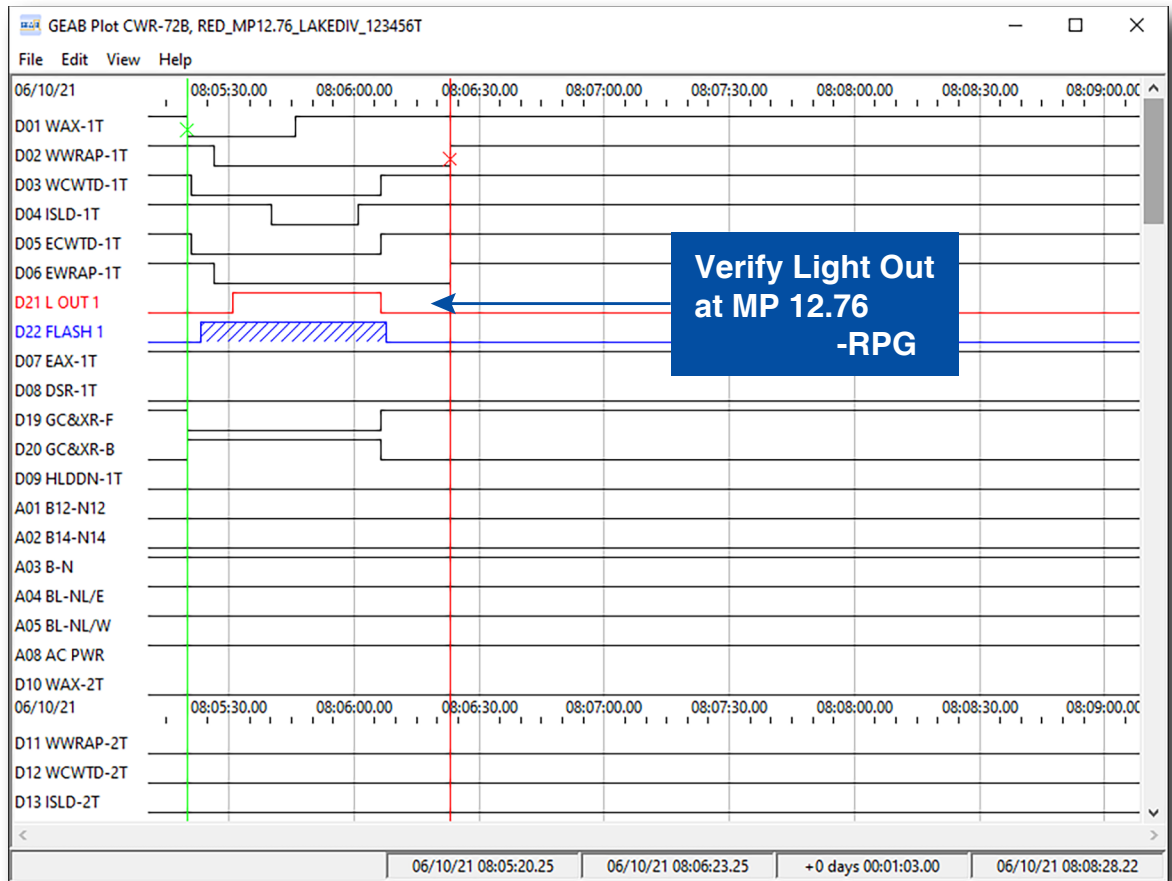
**EVENT RECORDERS ALARM REPORTERS DATA LOGGERS
CLOCK SYNCHRONIZERS CURRENT SENSORS VOLTAGE MONITORS
BATTERY MONITORS LIGHT OUT DETECTORS CUSTOM ENGINEERING**

MICRO-AIDE



www.micro-aide.com

RAIL SIGNAL PRODUCTS



GEAB GRAPHICAL EVENT ANALYZER USER MANUAL

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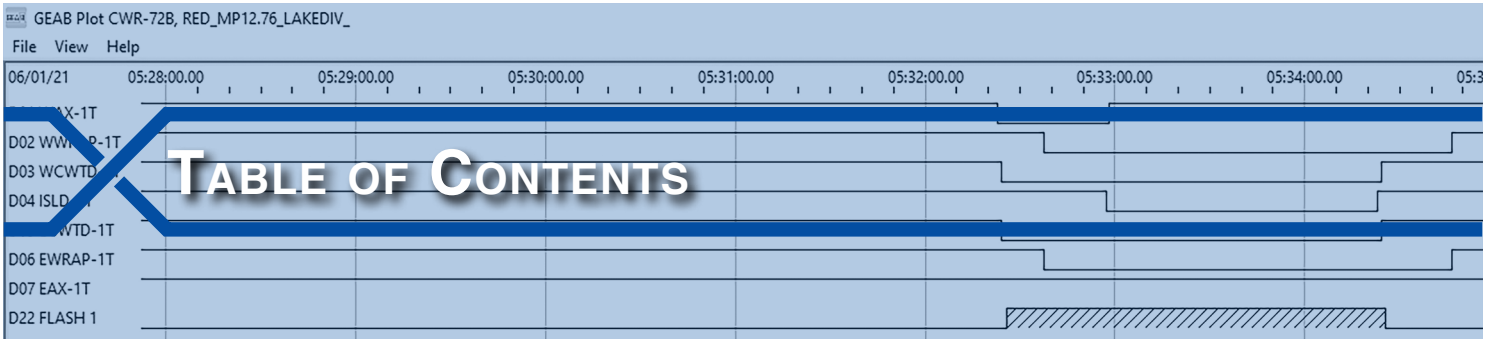
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CHAPTER 1 – GENERAL DESCRIPTION

INTRODUCTION

Since 1988 MICRO-AIDE has provided the rail signal industry with a broad range of Event Recorders, Alarm Reporters and Data Loggers that vary significantly in capacity, size and features. The CWR, CAR and VDL families represents an extensive line of products that include a variety of useful and easy-to-use features favored by many technicians and maintainers.

In 2020 MICRO-AIDE expanded its family of CWR devices with the introduction of its B-model Recorders. Currently the family consists of the CWR-24B, CWR-40B and CWR-72B. With GEAB (Graphical Event Analyzer B-version) MICRO-AIDE has now made the gathering, saving, viewing, analysis and plotting of CWR-B Event Record data even easier. GEAB is a Windows 10®-based application that is fully compatible with all B-model Event Recorders. Working in a Windows® environment the user can take advantage of its intuitive Graphical User Interface (GUI).

GEAB can be quickly and easily installed. GEAB software is provided as a zip file, downloadable from the MICRO-AIDE website. Once installed, a host of database preparation, printing and plotting features are made available to the user. GEAB can be used to access any B-model Recorder by establishing an Ethernet® connection to the Recorder.

All MICRO-AIDE rail signal products, including GEAB, are designed to be easy to use and maintain. Each design is based upon the premise that value and reliability start with attention to detail and a concern for usability rather than needless complexity. Our goal in creating GEAB was to provide the rail signal industry with a valuable software tool that best complements our Recorders, while also filling the needs of technicians and maintainers.

1

REQUIREMENTS

GEAB can be installed and run on a broad range of PC hardware types. However, it should always be installed on a PC running a 64-bit version of Windows 10. A complete list of requirements can be found in the section entitled "[PC Requirements](#)" on page 51.

KEY FEATURES

Listed in the following are some of the many features supported by GEAB.

- Fully compatible with MICRO-AIDE CWR-24B, -40B and -72B Event Recorders.
- A single file is used to install GEAB.
- Fully compatible with Windows 10 64-bit operating systems.
- An unlimited number of Event Recorders can be configured for use with GEAB.
- Setup Databases can be modified using GEAB, even when offline with the Recorder.
- The Setup Database for each Recorder is automatically saved to the PC.
- Both Passwords and the Passcode are encrypted when Downloaded as a text file.

- Data from the Recorders can be acquired locally (i.e., while on site) via an Ethernet connection or remotely via an Ethernet-based LAN connection.
- Each Recorder can be accessed via its assigned fixed IP Address or name.
- The Live Status Window displays the current state of each Recorder input. Simulated, multi-colored LEDs are used to indicate various signal states.
- The database parameters for any input can be viewed within the Live Status Window.
- Searching through the Event Record data for a particular combination of inputs states is facilitated by the use of eight Logical Equations.
- Logical Equations are entirely user-defined. Each yields a distinct Equation Output.
- Event Records can be viewed within GEAB either as text or as simulated pin plots within the Plot Window.
- Every Digital, Analog, Virtual and Alarm Input and Equation Output can be simultaneously plotted on screen.
- Event Records from System Input 1 (i.e., Power On/Off) are plotted on a separate Plotting Channel.
- Any input or Equation Output can be assigned to any Plotting Channel.
- Plotting Channels can be moved and relocated to any position within the Plot Window.
- Plotting Channels can be assigned colors to highlight data of special interest to the user.
- Flashing Event Records are plotted with a distinctive pattern for easy identification.
- Event Records that are viewed as text or on Plotting Channels can also be printed.
- Within the Plot Window, time measurement cursors can be positioned at any change in state.
- Also within the Plot Window, a context menu provides a comprehensive set of multi-level zoom-in and zoom-out controls.
- The mouse scroll wheel can also be used to zoom-in and zoom-out.
- Plot Window settings can be saved as a template and then reapplied to another plot at any time.
- Using the Ghostscript® application the Plot Window can be saved as an Adobe PDF® file or PNG image. It can then be annotated as the user may desire.
- An extensive HTML-based help document can be accessed directly within GEAB.
- The Real-time Plot feature provides a continuously updated, multi-channel view of each input. Available in a future release.

1

SOFTWARE MODIFICATION HISTORY

Features have either been introduced or modified as the result of the following software modifications.

- V1.00** Initial release.
- V1.01** Within GEAB, the Administrative and Restricted Passwords and Passcode are encrypted and decrypted when Downloaded and Uploaded, respectively. Requires version 1.03 (or later) software in the Event Recorder.
- V1.02** Eight Logical Equations, each containing up to four variables, can be defined by the user. Each Logical Equation yields an Equation Output. Alarm Inputs, Equation Outputs and System Input 1 are now plotted. If a Setup Database has not been Downloaded for a selected Recorder, the factory default database is used and saved when attempting to edit a database. The vertical list of Recorders in the GEAB Window can now manually changed.

V1.03 Corrected the background tinting of the **Edit > Edit Setup...** command Window.

EVENT RECORDER SOFTWARE

GEAB is designed for compatibility with the latest B-model Recorder software. Conversely, in some very rare cases it will not fully support older Recorder software versions. For this reason MICRO-AIDE advises all GEAB users to upgrade the software used by their Recorders whenever a new version of GEAB is installed. The latest versions of the GEAB software and B-model Recorder software are always available as downloadable files from the MICRO-AIDE website. There is no charge to the user for downloading files. The user is encouraged to contact MICRO-AIDE directly if a question regarding GEAB and Recorder compatibility arises.

The current version of the software file used by each MICRO-AIDE B-model Recorder and GEAB can be found at the following webpage.

www.micro-aide.com/support/downloads.html

ABOUT THIS MANUAL

TERMS

This document refers to various features, settings, options and properties that are unique to GEAB and MICRO-AIDE Event Recorders. This section provides a list of important terms and how each term is defined and used within the context of GEAB. Throughout this document, each term will be first-letter capitalized (e.g., Recorder Data Folder). It may be helpful to think of terms using first-letter capitalization as the proper name of an important feature, setting, option or property and is specific to the use of GEAB.

Analog Input-any Analog Input supported by the Recorder that is connected to a battery or AC power source.

Cursor-a measurement tool provided in the Plot Window to indicate time differences and when an Event Record was time stamped.

Digital Input-any Digital Input supported by the Recorder that is connected to a set of relay contacts.

Download (or Downloaded)-the operation of copying the Recorder's Setup Database file to GEAB.

Equation Output-the output that is the result of a Logical Equation defined within GEAB.

Event Record-a date and time stamped single line of text that contains all of the details related to the change in state of an Analog, Digital or Virtual Input.

GEAB Data Folder-a user-defined folder that is located on a PC drive and contains all of the Recorder data created or used by GEAB.

GEAB Window-the window that appears immediately after launching GEAB, inclusive of all commands and the list of Recorders.

Live Status Window-a separate window opened by GEAB that reports the real-time status of each input.

Logical Equation-defined within GEAB to find the simultaneous occurrences of several states shared among one to four inputs.

Menu Bar-the collection of grouped commands that appear near the top of the GEAB Window.

Off-as used by the Recorder and appears as a lower line on the assigned Plotting Channel.

On-as used by the Recorder and appears as an elevated line on the assigned Plotting Channel.

Passcode-the numeric code that controls access to the Recorder's front panel and included within GEAB.

- Password** - either the Administrative or Restricted Password as used by the Recorder and included with GEAB.
- Plot Item** - A Digital, Analog, Virtual or Alarm Input, Equation Output or System Input 1.
- Plot Window** - a separate window opened by GEAB that supports dozens of individual Plotting Channels.
- Plotting Channel** - the GEAB electronic equivalent of a single pen used by a physical pen recorder.
- Recorder** - unless otherwise stated, any MICRO-AIDE CWR-24B, CWR-40B or CWR-72B device.
- Recorder Data Folder** - the folder contained within the GEAB Data Folder that is used by a single Recorder to store various data files.
- Setup Database** - the collection of settings, parameters, names and labels used by the Recorder and used and maintained within GEAB.
- System Input** - used to report changes in state that are applicable to the Recorder as a whole (e.g., power, internal temperature, etc.).
- Upload (or Uploaded)** - the operation of copying the Setup Database file from GEAB to the Recorder.
- Virtual Input** - any Virtual Input supported by the Recorder that is used to perform logical analysis of the Event Record data.
- Windows** - specifically the Microsoft Windows 10 64-bit operating system inclusive of all its features.

CONVENTIONS

Throughout this document there are frequent references to items that are meant to be understood literally. These items can include, but are not limited to, commands, filenames and folder names. As an example of this convention, the Setup Database file named **setup.txt** is to be understood literally. It is not a reference to a text file that may be named setup.txt or something similar, rather it must be named **setup.txt**. Bold text is used to highlight these items. The item referenced by the bold text is sufficiently important that it should be entered, clicked or selected exactly as it is. Doing otherwise may result in the failure of an important procedure.

1

VERSION

This document is intended to provide the user with comprehensive, easy-to-read instructions on how to install, set up and use MICRO-AIDE's GEAB software. This document refers to Version 1.03 of the GEAB software. The sample data and command details depicted were prepared using Version 1.03. The numerous screen shots were captured from a Windows 10 computer. Wherever possible, step-by-step instructions have been included. In the event the user has questions about any of the described procedures the user should contact MICRO-AIDE for assistance.

MICRO-AIDE CORPORATION

685 Arrow Grand Circle

Covina, CA 91722

Tel: 626-915-5502 Fax: 626-331-9484

E-mail: support@micro-aide.com



The MICRO-AIDE "Material Return" and "Limited Warranty" policies can be found on the inside back cover of this manual.

The next chapter describes how to install and set up GEAB.

CHAPTER 2 – INSTALLATION AND SETUP

INTRODUCTION

This chapter describes how to properly install the GEAB software as provided and recommended by MICRO-AIDE. A detailed description of how to set up GEAB is also provided.



Numerous screen shots and operating system references are included throughout this User Manual. Windows 10 was used exclusively in the preparation of this document.

INSTALLATION

COMPATIBILITY AND SECURITY

GEAB has been successfully installed and used on several 64-bit versions of Windows 10. The procedure for installing GEAB is the same, regardless of the operating system version being used. GEAB should always be installed to a folder that incorporates the security and access restrictions desired by the user. This is particularly true of PCs configured for multiple users. The procedures for configuring these security features are outside the scope of this User Manual. The user may wish to confer with an I.T. specialist as regards this matter.

2



GEAB can be installed and used on any 64-bit version of Windows 10 PC that is also running GEA. GEA will continue to be supportive of all its compatible recording devices.

INSTALLATION PROCEDURE

Installing GEAB involves only a few simple steps. The Installation Procedure is similar to that used by many Windows applications. Less than 50 MBytes of disk space is required.

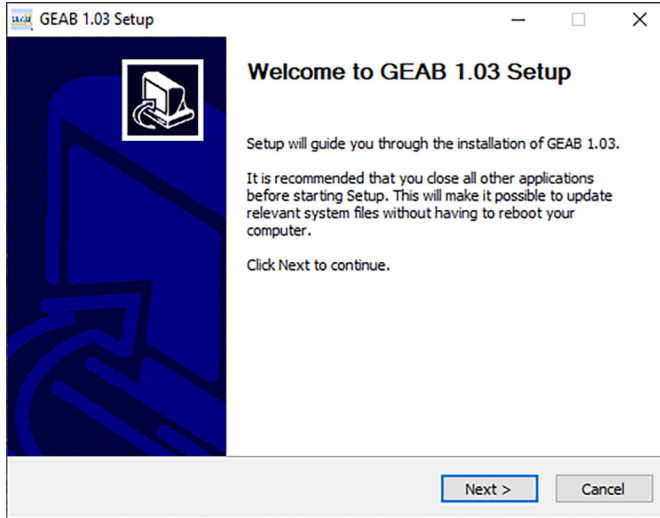
The following step-by-step procedure assumes that the **geab_v103.zip** file has been downloaded from the MICRO-AIDE website and saved to the PC's Desktop. The **GEAB_V1.03.exe** file should then be extracted and also saved to the Desktop. The GEAB installation file includes all of the GEAB-specific files. Their installation is mandatory.



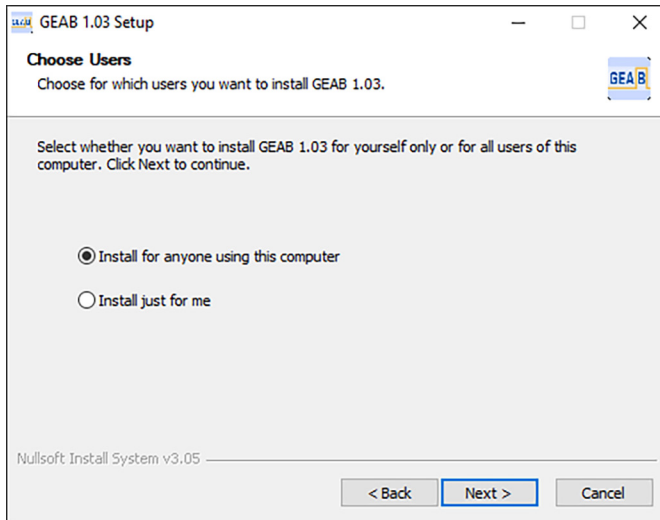
If the Installation Procedure is being used to install an updated version of GEAB, the previous version must be uninstalled first. Refer to the section entitled "[Uninstall Procedure](#)" on page 8.

INSTALLING GEAB

1. Double-click the file named **GEAB_V1.03.exe**.
2. The following screen will be displayed. Click the button labeled **Next >** to proceed with the installation.



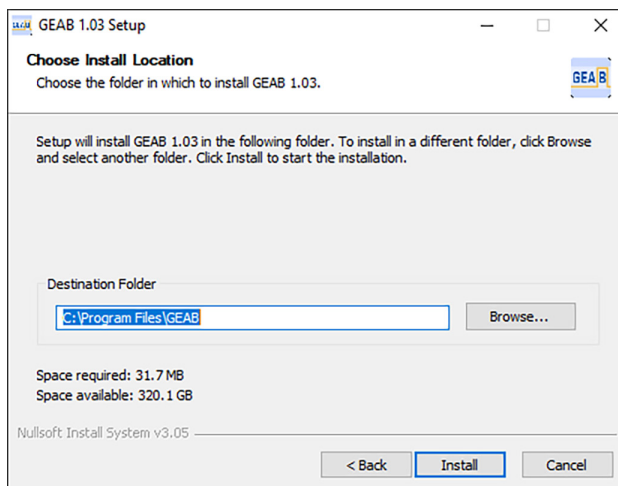
3. Set the appropriate radio button as required by multi-user or single-user operation. Then click the button labeled **Next >** to proceed.



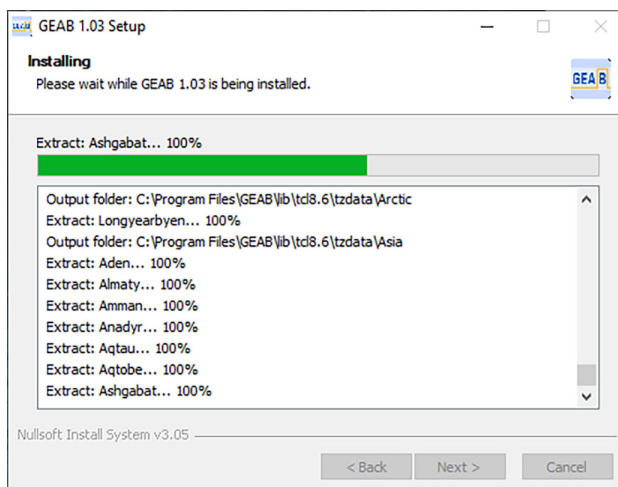
4. The **Choose Install Location** dialog box shown in the following will appear. The user must confirm or select the folder where the GEAB application files will be installed. By default, the **C:\Program Files\GEAB** folder is preselected. However, the user can select a different folder.



MICRO-AIDE strongly recommends that the user accept the preselected folder location for the installation of GEAB.



5. Click the **Install** button after the **Destination Folder** setting has been selected.
6. The installation will then proceed. The following dialog box will report the progress of the installation. It will complete automatically, typically after several seconds.

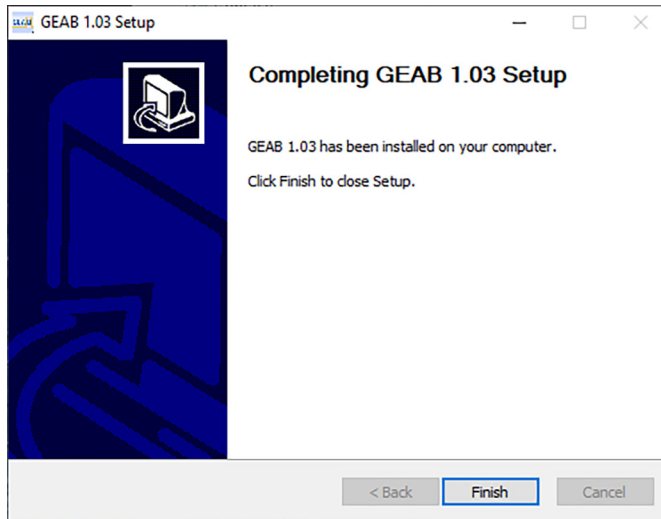


7. At the completion of the installation the following dialog box will appear. Click the button labeled **Finish**. GEAB is now installed and ready to be launched.



As a convenience, the user may wish to add a GEAB shortcut to the Desktop.

The **geab_v103.zip** and **GEAB_V1.03.exe** files are of no further use. Both can be deleted from their saved location. However, do not delete any files from the **C:\Program Files\GEAB** folder.



UNINSTALL PROCEDURE

The user may on occasion have need to uninstall GEAB. Uninstalling GEAB is described in the following section.



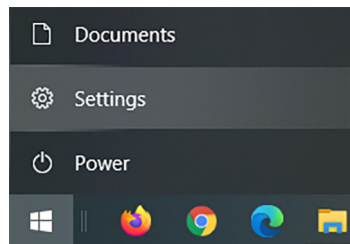
MICRO-AIDE recommends that GEAB always be uninstalled before a new version of the application is installed.

UNINSTALLING GEAB

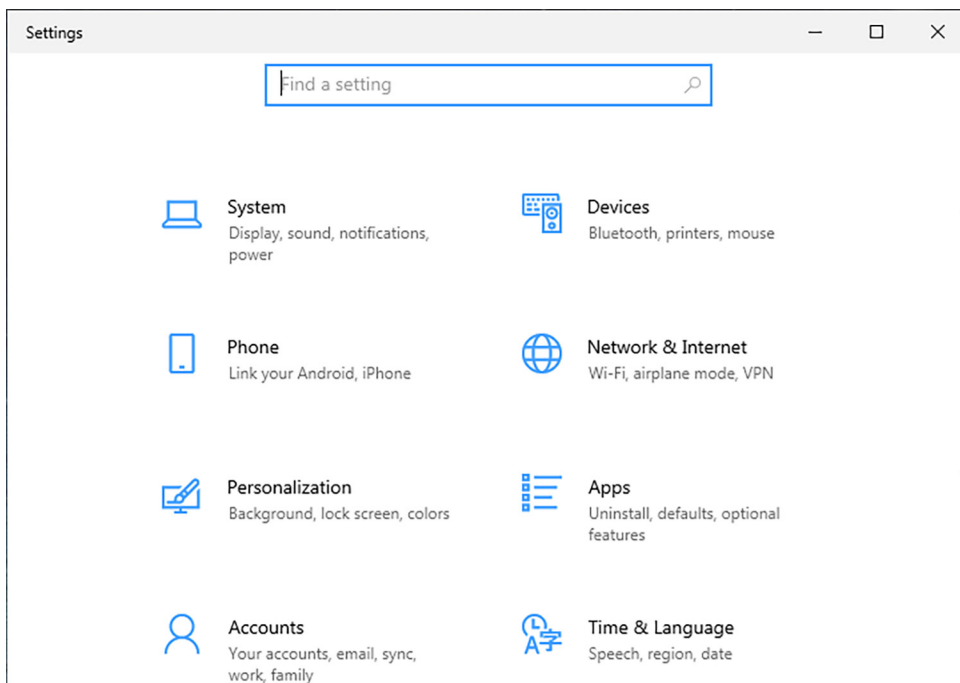
2

Complete the steps listed in the following section to uninstall GEAB.

1. Click the Windows **Start** button at the lower left corner of the Desktop.
2. Click the button labeled **Settings** as highlighted in the following screen.



3. A dialog box similar to the following will be displayed. Click the button labeled **Apps**.



4. A long list of installed applications will be displayed. Scroll down as necessary to locate GEAB. Click the **GEAB** item. In the context menu that opens, click the button labeled **Uninstall**. In the subsequent dialog box that opens, confirm the operation by clicking the **Uninstall** button.
5. The uninstall will proceed as indicated by a dialog box that will auto-complete after a few seconds.
6. Finally, click the button labeled **Close** to complete the Uninstall Procedure.



If the GEAB Data Folder has been created as the result of a previous installation, its contents will not be affected as the result of the Uninstall Procedure. The Uninstall Procedure removes only the GEAB executable files.

2

LAUNCHING GEAB AND GETTING HELP

INITIAL LAUNCH

To launch GEAB double-click the Desktop icon or click the Windows Start Menu item named **GEAB**. If GEAB is being launched for the first time the screen labeled [Figure 1 on page 10](#) will be displayed.

Near the top of the GEAB Window is a Menu Bar comprised of six commands. These commands function as common Windows commands. To execute a command simply click the command. In several cases subcommands will be displayed.

GETTING HELP

At the right end of the Menu Bar is the Help command. Click the **Help** command, followed by the **Help** subcommand (i.e., **Help>Help**). The user's default Browser will be automatically launched. The Browser will then display the GEAB Help page. A portion of the GEAB Help page is depicted in [Figure 2 on page 10](#). Firefox® was used in the example shown. The Help page contains an extensive collection of topics with links that can be clicked for ease of navigation. The Browser's find text feature can also be used to quickly search for a particular topic or text phrase.



The GEAB Help page should be consulted often as it is very comprehensive and is always available whenever GEAB is running.

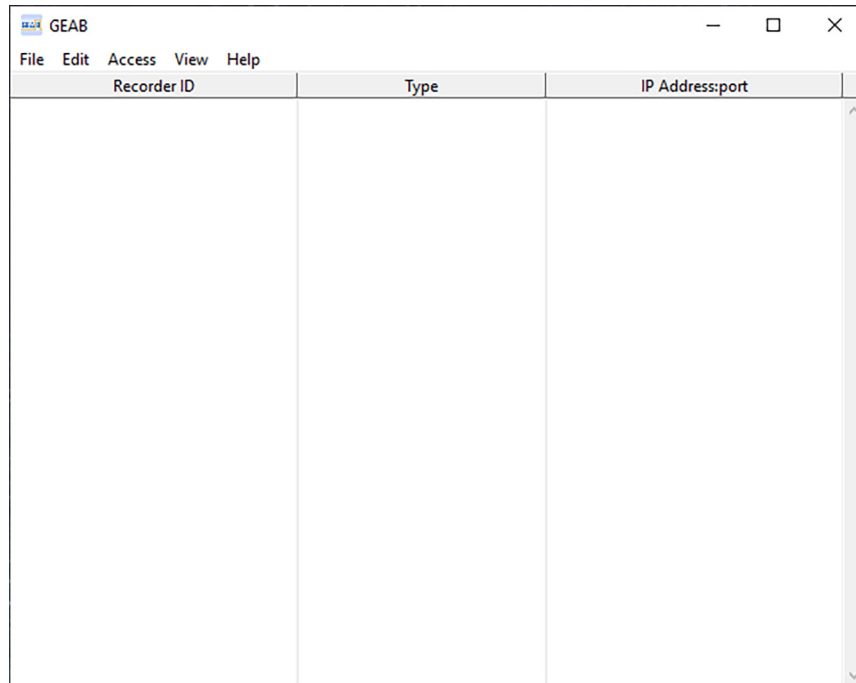


Figure 1: GEAB Window - Initial Condition

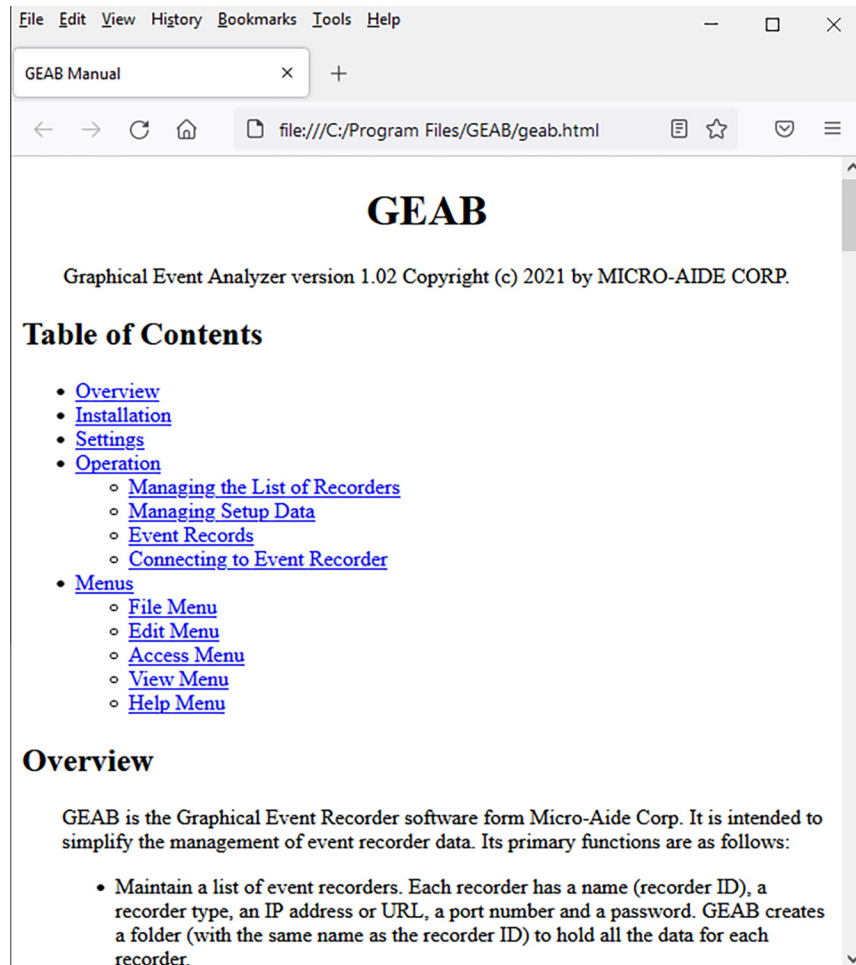


Figure 2: GEAB Help Page

SETTING UP GEAB

Setting up GEAB involves two procedures. The first is to create and then target the GEAB Data Folder. The second is to install and then target the Ghostscript application. Both procedures are described in the sections that follow.

GEAB DATA FOLDER

CREATING AND NAMING THE GEAB DATA FOLDER

GEAB can be used to access an unlimited number of B-model Recorders. In the next chapter the procedure for adding a Recorder to the GEAB list of accessible Recorders will be described. For now it is important to understand that GEAB requires a main data folder that will eventually contain numerous subfolders. Each subfolder is uniquely associated with one Recorder. The subfolders are referred to as Recorder Data Folders. At the highest level of this folder hierarchy is the main GEAB Data Folder.

The most important step in setting up GEAB is to properly create the GEAB Data Folder. To do this, perform the following steps.

1. Launch File Explorer within Windows.
2. Navigate to the user Documents folder or Desktop.
3. Right-click the Documents folder or Desktop to display the context menu.
4. Click the **New > Folder** command.
5. Change the folder name from **New folder** to **GEABData**.

The proper GEAB Data Folder has been created.



Under no conditions should the GEAB Data Folder be located anywhere in the Program Files area of the PC's C-drive. To be consistent with this documentation and the GEAB Help Page, MICRO-AIDE strongly recommends that it be named **GEABData** and located either in the user's Documents folder or on the Desktop.

2

TARGETING THE GEABDATA FOLDER

To use the **GEABData** folder, GEAB must be made aware of its location. Do this by performing the following steps.

1. From the Menu Bar of the GEAB Window click the **Edit > Setting...** command. The following dialog box will be displayed.

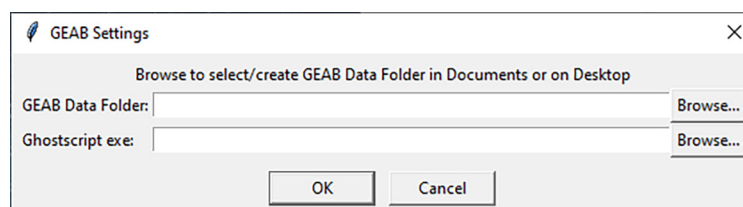
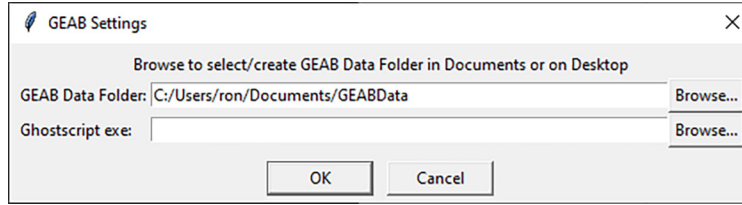


Figure 3: Edit > Setting... Command

2. To the right of the edit box labeled **GEAB Data Folder:** click the button labeled **Browse...**
3. In the folder selection dialog box that appears, navigate to the location of the **GEABData** folder and select it.
4. In the folder selection dialog box click the button labeled **Select Folder**. The dialog box will close automatically.
5. As depicted in the following figure, the dialog box from the first step will reappear with the location of the **GEABData** folder listed.



GHOSTSCRIPT APPLICATION

A key feature of GEAB is the ability to plot Event Record data from Digital, Analog, Virtual and Alarm Inputs as well as Equation Outputs. The Plot Window is the subject of [Chapter 6](#). The Plot Window can be configured in a variety of ways to suit the user's needs. Once configured, it can be converted and exported as a PDF or PNG file. Both file types can be annotated with labels and graphics that draw attention to an item of interest to the viewer. The annotation can be performed using a PDF editor (e.g., Adobe Acrobat®) or photo editor (e.g., Adobe Photoshop®).

The Plot Window conversion operation is performed by an application known as Ghostscript®. For GEAB to use Ghostscript the application must be installed and then targeted. Both procedures are described in the following two sections.

DOWNLOADING AND INSTALLING GHOSTSCRIPT

To download the current version of Ghostscript, start by clicking the following webpage link: <https://www.ghostscript.com/download/gsdnld.html>.

In the row labeled **Ghostscript 9.54.0 for Windows (64 bit)** click the link labeled **Ghostscript AGPL Release**. Clicking the link will download the **gs9540w64.exe** file. Double-click the .exe file to proceed with the installation of Ghostscript.

2



Do not install Ghostscript anywhere other than as described in the installation procedure. At the completion of the installation, this can be confirmed by locating the Ghostscript folder named **gs** in the **Program Files** folder of the PC's C-drive.

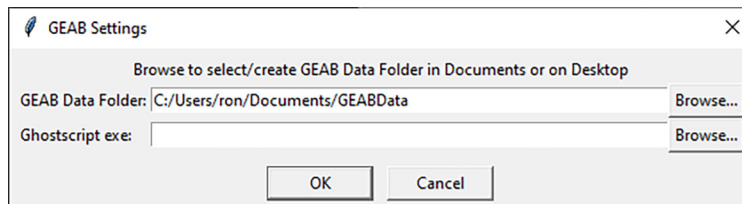


The version reference of 9.54.0 will vary as new releases of Ghostscript are made available.

TARGETING GHOSTSCRIPT

With Ghostscript installed, it can now be targeted for use within GEAB. Do this by performing the following steps.

1. The following dialog box may already be displayed. If not, from the Menu Bar of the of the GEAB Window click the **Edit>Setting...** command.



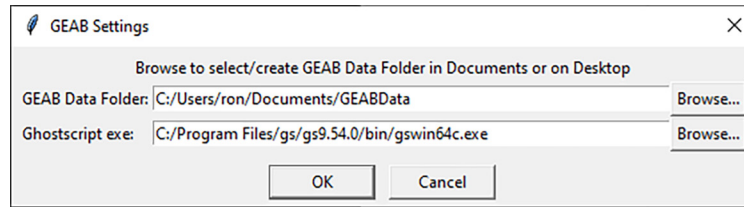
2. To the right of the edit box labeled **Ghostscript exe:** click the button labeled **Browse...**
3. In the File Explorer dialog box that appears, navigate to the following file location:
C:\Program Files\gs\gs9.54.0\bin\gswin64c.exe.



It is vitally important to select the proper file. Select the file named **gswin64c.exe** NOT **gswin64.exe**.

4. With the proper file selected click the button labeled **Open**.

- The previous dialog box will close automatically and the following GEAB dialog box will reappear with a file specification listing the proper Ghostscript executable file.



- Finally, to complete this procedure click the button labeled **OK**.

GEAB is now set up to make use of a properly defined GEAB Data Folder and the Ghostscript application.

This completes the chapter on how to install and set up GEAB. The next chapter describes how to assign an Event Recorder for use with GEAB.

CHAPTER 3 – ASSIGNING AN EVENT RECORDER

INTRODUCTION

This chapter describes how to assign a B-model Recorder for use within GEAB. For the sake of simplicity and clarity the CWR-72B Event Recorder is used consistently in the examples cited in this chapter.

ASSIGNING AN EVENT RECORDER

Start by launching GEAB by double-clicking its Desktop icon. The GEAB Window shown in the following will be displayed.

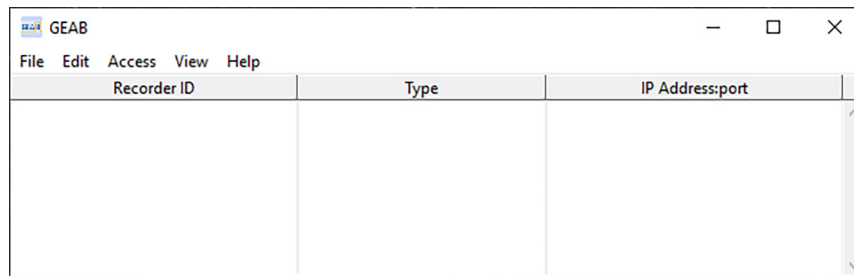


Figure 4: GEAB Window - Initial Condition



Before proceeding make sure that the GEAB Data Folder has been created. Refer to the section entitled "GEAB Data Folder" on page 11.

Commands are selected and various controls and activities are invoked from within the GEAB Window. In the center of the window is a blank area. The Recorders that GEAB will be used to access, acquire data from and plot the acquired data will be listed in this area.

To assign a Recorder within GEAB perform the following steps.

1. From the GEAB Menu Bar click the **Edit > Add Recorder** command. The following dialog box will be displayed.

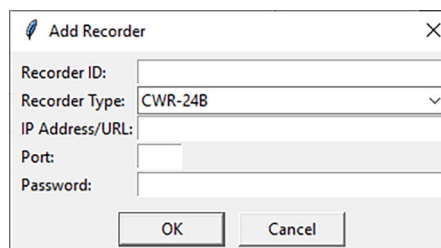


Figure 5: Edit > Add Recorder Command

2. In the edit box labeled **Recorder ID**: enter the Recorder's assigned Unit Name. The first twenty characters of the Unit Name appear on the fourth line of the Recorder's OLED display.
3. In the drop-down list box labeled **Recorder Type**: select the correct Recorder (i.e., CWR-24B, CWR-40B or CWR-72B).

4. The Recorder's assigned fixed IP Address or URL name must be entered in the edit box labeled **IP Address/URL:**.
5. In the edit box labeled **Port:** enter **8080**.
6. In the edit box labeled **Password:** enter the Recorder's Administrative or Restricted Password.



Using the Recorder's Restricted Password within GEAB will limit the user's ability to make changes to the Recorder's working Setup Database.

7. Finally, accept the new settings by clicking the button labeled **OK**. The new Recorder will be added to the list of Recorders accessible to GEAB.

The following screen depicts a GEAB Window with one Recorder assigned.

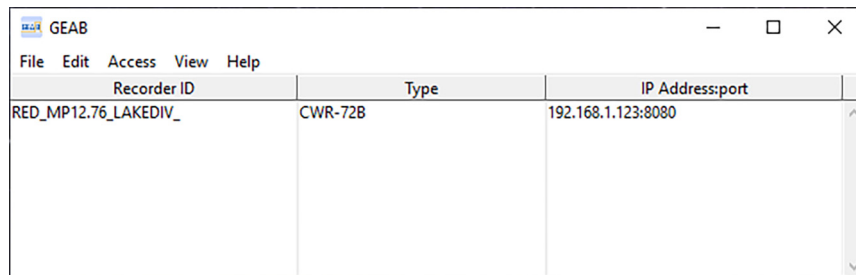


Figure 6: GEAB Window - Typical Recorder Entry

Use the **Edit > Add Recorder** command again to assign additional Recorders as required.

EDITING AN EVENT RECORDER

3

If circumstances change, it may become necessary to modify the GEAB settings for a specific Recorder. The **Edit > Edit Recorder** command can be used for this purpose. To change the settings perform the following steps.

1. Within the GEAB Window, single-click the Recorder of interest to select it. It will be highlighted as shown in the following figure.

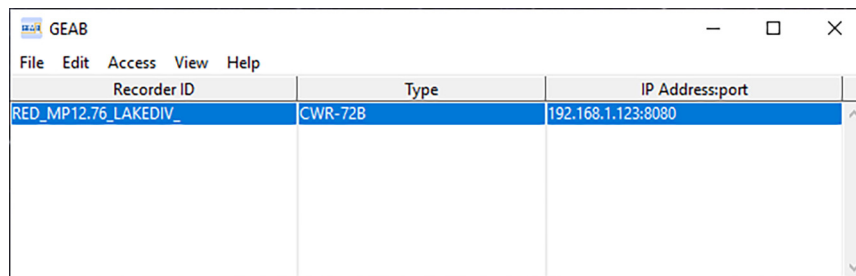


Figure 7: GEAB Window - Recorder Selected

2. Click the **Edit > Edit Recorder** command. A dialog box similar to the following will be displayed.

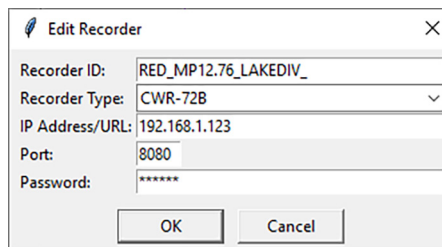


Figure 8: Edit > Edit Recorder Command

3. Single or multiple settings can be changed just as they were added using the **Edit>Add Recorder** command. Click the button labeled **OK** to save the changes and complete the procedure.

CHANGING THE EVENT RECORDER LIST

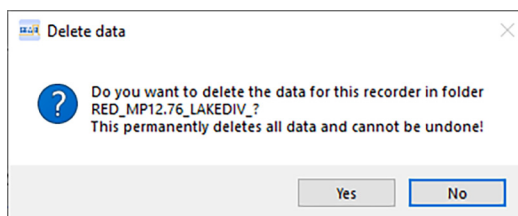
Over time it's likely that several Event Recorders will be listed in the GEAB Window. The user may wish to change the vertical top-to-bottom order in the which the Recorders are listed. To change the order perform the following steps.

1. Position the mouse over the Recorder entry that needs to be relocated.
2. Click and hold the left mouse button. The Recorder entry will be highlighted.
3. Without releasing the mouse button, drag the mouse to a preferred location in the list. It's new position will be dynamically displayed.
4. Release the mouse button to complete the relocation.

DELETING AN EVENT RECORDER

Eventually a Recorder may be removed from service or relocated. In this case the Recorder should be removed from within GEAB. To delete a Recorder perform the following steps.

1. Single-click the Recorder to be removed. It will be highlighted as shown in [Figure 7 on page 16](#).
2. Click the **Edit>Delete Recorder** command. The Recorder entry within GEAB will be immediately removed. A dialog box similar to the following will be displayed.



3. If the button labeled **Yes** is clicked, the Recorder Data Folder associated with the selected Recorder will be removed. Click the button labeled **No** to leave the folder and its contents intact.



Proceed with caution before confirming the data deletion in the previous dialog box. Once deleted, the Recorder Data Folder and its contents cannot be recovered. Saved Event Recorder data, the Setup Database and plots will all be permanently lost.

RECORDER DATA FOLDERS

With every Recorder that is assigned within GEAB a unique folder is added to the GEAB Data Folder. Only one folder can be added. It is named directly from the contents of the **Recorder ID:** edit box listed in the **Edit>Add Recorder** command. Refer to the section entitled "[Assigning an Event Recorder](#)" on page 15.



Under no circumstances should the user outside of GEAB rename, relocate or delete a Recorder Data Folder. Doing so severs the GEAB tie to the folder. GEAB will no longer be able to access the Recorder Data Folder, rendering the Recorder useless within GEAB.

[Figure 9 on page 18](#) depicts a File Explorer view of the GEAB Data Folder (named **GEABData**) which includes three assigned Recorders. Each Recorder is uniquely named as previously described. In this example, if the **Edit>Delete** command is clicked and the user confirms the deletion of the Recorder Data Folder, one of these folders will be permanently removed.

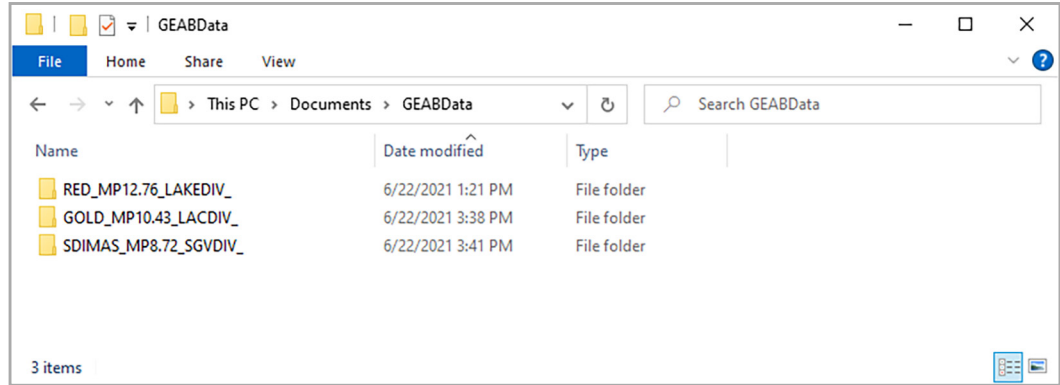


Figure 9: Typical GEAB Data Folder

This completes the chapter on how to assign a Recorder for use within GEAB. The next chapter describes how to prepare a Recorder's Setup Database by accessing it using GEAB.

CHAPTER 4 – PREPARING A SETUP DATABASE

INTRODUCTION

An Event Recorder can be configured in a variety of useful ways that allow it to best suit the intended application. The Unit Name, Input Names, Input Identifiers and Event Names can be used to add clarity to the Event Record data. Additionally, the Detection Times, Speed Monitor and Flash Measurement parameters directly control the Recorder's operation. Collectively these parameters are referred to as the Setup Database.

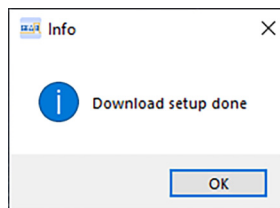
The Setup Database can always be established while online with the Recorder. In this case the user interacts directly with the user interface of the Recorder. GEAB provides an alternative to this method. Instead, the user can create the entire Setup database within GEAB while offline. After the Setup Database is created it is saved to a disk and can then be Uploaded to the Recorder.

This chapter describes how a typical Setup Database can be Downloaded, edited, saved and Uploaded. A CWR-72B Event Recorder is used in the examples that follow.

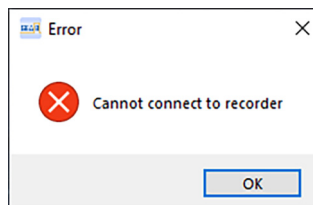
DOWNLOADING THE SETUP DATABASE

GEAB allows the user to edit the existing database resident in the Recorder. It follows that to edit the Recorder's database, first a copy of its installed database must be acquired from the Recorder. To acquire a copy of the database perform the steps listed in the following.

1. Select the Recorder by clicking its entry in the GEAB Window.
2. Click the **Access > Download Setup** command from the Menu Bar.
3. GEAB will attempt to connect with the selected Recorder. If it is able to connect with the Recorder, it will confirm the Download by displaying the following dialog box.



Conversely, if it is unable to do so (e.g., network outage, wrong IP Address, etc.) the following dialog box will be displayed. Another attempt should be made after the problem has been resolved.



4. If successful, a copy of the Recorder's Setup Database will be saved to the Recorder Data Folder. The file will be named **setup.txt**. Complete the procedure by clicking the button labeled **OK**.

VIEWING THE SETUP DATABASE

Provided GEAB has a copy of the **setup.txt** file, the Setup Database can be viewed at any time. To view the database perform the following steps.

1. Using the mouse, select the Recorder by clicking its entry in the GEAB Window.
2. Click the **View > View Setup Database** command.
3. GEAB will create and save a document named **setupdatabase.txt**. The document will be opened using Notepad. The following shows a portion of the text file listing the Recorder's System Parameters. Both Passwords and the Passcode are not readable as they have been replaced with asterisk characters.

```

setupdatabase.txt - Notepad
File Edit Format View Help
<<<< System Parameters >>>>
Unit Name:
RED_MP12.76_LAKEDIV_
Description:

Administrative Password: *****
Restricted Password: *****
Passcode: *****
Clock Sync Mode: GPS
SNTP Server:
0.0.0.0
Time Zone: CST
Daylight Saving Time: Enabled
High Temp Limit: 255 Degrees F
Low Temp Limit: -67 Degrees F
Maint Time: 3600 Sec
Health Check Interval: 48 Hours
Retry Interval: 5 Minutes
Retry Count: 3
Min/Max Falsh Rate: 0/0 FPM
Equipment ID: 72B
State: IL
Subdivision:
DOT Number:
DNS Name:
<<<< Alarm Configuration >>>>
Alarm SetInput SetState SetTime SetName ClrInput ClrState ClrTime ClrName MaintClear
L01 --- On 0 --- On 0 No
    
```

Figure 10: Partial View of setupdatabase.txt Document

4. The **setupdatabase.txt** file can then be copied, renamed or printed if a hardcopy is required.
5. Close Notepad to close the file. The user is then returned to the GEAB Window.



The **setupdatabase.txt** file is strictly for viewing purposes. It is not used by GEAB. Instead, GEAB uses the **setup.txt** file. Both files can be found in the Recorder Data Folder.

EDITING THE SETUP DATABASE

If the user has access (remotely or locally) to the Recorder the installed Setup Database should be Downloaded. Refer to the section entitled "Downloading the Setup Database" on page 19. To edit a Downloaded and saved database follow the procedure entitled "Editing a Previously Downloaded Database File" on page 21.

If the user does not have access to the Recorder because the LAN is not yet available or local access is not possible, a Setup Database can nevertheless be prepared while offline with the Recorder. In this case, follow the procedure entitled "Editing the Factory Default Database File" on page 21.

EDITING A PREVIOUSLY DOWNLOADED DATABASE FILE

Once a copy of the Recorder's Setup Database file is saved, GEAB can be used to edit the file while off-line with the Recorder. Perform the following steps to edit the database.



The entire Setup Database is saved in a file named **setup.txt** and located in the Recorder Data Folder. As a text file, it can be edited using any text editor application. The file uses a specific set of syntax rules that must not be violated. If the user elects to modify the **setup.txt** file directly, care must be exercised not to create a corrupted file.

1. Using the mouse, select the Recorder by clicking its entry in the GEAB Window.
2. Click the **Edit > Edit Setup...** command from the Menu Bar. If the **setup.txt** file is located, a multi-tab dialog box similar to the following will be displayed.

Figure 11: Edit > Edit Setup... Command

3. To begin editing, first select a tab. In [Figure 11 on page 21](#) the System tab is selected. It displays the Recorder's System Parameters. Other tabs contains the settings for related settings (e.g., Input Names).
4. Change any settings as required. Changes must be made consistent with the requirements of the Recorder and the intended application. A complete explanation of each Setup Database setting can be found in the Recorder's User Manual.
5. Click the button labeled **OK** to save the changes and close the dialog box.

The new database file can now be Uploaded to the Recorder. Refer to the section entitled "[Uploading the Setup Database](#)" on [page 23](#).

EDITING THE FACTORY DEFAULT DATABASE FILE

If a copy of the Recorder's working Setup Database file is not available, the factory default database can be edited instead. Once fully edited, it can then be installed sometime later. With this procedure,

the user can work entirely offline with the Recorder. Perform the following steps to edit the factory default database.

1. Using the mouse, select the Recorder by clicking its entry in the GEAB Window.
2. Click the **Edit > Edit Setup...** command from the Menu Bar. The following dialog box will be displayed.

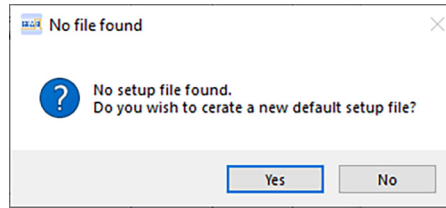


Figure 12: Edit > Edit Setup... Command - No Database File

3. To proceed with editing the factory default database file click the **Yes** button. The following multi-tab dialog box will be displayed.

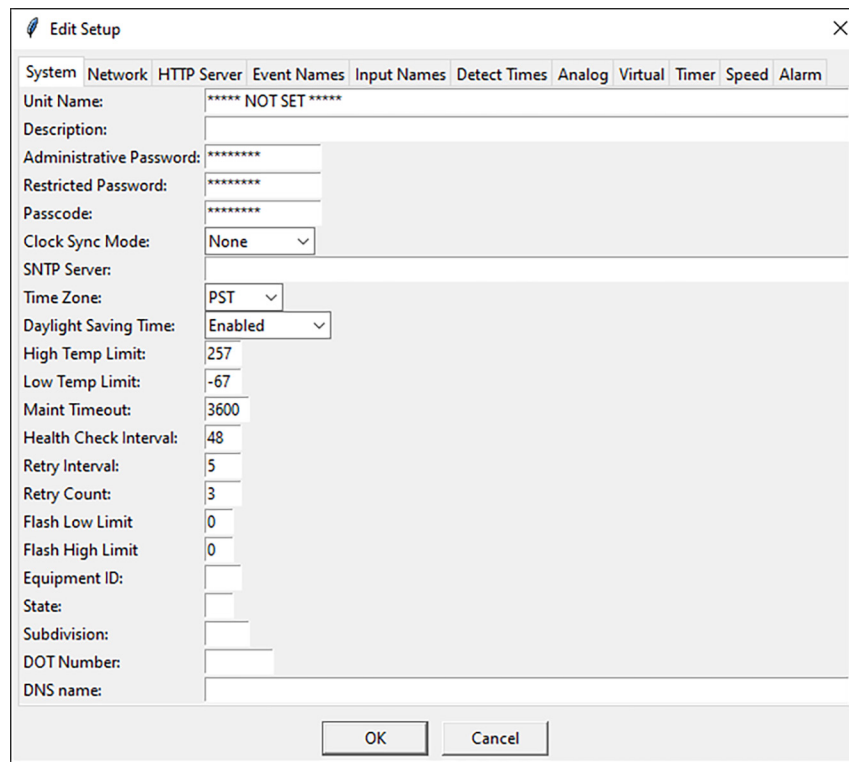


Figure 13: Editable Factory Default Database



If the **No** button is clicked in the preceding step, the user will have to forego preparing a Setup Database file until such time as the Recorder can be accessed either remotely or locally.

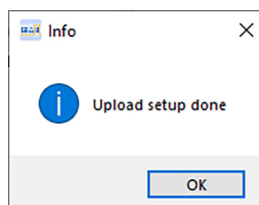
4. To begin editing, first select a tab. In [Figure 13 on page 22](#) the System tab is selected. It displays the Recorder's System Parameters. Other tabs contains the settings for related settings (e.g., Input Names).
5. Change any settings as required. Changes must be made consistent with the requirements of the Recorder and the intended application. A complete explanation of each Setup Database setting can be found in the Recorder's User Manual.
6. Click the button labeled **OK** to save the changes and close the dialog box.

The new database file can now be Uploaded to the Recorder. Refer to the next section.

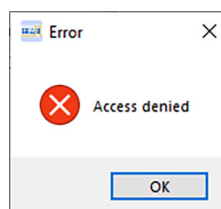
UPLOADING THE SETUP DATABASE

The Setup Database file saved by GEAB will now contain new user-defined settings. However, the Recorder still retains its working database. To update the database used by the Recorder, perform the following steps.

1. Using the mouse, select the Recorder by clicking its entry in the GEAB Window.
2. Select the **Access>Upload Setup** command from the Menu Bar.
3. GEAB will attempt to connect with the selected Recorder. If it is able to login with the Recorder, it will confirm the Upload by displaying the following dialog box.



If GEAB is able to make a connection to the Recorder but the Password is incorrect, the following dialog box will be displayed. Another attempt should be made after the Password problem has been resolved.

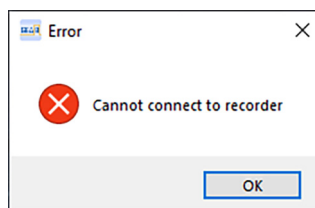


4



To perform an Upload the Administrative Password must be used to login.

If a connection cannot be made (e.g., network outage, wrong IP Address, etc.) the following dialog box will be displayed. Another attempt should be made after the problem has been resolved.



Click the **OK** button to either complete or retry the Upload procedure.

This completes the chapter on how to prepare and edit a Setup Database. The next chapter describes how GEAB can be used to acquire data for the purposes of creating and viewing an Event Record report.

CHAPTER 5 – EVENT RECORD REPORTS

INTRODUCTION

GEAB can be used to access a Recorder and retrieve and save an Event Record report. Once saved the report can be viewed as text or plotted. Plotting is the subject of the [Chapter 6](#). The Live Status feature provides information about the real-time status of each Recorder input. An Ethernet connection to the Recorder can be launched from within GEAB. All three of these features are described in the sections that follow.

USING GEAB TO CREATE AND VIEW A REPORT

CREATING A REPORT

Before any Event Record data can be view or plotted, the data of interest must be acquired. Getting the data is referred to as creating a report. The procedure for doing so is described in the following steps.

1. Select the Recorder by clicking its entry in the GEAB Window.
2. Click the **Access>Query Events** command from the Menu Bar.
3. A dialog box similar to the following will be displayed.

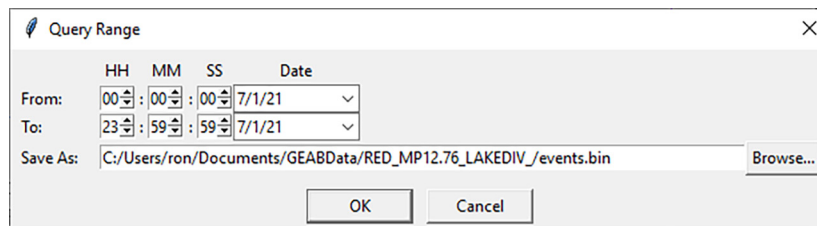


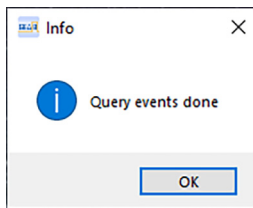
Figure 14: Access>Query Events Command

4. Select the range of dates and times the report should encompass. The drop-down list boxes associated with the **From:** and **To:** settings provide access to a multi-year calendar. Selected dates will be listed in MM/DD/YY format. Click the appropriate up and down arrow buttons to select the time range in hours, minutes and seconds.
5. In the edit box labeled **Save As:** a complete file specification will be listed. At the end of the file specification is the name the file will be assigned. The name will be preassigned as **events.bin**. The folder the file will be saved to matches the Recorder Data Folder created for the selected Recorder. To change the filename click the **Browse...** button. In the dialog box that opens enter a new name in the edit box labeled **File name:**. The file extension must be left as **.bin**.



If the user elects to change the report's filename the extension must be left as **.bin**. Additionally, the file must be saved to the appropriate Recorder Data Folder that is located within the GEAB Data Folder. For GEAB to view and plot report files, these rules must not be violated.

6. Complete the procedure by clicking the **OK** button. GEAB will attempt to connect with the selected Recorder. If it is able to connect with the Recorder, it will confirm the operation by displaying the following dialog box.



The report is now available for viewing.

VIEWING A REPORT

Any saved report can be viewed as a plotted image or text file. The former is the subject of the next chapter. The latter is the subject of the following procedure. To view a report as text perform the following steps.

1. Select the Recorder by clicking its entry in the GEAB Window.
2. Click the **View>View Events** command from the Menu Bar.
3. File Explorer will open in a dialog box similar to the following.

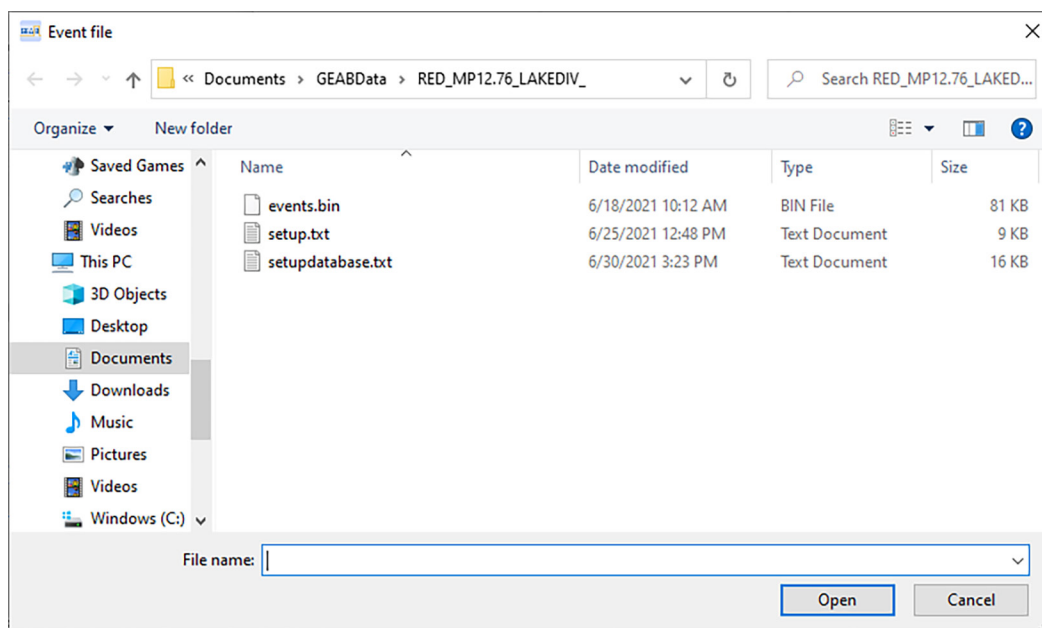


Figure 15: View>View Events Command

4. Click the report file to be viewed as text. In the previous figure only the **events.bin** file has been saved. Eventually the Recorder Data Folder will likely contain numerous **.bin** files. They can be viewed at any time and without limit.



To create an Event Record report the source of the data must always be a **.bin** file (e.g., **events.bin**, Incident_123456T_070121.bin).

5. To proceed, click the **Open** button. The dialog shown in [Figure 16 on page 27](#) will be displayed.
6. The Select Inputs dialog box can be used to create a report that includes Event Record data from all inputs and Equation Outputs or a filtered report from selected inputs and Equation Outputs. Without making any selections, click the **OK** button to create an all-inclusive report. Using the shift+click and ctrl+click mouse operations create a filter setting comprised of a contiguous range or collection of noncontiguous ranges. The dialog box depicted in [Figure 17 on page 27](#) shows an example of several noncontiguous ranges. Only the highlighted inputs will be included in the report.

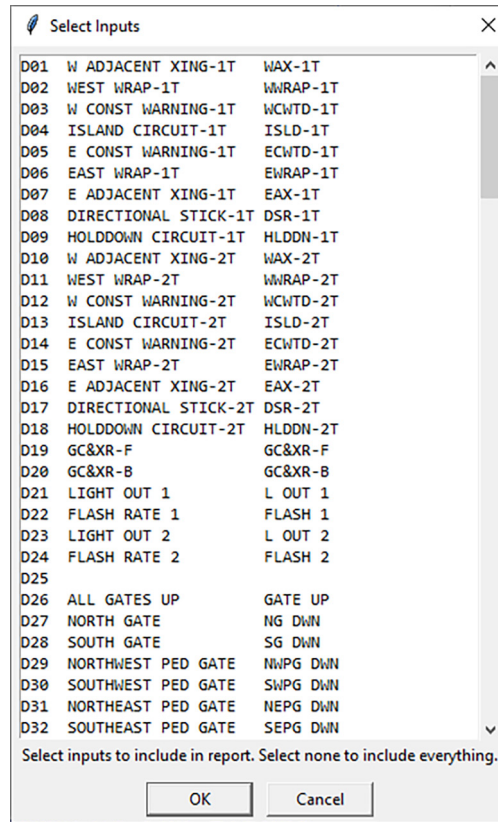


Figure 16: Select Inputs Dialog Box-All Inputs Selected

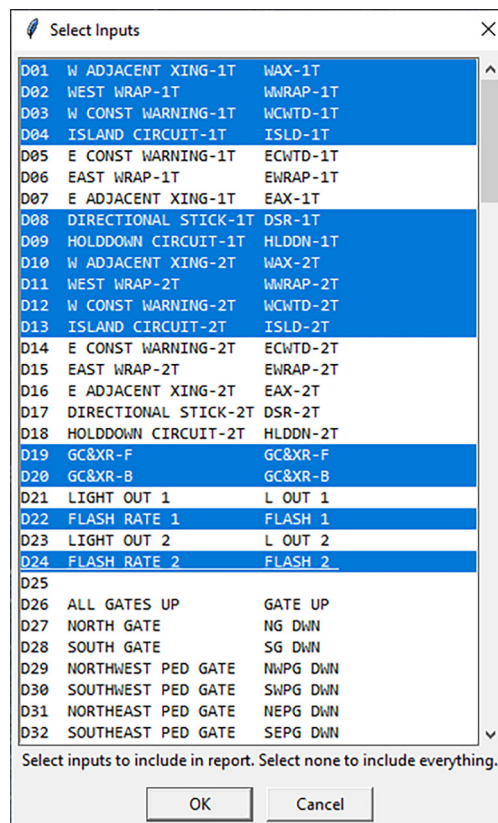


Figure 17: Select Inputs Dialog Box-Specific Inputs Selected

- Once the filter setting is defined, click the **OK** button to create the report and complete the procedure.

The report will be displayed as a Notepad document. A typical report for a selection of inputs is shown in Figure 18 on page 28.

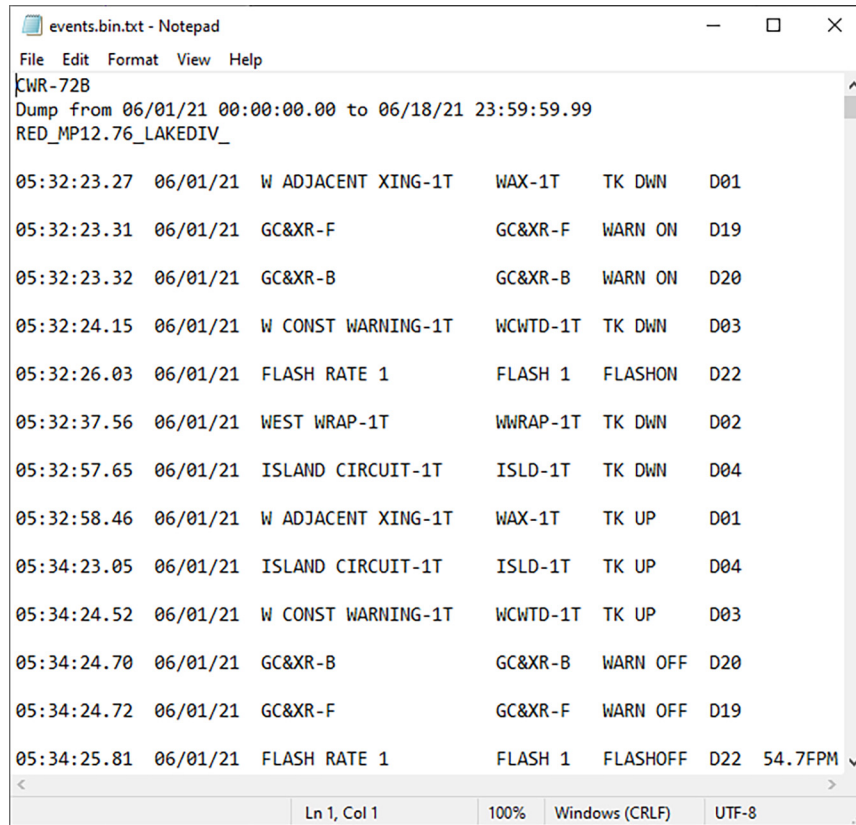


Figure 18: Typical View > View Events Report

At the top of the report is listed the Event Recorder model, the range of dates and times, and the assigned Unit Name of the Recorder. The remainder of the report includes single-line Event Record data meeting the range and input selection criteria.

The report will always be named after the source **.bin** file with an appended file extension of **.txt**. For example, the source binary file name of **events.bin** will yield a viewable text report file named **events.bin.txt**. It too will be saved in the appropriate Recorder Data Folder. GEAB does not use the **.txt** report file for any purpose other than to present it to the user for viewing. It is not used to plot data. If a subsequent report is created and by default it is named **events.bin.txt** it will automatically overwrite an existing similarly named report.



Event Record formats are fully described in the Recorder's User Manual.

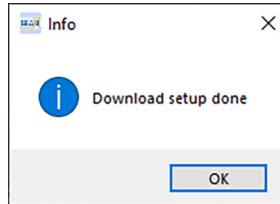
If the user wishes to save multiple Event Record reports created within GEAB, each new report should be renamed to prevent it from being eventually overwritten. As the report is a text file, the binary file extension can be dropped. The report text file can be renamed or moved using Windows File Explorer. The following represents a new, but arbitrary, filename:

Incident_123456T_070121.txt. The new name includes references to an incident, DOT Number, month, day and year.

VIEWING THE LIVE STATUS

GEAB can be used to display the real-time status of all Recorder inputs that have a persistent state. Timer Inputs and many System Inputs are not characterized by a persistent state. To display the live status of inputs perform the following steps.

1. Select the Recorder by clicking its entry in the GEAB Window.
2. Click the **View>Live Status** command from the Menu Bar.
3. GEAB will immediately acquire the working Setup Database used by the Recorder. It needs the Setup Database to properly interpret the real-time data it will eventually receive. The following dialog box will confirm the Setup Database has been acquired.



4. To proceed click the **OK** button in the previous dialog box.
5. In the case of a CWR-72B, a screen similar to the following will be displayed. The Live Status screens for a CWR-24B and CWR-40B will include fewer inputs, but will otherwise be the same. Only the upper portion of the Live Status screen is depicted. Use the scroll bar to view other portions of the screen.

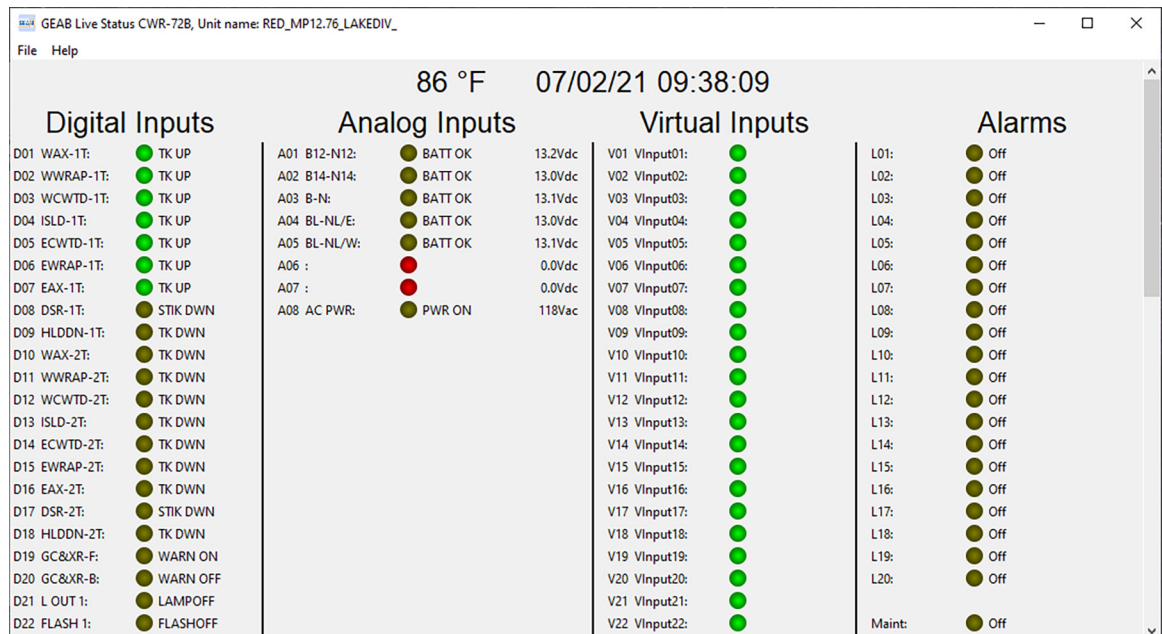


Figure 19: View>Live Status Command

6. When done viewing, close the Live Status screen by clicking the **File>Quit** command or clicking the X-mark in the upper right-hand corner.

At the very top of the Live Status screen is listed the Unit Name of the Recorder. Just below it is the Menu Bar of commands. For help specific to the Live Status feature, click the **Help>Help** command. An HTML page will open in the default Browser. The Help page is quite comprehensive. It includes numerous topics and links.

Just below the Menu Bar, the current internal temperature of the Recorder is listed. The current date and time are also reported. The time will be updated each second.

The Live Status screen depicts the current state of each Digital, Analog, Virtual and Alarm Input. Additionally the state of Maintainer Mode is shown. Inputs are labeled by their assigned Input Identifier label. The screen is updated in real-time without user intervention.

The Live Status screen uses simulated LEDs to depict the state of each input. The various LED colors are explained in the following.

- Digital Input: Bright green indicates the input is in an On state. Dark green indicates the input is in an Off state.
- Analog Input: Red indicates the input is in an On state because its voltage level is outside an acceptable range of values. Dark green indicates the input is in an Off state because its voltage level is within an acceptable range of values.
- Virtual Input: Bright green indicates the input has been evaluated as true and therefore considered to be in an On state. Dark green indicates the input has been evaluated as false and therefore considered to be in an Off state.
- Alarm Input: Red indicates the alarm is active and therefore considered to be in an On state. Dark green indicates the alarm is not active and therefore considered to be in an Off state.
- Maintainer Mode: Red indicates that Maintainer Mode is On. Dark green indicates that Maintainer Mode is Off.

CONNECTING WITH A RECORDER

A Browser connection to any Recorder can be launched from within GEAB. To do so, select the Recorder and then click the **Access > Open in Browser** command. The default Browser will be opened and a connection to the appropriate IP Address and Port will be attempted. A successful connection will display the Recorder's Login screen. Connections initiated from within GEAB are indistinguishable from those made by launching the Browser outside of GEAB.

5

This completes the chapter on how to create and work with Event Record reports. The following chapter describes how to plot Event Record data.

CHAPTER 6 – PLOTTING EVENT RECORD DATA

INTRODUCTION

Perhaps the most frequently used feature of GEAB involves its ability to plot Event Record data. Plotting is performed within the confines of the Plot Window. Once acquired and saved, the record data can be plotted in a variety of ways. Additionally, the Plot Window content can be presented using a variety of useful features.

ACQUIRING THE RECORD DATA

Before any data can be plotted, GEAB must have access to one or more **.bin** data files. The **Access>Query Events** command is used for this purpose. This procedure is documented in the section entitled "[Creating a Report](#)" on page 25. Creating a report always results in a **.bin** data file being saved in the Recorder Data Folder. By default the data file will be named **events.bin**; however, the user may elect to name the file differently (e.g., Incident_123456T_070121.bin). Additionally and as explained in the next chapter, one or more data files may have been copied from a USB flash drive.



Regardless of the method used to acquire data files, only **.bin** data files can be plotted. Do not attempt to plot any file with an extension of **.txt**.

6

PLOTTING THE RECORD DATA

The procedure for creating an initial plotted view of any data file is quite simple. To do so perform the following steps.

1. Select the Recorder by clicking its entry in the GEAB Window.
2. Click the **View>Plot Events** command from the Menu Bar.
3. A dialog box similar to the following will be displayed. For the sake of simplicity only the **setup.txt** file and a single data file named **events.bin** are included in the Recorder Data Folder.

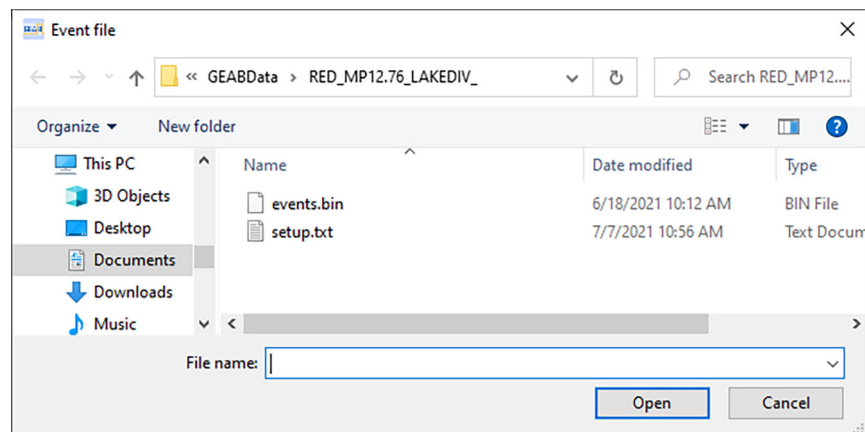


Figure 20: View>Plot Events Command

4. Select the **events.bin** file (or another **.bin** data file if available) and then click the button labeled **Open**.
5. The Plot Window will open automatically. The following figure depicts a typical initial view.

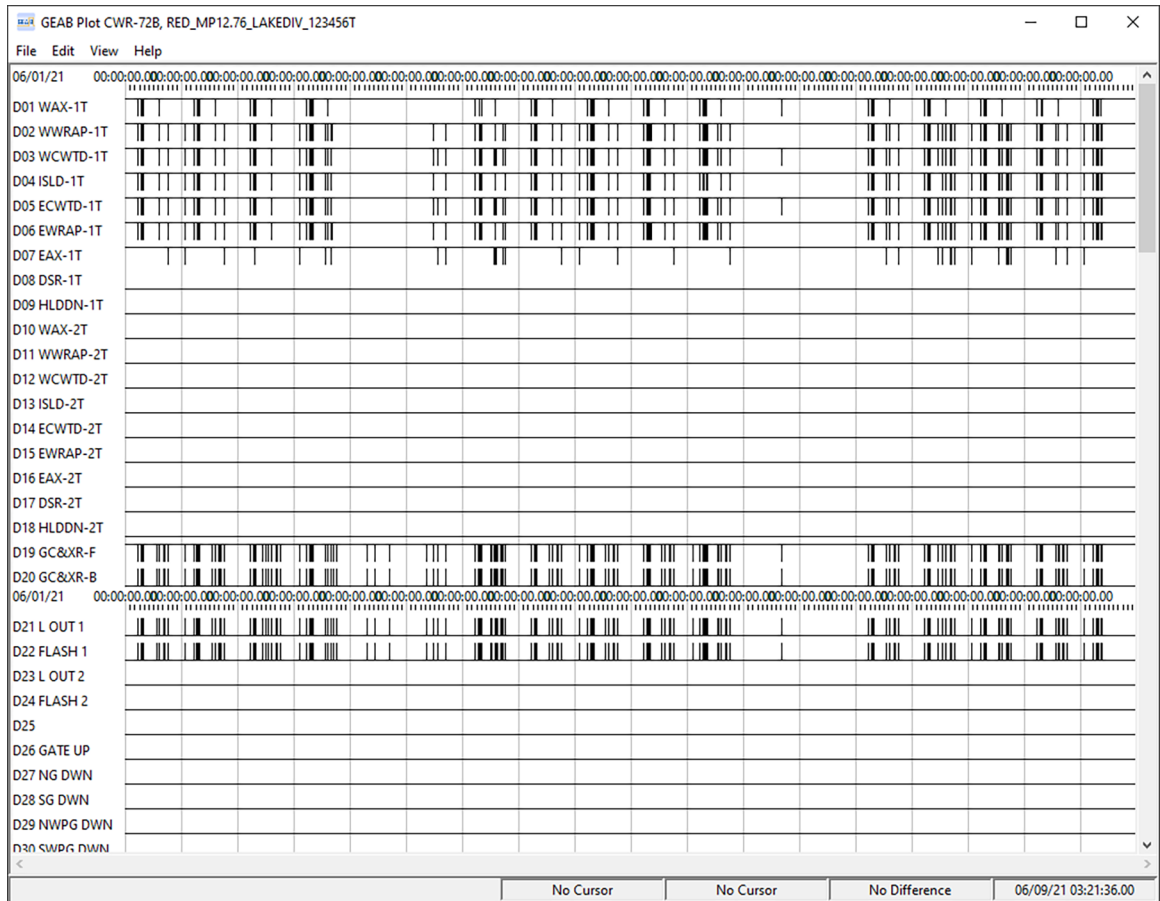


Figure 21: Plot Window - Initial View

The initial Plot Window view shows all of the Event Record data as it would appear had a physical pin plotter been used. The first and last records are plotted at the left and right edges, respectively. The column along the left side includes all of the Plotting Channels aligned vertically. One Plotting Channel is assigned to plot one input or Equation Output (i.e., Plot Item). They are labeled with their assigned Input Identifier (e.g., **WAX-1T**). In the remainder of this chapter a variety of features will be examined that can be used to change the view and content of the Plot Window. The same data file will be used throughout.

CHANGING THE PLOT WINDOW VIEW

The Plot Window shown in [Figure 21 on page 32](#) contains a significant amount of data. However, for it to be useful the view will have to be changed. The following controls can be used for this purpose.

ZOOM-IN AND ZOOM-OUT

There are two ways to zoom-in or zoom-out within the Plot Window. Only the horizontal dimension will be changed in the new view. The vertical dimension will remain unchanged.

SCROLL WHEEL

Position the mouse in the area to be zoomed-in or -out. Rotate the mouse scroll wheel forward to zoom-in or backwards to zoom-out. The area surrounding the location where the mouse is located will be zoomed-in or -out. Use the following context menu method if the mouse does not include a scroll wheel.

CONTEXT MENU

The Plot Window can also be zoomed-in or -out by a set factor of 2, 4, 8 or 16. Each factor can be applied multiple times. Locate the mouse in the area to be zoomed-in or -out. Right-click the mouse to display the following context menu. In the example shown the Plot Window is about to be zoomed-in by a factor of 16.

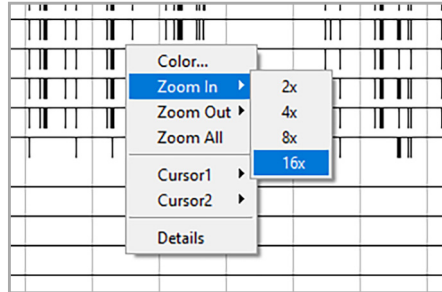


Figure 22: Plot Window - Context Menu - Zoom In 16x

In the following image, a specific area of the Plot Window has been zoomed-in by a factor of 16, again by 16, and finally by 8. The image now makes clear when various changes in state occurred. Digital Input 22, with an Input Identifier of **FLASH 1**, includes a distinctive pattern to indicate a flash event. The labeled time ticks, located along the top and at the mid-section, can now be read.

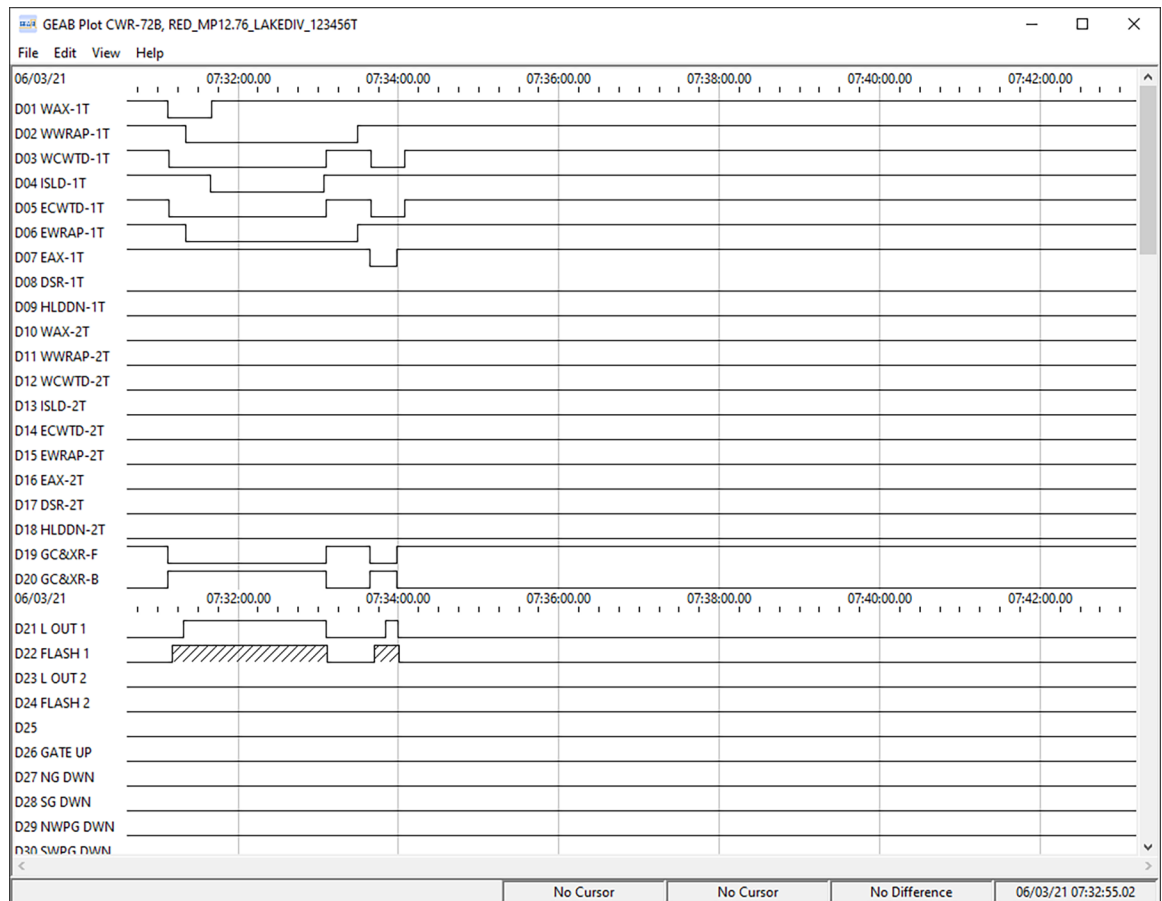


Figure 23: Plot Window - Zoomed-In

In [Figure 22 on page 33](#) the context menu shown includes a command labeled **Zoom All**. Click this command to restore the Plot Window to its initial view as shown in [Figure 21 on page 32](#). The Plot Window can also be restored to its initial view by clicking the **View > Zoom all** command from the Menu Bar.

PAN LEFT AND RIGHT

The Plot Window also includes a pan control. To pan, click and hold the left mouse button. Without releasing the mouse button, drag the mouse to the right to view more of the image on the left. Drag the mouse to the left to view more of the image on the right. Use either method as appropriate to center a portion of the image. The following screen shows the previous Event Record data centered within the Plot Window.

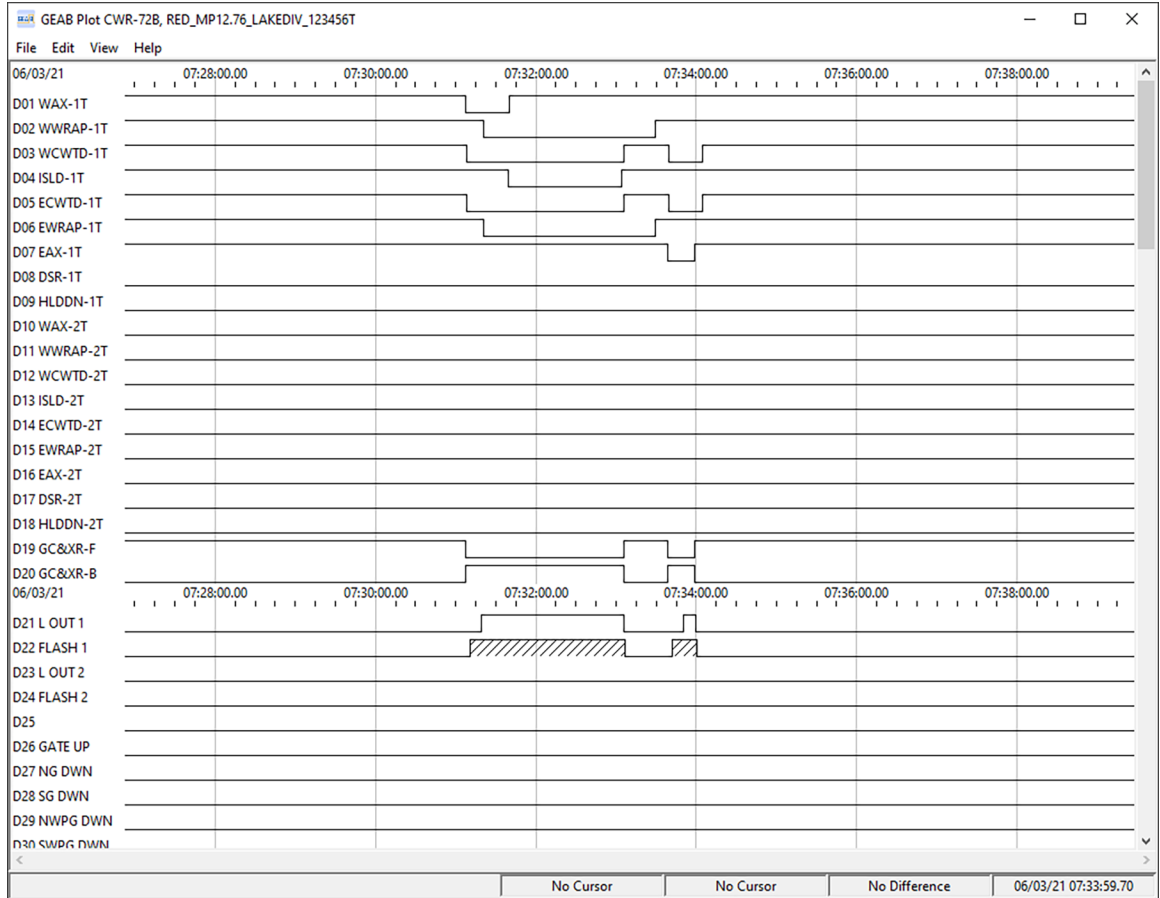


Figure 24: Plot Window - Centered Image

ASSIGNING COLORS TO PLOTTING CHANNELS

The context menu shown in Figure 22 on page 33 also includes the **Color** command. Use this feature to highlight a specific plotted line. To do so perform the following steps.

1. Position the mouse either on the Input Identifier (e.g., **L OUT 1**) or along any portion of the plotted line.
2. Right-click the mouse to open a context menu and then click the **Color** command.
3. The following color selection dialog box will open.

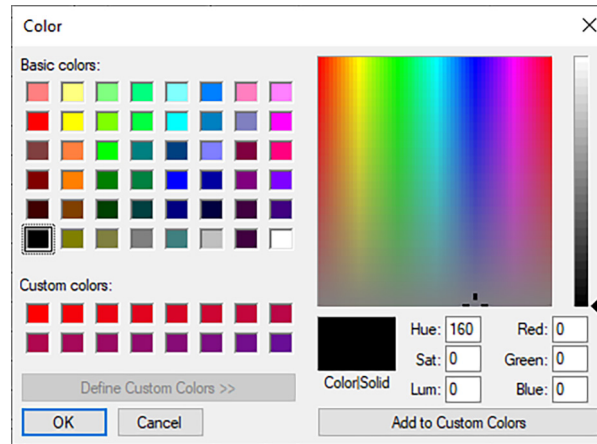


Figure 25: Color Selection

- Click any of the colors grouped as **Basic colors**: or create a custom color. Finally, click the **OK** button to complete the procedure.

In the following partial view, the Plotting Channels associated with Digital Input 21 (i.e. **L OUT 1**) and Digital Input 22 (i.e., **FLASH 1**) have been colored red and blue, respectively, to highlight their association and significance.

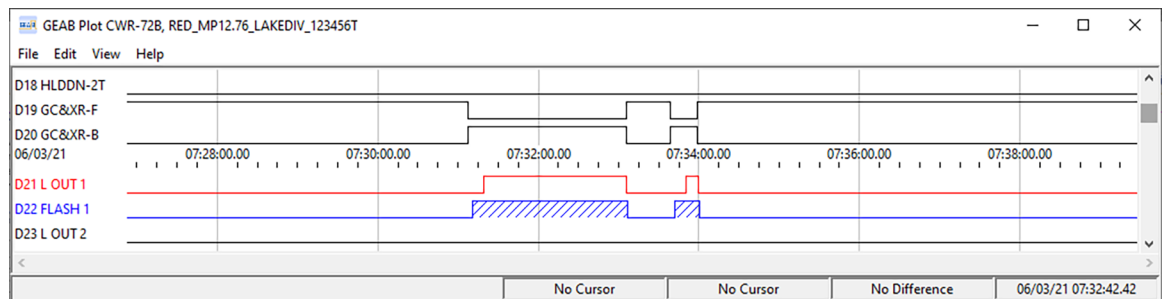


Figure 26: Plot Window - Plotting Channels with Color

CHANGING THE PLOT WINDOW CONTENT

In the previous sections the Plot Window was zoom-in, shifted horizontally, and color was added. These controls provide a better view of a portion of the Plot Window. In this section controls for changing and adding content to the Plot Window will be examined.

MOVING PLOT ITEMS

In the initial Plot Window view Plot Items are assigned, from top to bottom, to Plotting Channels in the following sequence. Refer to [Figure 21 on page 32](#).

- Digital Inputs 1 through 20/32/64. The plotted line is high and low when the Digital Input is On and Off, respectively.
- Analog Inputs 1 through 4/8. The plotted line is high and low when the Analog Input is On (outside an acceptable range of operation) and Off (within an acceptable range of operation), respectively.
- Virtual Inputs 1 through 16/32. The plotted line is high and low when the Virtual Input is On (evaluates as true) and Off (evaluates as false), respectively.
- System Input 1 (Power On/Off). The plotted line is high and low when power to the Recorder is on and off, respectively.
- Alarm Inputs 1 through 20. The plotted line is high and low when the Alarm Input is in a Set state and Clear state, respectively.

- Equation Outputs 1 through 8. Refer to the section entitled "Plotting Equation Outputs" on page 39. The plotted line is high and low when the Logical Equation evaluates as true and evaluates as false, respectively.

However, this sequence of Plot Items can be changed. This capability is useful if certain inputs that share a logical association would be better viewed as a contiguous group rather than being scattered vertically within the Plot Window.

A single Plot Item or a noncontiguous collection of items can be moved to any position. Perform the following steps to move one or more items.

- Position the mouse over the Input Identifier of a Plot Item to be moved. Click the mouse button to select the item. The item will be highlighted in gray. Click additional items if more than one item needs to be moved. In the following image Digital Inputs 5, 19, 21 and 22 have been selected.



If a Plot Item is mistakenly selected, simply click it once again. The item will no longer be selected or highlighted.

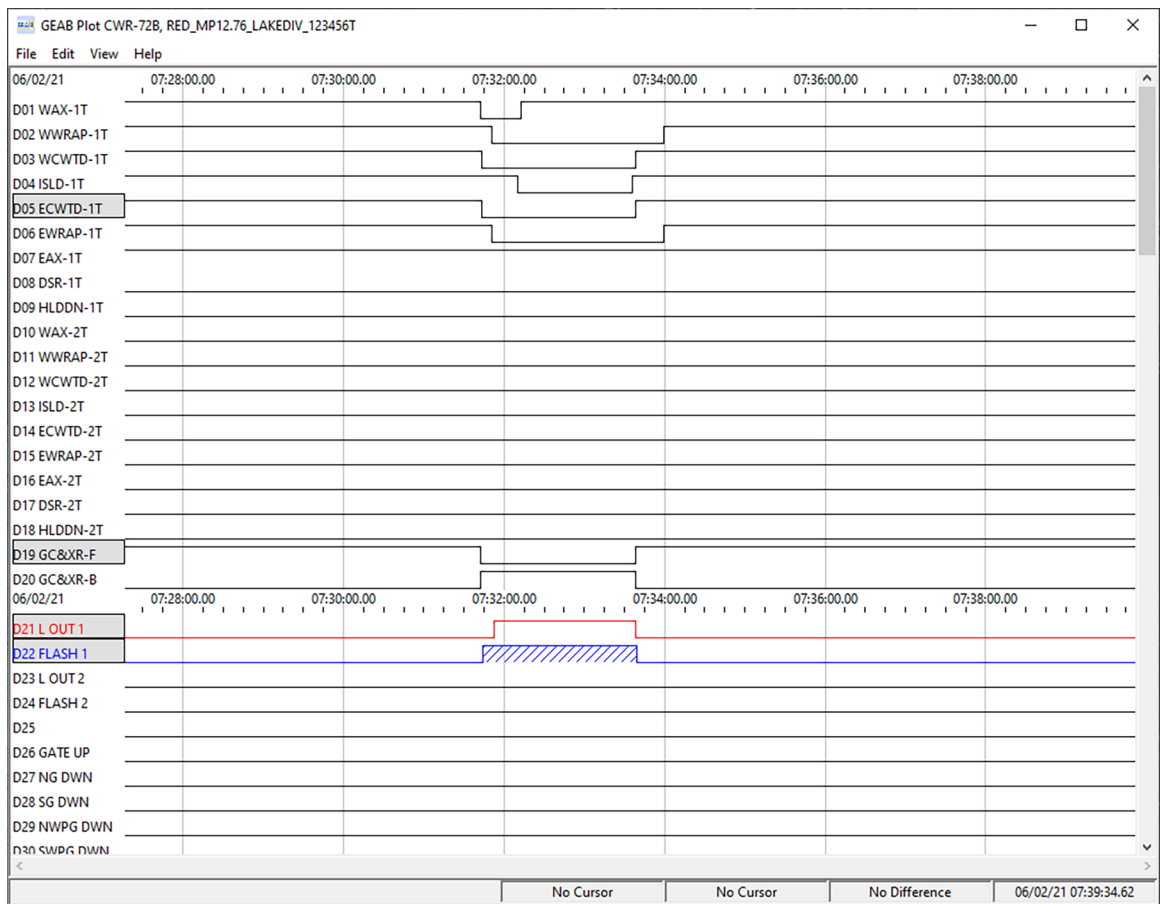


Figure 27: Plot Window - Selected Plot Items to be Moved

- Without clicking, simply reposition the mouse to where the selected items will be moved. The Input Identifier at the new location will be highlighted in blue.
- Right-click the mouse to display the context menu shown in the following image. For the example cited the mouse was placed over the second Plotting Channel.

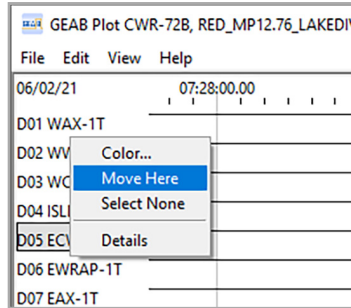


Figure 28: Plot Window - Context Menu - Move Here

- Finally, click the **Move Here** command to move the selected Plot Item(s). The item(s) will be moved directly above the blue highlighted item. This can be seen in the following image where Digital Inputs 5, 19, 20 and 21 now form a contiguous group directly below Digital Input 1.

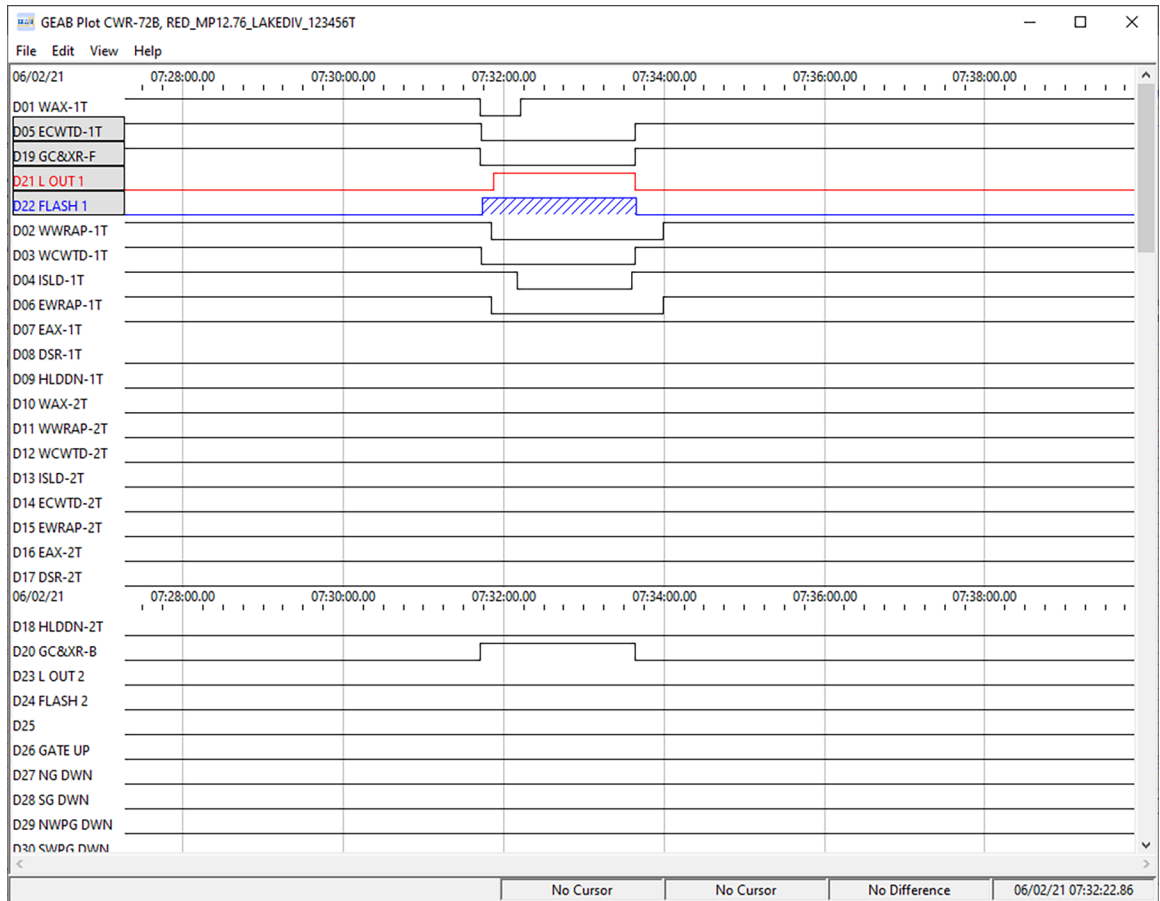




Figure 29: Plot Window - Plot Items After Move

-  Plot Items will always be moved to the Plotting Channels directly above the blue highlighted Input Identifier. The remaining items will be relocated downward. No Plotting Channels will be vacated after a move.
-  The vertical order of a selected noncontiguous collection of items will be retained after a move. The items will appear as a single, contiguous group with no intervening gaps.

SETTING AND USING THE CURSORS

There may be an occasion when the user needs to know exactly when an event occurred. Additionally, it may be useful to know the time difference between two events. The dual Cursor feature provides both capabilities within the Plot Window. In the following procedure two Cursors will be set. Information related to each Cursor position will be explained.



A transition from low to high represents an On event. A transition from high to low represents an Off event. Cursors can only be set on transitions (i.e., when the plotted line changes vertically).

1. Position the mouse on the plotted line of the item of interest and then on a transition along the same line.
2. Right-click the mouse. The context menu shown in [Figure 22 on page 33](#) will be displayed. From the context menu click the **Cursor 1 >Set** command. A green vertical line will extend through the Plot Window. The event transition will be marked by a green **X** character.
3. To set a second Cursor reposition the mouse on another transition of the same item or another item.
4. Right-click the mouse. The context menu shown in [Figure 22 on page 33](#) will be displayed. From the context menu click the **Cursor 2 >Set** command. A red vertical line will extend through the Plot Window. The event transition will be marked by a red **X** character.
5. Along the bottom edge of the Plot Window will be four horizontally aligned boxes. Each box includes a time and date measurement. The first and second boxes indicate the time and date positions of Cursors 1 and 2, respectively. The third box is the time and date difference between Cursors 1 and 2 calculated as Cursor 2 minus Cursor 1. A negative value simply indicates that Cursor 2 precedes Cursor 1. The fourth box is always presented, irrespective of either Cursor. It indicates the time and date position of the mouse within the Plot Window. Moving the mouse changes the reading immediately.

In the following image green and red vertical lines and **X** characters indicate both Cursors have been set. The readings in the boxes at the bottom of the Plot Window have been updated accordingly.

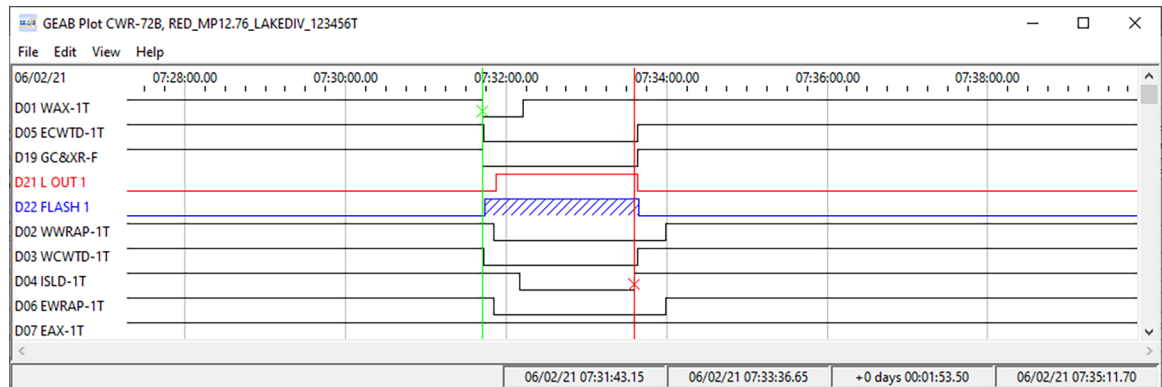


Figure 30: Plot View - Cursors Set

6. To set Cursor 1 or 2 to a new position, use the appropriate **Set** command described earlier. To clear a Cursor use the **Clear** command from the same context menu.

VIEWING EVENT RECORD DETAILS

Since the basic Plot Window image is entirely derived from the Event Record data file (e.g., **events.bin**), it follows that all of the event details are available from within the window. This is best illustrated by the following procedure.

1. Position the mouse on the plotted line of the Plot Item of interest and then on a transition along the same line.

- Right-click the mouse. The context menu shown in Figure 22 on page 33 will be displayed. From the context menu click the **Details** command. A dialog box that includes complete information about the event will be displayed. As can be seen in Figure 31 on page 39 the physical Input Number (**D22**), time stamp, Input Name (**FLASH RATE 1**), Input Identifier (**FLASH 1**) and Event Name (**FLASHOFF**) are listed. The measured level and state of each Analog Input is also reported.
- To close the dialog box click the **OK** button.

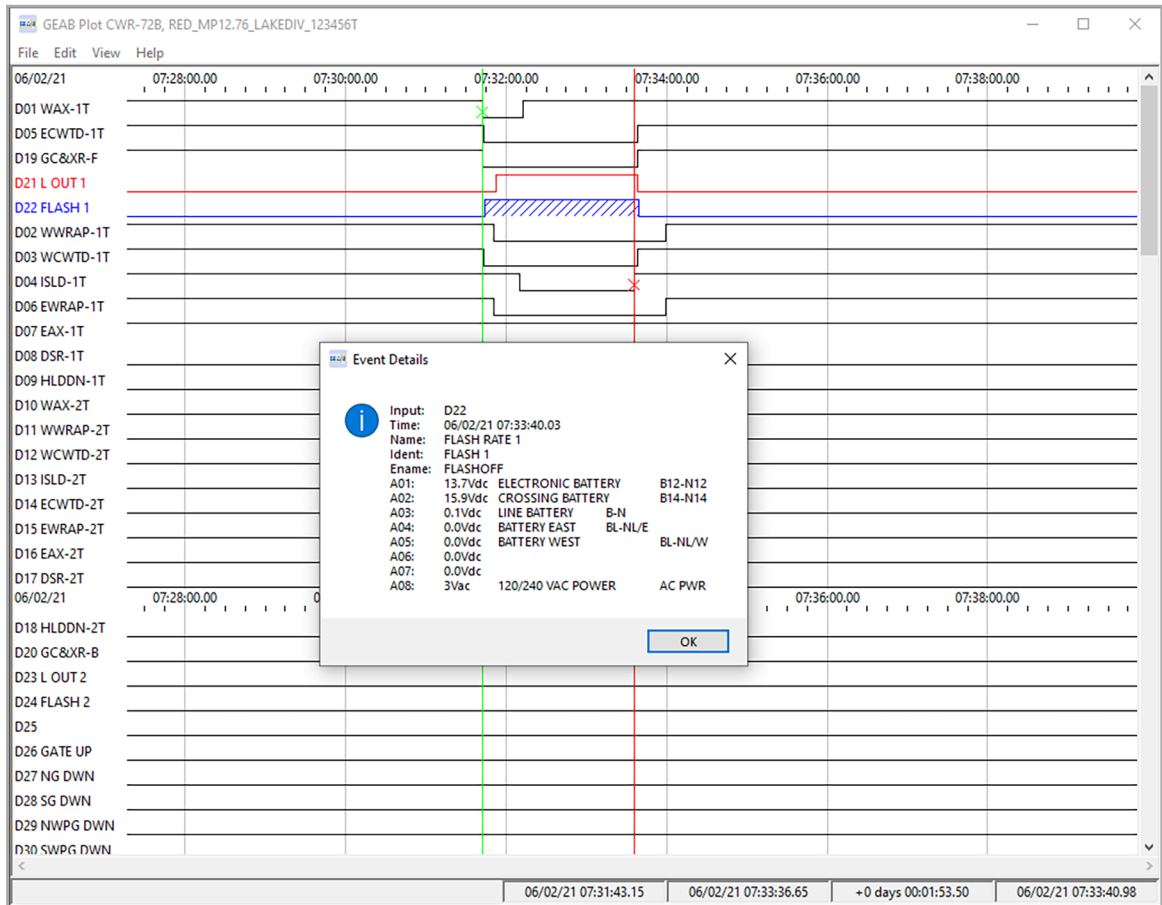


Figure 31: Plot Window - Event Record Details

PLOTTING EQUATION OUTPUTS

In any rail signal application there may be fault conditions that can be defined by the simultaneous occurrence of several input states. The Virtual Input feature allows the Recorder to continuously check for these occurrences in real-time. A change in state of any Virtual Input immediately logs an Event Record to memory. Properly configured, Virtual Inputs can be used to report a variety of fault conditions that can be defined by the logical conditions of one to four Recorder inputs.

Logical Equations, and their associated Equation Outputs, provide a similar capability within GEAB. The difference is that Logical Equations analyze the acquired Event Record data already saved within GEAB. Each Logical Equation has an Equation Output that can be plotted like any other Plot Item. Plotting Equation Outputs prevents the user from having to analyze the Plot Window content looking for a particular combination of On and Off states shared by one or more inputs. By default, GEAB plots all of the Virtual Inputs and Equation Outputs.

GEAB includes support for eight Logical Equations and Equation Outputs. The procedure used to configure a Logical Equation involves two parts. They are described in the following two sections.

ASSIGNING THE VARIABLES

Each Logical Equation can be based upon the On and Off states of one to four inputs. Each input can be thought of as a variable within the Logical Equation. The first step is to assign the variables. To do so perform the following steps.

1. Open the Plot Window and have it display the Event Record data of interest.
2. From the Plot Window Menu Bar, click the **Edit>Edit Equation** command. The following dialog box will be displayed.

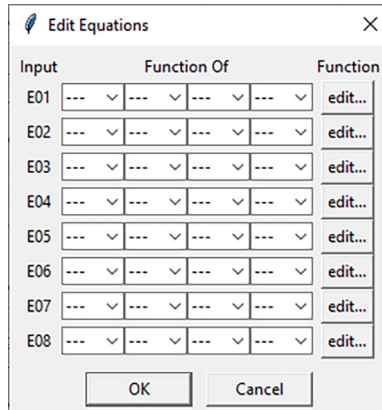
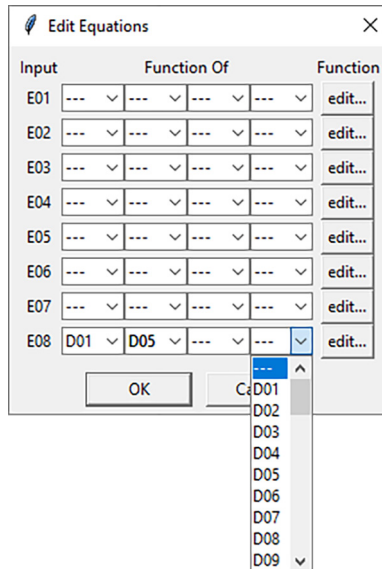


Figure 32: Edit>Edit Equations Command- Assign Variables

The Logical Equations are numbered along the left side as **E01** through **E08**. Each row contains the variables (one to four) for a single Logical Equation.

3. To assign an input as a variable click one of the drop-down list boxes in a row. The drop-down list box for the fourth variable of **E08** is shown in the following example. The first and second variables have already been assigned as **D1** and **D5**, respectively. The inputs can be assigned to variables in any order. Any variable can be skipped, which is the case with the third variable in the example. Any Digital, Analog or Virtual Input can be assigned as a variable.



4. Once the variables for the selected Logical Equation are assigned the variables for other Logical Equations can be assigned. To complete the assignment procedure click the **OK** button.

DEFINING THE FUNCTION

The variables for the Logical Equations should now be properly assigned. The second part of this procedure involves defining the logical function to be performed when evaluating the variables. It is the logical function that defines when a Logical Input and its associated Equation Output evaluates as true or false (i.e., On or Off, respectively). Perform the following steps to define the logical function.

Continuing from step 4, the following dialog box will be displayed for the example cited. Only Logical Equation **E08** has been configured. Its variables include Digital Inputs **D1**, **D4** and **D5**.

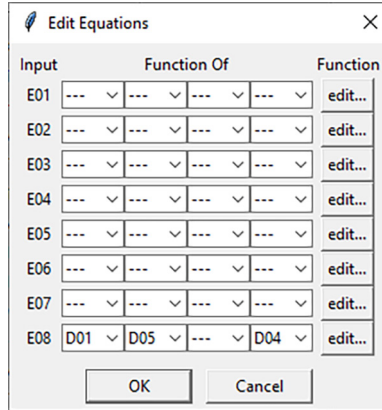


Figure 33: Edit > Edit Equations Command - E08 Variables Assigned

- In the column labeled **Function**, click the button labeled **edit...** for the Logical Equation of interest. A dialog box similar to the following will be displayed.

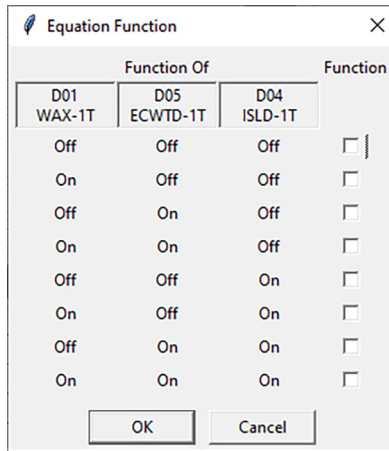
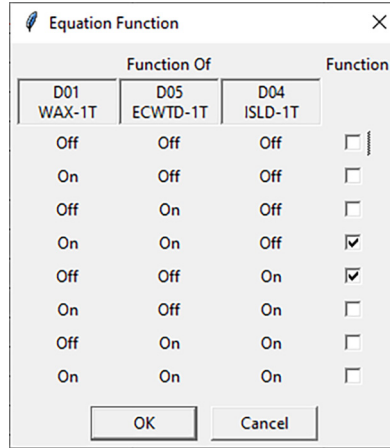


Figure 34: Edit > Edit Equations Command - Defining the Function

- Towards the top of the dialog box, each of the assigned variables is identified by its physical input number (e.g., **D01**) and Input Identifier (e.g., **WAX-1T**). In the example cited there are three variables. Among three variables there are eight different states. To define the function simply click the appropriate check box in the column labeled **Function**.
- In the following dialog box, **E08** will evaluate as true whenever the **WAX-1T** and **ECWTD-1T** inputs are in the same state, but opposite of the **ISLD-1T** input state.



8. Click the **OK** button to complete the function definition. The user will be returned to the dialog box depicted in Figure 33 on page 41.
9. Additional Logical Equations and their functions can be configured as required. Otherwise, click the **OK** button to complete the procedure and return to the Plot Window.

SAMPLE EQUATION OUTPUT PLOT

By default the Equation Outputs of all eight Logical Equations are plotted at the bottom of the Plot Window. Like any Plot Item each Equation Output can be moved to any Plotting Channel location. The Equation Output **E08** is plotted in the following screen. For clarity the content of the sample plot is limited to Digital Inputs **D1**, **D4** and **D5**, along with **E08**. The latter is plotted in green.

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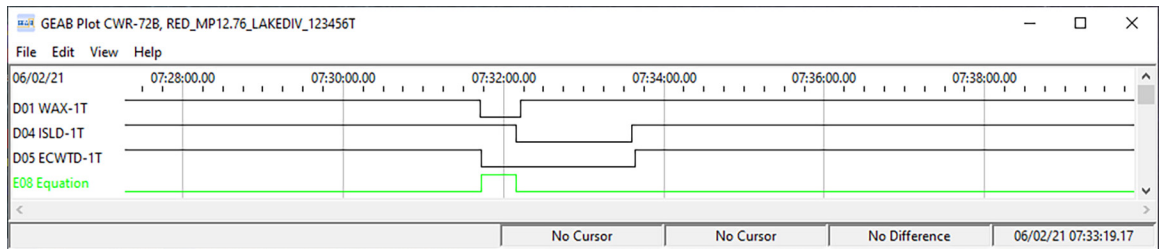


Figure 35: Sample Plot of Equation Output E08

Configuring and then plotting **E08** has made it immediately obvious when **D1**, **D4** and **D5** have collectively assumed a specific state of interest.

PLOTTING A POWER OUTAGE

The On and Off transitions of System Input 1 always reflect the state of power applied to the Recorder. By default System Input 1 is plotted within the Plot Window. Like any Plot Item it can be assigned a color and moved to any Plotting Channel location. In Figure 36 on page 43 System Input 1 is shown in blue at the very top. Digital Inputs 1 and 2 follow. Alarm Input 1 is toggling On and Off every 10seconds. Cursors 1 and 2 are set at the transition edges of System Input 1. They report that power was off for 24.00seconds. No new events from any source can be logged to memory while power to the Recorder is off.

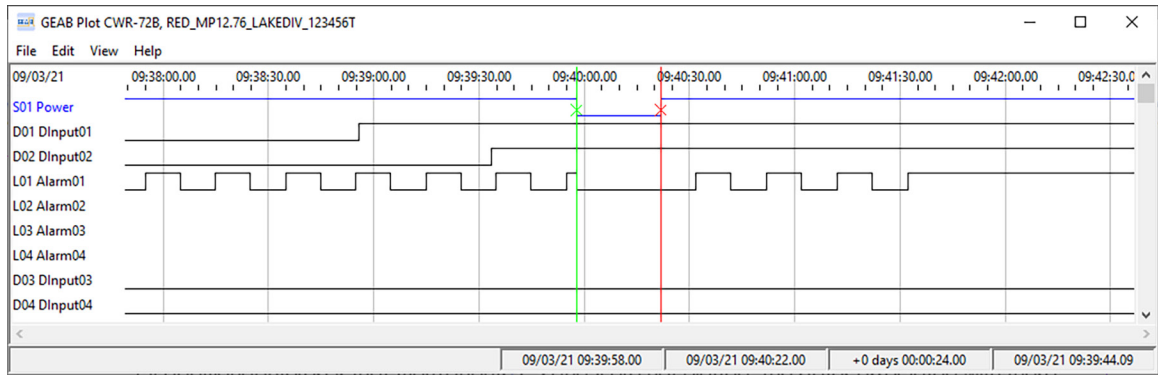


Figure 36: Plot Window with Power On / Off Event

Of additional interest is that Alarm Inputs 2, 3 and 4 are not plotted. The states associated with these inputs are indeterminate both before and after the power off event. All other inputs share states that are either known or can be implied.

SAVING AND RESTORING A PLOT VIEW

As shown in the previous sections of this chapter, the view within the Plot Window can be customized in a variety of ways. In many cases the Plot Items assigned to Plotting Channels and the colors assigned to channels will be used to plot other record data. As an example, a plot view customized for a particular type of incident investigation or maintenance review may be used repeatedly. Rather than duplicate the view each time, the view can be saved and then applied in the future to any Event Record data file.

SAVING THE VIEW

To save a view, perform the following steps.



The zoom factor, pan position, Cursor positions and Event Record details dialog box are not saved in the following procedure. The plotted data within the Plot Window is not saved. The saved view can be thought of as a formatting template that can be applied to other record data.

1. Create a Plot Window view that has Plot Items ordered from top to bottom as required. Assign colors to the Plotting Channels to highlight them as required. Also, configure the Logical Equations as required. All of these assignments will be saved.
2. Click the **File > Save View** command.
3. A dialog box similar to the following will be displayed.

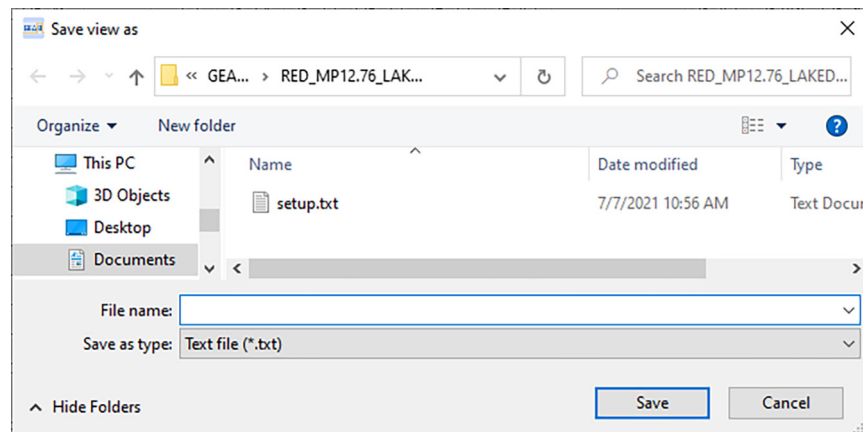


Figure 37: File > Save View Command

- In the edit box labeled **File name**: assign an appropriate file name (e.g., incident_view1_rpg.txt). The file created will include a **.txt** file extension. By default the file will be saved in the Recorder Data Folder of the selected Recorder.
- To complete the save procedure click the **Save** button. The dialog box will close automatically.

RESTORING THE VIEW

Once a plot view has been saved, it can be restored or applied to any data file. The procedure is described in the following steps.

- The Plot Window must include plotted data.
- Click the **File > Restore View** command.
- A dialog box similar to the following will be displayed.

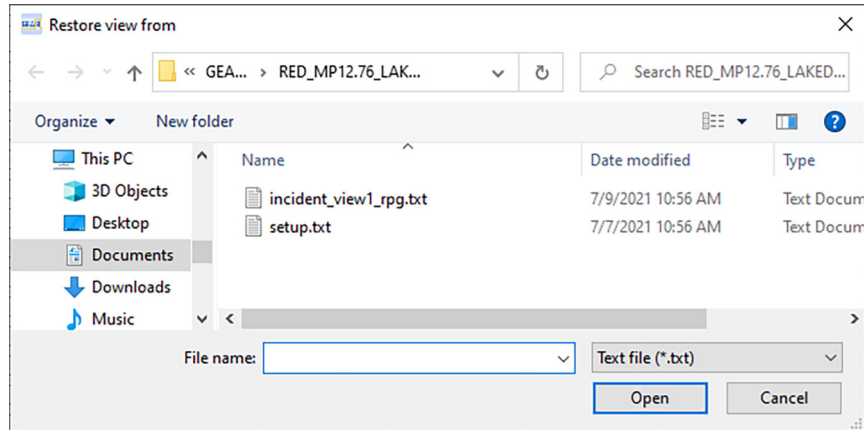


Figure 38: File > Restore View Command

- Navigate to and select the saved view file of interest (e.g., incident_view1_rpg.txt).
- Complete the procedure by clicking the **Open** button. The dialog box will close automatically. The plot view will now include the Plot Item ordering, color and equation assignments that were previously saved.

OPENING A DIFFERENT PLOT WINDOW VIEW

At any time, another data file can be opened and plotted within the existing Plot Window. The current view will be replaced by newly plotted data. Perform the following steps to create a new data plot.

- Click the **File > Open** command.
- A dialog box similar to the following will be displayed.

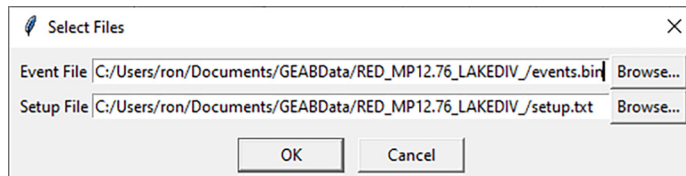


Figure 39: File > Open Command

- The edit boxes labeled **Event File** and **Setup File** will reference the Recorder Data Folder for the Recorder originally selected within the GEAB application. Click the **Browse...** buttons to navigate to and select a different Recorder Data Folder. A **.bin** data file and its associated **setup.txt** file must both be selected. Verify that both edit boxes reference the same Recorder Data Folder.

- Finally, to create a new data plot click the **OK** button. The Plot Window will include an initial view that spans all of the new data. An example of an initial view is shown in [Figure 21 on page 32](#). The various Plot Window controls can then be applied to customize the view as needed. The **File > Restore View** command can also be applied.
- To complete the procedure and close the existing plot view click the **File > Close** command. The Plot Window will appear empty. A new data file can then be opened or the Plot Window can be closed.

ANNOTATING A PLOT VIEW

A comprehensive incident investigation may require Event Record data be compiled in text as well as plotted form. For this reason, the view within the Plot Window can be printed and saved as a bit map image. As a bit map image it can be annotated with comments and explanations that may be helpful to other viewers. The process of annotating the image involves exporting the image in a suitable format and then adding comments and explanations. The annotations are drawn in as if the Plot Window image were a background on a canvas.



Before a Plot Window image can be exported, the Ghostscript application must be installed. Refer to the section entitled "[Ghostscript Application](#)" on page 12.

To add annotations perform the following steps.

- Prepare the view within the Plot Window. The view should include the desired zoom factor, pan position, ordering, colors and cursors. It cannot include the Event Record details dialog box.
- Click the **File > Export PDF** or **File > Export PNG** command. The **Export PDF** command includes two additional subcommands which are **Landscape** and **Portrait**. In both cases the exported image will create a PDF document. The **Export PNG** command will create a bit map image in the form of a PNG file.

A dialog box similar to the following will be displayed.

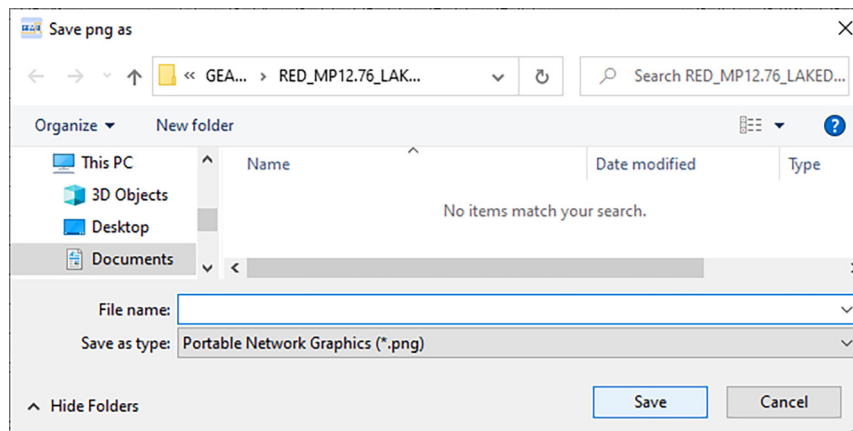


Figure 40: File > Export PNG Command

- In the edit box labeled **File name:** assign an appropriate name. By default the image file will be saved in the Recorder Data Folder for the Recorder that was originally selected. The file extension will be either **.pdf** or **.png** in accordance with the export command that was selected.
- Complete the export by clicking the **Save** button. The dialog box will close automatically. The image file will be created and saved.
- The **.pdf** or **.png** file can be opened in a variety of applications such as Adobe Reader®, Adobe Acrobat®, Adobe Illustrator®, Microsoft Paint and GIMP. Using the tools of the selected application, add notes, comments, explanations and artwork. When done remember to save the completed file. It can then be printed or copied.



The steps necessary to include annotations to the exported image are beyond the scope of this User Manual. The documentation and support that accompanies the application should be reviewed.

GETTING PLOT WINDOW HELP

Help specific to the Plot Window is available. From the Menu Bar click the **Help>Help** command. An HTML page will open in the default Browser. The Help page is quite comprehensive. It includes numerous topics and links.

This completes the chapter on how to plot Event Record data. The next chapter describes how to properly copy data to GEAB that was originally saved to a USB flash drive.

CHAPTER 7 – COPYING FROM A FLASH DRIVE

INTRODUCTION

Every Recorder includes a USB Host Port. As a matter of convenience, it is arguably the most important feature of any CWR product. The Recorder's front panel Save command allows the user to quickly copy Event Record data to a flash drive from a single date or selected time span. Using GEAB, the saved data can be viewed as text or plotted.

DATA FOLDER STRUCTURES

Before the data saved to a USB flash drive can be properly copied for use by GEAB, it is important to understand how data is saved in the flash drive and within GEAB.

USB FLASH DRIVE DATA FOLDER

At the root of the flash drive, the USB Host Port feature will create a unique folder for each Recorder. The name of the folder will be taken from the first twenty characters of the assigned Unit Name. These are the same characters that appear on the fourth line of the Recorder's OLED display. When the user executes a front panel Save command, three files are always written to the Recorder's flash drive folder. The following figure shows a typical example.

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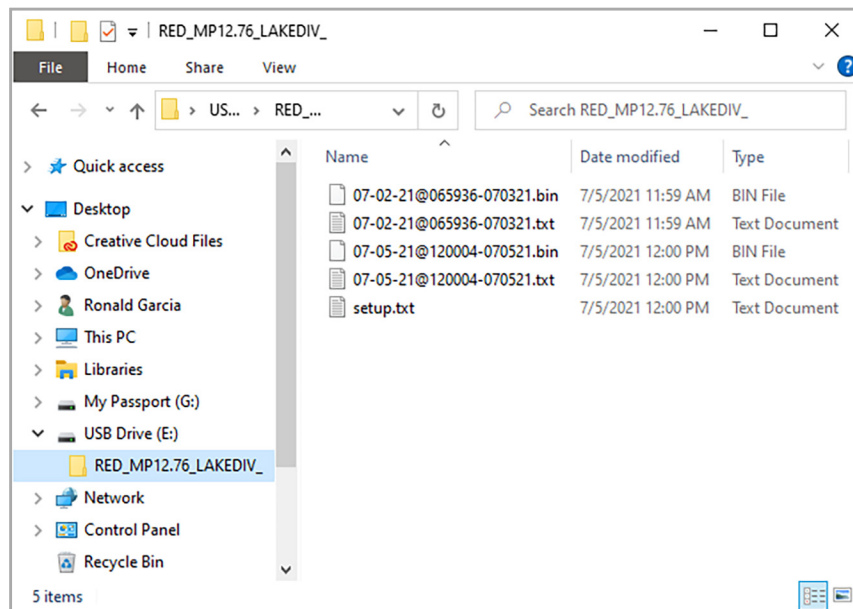


Figure 41: USB Flash Drive Data Folder

In the example shown, there are data files from two separate Save operations. A complete explanation of the folder's structure and content follows.

- At the root of the flash drive will be one or more folders named after the first twenty characters of the Recorder's Unit Name. The example contains only one folder named **RED_MP12.76_LAKEDIV_**.

- Each Save operation always creates two Event Record data files. One file is a text file for report viewing. The other is a binary file of the same data. This file is required by GEAB. Regardless of the file type, the name of each file is taken from the date of the first Event Record saved and the time and date the file was created. A **.bin** or **.txt** extension is then added to complete the filename. The sample files named **07-02-21@065936-070321.bin** and **07-02-21@065936-070321.txt** illustrate this naming convention. Eventually, dozens or perhaps hundreds of data files will be saved to the same USB folder.
- Finally, each Save operation writes a copy of the Recorder's working Setup Database. As each Save operation writes a **setup.txt** file it will automatically overwrite any existing similarly named file. In this way, the saved file is assured to be the latest version used by the Recorder. This file is the same file that GEAB saves when using its Download command. Refer to the section entitled "[Downloading the Setup Database](#)" on page 19.

In summary, each Save operation creates an Event Record data file in a form useful to GEAB and a **setup.txt** file. They are both saved in a folder uniquely associated with a specific Recorder.

GEAB RECORDER DATA FOLDER

GEAB always requires a GEAB Data Folder. Refer to "[GEAB Data Folder](#)" on page 11 for details. Furthermore, every Recorder added to GEAB will have a Recorder Data Folder named as part of the **Edit>Add Recorder** command. Refer to "[Assigning an Event Recorder](#)" on page 15. The following figure shows a typical Recorder Data folder for a Recorder with a Unit Name of **RED_MP12.76_LAKEDIV_123456T**. Notice there are more than twenty characters used in the folder name. The Recorder Data Folder is saved within the GEAB Data Folder which is named **GEABData**. Data folders for two other Recorders have also been created.

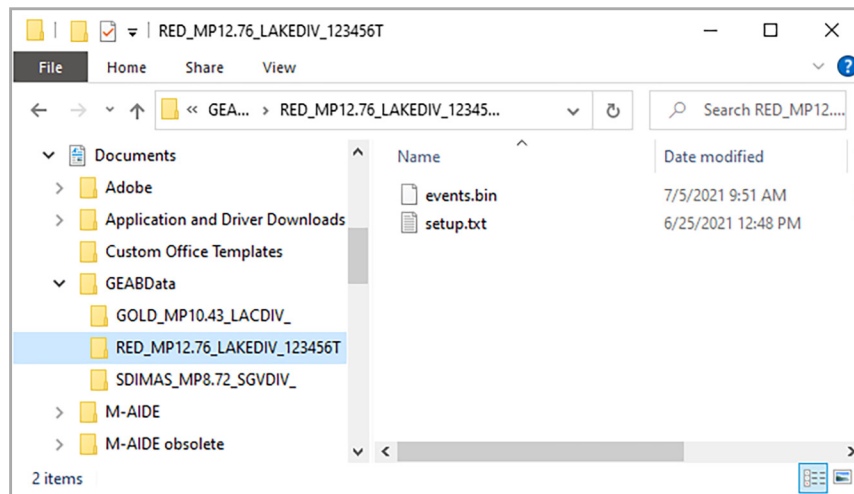


Figure 42: Typical Recorder Data Folder

For the sake of simplicity only two files have been saved within the Recorder Data Folder. One is named **events.bin**. It was created when the **Access>Query Events** command was used to acquire Event Record data. Refer to "[Creating a Report](#)" on page 25. The second file is named **setup.txt**. It is always saved when Event Record data is acquired or as part of a Download operation. The two files reflect the minimum content that GEAB requires to view and plot Event Record data.

COPYING THE USB FLASH DRIVE CONTENT

There are two procedures that will be explained in the following sections. The first is used if within GEAB an appropriate Recorder has already been assigned (i.e., added). The second procedure is used if GEAB does not have an assigned Recorder associated with the data to be copied.

COPYING TO AN ASSIGNED RECORDER

This procedure is quite simple. Using Windows File Explorer, copy the Event Record binary data file(s) to the Recorder Data Folder of the appropriate Recorder. Do the same for the **setup.txt** file so that GEAB has the latest Setup Database content. In the figure that follows, the **07-02-21@065936-070321.bin** and **07-05-21@120004-070521.bin** files have been copied. The **setup.txt** file has also updated. The latter copy operation is optional if GEAB already has an up-to-date Setup Database file.

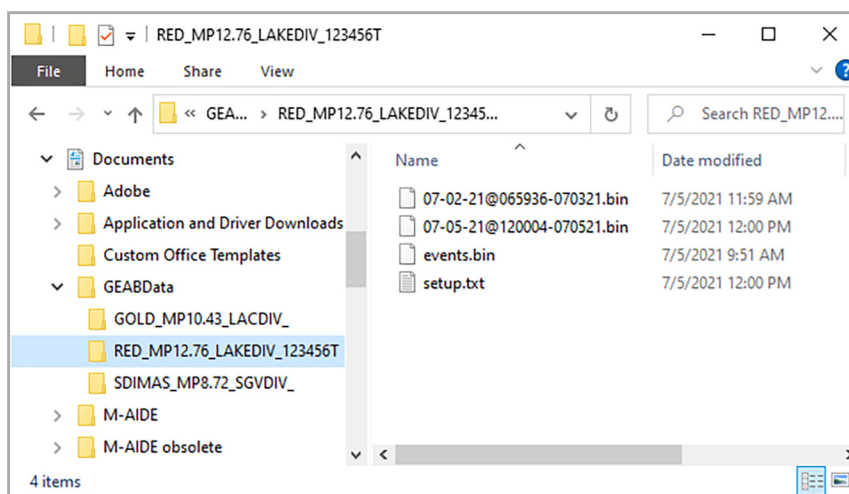


Figure 43: Recorder Data Folder - After Copying

In the example cited, the **.txt** files from the USB flash drive were not copied. GEAB does not use them. If the user wishes to view a text version of the Event Record data the **View>View Events** command can be used to recreate and save a viewable text document. Refer to “[Viewing a Report](#)” on page 26.

It is important to note that the Recorder involved in the previous example is associated with two slightly different folder names. In the USB flash drive the folder is named **RED_MP12.76_LAKEDIV_**. Within GEAB the folder of interest is named **RED_MP12.76_LAKEDIV_123456T**. The difference is inconsequential. What is important is that the **.bin** data file(s) and **setup.txt** file be present. The folders involved could be named ABC and XYZ. GEAB would not be impacted.



To avoid confusion MICRO-AIDE recommends that the Recorder Data Folder within the GEAB Data Folder be named after the Recorder's assigned Unit Name. The Recorder will always create a USB Data Folder using the first 20 characters of the same Unit Name. In this way it will be obvious into which Recorder Data Folder any USB files should be copied.

COPYING TO AN UNASSIGNED RECORDER

In this procedure it is assumed that a GEAB Data Folder named **GEABData** already exists. However, a Recorder named **RED_MP12.76_LAKEDIV_** has not as yet been assigned (i.e., added) within GEAB.

The first step in this procedure is also quite simple. Copy and paste the entire USB Data Folder associated with the Recorder of interest into the **GEABData** folder. The **.txt** files and any **.bin** data files that are of no use or interest, respectively, can then be deleted. The following figure shows the final content of the **GEABData** folder and a Recorder Data Folder named **RED_MP12.76_LAKEDIV_**. Unnecessary text and binary files have not been deleted in the example depicted.

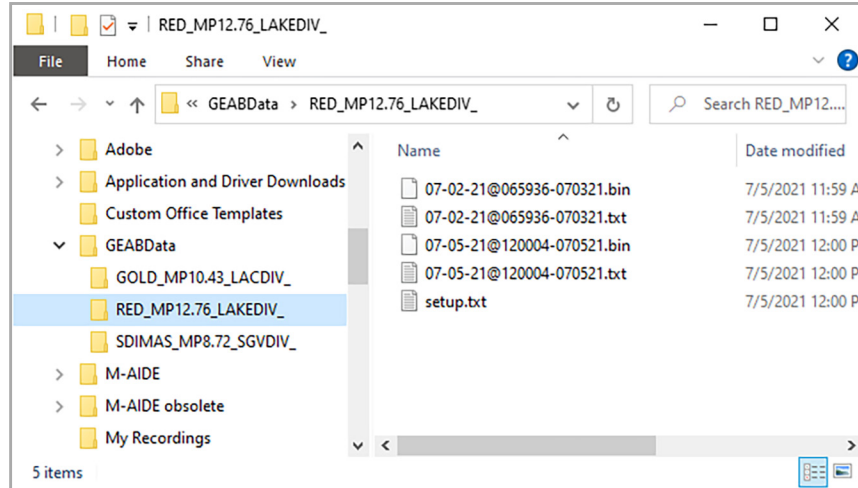


Figure 44: New Recorder Data Folder - After Copying

The final step is to use the **Edit> Add Recorder** command to assign a new Recorder. Refer to [“Assigning an Event Recorder” on page 15](#). In this case the name of the added Recorder must exactly match the folder name saved in the USB flash drive.



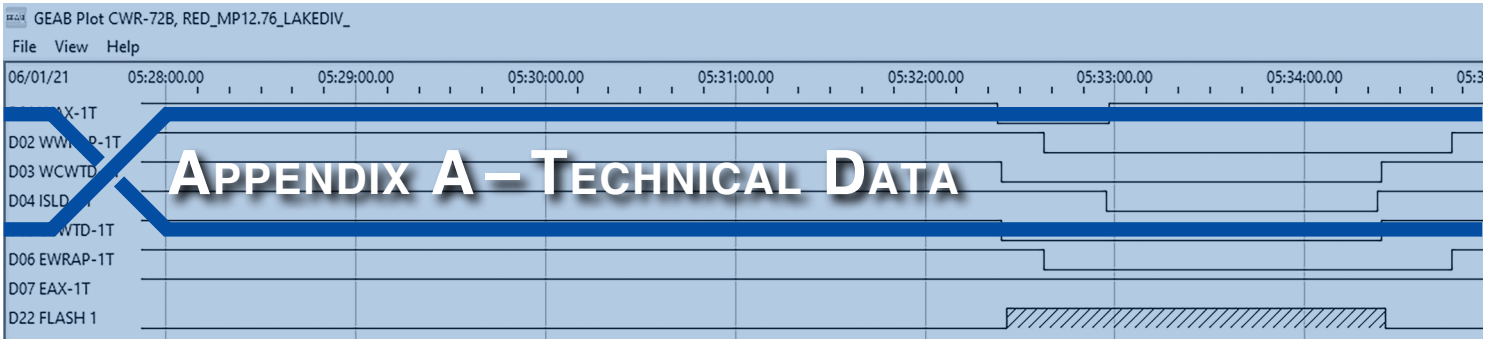
In the latter step, care must be taken not to add a Recorder with a name that is different than the USB Data Folder name. If the names are even slightly different a new differently named Recorder will be added. Only if the folder names match will GEAB be able to associate the Recorder with the correct data folder content.

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Any Event Record **.bin** data files can now be viewed and plotted as if they had been acquired directly from within GEAB.

This completes the chapter on how to properly copy files from a USB flash drive so that they can be used by GEAB. The next chapter is an Appendix that lists important GEAB specifications and requirements.

Any comments the reader may have on how to improve this manual are welcomed. Comments should be forwarded to the Director of Marketing, MICRO-AIDE Corporation.



SPECIFICATIONS

Recorder Compatibility

Models

CWR-24B, CWR-40B, CWR-72B

Quantity

Unlimited number of Recorders are supported

GEA Considerations

Use GEA for all other recording devices

GEAB and GEA can run concurrently on a single Windows 10 PC

Recorder Support

Setup Database

Recorder database can be Downloaded, edited and Uploaded

Viewed and saved as separate text file

Passwords and Passcode settings are encrypted

Reports

Event Record data from any time span can be accessed and saved

Any saved Event Record data can be plotted or used to create and save a report

USB Flash Drive

Setup Database and Event Record data can be copied and pasted directly within GEAB Data Folder

USB acquired data can be plotted or used in a report

Plot Window

Emulates

Multi-channel physical pin plotting machine

Plotting Channels

One per Digital, Analog, Virtual and Alarm Input of Recorder

One for each of 8 user-defined Equation Outputs

One for System Input 1 (Power On/Off)

Controls

Mouse scroll wheel supports zoom-in and zoom-out

Context menu includes multiple zoom-in and zoom-out factors

Mouse click and drag feature supports pan-left and pan-right window movement

Any Plot Item can be assigned to any Plotting Channel

Plotting Channels can be highlighted with any color

Plotting Channels can be vertically repositioned anywhere to create groups of similar inputs

Event Record details provided with any change in input state

Dual cursors provide time position and difference details

Flashing events are highlighted with a different pattern

Live Status Window

Emulates

Single screen with multi-colored simulated LEDs used to indicate real-time status of inputs

Simulated LEDs

One per Digital, Analog, Virtual and Alarm Inputs

One for Maintainer Mode

Additional Data

Real-time clock and internal temperature of Recorder

Help

Separate help screens available for GEAB application, Plot Window and Live Status

Help screens are displayed as web pages in default Browser

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PC REQUIREMENTS

Operating System

Windows 10, 64-bit version

Documented using release version 21H1

Memory

Less than 50 MBytes of disk space

RAM as required by Windows 10

Browsers

Firefox, Google Chrome, Microsoft Edge

Ethernet Port

Required for local or remote access of Event Recorder data

Plot Window Annotating

Requires separate installation of Ghostscript

Documented using release version 9.54.0

User Notes

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MATERIAL RETURN

In the event the customer identifies a malfunction in any product, call or write MICRO-AIDE and obtain a Return Material Authorization (RMA) number from the customer service department. Return the product to MICRO-AIDE, freight prepaid, with a note (in-warranty repair) or a purchase order (out-of-warranty) for the repair listing the following information:

- RMA number issued by MICRO-AIDE
- Return shipment address
- Name and e-mail address or telephone number of person familiar with the problem
- Brief description of the problem (include any printouts that may have a bearing on the problem)
- Method of payment for repair costs (out-of-warranty)
- Send product to the following address:

MICRO-AIDE CORPORATION

685 Arrow Grand Circle

Covina, CA 91722

Tel: 626-915-5502 Fax: 626-331-9484

E-mail: support@micro-aide.com

LIMITED WARRANTY

MICRO-AIDE warrants its products to be free from defects in material and workmanship for a period of five (5) years from the date of shipment. This warranty is in lieu of any other warranty, expressed or implied. In no event shall MICRO-AIDE be held liable for incidental or consequential damage resulting from (1) the use of any of its products, or (2) any alleged breach of this warranty provision. MICRO-AIDE's liability shall be limited to repairing or replacing, at its sole discretion, any defective product which is returned in accordance with the MICRO-AIDE Material Return Policy.

Product that has been subjected to abuse, misuse, alteration, accident, lightning damage, neglect or unauthorized installation or repair shall not be covered by this warranty. MICRO-AIDE reserves the right to make a final decision as to the existence of any failures and the cause of such failures. No warranty is made with respect to custom equipment or products produced to buyer's specifications except as mutually agreed upon in writing.

MICRO-AIDE CORPORATION

685 Arrow Grand Circle

Covina, CA 91722

Tel: 626-915-5502 Fax: 626-331-9484

E-mail: support@micro-aide.com