

# MonitorKey™

## Data Key Programming Tool

---

### Operations Manual

THIS MANUAL CONTAINS TECHNICAL INFORMATION FOR THE MONITORKEY™ DATA KEY PROGRAMMING TOOL AND SOFTWARE VERSION 1.3.7

INCLUDED ARE GENERAL DESCRIPTION, OPERATIONAL DESCRIPTION, INSTALLATION, AND SPECIFICATIONS.

**THE MONITORKEY™ DATA KEY PROGRAMMING TOOL IS DESIGNED AND MANUFACTURED IN THE USA BY EBERLE DESIGN INC., PHOENIX, ARIZONA.**

INFORMATION CONTAINED HEREIN IS PROPRIETARY TECHNICAL INFORMATION OF EBERLE DESIGN INC. MONITORKEY IS A TRADEMARK OF EBERLE DESIGN INC. DATAKEY IS A TRADEMARK OF DATAKEY ELECTRONICS, SAVAGE MN. PUBLICATION, REPRODUCTION OR USE IN WHOLE OR PART IS NOT PERMITTED EXCEPT UNDER TERMS AGREED UPON IN WRITING.

© COPYRIGHT 2002-2008 EDI.

MANUAL REVISION: AUGUST 2008  
pn 888-1212-001



**EBERLE DESIGN INC.**

3819 East La Salle Street      Tel (480) 968-6407  
Phoenix, AZ 85040 USA      Fax (602) 437-1996  
[www.EDIttraffic.com](http://www.EDIttraffic.com)



<blank>

## Table of Contents

<b>SECTION 1 GENERAL</b> .....	<b>1</b>
1.1 Overview .....	1
1.2 Functions .....	1
1.2.1 PROGRAMMING TOOL .....	1
1.2.2 PARAMETER FORMS .....	1
1.2.3 DATA KEY PARAMETER VERIFY .....	2
1.2.4 WIZARDS .....	2
1.2.4.1 INITIAL PARAMETER SETUP WIZARD .....	2
1.2.4.2 PARAMETER CHECK WIZARD.....	2
1.2.5 FILE MANAGEMENT.....	2
1.2.6 PARAMETER REPORT .....	2
<b>SECTION 2 INSTALLATION</b> .....	<b>3</b>
2.1 Hardware Requirements.....	3
2.2 Software Installation.....	3
2.3 Software Updates .....	3
2.4 EIA-232 Cable.....	3
2.4.1 NULL MODEM VERSION (MONITORKEY-NM).....	3
2.4.2 STRAIGHT THROUGH VERSION (MONITORKEY-ST) .....	3
<b>SECTION 3 OPERATION</b> .....	<b>4</b>
3.1 Launching <i>MonitorKey</i> .....	4
3.1.1 SPECIFYING THE PC COMM PORT .....	4
3.1.2 SPECIFYING THE TARGET MONITOR.....	4
3.1.3 SPECIFYING THE CMU-212 CHANNEL LABEL DISPLAY MODE .....	4
3.1.4 CONNECTING TO THE PROGRAMMING TOOL .....	5
3.1.5 PROGRAMMER STATUS LED .....	5
3.2 Main Menu .....	5
3.2.1 STATUS BAR .....	5
3.3 File Menu .....	6
3.3.1 NEW .....	6
3.3.2 OPEN.....	6
3.3.3 SAVE KEY FILE.....	6
3.3.4 SAVE KEY FILE AS .....	6
3.3.5 SAVE REPORT AS.....	6
3.3.6 DISPLAY DATA BUFFER (HEX) .....	6
3.3.7 DISPLAY DATA BUFFER REPORT .....	6
3.3.8 PRINT REPORT.....	7
3.3.9 SHOW BUFFER CHECK VALUE.....	7
3.3.10 EXIT .....	7
3.4 Port Menu .....	7
3.4.1 SETTINGS .....	7
3.4.2 RECONNECT .....	7
3.5 Data Key Menu .....	7
3.5.1 VERIFY DATA KEY .....	7
3.5.2 READ DATA KEY.....	7
3.5.3 WRITE DATA KEY .....	7
3.5.4 PRODUCTION MODE .....	8
3.6 Set Parameters .....	8
3.6.1 CMU-212 SERIES TARGET .....	8
3.6.1.1 UNIT DATA .....	8

3.6.1.2	PERMISSIVE MATRIX.....	9
3.6.1.3	LACK OF SIGNAL.....	9
3.6.1.4	MULTIPLE INPUT.....	9
3.6.1.5	CLEARANCE.....	9
3.6.1.6	CURRENT SENSE.....	9
3.6.1.7	FIELD CHECK.....	10
3.6.1.8	YELLOW DISABLE.....	10
3.6.1.9	VIRTUAL CHANNELS.....	10
3.6.2	2018KCL SERIES TARGET.....	10
3.6.2.1	UNIT DATA.....	10
3.6.2.2	PERMISSIVE MATRIX.....	11
3.6.2.3	RED FAIL ENABLE.....	11
3.6.2.4	DUAL INDICATION.....	11
3.6.2.5	CLEARANCE.....	11
3.6.2.6	YELLOW DISABLE.....	11
3.7	Wizards.....	11
3.7.1	PARAMETER SETUP WIZARD (TARGET = CMU-212).....	11
3.7.2	PARAMETER SETUP WIZARD (TARGET = 2018KCL).....	12
3.7.3	PARAMETER CHECK WIZARD.....	12
3.8	Window.....	13
3.8.1	CLOSE ALL.....	13
3.8.2	CASCADE.....	13
3.8.3	ARRANGE ICONS.....	13
3.9	Help.....	13
3.9.1	HELP CONTENTS.....	13
3.9.2	DATA KEY PROTOCOL VERSION.....	13
3.9.3	ABOUT MONITORKEY.....	13
<b>SECTION 4 TROUBLE SHOOTING.....</b>		<b>14</b>
4.1	Status Indicator.....	14
4.2	Cable Problems.....	14
4.3	Error Messages.....	14
4.3.1	COMMUNICATIONS ERRORS.....	14
4.3.2	DATA KEY ERRORS.....	14
4.3.3	FILE ERRORS.....	15
4.4	Technical Support.....	15
<b>SECTION 5 SPECIFICATIONS.....</b>		<b>16</b>
5.1	EIA-232 Connector.....	16
5.1.1	NULL MODEM VERSION (MONITORKEY-NM).....	16
5.1.2	STRAIGHT THROUGH VERSION (MONITORKEY-ST).....	16
5.2	Power Requirements.....	16
5.3	Data Key Default Parameters (Target = CMU-212 Series).....	16
5.4	Data Key Default Parameters (Target = 2018KCL Series).....	17

## Section 1 GENERAL

### 1.1 OVERVIEW

The Eberle Design *MonitorKey*<sup>TM</sup> programming tool set is used to format and program the nonvolatile memory of the Datakey<sup>tm1</sup> device used to configure the CMU-212 Cabinet Monitor Unit series and the 2018KCL Signal Monitor series. The hardware is designed to interface the serial communications port of a personal computer to the Datakey<sup>tm</sup> electronics. The *MonitorKey*<sup>TM</sup> software provides the capability to format the monitor programming data and transfer this data to and from the Datakey<sup>tm</sup> device.

The Eberle Design *MonitorKey*<sup>TM</sup> software meets all specifications outlined in the **ASHTO/ITE/NEMA Intelligent Transportation System (ITS) Standard Specification for Roadside Cabinets** Version 01.02.17b, as well as Chapter 3 Section 7, ITS Cabinet Monitor Unit, of the State of California Department of Transportation (Caltrans) **Transportation Electrical Equipment Specification (TEES) 2007** document.

For further information on monitor functions and Data Key parameters refer to the Eberle Design **CMU-212 Operations Manual** and the **2018KCL Series Operations Manual**.

### 1.2 FUNCTIONS

#### 1.2.1 Programming Tool

The *MonitorKey*<sup>TM</sup> programming tool provides all the electronics necessary to read data from and write data to the Datakey device. The programmer is configured to interface to the Datakey model LCK4000, providing 512 bytes of storage. Power for the *MonitorKey*<sup>TM</sup> programming tool is obtained from the personal computer communications port so no external power supply source is required.



#### 1.2.2 Parameter Forms

A parameter form is provided for each monitor function. Data is entered on the parameter form (see 3.6) and then saved to the main data buffer image. When all parameter forms are completed the Write function (see 3.5.3) transfers the contents of the data buffer to the nonvolatile memory of the Datakey device. Reading the contents of a Datakey device (see 3.5.2) sets the parameters of each form for review or modification.

---

<sup>1</sup> Datakey and Keyceptacle are trademarks of Datakey Electronics, Burnsville, MN

### **1.2.3 Data Key Parameter Verify**

The Data Key Parameter Verify function (see 3.5.1) compares the contents of a Datakey device with parameters in the data buffer. The data buffer parameters may be set by changing parameters on the forms, reading the contents of a Datakey device, or loading a set of parameters from a file.

### **1.2.4 Wizards**

#### **1.2.4.1 Initial Parameter Setup Wizard**

The Initial Parameter Setup wizard (see 3.7) helps define and set a basic set of parameters for a new Data Key setup. The wizard will ask a series of questions describing basic intersection setup and develop a template for many of the monitor parameters.

The Parameter Setup wizard DOES NOT set parameters for Permissive Matrix (conflict matrix) parameters, Unit Data parameters, Dark Channel Maps, Current Sense threshold parameters, or Virtual Channel parameters. These parameters must be set manually using the parameter forms.

After running the wizard ALL parameters should be verified for correct and safe operation in the intersection.

#### **1.2.4.2 Parameter Check Wizard**

The Parameter Check wizard (see 3.7.3) will apply a set of basic configuration rules to the data buffer and will provide a warning that configuration conflicts may exist. This is a basic parameter consistency check and DOES NOT guarantee that improper data is not set, or that unsafe intersection operation may not occur.

### **1.2.5 File Management**

Data Key images can be saved to files or retrieved from files (see 3.3). These files are binary coded files and are formatted for use with *MonitorKey*<sup>TM</sup> software only.

### **1.2.6 Parameter Report**

The contents of the data buffer can be displayed in a hex format for numerical analysis (see 0). A report can also be printed that specifies all parameter settings (see 3.3.8).

## Section 2 INSTALLATION

### 2.1 HARDWARE REQUIREMENTS

To run *MonitorKey™* software, the following hardware is required:

Personal computer running Microsoft Windows 2000, NT, or XP.

At least 16 Mb of ram.

At least 15 Mb of free space on the PC hard disk.

Available serial port (COM1 - COM10).

### 2.2 SOFTWARE INSTALLATION

Insert the *MonitorKey™* installation CD-ROM in the PC CD-ROM drive.

Choose the Start menu and select Run. Then type X:setup (where X is the drive letter of the CD-ROM drive and press Enter. The Installation Wizard will check the system and the installation process will begin. Answer the questions asked by the installation program.

Once installation is complete, the *MonitorKey™* program icon will be added to the Windows system. The icon is found by selecting Start/Programs/EDI MonitorKey.

### 2.3 SOFTWARE UPDATES

The most current version of the *MonitorKey™* program can be downloaded from the Eberle Design web site at [www.editraffic.com](http://www.editraffic.com). Before installing a new update the currently installed version of the *MonitorKey™* program should be uninstalled from the computer. The *MonitorKey™* program can be uninstalled by going to the "Add/Remove Programs" icon in the Windows Settings/Control Panel window and selecting EDI MonitorKey.

### 2.4 EIA-232 CABLE

Two versions of the MonitorKey Programming tool are provided depending on whether the serial interface is configured for a null modem type cable or a straight through cable connection to the PC. In both products the connector type on the MonitorKey tool is a 9 pin female plug.

#### 2.4.1 Null Modem Version (MonitorKey-NM)

**A Null Modem cable is used** when connecting the *MonitorKey™* programming tool to a PC COMM port with a DB-9 connector. The cable connector for the programming tool should be a male DB-9 type. Refer to section 5.1 for connection details.

#### 2.4.2 Straight Through Version (MonitorKey-ST)

**A Straight Through cable is used** when connecting the *MonitorKey™* programming tool to a PC COMM port with a DB-9 connector. The cable connector for the programming tool should be a male DB-9 type. Refer to section 5.1 for connection details.

## Section 3 OPERATION

### 3.1 LAUNCHING MONITORKEY

#### 3.1.1 Specifying the PC COMM Port

The communications port of the PC must be specified to *MonitorKey*<sup>TM</sup> in order to connect to the programming tool. The communications port can be specified in the PORT / SETTINGS menu window (section 3.4.1). This setting will be automatically saved by the program and used as the default setting each time *MonitorKey*<sup>TM</sup> is subsequently launched.

A command line option can also be added to the MonitorKey shortcut used to launch the program. The command line should be specified as follows:

```
<path>\MonitorKey.exe /comm=X
```

Where X is the PC COMM port to be connected to the programming tool. The software accommodates COMM1 through COMM10 (X = 1 thru 10). The <path> parameter is dependant on the installation location of the *MonitorKey*<sup>TM</sup> software and is "C:\Program Files\Monitorkey" by default.

#### 3.1.2 Specifying the Target Monitor

The *MonitorKey*<sup>TM</sup> program must be configured for the monitor model that the Datakey will be used for. This can be done using a command line option added to the *MonitorKey*<sup>TM</sup> shortcut used to launch the program. The command line should be specified as follows:

```
<path>\MonitorKey.exe /target=X
```

Where X is the monitor model name of the target. The *MonitorKey*<sup>TM</sup> software currently supports the following models:

CMU-212

CMU-220VAC

CMU-48VDC

CMU-24VDC

CMU-12VDC

2018KCL (2018KCLip model should use the 2018KCL target)

The <path> parameter is dependant on the installation location of the *MonitorKey*<sup>TM</sup> software and is "C:\Program Files\Monitorkey" by default.

If the target model is not supplied by the command line parameter after the *MonitorKey*<sup>TM</sup> program is first installed, a window is displayed that provides the user an opportunity to select the target model.

#### 3.1.3 Specifying the CMU-212 Channel Label Display Mode

The *MonitorKey*<sup>TM</sup> program can be configured to display the Channel numbers in a Phase/Ped mode rather than the default 1:1 channel numbering. This can be done using a command line option added to the *MonitorKey*<sup>TM</sup> shortcut used to launch the program. The command line should be specified as follows:

```
<path>\MonitorKey.exe /disp=phped
```

Where X is either "phped" or "def". If the "phped" option is provided then channels 1 through 12 will be labeled as 1, 2, 2P, 3, 4, 4P, 5, 6, 6P, 7, 8, 8P. This corresponds to the conventional 332 cabinet wiring scheme that assigns the physical pedestrian load switch to channels 3, 6, 9, and 12 respectively. Note

that this option only modifies the labels displayed in the MonitorKey windows and does not affect physical assignments or monitoring functions.

The mode selected by “/disp=def” can be used to set the mode back to the default 1:1 labeling convention.

The <path> parameter is dependant on the installation location of the *MonitorKey™* software and is “C:\Program Files\Monitorkey” by default.

If the display mode is not supplied by the command line parameter after the *MonitorKey™* program is first installed, the numeric default mode (Channel 1 thru 32) is selected.

### 3.1.4 Connecting to the Programming Tool

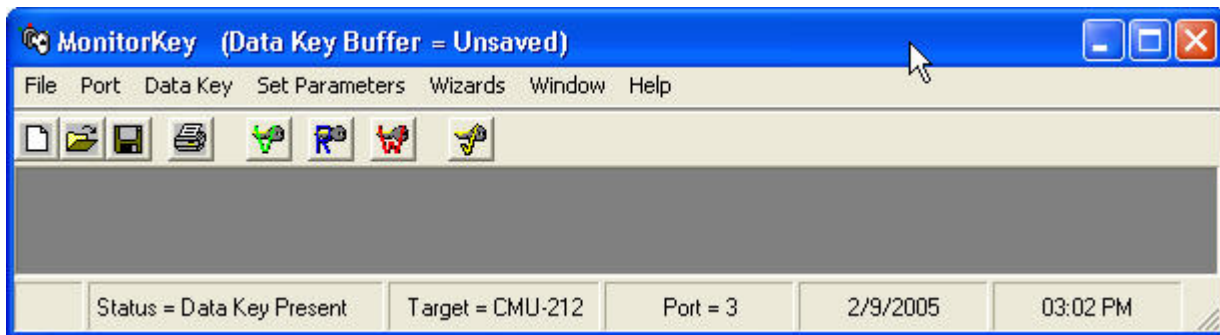
When the program is launched it will attempt to establish a communication link with the programming tool using the COMM port specified in the settings or command line option. If the programming tool is not connected to the specified port or communications cannot be established, an error message will be indicated. The PORT / SETTINGS menu window (section 3.4.1) can then be used to select the correct port.

The PORT / RECONNECT menu item (section 3.4.2) will also invoke an attempt to connect with the programming tool.

### 3.1.5 Programmer Status LED

A small red LED indicator next to the key socket indicates that sufficient power is being supplied to the programming tool when illuminated. The indicator will be pulsed Off when data is transmitted to the PC. This occurs approximately once per second when no Read or Write operations are in progress. When a data transfer is being performed the indicator will pulse Off more often. This pulsing indicates a communication connection is operating correctly.

## 3.2 MAIN MENU



### 3.2.1 Status Bar

The first panel of the Status Bar across the bottom of the *MonitorKey* main window will indicate the current status of the programming tool. This status will indicate the following conditions:

1. Data Key Programming Tool Not Connected  
This message will appear when a valid connection has not been made to the programming tool or the connection has been lost.
2. Data Key Present or Not Present  
If a programming tool is connected the status will indicate whether a Datakey device is inserted or not.
3. Reading Data Key  
The Datakey device contents are being read.
4. Writing Data Key

The Datakey device contents are being written.

The second panel indicates the target monitor.


The third panel indicates the COMM port selected.

### 3.3 FILE MENU

#### 3.3.1 New

The FILE / NEW menu item will reinitialize the data buffer with predefined default Data Key settings (see 5.3). Any existing data in the buffer is lost.




The  toolbar button will also invoke the FILE / NEW menu item.

#### 3.3.2 Open

The FILE / OPEN menu item will load a previously saved Data Key parameter file from disk. The default file extension is “.key”. Any existing data in the buffer is lost.



The  toolbar button will also invoke the FILE / OPEN menu item.


#### 3.3.3 Save Key File

The FILE / SAVE KEY FILE menu item will re-save the contents of a previously saved data buffer to a file. The default file extension is “.key”. This file format is only readable by *MonitorKey™* software.

#### 3.3.4 Save Key File As

The FILE / SAVE KEY FILE AS menu item will save the contents of the data buffer to a file. A dialog box will allow the selection of a (new) path and file name for the data. The default file extension is “.key”. This file format is only readable by *MonitorKey™* software.



The  toolbar button will also invoke the FILE / SAVE KEY FILE AS menu item if the active window is not a Parameter Check report or a Data Key Buffer Parameters report.

#### 3.3.5 Save Report As

The FILE / SAVE REPORT AS menu item will save the contents of the Parameter Check report or a Data Key Buffer Parameters report to a file. A dialog box will allow the selection of a (new) path and file name for the data. The default file extension is “.txt”. This file format is text.



The  toolbar button will also invoke the FILE / SAVE REPORT AS menu item if the active window is a Parameter Check report or a Data Key Buffer Parameters report.

#### 3.3.6 Display Data Buffer (Hex)

The FILE / DISPLAY DATA BUFFER menu item displays the raw binary contents of the data buffer in hex format. The left most column of numbers indicates the byte number (1 thru 512) of the first data of the corresponding row.


#### 3.3.7 Display Data Buffer Report

The FILE / DISPLAY DATA BUFFER REPORT menu item displays the formatted contents of the data buffer in text format as the Data Key Buffer Parameters report.

### 3.3.8 Print Report

The FILE / PRINT REPORT menu item will print the contents of the Parameter Check report or a Data Key Buffer Parameters report to the default printer. The report window must be selected as the active window.



The  toolbar button will also invoke the FILE / PRINT REPORT menu item if the Parameter Check report or a Data Key Buffer Parameters report window is the active window.

### 3.3.9 Show Buffer Check Value

The FILE / SHOW BUFFER CHECK VALUE will display the 16 bit Frame Check Sequence (FCS) value used to validate the contents of the Data Key when read. This data is contained in bytes 511 and 512 of the data buffer. The display format is decimal.

### 3.3.10 Exit

The FILE / EXIT menu item will close all windows, close the communications port and terminate the *MonitorKey™* program.

## 3.4 PORT MENU

### 3.4.1 Settings

The PORT / SETTINGS menu item is used to select the communications port of the PC to be used with the programming tool. Settings for COMM1 through COMM10 are provided. When the OK button is clicked, the *MonitorKey™* software will try to connect to the programming tool. If a valid connection is made, the new port setting will be updated in the MonitorKey registry.

### 3.4.2 Reconnect

The PORT / RECONNECT menu item will try to reconnect to the programming tool if a valid connection is lost.

## 3.5 DATA KEY MENU

### 3.5.1 Verify Data Key

The DATA KEY / VERIFY DATA KEY menu item will read the contents of the currently inserted Datakey device and compare it to the data buffer. The contents of the data buffer will not be modified.



The  toolbar button will also invoke the DATA KEY / VERIFY DATA KEY menu item.

### 3.5.2 Read Data Key

The DATA KEY / READ DATA KEY menu item will read the contents of the currently inserted Datakey device and save it to the data buffer. Any existing data in the buffer is lost.



The  toolbar button will also invoke the DATA KEY / READ DATA KEY menu item.

### 3.5.3 Write Data Key

The DATA KEY / WRITE DATA KEY menu item will write the contents of the data buffer to the currently inserted Datakey device. The Parameter Check Wizard (see 3.7.3) will be automatically run before writing the data to the Data Key to help ensure programming parameters are consistent. If no errors or warnings are generated the Data Key will be written. If errors or warnings are generated, the option of aborting the write function or continuing with the write function is given. Normally, all errors and warnings should be resolved before writing the data to the Data Key.



The  toolbar button will also invoke the DATA KEY / WRITE DATA KEY menu item.

### 3.5.4 Production Mode

When many Data Keys need to be programmed with the same data, the Production Mode will provide a fast way to program. Once the data buffer is ready and the Parameter Check wizard (see 3.7.3) has produced a satisfactory report, select the DATA KEY / PRODUCTION MODE menu item. Each time a Data Key is inserted into the programmer it will automatically be programmed. When the DONE indicator is On, remove the Data Key and insert the next Data Key to be programmed. No other interaction with the MonitorKey™ software is necessary. Continue this operation until the last Data Key is completed and then Exit the window.

## 3.6 SET PARAMETERS

The SET PARAMETERS forms are used to display and modify parameters for target monitor functions. Each monitor function has a parameter form associated with it. Each parameter form has three control buttons:

1. Set to Default

This button will reinitialize the parameter form with a default setup as defined in section 5.3. This default setup is typically the most conservative programming for that function and may not be suitable for actual intersection operation.

2. Save to Data Key Buffer

This button will transfer the contents of the parameter form to the data buffer. When a Write Data Key operation is invoked, the Datakey device is programmed with the contents of the data buffer, not the contents of the form. Once parameters for a form have been modified, the Save to Data Key Buffer button should be clicked to transfer the form data to the data buffer.

3. Close

The Close button will unload the parameter form and close the form window. If the parameters on the form have been modified and not saved to the data buffer, the form modifications will be lost.

### 3.6.1 CMU-212 Series Target

See the EDI *CMU-212 Series Operation Manual* for details on the following parameters.

#### 3.6.1.1 Unit Data

The SET PARAMETERS/UNIT DATA form displays the following CMU-212 monitor parameters:

1. AMU Configuration

The AMU programming is based on a configuration of four output assemblies. There are ten possible valid cabinet configurations:

Assembly #1	Assembly #2	Assembly #3	Assembly #4
14 channel	--	none	none
14 channel	--	14 channel	--
14 channel	--	6 channel	none
14 channel	--	6 channel	6 channel
6 channel	none	none	none
6 channel	6 channel	none	none
6 channel	6 channel	6 channel	none
6 channel	6 channel	6 channel	6 channel
6 channel	none	14 channel	--

Assembly #1	Assembly #2	Assembly #3	Assembly #4
6 channel	6 channel	14 channel	--

A 14-position assembly can only be assigned to assembly #1 or #3. If a 14-position assembly is installed in assembly #1, then assembly #2 is reserved. If a 14-position assembly is installed in assembly #3, then assembly #4 is reserved.

2. Minimum Flash Interval  
Select a value between 6 and 16 seconds.
3. +12VDC Power Supply Monitor Enable  
A check mark ENABLES the cabinet +12VDC power supply monitor.
4. Monitor ID and User ID  
Each ID field accepts up to forty characters. The field will be saved as left justified.

### 3.6.1.2 Permissive Matrix

The SET PARAMETERS / PERMISSIVE MATRIX form displays the permissive channel pair programming for the CMU-212 Conflict function. For each of the channels 1 through 31, a check mark indicates the selected channel is PERMISSIVE (compatible) with the associated channel. A permissive channel is allowed to be active (Green or Yellow) concurrently with the associated channel.

### 3.6.1.3 Lack of Signal

The SET PARAMETERS / LACK OF SIGNAL form displays the Lack of Signal Enable programming and Dark Map #1 through #4 programming for the CMU-212 Lack of Signal function. A check mark for the Lack of Signal parameters will ENABLE that channel for Lack of Signal monitoring. A check mark for the Dark Channel Map parameters will DISABLE that channel for Lack of Signal monitoring when the CMU-212 is using the selected map.

A channel should have Lack of Signal monitoring disabled if an input of that channel has been remapped to a Virtual Channel (channels 29:32). If a Virtual Channel does not have all three inputs assigned it should have Lack of Signal monitoring disabled.

### 3.6.1.4 Multiple Input

The SET PARAMETERS / MULTIPLE INPUT form displays the Multiple Input Enable programming for the CMU-212 Multiple Input function. A check mark ENABLES a channel for the associated Multiple Input function; Green - Yellow, Yellow - Red, Green - Red.

### 3.6.1.5 Clearance

The SET PARAMETERS / CLEARANCE form displays the Minimum Yellow Change and Minimum Yellow Plus Red Change Enable programming for the CMU-212 Clearance function. A check mark ENABLES a channel for the associated Clearance function.

A channel with the Yellow input disabled (see 3.6.1.8) should have the Minimum Yellow Change function disabled.

### 3.6.1.6 Current Sense

The SET PARAMETERS / CURRENT SENSE form displays the Current Sense parameters for each of 28 physical channels. A check mark ENABLES a channel for CMU-212 Current Sense monitoring. If a channel is enabled and the total load current to the channel falls below the minimum value specified by the %FS parameter times the Full Scale value parameter then the channel will be detected as Lack of Signal.

The Full Scale parameter is determined by how many turns of the load switch supply wire (primary) pass through the current sense transformer:

Number of Primary Turns	Full Scale
1	1.00 Amps
2	0.50 Amps
3	0.33 Amps
4	0.25 Amps

The Percent Full Scale (%FS) parameter sets the minimum load current threshold for the channel. Once the Full Scale parameter has been set, the minimum total load current required to prevent a Lack of Signal fault = %FS/100 \* Full Scale. For example, if the Full Scale parameter is set to 1.0 Amps indicating one turn of wire on the transformer primary, and the Percent Full Scale (%FS) parameter is 20, then the minimum total load current required to prevent a Lack of Signal fault on that channel is:

$$20/100 * 1.0 = 0.2 \text{ Amps}$$

A channel should have Current Sense monitoring disabled if an input of that channel has been remapped to a Virtual Channel (29:32).

### 3.6.1.7 Field Check

The SET PARAMETERS / FIELD CHECK form displays the Field Check Enable programming for the CMU-212 Field Check function. A check mark ENABLES an input of a channel for the Field Check function.

An input should have Field Check monitoring disabled if it has been remapped to a Virtual Channel (channels 29:32). A Virtual Channel input should have Field Check monitoring disabled if it has not been mapped to a physical input. A Yellow input should have Field Check monitoring disabled if its associated Yellow Disable parameter checked.

### 3.6.1.8 Yellow Disable

The SET PARAMETERS / YELLOW DISABLE form displays the Yellow Disable programming for each of 28 physical channels. A check mark forces the CMU-212 to set the state of the associated Yellow input of a channel to the Off state (0 volts) regardless of the voltage that may be sensed by the AMU-214 on that physical input.

### 3.6.1.9 Virtual Channels

The SET PARAMETERS / VIRTUAL CHANNELS menu item displays the input source mapping for the four virtual channels (29, 30, 31, and 32). The CMU-212 performs fault processing on the four virtual channels just as it does for each of the 28 physical channels. A virtual channel is actually composed of an image of inputs from physical channels.

For each of the virtual channel inputs, the parameter form provides a pull-down selection for the source channel and source color from which the virtual channel input is mapped. The CMU-212 will remap the input voltage from the source color and channel to the virtual channel. The physical channel input providing the source input will be set to the Off state (0 volts) by the CMU-212.

## 3.6.2 2018KCL Series Target

See the EDI *2018KCL Operation Manual* for details on the following parameters.

### 3.6.2.1 Unit Data

The SET PARAMETERS/UNIT DATA form displays the following 2018KCL series monitor parameters:

1. COMM Port Settings. Note the settings for the 2018KCLip model must be set to the default values of 9600 baud, Even parity.
2. Minimum Flash Interval  
Select a value of None, or between 4 and 10 seconds.
3. Monitor Options

4. Monitor ID number and name  
The ID Number field accepts 0:99999999. The ID Name field accepts up to thirty characters. The field will be saved as left justified.
5. Flashing Yellow Arrow Enables

### 3.6.2.2 Permissive Matrix

The SET PARAMETERS / PERMISSIVE MATRIX form displays the permissive channel pair programming for the Conflict function. For each of the primary channels 1 through 17, a check mark indicates the selected channel is PERMISSIVE (compatible) with the associated channel. A permissive channel is allowed to be active (Green or Yellow) concurrently with the associated channel.

### 3.6.2.3 Red Fail Enable

The SET PARAMETERS / RED FAIL form displays the Red Fail Enable programming for the Red Fail function. A check mark for the Red Fail parameters will ENABLE that channel for Red Fail monitoring.

### 3.6.2.4 Dual Indication

The SET PARAMETERS / DUAL INDICATION form displays the Green-Yellow, Yellow-Red, and Green-Red Enable programming for the Dual Indication function. A check mark ENABLES a channel for the associated Dual Indication function; Green - Yellow, Yellow - Red, Green - Red.

### 3.6.2.5 Clearance

The SET PARAMETERS / CLEARANCE form displays the Minimum Yellow Change and Minimum Yellow Plus Red Change Enable programming for the Clearance function. A check mark ENABLES a channel for the associated Clearance function.

A channel with the Yellow input disabled (see 3.6.2.6) should have the Minimum Yellow Change function disabled.

### 3.6.2.6 Yellow Disable

The SET PARAMETERS / YELLOW DISABLE form displays the Yellow Disable programming. A check mark forces the monitor to set the state of the associated Yellow input of a channel to the Off state (0 volts) regardless of the voltage that may be sensed on that input.

## 3.7 WIZARDS

**- WARNING -**

**The Parameter Setup Wizard is an aid to setup basic form parameters. Before programming a Data Key device, ALL parameter forms should be completely programmed and manually reviewed for correctness, consistency with the intersection configuration and cabinet wiring, and consistency with other form parameters.**

### 3.7.1 Parameter Setup Wizard (Target = CMU-212)

The WIZARDS / PARAMETER SETUP WIZARD menu item launches the Parameter Setup Wizard. This wizard will assist in developing an initial basic template for a new Data Key. Using a series of basic questions regarding cabinet configuration and intersection approach assignments, the wizard will format the data buffer parameters for the following functions:

1. AMU Configuration
2. Lack of Signal Enable
3. Multiple Input

4. Clearance
5. Field Check Enable
6. Yellow Disable
7. Current Sense Channel Enable

The following parameters retain their default settings (see 5.3) and are NOT set by the wizard. They must be set manually:

1. Permissive Matrix (see 3.6.1.2)
2. Dark Channel Maps (see 3.6.1.3)
3. Current Sense Threshold Parameters (see 3.6.1.6)
4. Virtual Channel Assignments (see 3.6.1.9)

### 3.7.2 Parameter Setup Wizard (Target = 2018KCL)

The WIZARDS / PARAMETER SETUP WIZARD menu item launches the Parameter Setup Wizard. This wizard will assist in developing an initial basic template for a new Data Key. Using a series of basic questions regarding cabinet configuration and intersection approach assignments, the wizard will format the data buffer parameters for the following functions:

1. Red Fail Enable
2. Dual Indication Enable
3. Minimum Yellow and Minimum Yellow Plus Red Clearance Enable
4. Yellow Disable

The following parameters retain their default settings (see 5.3) and are NOT set by the wizard. They must be set manually:

1. Permissive Matrix (see 3.6.2.2)
2. Unit Data Parameters (see 3.6.2.1)

### 3.7.3 Parameter Check Wizard

The WIZARDS / PARAMETER CHECK menu item launches the Parameter Check Wizard. This wizard will perform a basic error and consistency check on form parameters that have been saved to the data buffer. The results are displayed in a report format that can also be printed to the default printer. Two levels of checks are performed, Error and Warning.

An Error indicates a parameter is incorrectly set and may result in incorrect operation of the monitor if programmed into the Data Key. Errors should always be corrected before proceeding. Warnings indicate that a parameter is set inconsistently with other parameters and review is suggested before proceeding.

The Parameter Check does not modify the data buffer parameters. Any changes to the data buffer must be done manually using the parameter forms. The Parameter Check should then be run again until a report with no errors or warnings is obtained. The results of the Parameter Check will not prevent the programming of a Data Key.

**- WARNING -**

**The Parameter Check Wizard is an aid to verify form parameter consistency and DOES NOT guarantee that improper data is not set, or that unsafe intersection operation may not occur. It is not intended as a complete check for correctness or completeness.**

**Before programming a Data Key device, ALL parameter forms should be completely programmed and manually reviewed for correctness, consistency with the intersection configuration and cabinet wiring, and consistency with other form parameters.**


A check mark next to the WIZARDS / PARAMETER CHECK menu item indicates the Parameter Check wizard has already been run on the current contents of the data buffer.



The  toolbar button will also invoke the WIZARDS / PARAMETER CHECK menu item.

The FILE / PRINT REPORT menu item sends a text listing of the Parameter Check report to the default printer. The Parameter Check report window must be selected as the active window.



The  toolbar button will also invoke the FILE / PRINT REPORT menu item if the Parameter Check report window is the active window.

### 3.8 WINDOW

#### 3.8.1 Close All

The WINDOW / CLOSE ALL menu item will close all open windows.

#### 3.8.2 Cascade

The WINDOW / CASCADE menu item will arrange all open windows in a cascading format starting from the upper left corner of the *MonitorKey<sup>TM</sup>* main window.

#### 3.8.3 Arrange Icons

The WINDOW / ARRANGE ICONS menu item will organize all the icons of minimized windows horizontally across the bottom of the *MonitorKey<sup>TM</sup>* main window.

### 3.9 HELP

#### 3.9.1 Help Contents

The HELP / HELP CONTENTS menu item launches the on-line help system.

#### 3.9.2 Data Key Protocol Version

The HELP / DATA KEY PROTOCOL VERSION menu item displays the format version for the data buffer and the format version for the *MonitorKey<sup>TM</sup>* program. The format version is used to ensure that any changes to the Data Key data structure are managed correctly.

The format version of the Data Key should always be exactly the same as the format version of the *MonitorKey<sup>TM</sup>* program and the format version of the target monitor that the Data Key will be used with. Consult with the factory for format version compatibility issues.

#### 3.9.3 About MonitorKey

The HELP / ABOUT MONITORKEY menu item will display the software version of the *MonitorKey<sup>TM</sup>* program, the firmware version of the currently connected programming tool, and technical support information for Eberle Design Inc.

## Section 4 TROUBLE SHOOTING

### 4.1 STATUS INDICATOR

A small red LED indicator located next to the key socket indicates that sufficient power is being supplied to the programming tool when illuminated. If the indicator is not illuminated when the *MonitorKey™* program is active, the serial port may not be compatible with the programming tool power requirements.

The indicator will be pulsed Off when data is transmitted to the PC. This occurs approximately once per second when no Read or Write operations are in progress. When a data transfer is being performed the indicator will pulse Off more often. This pulsing indicates a communication connection is operating correctly.

### 4.2 CABLE PROBLEMS

Most connection problems are related to an incorrect or damaged communications cable. Be sure the cable is a "Null Modem" type cable, i.e. pin #2 of male end goes to pin #3 of the female end, pin #3 of male end goes to pin #2 of the female end.

### 4.3 ERROR MESSAGES

#### 4.3.1 Communications Errors

##### CRC ERROR

Data communications between the PC and the programming tool have been corrupted.

##### NO HANDLE

A valid communications connection has not been made with the programming tool.

##### RX TIMEOUT ERROR

Data communications has been lost with the programming tool. No response was received.

##### DATA KEY PROGRAMMING TOOL NOT CONNECTED

A valid communications connection with the programming tool has been lost.

#### 4.3.2 Data Key Errors

##### DATA KEY NOT PRESENT

A Read or Write device operation was attempted without a Data Key device inserted in the programming tool.

##### INVALID DATA CHECK VALUE

A Data Key device was read with an invalid data check value for the data.

##### COMMAND READ FAILURE

The programming tool was unable to read data from the Data Key device.

##### COMMAND NOT SUPPORTED

An invalid command was sent to the programming device.

##### COMMAND RESPONSE INVALID

An invalid response was received from the programming device.

##### COMMAND WRITE FAILURE

The programming tool was unable to write data to the Data Key device.

#### 4.3.3 File Errors

##### INVALID DATA CHECK VALUE

A Data Key file was opened with an invalid data check value for the data.

##### INVALID FILE FORMAT

A Data Key file was opened with an invalid file format.

#### 4.4 TECHNICAL SUPPORT

Additional technical support may be obtained by contacting Eberle Design Inc.

Eberle Design Inc.  
3819 East La Salle Street  
Phoenix, AZ 85040 USA

Telephone: (480) 968-6407  
Fax: (602) 437-1996  
e-mail: [support@editraffic.com](mailto:support@editraffic.com)  
Web Site: [www.editraffic.com](http://www.editraffic.com)

## Section 5 SPECIFICATIONS

### 5.1 EIA-232 CONNECTOR

#### 5.1.1 Null Modem Version (MonitorKey-NM)

The front panel EIA-232 connector is a 9 pin metal shell “DB9S” female subminiature type connector. **The port is configured as a DTE device such that a Null Modem cable is required to connect directly to a personal computer COMM port.**

PC				MonitorKey		
Pin #	Function	I/O		Pin #	Function	I/O
2	Receive Data	In	←	3	Transmit Data	Out
3	Transmit Data	Out	→	2	Receive Data	In
4	DTR	Out	→	6	Power	In
5	Signal Ground	--	↔	5	Signal Ground	-
7	RTS	Out	→	8	Power	In

#### 5.1.2 Straight Through Version (MonitorKey-ST)

The front panel EIA-232 connector is a 9 pin metal shell “DB9S” female subminiature type connector. **The port is configured as a DCE device such that a Straight Through cable is required to connect directly to a personal computer COMM port.**

PC				MonitorKey		
Pin #	Function	I/O		Pin #	Function	I/O
3	Receive Data	In	←	3	Transmit Data	Out
2	Transmit Data	Out	→	2	Receive Data	In
4	DTR	Out	→	4	Power	In
5	Signal Ground	--	↔	5	Signal Ground	-
7	RTS	Out	→	7	Power	In

### 5.2 POWER REQUIREMENTS

Operating Voltage (DTR, RTS) ..... +4 Vdc to +15 Vdc  
Maximum Input Current (DTR, RTS) ..... 5 mA

### 5.3 DATA KEY DEFAULT PARAMETERS (TARGET = CMU-212 SERIES)

Byte #	Contents	Default Value
1	Format Version	0x01
2:63	Permissive Matrix	Non-permissive (0)
64:67	Lack of Signal Enable	Enabled (1)
68:79	Dark Channel Maps 1:4	Disabled (0)
84:95	Multiple Input Enable	Enabled (1)
96:103	Clearance Enable	Enabled (1)
104:107	Yellow Input Disable	Disabled (0)

Byte #	Contents	Default Value
108:111	Current Sense Enable	Enabled (1)
112:118	Current Sense Full Scale	1.0 Amp (00)
119:146	Current Sense Threshold	25%
147:158	Field Check Enable	Enabled (1)
159	Minimum Flash Interval	6 seconds
160	+12VDC Monitor	Enabled (1)
161:172	Virtual Channel Assignment	None (0)
173:176	AMU Configuration	14,0,0,0
177:216	Monitor ID	None (0)
217:256	User ID	None (0)
267:510	Reserved	0
511	FCS Check Value (lsb)	0x6F
512	FCS Check Value (msb)	0x4A

#### 5.4 DATA KEY DEFAULT PARAMETERS (TARGET = 2018KCL SERIES)

Byte #	Contents	Default Value
1	Format Version	0x81
2:52	Permissive Matrix	Non-permissive (0)
53:55	Red Fail Enable	Enabled (1)
56:58	GY Dual Enable	Enabled (1)
59:61	YR Dual Enable	Enabled (1)
62:64	GR Dual Enable	Enabled (1)
65:67	MYC Enable	Enabled (1)
68:70	MYRC Enable	Enabled (1)
71:73	Yellow Disable	Enabled (0)
74	Minimum Flash	6
75	Options 1	Off (0x00)
76	Options 2	Off (0x00)
77	Comm Port 1 Settings	9600-Even (0x10)
78	Reserved	(0x10)
79:82	Monitor ID Number	00000000
83:122	Monitor ID Name	None (0)
123	FYA Enable	(0x00)
124:508	Reserved	(0x00)
509	Reserved	(0x01)
510	Model	2018KCL = 8
511	FCS Check Value (lsb)	2018KCL = 0xE4
512	FCS Check Value (msb)	2018KCL = 0x3A