Instructions for Operation of OPTIMizer Hand Held Programmer

(For Use with Digitrip OPTIM Trip Units)

PROTECTION AND COORDINATION

POWER QUALITY

ENERGY MONITORING

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SECTION 1: INTRODUCTION

1-1 COMMON TERMS

Several commonly used terms or phrases are used throughout this manual. They are defined here to eliminate any confusion that might arise when reading the text.

IMPACC (Integrated Monitoring, Protection and Control Communications) – A family of communicating electrical power distribution protective devices, meters, motor control devices, communications networks and protocols and software packages to provide power distribution monitoring and control.

INCOM (Industrial Communications) – A noise immune communications system designed specifically for power distribution monitoring and control applications.

PONI (Product Operated Network Interface) – A plug-in communications module that enables network communications.

1-2 PRELIMINARY COMMENTS AND SAFETY PRECAUTIONS

This instructional manual is intended to present specific descriptive, operational and maintenance information associated with the Hand Held Programmer (OPTIMizer) only. The OPTIMizer is used exclusively with the Digitrip OPTIM Trip Unit System. For a general overview of the entire Digitrip OPTIM Trip Unit System and certain specific application possibilities, refer to Instruction Book 29C890 entitled "Instructional Overview for Use of the Digitrip OPTIM Trip Unit System."

Detailed instructional material relative to the installation, use and maintenance of specific devices is included under separate cover by a manual dedicated to each device. A series of four manuals brings together the wide array of capabilities offered by the most advanced programmable trip unit system - Digitrip OPTIM. Refer to Appendix A for all instructional material references.

Please read and understand this manual and all other relevant manuals before proceeding with the installation and operation of any device included in the trip unit sys-

tem. Pay particular attention to all WARNINGS and CAUTIONS. They are intended to help insure personnel safety and equipment protection. Refer to the WARNING and CAUTION in Paragraph 1-2.1 before proceeding to any other section in this manual or any other manual. If further information is required by the purchaser regarding a particular installation, application or maintenance activity, a Cutler-Hammer representative should be contacted.

1-2.1 SAFETY PRECAUTIONS

All safety codes, safety standards and/or regulations must be strictly observed in the installation, operation and maintenance of any device in this system.

⚠ **WARNING**

THE WARNINGS AND CAUTIONS INCLUDED AS PART OF THE PROCEDURAL STEPS IN THIS DOCUMENT ARE FOR PERSONNEL SAFETY AND PROTECTION OF EQUIPMENT FROM DAMAGE. AN EXAMPLE OF A TYPICAL WARNING LABEL HEADING IS SHOWN ABOVE IN REVERSE TYPE TO FAMILIARIZE PERSONNEL WITH THE STYLE OF PRESENTATION. THIS WILL HELP TO INSURE THAT PERSONNEL ARE ALERT TO WARNINGS, WHICH MAY APPEAR THROUGHOUT THE DOCUMENT. IN ADDITION, CAUTIONS ARE ALL UPPER CASE AND BOLDFACE AS SHOWN BELOW.

⚠ **CAUTION**

COMPLETELY READ AND UNDERSTAND THE MATERIAL PRESENTED IN THIS DOCUMENT BEFORE ATTEMPTING INSTALLATION, OPERATION OR APPLICATION OF THE EQUIPMENT. IN ADDITION, ONLY QUALIFIED PERSONS SHOULD BE PERMITTED TO PERFORM ANY WORK ASSOCIATED WITH THE EQUIPMENT. ANY WIRING INSTRUCTIONS PRESENTED IN THIS DOCUMENT MUST BE FOLLOWED PRECISELY. FAILURE TO DO SO COULD CAUSE PERMANENT EQUIPMENT DAMAGE.

1-3 PRODUCT OVERVIEW

The OPTIMizer Hand Held Programmer is required for all OPTIM Trip Unit Systems. It plugs into the front of OPTIM 550, 750 or 1050 Trip Units and is powered by a standard nine volt battery (Figure **1-1**) or auxiliary power module. The OPTIMizer accesses, displays, and configures information from OPTIM Trip Units. The OPTIMizer Hand Held Programmer provides a broad range of programming possibilities available with the OPTIM Trip Unit System and the range of compatible circuit breakers.

1-4 FEATURES AND FUNCTIONS

An OPTIMizer must be used to configure the trip unit for communications on the INCOM Network. This requires an operator, during initial start-up, to:

- **Assign Unique Device Addresses**

- **Select Baud Rates**

In addition, the OPTIMizer can be used to:

- **Configure OPTIM Trip Unit**
  - Select frequency (50/60 Hz)
  - Set security passwords
  - Change time-current setpoints
  - Select protection options
  - Select High Load Alarm level

- **Display Information**
  - Breaker description
  - Time-current setpoints
  - Metered values
  - Trip event information

- **Test OPTIM Trip Unit Performance**
  - Phase and ground
  - Trip or no trip

- **Communicate over INCOM**

- **Copy Trip Unit Settings**
  - To download to any OPTIM breaker of any type

Figure 1-1 Hand Held Programmer in Use with Series C̄ R-Frame Circuit Breaker

SECTION 2: HARDWARE DESCRIPTION

2-1 GENERAL

The purpose of this section is to familiarize the reader with OPTIMizer hardware, its nomenclature, and any applicable specifications. The information presented is divided into the following three sections:

• Package and External Connections

• Operator Panel

• Specification Summary

Notice: *Integral to the OPTIMizer Hand Held Program-* *mer is the ability to lock out changes to a* *breaker's settings through the use of a pass-* *word. The correct password must be entered* *to proceed with setpoint changes, baud rate* *changes or the initiation of a test. The pass-* *word entry field contains four digits that can be* *changed. The factory installed password* **1000** *can be used until a new password is selected* *by the user.*

⚠ CAUTION

THIS IS A SOPHISTICATED PIECE OF ELECTRICAL EQUIPMENT. AS SUCH, IT SHOULD BE HANDLED CAREFULLY AT ALL TIMES TO AVOID POSSIBLE DEVICE DAMAGE.

2-2 PACKAGE AND EXTERNAL CONNECTIONS

The OPTIMizer Hand Held Programmer is packaged in a high strength plastic housing with approximate dimensions of 5.75 inches by 3.5 inches by 1.25 inches. An operator panel with a display and associated pushbuttons are located on the front of the device (Figure **2-1**). External connections are made on the top of the hand held programmer (Figure **2-2**). A top hinged protective cover is provided to protect external connections from the entrance of foreign matter. The protective cover is opened through the use of a thumb nail notch (Figure **2-3**). A storage case holds the hand held programmer and its phone type connection cord.

❶ On/Off Pushbutton
❷ Save Pushbutton
❸ Select Pushbutton
❹ View Functions Up-Arrow Pushbutton
❺ Right-Arrow Pushbutton
❻ Left-Arrow Pushbutton
❼ Edit Values Up and Down Pushbuttons
❽ Liquid Crystal Display

Figure 2-1 OPTIMizer Operator Panel

① Custom Phone Jack Port (HDR1)
② 2-Pin Auxiliary Power Receptacle
③ 3-Pin Network Receptacle (J2)
④ Communication Indicating LED
⑤ Display Intensity
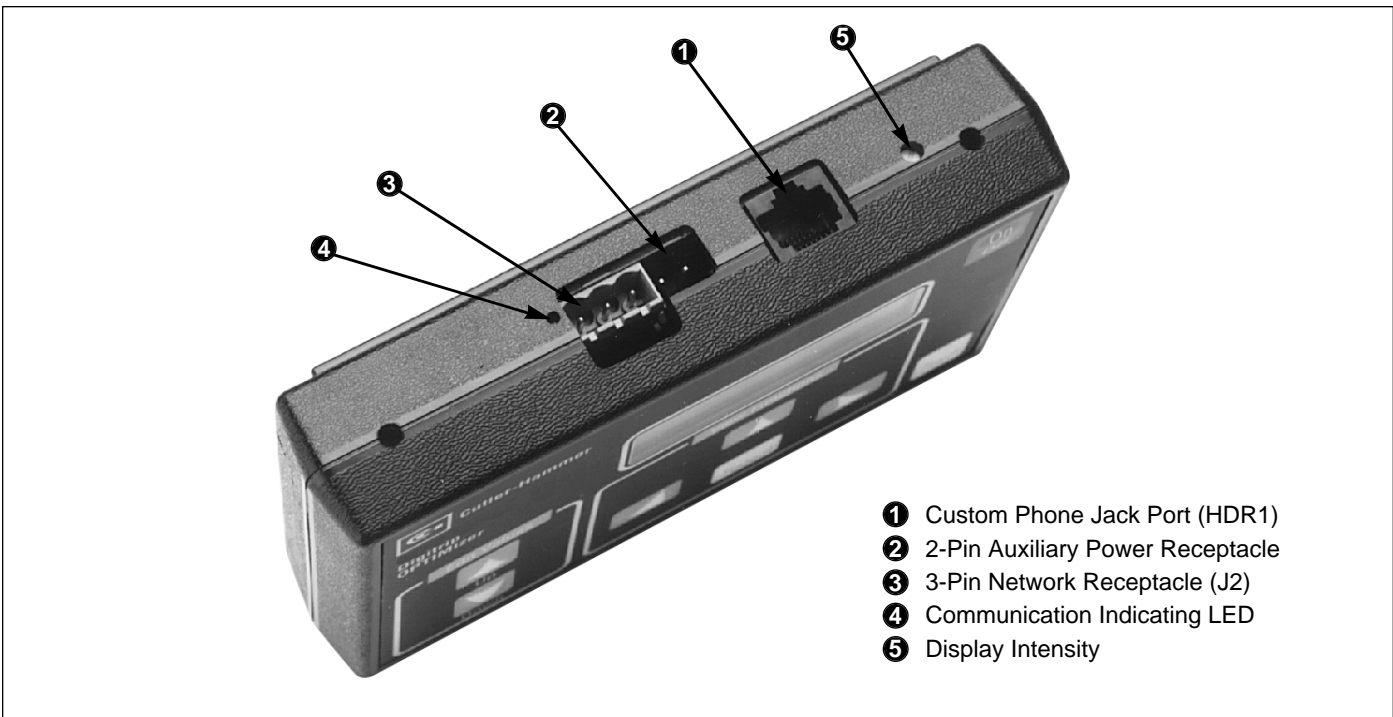
Figure 2-2 OPTIMizer Top View

Notice: *A small red LED located on the top of the hand held programmer near the external connections blinks when the hand held programmer is communicating with a trip unit.*

2-2.1 INTERNAL BATTERY POWER

A 9-volt battery compartment with a slide out access cover located on the back of the device provides easy access to an internal 9-volt battery (Figure **2-4**). The number of continuous operation hours the 9-volt battery will support depends upon the type of battery used. Refer to Table **2.2** for information about battery choices.

When an auxiliary power supply is not being used, the programmer will automatically turn off to save battery power or provide an indication of insufficient power under the following conditions:

1. The programmer turns itself off when the battery power available is not sufficient to carry out all programmer functions, including both powering of the programmer and the trip unit. When this occurs the battery should be replaced.

Figure 2-3 OPTIMizer Hinged Protective Cover (Open Position)

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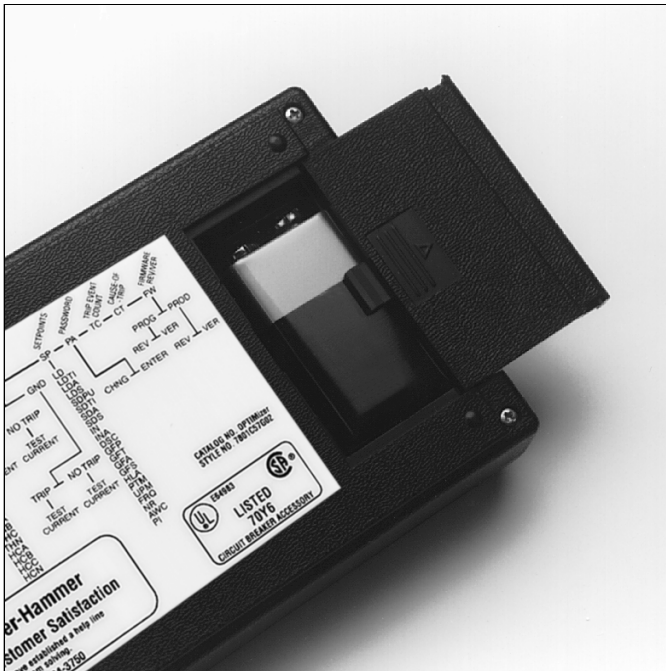
Figure 2-4 OPTIMizer Battery Compartment with
Battery Installed

Figure 2-5 Auxiliary Power Module Shown Connected
to OPTIMizer

2. If none of the pushbuttons on the operator panel are
    used for approximately 2 1/2 minutes, the program-
    mer turns itself off. This includes the performance of
    a non-trip test. External power is required to perform
    a trip test. Refer to the next paragraph for external
    power details.

2-2.2 EXTERNAL CONNECTIONS

Three receptacles are provided on the top of the device,
one for an external power connection and two different
means for connecting the programmer to the trip unit
(Figure **2-2**).

External Power Connection

Use external power to:
- Save internal battery power
- Perform trip test on circuit breaker
- Communicate over INCOM

External power is provided by connecting an Auxiliary
Power Module (Catalog Number PRTAAPM) to the
OPTIMizer through the 2-pin male receptacle. The
Auxiliary Power Module requires a 120 Vac 50/60 Hz
input and delivers a 32 Vdc 4 VA output (Figures **2-2**
and **2-5**). Note that OPTIM trip units with external
power connections (K, L and N) operate from a 24 Vdc
power source.

Direct Breaker Connection

The first method for connecting the hand held program-
mer to the trip unit is by means of the 8 conductor cus-
tom phone cord provided with the programmer. One end
plugs into the front panel of the trip unit and the other
end into a custom phone jack port (HDR1) on the top of
the programmer. This direct connection is intended only
for use with the hand held programmer, and is normally
associated with the direct programming of individual trip
units (Figures **1-1, 2-2** and **2-6**).

Network Connection

The second means for connecting the hand held pro-
grammer is through the 3-pin male connector (J2) locat-
ed on the top of the programmer. This connection is
made through an INCOM shielded twisted-pair. The
hand held programmer has an internal INCOM trans-
former permitting it to communicate over the network.
This is the method normally associated with network pro-
gramming (Figure **2-2**). Auxiliary power to the OPTIMizer
is required to communicate over the INCOM network.

Notice: *A direct connection will override an INCOM
connection. This will also signal a no response
alarm on other network devices.*

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Figure 2-6 OPTIMizer Shown Connected to Series C̄ L-Frame Circuit Breaker

Figure 2-7 General Pushbuttons

2-3 OPERATOR PANEL

The operator panel provides a means to initially assign addresses, select baud rates, configure trip units, display information, and perform testing (Figure **2-1**). For the purpose of familiarization, the panel is divided into two sub-sections:

• Pushbuttons
• Display

2-3.1 PUSHBUTTONS

The operator panel contains eight membrane pushbuttons. Pushbuttons generally accomplish their function when pressed and released. Variations in the use of a particular pushbutton are detailed in the description for that particular pushbutton. The pushbuttons are categorized as follows:

• *General* Pushbuttons
• *View Functions* Pushbuttons
• *Edit Values* Pushbuttons

2-3.2 GENERAL PUSHBUTTONS

(Figure **2-7**)

On/Off Pushbutton

The *On/Off* pushbutton turns the hand held programmer on and off. To achieve power-up, the pushbutton must be pushed and held for approximately one second. The programmer cannot be turned off while *Find Baud/Addr* is displayed. When the programmer is on, power is delivered to the trip unit.

Save Pushbutton

The *Save* pushbutton is used in conjunction with the *Select* pushbutton to cause any programmer initiated change to be saved to memory. The *Save* pushbutton must be pressed and held followed by depression of the *Select* pushbutton to accomplish the saving function. Changes must be saved individually before moving to another menu. This feature minimizes the possibility that re-programming would be required if the programmer turns itself off during the programming process.

2-3.3 VIEW FUNCTIONS PUSHBUTTONS

(Figure **2-8**)

Select Pushbutton

The *Select* pushbutton performs two functions. First, it is used in conjunction with the *Save* pushbutton to save

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changes to memory as previously described. In addition, the **Select** pushbutton by itself causes the programmer to select a particular category indicated by the blinking cursor and move further into that particular selected menu.

Up-Arrow Pushbutton

The **Up-Arrow** pushbutton is used to move the blinking cursor back to the first selection **Select Address (SA)** when the programmer is displaying the top level menu (Figure **2-9**). It is similar to the Escape Key of a PC. If the programmer is displaying a lower level menu, use of this pushbutton moves the display back one menu level, eventually ending at **SA**.

Right-Arrow Pushbutton

The **Right-Arrow** pushbutton moves the blinking cursor horizontally to the right in the display from category to category. Continued use of this pushbutton will wrap around and eventually return to the starting category.

Left-Arrow Pushbutton

The **Left-Arrow** pushbutton performs the same function as the previously described **Right-Arrow** pushbutton except movement of the blinking cursor is horizontally to the left.

Figure 2-9 Top Level Main Menu Display

2-3.4 EDIT VALUES PUSHBUTTONS

(Figure **2-10**)

Up Pushbutton

The **Up** pushbutton is used to edit already programmed values and/or selections. Use of this pushbutton increases the value and/or selection presently programmed. When this pushbutton is held depressed, the displayed values scroll at a more rapid rate. Eventually, the display will wrap around to the original starting point.

Figure 2-8 View Functions Pushbuttons

Figure 2-10 Edit Values Pushbuttons

Down Pushbutton

The **Down** pushbutton performs the same function as the previously described **Up** pushbutton except movement is in the opposite direction down through the values and/or selections.

2-3.5 DISPLAY

Notice: *This manual utilizes a gray rectangular box underlined in black to represent a blinking cursor in all illustrations of the programmer's display (Figure **2-9**).*

A 2-line, 16-character per line liquid crystal display is used to display all trip unit data, setpoints and mes-

sages. The brightness of the display can be adjusted through the use of a small, recessed adjusting screw located in the top side of the programmer (Figure **2-2**).

The first line of the display is normally used to show the main menu selection possibilities. A blinking cursor indicates which category on the first line is active. The second line of the display either defines the first line category highlighted by the blinking cursor or, in lower level menus, presents a field that is capable of being changed, as indicated by a blinking cursor. Note in Figure **2-9** that the blinking cursor is positioned just to the left of **SA** in the top line of the display. Note also that the second display line defines that category as **Select Address**. Table **2.1** outlines all the displayed menu items that can be encountered in the OPTIMizer display along with their specific definitions. Figure **2-11** shows the twelve available options accessible from the main menu.
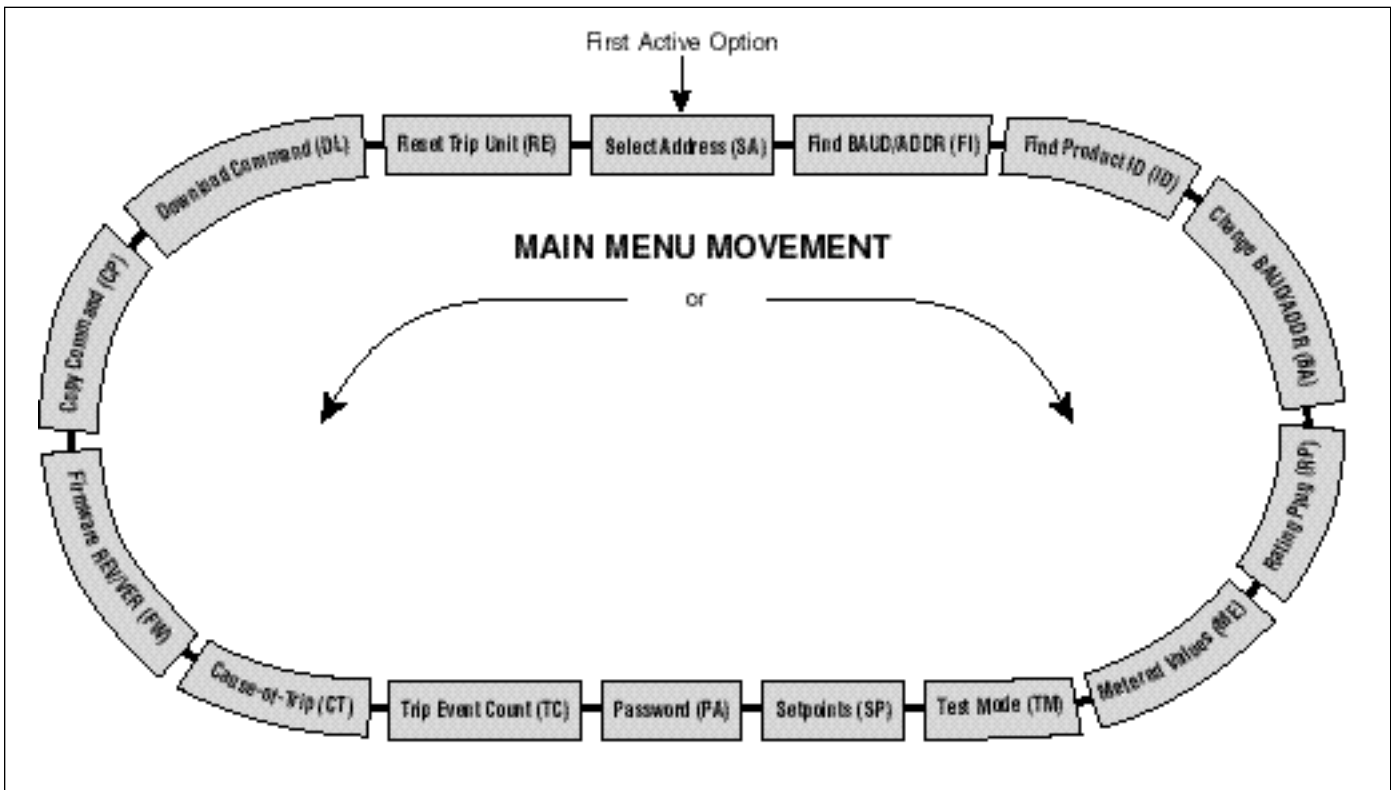
Figure 2-11 Main Menu Option Screens

Table 2.1 Programmable Categories

Displayed Menu Items	Display Definition	Additional Comments
SA	SELECT ADDRESS	Network use only – permits selection of specific trip unit address within network
FI	FIND BAUD/ADDR	Search to identify address and baud rate of connected trip unit (8 conductor custom phone cord only)
ID	FIND PRODUCT ID	Identification of type and frame rating of connected breaker
BA	CHANGE BAUD/ADDRESS	Permits the initial setup or changing of address and baud rate of connected trip unit – valid password required to setup or change address
RP	RATING PLUG	Rating plug size installed in connected trip unit
ME	METERED VALUES • Current (A) • Energy (kWh) • Power (kW) • Power Factor • THD Currents (%) • Harmonic Content	Depending on trip unit connected, some or all of the values are displayed: - Phases A, B, C, Ground and Neutral - Total, Forward and Reverse - Power and Peak Demand - Phases A, B, C and Neutral - Phases A, B, C and Neutral
TM	TEST MODE	Provides for Phase or Ground, Trip or Non-Trip Test (valid password)
SP	SETPOINTS • LD • LDTI • LDA • LDS • SDPU • SDTI • SDA • SDS • IN • INA • DSC • GFP • GFT • GFA • GFS • HLA • PTM • UPM • FRQ • NR • AWC • PI	Permits viewing, initial setup and changing of setpoints for connected trip unit – valid password required to setup or change setpoints: - Long Delay Setting - Long Delay Time - Long Delay Action - Long Delay Slope - Short Delay Setting - Short Delay Time - Short Delay Action - Short Delay Slope - Instantaneous Setting - Instantaneous Action - Discriminator - Ground Fault Setting - Ground Fault Time - Ground Fault Action - Ground Fault Slope - High Load Setting - Powered Thermal Memory - Unpowered Thermal Memory - Line Frequency - Neutral Ratio - Auto Waveform Capture - Phase A Identification
PA	PASSWORD	Permits authorized personnel to change or enter 4 digit password
TC	TRIP EVENT COUNT	Display of number of circuit breaker automatic trip operations
CT	CAUSE-OF-TRIP	Displays one of four possible modes of trip on most recent automatic trip operation: • Long Delay • Short Delay • Instantaneous • Ground Fault
FW	FIRMWARE REV/VER	Displays Firmware Revision and Version of OPTIMizer or connected trip unit
CP	COPY COMMAND	Loads trip unit settings into OPTIMizer
DL	DOWNLOAD COMMAND	Sends stored settings in OPTIMizer to trip unit (valid password)
RE	RESET TRIP UNIT	Resets trip unit LEDs, historical current etc.

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2-4 SPECIFICATION SUMMARY

Refer to Table **2.2**.

Table 2.2 OPTIMizer/Accessory Specifications

Power Supply:	
• Battery[1]	ULTRALIFE Batteries Inc.
Lithium Power Cell	Part #U9VL
(+9 volts dc)	
• Auxiliary Power Module	Cutler-Hammer
	Catalog #PRTAAPM
	Input 120 Vac
	Output +32 Vdc, 4 VA

[1] Alkaline type batteries can be used but will require more
   frequent replacement.

SECTION 3: OPERATION AND USE

3-1 GENERAL

This section specifically describes the effective operation and functional use of the OPTIMizer Hand Held Programmer. The OPTIMizer is used to access the many capabilities of OPTIM 550, 750 and 1050 Trip Units. Specific details associated with the trip units are covered in Instruction Book 29C891 entitled "Instructions for Installation, Operation and Maintenance of Cutler-Hammer Digitrip OPTIM Trip Units." It is recommended that the operator review the material presented in Section 2 prior to operating and using the hand held programmer.

Familiarization with the information presented in Table **2.1** will prove helpful. Table **2.1** outlines the menu items accessed from the top level menu (Figure **2-9**). Menu item definitions are provided in the user friendly display with additional explanatory information provided in Table **2.1**. In addition, an OPTIMizer Menu Diagram provides an overall picture of the device's capabilities (Figure **3-1**). This diagram is also shown on the OPTIMizer back panel for quick and easy reference (Figure **2-4**).

Section 3 covers the operation and use of the OPTIMizer. It is broken down into the following general categories:
- Getting Started
- Power Application
- Security Password
- Assign Address/Select Baud Rate
- Configure Trip Unit
- Displayed Information
- Test Trip Unit

3-2 GETTING STARTED

The OPTIMizer Hand Held Programmer is a simple to use device. Before applying power and using the device, it is recommended that the following preliminary steps be taken:

Step 1: If the programmer is to be operated by battery power only, be sure that a fresh battery is properly installed. Refer to paragraph 2-2.1 for battery information.

Step 2: If power will be supplied by an Auxiliary Power Module, be certain that the Auxiliary Power Module is connected to the appropriate 120 Vac source and the OPTIMizer Hand Held Programmer. Refer to paragraph 2-2.2 for details on an external power connection.

Notice: *Keep in mind that an Auxiliary Power Module is always required if a "Trip" Test is to be performed on a circuit breaker.*

Step 3: When a **Direct Breaker Connection** is being made, plug either end of the custom phone cord into the phone jack port on the top of the programmer first, and then plug the other end into the port provided on the trip unit. The connections should be made before power is applied. Refer to paragraph 2-2.2 for details on a **Direct Breaker Connection**.

Notice: *A direct breaker connection will override an INCOM connection. This will also signal a no response alarm on other network devices. Clear the alarms when finished.*

Step 4: If a **Network Connection** is being made using an INCOM twisted-pair connection to the 3-pin connector located on the top of the programmer, refer to paragraph 2-2.2 for details on a **Network Connection**.

Step 5: No matter which connection approach is used, be certain that all plug-in connections are properly seated. This includes trip unit, external power and INCOM connections to the programmer as well as connections from the programmer to the trip unit or INCOM.

The programmer is now ready to have power applied.

3-3 POWER APPLICATION

Turn the programmer on by holding the red *On/Off* pushbutton in the depressed position for approximately one second. Upon release of the pushbutton, the first message will be displayed.

Three different types of messages can be displayed before the top level menu appears (Figure **2-9**). The messages displayed will depend on the programmer connection or lack of a proper connection as follows:

- If the programmer detects the lack of a proper connection, two consecutive messages will be displayed. Figure **3-2** shows the first message displayed while the programmer searches for a compatible device. If the programmer is unable to make a connection, Figure **3-3** shows the second message that appears momentarily before the top level main menu is displayed (Figure **2-9**).

M A I N M E N U ①

| SELECT ADDRESS | FIND BAUD/ADDR | FIND PRODUCT ID | CHANGE BAUD/ADDR | RATING PLUG | METERED VALUES | TEST MODE | SETPOINTS |

| ② INCOM Only | ② Identification of Baud Rate/Address | ② Identification of Type/Frame of Breaker | ② Setup or Change to Address/Baud Rate | ② Installed Plug Size | ② ⑦ Phase A Current | ② Phase or Ground | ② ⑦ Long Delay Setting |

③ ④ ⑤ ⑥   ③   ③   ③ ④ ⑤ ⑥   ③

Phase B Current	Trip or No Trip	Long Delay Time
Phase C Current	Test Current	Long Delay Action
Ground Current	③ ④ ⑤ ⑥	Long Delay Slope
Neutral Current		Short Delay Setting
Total Energy		Short Delay Time
Forward Energy		Short Delay Action
Reverse Energy		Short Delay Slope
Power		Instantaneous Setting
Peak Demand		Instantaneous Action
Power Factor		Discriminator
Harmonic Distortion A, B, C and N		Ground Fault Setting
Harmonic Content A, B, C and N		Ground Fault Time

③ ④

Ground Fault Action

Ground Fault Slope

High Load Setting

Powered Thermal Memory

Unpowered Thermal Memory

Line Frequency

Neutral Ratio

Auto Waveform Capture

③ ④ ⑤ ⑥

Phase A Identification

Figure 3-1 OPTIMizer Menu Diagram — continued to next page

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MAIN MENU ①

PASSWORD	TRIP EVENT COUNT	CAUSE OF TRIP	FIRMWARE REV/VER	COPY	DOWNLOAD	RESET
②	②	②	②	②	②	
Change or Enter	Number of Automatic Trips	Reason for Automatic Trip	Present Revision and Version	Copy Trip Unit Settings into OPTIMizer	Send Stored Settings of OPTIMizer to Product	Trip Unit Reset
③ ④ ⑤ ⑥	③	③	③ ④	②	② ⑥	
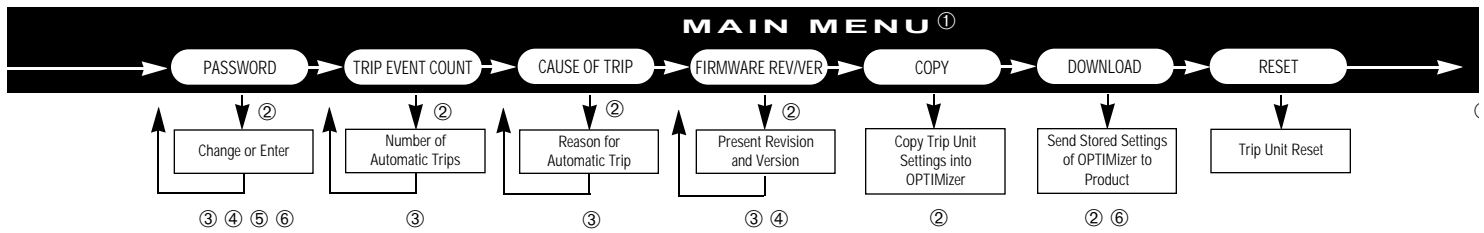
① Use Right-Arrow or Left-Arrow Pushbuttons to move from one Main Menu item to another.

② Use Select Pushbutton to enter a specific Main Menu item.

③ Use View Functions Up-Arrow Pushbutton to return to Main Menu or return is automatic.

④ Use Right-Arrow or Left-Arrow Pushbuttons to move to different selections.

⑤ Use Edit Values Up or Down Pushbuttons to alter active item or value.

⑥ Use Select and Save Pushbuttons simultaneously to save to memory or initiate test.

⑦ Some entries in Metered Values and Setpoints may not be visible due to other settings.

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FIND BAUD/ADDR
  ** WORKING **

Figure 3-2 Initial Power Application Message Display

FIND BAUD/ADDR
TARGET = 96B/012

Figure 3-5 Typical Momentary Successful Connection Message Display

CONNECT FAILURE

Figure 3-3 Momentary Connect Failure Message Display

<ME TM SP PA>
PASSWORD

Figure 3-6 Cursor on Password in Main Menu

ADDRESS INVALID
OVER INCOM PORT

Figure 3-4 Address Invalid Display

- If the programmer is connected to an INCOM Network, the message shown in Figure **3-2** will first be displayed followed by the INCOM message shown in Figure **3-4**. The top level menu will then be displayed (Figure **2-9**).

- If the programmer is successful in its device search, the same in progress type message is displayed as shown in Figure **3-2**. Refer to Figure **3-5** for a typical baud rate and address message momentarily displayed once the trip unit is identified. The top level main menu is ultimately displayed and the programmer is ready for use (Figure **2-9**).

3-4 FUNCTION OVERVIEW

3-4.1 SELECT ADDRESS (SA)

The *Select Address* menu item is used when it is desired to communicate over the 3-pin INCOM connection to an OPTIM trip unit. The address of the breaker you desire to communicate to is entered here. Note that an auxiliary power module must be plugged into the OPTIMizer for the OPTIMizer's INCOM transceiver to work. Selectable addresses are in the range 001-FFE hexadecimal (001 to 4094 decimal).

3-4.2 FIND BAUD/ADDRESS (FI)

This menu item is used to retrieve the address and baud rate of the OPTIM trip unit connected to the OPTIMizer's custom phone cord. The OPTIMizer executes this function automatically when the OPTIMizer is first turned on. Several attempts will be made to retrieve the address and baud rate. If no trip unit is connected to the OPTIMizer at the time the OPTIMizer is turned on, an error message will be displayed.

3-4.3 FIND PRODUCT ID (ID)

The breaker frame type is displayed when this menu item is selected.

3-4.4 CHANGE BAUD/ADDR (BA)

The baud rate of the trip unit can be changed to that of the system by using this menu item. The baud rate is programmable to either 1200 or 9600 baud. All breakers connected together on a line must communicate at the same baud rate.

The address of a given breaker can be changed by using this menu item. Valid addresses of 001-FFE Hexadecimal (001 to 4094 decimal) can be used, however, when OPTIM trip units are connected to a Breaker Interface Module (BIM) the range of usable addresses is from 1-32 hexadecimal (1-50 Decimal).

3-4.5 RATING PLUG (RP)

The rating plug installed in a trip unit can be read using this command.

PASSWORD
<=CHANGE ENTER=>

Figure 3-7 Password Menu

*** PASSWORD ***
* * * A C C E P T E D * *

Figure 3-9 Password Accepted Display

PASSWORD   ENTER
SET CODE   0000

Figure 3-8 Present Valid Password Entry Screen

PASSWORD ERROR
ENTER CODE AGAIN

Figure 3-10 Password Error Display

3-4.6 METERED VALUE (ME)

The phase, neutral and ground currents are displayed in the **Metered Values** menu, as well as Total Energy, Forward Energy, Reverse Energy, Power, Peak Demand, Power factor, %THD of each phase, and Harmonic Content of each phase.

PASSWORD CHANGE
SET CODE   0000

Figure 3-11 Password Change Display

3-4.7 TEST MODE (TM)

Simulations of either a long delay, short delay, or instantaneous fault condition can be performed by using **Test Mode**. This can be done by first reading the setpoints and noting their adjustment. The trip mode menu item can then be selected and a current above the noted settings can be entered. A trip or no trip test can be performed. A test in progress may be terminated if the currents through the breaker under test are above 40% of the rating plug value. See section **3-9**.

3-4.8 SETPOINTS MENU (SE)

The trip unit can be adjusted for various time-current characteristic curves. This is done within the **Setpoints Menu**. See section **3-7**, and Figure **3-1**.

Notice: 1) *Short Delay and Instantaneous Action can not be turned off at the same time.*
2) *When long delay is set to I^4t, the short delay slope must be set to **Flat**.*

3-4.9 PASSWORD (PA)

For system security, a password is required to change

settings or use certain features. To change the baud rate or trip unit address, setpoints, run test mode, or download copied setpoints, a correct password must be used. The OPTIMizer's factory default setting is 1000. See section **3-5** for additional details.

3-4.10 TRIP EVENT COUNT (TC)

The trip unit records the number of times that the trip unit has initiated a trip. This is displayed when the **Trip Event Count** is selected.

3-4.11 CAUSE OF TRIP (CT)

The OPTIMizer can display the cause of trip, similar to the cause of trip LEDs of the trip unit, but in some cases with more specific information. This information is available as long as the trip unit **Reset** pushbutton has not been pressed after a trip condition. For example, a non-compliant rating plug may cause an instantaneous trip to occur which will light the Instantaneous LED of the trip unit. However, the OPTIMizer in this case would display that the instantaneous trip is a result of a **Bad Plug**.

PASSWORD CHANGE
CODE BEING SAVED

Figure 3-12 Password Code Change Display

CHANGE BAUD/ADDR
96B/FFE▊

Figure 3-14 Present Baud Rate and Address Displayed

< SA   FI   ID ▊BA>
CHANGE BAUD/ADDR

Figure 3-13 Cursor on CHANGE BAUD/ADDR in Main Menu

The **Cause-of-Trip** function may also be used in conjunction with the **Metered Values** menu item. After reading the cause of trip, the operator should enter the **Metered Values** menu to read the last current that the trip unit recorded before a trip was initiated. In this way the type of trip as well as the magnitude of the current on each phase is known. Pressing the **Reset** pushbutton clears these values.

3-4.12 FIRMWARE VERSION /REVISION (FW)

This feature allows the operator to read the firmware version and revision of either the trip unit or the OPTIMizer.

3-5 SECURITY PASSWORD

The OPTIMizer Hand Held Programmer utilizes a password to restrict access to certain functional options. A valid password is required to make changes or initiate certain actions within the following main menu options:

- **Change Baud/Address**
- **Test Mode**
- **Setpoints**
- **Password**
- **Download**

The OPTIMizer Hand Held Programmer is supplied with a factory programmed password of **1000**. If it is desirable to establish a new password, follow the procedure outlined in paragraph 3-5.1.

When the programmer is being used, a valid password

can be entered in either of the two following methods:

Method 1: Proceed directly to **Password (PA)** in the main menu to enter a valid password. Entry of a valid password in this manner will apply to any procedure requiring a valid password as long as the programmer does not turn off. To initially enter a valid password, proceed with the following steps:

Notice: *If the programmer automatically turns off or is intentionally turned off, the procedure must be repeated from the beginning. Use of an Auxiliary Power Module will eliminate Auto-Power Down and retain password while unit is on.*

Step 1: With the programmer turned on and the main menu displayed, use the **Right-Arrow** or **Left-Arrow** pushbuttons to move the blinking cursor to **Password (PA)** (Figure **3-6**).

Step 2: Use the **Select** pushbutton to enter **Password (PA)** (Figure **3-7**).

Step 3: Use the **Right-Arrow** pushbutton to select **Enter=** in the display. A screen that permits entry of a valid password is displayed (Figure **3-8**).

Step 4: The blinking cursor indicates which of the four displayed zeros is active and able to be altered. Use the **Up** or **Down** pushbuttons to change the active number. Use the **Right-Arrow** or **Left-Arrow** pushbuttons to move the cursor from one digit to another.

Step 5: Once the password displayed is correct, hold **Save** pushbutton depressed and depress **Select** pushbutton. This simultaneous use of the two pushbuttons will enter the password. If the password entered is valid, **Password Accepted** will be displayed (Figure **3-9**). If the password is not valid, a **Password Error** message will be displayed momentarily. In both cases the display will automatically return to the main menu (Figure **3-10**).

Method 2: Enter a valid password when requested

F:T•N

CHANGE BAUD/ADDR
*** ACCEPTED ***

Figure 3-15 Address/Baud Rate Change Accepted Display

SELECT ADDRESS
INCOM ONLY   OOO

Figure 3-16 Network Address Selection Display

during use of the programmer. To accomplish this, follow Steps 4 and 5 just outlined for Method 1.

3-5.1 CHANGE SECURITY PASSWORD

Step 1: With the programmer turned on and the main menu displayed, use the **Right-Arrow** or **Left-Arrow** pushbuttons to move the blinking cursor to **Password (PA)** (Figure **3-6**).

Step 2: Use the **Select** pushbutton to enter **Password (PA)** (Figure **3-7**).

Step 3: Use the **Left-Arrow** pushbutton to select **=Change** in the display. A screen that permits entry of the present valid password is displayed (Figure **3-8**).

Step 4: The blinking cursor indicates which of the four displayed zeros is active and able to be altered. Use the **Edit Values Up** or **Down** pushbuttons to change the active number. Use the **Right-Arrow** or **Left-Arrow** pushbuttons to move the cursor from one digit to another.

Step 5: Once the present password is displayed correctly, hold **Save** pushbutton depressed and depress **Select** pushbutton. This simultaneous use of the two pushbuttons will enter the password. If the password entered is valid, **Password Accepted** will be displayed (Figure **3-9**). If the password is not valid, a **Password Error** message will be displayed momentarily and the display will automatically return to the main menu (Figure **3-10**).

Step 6: If the password entered in Step 5 was valid, **Password Accepted** will continue to be displayed until the **Up-Arrow** pushbutton of **View Functions** is pressed and released. When the pushbutton is used, **Password Change** is displayed (Figure **3-11**). This display permits the entry of a new password.

Step 7: The blinking cursor indicates which of the four

displayed zeros is active and able to be altered. Use the **Up** or **Down** pushbuttons to change the active number. Use the **Right-Arrow** or **Left-Arrow** pushbuttons to move the cursor from one digit to another.

Step 8: Once the password displayed is as required, hold **Save** pushbutton depressed and depress **Select** pushbutton. This simultaneous use of the two pushbuttons will enter the new password, and **Password Code Change Being Saved** will be momentarily displayed (Figure **3-12**). When the new password is saved, the display automatically returns to the main menu.

3-6 ASSIGN ADDRESS/SELECT BAUD RATE

The OPTIMizer Hand Held Programmer must be used to initially establish the baud rates and unique addresses of connected circuit breakers. Assigning or changing circuit breaker addresses and/or baud rates takes place within the same category of the main menu, **Change Baud/Addr (BA)**. Each circuit breaker must have a unique address with all addresses containing three digits. The three digit address will be in a HEXADECIMAL Format with choices of 0 through 9 and A through F. The two baud rate choices are 1200 or 9600, displayed as 96B or 12B.

Notice: *All circuit breakers are supplied from the factory with a 9600 baud rate "96B" and an address of "FFE" (Hex Form) already programmed. Keep in mind, however, when assigning addresses, the Breaker Interface Module will only recognize addresses at or below 32 HEX (two digits).*

3-6.1 DIRECTLY CONNECTED BREAKER ADDRESS AND BAUD RATE

Use the following steps as a guide to assigning or changing addresses and selecting baud rates when the programmer is directly connected to a circuit breaker:

F·T·N

```
<RP  ME  TM ▋SP>
SETPOINTS
```

Figure 3-17 Cursor on Setpoints in Main Menu

```
▋LD         LDTI
LD SET
```

Figure 3-18 Initial Setpoints Menu

```
LDA        ▋LDS
LD SLOPE
```

Figure 3-19 Setpoints Menu with Long Delay Slope Active

```
LDA        ▋LDS
LD SLOPE        I2T
```

Figure 3-20 Long Delay Slope Present Setting Displayed

```
LDA        ▋LDS
LD SLOPE        I4T
```

Figure 3-21 Long Delay Slope with New Setting Displayed

Step 1: Use the ***On/Off*** pushbutton to turn the programmer on. The baud rate/address of the connected circuit breaker will automatically be identified and momentarily displayed (Figure **3-4**), before the main menu is displayed (Figure **2-9**).

Step 2: Use the ***Right-Arrow*** or ***Left-Arrow*** pushbuttons to move the cursor to ***Change Baud/Addr (BA)*** in the main menu (Figure **3-13**).

Step 3: Use the ***Select*** pushbutton to enter ***Change Baud/Addr (BA)*** and the present baud rate and address of the connected circuit breaker are displayed (Figure **3-14**).

Step 4: The blinking cursor indicates which digit of the display is active and able to be altered. Use the ***Up*** or ***Down*** pushbuttons to change the active number. Use the ***Right-Arrow*** or ***Left-Arrow*** pushbuttons to move the cursor from one digit to another.

Step 5: Once the desired baud rate and address are correctly displayed, hold ***Save*** pushbutton depressed and depress ***Select*** pushbutton. This simultaneous use of the two pushbuttons will enter the new baud rate and address. If the changes are accepted, the display will indicate the acceptance momentarily before returning to the main menu (Figure **3-15**).

Notice: *Keep in mind that a change in the baud rate and/or address is password protected. Step 5 may require the entry of a valid password before any changes are accepted. If the programmer was already turned on, and a valid*

password was initially entered as described in paragraph 3-4 Method 1, entry of a password will not be required again and the baud rate and/or address changes will be saved. If a valid password was not initially entered, the display will require the entry of a valid password before any changes can be saved (Figure 3-8). Follow the steps outlined in paragraph 3-4 Method 2 to enter a valid password.

Notice: *Any time a circuit breaker address or baud rate is changed, verify that the correct address and baud rate are displayed by using the **Right-Arrow** or **Left Arrow** pushbuttons to move the blinking cursor in the main menu to **Find Baud/Addr (FI)**. Use the **Select** pushbutton to enter **Find Baud/Addr (FI)**, and the newly assigned address and selected baud rate will be displayed.*

3-6.2 INCOM CONNECTED ADDRESS AND BAUD RATE

Step 1: If the programmer is INCOM connected and a Baud Rate and/or Address Change to a net-

Figure 3-22 Cursor on Metered Values in Main Menu

Figure 3-24 Cursor Indicating Phase B Current Active

Figure 3-23 First Display in Metered Values

Figure 3-25 PHASE B (IB) Current Selected and Displayed

work connected circuit breaker is required, proceed by using the **On/Off** pushbutton to turn the programmer on.

Notice: *Keep in mind that a change in the baud rate and/or address is password protected. Entry of a valid password will be required before any changes are accepted. If the programmer was already turned on, and a valid password was initially entered as described in paragraph 3-4 <u>Method 1</u>, entry of a password will not be required again and the baud rate and/or address changes will be saved. If a valid password was not initially entered, the display will require the entry of a valid password before any changes can be saved (Figure **3-8**). Follow the steps outlined in paragraph 3-4 <u>Method 2</u> to enter a valid password.*

Step 2: Once the main menu is displayed, use the **Select** pushbutton to enter **Select Address (SA)** which is active as indicated by the blinking cursor. This network display provides a means for selecting the three digit address of the circuit breaker of interest within the network (Figure **3-16**). The blinking cursor indicates which of the three digits is active and able to be changed.

Step 3: Use the **Up** or **Down** pushbuttons to change the active digit. Use the **Right-Arrow** or **Left-Arrow** pushbuttons to move the cursor from one digit to another.

Step 4: Once the desired breaker address is displayed,

hold **Save** pushbutton depressed and depress **Select** pushbutton. This simultaneous use of the two pushbuttons will enter the address of the circuit breaker in question. The user will be automatically returned to the main menu (Figure **2-9**).

Step 5: Proceed with Step 4 and 5 of paragraph 3-5.1 to complete the process.

3-7 CONFIGURE TRIP UNIT

The OPTIMizer Hand Held Programmer can be used to program the protective, coordination and alert features of OPTIM 550, 750 and 1050 Trip Units, such as:

• Time-Current Setpoints
• Protection Options
• High Load Alarm
• Phase A Identification

The features to be configured are contained under the **Setpoints (SP)** option of the main menu (Table **2.1**).

Proceed with the following steps as a guide to configuring a trip unit:

Step 1: Use the **On/Off** pushbutton to turn the programmer on.

Step 2: Since a valid password will be required to configure the trip unit, it is recommended that paragraph 3-4 "Security Password" be reviewed before moving into the **Setpoints**

< BA   RP   ME ▮TM>
TEST MODE

Figure 3-26 Cursor on Test Mode in Main Menu

AUX.POWER NEEDED
FOR TRIP TEST   ▮

Figure 3-29 Momentary Notice Displayed

▮PHASE   GND
** **PHASE TEST****

Figure 3-27 First Display in Test Mode

GETTING
FRAME/PLUG VALUE ▮

Figure 3-30 Momentary Notice Displayed

TRIP▮   >NO TRIP
**   **TRIP****

Figure 3-28 Displayed Choices After Phase or Ground

ENTER CURRENT IN
AMPS   40▮

Figure 3-31 Displayed Choice After Trip or No Trip

(SP) option. Method 1 or Method 2 can be used to enter a valid password, although Method 1 is recommended. Directions on how to enter a password will not be given in the following steps covering setpoint changes.

Step 3: Once a valid password is entered and accepted, use the *Right-Arrow* or *Left-Arrow* pushbuttons to move the blinking cursor to *Setpoints (SP)* (Figure **3-17**).

Step 4: Use the *Select* pushbutton to enter *Setpoints (SP)* (Figure **3-18**). The blinking cursor indicates which programmable category is active and available for programming. The second line of the display defines the active category.

Step 5: Use of the *Right-Arrow* or *Left-Arrow* pushbuttons to move from one programmable category to another (Figure **3-19**).

Step 6: Use the *Select* pushbutton to enter an active category, such as *Long Delay Slope* (Figure **3-20**). The present programmed setpoint for *Long Delay Slope* is I^2t, for example.

Step 7: Use the *Up* or *Down* pushbuttons to establish a new setpoint, such as I⁴t (Figure **3-21**).

Step 8: Hold *Save* pushbutton depressed and depress *Select* pushbutton. This simultaneous use of the two pushbuttons will enter the new setpoint into memory.

Notice: *Keep in mind that changes must be saved individually to minimize the possibility that re-programming would be required if the programmer turns itself off during the programming process.*

Step 9: All setpoint changes are made using the same repetitive steps just described.

3-8 DISPLAYED INFORMATION

The OPTIMizer Hand Held Programmer displays a comprehensive list of:
• Circuit Breaker Information
• Time-Current Setpoints
• Metered Values
• Trip Event Information

Use the following steps as a guide for obtaining specific displayed information:

Step 1: Use the *On/Off* pushbutton to turn the pro-

SHORT DELAY TRIP
TRIP TIME   .03s

Figure 3-32 Typical Cause of Trip Message

grammer on. If the programmer is directly con-
nected to a trip unit, it will momentarily identify
the baud rate and address, and move to the
main menu (Figure **2-9**). If the programmer is
INCOM connected, proceed with Steps 2, 3
and 4, otherwise move directly to Step 5.

Step 2: Once the main menu is displayed, use the
Select pushbutton to enter ***Select Address
(SA)*** which is active as indicated by the blinking
cursor. This network display provides a means
for selecting the three digit address of the circuit
breaker of interest within the network (Figure **3-
16**). The blinking cursor indicates which of the
three digits is active and able to be changed.

Step 3: Use the ***Up*** or ***Down*** pushbuttons to change
the active digit. Use the ***Right-Arrow*** or ***Left-
Arrow*** pushbuttons to move the cursor from
one digit to another.

Step 4: Once the desired breaker address is displayed,
hold ***Save*** pushbutton depressed and depress
Select pushbutton. This simultaneous use of
the two pushbuttons will enter the address of
the circuit breaker in question, and the main
menu will be displayed.

Step 5: Use the ***Right-Arrow*** or ***Left-Arrow*** pushbut-
tons to move the cursor to ***Metered Values
(ME)*** in the main menu (Figure **3-22**).

Step 6: Use the ***Select*** pushbutton to enter ***Metered
Values (ME)*** and the first four metered values
are displayed with the blinking cursor indicating
that Phase A Current is active (Figure **3-23**).

Step 7: Use the ***Right-Arrow*** or ***Left-Arrow*** pushbut-
tons to move the blinking cursor to a metered
value of interest, Phase B current for example
(Figure **3-24**).

Step 8: Use the ***Select*** pushbutton to choose the
metered value of interest and have the present
value displayed (Figure **3-25**).

Step 9: Repeating Steps 7 and 8 will permit the view-
ing of all the metered values outlined in Table
2.1.

Step 10: Use the ***Up-Arrow*** pushbutton to return to the
main menu (Figure **2-9**).

3-9 TEST TRIP UNIT

Digitrip OPTIM 550, 750 and 1050 Trip Units contain a
test capability. One of the means for performing tests is
through the use of the OPTIMizer Hand Held Program-
mer. The intent is to permit the periodic performance of
tests that verify the functional performance of the trip
unit. Two types of testing are possible through the use
of the OPTIMizer Hand Held Programmer, the "No-Trip"
and the "Trip" tests.

No-Trip Test: This test can be performed using the
internal battery power of the programmer. It verifies that
the trip unit is performing under test within acceptable
limits of the programmed protective setpoints.

Trip Test: This test can only be performed using exter-
nal power supplied by an Auxiliary Power Module or by
auxiliary power supplied to the circuit breaker. The addi-
tional power is required to activate the breaker's flux
transfer shunt trip. This test verifies the trip unit's perfor-
mance, as well as the trip circuitry and mechanical oper-
ation of the circuit breaker.

Notice: *Keep in mind that an Auxiliary Power Module is
required to perform a "Trip" test. Refer to para-
graph 2-2.2 for details on the use of an
Auxiliary Power Module.*

Notice: *Basic protection functions are not affected dur-
ing the performance of testing procedures.*

Proceed with the following steps to perform a "Trip" or a
"No-Trip" test:

Step 1: With the programmer turned on and the main
menu displayed, use the ***Right-Arrow*** or ***Left-
Arrow*** pushbuttons to move the blinking cursor
to ***Test Mode (TM)*** (Figure **3-26**).

Step 2: Use the ***Select*** pushbutton to enter the ***Test
Mode (TM)***. The blinking cursor indicates
which test category is active and able to be
selected (Figure **3-27**).

Step 3: Use the ***Right-Arrow*** or ***Left-Arrow*** pushbut-
tons, if required, to move the blinking cursor to
a different test category. Use the ***Select*** push-

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button to choose a particular category, **Phase** for example, and the next selections are displayed **Trip** or **No Trip** (Figure **3-28**).

Step 4: Once again, use the **Right-Arrow** or **Left-Arrow** pushbuttons, if required, to move to a different test category. Use the **Select** pushbutton to choose a particular category, **Trip** for example, and two different notices are momentarily displayed before the next selection appears (Figures **3-29** and **3-30**).

Step 5: After the two momentary displays, the test current screen is displayed permitting the selection of the desired test current (Figure **3-31**).

Step 6: The blinking cursor indicates the selectable test current field. The current initially displayed is the minimum test current value. Use the **Up** or **Down** pushbuttons to alter the current value.

Step 7: Once all the test parameters have been selected, hold **Save** pushbutton depressed and depress **Select** pushbutton to initiate the test. When the test is completed, a cause of trip message is displayed (Figure **3-32**).

Step 8: Use the **Up-Arrow** pushbutton to return to the main menu.

Testing will not be permitted to proceed if there is greater than 0.4 per unit of current flowing on a phase circuit or 0.2 per unit of current on a ground circuit. The maximum permitted current value can be determined by multiplying the appropriate per unit value (0.4 or 0.2) times the ampere rating of the installed rating plug.

Notice: *For currents less than the trip unit setpoint, no message is displayed after the "Accepted Message." The trip unit will not be placed in a* ***Test Mode*** *and, therefore, no pickup LEDs will flash. The trip unit, however, <u>must</u> be reset. The OPTIMizer will eventually return to the main menu.*

3-10 COPY AND DOWNLOAD COMMANDS

The OPTIMizer can quickly download trip unit setpoints from one breaker to other breakers in a system. The per-unit values (not the current ampere values) are copied from one breaker and downloaded to any other breaker in the OPTIM family within a system. The settings are permanently retained in the memory of the OPTIMizer until another copy sequence replaces them.

3-10.1 USING THE COPY COMMAND (CP)

Plug the OPTIMizer into the trip unit that the settings are to be copied from. Move the cursor to the main menu item **CP**. Press the **Select** key and wait while the OPTIMizer reads the trip unit's setpoints. The message **Accepted** will be displayed if the copy was successfully completed. The settings are now stored within the OPTIMizer's memory and will be retained even after the OPTIMizer is turned off.

3-10.2 USING THE DOWNLOAD COMMAND (DL)

Plug the OPTIMizer into the trip unit that the stored settings are to be downloaded to. Enter the password for the OPTIMizer within the password main menu item **PA**. Move the cursor to the main menu item **DL**. Press the **Select** key and wait while the OPTIMizer gets the address of the trip unit and then downloads the OPTIMizer's stored settings to the trip unit. If the OPTIMizer's password was not entered, the operator will be required to first enter their password and then reselect the **Download** menu item from the main menu. The message **Accepted** will be displayed if the settings were successfully downloaded.

Notice: *The* ***Copy /Download*** *commands will not change factory enabled functions such as ground fault trip or alarm. When copying from a trip unit with ground fault trip to a trip unit with ground fault alarm, only the pick-up, slope, and time adjustments are copied.*

Some breakers such as the DS will have setting limitations based on the rating plug value. If settings are downloaded which are not within the allowable limits of the trip unit and rating plug, an error message will be displayed. See I.L. 29C891 Table 3.3 for allowable settings. This may also be the case for ground fault settings in breakers above 1200 amps.

3-11 RESET TRIP UNIT (RE)

The trip unit status indicators are generally reset by pressing the ***Reset*** *pushbutton on the trip unit. In some instances, such as when a motor operator is used with on an OPTIM breaker, it may be desirable to use a remote reset. The reset trip feature is used in this case.*

SECTION 4: TROUBLESHOOTING AND MAINTENANCE

4-1 LEVEL OF REPAIR

This manual is written based on the assumption that only unit-level troubleshooting will be performed. If the cause of a malfunction is traced to an OPTIMizer Hand Held Programmer, the device should be replaced. The malfunctioning programmer should be returned to Cutler-Hammer.

4-2 TROUBLESHOOTING

Refer to Table **4.1** for troubleshooting guidelines.

4-3 MAINTENANCE AND CARE

The OPTIMizer Hand Held Programmer is designed to be a self contained and maintenance free device, except for battery replacement. Refer to paragraph 2-2.1 for battery information.

The OPTIMizer Hand Held Programmer should be stored in an environment that does not exceed the storage temperature range of -30°C to +85°C. The environment should also be free of excess humidity. Store the device in its original packing material or the provided carrying case.

4-4 RETURN PROCEDURE

The Troubleshooting Guide (Table **4.1**) is intended for service personnel to identify whether a problem being observed is external or internal to the device. If a problem is determined to be internal, the device should be returned to the factory for replacement. To have an OPTIMizer returned, contact your local Cutler-Hammer authorized distributor.

4-5 TECHNICAL ASSISTANCE

For information, technical assistance or referral to a local authorized distributor, contact the Advanced Product Support Center at 412-494-3750.

Table 4.1 Troubleshooting Guide

Symptom	Probable Cause	Possible Solution(s)	Reference
"Low Battery – Replace Soon" displayed as on/off is depressed	Dead Battery	Replace with Lithium battery or use auxiliary power module	Aux. supply #PRTAAPM, Table 2.2
"Connection Failure" when selecting "Find Address"	Custom phone cord not plugged into OPTIMizer or OPTIM trip unit	Check connection to OPTIMizer or trip unit	Paragraphs 2-2.2 and 3-2
OPTIMizer powers down repeatedly	Battery power is insufficient for proper operation	Change battery	Paragraph 2-2.1
Warning displayed while changing long delay slope	Short delay slope is not set to flat; long delay time not set to 2-5 sec.	Change short delay slope and long delay time	Paragraph 3-6 and appropriate trip curves Appendix A
Setpoints not saved after changing	"Save" not pressed before "Select"	Press save and then select simultaneously	Paragraph 3-6, Step 8
	Password not entered first	Enter Password	
"None" displayed when selecting THD	Trip unit is a non-energy unit	Replace with energy version if function is needed	I.B. 29C891
"None" displayed when selecting harmonic content	Trip unit is a non-energy unit	Replace with energy version if function is needed	I.B. 29C891
Breaker does not trip during trip test	Auxiliary power module not plugged into OPTIMizer	Plug auxiliary power module into OPTIMizer	Paragraph 3-8
OPTIMizer does not respond to pressing on/off	Incorrect key press	Let OPTIMizer time out for 30 seconds. Unit will shut off or go to main menu	Paragraph 3-3
OPTIMizer turns off after several minutes (no auxiliary power)	Energy saver powered unit off automatically after 2 1/2 minutes	Use auxiliary power module	Paragraph 2-2.1
"Connection Failure" when selecting menu item while connected to INCOM network	Invalid address entered under "Select Address"	Check trip unit address and re-enter under "Select Address" main menu item	Paragraph 3-5.2
	Auxiliary power not used	Use auxiliary power module	Paragraph 2-2.2, Table 2.2
Ground pickup LED on trip unit does not flash when ground test initiated	Current value selected is below ground fault pickup setting	Depress trip unit reset pushbutton then increase test current or decrease ground pickup level	Appropriate trip curves Appendix A
Long nor short Pickup LEDs on trip unit do not flash when phase test initiated	Current value selected is below phase pickup setting	Depress trip unit reset pushbutton then increase test current or decrease phase pickup level	Appropriate trip curves Appendix A
Test will not initiate when test current is entered and saved	Trip unit was not reset after previous test	Press trip unit reset button	I.B. 29C891 paragraphs 2-5.1 and 2-6.1
OPTIMizer does not turn on when pressing on/off	On/off button was not depressed	Depress on/off button for at least 2 seconds	Paragraph 2-3.2

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APPENDIX A - INSTRUCTIONAL REFERENCES

A list of instructional references is provided in Table **A.1** to identify instructional documents that could be of assistance.

Table A.1 Instructional References (continued on next page)

DOCUMENT DESCRIPTION	DOCUMENT NUMBER
Circuit Breakers	
Series $\overline{C}$ K-Frame Frame Book	IL 29-120K
Series $\overline{C}$ L-Frame Frame Book	IL 29-120L
Series $\overline{C}$ N-Frame Frame Book	IL 29-120N
Series $\overline{C}$ R-Frame Frame Book	IL 29-120R
Series $\overline{C}$ R-Frame Supplement	IL 29C713
SPB Systems Pow-R Breaker Supplement	IL 29849
DSII/DSLII Breaker Supplement	IL 8700C39
Digitrip OPTIM Trip Unit System	
OPTIM Trip Unit System Overview	IB 29C890
OPTIM Trip Units	IB 29C891
OPTIMizer Hand Held Programmer	IB 29C892
Breaker Interface Module	IB 29C893
Digitrip RMS Trip Units	
Digitrip RMS 810	IL 29-888
Digitrip RMS 910	IL 29-889
Digitrip OPTIM Wiring Diagrams	
Series $\overline{C}$ K, L and N-Frame Wiring	IL 29C894
Series $\overline{C}$ R-Frame Wiring	IL 29C714
SPB Systems Pow-R Wiring	IL 15545
DSII/DSLII Wiring	IL 1A33600
Energy Monitoring Devices	
IQ Energy Sentinel	
Series $\overline{C}$ F-Frame	IL 17537
Series $\overline{C}$ J-Frame	IL 17538
Series $\overline{C}$ K-Frame	IL 17539
Universal IQ Energy Sentinel	
Internal	IL 17540
External	IL 17541
Communication Devices	
Communications Module (PONI)	
INCOM PONI	IL 17547
RS-232 PONI	IL 17202
Modem PONI	IL 17203
Buffered PONI	IL 17361
CONI	IL 17436
IMPACC Wiring Spec.	IL 17513

Table A.1 Instructional References (continued from previous page)

DOCUMENT DESCRIPTION	DOCUMENT NUMBER
Accessories	
Potential Transformer Module (K, L and N-Frame)	29C126
Ground Fault Indicator	1259C14G01
Digitrip OPTIM Time-Current Curves	
Series $\overline{C}$ K-Frame Curves	
$\quad$ I^{2}t Long & Short Delay Phase	SC-6924-98
$\quad$ I^{2}t Long & Flat Short Delay Phase	SC-6925-98
$\quad$ I^{4}t Long & Flat Short Delay Phase	SC-6926-98
$\quad$ 400A Instantaneous & Override Phase	SC-6927-98
$\quad$ 250A Instantaneous & Override Phase	SC-6928-98
$\quad$ 125A Instantaneous & Override Phase	SC-6929-98
$\quad$ Ground Fault Protection	SC-6930-98
Series $\overline{C}$ L-Frame Curves	
$\quad$ I^{2}t Long & Short Delay Phase	SC-6323-96
$\quad$ I^{2}t Long & Flat Short Delay Phase	SC-6324-96
$\quad$ I^{4}t Long & Flat Short Delay Phase	SC-6325-96
$\quad$ 600A Instantaneous & Override Phase	SC-6326-96
$\quad$ 400A Instantaneous & Override Phase	SC-6327-96
$\quad$ Ground Fault Protection	SC-6330-96
Series $\overline{C}$ N-Frame Curves	
$\quad$ I^{2}t Long & Short Delay Phase	SC-6331-96
$\quad$ I^{2}t Long & Flat Short Delay Phase	SC-6332-96
$\quad$ I^{4}t Long & Flat Short Delay Phase	SC-6333-96
$\quad$ Instantaneous & Override Phase	SC-6334-96
$\quad$ Ground Fault Protection	SC-6335-96
Series $\overline{C}$ R-Frame Curves	
$\quad$ 1600/2000A I^{2}t Long & Short Delay Phase	SC-6336-96
$\quad$ 1600/2000A I^{2}t Long & Flat Short Delay Phase	SC-6337-96
$\quad$ 1600/2000A I^{4}t Long & Flat Short Delay Phase	SC-6338-96
$\quad$ 2500A I^{2}t Long & Short Delay Phase	SC-6339-96
$\quad$ 2500A I^{2}t Long & Flat Short Delay Phase	SC-6340-96
$\quad$ 2500A I^{4}t Long & Flat Short Delay Phase	SC-6341-96
$\quad$ 1600A Instantaneous & Override Phase	SC-6342-96
$\quad$ 2000A Instantaneous & Override Phase	SC-6343-96
$\quad$ 2500A Instantaneous & Override Phase	SC-6344-96
$\quad$ 1600A Ground Fault Protection	SC-6345-96
$\quad$ 2000A Ground Fault Protection	SC-6346-96
$\quad$ 2500A Ground Fault Protection	SC-6347-96
SPB Systems Pow-R Curves	
$\quad$ 400-1200A I^{2}t Long & Short Delay Phase	SC-6348-96
$\quad$ 400-1200A I^{2}t Long & Flat Short Delay Phase	SC-6349-96
$\quad$ 400-1200A I^{4}t Long & Flat Short Delay Phase	SC-6350-96
$\quad$ 1600-3000A I^{2}t Long & Short Delay Phase	SC-6351-96
$\quad$ 1600-3000A I^{2}t Long & Flat Short Delay Phase	SC-6352-96
$\quad$ 1600-3000A I^{4}t Long & Flat Short Delay Phase	SC-6353-96
$\quad$ 4000-5000A I^{2}t Long & Short Delay Phase	SC-6354-96
$\quad$ 4000-5000A I^{2}t Long & Flat Short Delay Phase	SC-6355-96
$\quad$ 4000-5000A I^{4}t Long & Flat Short Delay Phase	SC-6356-96
$\quad$ 400-1200A Instantaneous & Override Phase	SC-6357-96
$\quad$ 1600-3000A Instantaneous & Override Phase	SC-6358-96
$\quad$ 4000-5000A Instantaneous & Override Phase	SC-6359-96
$\quad$ Ground Fault Protection	SC-6360-96
DSII/DSLII Curves	
$\quad$ 400-1200A I^{2}t Long & Short Delay Phase	SC-6275-95
$\quad$ 400-1200A I^{2}t Long & Flat Short Delay Phase	SC-6276-95
$\quad$ 400-1200A I^{4}t Long & Flat Short Delay Phase	SC-6277-95
$\quad$ 1600-5000A I^{2}t Long & Short Delay Phase	SC-6278-95
$\quad$ 1600-5000A I^{2}t Long & Flat Short Delay Phase	SC-6279-95
$\quad$ 1600-5000A I^{4}t Long & Flat Short Delay Phase	SC-6280-95
$\quad$ 400-1200A Instantaneous & Override Phase	SC-6281-96
$\quad$ 1600-5000A Instantaneous & Override Phase	SC-6282-96
$\quad$ Ground Fault Protection	SC-6283-96

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