

# **MLR2-E**

## **Multi-Line Digital Receiver**



TM

**SG SECURITY  
COMMUNICATIONS**

A Division of Sur-Gard Security Systems Ltd.



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*Installation and Operation Manual  
For U.L. Listed Applications*

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## INTRODUCTION

The MLR2-E is a Multi-Line, Multi-Format Digital Receiver for commercial fire and burglary. The basic unit consists of up to 30 individual line cards (DRL2E) connected to a CPM2. The MLR2-E can decode a variety of popular and widely used communication formats. Refer to Appendix A, DRL2E Communication Formats for a list of the available communication protocols.

The MLR2-E's real-time clock and calendar stamps all information received with the time and date, and all information may be printed and/or forwarded to a computer. To ensure security, adjustment of the clock, calendar and other programming is password-protected.

### CPM2

The CPM2 Central Processing Module oversees operation of the line cards. Along with its built-in keypad and LCD message screen, the CPM2 features one parallel printer, and two COM Ports.

### DRL2E

Each DRL2E Module can monitor two telephone lines. The Line Card module is equipped with a 256-event nonvolatile memory buffer to record events and corresponding telephone numbers. Caller Source capability is built-in and telephone numbers can be printed out, sent to automation and stored in memory. Events and information stored in memory can be printed at any time. Each line card also features flash EPROM uploads through the Debug port for software upgrades or options programming.

### SUPERVISION

The standby battery voltage and connections are supervised. The Line Cards are also continuously supervised to ensure uninterrupted communication with the CPM2. Any trouble conditions are reported on the LCD screens and sent to the printer and the computer.

The DRL2E Line Card Module also verifies communications with the CPM2. In the event of a malfunction, the operator will be advised with a visual indication and the Line Cards will continue to function. Each line card will continue to receive information.

The printer is supervised for loss of power, off-line, paper out and other trouble conditions. The communication link to the computer through the RS-232 port is monitored by the supervisory "heartbeat" test transmissions.

### COMPATIBILITY

Central station automation software packages such as:

- M.A.S.
- DICE
- SIMSII
- S.I.S.
- GENESIS
- MICROKEY

support the MLR2-E Sur-Gard interface. Compatibility with the automation software in a system used at a central station is intended to be handled under a separate UL 1981 software and/or site certification evaluation.

### CPM2 OUTPUTS/INPUTS

The CPM2 features three switched-negative outputs. One output labeled "OPTION" has a corresponding LED on the CPM2 front panel; the factory default programming slowly flashes the OPTION LED when the "OPTION" output is activated. Switched negative outputs are also provided for the Acknowledge and Trouble LEDs.

## SYSTEM OVERVIEW

- Patented Caller Identification (Call Display) capability
- Patent Pending DNIS Identification
- Battery backed up RAM on each DRL2E line card module for programming and event buffers.
- Fast communication between line cards and CPM2
- Flash Upload for software upgrades
- Up to 64 different options set (profiles per line)
- Patent Pending Virtual configurations
- 3/1, 4/2 formats with or without parity, 4/1 without parity at 10, 14, 20, or 40 Baud
- 4/1, 4/2, 4/3, and 4/3 with checksum DTMF formats
- Optional\* Formats: 3-2, 4/1,4/2 extended
- Contact ID (DTMF) format
- Super Fast or High Speed DTMF format, with or without parity
- DTMF 4/1 Express format optional\*
- DTMF 4/2 Express format
- FBI Super Fast format with or without parity
- RADIONICS Modem II, Modem IIE, Modem IIIa<sup>2</sup> and BFSK formats
- SIA format: 110 and 300 Baud, tone and data acknowledgment
- SK FSK1, FSK2
- Any handshake frequencies by increment of 100 Hz from 300 Hz to 3400 HZ, Dual Tone, SIA FSK, Modem IIx, Double Dual Tone and ITI selected by configuration commands.
- Up to 8 different handshakes per profile with individual duration control.
- Large, easy to read 2-line, 16-characters-per-line, Liquid Crystal Display screen
- All modules function individually to help ensure uninterrupted operation during hardware or software upgrades
- Inputs on CPM2 for UPS supervisory
- 30 lines maximum per receiver
- 256-event memory buffer on each individual line cards
- Real-time clock
- CPM2 features 16-bit microcontroller
- 1 parallel printer port and 2 serial RS-232 ports
- Programmable serial port configurations
- Programmable System Functions: Computer and printer
- Fast transmission of multiple alarms to the computer and printer to ensure operator's quick response
- Continuous verification of the computer-receiver links with the "heartbeat" function
- Switched-negative outputs on CPM2 (special applications)
- AC-lost detection and standby battery supervision
- Low battery detection and automatic low battery disconnect to prevent deep-discharge damage to battery
- Operator Acknowledge option
- Telephone Line Supervision and reporting

*\*All formats noted as optional are selected using configuration commands.*

## **VIRTUAL RECEIVER ARCHITECTURE**

The most novel feature of the DRL2E is the ability to use the telephone company information delivered as DNIS (Dialed Number Information Service) or Caller ID. This allows the Sur-Gard Format Expert System to handle on the fly each received call. With this feature, dedicated line pool hardware is eliminated. Instead, the DNIS or Caller ID information allows dynamic options that set up virtual line pools to identify security formats and extend account numbers.

Standard DNIS is supported up to 10 digits. Each dialed number should be assigned to a virtual receiver. Multiple Caller ID numbers can be assigned to a single virtual receiver. Each dialed number would formerly have been a line pool on conventional line cards.

## **NUMBER OF LINE CARDS SUPPORTED**

The system will support a maximum of 15 line cards concurrently connected.

## **APPROVALS**

### **Industry Approvals**

The MLR2-E is listed for meeting the following approvals:

- UL 864 Control Units for Fire-Protective Signaling Systems
- UL 1610 Central Station Burglar Alarm Units

This equipment should be installed in accordance with the requirements of NFPA72, NFPA70 and UL827.

### **UL MANUAL MODE**

For UL manual mode, each event will activate the internal buzzer to be acknowledged manually. Each event will also be sent automatically to the connected printer.

For Central Station applications, the signaling performance of each DACT (Digital Alarm Communication Transmitter) shall be manually tracked. Failure to receive a signal from a DACT over a 24 hour period shall be handled as a trouble signal.

## **UL REQUIREMENTS**

Installation - The product is intended to be installed in accordance with its installation instructions and the requirements of the local authority having jurisdiction (AHJ).

### **For Grade AA and A Central Station Service:**

- The polling between the premise radio and the central station shall be such that a failure of the radio link shall be annunciated within 200 seconds at the central station. Programming 006: Option 2 must be on and Option 3 must be off.
- The radio shall be mounted in an attack-resistant enclosure.
- Simultaneous alarm signals shall be sent over the DACT line and radio.
- Failure of the premise radio shall be reported over the DACT line and annunciated at the central station within 200 seconds.
- Failure of the DACT line shall be reported over the radio and annunciated at the central station within 200 seconds.
- Opening and closing signals must be transmitted over the radio or the DACT line.

### **For Grade B central station service and grade A police station connect with high line security:**

- The radio shall be mounted in an attack resistant enclosure.
- The system shall send a check-in signal to the central station every 24 hours.
- A listed compatible burglar alarm sounding device shall be used in conjunction with the system.
- Opening and closing signals are not required for Police station connect service.

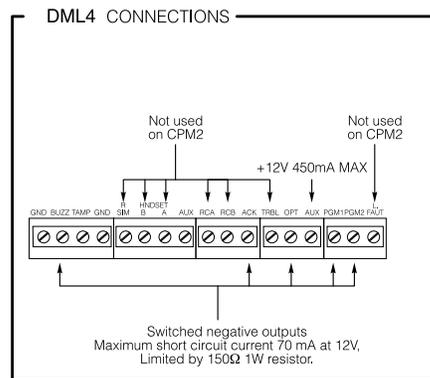
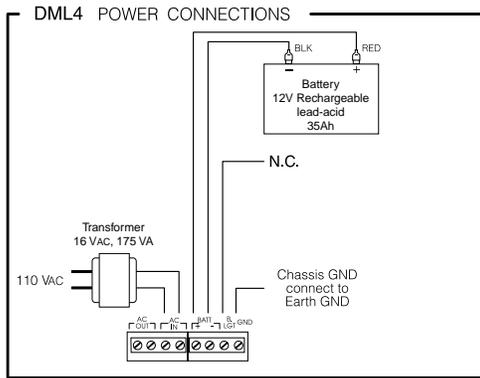
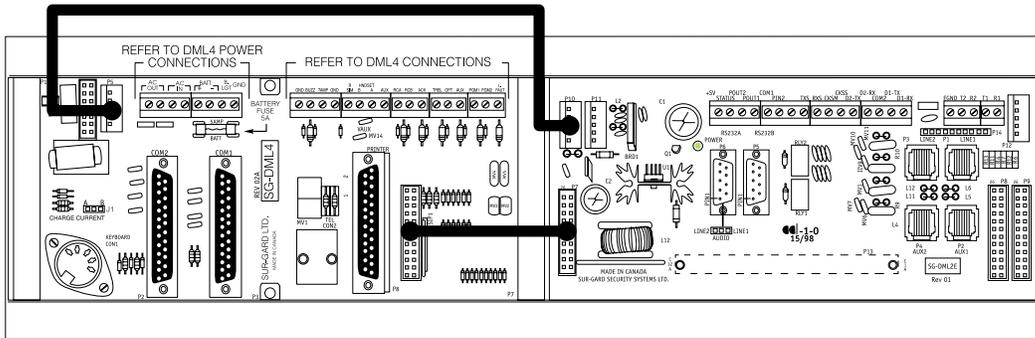
### **For grade C central station service:**

- The radio shall be mounted in an attack-resistant enclosure.
- The system shall send a check-in signal to the central station every 24 hours.

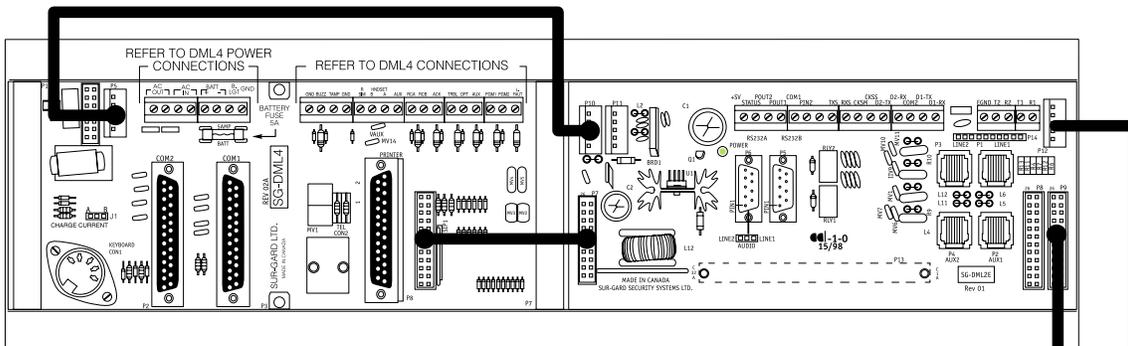
### **For commercial Fire Installations:**

- The one-way radio shall be a secondary communication line to the DACT.
- Each communication line will supervise the other.
- The DACT shall send a check-in signal to the central station every 24 hours.
- The Bell +, Bell - terminals on the control panel shall not power other devices.

# MLR2-E BACKPLANE CONNECTION DIAGRAM

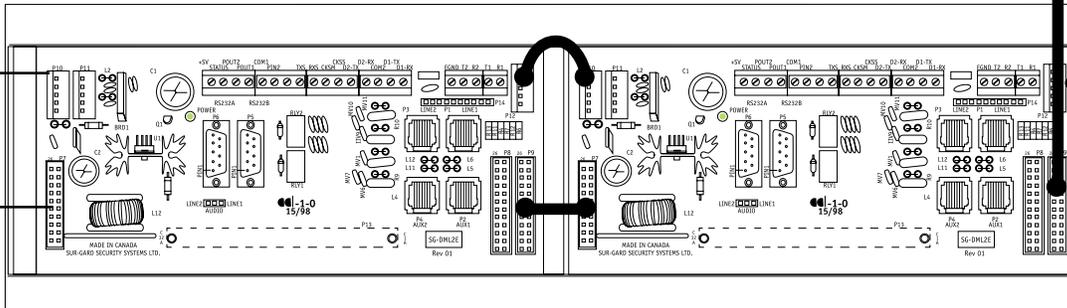


# CONNECTIONS FOR DML2E LINE CARD EXPANSION

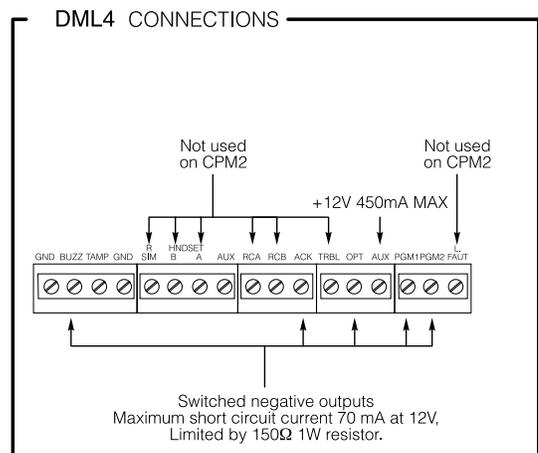
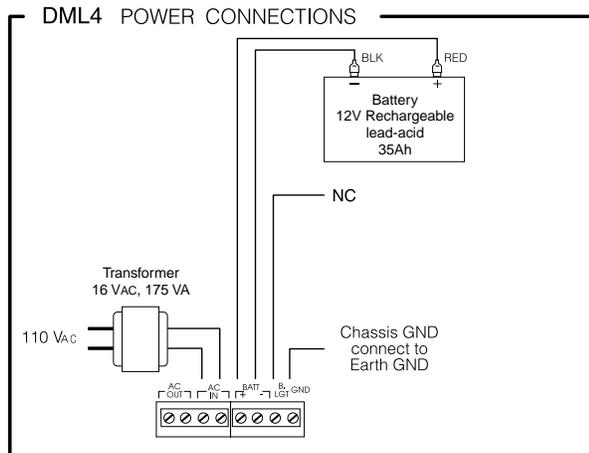
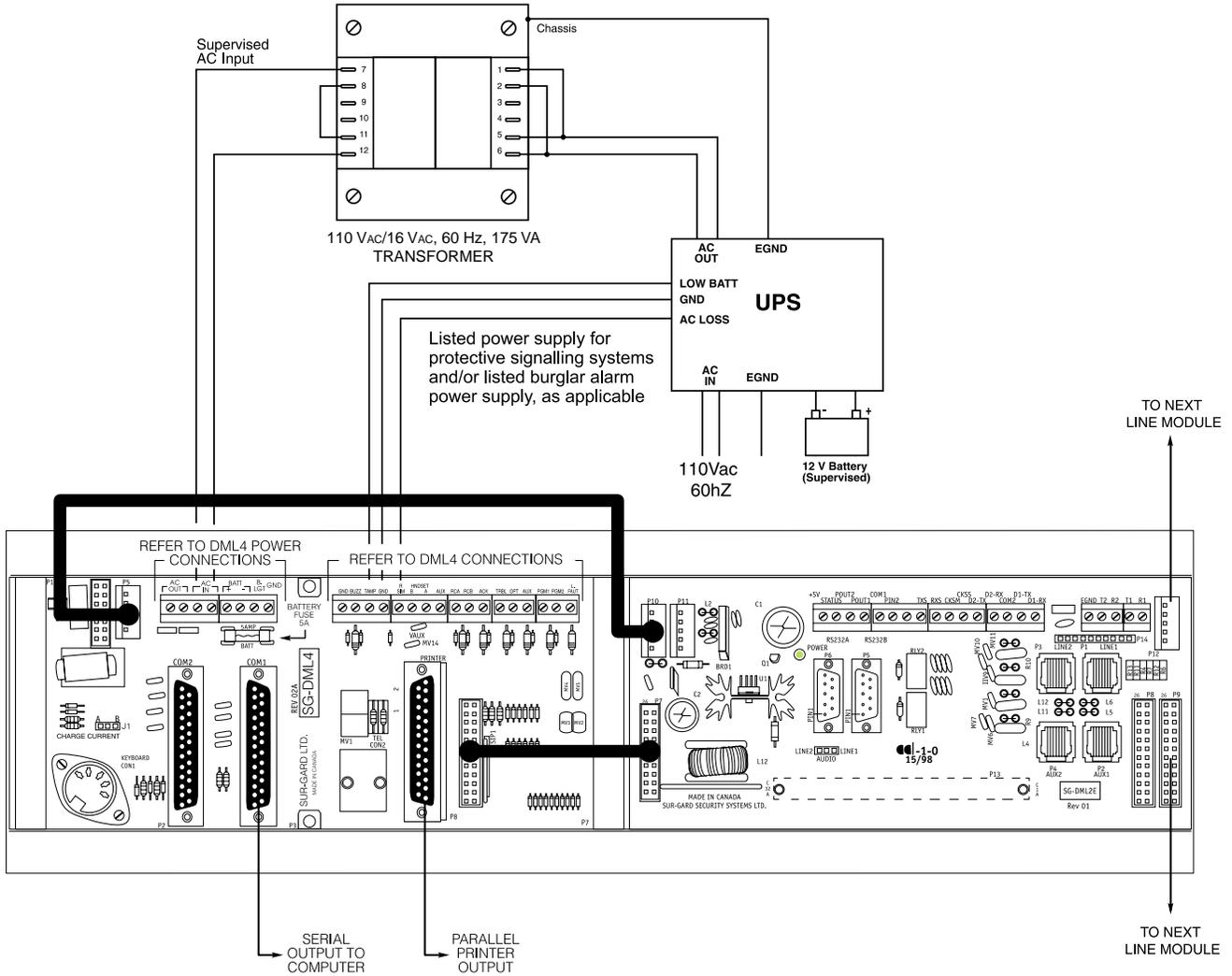


NEXT  
MODULE

NEXT  
MODULE



# MLR2-E UPS CONNECTION DIAGRAM



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## QUICK START

### Receiver Setup and Operation Without Programming

#### UNPACKING

Carefully unpack the receiver and inspect for shipping damage. If there is any apparent damage, notify the carrier immediately.

#### BENCH TESTING

It is suggested that the receiver be tested before actual installation; becoming familiar with the connections and setup of the unit on the workbench will make final installation more straightforward.

The following items are required:

- 16VAC, 175VA Transformer
- 2 telephone lines
- One or more dialers or digital dialer control panels

Dialers and control panels using an optocoupler phone line interface will require a connection method providing a DC current for direct connection testing.

#### POWER UP

When power is applied, the receiver will beep and will indicate any trouble conditions on the LCD message screen. If the Line Cards do not have telephone lines connected, the DRL2E modules will beep and their "Line Fault" LEDs will FLASH.

Press the flashing [ACK] button to silence the buzzer. If there is no computer or printer connected, a trouble message will be displayed on the CPM2 LCD and the "ACK" light will FLASH. Press the [ACK] button to silence the CPM2 buzzer.

#### OPERATION WITH DEFAULT PROGRAMMING

Without any changes to the factory default programming, the receiver operates as follows:

- Answers incoming calls on the first ring
- Sends SIA FSK as the first handshake
- Sends 1400 Hz as the second handshake
- Sends double dual tone as the third handshake
- Sends 2300 HZ tone as the fourth handshake
- Sends Modem II tone as the fifth handshake
- Sends ITI, Modem IIE, Modem IIIa2 tone as sixth handshake
- The following formats can be manually selected:  
3/2, 4/1 express, 4/2 extended, 4/2 checksum and 3/1 checksum.

Signals can be displayed on the debug output as they are received. The signals are then sent to the parallel printer and computer connected to serial port COM1. The default event codes described in the "DRL2E Library Decoding and Event Codes Table" will be used with the Sur-Gard Automation Communication Protocol to send signals to the computer, if connected.

If a computer is not connected, press the [ACK] button on the CPM2 module to silence the buzzer.

#### DEBUG OUPUT

The debug output is another means of accessing the line card's programmed options and diagnostics features. A null modem cable is required to connect by serial communication.

#### DEBUG CABLE CONNECTIVITY

Connect the female DB-9 connector to the serial port of a computer.

#### DEBUG SOFTWARE SETUP

Using WIN9x, point and click on the "START" button. Access "Programs" -> "Accessories" -> "HyperTerminal." Once in the HyperTerminal window, point and click on "Hypertrm.exe" icon.

A connection description window should appear. A prompt should appear on the "Name" category. Type a name. Point and click on "OK."

A phone number window should appear. Choose the "direct to" COM port required for connection and point and click on "OK".

COM Port properties windows should appear. The configuration should be :

- Bits per second: 19200
- Data bits: 8
- Parity: None
- Stop bits: 1
- Flow control: None

Point and click on the "OK" button after setting the configuration.

The HyperTerminal window should appear. Press any button. The debug menu will be displayed.

#### BUTTON COMMANDS

**C** Cold boot

**D** This button will initiate the download of a file to the line card.

**O** This button will enable the user to dump the current programmed options of the line card or set an option to a particular value.

**V** To view software version information

#### DOWNLOADING STEPS

Press the "D" button to initiate downloading of the binary file. The Hyper Terminal will display:

Ready to download.

CCCC

Point and click at "Transfer" on the Hyper Terminal menu and access the "Send File" category (you also have right-click access with the mouse). The "Send File" window should appear. Change the protocol to "X-modem" and place the correct path and file name of the binary file to be uploaded. Point and click on the "Send" button and the downloading status window should appear.

The line card will restart automatically after a successful upload.

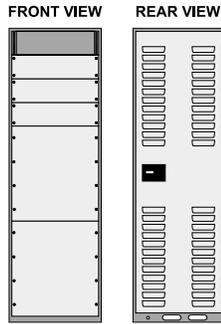
# INSTALLATION

## MOUNTING THE RECEIVER

Install the MLR2-E in a closed 19"/48cm rack or cabinet with a locking rear access door. Cover all unused spaces with blank metal plates. The LCD screens on the receiver are designed to be viewed below eye level. If the unit must be mounted where the screens are above eye level, angle the unit downwards to improve visibility. The following items can be supplied for a complete installation:

### Stand-up Unit (61.25"/1.55cm tall up to 30 telephone lines) Part # MLR2-CL

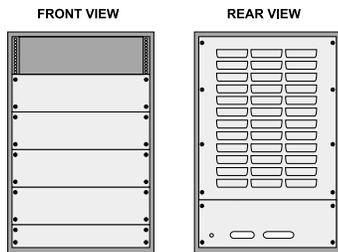
- Rack
- Door with lock and ventilation
- Blank plates 21"/53cm (2)
- Blank plate 5.25"/13.3cm (3)
- Screws
- Washers
- Clipnuts
- FROST 16V/175VA transformer
- AC Utility Box
- AC Cable Clamps (2)
- 8'/2.4m Battery Cables
- 3-Gauge conductor AC Cable



**NOTE: If 30 telephone lines are not used, cover each unused location with a blank plate.**

### Desk-mount Unit (28"/71cm tall up to 14 telephone lines) Part # MLR2-CM

- Rack
- Louvered door back plate
- Blank Plate 1.75"
- Back Plate 7"/17.8cm
- Blank Plates 5.25 (4)
- Screws
- Washers
- Clipnuts
- FROST 16V/175VA
- AC Utility Box
- AC Cable Clamp for 3/8"/1cm cable
- 8'/2.4m Battery Cable
- 18 gauge 3-conductor AC Cable



**NOTE: If 18 telephone lines are not used, cover each unused location with a blank plate**

## PRINTER CONNECTIONS

Connect the parallel printer to the MLR2-E printer output port using a standard parallel printer cable.

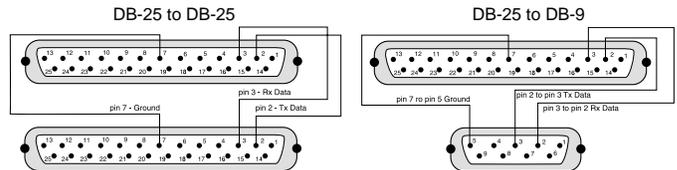
**For UL Listed applications, the following UL listed printers can be used with the MLR2-E:**

- Sur-Gard CPV-1150
- Sur-Gard CPV DMP-206
- DMP SCS-PTR

**IMPORTANT: Do not use a printer cable that has only 1 common ground wire.**

## COMPUTER CONNECTIONS

Connect the computer to the MLR2-E RS-232 port using a serial cable to COM1. **IMPORTANT: Do not use a null modem cable.**



MLR2 COM1 or COM2  
Automation Computer Connection

Receiver RS-232 25 pin connector	Computer RS-232 25 pin connector	Computer RS-232 9pin connector
1	1	
2	2	3
3	3	2
7	7	5

## TELEPHONE LINE CONNECTIONS

With 6-pin modular cables, connect each line module jack (line 1 or 2) to its corresponding telephone line.

## GROUNDING

For maximum resistance to static and electrical noise, the 19"/48cm rack frame should be connected to earth ground through the AC utility box.

## POWER SUPPLY

Ensure that all electrical connections are made correctly. After verifying all connections, connect the RED and BLACK leads to a 12Vdc sealed rechargeable battery. Be sure to observe polarity when connecting the battery. When the battery is connected, test the system under battery power only. **CAUTION: Connecting a positive (+) terminal to a negative (-) terminal may cause a fire and possibly serious personal harm.**

For 4-hour standby a 12-volt 35 Ah rechargeable battery should be used in conjunction with an engine-driven power generator.

## BATTERY CHARGING CURRENT

The maximum battery charging current is factory set at 1A.

# DRL2E DIGITAL RECEIVER LINE CARD

The DRL2E acts as an interface between the digital alarm transmitter and the CPM2. Different communication formats can be used to transmit the information.

The main functions of the line cards are to continuously monitor the telephone line, receive calls from digital dialers or control panels, and to report alarms to the CPM2. In addition, if a Line Card is unable to communicate with the CPM2, then each Line Card is capable of functioning independently. Each Line Card can record 256 different alarm messages and 255 Caller-ID telephone numbers.

## GENERAL INFORMATION

The receiver is capable of processing signals from digital communicators in a variety of formats. The type of signal (alarm, trouble, restore, cancel and so on) can be printed.

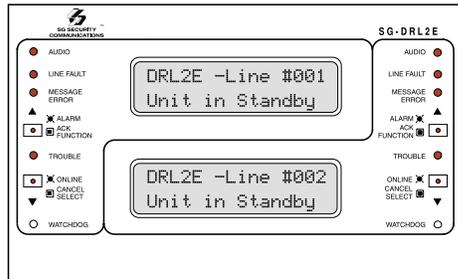
## DRL2E FEATURES

- Operator selection of communication formats and handshake priority
- 64 profiles per line card, up to 30 line pools.
- Flash Download for software upgrades.
- Records up to 256 messages.
- Records up to 256 Caller ID phone numbers. This feature helps to locate and identify the source of the device in communication and assists in troubleshooting.
- Multiple alarms are forwarded to the computer and printer through the CPM2 with minimum delay
- The DRL2E monitors the telephone line connection, and line faults will result in reports to the computer and the printer
- DRL2E automatically goes into standalone mode in case of CPM2 failure
- "Watchdog" timer continually monitors receiver operation
- "Cold boot" option allows receiver's configuration to be reset to factory default programming
- DSP processing to reduce data receiving errors, and to help for weak and noisy signals
- Gain boost available to amplify weak signals
- Serial link for troubleshooting and easy software upgrade

## INSTALLATION

Check the configuration information listed in the Quick Reference Guide to make any required changes for your particular application.

## DRL2E CONTROLS



Each DRL2E Module features 2 line cards. The LEDs and push buttons on the left side and the upper LCD are for Line Card 1. The LEDs and push buttons on the right side and the lower LCD are for Line Card 2.

Momentarily depressing and releasing a button will register as a single input or keystroke. Pressing and holding a button for approximately 1 second will register as a repeating input or keystroke. For example, to quickly scroll through a list of items, you press and hold the appropriate button, rather than pressing the button repeatedly.

### LCD (Liquid Crystal Display)

Displays incoming data, programming and other information. The display is backlit for visibility in low light environments.

### AUDIO

The "Audio" light comes ON when the receiver is in Audio Mode. When ON, "listen-in" or "2-Way Audio" is in use. The "Audio" light will automatically turn OFF at the end of the timed period or when the [CANCEL] button is pressed.

### LINE FAULT

The "Line Fault" light will come ON if the telephone line is disconnected. The "Line Fault" light will turn OFF automatically when the telephone line is restored.

### MESSAGE ERROR

The "Message Error" light will come ON when faulty data is received (for example, if the round pair does not match, or if the checksum is incorrect). Press the [ACK] button to acknowledge the error; the "Message Error" light will be shut OFF.

### [ACK/FUNCTION] BUTTON

Press this button to acknowledge an alarm in emergency manual mode. In the normal mode, press this button to access the Line Card Menu.

### ALARM

The "Alarm" light is located inside the [ACK/FUNCTION] button. The "Alarm" light will flash if an alarm is received. The "Alarm" light will be shut OFF when the alarm is successfully communicated to the CPM2, or when the operator acknowledges the alarm by pressing the [ACK/FUNCTION] button.

### CANCEL SELECT

While on-line, press this button to drop the line. In normal mode, press this button to select the current item.

### WATCHDOG

The "Watchdog" light will FLASH once every 4 seconds to indicate that Line Card operation is being monitored.

---

## DRL2E Operating Mode

### DRL2E STANDBY MODE

With the Line Card installed, apply power to the unit. This message will be displayed briefly on the top LCD:

```
INITIALIZING  
CONTRAST LOADING
```

Next, the following message will be displayed on each line card in turn, starting with line card 1:

```
PRESS ACK+SELECT  
TO COLDBOOT
```

The cold booting procedure is covered in detail below. The LCDs will then display:

```
INITIALIZING  
CONTRAST LOADING
```

During this time, the line cards will load default options and code, and perform a low-level diagnostic to determine the status of the system.

Once the line cards are ready, they will display a message similar to the following:

```
DRL2E-Line #D  
<<-Line Fault->>
```

After these startup messages, the line card monitors the telephone line and the CPM2.

### LINE FAULT

The DRL2E verifies the telephone line voltage every 10 seconds. The "Line Fault" light will come ON after two successive line verifications indicate irregular telephone line voltage. This message will be displayed:

```
DRL2E-Line #D  
<<-Line Fault->>
```

If the Line Check option is enabled, the following information will be transmitted to the printer and computer:

Printer: L01- 0000-PHONE-LINE-TROUBLETIME:DATE  
(printer option set to 03)

Computer: ORRL[#0000 | NLTRRL]

**NOTE: The first RRL is subject to the line card length option. The second RRL is the receiver and line card number, both in HEX.**

If the Line Check option is disabled, the DRL2E will not send the report to the printer or computer. Refer to "DRL2E Programmable Features" for information on enabling the Line Check option.

When the line condition returns to normal, the "Line Fault" LED will be shut OFF.

If the Line Check option is enabled and the telephone line returns to normal, the following information will be transmitted to the printer and computer:

Printer: L01- 0000-PHONE-LINE-RESTORALTIME:DATE  
Computer: ORRL[#0000 | NLRRRL]

**NOTE: The first RRL is subject to the line card length option. The second RRL is the receiver and line card number, both in HEX.**

### CPM2 ERROR; DISPLAY ALARM MESSAGES

If the DRL2E cannot detect CPM2 polling and there are no alarm events in the event buffer, this message will be displayed:

```
DRL2E-Line #D  
<<-CPM ERROR->>
```

If alarm messages cannot be sent to the CPM2 because of the error, the DRL2E will display the oldest message which has not been manually acknowledged. The "Alarm" light will FLASH and the sounder will beep if the "Mute Buzzer" Option is programmed as [00], [02] or [03].

When a CPM2 Error is present, each alarm must be manually acknowledged. Press the [ACK/FUNCTION] button to acknowledge the alarm and silence the Line Card sounder. If several alarms have been received but cannot be sent to the CPM2, they will have to be individually acknowledged; when all alarms are acknowledged, the Line Card sounder will be silenced.

Up to 128 alarm messages for the printer and computer will be retained in the CPM2 event buffer. When the event buffer is full, the oldest messages will be deleted as new events are recorded.

When the CPM2 Error condition is corrected, the alarm messages in the event buffer will be transmitted to the CPM2.

### KEEP LAST ALARM MESSAGE

The DRL2E may be programmed to leave the last alarm message on the display screen until a new message is received. A typical alarm message is shown below:

```
0000-PHONE LINE  
TROUBLE 28
```

"0000" is the "internal" account code.

"28" is the event's location in the event buffer.

### STANDBY MODE

When the Line Card is operating normally, this message will be displayed:

```
DRL2E-Line #D  
Unit in Standby
```

### LINE CARD MENU MODE

When the unit is not on line, pressing the [ACK/FUNCTION] button will display the first Function Menu:

```
PRINTER BUFFER  
ACK:menu SEL:sel
```

Press the [ACK] button to scroll through the menu items. Press the [SELECT] button to select the function displayed on the LCD screen. When a function is selected, press [ACK] and [SELECT] together to exit from the Menu Mode. The DRL2E will automatically exit from the Menu Mode if no keys are pressed for 30 seconds.

The following functions are available in the Line Card Menu Mode:

- Display Printer Alarm Buffer
- Display Line Card Configuration
- Display Program Version
- Adjust LCD Contrast
- Adjust Backlight

### DISPLAY PRINTER AND CALLER ID ALARM BUFFER

```
PRINTER BUFFER
ACK:menu SEL:sel
```

With this message displayed, press the [SELECT] button; the most recent alarm message will be displayed. If Option [12] CALLER SOURCE is selected, the corresponding Caller Identification will also be displayed.

Press the [SELECT] button to scroll backwards through alarm messages; press the [ACK] button to scroll forward through alarm messages.

Press the [ACK] button to display the alarm message:

```
3576-312
Alarm      001
```

“3576” is the Account Code.

In this example, a 4/3 communication format is used. “3” indicates an alarm, while “12” is the zone number.

“Alarm” indicates an alarm.

“001” is the event’s location in the Event Buffer.

The Event Buffer can record up to 256 alarm messages and Caller Identifications. To print these messages, a print command can be sent from the CPM2; refer to “System Command Mode” for information.

If no Caller Identification data was received from the telephone company, the following message will be displayed when the [ACK] button is pressed to display the Caller Identification screen:

```
1234 - UnknownCall
```

If the Caller Identification is sent but with no telephone number, one of these messages could be displayed:

```
1234 - PRIVATE NO
1234 - UNAVAILABLE
```

If Option [12] is disabled, the Caller Identification feature will be bypassed; only the alarm messages will be displayed. Press [ACK] and [SELECT] together to return to the Standby Mode. If no keys are pressed, the DRL2E will automatically return to the Standby Mode after 30 seconds.

### DISPLAY OPTIONS

```
DISPLAY OPTIONS
ACK:menu SEL:sel
```

With this message displayed, press the [SELECT] button; the current Option Configuration will be displayed. Shown below is the first screen you will see, representing profile 0. Use the ACK button to scroll through all 64 profiles (0-63).

```
Select Profile 0
Ack: up  SEL: sel
```

Press [ACK] and [SELECT] together to return to the Standby Mode.

```
options display
and description
```

### DISPLAY PROGRAM VERSION

```
PROGRAM VERSION
ACK:menu SEL:sel
```

With this message displayed, press the [SELECT] button; the date and the software version number will be displayed as shown below:

```
SG -DRL2E  V1.20
Jan 19,1999
```

Press [ACK] and [SELECT] together to return to the Standby Mode.

### ADJUST LCD CONTRAST

```
Adjust CONTRAST
ACK:menu SEL:sel
```

With this message displayed, press the [SELECT] button to adjust the LCD screen’s contrast. When the [SELECT] button is pressed, this message will be displayed:

```
Adjust CONTRAST
....
```

Press the [ACK] button to increase the contrast; press the [SELECT] button to reduce the contrast. The display will indicate the contrast level on the second line.

Press [ACK] and [SELECT] together to return to the Standby Mode.

### ADJUST BACKLIGHT

```
ADJUST BACKLIGHT
ACK: up  SEL: down
```

The [ACK] button is used to brighten the backlighting and the [SELECT] button is used to darken it.

## DRL2E COLD STARTUP

From Hyper Terminal, press "C" to perform a cold boot and select which channel to cold boot, either 1 or 2. The following will appear on the display:

```
COLD BOOTING
Channel X
```

**X = 1 or 2**

Pressing [ACK] and [SELECT] together for at least 5 seconds on system startup will also result in a cold boot.

```
COLD BOOT?
ACK: yes SEL: no
```

```
CHANGE LC NUMBER?
ACK: yes SEL: no
```

```
LINECARDNUMBER:OE
ACK: up SEL:down
```

## COMMUNICATIONS IN PROGRESS

### Data Reception

During data reception, a message similar to this will be displayed:

```
In Communication
1234 56
```

If valid Caller Identification information is received, a message similar to this will be displayed:

```
TEL:15145551212
1234 56
```

The DRL2E decodes all information received and stores the information in its event buffer. When a valid signal is received, the DRL2E sends a kissoff signal and transmits the decoded alarm signal to the computer and then to the printer through the CPM2.

Options [1D] and [1E] can be adjusted to allow the DRL2E to compensate for weak signals or noisy telephone lines; refer to "DRL2E Programmable Features" for information on programming these Options.

The DRL2E will send each message it receives to the printer for review by the system operator. Two messages may be sent to the printer to indicate reception problems: the "Invalid Report" and "Communication Fail".

### FAULT DATA MESSAGE

When this problem is encountered, the following information is transmitted to the printer and the computer:

Printer: L01- 0000-INVALID REPORT TIME:DATE  
 Computer: ORRL[#0000 | NYNRRL]

**NOTE: The first RRL is subject to the line card length option. The second RRL is the receiver and line card number, both in HEX.**

This output for account code "0000" indicates that data has been received, but is not valid (for example, there are unmatched rounds or the wrong parity). The following is an example of faulty data received by the DRL2E, and the printer output generated:

Round	Data Received	Printer Output
1st	123456	[No printout]
2nd	123446	?1234?56 Invalid Report
		?1234?46 Invalid Report
3rd	123356	?1233?56 Invalid Report
4th	123456	?1234?56 Invalid Report
5th	123346	?1233?46 Invalid Report
		?????10 Invalid Report

**NOTE: There is only 1 invalid report at the end of a call.**

### FAULT CALL

When this problem is encountered, the following information is transmitted to the printer and the computer:

Printer: L01- 0000-COMMUNICATION FAIL TIME:DATE  
 Computer: ORRL[#0000 | NYCRRLL]

**NOTE: The first RRL is subject to the line card length option. The second RRL is the receiver and line card number, both in HEX.**

This output indicates that a call was received, but no data was detected. The call may have been a wrong number, or the calling control panel was unable to connect with the receiver's handshake.

### CALLER ID

If an Invalid Report or Communication Fail occurs, and Caller ID is enabled, the printer messages will be similar to the following:

Fault Data: "??????10 5551212"  
 Fault Call: "??????40 5551212"

Note that "?" represents the missing data; "5551212" represents the originating telephone number.

### Stopping Data Reception Manually

To cancel communications between the DRL2E Line Card and the calling control panel, press the [CANCEL] button. Pressing the [CANCEL] button will hang up the line. This feature can be used to hang up on a control panel that is repeatedly sending alarms.

---

## PROFILES

The DRL2E “virtual receiver” will load unique “profiles” in order to effectively communicate with control panels. A profile is a set of pre-programmed line card options unique for a particular “calling id number” or DNIS number. The “Calling id” or “DNIS” will point to a particular profile, which will then be loaded into the line card at the beginning of each call.

Each “virtual receiver” can have a maximum of 64 profiles. To change the options for a particular profile, utility software is provided. This software will allow the user /operator to edit the profiles.

## STATIC OPTIONS

**See APPENDIX E for table of default static options.**

**Option [00]: Reserved**

**Option [01]: Line Card Number**

The Line Card Number provides a virtual identification code for each DRL2E module. Hexadecimal numbers “01” to “1E” can be programmed in Option [01] to identify Line Cards.

[Default is 0D or OE]

**Option [02]: Line Card Number Length**

The Line Card Number Length option is used to determine how many digits from the line card number will be sent to the output. You also have the option of displaying the number in hex or decimal.

Program option 02 with one of the following:

- 01** Send only one hex digit to the printer or computer output (If you have a 2 digit line card number, only the last digit will be sent to the output)
- 02** Send 2 hex digit line card number to the output
- 03** Send 3 hex digit line card number to the output (leading zeros will be inserted prior to the line card number)
- 0A** Send 2 digits receiver number in decimal. 3 digits line number in decimal.
- 0D** Send 2 digits receiver number as programmed. Send 3 digits line card number in decimal
- 0E** Send 2 digits receiver number in Hex. Send 1 digit line card number as follows:

Line Card #	Send
1..F	1..F
10..1E	G..U

**NOTE: When using the DRL2E, the Line Card Number Length option should always correspond to the number of DNIS digits being received.**

For example, if 5 digits are being received then the Line Card Number Length Option should be programmed to 3 such that 1RRLLL would be overwritten by the 5 digits of DNIS to become 1ddddd.

[Default is 0E]

**Option [05]: Pre-Handshake Delay**

When the line card seizes the line, it will wait the time programmed at option [05], then send the first handshake.

The time programmed (hex) at this location will be multiplied by 100 ms – e.g., 100 ms, 200 ms etc.

*The default setting is 0A, for 1 second*

**NOTE: If DNIS is used, this time will not start until DNIS is received.**

**Options [06] to [0D]: Reserved**

**Option [0E]: Line Detection Reports**

The Line Card will perform periodic telephone line tests. When Option [0E] is enabled, if the line is faulty, a warning LED will

be displayed on the Line Card front panel and an alarm will be sent to the computer and the printer. When option [0E] is disabled, no alarm will be transmitted. [Default is 01]

**Option [0F]: Mute Buzzer Option**

Operation of the line card’s buzzer may be programmed as follows:

- 00** Buzzer sounds for line fault, CPM2 error, or if an alarm occurs during a CPM2 error
- 01** Buzzer does not sound for any event
- 02** Buzzer sounds for audio, line fault, CPM2 error, or if an alarm occurs during a CPM2 error
- 03** Buzzer sounds for all status change conditions

[Default is 00]

**Option [10]: Keep Last Message On**

To have the last alarm message retained on the DRL2E display, enable this option with a setting of 01.

**Option [11]: Hook-flash Enable/Disable**

Enables or disables ability to hook-flash the phone lines and determines its duration in increments of 10 ms.

If programmed as 00, the option is disabled. If set to anything else, you multiply the decimal equivalent of the hex value by 10ms and that is the duration.

For example, if a hook-flash time of 500 ms is wanted, program option [11] to 32 hex. 500 ms/10=50, 50 Dec=32 hex.

[Default is 00]

**Option [12]: Caller Source Selection**

Option [12] allows the Line Card to receive Caller ID data or DNIS that is transmitted after the first ring on the telephone line.

**The appropriate service must be available and requested from the Telephone Company for this feature to be operational.**

**00** Disabled

**01** North American CID

- Private Call: An anonymous indication is received instead of the originating telephone number
- No call no.: An out-of-area or unavailable indication is received instead of the originating telephone number
- Unknown Call: The originating telephone number has not been received or was not transmitted

**04 – 0A** Receive 04 –10 DTMF DNIS digits [Default is 00]

**Option [13]: Caller Source to SG Computer**

Option [13] allows the transmission of the Caller Identification or DNIS, to the computer output.

Program Option [13] as one of the following:

**00** Do not send to the computer

**01** 4RRL Protocol: send to the computer using North American Caller ID protocol

**05** 4RRL Protocol: send to the computer using North American Caller ID protocol sending Calling name to the computer if available.

**NOTE: Option [12] must be enabled.** [Default is 00]

**Option [14]: Caller Source to printer**

Option [14] allows the transmission of the Caller Identification or DNIS, to the printer output.

Program Option [14] as one of the following:

**00** Do not send Caller Source to the printer

**01** Send Caller ID to the printer

**05** Send Caller name and Caller ID to the printer if available.

Each alarm will print an extra line, printing the Caller Source.

**NOTE: Option [12] must be enabled.** [Default is 00]

### Option [15]: Line Seizure Event

Generate event on each call to indicate off-hook condition (line seizure).

Printer: L01-0000—OFF HOOK           HH:MM:SS-DD/MM  
Computer: 0RRL[#0000IAOFF HOOK/RLL][14]

- 00 Disabled
- 01 Enabled

[Default is 00]

### Option [16]: Line Release Event

Generate events on each call to indicate on-hook condition.

Printer: L01-0000—ON HOOK           HH:MM:SS-DD/MM  
Computer: 0RRL[#0000IAON HOOK/RLL][14]

- 00 Disabled
- 01 Enabled

[Default is 00]

### Option [17] to [1B]: Reserved

#### Option [1C]: Busy Out

This option allows the line card to immediately seize the phone line in case of loss of communication with the CPM, checksum error after download or when its internal buffer is full.

Program Option [1C] with one of the following:

- 00 The line is seized if any of the conditions mentioned above occur
- 01 The line is not seized if any of the conditions mentioned above occur

[Default is 00]

#### Option [1D]: Input Sensitivity

The default setting is 3F.

**NOTE: Do not change this option unless specified by a Sur-Gard technician.**

#### Option [1E]: Output Levels

Default is C0 for -9.7db transmit level.

**NOTE: Do not change this option unless specified by a Sur-Gard technician.**

#### Option [1F]: Debug Output

- 00 Disabled
- 01 Enabled

This output when enabled will allow you to see the data received by the DRL2E on the Hyper terminal.

[Default is 00]

**NOTE: Do not change this option unless specified by a Sur-Gard technician.**

### Options [20] - [26]: Reserved

#### Option [27]: Caller Source Process

This option determines how many digits of Caller ID or DNIS the receiver will process.

- 0x x is number of digits of DNIS or Caller ID to be processed (range from 1 to A hex).

[Default is 00]

#### Option [28]: SK FSK Receive Enable

- 00 Disabled
- 01 Enabled

[Default is 00]

### Options [29]-[2A]: Reserved

#### Option [2B]: Echo Suppression

- 00 Disabled
- 01 Enabled: The echo suppression option will enable the transmission of a 2-second, 2025Hz tone from the line card to disable echo suppression equipment. This option will only work with panels that require a 2225Hz handshake.

[Default is 00]

### Options [2C]-[2E]: Reserved

#### Options [2F]: Max On-Line time

On-line duration delay is built in to control runaway dialers. A duration delay from 01 to 99 minutes can be programmed. The receiver starts timing when it picks up the line and, when the delay expires, the receiver will hang up the call even if the dialer continues to send data. If the duration delay is programmed as 00, this feature will be disabled.

[Default is 00]

## DEFAULT DYNAMIC OPTIONS

**See APPENDIX F for table of default dynamic**

#### **Options [30] - [AF]**

The DRL2E uses a unique Sur-Gard communication format to transmit data through the CPM2 to the central station computer. Event codes corresponding to alarm codes in 10 to 40 Baud formats and DTMF 4/1 to 4/3 formats are used in this unique format to enable the computer software to determine alarm types.

#### **Options [30] - [3F]: 3/1, 4/1 Format Event Codes**

The DRL2E will use the last digit of data received in 3/1 and 4/1 formats to determine the computer event code. The event code will then be transmitted to the central station computer. Refer to the DRL2E Decoding Library for the complete set of event codes used by the DRL2E.

In Sections [30] through [3F], program ASCII codes according to the Decoding Library. Values other than 20-7F (ASCII) will not be accepted. Note that the old value programmed in each Option will not be changed until a command with valid data is received.

Default settings are as below:

- 30 - 38: 41   • 3A: 41   • 3C: 43   • 3E: 52
- 39: 52       • 3B: 4F   • 3D: 5C   • 3F 54

#### **Options [40] - [4F]: 4/2 Format Event Codes Selection**

The DRL2E will use the first digit following the account code in 4/2, 3/1 extended, 4/1 extended, or 3/2 formats to determine the computer event code. The event code will then be transmitted to the central station computer. Refer to the "DRL2E Decoding Library" for the complete set of event codes used by the DRL2E.

In Sections [40] through [4F], program ASCII codes according to the Decoding Library. Values other than 20-7F (ASCII) will not be accepted. Note that the old value programmed in each Option will not be changed until a command with valid data is received.

Default settings are as below:

- 40-48: 41   • 4A: 41   • 4C: 43   • 4E: 52
- 49: 52       • 4B: 4F   • 4D: 5C   • 4F: 54

### Options [50] - [5F]: 4/3 Format Event Codes Selection

The DRL2E will use the fifth digit of data received in 4/3 and 4/2 extended formats to determine the message and event code. The event code will then be transmitted to the central station computer. Refer to the "DRL2E Decoding Library" for the complete set of messages and event codes used by the DRL2E.

In Sections [50] through [5F], program ASCII codes according to the Decoding Library. Values other than 20-7F (ASCII) will not be accepted. Note that the old value programmed in each Option will not be changed until a command with valid data is received.

Default settings are as below:

- 50: 54      • 54: 43      • 58: 41      • 5C: 4F
- 51: 41      • 55: 4F      • 59: 52      • 5D: 4E
- 52: 41      • 56: 54      • 5A: 54      • 5E: 48
- 53: 41      • 57: 41      • 5B: 43      • 5F: 5C

### Option [60]-[6F]: See APPENDIX D

#### Option [70]: Automation Common Event Code

Some central station software packages are unable to process the alarm using the event codes listed in the DRL2E Decoding Library. Where a central station monitors thousands of accounts belonging to different companies, the same reporting codes may have different meanings depending on the company. Because of this, the individual event codes in Options [30] through [5F] cannot accurately represent the alarm condition. To overcome this, Option [70] may be programmed as follows:

Program	Operation
00	Use Individual Event Codes to computer
20, 30-39 & 41-5A	Use Common Event Codes (space, 0-9, A-Z)

When using Common Event Codes, it is recommended that either hexadecimal code "5A" (ASCII "Z") or hexadecimal code "41" (ASCII "A") be used.

The "Space" character (Hex 20) can be used as the common event code with certain automation software packages to avoid account code database changes when switching over from other brand receivers to the Sur-Gard receiver.

Note that Option [70] is ignored when using Modem formats, Contact-ID, ACRON, FBI Super Fast, BFSK, ADEMCO Super Fast and SK FSK1, 2 formats.

#### Option [71]: Library Select

Determine how to use Printer Words Options.

- 00** No printer words
- 01** Printer word options used for 1-digit reporting code formats only; other will use predefined (hard coded) library
- 02** Printer word options used for 2-digit reporting code formats only; other will use predefined library
- 03** Printer word options used for 3-digit reporting code formats only; other will use predefined library
- 04** Printer word options used for 1-digit and 2-digit reporting code formats only; other will use predefined library
- 05** Printer words options 60-6F used for 1-digit, 2-digit and 3-digit reporting code formats.

The hard coded library can be found on page 25.

[Default is 04]

#### Option [72]: Communication Select

If the Line Card is not to report to the central station automation software and a computer, program Option [72] as "00". Otherwise, program Option [72] as "01." [Default is 01]

#### Option [73]: Printer Select

If a printer is not used with the MLR2-E, program Option [73] as "00."

If a printer is to be used with the MLR2-E, program Option [73] as "01."

If a 40 column printer is to be used with the MLR2-E, program option [73] as "03."

**NOTE: This option must be enabled in a UL configuration.**

[Default is 01]

#### Option [74]: Equivalent Line

Equivalent line option is used when an incoming signal can be received on another receiver telephone line if the original line is busy. Information printed and/or sent to computer will indicate that the information was received on the same telephone line. The receiver number does not change. Program 00 at option [74] to disable, or a number from 01 to 1E.

[Default is 00]

#### Option [75]: Receiver Number

The Receiver Number is used for sending signals to the central station software.

Refer to the manuals for any central station automation software being used to determine if there are any special requirements for this number. Also, check the numbers used for any other receivers in the station to ensure that numbers are not duplicated.

[Default is 01]

#### Option [76]: Leading zeros (3/x to 4/x)

Program Option [76] with one of the values listed below:

**Value Function** [Default is 00]

- 00** All 3 digit account codes will have a leading space.
- 01** All 3 digit account codes will have a leading zero
- 02** All 3 digit account codes will have a leading zero.  
All one digit event codes will have a leading zero

#### Option [77]: Reserved

#### Option [78]: Max Inter-digit time

Certain old dialers may have difficulties communicating with the receiver. The DRL2E provides a possible solution by programming this option. This option should be left as a default and should be changed only on the recommendation of a Sur-Gard technician. When programmed as 00, the inter-digit time is determined by the Baud rate of the format being used, all other values are in 100 ms intervals.

**00** determined by Baud rate (default)

**01** 100 ms

**02** 200 ms

... etc.

#### Option [79]: Max Inter-burst

Certain old dialers may have difficulties in communicating with the receiver. The DRL2E provides the possible solution by programming this option. This option should be left as default and should be changed only on the recommendation of a Sur-Gard technician. When programmed as 00, the inter-burst has a time of 100 ms, all other values are in 10ms increments.

**00** 100 ms (default)

**01** 10 ms

**02** 20 ms

... etc.

### Option [80]: Kissoff to Hang-up Time

This option determines the delay between Kissoff and the release of the line.

The hex value programmed at this location will be converted to decimal and then multiplied by 100 milliseconds to generate the delay.

For example:

Option 80 = 0A hex = 10 decimal \* 100 ms = 1000 ms = 1 second delay.

Option 80 = 28 hex = 40 decimal \* 100 ms = 4000 ms = 4 second delay.

The default for this option is 1E for 3 seconds

### Options [81] through [88]: Handshake Selection

The DRL2E is a multi-format receiver capable of sending several handshakes to a dialer. Often it is important which handshake is sent first. Program Options [81] through [88] according to your applications.

#### Handshake Options

00	No handshake
0B	Modem II handshake
0C	SIA FSK handshake
0E	Modem IIE, Modem IIIa <sup>2</sup> and ITI handshake
0F	DMP handshake
1D	Single Dual tone handshake
2D	Double Dual tone handshake
FC	Full duplex SIA FSK

All other frequencies can be used by programming the first two digits. For example:

23 = 2300 Hz, 18 = 1800 Hz, 14 = 1400 Hz, 10 = 1000 Hz

Default settings are as below:

- 81: 14      • 83: 2D      • 85: 0E      • 87: 00
- 82: 23      • 84: 0C      • 86: 0B      • 88: 00

### Option [89] to [90]: Handshake and Kissoff Duration

Some control panels may require different handshake duration. Each unit has increments of 100 ms, from 100 ms to a maximum of 6.3 sec. Program options 89 to 90 to the desired duration respective to the corresponding handshake options 81-88.

00	1 sec (default)
01	100 ms
02	200 ms
03	300 ms
04	400 ms
...	
0A	1 sec
0C	1.2 sec.

**NOTE: These options will only affect steady tone handshakes.** [Default is 00]

### Option [91]: Inter Handshake Duration

The DRL2E Line Card will usually wait for signals from the control panels for 4 seconds before sending the next handshake, if there are no signals received. In certain applications, control panels can not wait long enough to get their own handshake, especially if the handshake is programmed as the fifth or later handshake.

Program Option [91] with one of the following:

00	4 second interval (default)
01	1 second interval (default)
02	2 second interval (default)
03	3 second interval (default)

### Option [92] to [94]: reserved

#### Option [95]: 5 digits pulse

The DRL2E cannot distinguish between 4/1, 3/2 and 3/1 with checksum because all of them contain a total of 5 digits. Therefore, this option must be programmed to inform the DRL2E which of the 3 formats may be used.

00	select 4/1 format (default)
01	select 3/2 format (default)
02	select 3/1 with checksum format.

**NOTE: The printer messages for the 3-2 format are the same as those used for the 4/2 format.**

#### Option [96]: 4/1 Extended Format

Program Option [96] as "01" to combine 2 round pairs of 4/1 extended format into 4/2 output for reporting to the computer and the printer.

For example, with Option [96] enabled, the security control panel may transmit the following information:

- 1234 3
- 1234 3
- 3333 1
- 3333 1

The DRL2E will interpret this information as: 1234 31

This format is not recommended as it occupies the telephone line for long periods of time. The default setting for Option [96] is "01"; when programmed as "00," the option is disabled.

#### Option [97]: 4/2 Extended Format

Program Option [97] as "01" to combine 2 round pairs of 4/2 extended format into 4/3 output for reporting to the computer and the printer. Program one of the following:

00	4/2 Extended format data is not combined
01	The panel sends:
	1234 05
	1234 05
	0505 16
	0505 16

The DRL2E will interpret this information as 1234 516, or the panel sends:

1234 03  
1234 03  
3333 01  
3333 01

The DRL2E will interpret this information as 1234 301.

**NOTE: The default setting for Option [97] is "00"; when programmed as "00", the option is disabled.**

### Option [98]: 3/1 extended format

Program Option [98] as "01" to combine 2 round pairs of 3/1 extended format into 3/2 output for reporting to the computer and the printer. (For M.A.S. software users, the option should be programmed as "02")

For example, with Option [98] enabled, the security control panel may transmit the following information:

123 3  
123 3  
333 1  
333 1

The DRL2E will interpret this information as: 123 31

The default setting for Option [98] is "01"; when programmed as "00", the option is disabled.

### Option [99]: 8 digit DTMF

The Ademco 4/1 Express format may cause conflicts with the Sur-Gard DTMF 4/3 with checksum format or FBI Superfast without checksum. Therefore, this option must be programmed to inform the DRL2E which of the 3 formats may be used.

- 00** Sur-Gard DTMF 4/3 with checksum
- 01** Ademco 4/1 Express
- 02** FBI without checksum [Default is 01]

### Option [9A]: Group Arming / Disarming with User Code

Option [9A] applies to the Sur-Gard DTMF 4/3 format.

When Option [9A] is programmed as "01," group arming/disarming signals will be combined with the user code into one signal which will be sent to the computer and the printer.

For example, the following information may be sent to the computer and the printer.

- Printer:
  - 1234-B01 CloseGrp
  - 1234-416 Close
  - 1234-C02 OpenGrp
  - 1234-532 Open
- Computer:
  - 1234 C1 16 (instead of 1234 C 01 and 1234 C 16)
  - 1234 O2 32 (instead of 1234 O 02 and 1234 O 32)

If a user code is not received after the group opening/closing, the message "1234 C1 FF" will be sent; "FF" indicates that a user code was not received. [Default is 00]

### Option [9B]: 4/3 Format User Conversion / 3-digit Alarm Code

The Sur-Gard 4/3 DTMF format is made up of a 4-digit account code, a 1-digit event code, and a 2-digit hexadecimal zone code or user number. However, some central station software packages use a common event code and require decimal user codes.

Option [9B] allows the user codes to be converted from hexadecimal to decimal to meet the needs of the central station software. Program Option [9B] with one of the following:

- 00** sends the last two digits as user codes without conversion (default).
- 01** converts the last 2-digit user codes to decimal as shown here:
 

User Code received	User Code after conversion
00 to 99	00 to 99
B0 to B9	100 to 109

C0 to C9	110 to 119
D0 to D9	120 to 129
E0 to E9	130 to 139
F0 to F9	140 to 149

For example, if 1234 4B1 is received, 1234 C 101 will be sent to the computer.

- 02** sends the last 3 digits as the zone codes with the 5th digit still used as the event code

For example, if 1234 161 is received, 1234 A 161 will be sent to the computer.

When individual event codes are used, and 1234 401 is received, 1234 C 401 will be transmitted to the computer. When common event codes are used, and 1234 401 is received, 1234 Z 401 will be transmitted to the computer.

- 03** sends the last 3 digits as the zone codes and convert the user codes only to decimal

**NOTE: When Option [9A] Group Arming/Disarming with User Code is programmed as "01", the 3-digit user codes will be combined with the group number as follows:**

Code received	Code sent to computer and printer
1234B01	No transmission
12344B1	1234 C1 101

### Option [9C]: Reserved

### Option [9D]: MODEM II RS-232

The DRL2E is able to decode the Modem II formats. The handshake 0B needs to be programmed as one of the handshakes of the DRL2E for the Modem II, modem IIa, or modem IIb, and handshake 0E for Modem IIE or Modem IIIa<sup>2</sup>. Option [9D] determines the protocol sent to the computer.

**NOTE: This option will also affect the BFSK format only if programmed as 00 or 01.**

- Option 9D: Modem II RS232
- 00: 1RRLssssssAAAAXXYYYY[DC4] (6500 protocol)
  - 01: 6RRLssssssAAAAXXYYYY[DC4] (SG protocol)
  - 02: Modem II to SIA protocol
  - 03: Modem II to SIA protocol, and text is decoded and sent to printer and computer.

**NOTE: please make sure the automation software supports settings 02 and 03 if the SIA protocol is desired.**

[Default is 01]

### Option [9E]: Acron RS-232

When this option is programmed as "00", the DRL2E will convert the Acron Super Fast format signal into 3/2 or 4/2 format (Ex: AAAAsXssYY[DC4]). If it is programmed as "01" the Acron Super Fast will be sent to the computer as follows:

9RRLssssAAAACCCCCCCCC[DC4]

Where:

- 9 = Protocol number
- RR = receiver number
- L = Line number
- ssss = Spaces
- AAAA = Account code
- CCCC = Channel 1-4
- CCCC = Channel 5-8
- [DC4] = Terminator

Example:

- Raw data:  
1578BDDDDDDDD  
1578BDDDDDDDD
- Printer output will be as follows:  
(01-001-1578-BDDDDDDDD-)
- Computer output:  
(901001 1578BDDDDDDDD) [Default is 01]

### Option [9F]: Ademco High Speed RS-232

When this option is programmed as "00", the DRL2E will convert the High-Speed format signal into 4/2 format (Ex: 1RRLsssssssAAAAsXssYY[DC4]). If it is programmed as "01" the Ademco High Speed will be send to the computer as follows:

8RRLAAAAsCCCCsCCCCsC[DC4]

Where:

8	Protocol number
RR	Receiver number
L	Line number
AAAA	Account code
s	Space
CCCC	Channel 1-4
s	Space
CCCC	Channel 5-8
s	Space
C	Channel 9
[DC4]	Terminator [Default is 01]

### Option [A0]: Reserved

### Option [A1]: FBI RS232

To enable the computer FBI Superfast protocol, program option [A1] as "01." When enabled, the computer output will be as follows:

JRRLsssssssAAAATZZEss[DC4]

Where:

J	= FBI protocol identifier
RR	= receiver number
L	= Line number
s	= spaces
AAAA	= Account code.
T	= Zone type
ZZ	= Zone number, in hex.
E	= Event code

**NOTE: if E=0 and T=0 : listen in.** [Default is 01]

### Option [A2]: Reserved

### Option [A3]: D6500 computer output

The DRL2E will emulate the Radionics D6500 RS-232 protocol on pulse formats only. (00 = disable, 01 = enable)

Examples:

1. 3/1 format: Account code "123" with alarm code "1", (alarm) the computer output will be:

```
00 1RRLsssssss123sAss1[DC4]
01 1RRLsssssss123sAss1[DC4]
```

2. 3/1 format: Account code "123" with alarm code "B", (opening) the computer output will be:

```
00 1RRLsssssss123sOssB[DC4]
01 1RRLsssssss123sOsss[DC4]
```

3. 4/2 extended (or 3/2 or 3/1 extended): Account code "1234" with alarm code "2" on zone "1", (alarm) the computer output will be:

```
00 1RRLsssssss1234sAs21[DC4]
01 1RRLsssssss1234sAs21[DC4]
```

4. 3/1 extended (or 4/2 or 3/2): Account code "234" with alarm code "C" on zone "2", (closing) the computer output will be:

```
00 1RRLsssssss234sCsC2[DC4]
01 1RRLsssssss234sCss2[DC4]
```

Where RR = Receiver Number  
L = Line Number  
s = Space  
[DC4] = Terminator

Please note that option [70] must be left as individual event code when enabling this option.

### Option [A4]: BFSK RS232

When programming option [A4] as "01", the BFSK format will convert its Radionics D6500 computer output to a standard protocol output. [Default is 00]

**NOTE: This option also affects the modem option [9D].**

### Option [A5]: 7 Digit Pulse

This option allows the DRL2E to select Sescoa Super Speed or 4/2 checksum pulse. Ordinarily, the DRL2E cannot distinguish between these two formats, since they are both 7 digit pulse. Program option [A5] as 00 to have all incoming 7 digit pulse calls decoded as 4/2 checksum, or 01 to decode as Sescoa Super Speed. [Default is 01]

### Option [A6]: Reserved

### Option [A7]: SK FSK2 RS232

The DRL2E provides two possible outputs to the computer. Select 00 for protocol #1 or 01 for protocol #2. Please refer to DRL2E Communication Fomats section (SK FSK communication format) for more details.

[Default is 00]

---

# DRL2E COMMUNICATION FORMATS

## COMMON FORMATS

The following formats are commonly used:

- 3/1, 4/1, 4/2 formats; 10, 14, 20 Baud
- 3/1 extended format; 10, 14, 20, 40 Baud.
- 3/1, 4/2 formats with or without Checksum; 40 Baud
- 3-2 format; 10, 14, 20 Baud
- 4/1 Extended format; 10, 14, 20 Baud
- 4/2 Extended format; 10, 14, 20, 40 Baud

Example:

- 3/1 FORMAT  
Computer: 1011sssss123sAss1[14]  
Printer: L01-123-1-FIRE ALARM HH:MM:SS-DD/MM
- 3/1 EXTENDED FORMAT  
Computer: 1011sssss123sAss32[14]  
Printer: L01-123-32-FIRE ALARM HH:MM:SS-DD/MM
- 4/2 FORMAT  
Computer: 1011sssss1234sAss22[14]  
Printer: L01-1234-22-FIRE ALARM HH:MM:SS-DD/MM

## SUR-GARD DTMF FORMATS

Sur-Gard DTMF 4/3 and 4/3 with Checksum formats provide fast, reliable and easy-to-understand and decode data transmission. On-line time will be greatly reduced when using 4/3 and 4/3 with Checksum formats. The 4/1 and 4/2 DTMF formats can also be decoded by the DRL2E.

The 4/3 with Checksum format is recommended for use with Sur-Gard and DSC security control panels.

Example:

- Sur-Gard 4/3 format  
Each round pair represents a single event: AAAAEZZ  
AAAA = 4-digit account code.  
E = Event code.  
ZZ = Zone number or user number.  
Computer: 1011sssss2255sAs266[14][6]  
Printer: L01—2255-266-PANIC ALARM HH:MM:SS-DD/MM

## ADEMCO CONTACT ID

This DTMF format requires a dual tone handshake and 1400 Hz kissoff, or 1400 Hz handshake and 1400 Hz kissoff.

Example:

Printer:  
Computer: 5011s181234E12101001 [14]

**\*\*PLEASE SEE APPENDIX G FOR EVENT CODES CLASSIFICATIONS TABLE\*\***

## ADEMCO EXPRESS

This format consists of 4-digit Account Codes, two digit format identifiers and 1- or 2-digit alarm codes. The DRL2E will decode the signal as regular 4/1 or 4/2 format. Option [99] must be programmed as "01" to decode the 4/1 Express format instead of the Sur-Gard 4/3 with Checksum format or FBI Superfast no checksum.

Example:

- Option 99 set to 00  
Raw data: 23451726  
Computer Output: 1011 2345 A 172  
Printer Output: L01-2345-172-FIRE ALARM  
HH:MM:SS-DD/MM
- Option 99 set to 01  
Raw data: 23451726  
Computer Output: 1011 2345 A 2  
Printer Output: L01-2345-2-PANIC ALARM  
HH:MM:SS-DD/MM

## ADEMCO SUPER FAST (High Speed Format)

The High-Speed format consists of 4 account numbers, 8 channel status digits, and 1 auxiliary channel.

**NOTE: When option [9F] is programmed as "00," the DRL2E will convert the signal into 4/2 format. When option [9F] is programmed as "01," the DRL2E will send the information as it received to the printer and to the computer using High Speed RS-232 communication protocol.**

8RRLAAAAsCCCCsC[DC4]

AAAAZZZZ ZZZZ S

AAAA= Three digit or Four digit account number.

ZZZZ ZZZZ = Zone Status.

S = Status Channel indicates the meaning of the message.

AAAAZZZZZZZZS or AAAZZZZZZZZS

### Example

- With option 9F disabled  
Computer: 1011sssss1234sAss02[14][6]  
Printer: L01-1234-02-ALARM ZONE02  
HH:MM:SS-DD/MM
- With option 9F enabled  
Computer: 8011 1234s5155s5555s7[14][6]  
Printer: L01-1234 - 51555557 HH:MM:SS-DD/MM

## DMP FSK

PRRLssAAAAAsXT<sub>1</sub>...T<sub>n</sub>s[DC4]

Data:

P = DMP protocol identifier

RR = Receiver number

L = Line number

s = Spaces

AAAA = Account code

X = If X position is inhabited by any character other than an upper case "Z"; then the incoming signal is in serial 1 format. If X position holds an upper case "Z" then the incoming signal will be in serial 3 format.

The actual character position of X will vary depending on number of account digits and/or line number length.

T<sub>1</sub>-T<sub>2</sub> = Alarm information

**NOTE: If account code changes, it will be right justified by the panel. Panel will send leading spaces as place fillers.**

## Expected Output

PRRLssAAAAAsXT<sub>1</sub>...T<sub>n</sub>s[DC4]

Data:

P = DMP Protocol identifier

dddd= RRL replaced by the 5-digit DNIS therefore increasing the length by two.

s = Spaces

AAAA = Account code

X = DMP serial format identifier

T<sub>1</sub>-T<sub>n</sub> = Alarm information

### Examples:

P011ss12345sA00081EASTsSMOKE[DC4]  
P011ss12345sA00085555116NORTH OFFICE PRI15S.  
WEST BUILDING[DC4]

The above two automation signals are both DMP serial 1 format. The 15th character in the above examples will determine if the received format is serial 1 or serial 3. If the 15th digit is anything but an uppercase "Z", the DMP format is serial 1. If you look at the signal below, you will see that the 15th digit is an uppercase "Z"; therefore, the signal is serial 3 format.

P011ss12345sZa\61\t"BU\z 0232"FRONT DOOR\A  
03OFFICE\U0568"JOHN SMITH\DC4]

**NOTE: The position of the DMP serial format identifier can change, depending on the line card number length.**

## FBI SUPER FAST FORMAT

This DTMF format consists of 4-digit Account Codes, 2-digit zone codes, 1-digit zone type codes, and 1-digit event codes. The zone codes will be converted into 3-digit decimal codes by the DRL2E.

The following are the zone type codes used by this format:

FBI Event	Code	Converted Event Code
Fire	1	A
Panic	2	A
Burglary	3	A
Medical	4	A
Auxiliary	5	A
Bypass	6	B
Inactive	7	A
Eight	8	A
Nine	9	A
Zero	0	A
Opening	B	O
Closing	C	C
Abort	D	T
Restore	E	R
Trouble	F	T

**NOTE: Option [A1] enabled will output the FBI RS-232 protocol.**

### Example

Alarm string - 1234B001  
FBI RS-232 Option on  
Automation: J011 1234B001[14]

FBI RS-232 Option Off  
Automation: 1011 1234B001[14]

## ITI FORMAT

The ITI format covers ITI panel models RF Commander, Caretaker Plus, SX-V, SX-IVB, UltraGard 5000 (Pro 5000), Commander III and Commander 2000 Simon. In order to receive the ITI format, the handshake 0E must be programmed. Upon a Cold-boot, the fifth handshake (option [86]) is programmed as 0E hex.

### RF Commander/Commander III:

Sensor# Printed out as

00-16	ALARM
80	ALARM
81	ALARM
82	ALARM
83	PHONE TEST
84	OPEN USER X
85	CLOSE USER X
86	SILENT DURESS
87	FORCE ARMED
90	AC FAILURE
91	LOW CPU BAT
92	ALM TAMPR LOOP
93	AUTO PHONE TEST
94	TROUBLE
95	CPU BACK IN

### Caretaker Plus

77	ALARM TAMPER
78	TROUBLE
79	NO ACTIVI ALM
80	ALARM
81	ALARM
82	ALARM
83	PHONE TEST
84	OPEN USER X
85	CLOSE USER X
86	ALARM SILENT DURESS
87	FORCE ARMED
88	TROUBLE
92	ALARM TAMPER LOOP
93	AUTO PHONE TEST

### SX-V

01	BAD SENSOR #
02-76	ALARM
77	TAMPER KEYPAD
80	ALARM
81	ALARM
82	ALARM
83	PHONE TEST
84	OPEN USER
85	CLOSE USER
86	SILENT DURESS
87	FORCE ARM
90	AC FAILURE
91	LOW CPU BAT
92	ALM TAMPR LOOP
93	AUTO PHONE TEST

94	RECEIVER TROUBLE
95	CPU BACK IN

### Commander 2000

Sensor #

01-18	ALARM
80	ALARM
81	ALARM
82	ALARM
83	ALARM
84	OPEN USER#
85	CLOSE USER#
86	SILENT DURESS
87	FORCE ARMED
89	RF TOUCHPAD
90	AC FAILURE
91	LOW CPU BAT
92	ALM TAMPR LOOP
93	AUTO PHONE TEST
94	CPU RX FAIL
95	CPU BACK IN
96	FAIL TO COMMUNICATE
98	EVENT DUMP REPORT

### Pro 5000 (UltraGard 5000)

Sensor #

01-76	ZONE ALARM
01-76	Zone Alarm Cancel
77	Touchpad Tamper
77	Touchpad Tamper Cancel w/User ID
78	Freeze Sensor Trouble
79	No Activity Time-out
79	No Activity Time-out Cancel
80	Touchpad Fire Alarm
81	Touchpad Police Alarm
82	Touchpad Auxiliary Alarm
83	Manual Phone Test w/User ID
84	Open User #
85	Close User #
86	Silent Duress w/User ID
87	Force Arm
88	Energy Saver Trouble
89	Wireless Touchpad (Supervisory or Low Battery)
90	AC Failure
90	AC Restore
91	Low Panel Battery
91	Panel Battery Restore
92	Panel Tamper
93	Automatic Phone Test
94	Wireless Receiver Failure
95	Panel Reset
96	Phone Failure

Example:

- ITI Printer:  
L01-12345-81-TOUCHPAD FIRE ALARMHH:MM:SS-  
DD/MM
- ITI Computer Example:  
1011sssss1B2345A081A31[DC4]

## MODEM II, MODEM IIE, MODEM IIIa<sup>2</sup> and BFSK FORMATS

BFSK, Modem II, Modem IIIa<sup>2</sup> or Modem IIE formats can be decoded by the DRL2E.

### Modem II

#### Example

- Modem II RS-232 Option ON  
Computer Output: 6011 7112 T 9[14]  
Printer Output: L01-7112—BATTERY MISSING  
HH:MM:SS-DD/MM
- Modem II RS 232 option OFF  
Computer Output: 1011 7112 R F01[14]  
Printer Output: L01-7112—PROG ACCESS OK  
HH:MM:SS-DD/MM

### BFSK

#### Example:

- Modem II RS232 option ON  
Computer Output: 6011 112F 1[14]  
Printer Output: L01 112—FIRE ALARM HH:MM:SS-DD/MM
- Modem II RS232 option OFF  
Computer Output: 1011 112F 1[14]  
Printer Output: L01-112—FIRE ALARM HH:MM:SS-DD/MM

## SIA FSK

The SIA digital format is a modem format communicating at 110 or 300 Baud and using the SIA protocol to transfer information to the computer.

The standard DRL2E can receive Bell 103 modem frequencies.

*NOTE: The DRL2E can accept SIA formats with and without separators. The DRL2E Version 1.2 Software implements Level 1, 2 and 3 of the SIA 1993Ib Digital Communication Standard, but it does not support "Receiver Call out and Access Passcode Block," "Reverse Channel Block," and "V-Channel Communications".*

The DRL2E supports an account code with a maximum of 16 digits, (including any displayable ASCII characters except the pipe symbol: "|"). It also supports an Alarm code with a maximum of 4 digits. Usually, the central station automation refers to the SIA Event Block Data Code Definitions for information on interpreting the Alarm Codes.

Acknowledgments for the SIA format are tonal by default. The transmitter may, however, request data acknowledgment by transmission of the optional configuration block. When the DRL2E receives the configuration block from a transmitter requiring data acknowledgment, it will send the tonal acknowledgment to this block. It will then send the data acknowledgment to the following data blocks if the data received is valid.

#### Example

Printer: L01-1234 – NM008 HH:MM:SS-DD/MM  
Computer: S011[#1234:NBA08]

## SILENT KNIGHT FSK1, FSK2

### Silent Knight FSK1 Protocol

ERRLssssAAAAAXXssss[DC4]

#### Where:

E FSK protocol identifier  
RR Receiver number  
L Line number  
s Spaces  
AAAAAA Account number (if the account is 4 or 5 digits, the leading "A"s will be replaced by spaces)  
XX Alarm code

#### Possible alarm codes are as follows:

00 Alarm Panic  
01-08 Alarm 01-08  
09 Holdup  
10-19 Alarm 10-19  
30 Test code  
31 Trouble line 1  
32 Trouble line 2  
33 Expand trouble  
34 Forced access  
35 Restore line 1  
36 Restore line 2  
37 Expand restore  
38 Cancel code  
39 Data lost  
40 Closing  
41-49 Closing 1-9  
50-59 Bypass 10-19  
60 Trouble AC  
61-68 Trouble 1-8  
69 Trouble bat  
70 Restore AC  
71-78 Restore 1-8  
79 Restore bat  
80 Access  
81-89 Access 1-9  
90 Opening  
91-99 Opening 1-9  
[DC4] Represents the terminator

### SILENT KNIGHT FSK2 PROTOCOL

The DRL2E will provide two possible outputs to the computer, according to the value set under option A7. When the option is programmed as "00" (factory default), the computer output will be as follows:

FRRLssssAAAAAYZZss[DC4]

#### Where:

F FSK2 protocol 1 identifier  
RR Receiver number  
L Line number  
s Spaces  
AAAAAA Account number (if the account is 4 or 5 digits, the leading "A"s will be replaced by spaces)  
YY Event code  
ZZ Zone/user number  
[DC4] Represents the terminator

**Possible events are as follows:**

- YT00 Battery Trouble
- YR00 Battery Restore
- AT00 System Trouble AC
- DOZZ Access left open ID ZZ
- DFZZ Access forced ID ZZ
- DSZZ Access Station ID ZZ
- AJ00 System Restore AC
- LT0Z Trouble phone line #0Z  
Restore phone line 0Z  
Expand trouble device ID z  
Expand restore device ID z
- ETZZ Expand trouble station ID ZZ (ZZ=17-31)
- ERZZ Expand restore station ID ZZ (ZZ=17-31)
- RP00 Automatic test
- RXZZ Manual test zone ZZ
- CA Automatic closing
- OA Automatic opening
- CLZZ Normal closing ID ZZ
- OPZZ Normal opening ID ZZ
- CFZZ Forced closing ID ZZ
- ORZZ Forced opening ID ZZ  
Supervised closing ID ZZ
- OTZZ Supervised opening ZZ
- CG0a Closing area 0a
- OG0a Opening area 0a
- DRZZ Access granted ID ZZ

When the option is programmed as "01", the computer output will be as follows:

CRRRLssssAAAAAAXYZZss[DC4]

**Where:**

- C FSK2 protocol 2 identifier
- RR Receiver number
- L Line number
- s Spaces
- AAAAAA Account number (if the account is 4 or 5 digits, the leading "A"s will be replaced by spaces)
- X Event code
- Y Condition code
- ZZ Zone/user number
- [DC4] Represents the terminator

**Possible events are as follows:**

- B600 Battery Trouble
- BE00 Battery Restore
- C600 System Trouble AC
- CE00 System Restore AC
- D60z Trouble phone line #0z
- DE0z Restore phone line 0z
- E60z Expand trouble device ID z
- EE0z Expand restore device ID z
- E6zz Expand trouble station ID zz (zz=17-31)
- EEzz Expand restore station ID zz (zz=17-31)
- E100 Automatic test
- E2zz Manual test zone ZZ
- F000 Automatic closing
- F400 Automatic opening
- F1zz : Normal closing ID ZZ
- F5zz : Normal opening ID ZZ
- F2zz : Forced closing ID ZZ
- F6zz : Forced opening ID ZZ
- F3zz : Supervised closing ID ZZ
- F7zz : Supervised opening ZZ
- FD0a : Closing area 0a
- FF0a : Opening area 0a
- F8zz : Access
- F9zz : Access left open ID zz
- FAzz : Access forced ID ZZ
- FBzz : Access station ID ZZ
- FC00 : Duress
- FE00 : Data lost

**SESCOA SUPER SPEED**

Sescoa Super Speed is a 40 Baud communication format. Account Codes are programmed as 4-digit decimal codes ranging from 0001 to 3374. The Account Code is followed by a 1-digit event code, a 2-digit alarm code, and 1-digit checksum. Option [A5] must be programmed as "01" in order to use Sescoa Super Speed decoding instead of 4/2 with Checksum decoding.

Example:  
Printer: L01-1234—LOW BATT HH:MM:SS-DD/MM  
Computer: 7017ssssss1234sF

## DRL2E PREDEFINED LIBRARY DECODING AND EVENT CODES TABLE

### 3/1 - 4/1 Alarm Library

For Alarm Message	Corresponding Code	Event Code (Options 30-3F)	Event
	0 (A)	A	PER TEST REPORT
	1	A	FIRE ALARM
	2	A	PANIC ALARM
	3	A	BURGLARY
	4	A	GENERAL ALARM
	5	A	GENERAL ALARM
	6	A	GENERAL ALARM
	7	A	MEDICAL
	8	A	SYSTEM TROUBLE
Restore	9	R	RESTORE
Open	B	O	OPENING
Close	C	C	CLOSING
Cancel	D	/	CANCEL
Restore	E	R	RESTORE
Trouble	F	T	SYSTEM TROUBLE

### 3/1-4/1 Extended, 3/2 & 4/2 Alarm Library

Alarm	0x(Ax)	A	PER TEST REPORT
Alarm	1x	A	FIRE ALARM
Alarm	2x	A	PANIC ALARM
Alarm	3x	A	BURGLARY
Alarm	4x	A	GENERAL ALARM
Alarm	5x	A	GENERAL ALARM
Alarm	6x	A	GENERAL ALARM
Alarm	7x	A	MEDICAL
Alarm	8x	A	SYSTEM TROUBLE
Restr	9x	R	RESTORE
Open	Bx	O	OPENING
Close	Cx	C	CLOSING
Cancel	Dx	/	CANCEL
Restr	Ex	R	RESTORE
Trble	Fx	T	SYSTEM TROUBLE

### 4/2 Extended & 4/3 Alarm Library

Alarm 0xx(Axx)	T	0	PER TEST REPORT
Alarm 1xx A	1		FIRE ALARM
Alarm 2xx A	2		PANIC ALARM
Alarm 3xx A	3		BURGLARY
Close 4xx C	4		CLOSING
Open 5xx O	5		OPENING
Alarm 6xx T	6		SERVICE
Alarm 7xx A	7		MEDICAL
Alarm 8xx A	8		MESSAGE
Restr 9xx R	9		RESTORE
CloseGrp Bxx	C		C GROUP CLOSING
OpenGrp Cxx	O		O GROUP OPENING
Bypas Dxx B	B		CANCEL
UnByp ExxH	H		ZONE BYPASS
Cancel Fxx / /	/		UN BYPASS

\* These alternative codes are available. Ensure that the central station automation software is able to accept these codes if they are to be used.

### Event Codes Summary

Code	Event
0	Automatic Test
1	Fire Alarm
2	Panic Alarm
3	Burglary Alarm
4	Closing by User Number
5	Opening by User Number
6	Service
7	Medical Emergency
8	Message
9	Restore
A	Alarm
B	Bypass
C	Closing
D or /	Cancel
H	Unbypass
O	Opening
R	Restore
T	Trouble
Z	Common Event Code
20 Hex	Common Event code "Space"

---

# CPM2 – Central Processing Module

## GENERAL INFORMATION

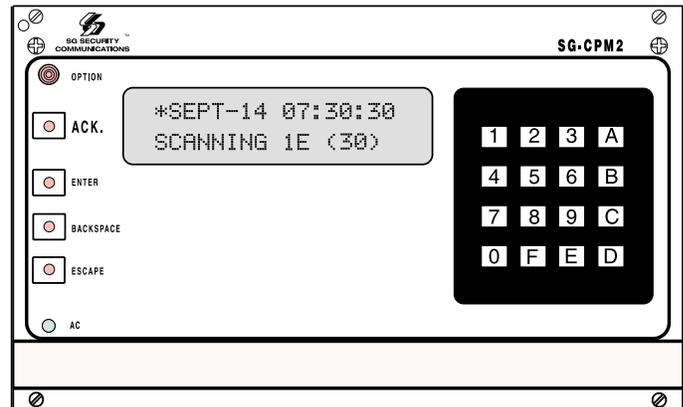
The CPM2 16-bit microcontroller and real-time assembly language program running at 16 MHz allow the system to quickly and efficiently execute several tasks at the same time. The use of a unique menu display system enhances the system's ease of use for the operator and makes the system configuration and programming simple and efficient. Several diagnostic modes are available to assist the operator in troubleshooting and maintenance.

## FEATURES

- Multi-tasking allows the receiver to perform functions that might otherwise be delayed by a slow computer acknowledgment response
- Fast internal communication results in practically no delay in transfer of information between the Line Card and the CPM2.

## CPM2 CONTROLS

- 128-event computer alarm message buffer
- 128-event printer alarm message buffer
- LCD contrast easily adjusted
- Ability to individually examine each Line Card message
- "Cold boot" option allows easy installation of default configuration
- Built-in diagnostic "debug" mode allows each Line Card to be monitored individually
- Serial Port COM1 features LED indicators for Transmit (Tx) and Receive (Rx) functions
- Available COM1 Baud rates: 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200 or 38400
- COM1 Data bits: 7, 8 or 9
- COM1 Parity: Even, odd or none
- COM 1 Stop Bits: fixed at 1
- Built-in Serial Communication Diagnostic Mode for COM1. The technician can test the communication with the central station computer and monitor what is being transmitted to and received from the computer
- Two programmable outputs, one with front panel LED indicator
- Buzzer mute option for system testing
- System menu for easy programming and diagnostics
- Software Version 2.1 (or higher) supports SCADA Line Cards for networks of receivers
- Software Version 2.1 (or higher) supports line card and CPM2 programming through computer software interface
- Software Version 2.4 (or higher) allows up to 30 line cards to be connected to a single CPM2.



### LIQUID CRYSTAL DISPLAY

2-line, 16 character per line liquid crystal display; backlit for easy reading in low level light

### "OPTION" LIGHT

Indicates the state of the "Option" programmable output. Flashing 2 seconds ON, 2 seconds OFF, with the standard program.

### [ACK] BUTTON

Used to manually acknowledge an alarm event when a computer is not connected to the receiver or when the UL Receiver Option is enabled. Press the [ACK] button to turn the "ACK" light OFF and silence the buzzer. The [ACK] button is also used in the Configuration Mode to select menu items.

### "ACK" LIGHT

Flashes when a message is received from the Line Card and COM1 is disabled or disconnected.

### [ENTER] BUTTON

Executes a command or scrolls the display to the next message.

### "TX" LIGHT

Monitors the COM1 transmission signal.

### [BACKSPACE] BUTTON

Used to erase errors or move the cursor back one character; also used to scroll the display back to the previous message.

### "RX" LIGHT

Monitors the signal received from the computer connected to COM1.

### [ESCAPE] BUTTON

Used to save changes and exit a mode; also used for other functions when indicated on the display screen.

### "TROUBLE" LIGHT

Illuminates when a trouble condition is present (not used).

### "AC" LIGHT

Indicates that AC power is present.

## CPM2 OPERATING MODE

### CPM2 COLD START-UP

The “cold boot” should be performed to install the default system software. Follow the procedure described here to perform a “cold boot” of the CPM2.

Remove the CPM2 from the card cage.

Turn the “PROG EN” (Program Enable) switch ON. The Program Enable switch is located on the left side of the CPM2 unit; use a small screwdriver to turn the switch ON by turning it clockwise.

Reinstall the CPM2 in the card cage, but do not fasten the mounting screws. The CPM2 should power up and this message will be displayed:

```
SYST COLD BOOT?  
Ent=Yes Bsp=No
```

Press the [Enter] button to perform the “cold boot.” This message will be displayed:

```
SYST COLD BOOT  
Executing!
```

After approximately 1 second, this message will be displayed:

```
Please Turn Off  
Program Switch!
```

The CPM2 will remain in an inoperative mode until the Program Enable switch is turned OFF.

- Pull the CPM2 part way out of the card cage
- Use a small screwdriver to turn the Program Enable switch OFF by turning it counterclockwise.
- Reinstall the CPM2 in the card cage and secure the faceplate screws

The CPM2 is now ready for operation. Set the clock and calendar and configure the CPM2.

### CPM2 IN STANDBY MODE

When the CPM2 is in Standby mode, a message similar to this will be displayed:

```
*FEB-23 07:30:45  
Scanning 1E (30)
```

This indicates that the system is ready to receive data from the Line Cards and input from the numeric keypad and push buttons.

### CPM2 CONFIGURATION MODE

The Configuration Mode allows programming of the various features and options available on the CPM2. To enter the Configuration Mode, press the [Escape] button; this message will be displayed:

```
Enter MASTER-ID  
* * * *
```

Enter the Master Access Code using the keypad; the default Master Access Code is “CAFE.” When the access code is entered, the screen will display the first option in the Options Menu:

```
01:Sys Date/Time  
Ent:+ Bs:- Ack:S
```

Press the [Enter] button to display the next menu item, or press the [Backspace] button to display the previous menu item; press the [ACK] button to select the menu item presently displayed on the screen.

### CONFIGURATION OPTIONS

The CPM2 features 28 configuration options:

- 01 System Date and Time
- 02 System Passwords
- 03 Number of Line Cards
- 04 Printer Select
- 05 COM1 Configuration
- 06 COM1 Format
- 07 Acknowledge Wait Delay
- 08 Heartbeat Select
- 09 COM2 Configuration
- 10 COM2 Format
- 11 Contrast Adjust
- 12 UL Receiver Option
- 13 Erase Memory
- 14 Mute Buzzer
- 15 Keep Last Message
- 16 Debug ComPort
- 17 Test 9v/12v Batt
- 18 Debug Line Card
- 19 Program Version
- 20 Monitor Battery
- 21 Year / Second
- 22 Force Reset
- 23 Change Receiver Number
- 24 Scada COM1 and COM2 Control
- 25 Printer Control
- 26 Printer Test
- 27 Printer Width
- 28 Tamper Input

#### Option 01: Setting the Clock

Option [01] allows the CPM2 date and time to be set. Press the [ACK] button when the “01: Sys Date/Time” message is displayed; this message will be displayed:

```
(D/M/Y) 23/02/93  
(H:M:S) 07:30:45
```

Enter the date and time using the numbers 0 through 9 only. Press the [Enter] button to move the cursor one character to the right; press the [Backspace] button to move the cursor one space to the left. When the date and time are entered, press the [Escape] button; when the [Escape] button is pressed, the next Configuration Option will be displayed on the screen. Note that if “0” or a number greater than “12” is programmed for the month, the screen will display the word “Nul” in place of the month while in the Standby mode. “Nul” will also be displayed for the time if the time has not been programmed properly.

### Option 02: Changing System Passwords

Option [02] allows the CPM2 passwords to be changed or erased. Press the [ACK] button when the "02: Sys Passwords" message is displayed; this message will be displayed:

```
PassID#0: xxxx
Operator: S.G.
```

Sixteen 4-digit passwords are available for use on the CPM2. Password 0 is the Master Password, and Passwords 1 through F may be assigned to individual operators. Two letters, representing the initials of the operator, may be assigned to each Password to help in identifying the operator. When this option is entered, a cursor will appear beneath the first character in the 4-digit Password. Enter a new Password using the 0 through 9 and the A through F keys. To enter the operator's initials, use the [0] and [1] keys to scroll forward or backward through the alphabet. When the desired letter is displayed, press the [Enter] button; the cursor will move to the next character. To move the cursor to the previous character, press the [Backspace] button. When the Password and initials have been entered, press the [Escape] button; the next Password will be displayed. When all Passwords have been programmed, the display will advance to the next Configuration Option.

### Option 03: Change the Number of Line Cards

Option [03] is used to set the number of Line Cards polled by the CPM2. Press the [ACK] button when the "03: Numb of Lcard" message is displayed; this message will be displayed:

```
#LnCard Attached
0E Change to:xx
```

Enter a number from 01 to 1E to indicate how many Line Cards, from 1 to 30, are to be polled by the CPM2. When the new number is entered, press the [Enter], [Backspace], or [Escape] button; the screen will then display the next Configuration Option.

### Option 04: Select Printer Function

Option [04] determines how the printer connected to the CPM2 will operate. Press the [ACK] button when the "04:PrinterSelect" message is displayed; this message will be displayed:

```
Prnter Config As:
Bkup:0 Enable:1
```

Enter a digit from 0 through 1 for both "Bkup" and "Enable" according to the chart below:

Bkup Enable Printer Operation

0 0 Bypass printer

0 1 Enable printer (default setting)

1 x Enable printer only if COM1 is in failure

where x = don't care

(same as above)

If "Bkup" is programmed as "1," messages will only be sent to the printer if an acknowledge signal is not received from COM1. When using the Star 8340 printer, the CPM2 is able to print in both red and black. If an IBM-compatible printer is selected, the CPM2 will print in black only. When programming is complete, press the [Escape] button; when the [Escape] button is pressed, the next Configuration Option will be displayed on the screen.

### Option 05: COM1 Configuration

Option [05] determines the Baud rate, data bits and parity to be used on COM1. Press the [ACK] button when the "05: Com#1 Config." message is displayed; this message will be displayed:

```
Com#1 Config As:
Br:12 Da:7 Pa:2
```

- Br: Baud Rate

#### Enter... for Baud rate

11	110
15	150
03	300
12	1200
24	2400
48	4800
96	9600
19	19200
38	38400

- Da: Data Bits

Enter a number from 7 through 9 to indicate 7, 8, or 9 data bits.

- Pa: Parity

#### Enter... for parity

0	no parity
1	odd parity
2	even parity

**NOTE: The stop bit is fixed at 1.**

When programming is complete, press the [Escape] button; when the [Escape] button is pressed, the next Configuration Option will be displayed on the screen.

### Option 06: COM1 Communication Format

Option [06] determines the communication format to be used on COM1. Press the [ACK] button when the "06: Com#1 Format" message is displayed; this message will be displayed:

```
Com#1 Format is:
1 Change to: x
```

Enter a number from 0 to 4 to select one of the following:

0 COM1 disabled

1 Sur-Gard format (default setting)

2 Sur-Gard format with common event code "A"

3 Sur-Gard format with header 01 Hex.

4 Sur-Gard Clock Signal format

When programming is complete, press the [Enter], [Backspace], or [Escape] button; when a button is pressed, the next Configuration Option will be displayed on the screen.

### Option 07: Wait Time for Acknowledge on COM1

Option [07] determines the acknowledge wait time, in seconds, to be used for COM1. Press the [ACK] button when the "07:ACK Wait Time" message is displayed; this message will be displayed:

```
<ACK> Wait Delay
4.0S Chg to:x.xS
```

Enter a decimal number from 4.0 to 9.9. Use the [Enter] and [Backspace] buttons to move the cursor forward or backward when editing the acknowledge time. When programming is complete, press the [Escape] button; when the [Escape] button is pressed, the next Configuration Option will be displayed on the screen.

**NOTE: It is strongly recommended that you not to change the default setting (4.0 sec.) unless it is recommended by a Sur-Gard technician.**

#### Option 08: Heartbeat Time for COM1

Option [08] determines at what time interval, in seconds, the supervisory "heartbeat" transmission will be sent to COM1. The "heartbeat" transmission is used to ensure that communications through COM1 are functioning normally. Press the [ACK] button when the "08: Heartbeat Sel" message is displayed; this message will be displayed:

```
Heartbeat Select
30S Chg to:XXSec
```

Enter a decimal number from 01 through 99 to determine the time interval between heartbeat transmissions. Program this option as "00" to disable the heartbeat transmission. Use the [Enter] and [Backspace] buttons to move the cursor forward or backward when editing the heartbeat time. When programming is complete, press the [Escape] button; when the [Escape] button is pressed, the next Configuration Option will be displayed on the screen.

#### Option 09: COM2 Configuration

Option [09] determines the Baud rate, data bits and parity to be used on COM2. Press the [ACK] button when the "05: Com#1 Config." message is displayed; this message will be displayed:

```
Com#2 Config As:
Bd:03 Da:8 Pa:2
```

- Bd: Baud Rate  
Enter... for Baud rate
 

11	110
15	150
03	300
12	1200
- Da: Data Bits  
Enter a number from 7 through 9 to indicate 7, 8, or 9 data bits.
- Pa: Parity  
Enter... for parity
 

0	no parity
1	odd parity
2	even parity

**NOTE: the stop bit is fixed at 1 bit.**

When programming is complete, press the [Escape] button; when the [Escape] button is pressed, the next Configuration Option will be displayed on the screen.

#### Option 10: COM2 Communication Format

Option [10] determines the application to be used on COM2. Press the [ACK] button when the "10: Com#2 Format" message is displayed; this message will be displayed:

```
Com#2 Format is:
0 Change to x
```

Enter a number from 0 to 2 to select one of the following:  
0 PC Computer Programming Software capability (default setting)

- 1 SCADA connection through Com#2 enable
- 2 SCADA connection through Com#2 with Redundancy Backup enable

#### Option 11: Adjust LCD Contrast

Option [11] allows the contrast of the message display screen to be adjusted. Press the [ACK] button when the "11: Contrast Adj" message is displayed; this message will be displayed:

```
Contrast Level
*****
```

Press the [Enter] button to increase the contrast; press the [Backspace] button to reduce the contrast.

When the display contrast is adjusted to the desired level, press the [Escape] button; when the [Escape] button is pressed, the next Configuration Option will be displayed on the screen.

#### Option 12: UL Receiver Option

To have the MLR2-E operate in compliance with UL Listed Central Station requirements, press the [ACK] button when the "12: UL Receiver" message is displayed. This message will be displayed:

```
UL Requirement:
0 Change to:x
```

When Option [12] is programmed as "1," the CPM2 will operate according to the following UL864 requirements:

- All signals are sent to the computer and/or the printer if connected.
- The CPM2 retains alarm messages received from the Line Cards and the CPM2 supervisory signal on the LCD display, and activates the buzzer to alert the operator. The display will also indicate if additional signals are waiting to be displayed and acknowledged.
- The operator must press the [ACK] button to acknowledge the signal manually. The CPM2 will scroll to the next message if there are more messages to display.
- The CPM2 returns to the Standby Mode when all signals have been manually acknowledged.

When Option [12] is programmed as "00," functions described above will be bypassed. The default setting for Option 12 is "00."

**NOTE: By activating this option, the CPM2 will overwrite some option settings if they are not set to comply with UL requirements.**

#### Option 13: Erase Alarm Message Buffer

**NOTE: Under normal operating conditions, the buffer should not be erased.**

Option [13] is used to erase the CPM2 alarm message buffer. Press the [ACK] button when the "13: Erase Memory" message

is displayed; this message will be displayed:

```
Erase all MEMORY
ent=Y bs=N esc=X
```

Press the [Backspace] or [Escape] buttons to cancel this option without erasing the CPM2 buffer. To erase the buffer, press the [Enter] button. When the [Enter] button is pressed, this message will be displayed:

```
Are You Sure?
ent=Y bs=N esc=X
```

Again, press the [Backspace] or [Escape] buttons to cancel this option without erasing the CPM2 buffer. To erase the buffer, press the [Enter] button. When the [Enter] button is pressed, all printer and computer messages will be erased. Ensure that a printed record of the alarm messages is made before erasing the buffer.

#### Option 14: Mute Buzzer

A buzzer will sound when the CPM2 receives an alarm and is unable to forward the alarm message to COM1. The buzzer can be silenced by programming Option [14] as "1." Press the [ACK] button when the "14: Mute Buzzer" message is displayed; this message will be displayed:

```
Mute Buzzer: 1/0
0 Change to:X
```

When programmed as "1," the buzzer will not sound when an alarm is received and cannot be forwarded to COM1. When programmed as "0," the buzzer will sound when an alarm is received and cannot be forwarded to COM1. The default setting is "0."

**NOTE: Option 14 will have no effect on the buzzer if the UL Receiver Option is enabled.**

#### Option 15: Display Last Message

When an alarm is received, the alarm message is displayed on the screen until the message is forwarded to the computer and printer. When the message is sent to the computer and printer, the Standby Mode message will be displayed. The most recent alarm message may be retained on the screen until the next alarm message is received. To retain the most recent alarm message, program Option [15] as "1". Press the [ACK] button when the "15: Keep Lst Msg" message is displayed; this message will be displayed:

```
Keep Lst Msg:1/0
0 Change to:X
```

To have the Standby Mode message displayed after an alarm is received and sent to the computer or printer, program Option [15] as "0". The default setting is "0". When "0" or "1" has been entered, press the [Enter] key.

#### Option 16: ComPort Diagnostics

The CPM2 features a diagnostics mode that allows the operator to view all data being communicated through COM1 (or COM2) on the display screen. To use this feature, press the [ACK] button when the "16: Debug ComPort" message is displayed; this message will be displayed:

```
Debug ComPort1,2
0 Change to:x
```

Enter "1" and press the [Enter] button to enable the diagnostics feature on Com1 (or "2" for Com2). All data being sent through COM1 will now be displayed on the screen. A typical transmission is shown here:

```
1RRRL AAAA5X
YY N 06
```

N represents the number of times the CPM2 tries to re-send the message to COM1; this value should be "1" during normal communication.

[06] represents the acknowledge received from COM1 To disable the diagnostics feature, program Option 16 as "0". The diagnostics mode should only be enabled to test and review the information being sent to COM1; the diagnostics feature should be disabled during normal receiver operation.

#### Option 17: Test 9V/12V Battery

Some earlier CPM2 units provide 9V battery for memory storage while present CPM2 units use different technology for this purpose. If the unit uses 9V battery, the battery voltage should be supervised by enabling this option. Press [ACK] button when the "17:Test 9V/12v ." message is displayed; then the following message will be displayed:

```
9V/12V Batt: 0-3
3 Change to:x
```

- 0 Do not supervise the 12V and 9V batteries
- 1 Supervise 9V only
- 2 Supervise 12V only
- 3 Supervise both batteries

#### Option 18: Line Card Diagnostics

The CPM2 features a diagnostics mode that allows the operator to view all data being communicated between the CPM2 and the Line Cards. To enable this feature, press the [ACK] button when the "18: Debug LnCard#" message is displayed.

Enter a hexadecimal number from "1" through "E" to monitor Line Card 01 through 14, or enter "FF" to monitor all Line Cards connected to the CPM2. Standby communications between the Line Card and the CPM2 will be displayed with messages similar to this:

```
01 FE
```

- 01 represents the Line Card number
- FE represents the response from line number 1 to the normal CPM2 Alarm messages transmitted by the Line Cards will be displayed with messages similar to this:

```
L01-1234-C01
OpenGrp
```

**NOTE: When diagnostic modes are enabled, messages will be displayed according to the following priority:**

- UL message - Acknowledge required
- COM1 Diagnostic messages
- Line Card Diagnostic messages
- "Retain last message" displays
- Internal Troubles messages
- Standby Mode message

Refer to "Message Priorities" for more information.

### Option 19: Display Software Version

To display the software version presently installed in the CPM2, press the [ACK] button when the "19:Program Vers#" message is displayed; a message similar to this will be displayed:

```
SG-CPM2 RECEIVER
*June-29-99 U2.4
```

### Option 20: Battery Monitor

To view the present voltage of the 12V general backup batteries, press the [ACK] button when the "20: Monitor Batt." message is displayed. A message similar to this will be displayed:

```
Battery Monitor:
12V:13.9 Volt
```

If the 12V battery is disconnected, approximately 11.2V will be indicated for that battery.

**NOTE: If option 17 is at 03, a message similar to this will be displayed:**

```
Battery Monitor:
9V:08.8 12V:13.9
```

### Option 21: Alarm Messages Print Year or Seconds

Alarm messages may be programmed to include either the year in their dates, or the seconds in their times. To program Option [21], press the [ACK] button when the "21: Year/Second" message is displayed; this message will be displayed:

```
Year/Second:1/0
0 Change to:X
```

Program Option [21] as "1" to include the year in the alarm message date; alarm messages will be printed as follows:

L01-1234-05 Alarm 21:24-24/11/94

Note that the time (21:24) is represented with just hours and minutes, and that the year is added to the date (24/11/94). Program Option [21] as "0" to include the seconds in the alarm message time; alarm messages will be printed as follows:

L01-1234-05 Alarm 21:24:30-24/11

Note that the time (21:24:30) now includes hours, minutes and seconds; the date (24/11) only indicates the day and the month.

**NOTE: This option will affect COM1 when COM1 is programmed with communication format 4.**

### Option 22: System Reset

To reset the CPM2 program, press the [ACK] button when the "22: Force Reset" message is displayed; this message will be displayed:

```
Force Sys Reset
Ent=Yes Bsp=No
```

Press the [Backspace] button to cancel the option without resetting the CPM2. To reset the CPM2, press the [Enter] button. The reset will take approximately 8 seconds to complete. Press the [Backspace] or [Escape] buttons to move to the next Configuration Option.

### Option 23: Change Receiver Number

The receiver number is used to identify the receiver when communicating to COM1 and printer to report internal troubles. To change the receiver number, press the [ACK] button when the "23: Chg Receiver#" message is displayed. This message will be displayed:

```
Receiver Number:
01 Chg to:xx
```

Enter a new receiver number using the hexadecimal numbers "01" to "FF". When a new number is entered, press the [Enter] button.

### Option 24: COM1/2 Control

SCADA

The MLR2-SCADA (SCADA stands for Supervisory Control and Data Acquisition) consists of a SCADA receiver and a CPM2 module. Its function is to transport alarm data from a local (satellite) central station to the master central station reliably. This is done using linked modems (like the SG-M1) over leased phone lines. This system is specifically intended for use with a point to point 300 Baud Schedule 3A data line (Canada), but can be used with any data line. The CPM2 software version 2.3 and up supports data transactions for up to 14 digital and/or DVACS\*\*-compatible lines. But, we strongly suggest a maximum of 8 lines on the remote location when used within a SCADA configuration. For alarm output choices, (option [24]) a number corresponding to each of the line cards, 1 to 14, is indicated on the LCD at 14 positions from left to right as follows:

```
24:COM1/2Control
Ent:+Bs:-Ack:S
```

```
123456789ABCDE:
44444444444444
```

Press Enter or Backspace to move the cursor over the digit corresponding to the line card you wish to change. Enter the new digit. The CPM2 will display the change on the LCD, and the cursor will move to the next digit. Change another digit, as above, if desired, or exit and save the changes by pressing [Escape]. The numbers which can be programmed are:

- 0 no route at all - no printer output, no computer output (not recommended).
- 1 send computer alarm messages only to the COM#1 (local computer) only.
- 2 send computer alarm messages only to Master central through COM2 for transmission to the SCADA DVL2A of the master receiver only.
- 3 send computer alarm messages to COM1 (local computer) and next to COM2 for DVL2A SCADA.
- 4 send computer alarm messages to COM1 and COM2, and send printer alarm messages to COM2.

\*\*DVACS is a registered trademark of Electro Arts Limited.

### Option 25: Printer Control

The remote receiver SCADA CPM2 sends data to the local printer in the normal way, which can be enabled/disabled for each line at option [25] as follows:

```
25: Prter Control:
Ent: + Bs:- Ack:S
```

```
123456789ABCDE :
11111111111111
```

Programming "1" will enable the local printer report for this specific line.

"0" will disable the local printer for this specific line.

*NOTE: When the receiver routes the data to the serial port COM2, it needs to insert the checksum calculation and support the protocol described in more detail in the MLR2-SCADA manual. You can only change the values for line cards 01 to 0E. You cannot change the values for line cards 0F to 1E. They will remain at their default value, which is (1).*

### Option 26: Printer Test

When this option is enabled, a test signal will be sent to the printer at 05:00 and 17:00 hrs. This option is set to "0" (OFF) by default. Press [ACK] when "26: Printer Test" is displayed. The following message will then be displayed:

```
Printer Test:1/0
0 Change to:
```

Enter "1" and press the [Enter] button to enable the test feature. The CPM2 will send a test signal to the printer at the scheduled time.

Printer message: L10 Printer Test 17:00:00 - 12/05

### Option 27: Printer Width

**NOTE: The 80-column mode is not supported with SCADA installation. This new option has been included to support the new CIS format. The new format will be available with future line card revisions. This option will set the printer width to either 40 or 80-columns. Press [ACK] when the message "27: Printer Width" is displayed. The following message will then be displayed:**

```
40/80 Column:0/1
0 Change to:
```

Press "1" and then [Enter] to enable the 80-column width feature.

### Option 28: Tamper Input

To view the Tamper Input / UPS Low Battery supervisory, press the [ACK] button until "28: Tamper Input" is displayed. Press [ACK], the following message will then be displayed:

```
UPS/<ACK> : 0/1
0 Change to: 0
```

When this option is set to "0," the TAMP terminal when shorted to ground will send a UPS Low Battery supervisory to the computer and activate the buzzer and ACK LED. The buzzer will shut off when the [ACK] button is pressed, or the UPS Low Battery is restored. When the option is set to "1," the TAMP terminal can be used as a remote [ACK] button when shorted to ground. The default setting is "0." Connect a push button switch between the TAMP terminal and the GND terminal. When shorting the TAMP terminal with the ground, the receiver will react as if the front [ACK] button has been pressed. This could be used to install a remote acknowledge button when using the receiver in manual mode.

## MESSAGE PRIORITIES

When in Standby Mode, the CPM2 will display warning and other operational messages according to the following priority:

- 1 UL Requirement Message
- 2 COM1/COM2 Diagnostics
- 3 Line Card Diagnostics
- 4 "Retain last message" displays
- 5 Printer Error
- 6 COM1 Absent
- 7 12V Battery Low
- 8 9V Battery Low
- 9 AC Failure
- 10 Standby Mode message

### UL REQUIREMENT MESSAGE

When Option [12] is programmed as "01," the [ACK] button must be pressed to acknowledge each incoming alarm manually and to silence the internal buzzer.

### COM1 DIAGNOSTICS

If both Option [16] and Option [06] are enabled, the screen will display the data being communicated through COM1. Refer to Option [16] for information.

### LINE CARD DIAGNOSTICS

If Option [18] is enabled, the screen will display the data exchanged between the CPM2 and the selected (or all) Line Card(s). Refer to Option [18] for more information.

### "RETAIN LAST MESSAGE" DISPLAYS

If Option [15] is enabled, the latest printer message will be retained on the display screen. Refer to Option [15] for more information.

### PRINTER ERROR

If Option [04] is enabled and there is a printer trouble (for example, printer off-line, paper out, and so on), a message similar to this will be displayed:

```
*Feb-23 07:30:45
<Printer ERROR!>
```

### COM1 ABSENT

If Option 06 is enabled and COM1 is absent (for example, disconnects, off-line, or fails to send acknowledge signal), a message similar to this will be displayed:

```
*Feb-23 07:30:45
<<Com#1 ABSENT>>
```

### 12V BATTERY LOW

If the 12V backup battery is disconnected or its voltage is low, a message similar to this will be displayed:

```
*Feb-23 07:30:45
12V Battery LOW!
```

## AC FAILURE

If AC power is removed from the CPM2, this message will be displayed:

```
*Feb-23 07:30:45
<AC Power LOST!>
```

## Standby Mode Message

During normal standby operation, this message will be displayed:

```
*Feb-23 07:30:45
Scanning 1E (30)
```

## CPM2 UTILITY MODES

CPM2 v2.4 provides for a 2 digit line card number. Since v2.4 is being shipped with all DRL2E modules, the sample screens need to be changed.

- [A] Send Computer Messages to Printer
- [B] Operator Log-On
- [C] System Command Mode
- [D] Send Printer Messages to the Printer
- [E] Examine Printer Messages on Display Screen
- [F] Examine Computer Messages on Display Screen

### [A] SEND COMPUTER MESSAGES TO PRINTER

This mode is used to send the computer messages from the buffer to the printer. When the [A] key is pressed, this message will be displayed:

```
Dump COM Msg->PRT
LCard#:FF Ent:EXE
```

Enter a hexadecimal number to print the following:

- | Enter... | to print   |
|----------|--|
| 00       | CPM2 internal supervisory signals (if any)                                 |
| FF       | Computer messages for all Line Cards and CPM2 internal supervisory signals |
| 01-E     | Computer messages for specified Line Card                                  |

Example: If "0" is entered, the following will be printed:

```
Dump Computer Alarm Buffer
1011 ..... 0000 . R .. 06 12:37:31 - 12/10 106
1011 ..... 0000 . A .. 01 12:38:22 - 12/10 106
```

*NOTE: "106" indicates the message was sent to the computer once and the computer has responded correctly with an [06] acknowledge.*

### [B] OPERATOR LOG-ON

Different operators may "log-on" to the system by entering this mode. When an operator logs on, a message similar to this one will be printed: "Operator on duty S.G. 11:03-21/12/92"; the operator's initials (if programmed) and the time and date will be printed. If the Star 8340 printer is being used, this message will be printed in red.

To log on, press the [B] key, and then enter a 4-digit Password. If a valid password is entered, a log-on message will be printed. If an invalid password is entered, the CPM2 will sound a tone to indicate that the code was entered incorrectly. Refer to CPM2 Option [02] for information on programming operator Passwords and initials.

## [C] SYSTEM COMMAND MODE

The System Command Mode is used to send commands to the Line Cards through the CPM2. To enter this mode, press [C] and then enter an Operator Password. When the Password is entered, this message will be displayed:

```
LCard: __ Comd: __
Op: __ Cd: __ Sc: __
```

- LCard: Enter a 2-digit hexadecimal number from 01 to 0E to indicate which Line Card is to be affected.
- Comd: Enter one of the Line Card Commands described in the DRL2E Line Card Menu Mode section of this manual
- Op: and Cd: "Op" and "Cd" are used to indicate parameters that may be required within certain commands. For example, when using the F7 Line Card programming command "Op" and "Cd" are used to indicate the Option number and the new code programmed for that option.
- Sc: "Sc" is used with SCADA applications. Enter digits using the keypad; when a digit is entered, the cursor will move one character to the right. Press the [Backspace] button to delete the character presently indicated by the cursor and move the cursor 1 character to the left. When a command has been entered, press the [Escape] button to send the command to the Line Card. If more than one command is to be sent, press the [ACK] button to send the command presently displayed on the screen. Another command may now be entered.

### [D] SEND PRINTER MESSAGE TO THE PRINTER

With the CPM2 in the Standby Mode, press the [D] key to send printer messages in the buffer to the printer. When the [D] key is pressed, this message will be displayed:

```
Dump PRT Msg->PRT
LCard#:FF ent:EXE
```

Enter a hexadecimal number to print the following:

- | Enter... | to print                                |
|----------|---|
| 00       | CPM2 internal trouble messages (if any) |
| 01to1E   | Messages for specified Line Card        |
| FF       | Messages for all Line Cards             |

If an error is made in entering the number, simply re-enter the desired number again on the keypad.

Press the [Backspace] or [Escape] button to cancel this function and return to the Standby Mode, or, press the [Enter] button to print the indicated messages. When the [Enter] button is pressed, the CPM2 will print the printer messages, starting with the oldest message. The messages will be printed in red if the Star DP8340 printer is being used. If the CPM2 receives new alarms from the Line Card while the buffer is being printed, the new alarms will be sent to the printer when the buffer printout is completed.

### [E] EXAMINE PRINTER MESSAGES ON DISPLAY SCREEN

With the CPM2 in the Standby Mode, press the [E] key to review printer messages on the display screen. When the [E] key is pressed, this message will be displayed:

```
Exam PRINTER msg
LCard#:FF ent:EXE
```

Enter a hexadecimal number to view the following:

<b>Enter...</b>	<b>to view</b>
00	CPM2 internal trouble messages (if any)
01to1E	Messages for specified Line Card
FF	Messages for all Line Cards

If an error is made in entering the number, simply re-enter the desired number on the keypad.

Press the [Backspace] or [Escape] button to cancel this function and return to the Standby Mode, or, press the [Enter] button to view the indicated messages. When the [Enter] button is pressed, the CPM2 will display the printer messages, starting with the most recent message. When [Enter] is pressed, a message similar to this will be displayed:

```
L01-1234-05
Alarm xx
```

"xx" indicates the number (in hexadecimal) of printer messages in the Line Card buffer.

Press the [Enter] button to scroll through the messages; the messages will be displayed in order from the most recent to the oldest. Press the [Backspace] button to scroll from the oldest message to the most recent.

When finished viewing the messages, press the [Escape] button.

## [F] EXAMINE COMPUTER MESSAGES ON DISPLAY SCREEN

With the CPM2 in the Standby Mode, press the [F] key to review computer messages on the display screen. When the [F] key is pressed, this message will be displayed:

```
Examine COM1 msg
LCard#:FF ent:EXE
```

Enter a hexadecimal number to view the following:

<b>Enter...</b>	<b>to view</b>
00	CPM2 internal trouble messages (if any)
01to1E	Computer messages for specified Line Card
FF	Computer messages for all Line Cards

If an error is made in entering the number, simply re-enter the desired number again on the keypad.

Press the [Backspace] or [Escape] button to cancel this function and return to the Standby Mode, or, press the [Enter] button to view the indicated messages. When the [Enter] button is pressed, the CPM2 will display the computer messages, starting with the most recent message. When [Enter] is pressed, a message similar to this will be displayed:

```
1011.....0000.A
..03 1.06 xx
```

"xx" indicates the number (in hexadecimal) of computer messages in the Line Card buffer.

Press the [Enter] button to scroll through the messages; the messages will be displayed in order from the most recent to the oldest. Press the [Backspace] button to scroll from the oldest message to the most recent. When finished viewing the messages, press the [Escape] button.

## MLR2-DG Computer Interface

The CPM2 is able to send alarm messages to a computer connected to the COM1 serial port. This section describes the communication procedures, and the communication formats available for use.

## OVERVIEW OF COMMUNICATION

When the CPM2 receives data from a Line Card, it forwards the data to COM1 and awaits an acknowledgment signal from the computer. If a NAK signal is received from the computer, the CPM2 will make 4 attempts to send the data. If all four attempts fail, CPM2 buzzer will sound and the CPM2 will retain the alarms in its internal buffer until communications are restored. This routing provides reliable and supervised communication between the CPM2 and the Line Cards. The CPM2 also monitors the connection to the computer by sending a supervisory "heartbeat" signal through COM1 every 30 seconds. If the "heartbeat" transmission determines that the computer is off-line or disconnected, a message similar to this will be sent to the printer:

```
Com#1 Absent!! 09:45-21/09/92
```

Note that the message indicates the time and date that communications through COM1 were determined to be interrupted. When COM1 communications are re-established, a message similar to this one will be printed:

```
Com#1 Restored 09:50-21/09/92
```

Note that the message indicates the time and date that communications through COM1 were determined to be re-established. The "heartbeat" feature may be disabled if this feature is not compatible with the central station automation software being used on the computer.

## CPM2 COM1 STATUS REPORT MESSAGES

The CPM2 will send the following messages to COM1 to report internal status conditions. CPM2 will use an Account Code of "0000" to indicate that it is reporting an internal condition. The line number is fixed to be "0."

Sent to COM1	Event
0000 A 00	Reserved to indicate Operator activity for C or ESC mode (Not Implemented in this program version).
0000 A 01:	Printer Error
0000 R 02:	Printer Restored
0000 A 03:	12V Battery Low
0000 R 04:	12V Battery Restored
0000 A 05:	COM1 Absent
0000 R 06:	COM1 Restored
0000 A 07:	UPS AC Fail
0000 R 08:	UPS AC Restored
0000 A 11:	9V Batt. Low
0000 R 12:	9V Batt. Restr
0000 A 13:	COM2 Absent
0000 R 14:	COM2 Restored
0000 A 15:	AC Failure
0000 R 16:	AC Restored
0000 A 17:	UPS Low Battery
0000 R 18:	UPS Low Batt Restr
0000 T 19:	CPM2 Master Fail
0000 A C1 to CU:	Internal communication error
<b>NOTE: Trouble can be caused by bad backplane connections or RAM failure. Cold boot may be necessary.</b>	
0000 A D0:	CPM2 Reset

When a CPM event is sent to the computer that has the line card number in it, the CPM changes the value of the line card number to a letter. Line cards 01 to 1E will be displayed

as 1 to 9 for line cards 01 to 09 and A to U for line cards 0A to 1E.

0000 A F1 to FU: Line Card 01 to 1E Absent

0000 R E1 to EU: Line Card 01 to 1E Restored

The following messages will be sent to COM1 to report status changes on the Line Cards. Again, the Account Code of "0000" indicates that an internal event is being reported. The line number varies depending on which line card is reporting.

Sent to COM1	Event
#0000INYNRRL	Faulty Data Received on Line Card
#0000INLRRRL	Telephone Line Fault on Line Card
#0000INLRRRL	Telephone Line Restored on Line Card
#0000INYCRRL	Faulty Call; no data received on Line Card

Depends on Option [7E] Audio on line X

When a CPM event is sent to the printer that has the line card number in it, the CPM changes the value of the line card number to a letter. Line cards 01 to 1E will be printed as 1 to 9 for line cards 01 to 09 and A to U for line cards 0A to 1E.

The message will be printed as follows:

L1T-Linecard restored 17:49:56-11/08

L1U-Linecard Inc. Resp. 17:51:36-11/08

L1S-Comm Error 17:35:37-11/08

## CPM2 EPROM PROGRAMMING

6500	05H	Printer strobe pulse width default = 5 microseconds
6501-6502	3E80	Delay time x 0.25 ms to re-send message to COM1 if heartbeat is not selected
6505-6506	0100H	Test Line Card 01 at 01:00
6505-6508	0115H	Test Line Card 02 at 01:15
6507-650A	0130H	Test Line Card 03 at 01:30
6509-650C	0145H	Test Line Card 04 at 01:45
650B-650E	0200H	Test Line Card 05 at 02:00
650D-6510	0215H	Test Line Card 06 at 02:15
6511-6512	0230H	Test Line Card 07 at 02:30
6513-6514	0245H	Test Line Card 08 at 02:45
6515-6516	0300H	Test Line Card 09 at 03:00
6517-6518	0315H	Test Line Card 0A at 03:15
6519-651A	0330H	Test Line Card 0B at 03:30
651B-651C	0345H	Test Line Card 0C at 03:45
651D-651E	0400H	Test Line Card 0D at 04:00
6501F6520	0415H	Test Line Card 0E at 04:15

The 24 Hour Timetest will occur only for the first 14 line cards. Changes are rarely required, but these features may be changed to suit particular needs. To make changes to the EPROM programming, first insert a standard CPM2 EPROM into an EPROM programming unit. Follow the instructions provided with the EPROM programmer to select addresses and modify data. Ensure that the correct addresses are being programmed, and verify the existing data in the address before making changes.

## AUTOMATION PROTOCOLS

The Sur-Gard SG-MLR2-E receiver sends the various protocols to report signals to the central station computer via an RS-232 port. The complete description of protocols is available upon request.

### DATA BYTE PROTOCOL

The Sur-Gard MLR2-E receiver uses a default configuration of 19200 Baud rate, one start bit, seven data bits, one even parity bit, and one stop bit structure, to transmit and receive signals on the RS-232 port. This protocol can be programmed on the receiver to enable different configurations.

### ACKNOWLEDGEMENT OF THE SIGNAL

The Sur-Gard receiver requires an acknowledgment signal [ACK] (Hex 06) from the computer software within 4 seconds for each message sent. Failure to receive the [ACK] will result in the retransmission of the same signal three times before giving up. The same thing happens if the receiver receives a [NAK] (hex 15). In case of communication failure with the computer, the Sur-Gard receiver can store up to 127 times the number of lines installed in its internal memory. The communication is resumed when the first ACK is received on the heartbeat.

## APPENDIX A: DRL2E COMMUNICATION FORMATS

*UL has verified compatibility with the following formats:*

NAME	HANDSHAKE	DATA	BAUD	FORMAT	EXTENDED	KISS OFF
Ademco Slow	1400Hz	1900Hz	10bps	3/1,4/1(or 3/2),4/2	NO	1400Hz
Ademco Slow	1400Hz	1900Hz	10bps	4/2,4/1,3/1	YES	1400Hz
Silent Knight Fast	1400Hz	1900Hz	14bps	3/1,4/1(or 3/2), 4/2	NO	1400Hz
Silent Knight Fast	1400Hz	1900Hz	14bps	4/2,4/1,3/1	YES	1400Hz
Franklin	2300Hz	1800Hz	20bps	3/1,4/1(or 3/2), 4/2	NO	2300Hz
Franklin	2300Hz	1800Hz	20bps	4/2,4/1,3/1	YES	2300Hz
Radionics	2300Hz	1800Hz	40bps	3/1,4/2	NO	2300Hz
Radionics	2300Hz	1800Hz	40bps	4/2,3/1	YES	2300Hz
Radionics	2300Hz	1800Hz	40bps	3/1+parity	NO 4/2+parity	2300Hz
Radionics	2300Hz	1800Hz	40bps	3/1+parity 4/2+parity	YES	2300Hz
Sescoa S. Speed	2300Hz	1800Hz	40bps	4/3+Checksum	NO	2300Hz
Sescoa S. Speed	2300Hz	1800Hz	40bps	4/3+Checksum	ID O/C	2300Hz
SIA FSK Level 1, 2, and 3.	FSK mark Space	FSK mark 300bps	110bps			tonal data ACK
Contact ID	Dual Tone	DTMF	DTMF	4/2/1/3/2/3	NO	1400Hz
Sur-Gard	2300Hz	DTMF	DTMF	4/1,4/2,4/3	NO	2300Hz
Sur-Gard	Dual Tone	DTMF	DTMF	4/1,4/2,4/3	NO	1400Hz
Sur-Gard	2300Hz	DTMF	DTMF	4/3+Checksum	NO	2300Hz
Sur-Gard	Dual Tone	DTMF	DTMF	4/3+Checksum	NO	1400Hz
S.F. Ademco	Dual Tone	DTMF	DTMF	4/8/1	NO	1400Hz
S.F. Ademco	Dual Tone	DTMF	DTMF	4/8/1 + Checksum	NO	1400Hz
Ademco Express	Dual Tone	DTMF	DTMF	4/1(option), 4/2	NO	1400Hz
FBI Super Fast	2300Hz	DTMF	DTMF	4/3/1	NO	2300Hz
Modem II	FSK	FSK	110 Baud	FSK	NO	FSK
RadionicsBFSK	1400Hz	FSK	42 Baud	3/2	NO	1400Hz
RadionicsBFSK	2300Hz	FSK	42 Baud	3/2	NO	2300Hz
Silent Knight FSK1	2300Hz	FSK	110 Baud	4/2, 5/2, 6/2	NO	2300Hz
Silent Knight FSK2	2300Hz	FSK	110 Baud	SIA equiv.	NO	2300Hz
ITI	FSK	FSK	110/300 Baud		NO	FSK
Modem IIE	FSK	FSK	300 Baud		NO	FSK
Modem IIIa <sup>2</sup>	FSK	FSK	300 Baud		NO	FSK
DMP	Data hsk	FSK	300 Baud		NO	Data K-O

---

## APPENDIX B: ASCII CHARACTER CHART

ASCII with library on printer (Option 30)	Hex	Corresponding ASCII Character
	20	Space
B0	30	0
B1	31	1
B2	32	2
B3	33	3
B4	34	4
B5	35	5
B6	36	6
B7	37	7
B8	38	8
B9	39	9
C1	41	A
C2	42	B
C3	43	C
C4	44	D
C5	45	E
C6	46	F
C7	47	G
C8	48	H
C9	49	I
CA	4A	J
CB	4B	K
CC	4C	L
CD	4D	M
CE	4E	N
CF	4F	O
D0	50	P
D1	51	Q
D2	52	R
D3	53	S
D4	54	T
D5	55	U
D6	56	V
D7	57	W
D8	58	X
D9	59	Y
DA	5A	Z
DC	5C	\

## APPENDIX C DECIMAL - HEX - BINARY CONVERSION CHART

DEC	HEX	BINARY									
000	00	0000 0000	064	40	0100 0000	128	80	1000 0000	192	C0	1100 0000
001	01	0000 0001	065	41	0100 0001	129	81	1000 0001	193	C1	1100 0001
002	02	0000 0010	066	42	0100 0010	130	82	1000 0010	194	C2	1100 0010
003	03	0000 0011	067	43	0100 0011	131	83	1000 0011	195	C3	1100 0011
004	04	0000 0100	068	44	0100 0100	132	84	1000 0100	196	C4	1100 0100
005	05	0000 0101	069	45	0100 0101	133	85	1000 0101	197	C5	1100 0101
006	06	0000 0110	070	46	0100 0110	134	86	1000 0110	198	C6	1100 0110
007	07	0000 0111	071	47	0100 0111	135	87	1000 0111	199	C7	1100 0111
008	08	0000 1000	072	48	0100 1000	136	88	1000 1000	200	C8	1100 1000
009	09	0000 1001	073	49	0100 1001	137	89	1000 1001	201	C9	1100 1001
010	0A	0000 1010	074	4A	0100 1010	138	8A	1000 1010	202	CA	1100 1010
011	0B	0000 1011	075	4B	0100 1011	139	8B	1000 1011	203	CB	1100 1011
012	0C	0000 1100	076	4C	0100 1100	140	8C	1000 1100	204	CC	1100 1100
013	0D	0000 1101	077	4D	0100 1101	141	8D	1000 1101	205	CD	1100 1101
014	0E	0000 1110	078	4E	0100 1110	142	8E	1000 1110	206	CE	1100 1110
015	0F	0000 1111	079	4F	0100 1111	143	8F	1000 1111	207	CF	1100 1111
016	10	0001 0000	080	50	0101 0000	144	90	1001 0000	208	D0	1101 0000
017	11	0001 0001	081	51	0101 0001	145	91	1001 0001	209	D1	1101 0001
018	12	0001 0010	082	52	0101 0010	146	92	1001 0010	210	D2	1101 0010
019	13	0001 0011	083	53	0101 0011	147	93	1001 0011	211	D3	1101 0011
020	14	0001 0100	084	54	0101 0100	148	94	1001 0100	212	D4	1101 0100
021	15	0001 0101	085	55	0101 0101	149	95	1001 0101	213	D5	1101 0101
022	16	0001 0110	086	56	0101 0110	150	96	1001 0110	214	D6	1101 0110
023	17	0001 0111	087	57	0101 0111	151	97	1001 0111	215	D7	1101 0111
024	18	0001 1000	088	58	0101 1000	152	98	1001 1000	216	D8	1101 1000
025	19	0001 1001	089	59	0101 1001	153	99	1001 1001	217	D9	1101 1001
026	1A	0001 1010	090	5A	0101 1010	154	9A	1001 1010	218	DA	1101 1010
027	1B	0001 1011	091	5B	0101 1011	155	9B	1001 1011	219	DB	1101 1011
028	1C	0001 1100	092	5C	0101 1100	156	9C	1001 1100	220	DC	1101 1100
029	1D	0001 1101	093	5D	0101 1101	157	9D	1001 1101	221	DD	1101 1101
030	1E	0001 1110	094	5E	0101 1110	158	9E	1001 1110	222	DE	1101 1110
031	1F	0001 1111	095	5F	0101 1111	159	9F	1001 1111	223	DF	1101 1111
032	20	0010 0000	096	60	0110 0000	160	A0	1010 0000	224	E0	1110 0000
033	21	0010 0001	097	61	0110 0001	161	A1	1010 0001	225	E1	1110 0001
034	22	0010 0010	098	62	0110 0010	162	A2	1010 0010	226	E2	1110 0010
035	23	0010 0011	099	63	0110 0011	163	A3	1010 0011	227	E3	1110 0011
036	24	0010 0100	100	64	0110 0100	164	A4	1010 0100	228	E4	1110 0100
037	25	0010 0101	101	65	0110 0101	165	A5	1010 0101	229	E5	1110 0101
038	26	0010 0110	102	66	0110 0110	166	A6	1010 0110	230	E6	1110 0110
039	27	0010 0111	103	67	0110 0111	167	A7	1010 0111	231	E7	1110 0111
040	28	0010 1000	104	68	0110 1000	168	A8	1010 1000	232	E8	1110 1000
041	29	0010 1001	105	69	0110 1001	169	A9	1010 1001	233	E9	1110 1001
042	2A	0010 1010	106	6A	0110 1010	170	AA	1010 1010	234	EA	1110 1010
043	2B	0010 1011	107	6B	0110 1011	171	AB	1010 1011	235	EB	1110 1011
044	2C	0010 1100	108	6C	0110 1100	172	AC	1010 1100	236	EC	1110 1100
045	2D	0010 1101	109	6D	0110 1101	173	AD	1010 1101	237	ED	1110 1101
046	2E	0010 1110	110	6E	0110 1110	174	AE	1010 1110	238	EE	1110 1110
047	2F	0010 1111	111	6F	0110 1111	175	AF	1010 1111	239	EF	1110 1111
048	30	0011 0000	112	70	0111 0000	176	B0	1011 0000	240	F0	1111 0000
049	31	0011 0001	113	71	0111 0001	177	B1	1011 0001	241	F1	1111 0001
050	32	0011 0010	114	72	0111 0010	178	B2	1011 0010	242	F2	1111 0010
051	33	0011 0011	115	73	0111 0011	179	B3	1011 0011	243	F3	1111 0011
052	34	0011 0100	116	74	0111 0100	180	B4	1011 0100	244	F4	1111 0100
053	35	0011 0101	117	75	0111 0101	181	B5	1011 0101	245	F5	1111 0101
054	36	0011 0110	118	76	0111 0110	182	B6	1011 0110	246	F6	1111 0110
055	37	0011 0111	119	77	0111 0111	183	B7	1011 0111	247	F7	1111 0111
056	38	0011 1000	120	78	0111 1000	184	B8	1011 1000	248	F8	1111 1000
057	39	0011 1001	121	79	0111 1001	185	B9	1011 1001	249	F9	1111 1001
058	3A	0011 1010	122	7A	0111 1010	186	BA	1011 1010	250	FA	1111 1010
059	3B	0011 1011	123	7B	0111 1011	187	BB	1011 1011	251	FB	1111 1011
060	3C	0011 1100	124	7C	0111 1100	188	BC	1011 1100	252	FC	1111 1100
061	3D	0011 1101	125	7D	0111 1101	189	BD	1011 1101	253	FD	1111 1101
062	3E	0011 1110	126	7E	0111 1110	190	BE	1011 1110	254	FE	1111 1110
063	3F	0011 1111	127	7F	0111 1111	191	BF	1011 1111	255	FF	1111 1111

## APPENDIX D: PRINTER WORDS - OPTIONS [60] - [6F]

00 MEDICAL	47 LOW WATER PRESSURE	A7 REMOTE ARMED/DISARMED	EE RESERVED
01 PENDANT TRANSMITTER	48 LOW CO2	A8 QUICK ARMED	EF UNBYPASS
02 FAIL TO REPORT IN	49 GATE VALVE SENSOR	A9 KEYSWITCH O/C	F0 RESERVED
03 RESERVED	4A LOW WATER LEVEL	AA RESERVED	F1 MANUAL TRIG TEST
04 RESERVED	4B PUMP ACTIVATED	AB CALL BACK MADE	F2 PER TEST REPORT
05 RESERVED	4C PUMP FAILURE	AC ACCESS SUCCESS	F3 PER RF TRANSMIT
06 RESERVED	4D RESERVED	AD UNSUCCESS ACCESS	F4 FIRE TEST
07 RESERVED	4E RESERVED	AE SYSTEM SHUTDOWN	F5 STATUS TO FOLLOW
08 RESERVED	4F RESERVED	AF DIALER SHUTDOWN	F6 LISTEN TO FOLLOW
09 RESERVED	50 SYSTEM TROUBLE	B0 SUCCESSFUL UPLOAD	F7 WALK TEST MODE
0A FIRE ALARM	51 AC LOSS	B1 RESERVED	F8 OFF NORM CONDITION
0B SMOKE	52 LOW SYSTEM BATTERY	B2 RESERVED	F9 VIDEO TX ACTIVE
0C COMBUSTION	53 RAM CHECKSUM BAD	B3 RESERVED	FA RESERVED
0D WATER FLOW	54 ROM CHECKSUM BAD	B4 RESERVED	FB FIRE POINT TEST
0E HEAT	55 SYSTEM RESET	B5 ACCESS DENIED	FC FIRE POINT NOT TEST
0F PULL STATION	56 PANEL PROGRAM CHANGED	B6 ACCESS USER	FD INTRUSION ZONE WALK TESTED
10 DUCT	57 SELF-TEST FAILURE	B7 FORCED ACCESS	FE FIRE ZONE WALK TESTED
11 FLAME	58 SYSTEM SHUTDOWN	B8 EGRESS DENIED	FF PANIC ZONE WALK TESTED
12 NEAR ALARM	59 BATTERY TEST FAILURE	B9 EGRESS GRANTED	
13 RESERVED	5A GROUND FAULT	BA ACCESS REPORT	
14 PANIC ALARM	5B BATTERY MISSING	BB ACCESS REPORT	
15 DURESS	5C POWER SUPPLY TROUBLE	BC ACCESS REPORT	
16 SILENT	5D SYSTEM RESET	BD ACCESS REPORT	
17 AUDIBLE	5E RESERVED	BE RESERVED	
18 DURESS	5F RESERVED	BF ARMED STAY	
19 DURESS	60 RESERVED	C0 KEYSWITCH ARMED STAY	
1A RESERVED	61 RESTORE ALARM	C1 RESERVED	
1B RESERVED	62 OPENING ALARM	C2 RESERVED	
1C RESERVED	63 CLOSING ALARM	C3 RESERVED	
1D RESERVED	64 SOUNDER/RELAY	C4 RESERVED	
1E BURGLARY	65 BELL 1	C5 RESERVED	
1F PERIMETER	66 BELL 2	C6 RESERVED	
20 INTERIOR	67 ALARM RELAY	C7 RESERVED	
21 24 HOUR	68 TROUBLE RELAY	C8 O/C EXCEPTION	
22 ENTRY/EXIT	69 REVERSING	C9 EARLY O/C	
23 DAY/NIGHT	6A NOTIFICATION APPLIANCE CKT3	CA LATE O/C	
24 OUTDOOR	6B NOTIFICATION APPLIANCE CKT4	CB FAIL TO O/C	
25 TAMPER	6C RESERVED	CC FAIL TO O/C	
26 NEAR BURGLARY ALARM	6D RESERVED	CD AUTO ARMED FAIL	
27 INTRUSION VERIFIER	6E SYSTEM PERIPHERAL	CE O/C PARTIAL ARMED	
28 GENERAL ALARM	6F POLLING LOOP OPEN	CF EXIT ERROR	
29 POLLING LOOP OPEN	70 POLLING LOOP SHORT	D0 USER PRESENT	
2A POLLING LOOP SHORT	71 EXPANSION MODULE FAILURE	D1 RECENT CLOSE	
2B EXPANSION MODULE FAILURE	72 REPEATER FAILURE	D2 SOUNDER RELAY DISABLE	
2C SENSOR TAMPER	73 LOCAL PRINTER PAPER OUT	D3 BELL 1 DISABLE	
2D EXPANSION MODULE TAMPER	74 LOCAL PRINTER FAILURE	D4 BELL 2 DISABLE	
2E SILENT ALARM	75 EXPANSION MODULE DC LOSS	D5 ALM RELAY DISABLE	
2F SENSOR TROUBLE	75 EXPANSION MODULE DC LOSS	D6 TROUBLE RELAY DISABLE	
30 UNDECODED ALARM	76 EXPANSION MODULE LOW BATTERY	D7 REVERSING RELAY DISABLE	
31 UNDECODED ALARM	77 EXPANSION MODULE RESET	D8 NAPPLIANCE CKT 3 DISABLE	
32 24 HOUR NON-BURGLARY	78 RESERVED	D9 NAPPLIANCE CKT 4 DISABLE	
33 GAS DETECTED	79 EXP MOD TAMPER	DA RESERVED	
34 REFRIGERATION	7A EXP MOD AC LOSS	DB RESERVED	
35 LOSS OF HEAT	7B EXP MOD TEST FAIL	DC RESERVED	
36 WATER LEAKAGE	7C LOSS SUPRV.RF	DD DIALER DISABLE	
37 FOIL BREAK	7D RESERVED	DE RADIO TX DISABLE	
38 DAY TROUBLE	7E RESERVED	DF REMOTE UP/DOWNLOAD DISABLE	
39 LOW GAS	7F RESERVED	E0 RESERVED	
3A HIGH TEMPERATURE	80 RESERVED	E1 RESERVED	
3B LOW TEMPERATURE	81 RESERVED	E2 RESERVED	
3C RESERVED	82 COMMUNICATION	E3 RESERVED	
3D LOSS AIR FLOW	83 LINE 1 FAULT	E4 MESSAGE	
3E CARBON MONOXIDE DET	84 LINE 2 FAULT	E5 SERVICE	
3F TANK LEVEL	85 LONG RANGE RADIO	E6 ZONE BYPASS	
40 RESERVED	86 FAIL TO COMMUNICATE	E7 FIRE BYPASS	
41 RESERVED	87 LOSS RADIO	E8 24 HOUR ZONE BYPASS	
42 RESERVED	88 LOSS CENTRAL POLL	E9 BURGLARY BYPASS	
43 DOOR LEFT OPEN	89 RADIOTXVSWR	EA GROUP BYPASS	
44 RESERVED	8A RESERVED	EB SWINGER BYPASS	
45 RESERVED	8B RESERVED	EC ACCESS SHUNT	
46 FIRE SUPERVISORY	8C PROTECT LOOP	ED ACCESS POINT BYPASS	

For example, if the words "loss radio" are wanted when the alarm code 1 is received in 3/1 (or 4/1 formats), option [61] must be programmed as "87".

Default settings are as below:

Option 60: F2 – PER TEST REPORT  
 Option 61: 0A – FIRE ALARM  
 Option 62: 14 – PANIC ALARM  
 Option 63: 1E – BURGLARY  
 Option 64: 28 – GENERAL ALARM  
 Option 65: 28 – GENERAL ALARM  
 Option 66: 50 – SYSTEM TROUBLE  
 Option 67: 00 – MEDICAL  
 Option 68: 50 – SYSTEM TROUBLE  
 Option 69: 61 – RESTORE ALARM  
 Option 6A: F2 – PER TEST REPORT  
 Option 6B: 62 – OPENING  
 Option 6C: 63 – CLOSING  
 Option 6D: A6 – CANCEL  
 Option 6E: 61 – RESTORE  
 Option 6F: 50 – SYSTEM TROUBLE

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## APPENDIX E: DEFAULT STATIC OPTIONS

<i>Option</i>	<i>Description</i>	<i>Default</i>	<i>Option</i>	<i>Description</i>	<i>Default</i>
01	LINE #	0D, 0E	14	CALLER SOURCE	00
02	LINE # LENGTH	0E	15	LINE SEIZE EVENT	00
03	DSC AUDIO	01	16	LINE RELEASE EVENT00	
04	AUDIO TIME	00	1C	BUSY OUT	01
05	PRE H.S. TIME	0A	1D	INPUT SENSITIVITY	3F
0E	LINE DETECTION	01	1E	OUTPUT LEVELS	C0
0F	MUTE BUZZER	00	1F	DEBUG	00
10	LAST MESSAGE	1D	27	CALLER SOURCE PROCESS	00
11	HOOK-FLASH	00	28	SK FSK ENABLE	00
12	CALLER SOURCE	00	2B	ECHO SUPPRESSION	00
13	CALLER SOURCE -COMP	00	2F	MAX ONLINE TIME	00

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## APPENDIX F: DEFAULT DYNAMIC OPTIONS [30] - [AF]

### Line Card Configuration Command:

Option	Description	Default	Change	ASCII (HEX)	Option	Description	Default	Change	ASCII (HEX)
30	4/1 DIGIT#0 -A-	41			6D	PRINTER WORDS:	A6		
31	4/1 DIGIT#1 -A-	41			6E	PRINTER WORDS:	61		
32	4/1 DIGIT#2 -A-	41			6F	PRINTER WORDS:	50		
33	4/1 DIGIT#3 -A-	41			70	AUTOMATION CODE:	00		
34	4/1 DIGIT#4 -A-	41			71	LIBRARY SELECT:	04		
35	4/1 DIGIT#5 -A-	41			72	COM SELECT:	01		
36	4/1 DIGIT#6 -A-	41			73	PRINTER SELECT:	01		
37	4/1 DIGIT#7 -A-	41			74	EQUIVALENT LINE:	00		
38	4/1 DIGIT#8 -A-	41			75	RECEIVER NUMBER:	01		
39	4/1 DIGIT#9 -R-	52			76	LEADING ZEROS:	00		
3A	4/1 DIGIT#A=0 -A-	41			78	INTEGER DIGIT:	00		
3B	4/1 DIGIT#B -O-	4F			79	INTEGER BURST:	00		
3C	4/1 DIGIT#C -C-	43			7A	AUDIO 4 DIGIT	00		
3D	4/1 DIGIT#D -\-	5C			7B	AUDIO 3 DIGIT:	00		
3E	4/1 DIGIT#E -R-	52			7C	AUDIO CODE:	00		
3F	4/1 DIGIT#F -T-	54			7D	AUDIO ZONE:	00		
40	4/2 DIGIT#0=A -A-	41			7E	AUDIO EVENT:	00		
41	4/2 DIGIT#1 -A-	41			7F	AUDIO FORMAT:	00		
42	4/2 DIGIT#2 -A-	41			80	KO/HANGUP TIME:	1F		
43	4/2 DIGIT#3 -A-	41			81	HANDSHAKE#1:	14		
44	4/2 DIGIT#4 -A-	41			82	HANDSHAKE#2:	23		
45	4/2 DIGIT#5 -A-	41			83	HANDSHAKE#3:	2D		
46	4/2 DIGIT#6 -A-	41			84	HANDSHAKE#4:	0C		
47	4/2 DIGIT#7 -A-	41			85	HANDSHAKE#5:	0B		
48	4/2 DIGIT#8 -A-	41			86	HANDSHAKE#6:	0E		
49	4/2 DIGIT#9 -R-	52			87	HANDSHAKE#7:	00		
4A	4/2 DIGIT#A=0 -A-	41			88	HANDSHAKE#8:	00		
4B	4/2 DIGIT#B -O-	4F			89	HS/KO TIME#1:	00		
4C	4/2 DIGIT#C -C-	43			8A	HS/KO TIME#2:	00		
4D	4/2 DIGIT#D -\-	5C			8B	HS/KO TIME#3:	00		
4E	4/2 DIGIT#E -R-	52			8C	HS/KO TIME#4:	00		
4F	4/2 DIGIT#F -T-	54			8D	HS/KO TIME#5:	00		
50	4/3 DIGIT#0=A -T-	54			8E	HS/KO TIME#6:	00		
51	4/3 DIGIT#1 -A-	41			8F	HS/KO TIME#7:	00		
52	4/3 DIGIT#2 -A-	41			90	HS/KO TIME#8:	00		
53	4/3 DIGIT#3 -A-	41			91	INTER H.S:	00		
54	4/3 DIGIT#4 -C-	43			95	5 DIGIT PULSE	00		
55	4/3 DIGIT#5 -O-	4F			96	4/1 EXTEND	01		
56	4/3 DIGIT#6 -T-	54			97	4/2 EXTEND	00		
57	4/3 DIGIT#7 -A-	41			98	3/1 EXTEND	00		
58	4/3 DIGIT#8 -A-	41			99	8 DIGIT DTMF	01		
59	4/3 DIGIT#9 -R-	52			9A	GROUP O/C	00		
5A	4/3 DIGIT#A=0 -T-	54			9B	4/3 USR/ZN	00		
5B	4/3 DIGIT#B -C-	43			9C	RESERVED	01		
5C	4/3 DIGIT#C -O-	4F			9D	MODEM II RS232	01		
5D	4/3 DIGIT#D -B-	42			9E	ACRON RS232	01		
5E	4/3 DIGIT#E -H-	48			9F	ADEMCO HS RS232	01		
5F	4/3 DIGIT#F -A-	5C			A0	RESERVED	00		
60	PRINTER WORDS:	F2			A1	FBI RS232	01		
61	PRINTER WORDS:	0A			A3	D6500 COM	00		
62	PRINTER WORDS:	14			A4	BFSK RS232	01		
63	PRINTER WORDS:	1E			A5	7 DIGIT PULSE	01		
64	PRINTER WORDS:	28			A7	SKFSK RS232	00		
65	PRINTER WORDS:	28			A8	DIAL-OUT 2-WAY	00		
66	PRINTER WORDS:	50			A9	DIAL-OUT 2-WAY	00		
67	TEPRINTER WORDS:				AA	DIAL-OUT 2-WAY	00		
68	PRINTER WORDS:	50			AB	DIAL-OUT 2-WAY	00		
69	PRINTER WORDS:	61			AC	DIAL-OUT 2-WAY	00		
6A	PGM OUTPUT: 000	F2			AD	DIAL-OUT 2-WAY	00		
6B	PGM INPUT: 000	62			AE	DIAL-OUT 2-WAY	00		
6C	FILTER OPT: 000	63			AF	DIAL-OUT 2-WAY	00		

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## APPENDIX G: EVENT CODE CLASSIFICATIONS

The Event codes have been grouped according to the type of event, as described below.

### Medical Alarms - 100

- 100 Medical
- 101 Pendant transmitter
- 102 Fail to report in

### Fire Alarms - 110

- 110 Fire alarm
- 111 Smoke
- 112 Combustion
- 113 Water Flow
- 114 Heat
- 115 Pull Station
- 116 Duct
- 117 Flame
- 118 Near alarm

### Panic Alarms - 120

- 120 Panic alarm
- 121 Duress
- 122 Silent
- 123 Audible

### Burglar Alarms - 130

- 130 Burglary
- 131 Perimeter
- 132 Interior
- 133 24 Hour
- 134 Entry/Exit
- 135 Day/Night
- 136 Outdoor
- 137 Tamper
- 138 Near alarm
- 139 Silent Burg

### General alarms

- 140 General alarm
- 141 Polling loop open
- 142 Polling loop short
- 143 Expansion module failure
- 144 Sensor tamper
- 145 Expansion module tamper
- 146 Silent Alarm

### 24 Hour Non-Burglary - 150 and 160

- 150 24 Hour non-burg
- 151 Gas detected
- 152 Refrigeration
- 153 Loss of heat
- 154 Water leakage
- 155 Foil break
- 156 Day trouble
- 157 Low bottled gas level
- 158 High temp
- 159 Low temp
- 161 Loss of air flow

### Fire supervisory - 200 and 210

- 200 Fire supervisory
- 201 Low water pressure
- 202 Low CO2
- 203 Gate valve sensor
- 204 Low water level
- 205 Pump activated
- 206 Pump failure

### System Troubles - 300 and 310

- 300 System trouble
- 301 AC loss
- 302 Low system battery

- 303 RAM checksum bad
- 304 ROM checksum bad
- 305 System reset
- 306 Panel program changed
- 307 Self-test failure
- 308 System shutdown
- 309 Battery test failure
- 310 Ground fault

### Sounder/Relay Troubles - 320

- 320 Sounder/relay
- 321 Bell 1
- 322 Bell 2
- 323 Alarm relay
- 324 Trouble relay
- 325 Reversing

### System Peripheral Troubles - 330 and 340

- 330 System Peripheral
- 331 Polling loop open
- 332 Polling loop short
- 333 Exp. module failure
- 334 Repeater failure
- 335 Local printer paper out
- 336 Local printer failure
- 337 Exp Mod DC Loss
- 338 Exp Mod Low Batt
- 339 Exp Mod Reset
- 341 Exp Mod Tamper

### Communication Troubles - 350 and 360

- 350 Communication
- 351 Telco 1 fault
- 352 Telco 2 fault
- 353 Long range radio
- 354 Fail to communicate
- 355 Loss of radio supervision
- 356 Loss of central polling
- 357 Radio Xmtr VSWR

### Protection Loop Troubles - 370

- 370 Protection loop
- 371 Protection loop open
- 372 Protection loop short
- 373 Fire trouble
- 374 Exit Alarm

### Sensor Troubles- 380

- 380 Sensor trouble
- 381 Loss of super. - RF
- 382 Loss of super. - RPM
- 383 Sensor tamper
- 384 RF xmtr. low battery
- 385 Smoke Hi-Sens.
- 386 Smoke Low Sens.
- 387 Intrusion Hi-Sens.
- 388 Intrusion Low Sens.
- 389 Detector Self Test Fail

### Open/close - 400

- 400 Open/Close
- 401 O/C by user
- 402 Group O/C
- 403 Automatic O/C
- 404 Late to O/C
- 405 Deferred O/C
- 406 Cancel

- 407 Remote arm/disarm
- 408 Quick Arm
- 409 Keyswitch O/C

### Remote Access - 410

- 411 Callback request made
- 412 Success - download access
- 413 Unsuccessful access
- 414 System shutdown
- 415 Dialer shutdown

### Access Control - 420

- 421 Access denied
- 422 Access report by user

### System O/C - 440 and 450

- 441 Armed stay
- 450 O/C by Exception
- 451 Early O/C
- 452 Late O/C

- 453 Fail to Open
- 454 Fail to Close
- 455 Auto Arm Fail
- 456 O/C Partial Arm
- 457 Exit Error
- 458 User on Premises
- 459 Recent Close

### System Disables - 500 and 510

#### Sounder/Relay disables - 520

- 520 Sounder/Relay disable
- 521 Bell 1 disable
- 522 Bell 2 disable
- 523 Alarm relay disable
- 524 Trouble relay disable
- 525 Reversing relay disable

#### System peripheral Disables - 530 and 540

#### Communication Disables - 550 and 560

- 551 Dialer disabled
- 552 Radio xmitter disabled

#### Bypasses - 570

- 570 Zone bypass
- 571 Fire bypass
- 572 24 Hour zone bypass
- 573 Burg. bypass
- 574 Group bypass
- 575 Swinger Bypass

#### Test/Misc. - 600

- 601 Manual trigger test
- 602 Periodic test report
- 603 Periodic RF Xmission
- 604 Fire test
- 605 Status report to follow
- 606 Listen-in to follow
- 607 Walk Test Mode
- 621 Event log reset
- 622 Event log 50% full
- 623 Event log 90% full
- 624 Event log overflow
- 625 Time/Date Reset
- 626 Time/Date inaccurate
- 627 Program mode Entry
- 628 Program mode Exit
- 631 Exception Schedule change
- 632 Access Sched Change

## **Limited Warranty**

SG Security Communications warrants that for a period of 5 years from the date of purchase, the product shall be free of defects in materials and workmanship under normal use and that in fulfillment of any breach of such warranty, SG Security Communications shall, at its option, repair or replace the defective equipment upon return of the equipment to its repair depot. This warranty applies only to defects in parts and workmanship and not to damage incurred in shipping or handling, or damage due to causes beyond the control of SG Security Communications, such as lightning, excessive voltage, mechanical shock, water damage, or damage arising out of abuse, alteration or improper application of the equipment.

The foregoing warranty shall apply only to the original buyer, and is and shall be in lieu of any and all other warranties, whether expressed or implied and of all other obligations or liabilities on the part of SG Security Communications. This warranty contains the entire warranty. SG Security Communications neither assumes, nor authorizes any other person purporting to act on its behalf to modify or to change this warranty, nor to assume for it any other warranty or liability concerning this product.

In no event shall SG Security Communications be liable for any direct, indirect or consequential damages, loss of anticipated profits, loss of time or any other losses incurred by the buyer in connection with the purchase, installation or operation or failure of this product.

## **Warning**

***SG Security Communications recommends that the entire system be completely tested on a regular basis. However, despite frequent testing, and due to, but not limited to, criminal tampering or electrical disruption, it is possible for this product to fail to perform as expected.***

## **FCC Compliance Statement**

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

**CAUTION:** Changes or modification not expressly approved by Sur-Gard Security Systems Ltd. could void the user's authority to operate the equipment.

### **Important Information**

This equipment complies with Part 68 of the FCC Rules. On the back of this equipment is a label that contains among other information, the FCC registration number of this equipment.

### **Notification to Telephone Company**

Upon request, the customer shall notify the telephone company of the particular line to which the connection will be made, and provide the FCC registration number and the ringer equivalence of the protective circuit.

FCC Registration Number: 1VDCAN-35164-AL-N

Ringer Equivalence Number: 01A

### **Telephone Connection Requirements**

Except for the telephone company provided ringers, all connections to the telephone network shall be made through standard plugs and telephone company provided jacks, or equivalent, in such a manner as to allow for easy, immediate disconnection of the terminal equipment. Standard jacks shall be so arranged that, if the plug connected thereto is withdrawn, no interference to the operation of the equipment at the customer's premises which remains connected to the telephone network shall occur by reason of such withdrawal.

### **Incidence of Harm**

Should terminal equipment or protective circuitry cause harm to the telephone network, the telephone company shall, where practicable, notify the customer that temporary disconnection of service may be required; however, where prior notice is not practicable, the telephone company may temporarily discontinue service if such action is deemed reasonable in the circumstances. In the case of

such temporary discontinuance, the telephone company shall promptly notify the customer and will be given the opportunity to correct the situation.

### **Changes in Telephone Company Equipment or Facilities**

The telephone company may make changes in its communications facilities, equipment, operations or procedures, where such actions are reasonably required and proper in its business. Should any such changes render the customer's terminal equipment incompatible with the telephone company facilities, the customer shall be given adequate notice to effect the modifications to maintain uninterrupted service.

### **General**

This equipment should not be used on coin telephone lines. Connection to party line service is subject to state tariffs.

### **Ringer Equivalence Number (REN)**

The REN is useful to determine the quantity of devices that you may connect to your telephone line and still have all of those devices ring when your telephone number is called. In most, but not all areas, the sum of the REN's of all devices connected to one line should not exceed five (5). To be certain of the number of devices that you may connect to your line, you may want to contact your local telephone company.

### **Equipment Maintenance Facility**

If you experience trouble with this telephone equipment, please contact the facility indicated below for information on obtaining service or repairs. The telephone company may ask you disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning.

### **U.S. Point of Contact**

Digital Security Controls Ltd.

160 Washburn St.

Lockport, NY 14094

### **How to contact us:**

- **Sales**

For information about additional products, please call our sales number: 1-800-418-7618, fax us at 905-760-3030 or e-mail us at [sales@sur-gard.com](mailto:sales@sur-gard.com).

- **Technical Support**

If you have questions or problems when using this product, you can call Technical Support. If you are within the United States or Canada, you can get support by dialing 1-800-503-5869, or e-mail us at [support@sur-gard.com](mailto:support@sur-gard.com).

- **Internet**

Visit our new Sur-Gard web site. You can search the SG technical information database and read information about our new products. You can also send us any questions you may have. Our address is [www.sur-gard.com](http://www.sur-gard.com).