

Sur-Gard MLR2E

Multi-Line Digital Receiver



Installation and Operation Manual

WARNING: This manual contains information on limitations regarding product use and function and information on the limitations as to liability of the manufacturer. The entire manual should be carefully read.

version 1.7

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FCC Compliance Statement

CAUTION: Changes or modifications not expressly approved by Digital Security Controls could void your authority to use this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Re-orient the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/television technician for help.

The user may find the following booklet prepared by the FCC useful: "How to Identify and Resolve Radio/Television Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington D.C. 20402, Stock # 004-000-00345-4.

IMPORTANT INFORMATION

This equipment complies with Part 68 of the FCC Rules. On the side of this equipment is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN) for this equipment. If requested, this number must be provided to the Telephone Company.

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

REN: 0.1A

USOC Jack: RJ11C

Telephone Connection Requirements

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant. See installation instructions for details.

Ringer Equivalence Number (REN) The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local Telephone Company. For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the format

US: AAAEQ##TXXXX. The digits represented by ## are the REN without a decimal point (e.g., 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.

Industry Canada Statement

IC: 160A-MLR2E

NOTICE: This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

Incidence of Harm If this equipment Sur-Gard MLR2E causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the Telephone Company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

Changes in Telephone Company Equipment or Facilities The Telephone Company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the Telephone Company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

Equipment Maintenance Facility If trouble is experienced with this equipment Sur-Gard MLR2E, for repair or warranty information, please contact the facility indicated below. If the equipment is causing harm to the telephone network, the Telephone Company may request that you disconnect the equipment until the problem is solved. This equipment is of a type that is not intended to be repaired by the end user.

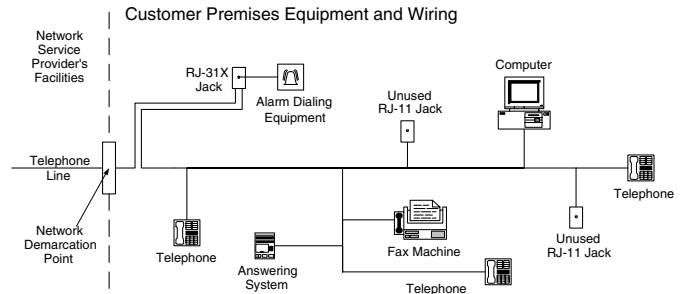
DSC

c/o APL Logistics

757 Douglas Hill Rd, Lithia Springs, GA 30122

Additional Information Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of this equipment Sur-Gard MLR2E does not disable your alarm equipment. If you have questions about what will disable alarm equipment, consult your telephone company or a qualified installer.



NOTICE: The Ringer Equivalence Number (REN) for this terminal is 01. The REN assigned to each terminal equipment provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed five.

GENERAL DESCRIPTION of the EQUIPMENT and CLASSIFICATION.

CLASSIFICATION

The MLR2E equipment is a CLASS 1, RACK-MOUNTED, (FIXED – STATIONARY) EQUIPMENT, PLUGGABLE TYPE A USING A DETACHABLE POWER SUPPLY CORD, designed to be INSTALLED, OPERATED and MAINTAINED by SERVICE PERSONNEL ONLY. [persons having appropriate technical training and experience necessary to be aware of hazards to which they are exposed in performing a task and of measures to minimise the danger to themselves or other persons].

The equipment MLR2E is designed to be installed in RESTRICTED ACCESS LOCATIONS within an environment that provides the Pollution Degree max 2 and OVERVOLTAGES CATEGORY II - NONHAZARDOUS LOCATIONS, INDOOR ONLY.

The POWER SUPPLY CORD serves as a means of disconnection from the MAINS. The OUTLET used to power the equipment shall be installed near the equipment and shall be easily accessible. The equipment must be connected to a socket-outlet with a protective earthing connection! The INSTALLATION of the MLR2E equipment must provide a reliable earth connection and it shall respect the local electrical wiring regulations.

IMPORTANT:

IT IS THE RESPONSIBILITY OF THE INSTALLER TO ENSURE THAT THE MLR2E EQUIPMENT IS PROPERLY MOUNTED WITHIN A METALLIC FIRE ENCLOSURE WITH A MINIMUM THICKNESS OF 1.5 MM AND THE FINAL ASSEMBLY IS COMPLIANT WITH ALL OF THE APPLICABLE REQUIREMENTS FROM THE POINT OF VIEW OF THE ACCESSIBILITY TO THE ENERGIZED PARTS (HAZARDOUS VOLTAGES, TNV CIRCUITS, ETC.) AS THESE CHARACTERISTICS ARE DEFINED WITHIN THE EN60950:2000 STANDARD.

THE EXTERNAL ENCLOSURE SHALL MEET ALL OF THE APPLICABLE REQUIREMENTS FROM THE POINT OF VIEW OF PHYSICAL REQUIREMENTS, E.G.: STEADY FORCE 250N, IMPACT AND STABILITY. THE EQUIPMENT MUST BE SECURED TO THE BUILDING STRUCTURE BEFORE OPERATION; ALL WIRING AND INSTALLATION SHALL BE IN ACCORDANCE WITH ELECTRICAL CODES ACCEPTABLE TO THE AUTHORITIES THAT HAVE JURISDICTION WHERE THE EQUIPMENT IS INSTALLED, SERVICED AND OPERATED.

NOT MORE THAN 3 (THREE) ASSEMBLIES [EACH CONSISTING OF 2 (TWO) MLR2E EQUIPMENT] MOUNTED WITHIN THE SAME RACK SHALL BE POWERED FROM THE SAME BRANCH CIRCUIT. USE A DIFFERENT BRANCH CIRCUIT FOR ANY GROUP LARGER THAN 3 (THREE) ASSEMBLIES.

Internal wiring shall be routed in a manner that prevents:

- excessive strain on wire and on terminal connections;
- loosening of terminal connections;
- damage of conductor insulation.

The wireways within the enclosure shall be smooth and free from sharp edges. Wires shall be protected and routed so that they do not come in contact with burrs, cooling fan or heatsinks which could cause damage to the insulation of conductors. Holes in metal shall have smooth well-rounded surfaces or shall be protected with bushings.

The EXTERNAL ENCLOSURE shall be connected to the PROTECTIVE EARTH GROUND. The external cabinet (RACK) must be secured to the building structure before operation in a such a way to fully meet the STABILITY REQUIREMENTS as per EN60950: 2000 conditions.

An adequate MARKING [visible before the door (cover)], NEXT TO THE ACCESS DOOR (or cover) of the rack, with instructions for protection once the DOOR (or covers) IS (are) removed, stating that “telephone cord is to be disconnected prior to opening the door” is an example of an acceptable Marking), and it shall be provided by the Installer.

An acceptable power supply cord (detachable), shall be used accordingly to the local outlets and voltages. IT IS THE INSTALLER'S RESPONSIBILITY TO PROVIDE AN APPROPRIATE ACCEPTABLE POWER SUPPLY CORD.

CAUTION:

This product uses Lithium Batteries. Improper handling of lithium batteries may result in HEAT GENERATION, EXPLOSION or FIRE, which may lead to personal injuries.

Please ensure that the above precautions are strictly observed by the related divisions including but not limited to sales, service, customers and (or) outside contractors.

THE EQUIPMENT MLR2E IS EQUIPPED WITH LITHIUM NON REPLACEABLE BATTERY. DO NOT ATTEMPT TO REPLACE THE BATTERIES.

CONNECTION TO THE MAINS

1. Connect first the DETACHABLE POWER SUPPLY CORD to the IEC 320 connector located on MLR2E equipment.
2. Connect all the telecommunications cord-sets to the appropriate connectors.
3. Be sure that the enclosure of the equipment MLR2E is fully installed (covers, doors, etc.) in a such a way that HAZARDOUS VOLTAGES and TNV Circuits will not be ACCESSIBLE when the equipment will be connected to the MAINS and/or TELECOMMUNICATION NETWORK.

ATTENTION: THE INTERNAL POWER SUPPLIES ARE NOT SWAPPABLE! DISCONNECT POWER BEFORE ATTEMPTING TO CHANGE A POWER SUPPLY!

In order to change the INTERNAL Power Supply, first DISCONNECT the DETACHABLE POWER SUPPLY CORD from the socket outlet used to provide power, and then, from the IEC320 Connector which is mounted on the MLR2E equipment. Wait minimum 5 seconds to allow the Capacitor (C8) within the unit to discharge. IF THE FUSE IS SUSPECTED OF HAVING OPENED, a discharge path for the involved Capacitor (C8) shall be provided.

Do not touch the HEATSINKS within the equipment: these are LIVE PARTS and/or may present a hazard related to high temperatures. In order to swap the boards USE THE PROVIDED PLASTIC HANDLES (INSERTERS, EXTRACTORS).

NO REPAIRS IN THE FIELD ARE ALLOWED. THE EQUIPMENT MLR2E MUST BE RETURNED TO THE MANUFACTURER FOR REPAIRS.

Section 1 - Introduction

The MLR2E is a multi-line, multi-format digital receiver for commercial fire and burglary. The basic unit consists of up to 15 individual line card modules (DRL2E) and 30 telco lines connected to a CPM2. The MLR2E 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 MLR2E's real-time clock and calendar stamps all information received with the time and date, and all information can be printed and/or forwarded to a computer. To ensure security, adjustment of the clock, calendar and other programming are password-protected.

1.1 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 port, and two COM Ports.

1.2 DRL2E

Each DRL2E module can monitor two telephone lines. The line card module is equipped with a 256-event non-volatile 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.

1.3 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.

1.3.1 Compatibility

Central station automation software packages such as M.A.S., DICE, SIMSII, S.I.S., GENESIS and MICROKEY support the MLR2E 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 package and/or site certification evaluation.

1.4 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.

1.5 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)
- Patented Virtual configurations
- 4/2 formats with or without parity, 4/1, 3/1 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, 4/2 extended, 3/1 parity
- Contact ID (DTMF) format
- Super Fast or High Speed DTMF format, with or without parity
- DTMF 4/1 Express format optional*, 4/2 Express format
- FBI Super Fast format with or without parity
- RADIONICS Modem II, Modem IIE, Modem IIIa² 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
- 512-event memory buffer on each individual line card
- 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

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

- 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

1.6 Virtual Receiver Architecture

The most novel feature of the DRL2E is its 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.

1.7 Number of Line Cards Supported

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

1.8 Approvals

1.8.1 Agency Listings

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

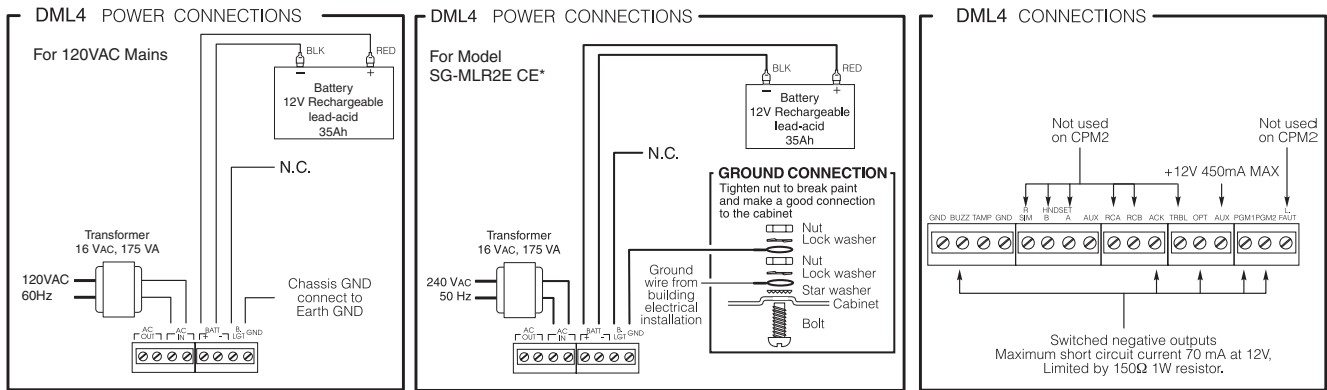
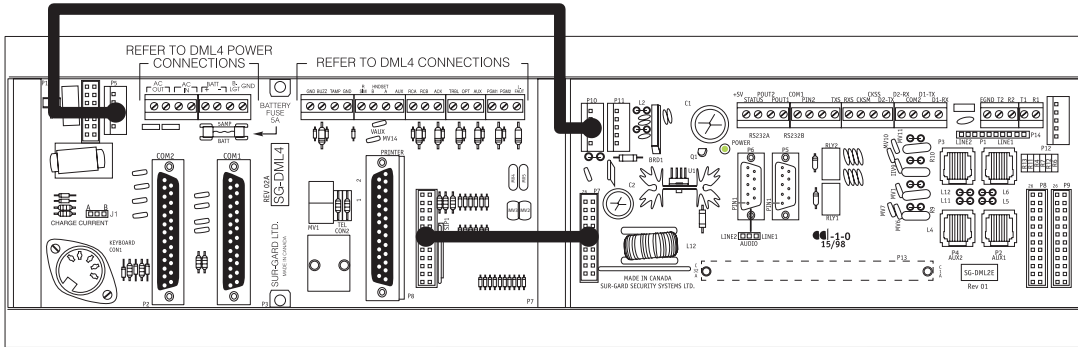
This equipment should be installed in accordance with the requirements of NFPA72, NFPA70, UL827 and the local authority having jurisdiction.

1.8.2 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.

Figure 1, MLR2E Backplane Connection



* Model MLR2E CE is not UL approved.
 For CE Version: The transformer is not supplied by DSC. It shall fully meet the LVD requirements and all of the applicable requirements of the EN60950-1: 2001. It shall be FAIL-SAFE and shall provide double or reinforced insulation between primary and secondary circuits. The transformer shall be acceptable to the local authorities. The equipment shall be installed by service persons ONLY and shall be used in RESTRICTED LOCATIONS ONLY, non-hazardous location.

Figure 2, Connection for DML2E Line Card Expansion

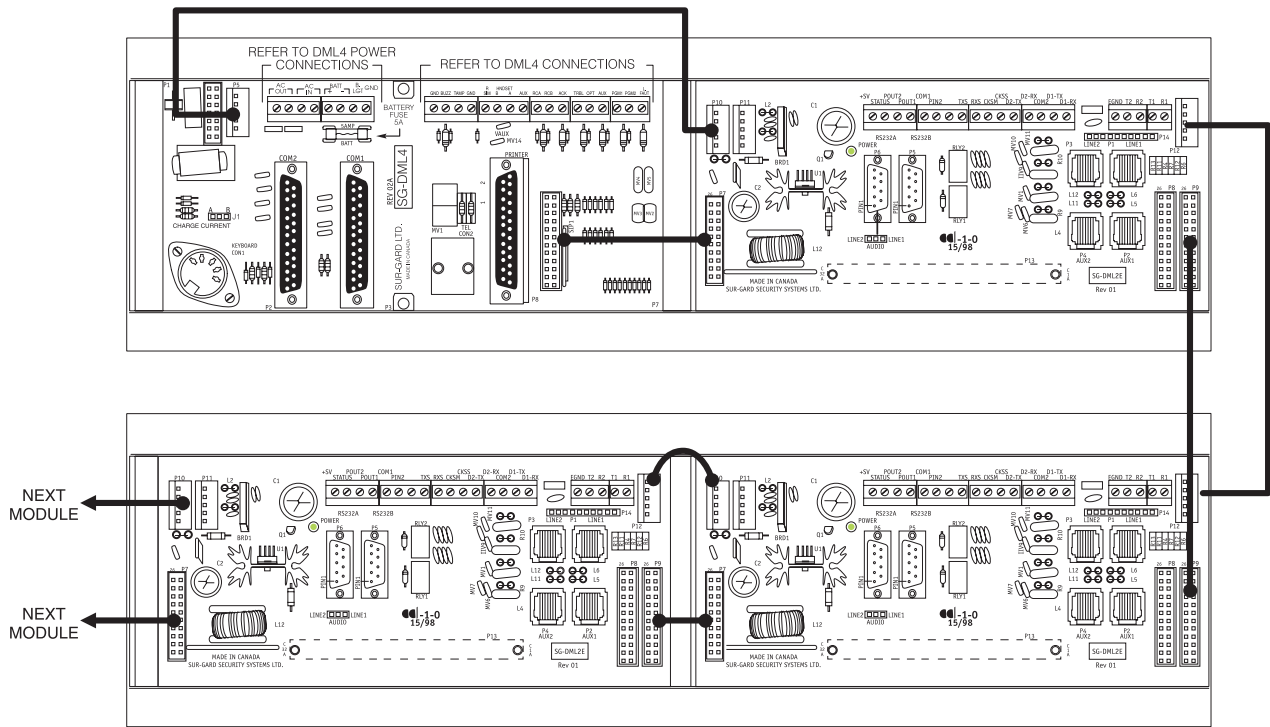


Figure 3, MLR2E UL UPS Connection, 120 VAC Mains

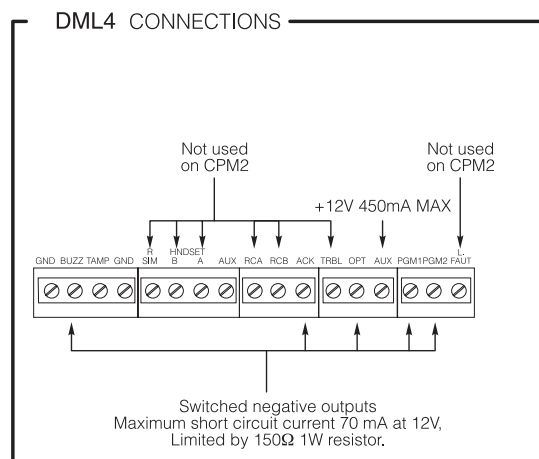
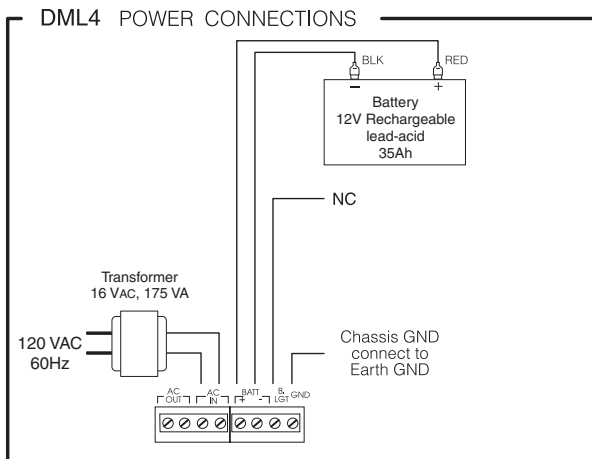
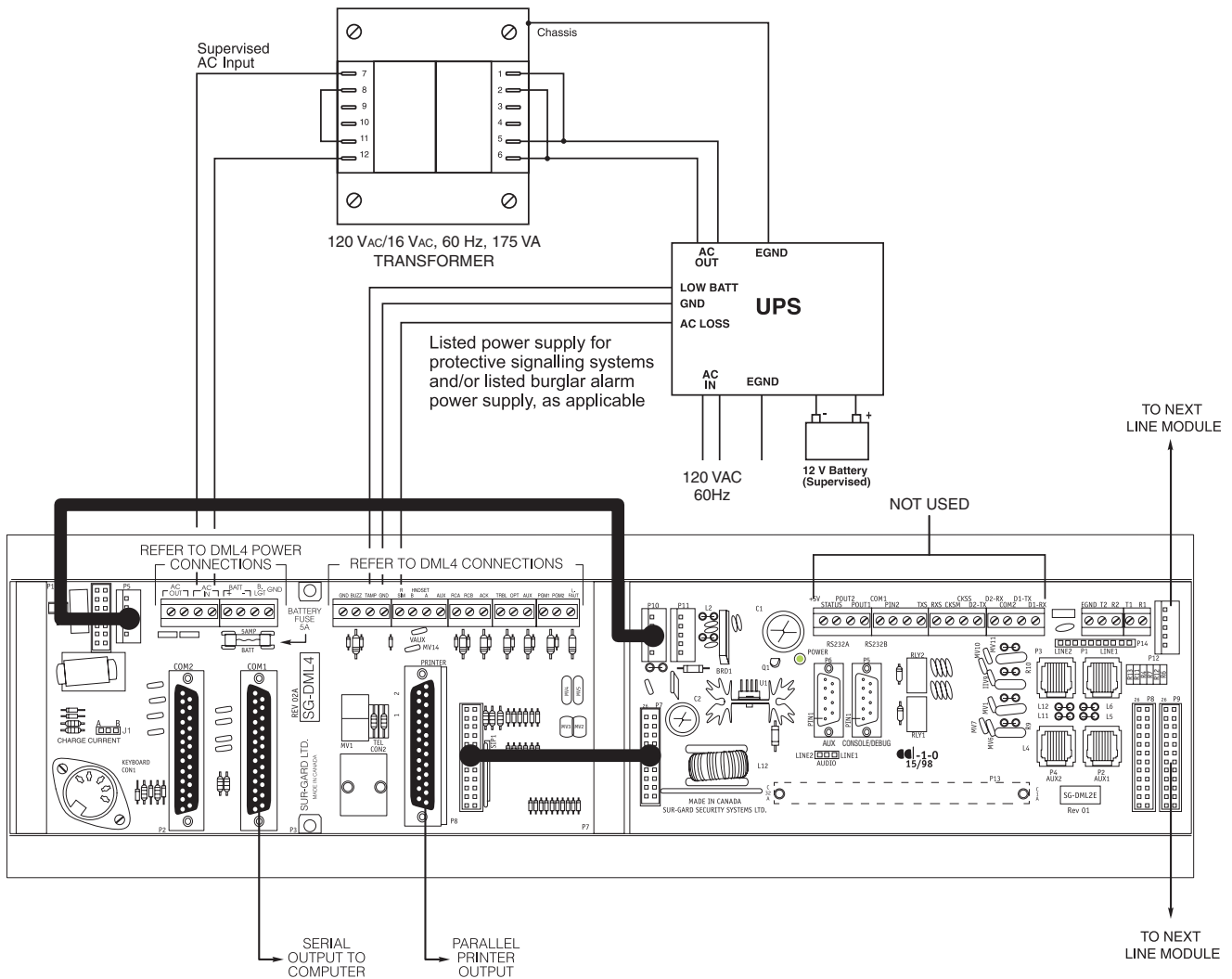
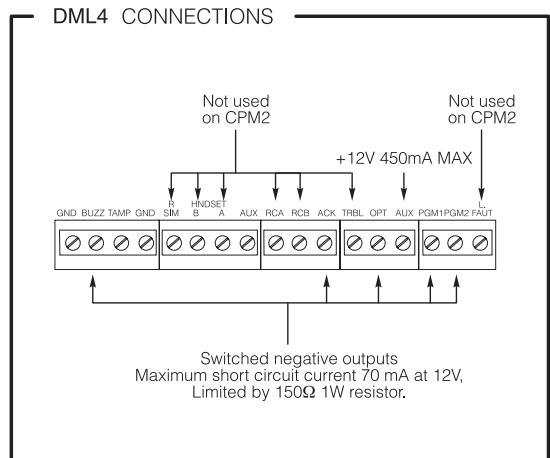
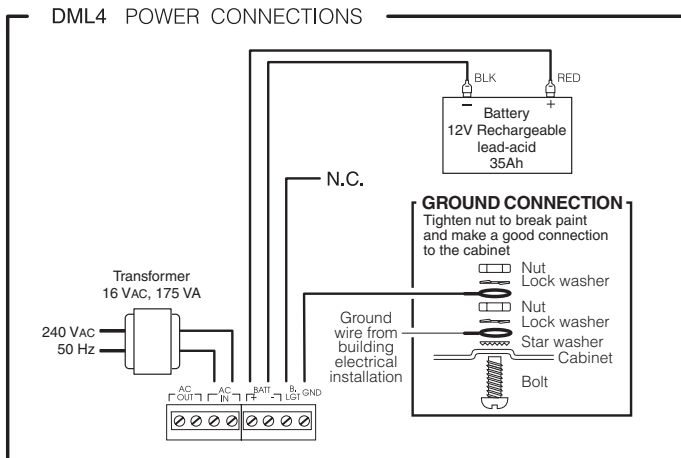
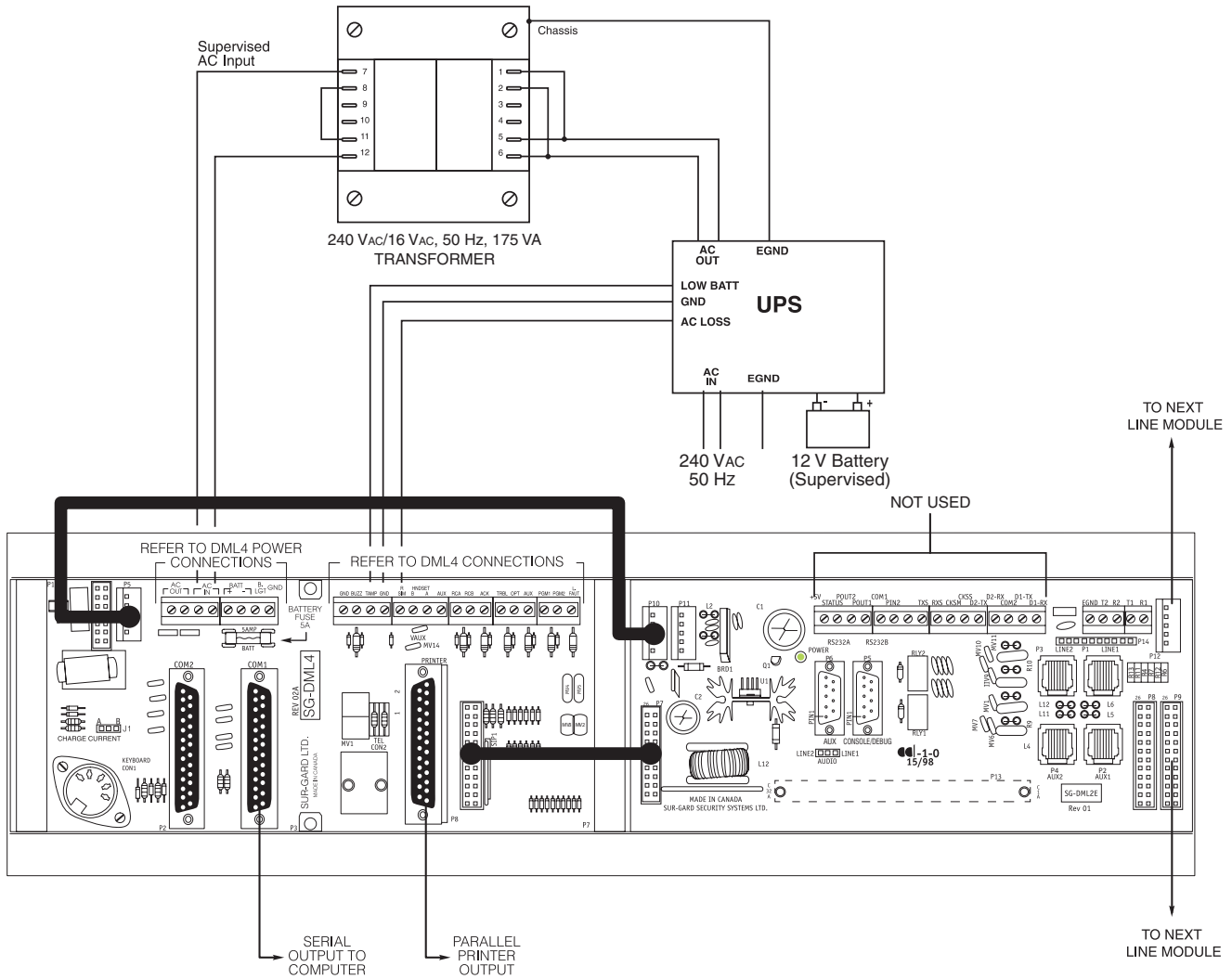


Figure 4, Model MLR2E CE UPS Connection, 240 VAC Mains*



For CE Version: The transformer is not supplied by DSC. It shall fully meet the LVD requirements and all of the applicable requirements of the EN60950-1: 2001. It shall be FAIL-SAFE and shall provide double or reinforced insulation between primary and secondary circuits. The transformer shall be acceptable to the local authorities. The equipment shall be installed by service persons ONLY and shall be used in RESTRICTED LOCATIONS ONLY, non-hazardous location.

* Not to be used in UL Listed Installations. Use only with Model SG-MLR2E CE (not UL Listed).

Section 2 - Quick Start

2.1 Receiver Setup and Operation without Programming

2.1.1 Unpacking

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

2.1.2 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.

2.1.3 Power Up

When power is applied, the receiver will beep and 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.

2.1.4 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.

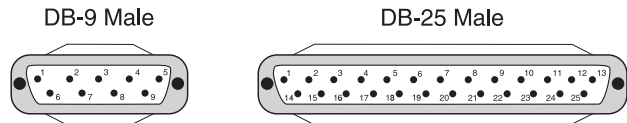
2.1.5 Serial Laplink Cable for Debug/Console

For Debug/Console data transfer between a PC and the DRL2E, a serial data transfer cable is used to connect either the DB9 male or DB25 male serial ports on a computer to the DB9 male serial (Debug/Console) port on the DRL2E.

Serial Laplink Cable				
from DB9	from DB25	to DB9	to DB25	Signal
2	3	3	2	Receive - Transmit
3	2	2	3	Transmit - Receive
4	20	6	6	DTR - DSR

5	7	7	5	Ground - Ground
6	6	20	4	DSR - DTR
7	4	5	8	RTS - CTS
8	5	4	7	CTS - RTS

Figure 5, Serial Laplink Cable (on cable)



2.1.6 DEBUG OUTPUT

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.

2.1.7 DEBUG CABLE CONNECTIVITY

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

2.1.8 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.

2.1.9 Button commands

C Cold boot

DThis button will initiate the download of a file to the line card.

OThis 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

2.1.10 Downloading steps

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

Ready to download.

CCCC

Point and click at "Transfer" on the HyperTerminal 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.

Section 3 - Installation

3.1 Mounting the Receiver

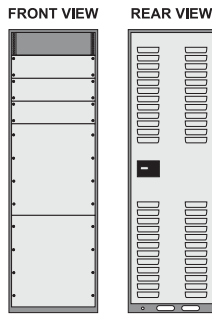
Install the MLR2E in a closed 19" / 48cm rack or cabinet with a locking rear access door. Cover all unused spaces with blank metal plates. The LCD screens on the receiver are designed to be viewed below eye level. If the unit must be mounted where the screens are above eye level, angle the unit downwards to improve visibility. The following items can be supplied for a complete installation:

3.1.1 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 P/N FT3304
- AC utility box
- AC cable clamps (2)
- 8' / 2.4m battery cables
- 3-Gauge conductor AC cable
- Secondary non-replaceable fuse, 15A, 125 VAC

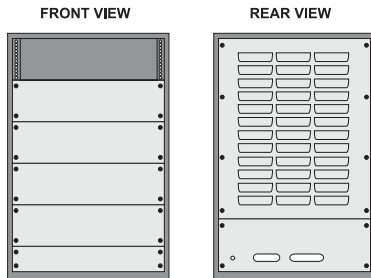
NOTE: If 30 telephone lines are not used, cover each unused location with a blank plate.



3.1.2 Desk-mount Unit (28" / 71cm tall up to 14 telephone lines)

Part # MLR2-CM

- Rack
- Louvered door back plate
- Blank Plate 1.75" / 4.45cm
- 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
- Secondary non-replaceable fuse, 15A, 125 VAC



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

3.2 Printer Connections

Connect the parallel printer to the MLR2E printer output port using a standard parallel printer cable.

For UL Listed applications, the following UL Listed printers can be used with the MLR2E:

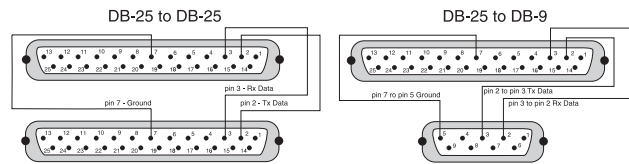
- Sur-Gard CPU-1150
- Sur-Gard CPU DMP-206
- DMP SCS-PTR

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

3.3 Computer Connections

Connect the computer to the MLR2E RS-232 port using a serial cable to COM1. **IMPORTANT: Do not use a null modem cable.**

Figure 6, MLR2E COM1/COM2 Automation Computer Connection



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

3.4 Telephone Line Connections

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

3.5 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.

3.6 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.

3.7 Battery Charging Current

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

Section 4 - 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, each line is capable of functioning independently when communication is lost between the line card and the CPM2. Each line card can record 256 different alarm messages and 256 Caller-ID telephone numbers.

4.1 General information

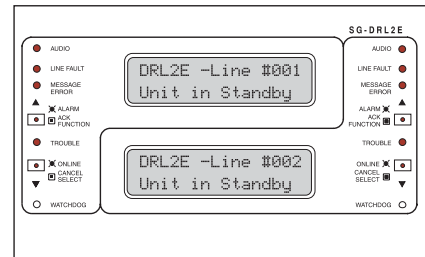
The receiver is capable of processing signals from digital communicators in a variety of formats. The type of signal (alarm, trouble, restore, cancel and so on) can be printed.

4.2 DRL2E Features

- Operator selection of communication formats and handshake priority
- 64 profiles per line, up to 30 lines.
- 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

4.3 DRL2E Controls

Figure 7, DRL2E Faceplate



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.

4.3.1 LCD (Liquid Crystal Display)

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

4.3.2 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.

4.3.3 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.

4.3.4 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.

4.3.5 [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.

4.3.6 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.

4.3.7 Cancel Select

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

4.3.8 Watchdog

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

Section 5 - DRL2E Operating Mode

5.1 DRL2E Standby Mode

When the line card is operating normally, this message will be displayed:

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

5.1.1 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.

5.1.2 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.

5.1.3 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.

5.1.4 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

5.1.5 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 "CPM2 Utility 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.

5.1.6 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
```

5.1.7 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 V1.4  
Sep 02,2002
```

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

5.1.8 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.

5.1.9 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.

5.2 DRL2E Cold Boot

There are two methods of cold booting a DRL2E line card:

5.2.1 Using the Line Card

1. Remove all four screws from the linecard.
2. Remove the line card out of the rack.
3. Replace the line card back into the rack. As you slide the line card back in you hold the [ACK] and [SELECT] buttons in.
4. It will then prompt you to do a cold boot. You press the [ACK] button for yes, or the [SELECT] button for no.

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

5. Once you have pressed the [ACK] button it will start the cold boot process on the first line.

```
COLD BOOTING  
Channel X
```

6. After it has finished cold booting it will prompt you to "Change LC Number."

7. You select [ACK] for yes, and [SELECT] for no.

```
CHANGE LC NUMBER?  
ACK: yes SEL: no  
LINECARDNUMBER:0E  
ACK: up SEL:down
```

8. Once you have assigned the line card a number you press and hold the [ACK] and [SELECT] buttons for two seconds. This exits the cold boot procedure.

```
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->>
```

9. Repeat the process for the second line.
10. After the second line has been completed tighten the four screws.

5.2.2 Using the Debug

From HyperTerminal, 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 BOOT  
Which Channel?-Hit 1 or 2  
Channel X
```

X = 1 or 2

```
Cold Booting
```

5.3 Communications in Progress

5.3.1 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: "Invalid Report" and "Communication Fail".

5.3.2 Invalid Report 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
3rd	123356	?1234?46 Invalid Report
4th	123456	?1233?56 Invalid Report
5th	123356	?1234?56 Invalid Report ?????10 Invalid Report

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

5.3.3 Communication Fail

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.

5.3.4 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.

5.3.5 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.

Section 6 - Advanced Programming

6.1 Profiles Introduction

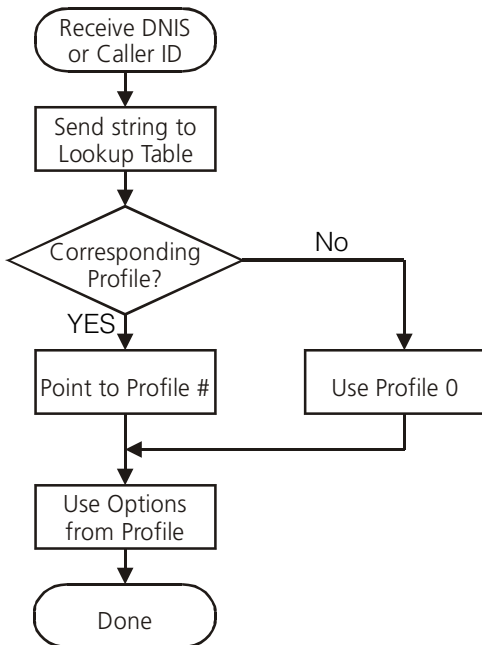
The DRL3 'virtual receiver' will load unique 'profiles' in order to effectively communicate with control panels. A profile is a set of pre-programmed line card options unique for a particular DNIS number. The 'DNIS' will point to a particular profile, which will then be loaded into the line card before the first handshake is sent. It is essential that the correct option be programmed for a profile in order to correctly communicate with the control panel. Each 'virtual receiver' can have a maximum of 64 profiles. To change the options for a particular profile, the MLR2E Console software is provided. This software will allow the user/operator to edit the profiles.

NOTE:DNIS (Dialled Number Identification Service). This number represents the dialled number, or the number being called. **ANI: (Automatic Number Identification).** This number represents the source of a call and allows the system to determine the handshake protocol. **Caller ID: This number identifies the source of a call.** For the purpose of this document, Caller ID and ANI will be referred to as Caller ID, but both can not be used at the same time. Contact your provider to determine which service is available.

DNIS or Caller ID can be used for profile selection.

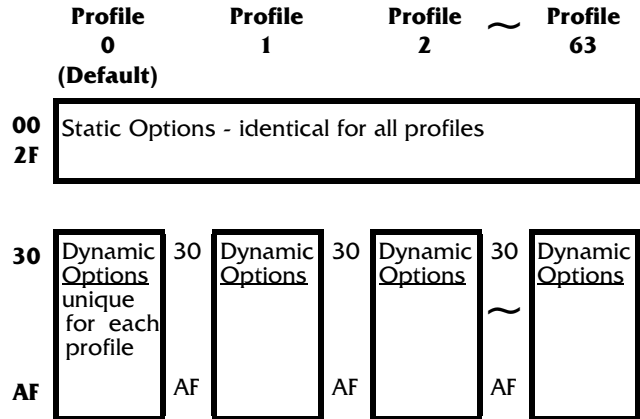
Line Cards Identification Number Handling:

Figure 5-1, Call Processing Flowchart



Each profile is made up of Static Options and Dynamic Options. The static options are the same for all profiles, but the dynamic options can be programmed specifically per hunt groups, panel type, etc.

By receiving the DNIS or Caller ID, the appropriate profile can be selected through a look-up table "stored" on the line card.



Profile 0 is the default. When no Caller ID or unknown DNIS is received, or when the received number does not point to a profile, the default will be used.

Profiles are used to reduce on-line time, and for specific customers or panel/format types, one can have a profile with certain handshakes sent first. Also, some formats require certain options, and this can be pre-defined as well.

Profiles allow for a more customized system. Rather than having a line card (or a receiver itself) devoted to certain customers, the MLR2E can "handle" any format at any time through the use of profiles. Each line card holds its own look-up table that can be shared through line pools, or shared within the entire receiver.

Two types of tables are available, but only one type can be chosen. The first type, which consists of 10 000 entries, is used strictly with DNIS of up to 5-digits.

Table type 1:

DNIS received Profile # to be used

DNIS Received	Profile# to be used
00001	01
00002	03
00003	24
...	...
99999	45

The second type is used if ANI-Caller ID and/or DNIS are received, and can consist of up to 5,000 entries, with Caller ID or DNIS of up to 10 digits.

Table type 2:

Caller ID Number	Convert Data	Profile
05 603000	Not Used	0
05 603001	Not Used	1
05 603002	Not Used	2
05 603003	Not Used	3
DNIS Number	Convert Data	Profile
12345	54321	0
12346	54322	1
1234	54333	2

Each portion may contain 0-10000 entries with the total of all the entries not exceeding 10000.

The receiver will first check through the Caller ID section if a Caller ID number is received. If only a DNIS number is received, or Caller ID is received but the Caller ID was not found, it will check in the DNIS section.

On a standard receiver, the Automation output would look similar to the following:

```
1RRLsSSSSsAAAAySZZ[DC4]
```

6.2 Static Options: [00] - [2F]

Option [00]: Reserved

Option [01]: Line Card Number - Default [01]

The line card Number provides a virtual identification code for each DRL3 module. Hexadecimal numbers '01' to 'FE' can be programmed in Option [01] to identify line cards.

Option [02]: Line Card Number Length - Default [0A]

This 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 3-digit line card number as entered (no conversion).
- 0D Send 3-digit line card number in decimal (conversion from decimal to hex decimal)

NOTE: When using the DRL3, 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, so that the 5 digits of DNIS will become 1ddddd and overwrite 1RRLLL.

Option [03]: Internal messages RS-232 - Default [01]

When this option is programmed as '00', the DRL3 will output its internal messages in the following format:

SRRL[#AAAA|Nxyy]

If it is programmed as '01' internal messages will be output as

ORRL[#AAAA|Nxyy]

Where S, 0 (zero) = Protocol number

RR = Receiver number

L = Line number

AAAA = Account code, always 0000

Nxyy = SIA event

Option [04]: 2-Way Audio Activation Time - Default [00]

Option [04] determines how long, in 10-second increments, the 2-way audio function will be active once it is initiated. At the end of this time, the line card will hang up the line. Program a value from "01" to "FF" for 10 seconds to 2550 seconds. Three (3) minutes is the recommended length of time for the 2-way audio activation time. To disable the 2-way audio feature, program Option [04] as "00".

NOTES: Enabling 2-way audio will affect NFPA 72 system loading requirements. Refer to Par. 4-5.3.2.2.2 of NFPA 72 for details.

If the alarm panel sends a listen-in code activation request and audio is enabled for this format (Option [7F]), the receiver will remain in two-way voice for a period of 60 seconds even if the activation time is not programmed.

Option [05]: Pre-H.S. Duration - Default [0A]

When the line card seizes the line, it will wait the time programmed at Option [05]; then send the first handshake. The value programmed (hex) at this location will be multiplied by 100 ms. [e.g., 100 ms., 200 ms.] The default is 0A, for 1000ms (100ms x default value).

The minimum time is 1 second. If the option is programmed with any value lower than 0A, the line card will use a 1 second delay.

Options [06] to [09]: Reserved

Options [0A] to [0C]: Reserved

Option [0D]: Ring Select - Default [00]

Enables or disables the double ring detection. If programmed as 00, the line card will detect single ring. If programmed as 01, the line card will detect the double ring.

Option [0E-10]: Reserved

Option [11]: Hook-flash Enable/Disable - Default [00]

Enables or disables ability to hookflash the phone line 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 10 ms and that is the duration. For example, if hookflash time of 500 ms is wanted, program Option 2A to 32 hex.

$$\begin{aligned} 500 \text{ ms} / 10 &= 50 \\ 50 \text{ Dec} &= 32 \text{ hex} \end{aligned}$$

Option [12]: Caller Source ID Option - Default [00]

Option [12] allows the line card to receive Caller Identification 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 Standard Bellcore Caller-ID
- 02 Reserved for future use
- 03 Reserved for future use
- 0X Receive X (4 to 10) digits DTMF DNIS

General messages other than Caller ID or DNIS:

- 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.

Option [13]: Caller Source to SG Computer - Default [00]

Option [13] allows the transmission of the Caller Identification or ANI, to the computer output. Program Option [13] as one of the following:

	Protocol	
00		Do not send to the computer
01	4RRL	Send to the computer (North American Caller ID)
02	URRL	Send to the computer (International Caller ID)

NOTE: Option [12] must be programmed as "01" to use Caller ID or "0X", where "X" represents the number of DNIS digits (including the terminator digit).

Option [14]: Caller Source to printer - Default [00]

Option [14] allows the transmission of the Caller Identification or ANI, to the printer output. Program Option [14] as one of the following

- 00 Do not send to the printer
- 01 Send to the printer; each alarm will print an extra line, showing the Caller ID

NOTE: Option [12] must be programmed as "01" for Caller ID or "0X", where "X" represents the number of DNIS digits (including the terminator digit).

Options [15]: Reserved

Option [16]: Format disabling Option - Default [00]

This option is bit oriented and will disable the decoding of the following DTMF formats. For multiple formats all corresponding bit must be disabled.

Example: to disable 13, 22 and 23 digits DTMF formats, set option to 4A.

- Bit 01: 15 digits DTMF formats
- Bit 02: 13 digits DTMF formats
- Bit 03: 8 digits DTMF formats
- Bit 04: 22 digits DTMF formats
- Bit 05: 11 digits DTMF formats
- Bit 06: 12 digits DTMF formats
- Bit 07: 23 digits DTMF formats

Option [17]: DMP User Length - Default [00]

Option 17 is for the variable length zone and user numbers. The first digit in the option represents the user number and the second digit represents the zone number. For example, if Option 17 is set for 24 than the receiver will output a 2-digit user number and a 4-digit

zone number. The default value is 00 for 2-digit zone and 2-digit user number.

NOTE: : Option [17] Only affects DMP Serial 1 format not DMP Serial 3.

Option [18]: Sur-Gard DTMF 4/3 Format Output - Default [00]

Each nibbles of this option controls how the 4/3 format computer output string is formatted. The first nibble allows for the user and group codes for openings and closings to be combined. When programmed as "1x", group arming/disarming signals will be combined with the user code into one signal which will be sent to the computer.

Example, the following information may be sent to the computer: (The printer output does not change)

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.

The second nibble of this option controls the user/zone number conversion. 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. This option allows the user codes to be converted from hexadecimal to decimal to meet the needs of the central station software. Program with one of the following:

- X0 Send the last two digits as user codes without conversion
- X1 Convert the last 2-digit user codes to decimal as shown here:

User Code Receive	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

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

X2 Send the last 3 digits as the zone codes with the 5th digit still used as the event code

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

When individual event codes are used, if 1234 401 is received, 1234 C 01 will be transmitted to the computer. When common event codes are used, if 1234 401 is received, 1234 Z 401 will be transmitted to the computer, where Z is the common event code.

X3 Send the last 3 digits as the zone codes and convert the user codes only to decimal

NOTE: When the first nibble of the option is set to 1 the 3-digit user codes will be combined with the group number as follows:

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

Option [19]: Fault Call Counter - Default [00]

Option 19 is used for limiting the number of Fault Call messages that are sent to the printer and computer. The default setting will send a Fault Call alarm for every 10 Fault Calls. To have every Fault Call sent to the computer and printer set Option 19 to 01.

Option [1A]: Reserved

Option [1B]: Reserved

Option [1C]: Busy Out - Default [00]

This option allows the line card to seize the phone line in case of checksum error after download or when its internal buffer is full after loss of communication with the CPM. Program Option [1C] with one of the following:

- 00 The line is seized if any of the conditions mentioned above occurs.
- 01 The line is NOT seized if any of the conditions mentioned above occurs.
- 04 The line will be seized immediately if the automation computer is absent.
- 05 The line will be seized if there is a loss of automation software or no communication to the CPM3 ONLY if the internal computer buffer is full. If there is a loss of printer(s), any new alarms will not be buffered in the internal printer buffer. (note: the line card has two independent printer and computer buffers).

NOTE: If the option is programmed to 01, the line card will NOT buffer any new alarms once the internal buffer is full. Setting Option [1C] to 01 is NOT RECOMMENDED.

Options [1D] - [1E]: Reserved

Option [1F]: Debug Output - Default [00]

Set to 01 to enable. The debug mode should only be used when required and disabled after use.

Options [20] - [21]: Reserved

Options [22] - [26]: Internal Use Only

Option [27]: Caller Source Process - Default [05]

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)

Options [28] - [29]: Reserved

Option [2A]: Hook-flash Delay - Default [00]

Time delay before hang-up option. Option value x 100ms to a maximum of 9.5 seconds. When programmed with values starting with A the second digit will be multiplied by 10 seconds. The second digit must be converted to decimal first.

Example a value of [AF] would result is 150 seconds delay.

Options [2B] - [2E]: Reserved

Option [2F]: Online Time Out - Default [00]

The Online Time Out option hangs up after a predetermined time delay. Time Out range can be programmed from 01 to 255 seconds (Hex 01 - FF) or until the call is completed by the panel (Hex 00). When time out occurs, the DRL3 hangs up and generates a signal to the printer and to the automation (SIA identifier YB).

For Example:

Printer Message: "DRL Online Time-Out"

Automation: NYS0102 (shelf 01, slot 02)

6.3 Dynamic Options: [30] - [FF]

Options [30] - [3F]: 3/1 - 4/1 Digit 0-F

The DRL3 uses a unique Sur-Gard communication format to transmit data through the CPM3 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.

The DRL3 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 DRL3 Decoding Library for the complete set of event codes used by the DRL3. In Sections [30] through [3F], program ASCII codes according to the Decoding Library.

Do **NOT** use values other than 20-7F (ASCII).

Defaults:

Option	Value	Code
30	41	A
31	41	A
32	41	A
33	41	A
34	41	A
35	41	A
36	41	A
37	41	A
38	41	A
39	52	R
3A	41	A
3B	4F	O
3C	43	C
3D	5C	/
3E	52	R
3F	54	T

Options [40] - [4F]: 3/2 - 4/2 Digit 0-F

The DRL3 will use the first digit following the account code in 4/2, 3/1 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 DRL3 Decoding Library for the complete set of event codes used by the DRL3.

In Sections [40] through [4F], program ASCII codes according to the Decoding Library. Do **NOT** use values other than 20-7F (ASCII).

Defaults:

Option	Value	Code
40	41	A
41	41	A
42	41	A
43	41	A
44	41	A
45	41	A
46	41	A
47	41	A
48	41	A
49	52	R
4A	41	A
4B	4F	O
4C	43	C
4D	5C	/
4E	52	R
4F	54	T

Options [50] - [5F]: 4/3 Digit 0-F

The DRL3 will use the fifth digit of data received in 4/3 formats to determine the message and event code. The event code will then be transmitted to the central station computer. Refer to the DRL3 Decoding Library for the complete set of messages and event codes used by the DRL3. In Sections [50] through [5F], program ASCII codes according to the **Decoding Library**. Do **NOT** use values other than 20-7F (ASCII).

NOTE: The old value programmed in each Option will not be changed until a command with valid data is received.

Defaults:

Option	Value	Code
50	41	A
51	41	A
52	41	A
55	41	A
54	41	A
55	41	A
56	41	A
57	41	A
58	41	A
59	52	R
5A	41	A
5B	43	C
5C	4F	O
5D	42	B
5E	54	T
5F	5C	/

Options [60] - [6F]: Printer Words.

The English Printer Library is provided and can be selected by programming the event codes to the corresponding word.

For example, if the words 'exit alarm' are required when the alarm code 1 is received in 3/1 (or 4/1 formats), Option [61] must be programmed as '90'.

Refer to Appendix A for a list of available words.

Defaults:

Option	Value	Word
60	F2	PERIODIC TEST REPORT
61	0A	FIRE ALARM
62	14	PANIC ALARM
66	1E	BURGLARY
64	63	CLOSING
65	62	OPENING
66	E5	SERVICE
67	00	MEDICAL*
68	E4	MESSAGE
69	61	RESTORE
6A	F2	PERIODIC TEST REPORT
6B	C6	GROUP CLOSING
6C	C7	GROUP OPENING
6D	E6	ZONE BYPASS
6E	50	SYSTEM TROUBLE
6F	A6	CANCEL

*Use only with Model MLR2E CE.
MLR2E CE is not UL Listed.

Option [70]: Automation Common Event Code - Default [00]

Some central station software packages are unable to process an alarm using the event codes listed in the DRL3 Decoding Library. Where a central station monitors thousands of accounts belonging to different companies, the same reporting codes may have different meanings for different companies. 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 indicated below:

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, DSC recommends 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.

Option [71]: Library Select - Default [04]

Determines how to use Printer Words Options.

- 00 No printer words.
- 01 Printer words options used for 1-digit reporting code formats only; other will use pre-defined library.
- 02 Printer words options used for 2-digit reporting code formats only; other will use pre-defined library.
- 03 Printer words options used for 3-digit reporting code formats only; other will use pre-defined library.
- 04 Printer words options used for 1-digit and 2-digit reporting code formats only; other will use pre-defined library.
- 05 Printer words options used for 1-digit, 2-digit and 3-digit reporting code formats.

NOTE: Option [71] is ignored when using SIA, ITI, Contact-ID, ACRON, MODEM II, MODEM IIE, MODEM IIIa?, FBI SuperFast, BFSK, ADEMCO Super Fast and SK FSK1, 2 formats.

Option [72]: SIA Option - Default [00]

This option is a bit selectable Option meaning some or all of these choices may be enabled. For example, to enable "Force SIA Zone Number", and "Convert Pulse formats to SIA", set Option[72]=05. To enable only "Convert Pulse to SIA" and "Convert BFSK to SIA" set Option[72]=0C.

Bit0 - Force SIA Zone Number.

The receiver will decode SIA Alarms sent without Zone numbers and add '00' as the zone number to the automation output:

Example: [#1234|NriBA] becomes [#1234|NriBA00]

Bit1 - Convert SIA Account A's.

Any Account Digits received as 'A' will be converted to '0'.

Example: [#A123|NriBA01] becomes [#0123|NriBA01]

Bit2 - Convert Pulse formats to SIA.

All Pulse Format Printer and Computer outputs will be converted to a SIA format, in a two step conversion process.

The automation Output will use the Protocol ID of 'R'.

First the type of alarm is determined by Options[30]-[5F], [70].

Secondly the type of alarm is mapped to a SIA output as per the following table.

Example:

12341 becomes '1234 A 1' becomes [#1234|NBA1]

Value	Codes	SIA
41	A	BA
42	B	BA
43	C	CL
46	F	FA
48	H	HA
4F	O	OP
4D	M	MA
50	P	PA
52	R	BR
54	T	TA
5C	\	OC
62	b	BR
66	f	FH
68	h	HH
6D	m	MH
70	p	PH
74	t	TH
7C		UB

Values programmed in Options[30]-[5F],[70] other than in this table will default to UAx for Undecoded Alarm.

Bit3 - Convert BFSK format to SIA.

The BFSK outputs will be converted to a SIA format. The automation Output will use the Protocol ID of 'R'.

When this option is enabled it has precedence over the BFSK RS232 Option[A4]. The Accounts 3/x to 4/x Option[76] may be used to insert a leading 0 to the account code.

Example:[#123|NFA1]

Option [73]: DSP Input & Output - Default [43]

The upper nibble will set the input sensitivity of the DSP where as the lower nibble of the option will set the output level. **NOTE:** This option should be left as default and should be changed only on the recommendation of a DSC technician.

Option [74]: Equivalent Line Number - Default [00]

The equivalent line number is used with the receiver number for sending signals to the central station soft-

ware. This option may be used if there is no DNIS number being received by the line card.

Option [75]: Receiver Number - Default [01]

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.

Option [76]: Accounts 3/x to 4/x - Default [00]

When programmed as 00, if the alarm is reported in 3/1, 3/1 extended, BFSK, 3/2 or 3/8 ACRON formats, a leading space will be communicated in front of the 3-digit account codes.

Ex: 1RRLsssssssAAAsXsssY[DC4]

01 - If the alarm is reported in 3/1, 3/1 extended, 3/2 or 3/8 ACRON formats, a leading '0' (zero) will be communicated in front of the 3-digit account codes.

Ex: 1RRLsssssss0AAAsXsssY[DC4]

02 - Alarms communicated to the computer. If the alarm is reported in 3/1, 3/1 extended, 3/2 or 3/8 ACRON formats, a leading '0' (zero) will be communicated in front of the 3-digit Account. And a '0' (zero) will be communicated in front of the 1-digit alarm code for the above formats as well as 4/1 formats.

Ex: 1RRLsssssss0AAAsXss0Y[DC4]

04 - If the panel is reported in SIA a leading '0' (zero) will be communicated in front of the 3-digit account.

EX: SRRL[#0AAA|Nri0/FH00]

05 - If the alarm is reported in 3/1, 3/1 extended, 3/2 BFSK, SIA, 3.8 ACRON formats then a leading '0' (zero) will be communicated in front of the 3-digit account.

06 - If the alarm is reported in 3/1, 3/1 extended, 3/2 BFSK, SIA, 3.8 ACRON formats then a leading '0' (zero) will be communicated in front of the 3-digit account and a '0' (zero) will be communicated in front of the 1-digit alarm code.

Option [77]: Digit Replace - Default [00]

Option 77 works in conjunction with Option A2. Option 77 is programmed with an ASCII value that will replace an account code digit or insert a value into an account code. Option A2 is used to replace a digit or insert a digit. To replace a digit use 0x where x is the digit to be replaced. To shift a digit use Option A2 and set to 8x where x is the location in the account code.

Example 1:

Option 77 is set for 41 and Option A2 is set for 01: Standard 4/2-format output:

1RRLssssssaAAAAsXssYZ
Account code is 9876
1RRLssssss9876sXssYZ

The receiver will do the following. First it will replace the first digit (Option A2=01) of the account code (in this example "1") and replace it with the ASCII value of 41, which is an "A".

New Output:

1RRLssssssA876sXssYZ

Example 2:

To insert a digit use 8x were x is the spot were the digit is to be inserted.

Option 77 is set to 2D and Option A2 is set for 82:

Account code is 9876 1RRLLLsssss9876sXssYZ

The receiver will do the following, it will insert the ASCII value of Option 77, in this case the ASCII value of 2D (2D is a " - ") into position two (Option A2=82), and the account code will shift to the left. So it will convert account code 9876 as indicated below:

1RRLLLsssss9-876sXssYZ

* This will not affect SIA.

Option [78]: Max Inter-digit - Default [00]

Certain old dialers may have difficulties in communicating with the DRL3 line cards. The DRL3 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 DSC 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. 0 determined by Baud rate (default).

00	auto
01	100 ms
02	200 ms
.....
0A	1000 ms

Option [79]: Max Inter-burst - Default [00]

Certain old dialers may have difficulties in communicating with the DRL3 line cards. The DRL3 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 DSC technician. When programmed as 00, the inter-burst has a time of 100 ms, all other values are in 10 ms increments.

00	100 ms (default)
01	10 ms
02	20 ms... and so on

Option [7A]: 4 and 5 Digit Account Codes to Activate 2-Way Audio - Default [00]

Option [7A] determines which account codes will be able to activate the 2-way audio feature. Program the first digits of the desired account codes in Option [7A].

For example:

To allow all account codes between 1000 and 2FFF to activate the 2-way audio function, program Option [7A] as '12'.

To allow all account codes between 3000 and 6FFF to activate the 2-way audio function, program Option [7A] as '36'.

To disable the 2-way audio function, program Option [7A] as '00'.

NOTE: Option [7A] may be used with any formats supported by the MLR2E.

Option [7B]: 3 Digit Account Codes to Activate 2-Way Audio - Default [00]

Option [7B] determines which 3-digit account codes will be able to activate the 2-way audio feature. Program the first digits of the desired account codes in Option [7B].

For example:

To allow all 3-digits account codes between 200 and 3FF to activate the 2-way audio function, program Option [7B] as '23'.

To allow all 3-digit account codes between 300 and 6FF to activate the 2-way audio function, program Option [7B] as '36'.

Program Option [04] as '00' to disable this function.

NOTE: Option [7B] may be used with any 3-digit account code formats supported by the MLR2E.

Option [7C]: Alarm Codes to Activate 2-Way Audio - Default [00]

Option [7C] determines the range of alarm codes, which will activate the 2-way audio function. Program the first digits of the desired alarm codes in Option [7C].

For example:

The DRL3 will initiate audio by the account range, Options [7A] and [7B] or by Option [7C] ALARM CODE or by both.

If all alarm codes beginning with 6, 7 and 8 are to activate 2-way audio, program Option [7C] as '68'. Option [7C] may be used with 10 to 40 Baud formats, DTMF 4/1, 4/2, and 4/3 formats.

Program Option [7C] as '00' to disable this function.

Example:

4/2 format with account code 1234, alarm code 2 on zone 3. (1234-23)

Option - [7A] [7C] Switch Reason (or [7B]) to Audio

00 1-2	Yes	Alarm code 2 falls within the code range 1-2.
1-1 00	Yes	Account code 1234 falls within the range 1-1.
2-3 00	No	Account code 1234 is outside the range 2-3.
00 3-4	No	Alarm code 2 is outside the range 3-4.
1-2 3-4	No	If both are programmed, both must be good and alarm code 2 is outside the range 3-4.
3-5 1-3	No	Both must be good and account code 1234 is outside the range 3-5.
1-4 1-5	Yes	Alarm code 2 falls within the code range 1-5, account code 1234 falls within the range 1-4.

Option [7D]: Audio Zone Code - Default [00]

Audio zone code is the range of zone codes that will activate audio. The first digit is the lowest code. The second digit indicates the highest zone that will activate audio. Option [7D] may be used with 10 to 40 Baud formats, DTMF 4/1, 4/2, and 4/3 formats.

NOTE: Option [7D] Only works for DMP Serial 1 not for DMP Serial 3.

Option [7E] Audio RS-232 - Default [00]

This is the code sent to the automation software that indicates that two-way audio has been initiated. If this option is set to '00' there will be no audio-initiated message sent to the automation output. If set to 01, the automation message for audio will be generated with protocol ID 'S'. If set to 02, the automation message will be generated with protocol ID 'O'.

- 00 No Automation Output
- 01 Send SRRL[#AAAA|NLFssoo][DC4]
- 02 Send ORRL[#AAAA|NLFssoo][DC4]

Option [7F]: Audio Format Enable - Default [00]

This option gives you the ability to enable and disable audio for selected formats. A '1' in the formats bit position will enable the format for audio. A '0' in the formats bit position will disable audio for the format.

- Bit 0 3 Digit pulse format
- Bit 1 4 and 5 Digit pulse format
- Bit 2 DTMF format
- Bit 3 Contact ID
- Bit 4 SIA format
- Bit 5 Modem II format
- Bit 6 ITI Format
- Bit 7 Westec format

For example: if the user wants audio to work only for 3-digit pulse and SIA formats, Option 7F would have to be programmed as 11 hex which enables bit 0 and bit 4.

Option 80: Kiss-Off to Hang-up Time - Default [1F]

This option determines the delay between Kiss-off 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

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

Default:	[81]	23	[85]	0E
	[82]	14	[86]	0B
	[83]	2D	[87]	00
	[84]	0C	[88]	00

The DRL3 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
- 2D Double dual-tone handshake
- 0C SIA FSK handshake
- 0B Modem II handshake
- 0E Modem IIE and ITI handshake
- 1D Single dual-tone handshake
- 0F DMP handshake
- 0D Westec handshake*
- EC SURTEC

All other frequencies can be programmed using the first two digits to represent the 3rd and 4th decimal places.

Example:

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

Option [89] to [90]: Handshake and Kiss-off Duration - Default [00]

Some control panels may require a different handshake duration. Each unit has increments of 100 ms, from 100 ms to a maximum of 8.1 seconds. Program Options 88 to 90 for the desired duration.

00	1 second
01	100 ms
02	200 ms
03	300 ms
04	400 ms
0A	1 second.
0C	1.2 second.... and so on

DSC does not recommend programmed durations longer than 1.5 seconds, as it may not be tolerated by the alarm panel. For special applications, it may be necessary, but any durations higher than 8.1 seconds will not be accurate and may not match the duration programmed.

NOTE: These options will only affect steady tones handshakes.

- Option [89]: Handshake #1 duration
- Option [8A]: Handshake #2 duration
- Option [8B]: Handshake #3 duration
- Option [8C]: Handshake #4 duration
- Option [8D]: Handshake #5 duration
- Option [8E]: Handshake #6 duration
- Option [8F]: Handshake #7 duration
- Option [90]: Handshake #8 duration

Option [91]: Inter-Handshake Duration - Default [00]

The DRL3 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 cannot wait long enough to get its 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
01	1-second interval
02	2-second interval
03	3-second interval

Option [92]: Reserved

Option [93]: Min Audio Tone - Default [00]

This option is used for Two-way audio tone detection from specific audio panels. This option should be left as default unless otherwise instructed by DSC Technical Support.

Option [94]: Account Digit Stripping - Default [00]

When Option 94 is set to 01, the leading digit of a four-digit account code will be stripped if it is an F.

Example:

Standard 4/2 format Output:
1 RRLssssssAAAAsXssYZ

Example 1:

Option 94 set to 00
Panel account code is F245

1RRLsssssf245sXssYZ

IF Option 94 is set to 01 the 'F' will be replaced by a space.

This setting will also enable the receiver to decode special pulse extended-extended formats.

1RRLsssssss245sXssYZ

If Option 94 is set to 02 than the leading digit of a four-digit panel account code will be stripped if it is a zero.

This option will work with the following formats:

Standard Pulse and DTMF(3/x, 4/x & Extended)

FBI

Ademco Super Fast (4/8/1, 4/8)

Contact ID

ITI

SIA

Modem II

SKFSK

Example 1:

Option 94 set to 02

Panel account code is 0345

1RRLssssss0345sXssYZ

New Output:

1RRLsssssss345sXssYZ

Option [95]: 5-Digit Pulse - Default [00]

The DRL3 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 DRL3 which of the 3 formats may be used.

The DRL3 cannot distinguish between 4/2 and 5/1 they both contain a total of 6 digits, therefore the DRL3 must be programmed to indicate what format.

Value	5 Digit Setting	6 Digit Setting
00	select 4/1 format	select 4/2 format
01	select 3/2 format*	select 4/2 format
02	select 3/1 checksum format	select 4/2 format
03	select 3/1 checksum format special**	select 4/2 format
10	select 4/1 format	select 5/1 format***
11	select 3/2 format*	select 5/1 format***
12	select 3/1 checksum format	select 5/1 format***
13	select 3/1 checksum format special**	select 5/1 format***

***NOTE 1:** The printer messages for the 3/2 format are the same as those used for the 4/2 format.

****NOTE 2:** Select 3/1 with checksum only for Radionics Fast (40 baud rate) sent on the 2300Hz handshake, and 4/1 on all other baud rate regardless of the handshake.

*****NOTE 3:** The printer messages for the 5/1 format are the same as those used for the 4/1 format.

Option [96]: 4/1 Extended - Default [00]

Program the 4/1 Extended Option as '01' to enable combining 2 round pairs of 4/1 extended format into 4/2 output for reporting to the automation 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 DRL3 will interpret this information as: 1234 31.

The default of '00', means 4/1 Extended is disabled.

Option [97]: 4/2 Extended - Default [00]

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 will send:

123405

123405

050516

050516

The DRL3 will interpret this information as 1234 516, or the panel will send:

123403

123403

333301

333301

The DRL3 will interpret this information as 1234 301.

Note that a longer on-line time is required for this format than for a standard 4/2 format. The default setting for Option [97] is '00'; when programmed as '00', the option is disabled.

Option [98]: 3/1 Extend - Default [01]

Program Option [98] as '01' to combine 2 round pairs of 3/1 extended or 3/1 partial extended format into 3/2 output for reporting to the computer and the printer. For example, with Option [98] enabled, the security control panel may transmit the following information:

1233

1233

3331

3331

The DRL3 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]: Ademco Express - Default [01]

The Ademco 4/1 Express format may cause conflicts with the Sur-Gard DTMF 4/3 with checksum format or FBI Super fast without checksum. Therefore, this option must be programmed to inform the DRL3 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

Option [9A]: Reserved

Option [9B]: Echo Cancellor - Default [00]

00 Disabled

01 Enabled: Disable echo canceller

Option [9C]: Acron RS-232 - Default [01]

When this option is programmed as '00', the DRL3 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 indicated below:

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

Option [9D]: MODEM II RS-232 - Default [01]

The DRL3 is able to decode the Modem II formats. The handshake 0B needs to be programmed as one of the handshakes of the DRL3 for the Modem II and handshake 0E for Modem IIE or Modem IIIa 2. Option [9D] determines the protocol sent to the computer. Note that this option will also affect the BFSK format only if programmed as 00 or 01.

Option 9D Programming

Option 9D has changed from a value programmed option to a bit programmed option.

Bit 0: Controls if the Modem II output protocol is 01 or 06.

Bit 1: Controls if the Modem II output is Modem II or converted to SIA without text.

Bit 2: Controls if the Modem II to SIA conversion includes the ASCII text.

Bit 3: Enables the full account code to be sent to the printer and automation if receiving more than 4 digits. Refer to example for more details. This affects the standard Modem output protocols as well as the SIA conversion.

NOTE: If disabled, only the first 4 digits will be decoded even if more are received.

For previous versions that were programmed Prior to 1.70 Equivalent programming on 1.70

00	00
01	01
02	02
03	06

NOTE: Ensure that the automation software supports settings 02 and 04 if the SIA protocol is desired.

Option [9E]: Scantronics Select - Default [00]

When this option is programmed as '00', 14 Digit DTMF will be decoded as Scantronics 4-8-1 with Checksum.

When this option is programmed as '01', 14 Digit DTMF will be decoded as Scantronics 5-8-1.

Option [9F]: Ademco High Speed RS-232 - Default [01]

When this option is programmed as '00', the DRL3 will convert the High Speed format signal into 4/2 format (E.g. 1RRLsssssAAAAsXssYY[DC4]). If it is programmed as '01' the Ademco High Speed will be sent to the computer as indicated below:

```
8RRLAAAAsCCCCsCCCCsC[DC4]
```

Where 8 = protocol number
RR = receiver number
L = line number
AAAA = account code
CCCC = channel 1-4
s = space
CCCC = channel 5-8
s = space
C = Channel 9
[DC4] terminator

Option [A0]: 11 / 12-Digit DTMF (Acron or Scantronics) - Default [00]

When this option is programmed as '00', if 11 or 12-digit DTMF is received, it will be decoded as ACRON Format.

When this option is programmed as '01', if 11 or 12-digit DTMF is received, it will be decoded as SCANTRONICS Format.

	Incoming Format	Decoded Format
00	11-digit DTMF	Acron 3-8
00	12-digit DTMF	Acron 4-8
01	11-digit DTMF	Scantronics 2-8-1
01	12-digit DTMF	Scantronics 3-8-1

Option [A1]: FBI RS-232 - Default [01]

To enable the computer for FBI Super Fast protocol, program Option [A1] as '01'. When enabled, the computer output will be as indicated below:

```
JRRLsssssAAAATZZEss[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
if E = 0 and T = 0 : listen in.

Option [A2]: Digit Replace - Default [00]

Option 77 works in conjunction with Option A2. Option 77 is programmed with an ASCII value that will replace an account code digit or insert a value into an account code. Option A2 is used to replace a digit or insert a digit. To replace a digit use 0x where x is the digit to be replaced. To shift a digit use Option A2 and set to 8x where x is the location in the account code.

Option [A3]: D6500 RS-232 - Default [00]

This option is used to strip hex digits on the automation output. The DRL3 will emulate the Radionics 6500 RS-232 protocol on pulse formats, Ademco Express and Varitech only. When Option A3 is set to 01 the hex digit will be stripped for 1-digit reporting codes including Varitech 4/1.

Example 1: Code 1
Computer output: 1RRLsssss022sAsss1

Example 2: Code B
Computer output: 1RRLsssss022sOssss
If Option A3 set to 02: the hex digit will be stripped for 2-digit reporting codes including Varitech 4/2.

Example 1: Code 21
Computer output: 1RRLsssss022sAss21

Example 2: Code B1
Computer output: 1RRLsssss022sOsss1
If Option A3 set to 03: the hex digit will be stripped for 1 and 2-digit reporting codes including Varitech.
If Option A3 set to 04: the hex digit will be stripped for BFSK.

NOTE: This option will only work if Option A4 is set to 01.

Example 1: Code 21
Computer output: 6RRLsssss022sAss21

Example 2: Code B1
Computer output: 6RRLsssss022sOsss1
If Option A3 is set to 05: the hex digit will be stripped for 1-digit reporting and BFSK.
If Option A3 is set to 06: the hex digit will be stripped for 2-digit reporting and BFSK.

If Option A3 set to 07: the hex digit will be stripped for 1-digit, 2-digit and BFSK.

NOTE: Option [70] must be left as an individual event code when enabling this option.

Option [A4]: BFSK RS-232 - Default [00]

When programming Option [A4] as '00', the BFSK format will be reported as Radionics 6500 BFSK mode to the computer; the protocol identifier will be a 6.

Example 1: Code 21

Computer Output: 6RRL 022sAsss1

Example 2: Code B1

Computer Output: 6RRL 022sOsss1

When Option A4 set to 01, the BFSK will be reported as a standard 3/1 extended format, the protocol identifier will also be changed from 6 to 1.

Example 1: Code 21

Computer Output: 1RRL 022sAss21

Example 2: Code B1

Computer Output: 1RRL 022sOssB1

Option [A5]: Sescoa Super Speed - Default [01]

If set to 00 Sescoa Super Speed will be disabled and 4/2 with checksum will be enabled.

If set to 01, Sescoa Super Speed will be enabled and 4/2 with checksum will be disabled.

If set to 03 Sescoa Super Speed will be disabled and only 4/2 with checksum will be enabled. 4/2 double round will be disabled.

Option [A6]: ITI Adjust - Default [00]

When set to 01, the ITI account codes will be converted to four digits by stripping the last digit off. For example, a panel account of 23459 will become account 2345. If the leading digit of the panel account is a 0 than it will be stripped and replaced with a space. For example, if 02349 is sent then the receiver will output 234 for the panel account.

Option [A7]: Silent Knight FSK2 RS-232 - Default [00]

The DRL3 provides two possible outputs to the computer for Silent Knight FSK2 format. The operation of this option is explained below:

[A7] = 00 SKFSK disabled

[A7] = 01 SKFSK enabled for:
SKFSK1
ERRLsssssssAAAAYYssss[DC4]
SKFSK2 Protocol #2
CRRLssssAAAAAYYZss[DC4]

[A7] = 02 SKFSK enabled for:
SKFSK1
ERRLsssssssAAAAYYssss[DC4]
SKFSK2 Protocol #2
FRRLssssAAAAAYYZss[DC4]

Options [A8] - [AF]: Dial-out Number For 2-way Audio Transfer - Default [00]

These 8 options are used to provide the dial-out number if the user wishes to transfer the call to another extension. Up to 16 digits may be programmed including any 'Feature Command' digits. The values in these options will be sent as DTMF tones on the phone line after the following sequence takes place:

- 1 The DRL3 has recognized the current call as a 2-way audio account and alarm code.
- 2 The calling control panel has finished sending its alarms and switched into 2-way audio mode.
- 3 The DRL3 will perform a Hook-flash with the time value as programmed in Option 11 and then start to dial the digits programmed in Options A8-AF.

Options A8-AF must be programmed in the following manner: Digits 1-9 are programmed as the numbers 1-9. The digit 'A' must be programmed if a zero is needed anywhere in the dial string as the digit zero is used to indicate to the line card that there are no more digits to dial. If a '*' is needed, (e.g., *70, the transfer command in some PBX/PABX switches) program a 'B'. Similarly, if a '#' is needed, program a 'C'.

To get the line card to wait for 3 seconds in a dial string, program a 'D'. For example: to have the line card transfer a 2-way audio call to Ext. 51386, with a 3 second pause between the transfer command and dialing, Options A8-AF would be programmed as the following:

A8 = B7	AC = 60
A9 = AD	AD = 00
AA = 51	AE = 00
AB = 38	AF = 00

Options [B0] - [FF]: Reserved

Section 7 - DRL2E Communication Formats

7.1 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: 1011ssssss123sAsss1[14]
Printer: L01-123-1-FIRE ALARM HH:MM:SS-DD/MM
- 3/1 EXTENDED FORMAT
Computer: 1011ssssss123sAss32[14]
Printer: L01-123-32-FIRE ALARM HH:MM:SS-DD/MM
- 4/2 FORMAT
Computer: 1011ssssss1234sAss22[14]
Printer: L01-1234-22-FIRE ALARM HH:MM:SS-DD/MM

7.2 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: 1011ssssss2255sAs266[14][6]
Printer: L01-2255-266-PANIC ALARM HH:MM:SS-DD/MM

7.3 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: L1-1221-E110-00 FIRE ALARM HH:MM:SS-DD/MM
Computer: 5011 181221E11000101[14]

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

7.4 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

7.7.1 Expected Output

PRRLssAAAAAsXT1...T_ns[DC4]

- 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

7.5 Scantronics*

The Scantronic format can consist of 2 to 6 account numbers, 8 or 16 status digits, and 1 auxiliary channel.

- 2-8-1 to 6-8-1
- 2-16-1 to 6-16-1

*** Use only with model SG-MLR2E CE. SG-MLR2E CE is not UL Listed.**

7.6 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.

8RRLLLLAAAsCCCCsC[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 AAZZZZZZZZS

Example:

- With option 9F disabled
Computer: 1011ssssss1234sAss02[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 - 515555557 HH:MM:SS-DD/MM

7.7 DMP FSK

PRRLssAAAAAsXT₁...T_ns[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", the incoming signal is in serial 1 format. If X position holds an upper case "Z" than 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.

T₁-T₂ = Alarm information

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

Data:

P = DMP protocol identifier

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

s = Spaces

AAAA = Account code

X = DMP serial format identifier

T₁-T_n = Alarm information

Examples:

```
PO11ss12345sA00081EASTSMOKE[DC4]
PO11ss12345sA00085555116NORTH 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.

```
PO11ss12345sZa\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.

7.8 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 DRLZE.

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

FBI Event	Code	ConvertedEvent 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: J0111234B001[14]
```

```
FBI RS-232 Option Off
Automation: I011 1234B001[14]
```

7.9 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.

7.9.1 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

7.9.2 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

7.9.3 SX-V

Sensor#	Printed out as
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

7.9.4 Commander 2000

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

7.9.5 Pro 5000 (UltraGard 5000)

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 ALARMMH:MM:SS-DD/MM
- ITI Computer Example:
1011ssss1B2345A081A31[DC4]

7.10 Modem II, Modem IIE, Modem IIIa² and BFSK Formats

BFSK, Modem II, Modem IIIa² or Modem IIE formats can be decoded by the DRL2E.

7.10.1 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

7.10.2 BFSK

Example:

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

7.11 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 1.4 software implements Levels 1, 2 and 3 of the SIA 1993IIB 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]

7.12 Silent Knight FSK1, FSK2

7.12.1 Silent Knight FSK1 Protocol

ERRLssssAAAAAAXXssss[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

Example

Printer: L1-1234-03-LIBRARY WORD
HH:MM:SS-DD/MM
Computer: E01001 123403 [14]

7.12.2 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 "02", the computer output will be as follows:

FRRLssssAAAAAAYYZs[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
LTOZ 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:

CRRLssssAAAAAAXYZs[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
FDOa	: 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

7.13 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: 7017sssss1234sF

7.14 DRL2E Predefined Library Decoding and Event Codes Table

7.14.1 3/1 - 4/1 Alarm Library

For Alarm Message	Corresponding Code	Event Code (Options 30-3F)
	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

7.14.2 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
Cancl	Dx	/	CANCEL
Restr	Ex	R	RESTORE
Trble	Fx	T	SYSTEM TROUBLE

7.14.3 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	OPENING
OpenGrp	Cxx	O	O	CLOSING
Bypas	Dxx	B	B	CANCEL
Unbyp	Exx	H	H	RESTORE
Cancl	Fxx	/	/	SYSTEM TROUBLE

Ensure that the central station automation software is able to accept these codes if they are to be used.

7.14.4 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"

Section 8 - CPM2 Central Processing Module

8.1 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.

8.2 Feature

- 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.

8.3 CPM2 Controls

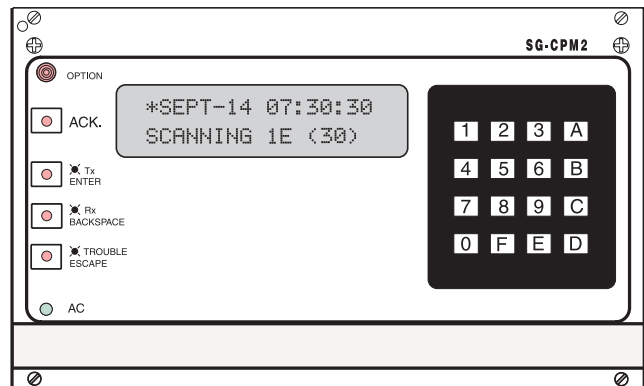
- 128-event computer alarm message buffer
- 128-event printer alarm message buffer
- LCD contrast easily adjusted
- Ability to individually examine each line card message
- "Cold boot" option allows easy installation of default configuration
- Built-in diagnostic "debug" mode allows each line card to 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 (SCADA stands for Supervisory Control and Data Acquisition) 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.

8.4 CPM2 Operating Mode

8.4.1 CPM2 Cold Startup

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.

Figure 8, CPM2 Front View



8.3.1 Liquid Crystal Display

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

8.3.2 "Option" light

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

8.3.3 [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.

8.3.4 "ACK" light

Flashes when a message is received from the line card and COM1 is disabled or disconnected.

8.3.5 [Enter] button

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

8.3.6 "TX" light

Monitors the COM1 transmission signal.

8.3.7 [Backspace] button

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

8.3.8 "RX" light

Monitors the signal received from the computer connected to COM1.

8.3.9 [Escape] button

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

8.3.10 "AC" light

Indicates that AC power is present.

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.

8.4.2 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.

8.4.3 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.

8.4.4 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] 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 change the default setting (4.0 sec.) unless so instructed 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.*

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 MLR2E 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:

```
1RRL AAAAsX
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; the following message will be displayed:

```
9V/12V Batt: 0-3
2 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 Diagnostics mode 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-22-00 V2.4
```

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 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. **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: Printer 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 had been pressed. This could be used to install a remote Acknowledge button when using the receiver in manual mode.

8.5 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

8.5.1 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.

8.5.2 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.

8.5.3 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.

8.5.4 "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.

8.5.5 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!>
```

8.5.6 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>>
```

8.5.7 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!
```

8.5.8 AC Failure

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

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

8.5.9 Standby Mode Message

During normal standby operation, this message will be displayed:

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

8.6 CPM2 Utility Modes

CPM2 v2.4 provides for a 2 digit line card number. Since v2.4 is being shipped with all DRLZE 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

8.6.1 [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.

8.6.2 [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.

8.6.3 [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 DRLZE 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.

8.6.4 [D] Send Printer Messages 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)

01 to 1E 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 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.

8.6.5 [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:
Enter... to view

```
00 CPM2 internal trouble messages (if any)
01 to 1E 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.

8.6.6 [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:

Enter... to view

```
00 CPM2 internal trouble messages (if any)
01 to 1E 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 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.

8.6.7 MLR2E 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.

8.6.8 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.

8.6.9 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

NOTE: *Trouble can be caused by bad backplane connections or RAM failure. Cold boot may be necessary.*

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

#0000|NYNRRRLFaulty Data Received on Line Card
 #0000|NLTRRL Telephone Line Fault on Line Card
 #0000|NLRRL Telephone Line Restored on Line Card
 #0000|NYCRRL Faulty Call; No Data Received on Line Card

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

8.7 CPM2 EPROM Programming

6500 05HPrinter strobe pulse width default = 5 microseconds

6501-65023E80Delay 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 Timer Test 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.

Section 9 - Automation Protocols

The Sur-Gard MLR2E 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.

9.1 Data Byte protocol

The Sur-Gard MLR2E receiver uses a default configuration of 19200 Baud, 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.

9.2 Acknowledgment 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

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 ²	FSK	FSK	300 Baud		NO	FSK
DMP	Data hsk	FSK	300 Baud		NO	Data K-O
Varitech*	2300Hz	FSK	40 Baud	4/2	NO	2300Hz
Scantronic*	Dual Tone 1600Hz	DTMF	DTMF	4/8/1,4/16/1,2/8/1, 3/8/1, 6/8/1, 6/16/1, 2/16/1, 3/16/1	NO	1400Hz

* UL has not verified compatibility with these formats. Use only with model SG-MLR2E CE. SG-MLR2E CE is not UL Listed.

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
B7	38	8
B8	39	9
B9	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	5B	\

Appendix C - Decimal - HEX - Binary Conversion Chart

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

Appendix D - Printer Words: Options [60-6F]

The English Printer Library is provided and can be selected by programming the event codes to the corresponding word. Words available:

Hex #	Printer Words
00	MEDICAL*
01	PENDANT TRANSMITTER
02	FAIL TO REPORT IN
03	RESERVED
04	RESERVED
05	RESERVED
06	RESERVED
07	RESERVED
08	RESERVED
09	RESERVED
0A	FIRE ALARM
0B	SMOKE
0C	COMBUSTION
0D	WATER FLOW
0E	HEAT
0F	PULL STATION
10	DUCT
11	FLAME
12	NEAR FIRE ALARM
13	RESERVED
14	PANIC ALARM
15	DURESS ALARM
16	SILENT ALARM
17	AUDIBLE ALARM
18	DURESS
19	DURESS
1A	RESERVED
1B	RESERVED
1C	RESERVED
1D	RESERVED
1E	BURGLARY
1F	PERIMETER
20	INTERIOR
21	24 HOUR
22	ENTRY/EXIT
23	DAY/NIGHT
24	OUTDOOR
25	TAMPER
26	NEAR BURGLARY ALARM
27	INTRUSION VERIFIER
28	GENERAL ALARM
29	POLLING LOOP OPEN
2A	POLLING LOOP SHORT
2B	EXPANSION MODULE FAILURE
2C	SENSOR TAMPER
2D	EXPANSION MODULE TAMPER
2E	SILENT BURG
2F	SENSOR SUPERVISION FAILURE
30	RESERVED
31	RESERVED
32	24 HOUR NON-BURGLARY
33	GAS DETECTED*
34	REFRIGERATION*
35	LOSS OF HEAT*
36	WATER LEAKAGE*
37	FOIL BREAK*
38	DAY TROUBLE
39	LOW BOTTLED GAS LEVEL*
3A	HIGH TEMPERATURE*
3B	LOW TEMPERATURE*
3C	RESERVED
3D	LOSS OF AIR FLOW*

Hex #	Printer Words
3E	CARBON MONOXIDE*
3F	TANK LEVEL*
40	RESERVED
41	RESERVED
42	RESERVED
43	RESERVED
44	RESERVED
45	RESERVED
46	FIRE SUPERVISORY
47	LOW WATER PRESSURE*
48	LOW CO2*
49	GATE VALVE SENSOR*
4A	LOW WATER LEVEL*
4B	PUMP ACTIVATED*
4C	PUMP FAILURE*
4D	RESERVED
4E	RESERVED
4F	RESERVED
50	SYSTEM TROUBLE
51	AC LOSS
52	LOW SYSTEM BATTERY
53	RAM CHECKSUM BAD
54	ROM CHECKSUM BAD
55	SYSTEM RESET
56	PANEL PROGRAM CHANGED
57	SELF-TEST FAILURE
58	SYSTEM SHUTDOWN
59	BATTERY TEST FAILURE
5A	GROUND FAULT
5B	BATTERY MISSING/DEAD
5C	POWER SUPPLY OVERCURRENT
5D	ENGINEER RESET
5E	RESERVED
5F	RESERVED
60	RESERVED
61	RESTORE ALARM
62	OPENING ALARM
63	CLOSING ALARM
64	SOUNDER/RELAY
65	BELL 1
66	BELL 2
67	ALARM RELAY
68	TROUBLE RELAY
69	REVERSING
6A	NOTIFICATION APPLIANCE 3 CHECK
6B	NOTIFICATION APPLIANCE 4 CHECK
6C	RESERVED
6D	RESERVED
6E	SYSTEM PERIPHERAL
6F	POLLING LOOP OPEN
70	POLLING LOOP SHORT
71	EXPANSION MODULE FAILURE
72	REPEATER FAILURE
73	LOCAL PRINTER PAPER OUT
74	LOCAL PRINTER FAILURE
75	EXPANSION MODULE DC LOSS
76	EXPANSION MODULE LOW BATTERY
77	EXPANSION MODULE RESET
78	RESERVED
79	EXP. MODULE TAMPER
7A	EXP. MODULE AC LOSS
7B	EXP. MODULE SELF-TEST FAIL

*Printer words to be used only with model MLR2E CE.

Model MLR2E CE is not UL Listed.

Hex #	Printer Words
7C	LOSS SUPERVISORY RF
7D	RESERVED
7E	RESERVED
7F	RESERVED
80	RESERVED
81	RESERVED
82	COMMUNICATION
83	TELCO 1 FAULT
84	TELCO 2 FAULT
85	LONG RANGE RADIO
86	FAIL TO COMMUNICATE
87	LOSS OF RADIO SUPERVISION
88	LOSS OF CENTRAL POLLING
89	VSWR
8A	RESERVED
8B	RESERVED
8C	PROTECTION LOOP
8D	PROTECTION LOOP OPEN
8E	PROTECTION LOOP SHORT
8F	FIRE TROUBLE
90	EXIT ALARM
91	PANIC ZONE TROUBLE
92	HOLDUP ZN TROUBLE
93	SWINGER TROUBLE
94	CROSS ZONE TROUBLE
95	RESERVED
96	SENSOR TROUBLE
97	LOSS OF SUPERVISORY - RF
98	LOSS OF SUPERVISORY - RPM
99	SENSOR TAMPER
9A	RF TRANSMITTER. LOW BATTERY
9B	SMOKE HI-SENSOR
9C	SMOKE LOW-SENSOR
9D	INTRUSION HI-SENSOR
9E	INTRUSION LOW-SENSOR
9F	SELF TEST FAIL
A0	OPEN/CLOSE
A1	O/C BY USER
A2	GROUP O/C
A3	AUTOMATIC O/C
A4	LATE O/C
A5	DEFERRED O/C
A6	CANCEL
A7	REMOTE ARM/DISARM
A8	QUICK ARM
A9	KEYSWITCH O/C
AA	RESERVED
AB	CALLBACK REQUEST MADE
AC	SUCCESSFUL DOWNLOAD ACCESS
AD	UNSUCCESSFUL ACCESS
AE	SYSTEM SHUTDOWN
AF	DIALER SHUTDOWN
B0	SUCCESS FULL UPLOAD
B1	RESERVED
B2	RESERVED
B3	RESERVED
B4	RESERVED
B5	ACCESS DENIED
B6	ACCESS REPORT BY USER
B7	FORCED ACCESS
B8	EGRESS DENIED
B9	EGRESS GRANTED
BA	ACCESS
BB	ACCESS
BC	ACCESS
BD	ACCESS

Hex #	Printer Words
BE	RESERVED
BF	ARMED STAY
C0	KEYSWITCH ARMED STAY
C1	RESERVED
C2	RESERVED
C3	RESERVED
C4	RESERVED
C5	RESERVED
C6	GROUP CLOSING
C7	GROUP OPENING
C8	EXCEPTION O/C
C9	EARLY O/C
CA	LATE O/C
CB	FAIL TO O/C
CC	FAIL TO O/C
CD	AUTO ARM FAIL
CE	O/C PARTIAL ARMED
CF	EXIT ERROR
D0	USER PRESENT
D1	RECENT CLOSE
D2	SOUNDER/RELAY DISABLED
D3	BELL 1 DISABLE
D4	BELL 2 DISABLE
D5	ALARM RELAY DISABLE
D6	TROUBLE RELAY DISABLE
D7	REVERSING RELAY DISABLE
D8	NOTIFICATION APPLIANCE 3 DISABLED
D9	NOTIFICATION APPLIANCE 4 DISABLED
DA	RESERVED
DB	RESERVED
DC	RESERVED
DD	DIALER DISABLED
DE	RADIO TRANSMITTER DISABLED
DF	REMOTE UPLOAD/DOWNLOAD DISABLED
E0	RESERVED
E1	RESERVED
E2	RESERVED
E3	RESERVED
E4	MESSAGE
E5	SERVICE
E6	ZONE BYPASS
E7	FIRE BYPASS
E8	24 HOUR ZONE BYPASS
E9	BURGLARY BYPASS
EA	GROUP BYPASS
EB	SWINGER BYPASS
EC	ACCESS ZN SHUNT
ED	ACCESS POINT BYPASS
EE	RESERVED
EF	UNBYPASS
F0	RESERVED
F1	MANUAL TRIGGER TEST
F2	PERIODIC TEST REPORT
F3	PERIODIC RF TRANSMISSION
F4	FIRE TEST
F5	STATUS REPORT TO FOLLOW
F6	LISTEN-IN TO FOLLOW
F7	WALK TEST MODE
F8	OFF NORMAL CONDITION
F9	VIDEO TRANSMITTER ACTIVE
FA	RESERVED
FB	FIRE POINT TEST
FC	FIRE POINT NOT TESTED
FD	INTRUSION ZONE WALK TESTED
FE	FIRE ZONE WALK TESTED
FF	PANIC ZONE WALK TESTED

Appendix E - Default Static Options

Option	Description	Default
01	LINE #	0D, 0E
02	LINE # LENGTH	0E
03	DSC AUDIO	01
04	AUDIO TIME	00
05	PRE H.S. TIME	0A
0E	LINE DETECTION	01
0F	MUTE BUZZER	00
10	LAST MESSAGE	1D
11	HOOK-FLASH	00
12	CALLER SOURCE	00
13	CALLER SOURCE -COMP	00

Option	Description	Default
14	CALLER SOURCE	00
15	LINE SEIZE EVENT	00
16	LINE RELEASE EVENT	00
1C	BUSY OUT	01
1D	INPUT SENSITIVITY	3F
1E	OUTPUT LEVELS	C0
1F	DEBUG	00
2A	HOOK FLASH DURATION	00
27	CALLER SOURCE PRO-	00
28	CESSSK FSK ENABLE	00
2B	ECHO SUPPRESSION	00
2F	MAX ONLINE TIME	00

Appendix F - Default Dynamic Options [30] - [AF]

Line Card Configuration Command:

LCard - Line Card Comd - Command(F7) Op - Option Cd - Code SC - Second Code

Option	Description	Default	Change ASCII (HEX)	Option	Description	Default	Change ASCII (HEX)
30	4/1 DIGIT#0 -A-	41		71	LIBRARY SELECT:	04	
31	4/1 DIGIT#1 -A-	41		72	SIA OPTION:	00	
32	4/1 DIGIT#2 -A-	41		73	RESERVED:	00	
33	4/1 DIGIT#3 -A-	41		74	EQUIVALENT LINE:	00	
34	4/1 DIGIT#4 -A-	41		75	RECEIVER NUMBER:	01	
35	4/1 DIGIT#5 -A-	41		76	3 DIGIT ACCOUNT	00	
36	4/1 DIGIT#6 -A-	41		77	DIGIT REPLACE	00	
37	4/1 DIGIT#7 -A-	41		78	INTEGER DIGIT:	00	
38	4/1 DIGIT#8 -A-	41		79	INTEGER BURST:	00	
39	4/1 DIGIT#9 -R-	52		7A	AUDIO 4 DIGIT	00	
3A	4/1 DIGIT#A=0 -A-	41		7B	AUDIO 3 DIGIT:	00	
3B	4/1 DIGIT#B -O-	4F		7C	AUDIO CODE:	00	
3C	4/1 DIGIT#C -C-	43		7D	AUDIO ZONE:	00	
3D	4/1 DIGIT#D -\-	5C		7E	AUDIO EVENT:	00	
3E	4/1 DIGIT#E -R-	52		7F	AUDIO FORMAT:	00	
3F	4/1 DIGIT#F -T-	54		80	KO/HANGUP TIME:	1F	
40	4/2 DIGIT#0=A -A-	41		81	HANDSHAKE#1:	14	
41	4/2 DIGIT#1 -A-	41		82	HANDSHAKE#2:	23	
42	4/2 DIGIT#2 -A-	41		83	HANDSHAKE#3:	2D	
43	4/2 DIGIT#3 -A-	41		84	HANDSHAKE#4:	0C	
44	4/2 DIGIT#4 -A-	41		85	HANDSHAKE#5:	0B	
45	4/2 DIGIT#5 -A-	41		86	HANDSHAKE#6:	0E	
46	4/2 DIGIT#6 -A-	41		87	HANDSHAKE#7:	00	
47	4/2 DIGIT#7 -A-	41		88	HANDSHAKE#8:	00	
48	4/2 DIGIT#8 -A-	41		89	HS/KO TIME#1:	00	
49	4/2 DIGIT#9 -R-	52		8A	HS/KO TIME#2:	00	
4A	4/2 DIGIT#A=0 -A-	41		8B	HS/KO TIME#3:	00	
4B	4/2 DIGIT#B -O-	4F		8C	HS/KO TIME#4:	00	
4C	4/2 DIGIT#C -C-	43		8D	HS/KO TIME#5:	00	
4D	4/2 DIGIT#D -\-	5C		8E	HS/KO TIME#6:	00	
4E	4/2 DIGIT#E -R-	52		8F	HS/KO TIME#7:	00	
4F	4/2 DIGIT#F -T-	54		90	HS/KO TIME#8:	00	
50	4/3 DIGIT#0=A -T-	54		91	INTER H.S:	00	
51	4/3 DIGIT#1 -A-	41		92	RESERVED:	00	
52	4/3 DIGIT#2 -A-	41		93	MIN AUDIO TONE	00	
53	4/3 DIGIT#3 -A-	41		94	ACCOUNT DIGIT	00	
54	4/3 DIGIT#4 -C-	43			STRIPPING		
55	4/3 DIGIT#5 -O-	4F		95	5 DIGIT PULSE	00	
56	4/3 DIGIT#6 -T-	54		96	4/1 EXTEND	01	
57	4/3 DIGIT#7 -A-	41		97	4/2 EXTEND	00	
58	4/3 DIGIT#8 -A-	41		98	3/1 EXTEND	01	
59	4/3 DIGIT#9 -R-	52		99	8 DIGIT DTMF	01	
5A	4/3 DIGIT#A=0 -T-	54		9A	ERROR COUNTER	00	
5B	4/3 DIGIT#B -C-	43		9B	ECHO CANCELLER	00	
5C	4/3 DIGIT#C -O-	4F		9C	ACRON RS-232	01	
5D	4/3 DIGIT#D -B-	42		9D	MODEM II RS-232	01	
5E	4/3 DIGIT#E -H-	48		9E	SCANTRONICS	00	
5F	4/3 DIGIT#F -A-	5C			SELECT		
60	PRINTER WORDS:	F2		9F	ADEMCO HS RS-232	01	
61	PRINTER WORDS:	0A		A0	1 1/2 DIGIT DTMF	00	
62	PRINTER WORDS:	14		A1	FBI RS-232	01	
63	PRINTER WORDS:	1E		A2	DIGIT REPLACE	00	
64	PRINTER WORDS:	28		A3	D6500 COM	00	
65	PRINTER WORDS:	28		A4	BFSK RS-232	01	
66	PRINTER WORDS:	50		A5	7 DIGIT PULSE	01	
67	PRINTER WORDS:			A6	ITI ADJUST	00	
68	PRINTER WORDS:	50		A7	SKFSK RS-232	00	
69	PRINTER WORDS:	61		A8	DIAL-OUT 2-WAY	00	
6A	PGM OUTPUT: 000	F2		A9	DIAL-OUT 2-WAY	00	
6B	PGM INPUT: 000	62		AA	DIAL-OUT 2-WAY	00	
6C	FILTER OPT: 0006	63		AB	DIAL-OUT 2-WAY	00	
6D	PRINTER WORDS:	A6		AC	DIAL-OUT 2-WAY	00	
6E	PRINTER WORDS:	61		AD	DIAL-OUT 2-WAY	00	
6F	PRINTER WORDS:	50		AE	DIAL-OUT 2-WAY	00	
70	AUTOMATION CODE:	00		AF	DIAL-OUT 2-WAY	00	

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 xmtr 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

WARNING Please Read Carefully

Note to Installers

This warning contains vital information. As the only individual in contact with system users, it is your responsibility to bring each item in this warning to the attention of the users of this system.

System Failures

This

system has been carefully designed to be as effective as possible. There are circumstances, however, involving fire, burglary, or other types of emergencies where it may not provide protection. Any alarm system of any type may be compromised delicately or may fail to operate as expected for a variety of reasons. Some but not all of these reasons may be:

■ Inadequate Installation

A security system must be installed properly in order to provide adequate protection. Every installation should be evaluated by a security professional to ensure that all access points and areas are covered. Locks and latches on windows and doors must be secure and operate as intended. Windows, doors, walls, ceilings and other building materials must be of sufficient strength and construction to provide the level of protection expected. A reevaluation must be done during and after any construction activity. An evaluation by the fire and/or police department is highly recommended if this service is available.

■ Criminal Knowledge

This system contains security features which were known to be effective at the time of manufacture. It is possible for persons with criminal intent to develop techniques which reduce the effectiveness of these features. It is important that a security system be reviewed periodically to ensure that its features remain effective and that it be updated or replaced if it is found that it does not provide the protection expected.

■ Access by Intruders

Intruders may enter through an unprotected access point, circumvent a sensing device, evade detection by moving through an area of insufficient coverage, disconnect a warning device, or interfere with or prevent the proper operation of the system.

■ Power Failure

Control units, intrusion detectors, smoke detectors and many other security devices require an adequate power supply for proper operation. If a device operates from batteries, it is possible for the batteries to fail. Even if the batteries have not failed, they must be charged, in good condition and installed correctly. If a device operates only by AC power, any interruption, however brief, will render that device inoperative while it does not have power. Power interruptions of any length are often accompanied by voltage fluctuations which may damage electronic equipment such as a security system. After a power interruption has occurred, immediately conduct a complete system test to ensure that the system operates as intended.

■ Failure of Replaceable Batteries

This system's wireless transmitters have been designed to provide several years of battery life under normal conditions. The expected battery life is a function of the device environment, usage and type. Ambient conditions such as high humidity, high or low temperatures, or large temperature fluctuations may reduce the expected battery life. While each transmitting device has a low battery monitor which identifies when the batteries need to be replaced, this monitor may fail to operate as expected. Regular testing and maintenance will keep the system in good operating condition.

■ Compromise of Radio Frequency (Wireless) Devices

Signals may not reach the receiver under all circumstances which could include metal objects placed on or near the radio path or deliberate jamming or other inadvertent radio signal interference.

■ System Users

A user may not be able to operate a panic or emergency switch possibly due to permanent or temporary physical disability, inability to reach the device in time, or unfamiliarity with the correct operation. It is important that all system users be trained in the correct operation of the alarm system and that they know how to respond when the system indicates an alarm.

■ Smoke Detectors

Smoke detectors that are a part of this system may not properly alert occupants of a fire for a number of reasons, some of which follow. The smoke detectors may have been improperly installed or positioned. Smoke may not be able to reach the smoke detectors, such as when the fire is in a chimney, walls or roofs, or on the other side of closed doors. Smoke detectors may not detect smoke from fires on another level of the residence or building.

Every fire is different in the amount of smoke produced and the rate of burning. Smoke detectors cannot sense all types of fires equally well. Smoke detectors may not provide timely warning of fires caused by carelessness or safety hazards such as smoking in bed, violent explosions, escaping gas, improper storage of flammable materials, overloaded electrical circuits, children playing with matches or arson.

Even if the smoke detector operates as intended, there may be circumstances when there is insufficient warning to allow all occupants to escape in time to avoid injury or death.

■ Motion Detectors

Motion detectors can only detect motion within the designated areas as shown in their respective installation instructions. They cannot discriminate between intruders and intended occupants. Motion detectors do not provide volumetric area protection. They have multiple beams of detection and motion can only be detected in unobstructed areas covered by these beams. They cannot detect motion which occurs behind walls, ceilings, floor, closed doors, glass partitions, glass doors or windows. Any type of tampering whether intentional or unintentional such as masking, painting, or spraying of any material on the lenses, mirrors, windows or any other part of the detection system will impair its proper operation.

Passive infrared motion detectors operate by sensing changes in temperature. However their effectiveness can be reduced when the ambient temperature rises near or above body temperature or if there are intentional or unintentional sources of heat in or near the detection area. Some of these heat sources could be heaters, radiators, stoves, barbecues, fireplaces, sunlight, steam vents, lighting and so on.

■ Warning Devices

Warning devices such as sirens, bells, horns, or strobes may not warn people or waken someone sleeping if there is an intervening wall or door. If warning devices are located on a different level of the residence or premise, then it is less likely that the occupants will be alerted or awakened. Audible warning devices may be interfered with by other noise sources such as stereos, radios, televisions, air conditioners or other appliances, or passing traffic. Audible warning devices, however loud, may not be heard by a hearing-impaired person.

■ Telephone Lines

If telephone lines are used to transmit alarms, they may be out of service or busy for certain periods of time. Also an intruder may cut the telephone line or defeat its operation by more sophisticated means which may be difficult to detect.

■ Insufficient Time

There may be circumstances when the system will operate as intended, yet the occupants will not be protected from the emergency due to their inability to respond to the warnings in a timely manner. If the system is monitored, the response may not occur in time to protect the occupants or their belongings.

■ Component Failure

Although every effort has been made to make this system as reliable as possible, the system may fail to function as intended due to the failure of a component.

■ Inadequate Testing

Most problems that would prevent an alarm system from operating as intended can be found by regular testing and maintenance. The complete system should be tested weekly and immediately after a break-in, an attempted break-in, a fire, a storm, an earthquake, an accident, or any kind of construction activity inside or outside the premises. The testing should include all sensing devices, keypads, consoles, alarm indicating devices and any other operational devices that are part of the system.

■ Security and Insurance

Regardless of its capabilities, an alarm system is not a substitute for property or life insurance. An alarm system also is not a substitute for property owners, renters, or other occupants to act prudently to prevent or minimize the harmful effects of an emergency situation.

Limited Warranty

Digital Security Controls warrants the original purchaser that for a period of twelve months from the date of purchase, the product shall be free of defects in materials and workmanship under normal use. During the warranty period, Digital Security Controls shall, at its option, repair or replace any defective product upon return of the product to its factory, at no charge for labour and materials. Any replacement and/or repaired parts are warranted for the remainder of the original warranty or ninety (90) days, whichever is longer. The original purchaser must promptly notify Digital Security Controls in writing that there is defect in material or workmanship, such written notice to be received in all events prior to expiration of the warranty period. There is absolutely no warranty on software and all software products are sold as a user license under the terms of the software license agreement included with the product. The Customer assumes all responsibility for the proper selection, installation, operation and maintenance of any products purchased from DSC. Custom products are only warranted to the extent that they do not function upon delivery. In such cases, DSC can replace or credit at its option.

International Warranty

The warranty for international customers is the same as for any customer within Canada and the United States, with the exception that Digital Security Controls shall not be responsible for any customs fees, taxes, or VAT that may be due.

Warranty Procedure

To obtain service under this warranty, please return the item(s) in question to the point of purchase. All authorized distributors and dealers have a warranty program. Anyone returning goods to Digital Security Controls must first obtain an authorization number. Digital Security Controls will not accept any shipment whatsoever for which prior authorization has not been obtained.

Conditions to Void Warranty

This warranty applies only to defects in parts and workmanship relating to normal use. It does not cover:

- damage incurred in shipping or handling;
- damage caused by disaster such as fire, flood, wind, earthquake or lightning;
- damage due to causes beyond the control of Digital Security Controls such as excessive voltage, mechanical shock or water damage;
- damage caused by unauthorized attachment, alterations, modifications or foreign objects;
- damage caused by peripherals (unless such peripherals were supplied by Digital Security Controls);
- defects caused by failure to provide a suitable installation environment for the products;
- damage caused by use of the products for purposes other than those for which it was designed;
- damage from improper maintenance;
- damage arising out of any other abuse, mishandling or improper application of the products.

Items Not Covered by Warranty

In addition to the items which void the Warranty, the following items shall not be covered by Warranty: (i) freight cost to the repair centre; (ii) products which are not identified with DSC's product label and lot number or serial number; (iii) products disassembled or repaired in such a manner as to adversely affect performance or prevent adequate inspection or testing to verify any warranty claim. Access cards or tags returned for replacement under warranty will be credited or replaced at DSC's option. Products not covered by this warranty, or otherwise out of warranty due to age, misuse, or damage shall be evaluated, and a repair estimate shall be provided. No repair work will be performed until a valid purchase order is received from the Customer and a Return Merchandise Authorisation number (RMA) is issued by DSC's Customer Service.

Digital Security Controls's liability for failure to repair the product under this warranty after a reasonable number of attempts will be limited to a replacement of the product, as the exclusive remedy for breach of warranty. Under no circumstances shall Digital Security Controls be liable for any special, incidental, or consequential damages based upon breach of warranty, breach of contract, negligence, strict liability, or any other legal theory. Such damages include, but are not limited to, loss of profits, loss of the product or any associated equipment, cost of capital, cost of substitute or replacement equipment, facilities or services, down time, purchaser's time, the claims of third parties, including customers, and injury to property. The laws of some jurisdictions limit or do not allow the disclaimer of consequential damages. If the laws of such a jurisdiction apply to any claim by or against DSC, the limitations and disclaimers contained here shall be to the greatest extent permitted by law. Some states do not allow the exclusion or limitation of incidental or consequential damages, so that the above may not apply to you.

Disclaimer of Warranties

This warranty contains the entire warranty and shall be in lieu of any and all other warranties, whether expressed or implied (including all implied warranties of merchantability or fitness for a particular purpose) And of all other obligations or liabilities on the part of Digital Security Controls Digital Security Controls neither assumes responsibility for, 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.

This disclaimer of warranties and limited warranty are governed by the laws of the province of Ontario, Canada.

WARNING: Digital Security Controls 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.

Installer's Lockout

Any products returned to DSC which have the Installer's Lockout option enabled and exhibit no other problems will be subject to a service charge.

Out of Warranty Repairs

Digital Security Controls will at its option repair or replace out-of-warranty products which are returned to its factory according to the following conditions. Anyone returning goods to Digital Security Controls must first obtain an authorization number. Digital Security Controls will not accept any shipment whatsoever for which prior authorization has not been obtained.

Products which Digital Security Controls determines to be repairable will be repaired and returned. A set fee which Digital Security Controls has predetermined and which may be revised from time to time, will be charged for each unit repaired.

Products which Digital Security Controls determines not to be repairable will be replaced by the nearest equivalent product available at that time. The current market price of the replacement product will be charged for each replacement unit.

DSC erklærer herved at denne komponenten overholder alle vigtige krav samt andre bestemmelser gitt i direktiv 1999/5/EC.

Por este meio, a DSC, declara que este equipamento está em conformidade com os requisitos essenciais e outras determinações relevantes da Directiva 1999/5/EC.

"DSC bekräftar härmed att denna apparat uppfyller de väsentliga kraven och andra relevanta bestämmelser i Direktivet 1999/5/EC".

Con la presente la Digital Security Controls dichiara che questo prodotto è conforme ai requisiti essenziali ed altre disposizioni rilevanti relative alla Direttiva 1999/05/CE.

"Por la presente, DSC, declara que este equipo cumple con los requisitos requeridos por la Directiva 1999/5/EC".

Hierdurch erklärt DSC, daß dieses Gerät den erforderlichen Bedingungen und Voraussetzungen der Richtlinie 1999/5/EC entspricht.

"Δια του παρόντος, η DSC, δηλώνει ότι αυτή η συσκευή είναι σύμφωνη με τις ουσιαστικές απαιτήσεις και με όλες τις άλλες σχετικές αναφορές της Οδηγίας 1999/5/EC".

Hierbij verklaart DSC dat dit toestel in overeenstemming is met de eisen en bepalingen van richtlijn 1999/5/EC.

Par la présente, DSC déclare que cet article est conforme aux exigences essentielles et autres pertinentes stipulations de la directive 1999/5/EC.

DSC vakuuttaa laitteen täyttävän direktiivin 1999/5/EC olennaiset vaatimukset.

Hereby, DSC, declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

The complete R & TTE Declaration of Conformity can be found at www.dsc.com/intl/rttedirect.htm.

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