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INTRODUCTION

The MLR2000 is a Multi-Line, Multi-Format Digital Receiver for commercial fire and burglary. The base unit consists of up to 60 individual line-cards (DRL-2000) connected to a dual redundant central resource, router and protocol converter (CPM-2000). The MLR2000 includes many features, especially high bandwidth internal buses and high bandwidth external connections to allow traditional network philosophies to be observed for the first time on a central station receiver. The MLR2000 can decode a variety of popular and widely used communication formats. Refer to Appendix D, DRL2000 Communication Formats for a list of the available communication protocols.

The MLR2000's real-time clock and calendar 'stamps' all information received with the time and date, and all information may be printed or forwarded to a computer. To ensure security, adjustment of the clock, calendar and other programming is protected by password codes.

CPM2000

The CPM2000 Central Processing Module oversees operation of the receivers. Along with its built-in keypad and LCD message screen, the CPM2000 features TCP/IP, two parallel printers, one serial printer and two serial computer interface capability.

DRL2000

Each DRL2000 Line Card Module can monitor one telephone line. The Line Card module is equipped with a 256-event nonvolatile memory to record events and corresponding telephone numbers. Calling source (caller ID and calling name) capability is built-in and telephone numbers can be printed out, sent to automation and stored in memory. Events and information stored in memory may be printed at any time. Each line card also features flash downloads through Ethernet or serial output for fast software upgrades.

Power and Supervision

PSU 2000

The MLR2000 power supplies inputs are 120 VAC at 10A, 60 Hz. Each AC power supply supplies a nominal 28 VDC +/-5% power. The receiver is equipped with 24V rechargeable stand-by battery connections at 160 Ahr. and an automatic battery charger. Provision is made for an internal battery pack for temporary use. User supplied batteries may be used externally but must be fused and connected to 10-32 lugs supplied via a stud termination.

Full power operation is .5 Amps per line and 1 Amp per CPM at 28 VDC nominal. All elements have extensive power down capabilities and are implemented in CMOS logic.

Supervision

The stand-by battery voltage and connections are supervised. The Line Cards are also continuously supervised to ensure uninterrupted communication with the CPM2000. Any trouble conditions are reported on the LCD screens and sent to the printer and the computer.

The DRL2000 Line Card Module also verifies communications with the CPM2000. 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 off-line, paper out and other trouble conditions. The communication link to the computer through the RS232 ports is monitored by the supervisory 'heartbeat' test transmissions.

Compatibility

Central station automation software packages such as:

- MAS
- DICE
- SIMS II
- GENESYS
- SIS
- ABM
- MICRO KEY

support the MLR2000 Sur-Gard interface.

Refer to automation software specifications for compatibility.

NOTES: Automation connections are considered supplementary per UL864 Listing. Compatibility with the automation software in a system used at a central station is intended to be handled under a separate UL1981 software and/or site certification evaluation.

CPM2000 Outputs/ Inputs

The CPM2000 features four switched-negative (PGMOUT1 is activated when automation fails) outputs, two relay outputs and four inputs.

System Overview

- Patented Caller Identification (Call Display) capability
- Patent Pending DNIS and ANI Identification
- Nonvolatile RAM on each DRL2000 line card module for programming and event buffer.
- Fast Ethernet communication between line-cards and CPM
- Flash download for software upgrades
- DSP
- Up to 64 different options set (profiles per line)
- Patent pending virtual configurations
- 3/1, 4/2 formats with or without parity, 4/1 without parity at 10, 14, 20, or 40 baud
- 4/1, 4/2, 4/3, and 4/3 DTMF formats
- Optional* formats: 3-2, 4/1, 4/2 extended
- ACRON DTMF format
- Contact ID (DTMF) format
- Adcor 20 baud
- Super fast or high speed DTMF format, with or without parity
- DTMF 4/1 express format (optional)
- DTMF 4/2 express format
- FBI super fast format with or without parity
- Radionics Modem II, Modem IIE, Modem IIIa² and BFSK formats
- SIA format: 110 and 300 baud, tone and data acknowledgement
- SK FSK1, FSK2
- Any handshake frequencies by increment of 100 Hz from 100 Hz to 2300 HZ, Dual Tone, SIA FSK, Modem II and ITI selected by configuration commands
- Up to 8 different handshakes per profile.
- Large, easy to read 2-line, 16-characters-per-line, LCD (Liquid Crystal Display) screen
- All modules function individually to help ensure uninterrupted operation during hardware or software upgrades
- Inputs on CPM2000 for UPS supervisory
- 255 lines maximum per receiver
- 256-event memory buffer on each individual line card
- Real-time clock
- CPM2000 features 32-bit micro-controller
- Two parallel printer port; three serial RS232 ports and 10 Base T connection.
- Programmable serial ports configuration

- Programmable System Functions: Computer and printer
- Fast transmission of multiple alarms to the computer and printer to ensure operator's quick response
- Continuous verification of the computer-receiver links with the 'heartbeat' function
- Switched-negative outputs on CPM2000 (special applications)
- AC-lost detection and stand-by battery supervision
- Low battery detection and automatic low battery disconnect to prevent deep-discharge damage to battery
- Operator Acknowledge
- Telephone Line Supervision

All formats noted as (optional) are selected using configuration commands

Virtual Receiver Architecture

The most novel feature of the DRL2000 is the ability to use Telco information delivered as a DNIS (dialed number identification service) and ANI (Automatic Numbering Identification) to allow the Sur-Gard expert format identification system to option on the fly each received call to eliminate dedicated line pool hardware. Instead the DNIS allows call up options which set up virtual line pools to identify security formats and extend account numbers. Standard dialed number identification is supported up to 10 digits.

Each dialed number should be assigned to a virtual receiver. Each dialed number would have formerly been a line pool on conventional line-cards.

Number of Line Cards Supported

The system will support a maximum of 255 line-cards concurrently connected. Optional hubs will be required for backplane connectivity in installations beyond 5 shelves.

Redundancy

The MLR2000 has a main power supply module for side A and for side B, and an optional stand-by power supply per rack. Additional 10B2 Ethernet is available as a backup B side. This and the ability to mount an optional second CPM-2000 controller will allow for seamless system redundancy in maximum configuration. In practical terms this means that any line card may fail and not affect system performance ; and with redundant CPM's the B unit will take up where the A unit failed with a loss of no more than 30 seconds. External networking components would necessarily be duplicated to take full advantage of this configuration.

Approvals

Industry Approvals

The MLR2000 in redundant configuration is listed under the following UL standards:

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

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

System Connectivity

The system may have two identical CPMs both connected to internal resources. Internal connections are A and B side 28 V power and A and B side 10B2 Ethernet. Additional internal connections are power monitoring services on the primary rack. External connections are two parallel printer and three serial ports. The serial ports are intended primarily for debug applications but may be used for fallback automation outputs (optional). The primary automation connection is via 10BT Ethernet connection. Again if redundant CPM's are used the external network components must be duplicated to allow for full redundancy.

Automation Mode

In automation mode it is expected that the primary connection is via TCP/IP networking on the 10BT Ethernet connection. A menu on the CPM2000 will prompt the user for the IP address setup and port setup. Once the configuration management port is set up, all other options and setups may be done via a Telnet session or the Sur-Gard Console.

UL Manual Mode

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

NOTE: For central station applications the signaling performance of each DACT shall be manually tracked. Failure to receive a signal from a DACT over a 24-hour period shall be handled as a trouble signal.

Virtual Connectivity

Each receiver has one IP address and a number of associated ports. Internal socket programming uses specific ports for expected tasks. The MLR2000 is the listener.

Configuration Management - Sur-Gard Configuration Port 1024

A tool is provided for NT 4 + or Win95/98 environments which provides graphical style menu for configuration management. Additional features are storage of virtual receiver setups, formats conversion table and configuration wizards.

Status Addressing

Line card status will be reported via physical addressing. This will be assigned by shelf and slot number. All device status information is in Sur-Gard format. The reporting of status on this port, automation output and printer will relate to physical addressing.

Automation Input/output (Port 1025, 1026)

Traditional automation communication will be provided via a minimum of two ports. The primary port is Sur-Gard standard output and provides Sur-Gard standard automation output. All or a number of virtual receiver types will be mapped to the Sur-Gard output.

Optional secondary automation communication will be provided to map to proprietary types. It is expected that named virtual receiver types will be mapped to this output. In addition two way automation commands may be supported on this port.

Internal 10B2 Ethernet

Internal Ethernet is not standard TCP/IP instead it has allocated proprietary type per Internet standards. Full physical 10B2 requirements are met allowing approved segment interconnects to be used including hubs, optical transceivers and wan interconnects (wan interconnects preclude trap and capture commands).

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QUICK START

Receiver Setup and Operation

Unpacking

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

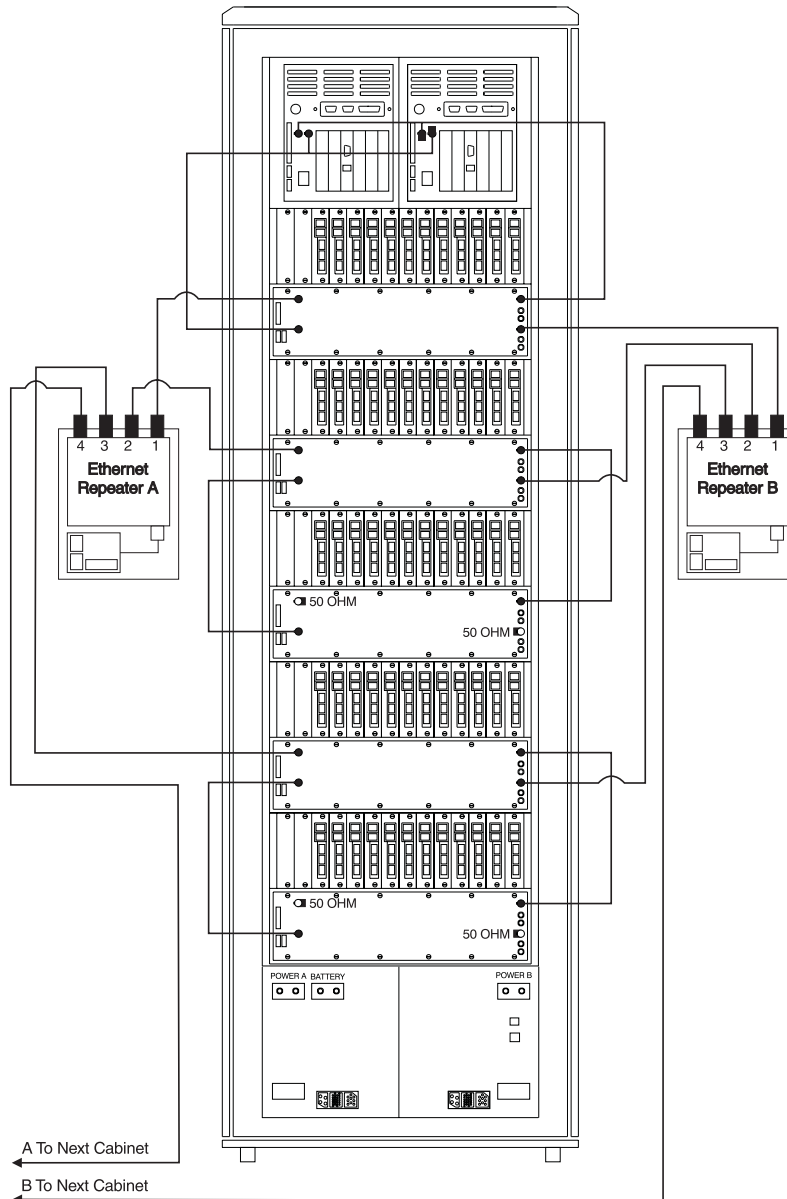
Ethernet Connections

NOTE: Be sure to be properly grounded.

- Take a 50 ohm coaxial cable and connect one end to the BNC connector (ETHERNET A) of the CPM2000. The other end of the coaxial cable should be connected to the BNC connector (ENET A IN) of the backplane.

- Take a 50-ohm coaxial cable and connect one end to the BNC connector (ETHERNET B) of the CPM2000. The other end of the coaxial cable should be connected to the BNC connector (ENET B IN) of the backplane.
- Make sure that there are 50 ohm BNC terminators on the other end of the T Connectors of the CPM2000 labelled ETHERNET A AND B.
- Make sure that there are 50 ohm BNC terminators connected on the BNC terminals marked ENET A OUT and ENET B OUT of the backplane. (This should be already done.)

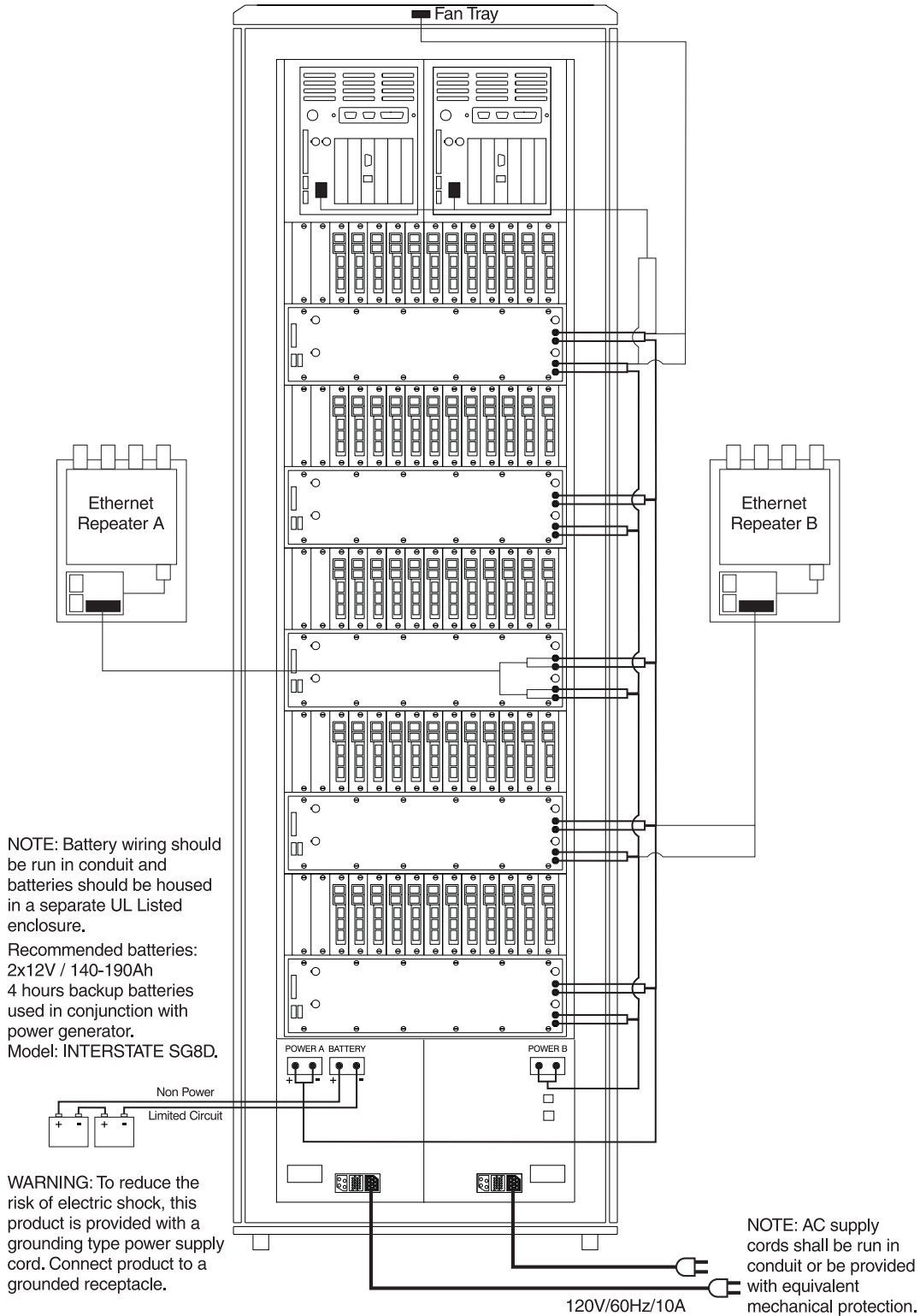
60 Line Cards Configuration



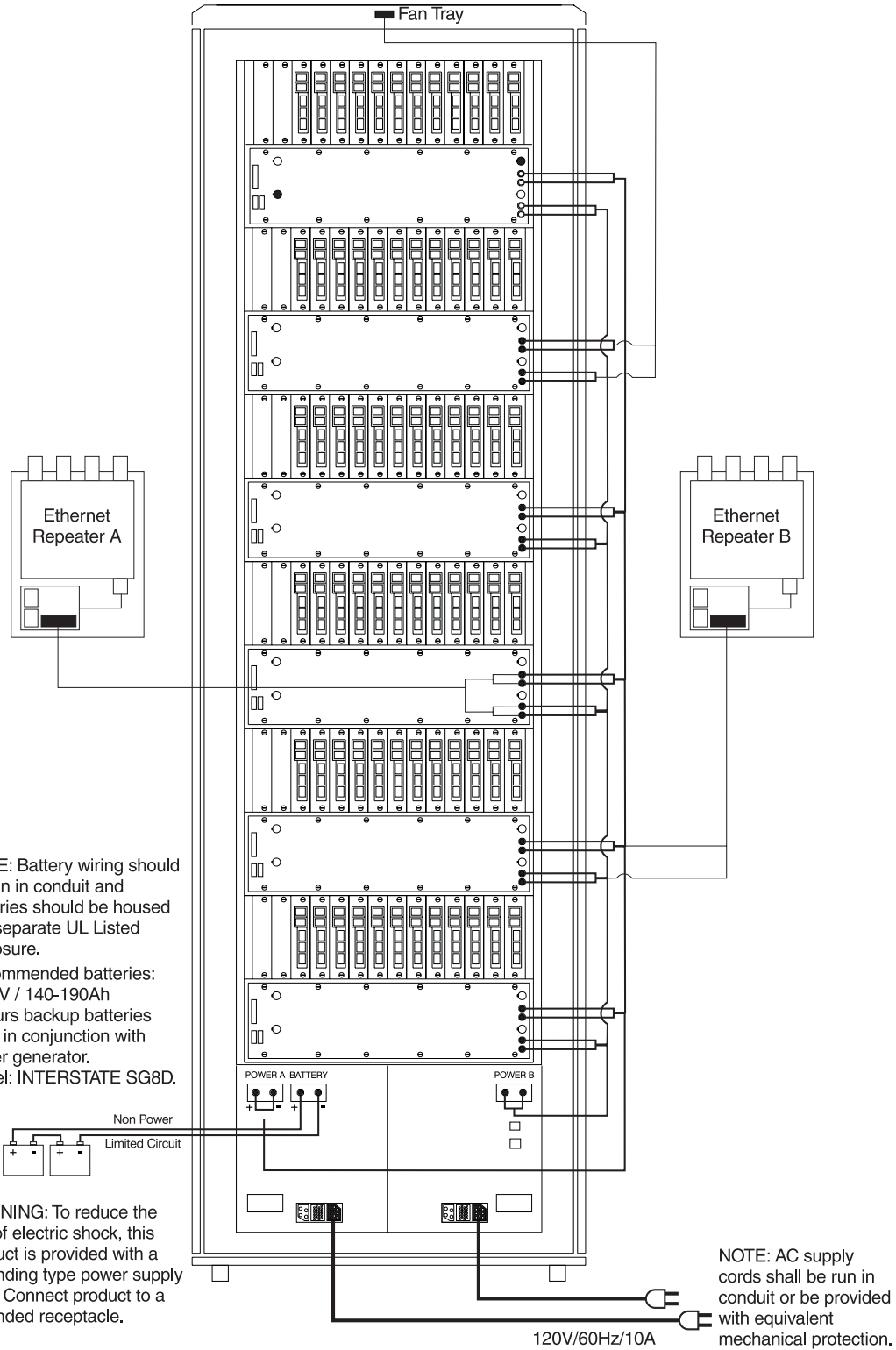
Power Cable Connections

- Take the power cable for the CPM2000 and connect the labelled wire to the designated terminal on the backplane. Take the other end of the power cable and connect it to the power connector on the CPM2000.
- Take the power cables (10 gage) and connect one end to the power terminals of the backplane marked PWR-GND (black cable) and +28 Vdc A (red cable). Take the other end of the power cables and connect to a 28 Vdc power supply (make sure power is OFF).

60 Line Cards Configuration



72 Line Cards Configuration (Expansion Cabinet)



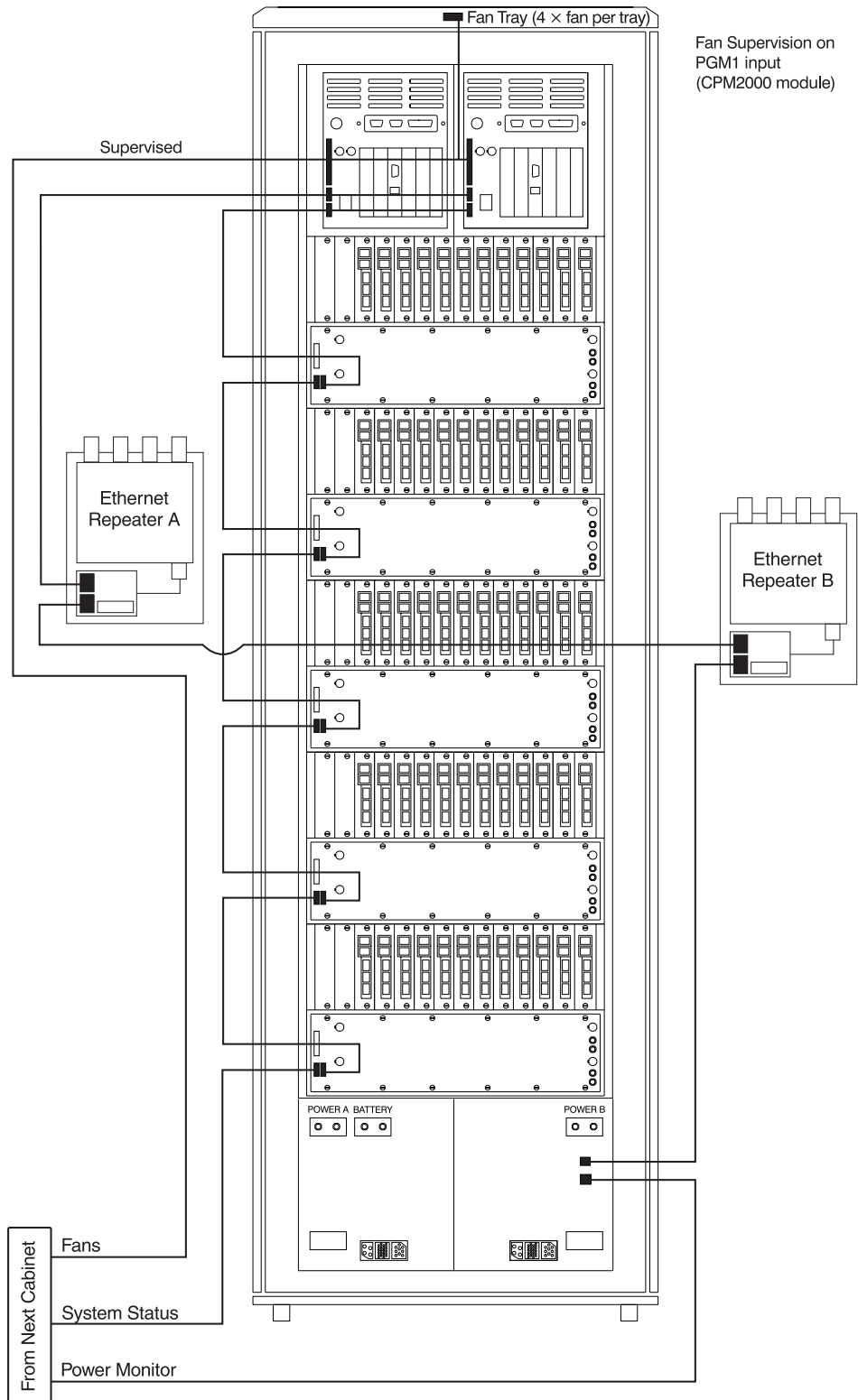
NOTE: Battery wiring should be run in conduit and batteries should be housed in a separate UL Listed enclosure.
 Recommended batteries:
 2x12V / 140-190Ah
 4 hours backup batteries used in conjunction with power generator.
 Model: INTERSTATE SG8D.

WARNING: To reduce the risk of electric shock, this product is provided with a grounding type power supply cord. Connect product to a grounded receptacle.

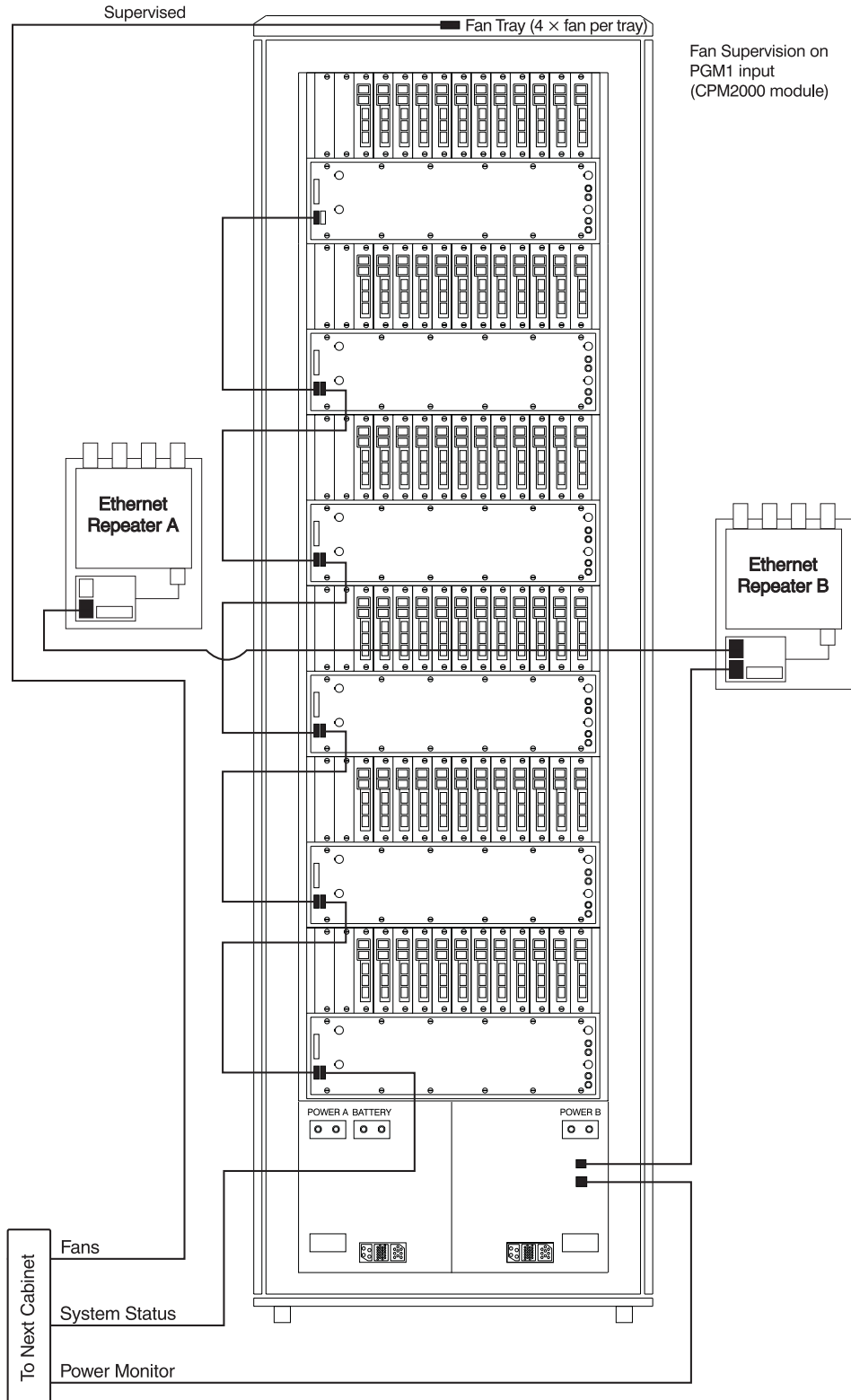
NOTE: AC supply cords shall be run in conduit or be provided with equivalent mechanical protection.

Signaling/Supervisory Connections

60 Line Cards Configuration



72 Line Cards Configuration (Expansion Cabinet)



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 work bench will make final installation more straightforward.

The following items are required:

- 28 V_{DC} Power supply
- One telephone line
- One or more dialler or digital dialler control panels

Power Up

When the 28 V_{DC} power is applied, the CPM2000 unit will beep for approximately 1-2 minutes during system initialization. The buzzer will deactivate as soon as the CPM2000 software initializes and is running. The LCD display on the CPM2000 should display 'Primary'. If the Line Cards do not have telephone lines connected, the DRL2000 modules will activate 'Line Fault' lights. The telephone line should be connected to the POTS jack at the back of the DRL SUBRACK. As soon as the line card detects a phone line, a line restore message will be sent to the printer and computer output. If the phone line is removed, a line fault message will be sent to the printer and computer output.

If there is no computer or printer connected, a trouble message will be displayed on the CPM2000 LCD and the 'ACK' light will flash. Press the [ACK] button to silence the CPM2000 buzzer.

The watchdog LED on the line card should flicker as soon as it is initialized. The Trouble LED will activate if the line card is not receiving a poll from the CPM2000. As soon as the line card responds to the polling, the Trouble LED should deactivate.

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 2300 Hz as the first handshake
- Sends 1400 Hz as the second handshake
- Sends dual tone as the third handshake
- Sends SIA FSK tone as the fourth handshake
- Sends ITI , Modem IIE/ Illa² tone as fifth handshake
- Sends Modem II tone as sixth handshake
- Receives all communication formats, except for: 3/2, 4/1 express, 4/2 extended and 4/2 checksum.
- The above formats can be manually selected.
- Signals can be displayed on the debug output computer as they are received. The signals are then sent to the parallel printer and computer connected to serial port COM1 or to the 10BT connector. The default event codes described in the 'DRL2000 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 CPM2000 module to silence the buzzer.

Printer output

- Printer Examples:

	Date	Time	SS/00	Receiver Type	Receiver #	Line #	Account #	Alarm Code	Message
Ex.	JUN 01 2000	- 08:00:22	- 01/02	-SG	- 01	- 061	- 965	- E9	RESTORE
Ex.	JUN 01 2000	- 08:00:22	- 01/02	-SG	- 01	- 061	- 965	- F9	TROUBLE
Ex.	JUN 01 2000	- 08:00:22	- 01/02	-SG	- 01	- 061	- 965	- 2	PANIC ALARM

Debug Output

The debug output is another means of accessing the line-card's programmed options and diagnostics features. A debug cable is required to connect by serial communication from the line card to a standard PC running WIN95 or WIN 3.11 (part #90016028).

Debug Cable Connectivity

- Connect the RJ45 end of the debug cable to the debug jack on the front of the line card or to the debug jack of the paddle board on the back of the sub-rack.
- Connect the female DB-9 connector to the serial port of a computer (COM1 port - usually DB-9 male, COM2 port - DB-25 female).

Debug Software Setup

- Using WIN95, 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 the 'OK' button.
- A phone number window should appear. Choose the direct to COM port required for connection and point and click on 'OK'.
- COMX properties windows should appear. The configuration should be:
Bits per second: 19200
Data bits: 8
Parity: None
Stop bits: 1
Flow control: None
- Point and click on the 'OK' button after setting the configuration.
- The HyperTerminal window should appear. Press any button. The debug menu will be displayed.

Button Commands

- A:** This button will display the address of the line card. The address includes the shelf and slot number of the line card making each line card unique.
- D:** This button will initiate the download of a file to the line card.
- O:** This button will enable the user to dump the current programmed options of the line card or set an option to a particular value.
- P:** Sets the message priority to be displayed. This is useful for debugging purposes only.

Downloading steps

1. Press the 'D' button to initiate downloading of the binary file. The Hyper Terminal will display:
Ready to download.
CCCC
2. Point and click at 'Transfer' on the Hyper Terminal menu and access the 'Send File' category. The 'Send File' window should appear.
3. Change the protocol to 'X-modem' and place the correct path and file name of the binary file to be downloaded.
4. Point and click on the [Send] button and the downloading status window should appear.

The line card will restart automatically after a successful download.

INSTALLATION

Dimensions

The MLR2000 is implemented into a 42U * 600 mm * 800 mm cabinet. The cabinet has 7 subracks, each on is 19 inches * 6U high. Housed in the top subrack, the CPM-2000 comes complete with its own 19 inch * 6U tray. Bellow the CPM -2000 tray, the MLRX-2000 expansion cage provides for up to 12 DRL-2000 line cards. Each DRL-2000 line card is 6U * 6HP * 220 mm. Each paddle board is 3U * 6 HP * 220 mm. The PSU-2000 comes complete in its own 19 inch * 6U high cage.

The main MRL-2000 cabinet will hold 2×CPM-2000, 5×MRLX-2000, 60×DRL-2000, 2×PSU-2000.

The expansion MLR-2000 cabinet will hold 6×MRLX-2000, 72×DRL-2000, 2×PSU-2000.

Spacing

All units of a receiver must be within 50 ft. (cable length) of the CPM to provide system timing integrity.

Definity DNIS

The AT&T Definity G3 DTMF vdn codes have been tested and are supported by the MLR2000.

Mounting the Receiver

Install the MLR2000 in a closed 19" rack or cabinet with a locking rear access door. Cover all unused spaces with blank metal plates. The LCD screen on the receiver is designed to be viewed below eye level. A Stand-up Unit (61.25" tall up to 60 telephone lines, part #90000016) can be supplied for a complete installation.

NOTE: If 60 telephone lines are not used, cover each unused location with a blank plate.

Printer Connections

The following UL Listed printers can be used with the MLR2000: Sur-Gard CPU-1150 (Panasonic KX-P1150)

DMP SCS-PTR (Okidata Microline 182/184)

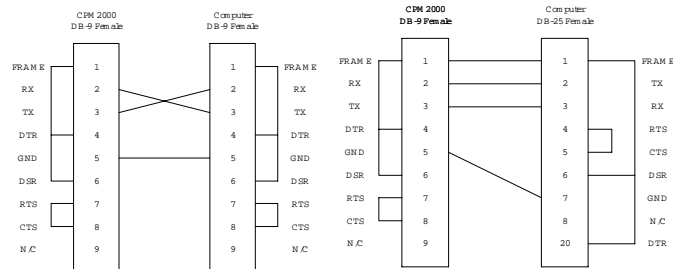
Connect the parallel printers to the MLR2000 printer output ports using parallel printer cables.

NOTES: A minimum of two printers are required for UL Listed applications.

Do not use a printer cable which has only 1 common ground wire.

Computer Connections

Connect the computer to the MLR2000 RS232 port using a serial cable to COM1.



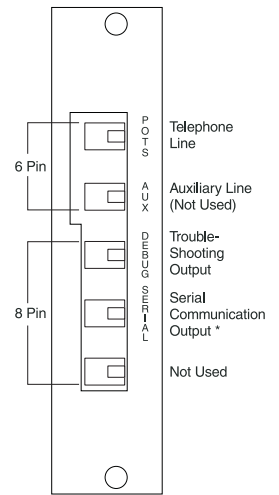
NOTE: Pins 1, 4 and 6 on the receiver side are connected together. Pin 7 and 8 are also shorted together. Pin 9 is not connected.

Telephone Line Connections

Each paddle module has the connections shown here. Connect each line module output (POTS) to the telephone line (analog) with 6-pin modular cables.

NOTE: Use minimum AWG 26 wires for telephone cables.

*** NOTE: Connection of an Ademco radio receiver model 7810RT or 7830R can be done on the serial port of the paddle module. The device should be mounted in the same room as the MLR2000 receiver (within 20 ft.). The connection shall be run in conduit or equivalent i.e. providing mechanical protection.**



Grounding

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

Power Supply

Ensure that all electrical connections are made correctly. After verifying all connections, connect the RED and BLACK leads to a 24 (2 × 12V batteries in series) Vbc 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.

Battery Charging Current

The maximum battery charging current is factory set at 5A.

Removing and Installing System Components

Note that the receiver does not have to be powered down when components are removed or installed.

To remove the Power Supply Modules

The Power Supply charges the battery and provides low battery voltage disconnect; removing the power supply module will disconnect the battery and shut down the entire system. Please make sure there is a second power supply module installed.

To Remove the CPM2000 Module

Slowly pull the module out of the metal cabinet.

To Remove a Line Card Module

Slowly pull the module out of the sub rack.

To Install a Line Card Module

Slowly insert the module in the sub rack.

Installation Checklist (Complete Operation)

- 19" Rack Mount Cabinet connected to earth ground
- SG-PSU2000 Power Supply installed
- 6-pin modular cable(s) connected to DRL2000 and telephone line
- Parallel Printer Cable connected to MLR2000 Parallel Printer Port
- Parallel Printer power connected
- Computer connected to MLR2000 COM1 port using serial cable
- Computer connected to MLR2000 10BT port using 10BT cable

DRL2000 DIGITAL RECEIVER LINE CARD

The DRL2000 acts as an interface between the digital alarm transmitter and the CPM2000. 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 CPM2000. In addition, if a Line Card is unable to communicate with the CPM2000, then each Line Card is capable of functioning independently. Each Line Card can record 256 different alarm messages and 256 Caller-ID telephone numbers.

General Information

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

DRL2000 Features

- Operator selection of communication formats and handshake priority
- 64 profiles per line card, up to 255 line pools.
- On-Board Ethernet interface.
- Flash Download for software upgrades.
- Records up to 256 messages.
- Records up to 256 Caller-ID phone numbers. This feature helps 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 CPM2000 with minimum delay
- The DRL2000 monitors the telephone line connection, and line faults will result in reports to the computer and the printer
- DRL2000 automatically goes into stand-alone mode in case of CPM2000 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

Installation

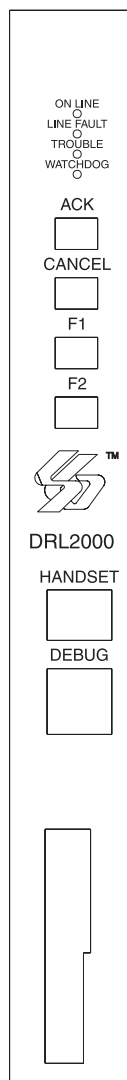
It is recommended that a DRL2000 Cold Start-up be performed when the unit is updated with a new program version. Refer to Operating Mode Section (DRL2000 Cold Start-up for information.

After the cold start-up, check the configuration information listed in the Quick Reference Guide to make any required changes for your particular application.

DRL2000 Controls

Each DRL2000 Module has one telephone line.

Momentarily depressing and releasing a button will register as a single input or keystroke.



ON LINE: The 'on-line' light will be ON when the Line Card is on-line in communication. The 'on-line' light will be OFF when the Line Card is in Stand-by Mode. When the line card is on-line but not in communication, the on-line LED will FLASH to indicate that the buffer is full, or that there is a checksum error after download.

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.

TROUBLE: The 'Trouble' light will come ON when the Line Card is shut down by an operator's command or when communication with the CPM2000 is interrupted. The 'Trouble' light will be shut OFF when the trouble condition is corrected.

WATCHDOG: The 'Watchdog' light will FLASH to indicate that Line Card operation is being monitored

[ACK] Button: Not used.

[CANCEL] Button: Not used.

HANDSET: Not used.

DEBUG: Connection to a PC for troubleshooting.

[F1] + [F2] Buttons: Pressing both buttons simultaneously on power up for 10 seconds will reset the line card to factory default.

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DRL2000 OPERATING MODE

DRL2000 Stand-by Mode

After start-up the Line Card enters the Stand-by Mode and monitors the telephone line and the CPM2000. Depending on the system's status, the following conditions will be indicated:

- Line Fault light
- Trouble light: of Line Card communication problem with CPM2000

Line Fault

The DRL2000 verifies the telephone line voltage. The 'Line Fault' light will come ON when the voltage drops below 12V.

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

Printer: Jul 17 1998-08: 08: 28-SS/OO-SG-RR-LLL-0000-PHONE LINE TROUBLE

Computer: ORRLLL[#0000;NLTSSOO][DC4]

A hexadecimal number from 00 to 0B representing the slot number of the Line Card will be sent for each 'O' shown above.

A hexadecimal number from 01 to FE representing the shelf number of the Line Card will be sent for each 'S' shown above.

If the Line Check option is disabled, the DRL2000 will not send the report to the printer or computer. Refer to 'DRL2000

Programmable Features' for information on enabling the Line Check option.

When the line condition returns to normal, the 'Line Fault' light 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: Jul 17 1998 - 08: 08: 35-SS/OO-SG-RR-LLL-0000-PHONE LINE RESTORE

Computer: ORRLLL[#0000;NLRSSOO][DC4]

CPM2000 Error

If the DRL2000 cannot detect CPM2000 polling, the trouble light will come on.

If alarm messages cannot be sent to the CPM2000 because of the error, the DRL2000 will start buffering incoming calls.

Up to 256 alarm messages for the printer and computer will be retained in the DRL2000 event buffer. When the event buffer is full, the line card will stop answering the calls.

When the CPM2000 Error condition is corrected, the alarm messages in the event buffer will be transmitted to the CPM2000 with the corresponding time/ date the alarm have been received.

DRL2000 Cold Start-up

To perform a Cold Start-up, press the [F1] and [F2] buttons simultaneously for 10 seconds after a power up.

Communications in Progress

Data Reception

During data reception, the on-line LED will turn on. The DRL2000 decodes all information received and stores the information in its Event Buffer. When a valid signal is received, the DRL2000 sends a kiss-off signal and transmits the decoded alarm signal to the computer and then to the printer through the CPM2000.

The DRL2000 will send each message it receives to the printer for review by the system operator. Two messages may be sent to the printer to indicate reception problems: the 'Fault Data' and 'Fault Call'.

Fault Data Message

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

Printer: Jun 25 1998-11:18:07-SS/OO-SG-12-234-0000-INVALID REPORT

Computer: 012234[#0000;NYNSSOO][DC4]

This output for account code '0000' indicates that data has been received, but is not valid (for example, there are unmatched rounds or wrong parity).

Fault Call

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

Printer: Jun 25 1998-11:18:07-SS/OO-SG-12-234-0000-COMMUNICATION FAIL

Computer: ORRLLL[#0000;NYCSSOO] [DC4]

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 handshakes.

Caller ID

When Caller-ID is enabled:

Printer: 19-Nov-1998 10:40:54 - Nov 19 1998-11:32:25-F3/00-SG -19-069-123F—

Computer: 419069 123F0000000000

Calling Name

When Calling name is enabled:

Computer: u19069 123FSUR-GARD SECURT

Printer: 19-Nov-1998 10:40:56 - Nov 19 1998-11:32:25-F3/00-SG -19-069-123F—SUR-GARD SECURT

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PROFILES INTRODUCTION

The DRL2000 'virtual receiver' will load unique 'profiles' in order to effectively communicate with control panels. A profile is a set of preprogrammed line card options unique for a particular 'calling ID number, DNIS number, or ANI number. The 'Calling id' or 'DNIS' will point to a particular profile, which will then be loaded into the line card before the line is picked up. It is essential that the correct options 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, a utility software is provided. This software will allow the user /operator to edit the profiles.

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

Option [00]: Reserved

Option [01]: Line Card Number

The Line Card Number provides a virtual identification code for each DRL2000 module. Hexadecimal numbers '01' to 'FE' can be programmed in Option [01] to identify Line Cards.

Option [02]: Line Card Number Length

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

Program option 02 with one of the following:

- 01 Send only one hex digit to the printer or computer output (If you have a 2 digit line card number, only the last digit will be sent to the output)
- 02 Send 2 hex digit line card number to the output
- 03 Send 3 hex digit line card number to the output (leading Zeros will be inserted prior to the line card number)
- 0D Send 3 digit line card number in decimal

NOTE: When using the DRL2000, the Line Card Number Length option should always correspond to the number of DNIS digits being received. For example if 5 digits are being received then the Line Card Number Length Option should be programmed to 3 such that 1RRLLL would be overwritten by the 5 digits of DNIS to become 1dxxxx.

Option [03]: DSC SIA Audio

Programming option [03] as "01", will enable the Audio Listen-in block with the DSC PC5010 control panel when used with the 5908 audio matrix module when sent in SIA format. Default is "01". To disable this option, program 00.

Option [04]: 2-Way Audio Activation Time

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".

NOTE: 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.

Option [05]: Pre-H.S. Duration.

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

The Time programmed (hex) at this location will be multiplied by 100 ms., i.e. 100 ms., 200 ms. etc. The default is 0A, for 1 second.

Options [06] to [0D]: Reserved

Option [0E]: Detection Reports

The Line Card will perform periodic telephone line tests. When Option [0E] is enabled, if the line is faulty, a warning LED will be displayed on the Line Card front panel and an alarm will be sent to the computer and the printer. When option [0E] is disabled, no alarm will be transmitted. Program Option [0E] as '01' to enable the line fault report; program '00' to disable the transmission of the line fault condition to computer and printer.

Option [0F] to [10]: Reserved

Option [11]: Hookflash Enable/Disable

Enables or disables ability to hookflash the phone line and determines it's 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 32hex.

500 ms / 10 = 50

50 Dec = 32 hex

Option [12]: Caller Source Identification Option

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: North American CID

04 - 0A: Receive 04 -10 DTMF DNIS

General:

- 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 S6 Computer

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

Program Option [13] as one of the following:

00 Do not send to the computer

01 4RRR Protocol :send to the computer using North American protocol

02 URRL Protocol :send to the computer using the International protocol

NOTE: Option [12] must be programmed as "01"

Option [14]: Caller Source to printer

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

00 Do not send to the printer

01 Send to the printer

Each alarm will print an extra line, printing the Caller ID. To use Option [14], Option [12] must be programmed as "01"

Option [15]: Line Seizure Event

Generate events on each call to indicate off hook condition.

Option [16]: Line Release Event

Generate events on each call to indicate on hook condition.

Option [17] to [1A]: Reserved

Option [1B]: Profile Source (future)

Option [1C]: Busy Out

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

00 The line is seized if any of the conditions mentioned above occur

01 The line is not seized if any of the conditions mentioned

above occur

02 Same as set to 00 when used with the Call Centre Feature configuration on the telephone interface module (SG-Paddle)

03 Same as set to 01 when used with the Call Centre Feature configuration on the telephone interface module (SG-Paddle)

Note of caution: If your system uses the Call Centre Feature, and the option is set to 00, the line will always be seized.

Option [1D]: Input Sensitivity

Default is 1F.

Option [1E]: Output Levels

Db	Programming Value
+2.3	00
+1.1	20
-0.2	40
-1.8	60
-3.7	80
-4.9	90
-6.2	A0
-7.8	B0
-8.7	B8
-9.7	C0
-12.2	D0
-13.8	D8
-15.7	E0
-17.6	E6
-19.0	EA
-21.8	F0
-24.2	F4
-27.8	F8

Default is C0.

Option [1F]: Debug Output

See debug p.xx. Default is 00.

Option [20]: C.L.A.S.S. Field Data

Option [20]: C.L.A.S.S. Field Data This option determines how the Caller Source information is sent to the CPM via the e-bus. Program with one of the following:

00 Send 0's in C.L.A.S.S. field of e-bus

01 Send Receiver Line Card Number from options in C.L.A.S.S. field of e-bus

02 Send DNIS in C.L.A.S.S. field of e-bus

03 Send Caller ID in C.L.A.S.S. field of e-bus

04 Send whatever option [13] Caller Source is set to in the C.L.A.S.S. field of e-bus

Default is 04.

Options [21] - [26]: Internal Use Only

Option [27]: Caller Source Process

This option determines how many digits of Caller ID or DNIS will be processed by the receiver.

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

Default is 05.

Options [28] - [2A]: Internal Use Only

Option [2B] Echo suppression

00 Disabled

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

Options [2C] - [2F]: Reserved

Options [30] - [FF]: Dynamic Options

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

The DRL2000 uses a unique Sur-Gard communication format to transmit data through the CPM2000 to the central station computer. Event codes corresponding to alarm codes in 10 to 40 BD 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 DRL2000 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 DRL2000 Decoding Library for the complete set of event codes used by the DRL2000.

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

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

The DRL2000 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 'DRL2000 Decoding Library' for the complete set of event codes used by the DRL2000.

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

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

The DRL2000 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 'DRL2000 Decoding Library' for the complete set of messages and event codes used by the DRL2000.

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

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

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

Words available:

- 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 ALARM
- 13 RESERVED
- 14 PANIC ALARM
- 15 DURESS
- 16 SILENT
- 17 AUDIBLE
- 18 POLICE
- 19 RESERVED
- 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 SILENT BURG ALARM
- 28 GENERAL ALARM
- 29 POLLING LOOP OPEN
- 2A POLLING LOOP SHORT
- 2B EXPANSION MODULE FAILURE
- 2C SENSOR TAMPER
- 2D EXPANSION MODULE TAMPER
- 2E SILENT ALARM
- 2F AUXILIARY
- 30 NO ACTIVITY
- 31 DOOR FORCED
- 32 24 HOUR NON-BURGLARY
- 33 GAS DETECTED
- 34 REFRIGERATION
- 35 LOSS OF HEAT
- 36 WATER LEAKAGE
- 37 FOIL BREAK
- 38 LOW BOTTLED GAS LEVEL
- 39 HIGH TEMPERATURE
- 3A LOW TEMPERATURE
- 3B DAY TROUBLE
- 3C LOSS OF AIR FLOW
- 3D EXPLOSIVE GAS
- 3E CARBON MONOXIDE
- 3F FAIL TO CHECK IN _ GUARD'S TOUR
- 40 FREEZE ALARM
- 41 SPRINKLER
- 42 LATCHKEY
- 43 DOOR LEFT OPEN
- 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 ENVIRONMENTAL
4E EMERGENCY
4F FOIL ALRM
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 REPEATER TAMPER
5C RF RECEIVER TAMPER
5D RESERVED
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 RESERVED
6B RESERVED
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 COMMUNICATION
79 TELCO 1 FAULT
7A TELCO 2 FAULT
7B LONG RANGE RADIO
7C FAIL TO COMMUNICATE
7D LOSS OF RADIO SUPERVISION

7E LOSS OF CENTRAL POLLING
7F USER TX USWR
80 LOW RECEIVED SIGNAL STRENGTH
81
82 PROTECTION LOOP
83 PROTECTION LOOP OPEN
84 PROTECTION LOOP SHORT
85 FIRE TROUBLE
86 EXIT ALARM
87 EXIT FAULT
88 RESERVED
89 RESERVED
86 RESERVED
87 RESERVED
88 SENSOR TROUBLE
89 LOSS OF SUPERVISORY - RF
9A LOSS OF SUPERVISORY - RPM
9B SENSOR TAMPER
9C RF TRANSMITTER. LOW BATTERY
9D SMOKE HI-SENSOR
9E SMOKE LOW-SENSOR
9F INTRUSION HI-SENSOR
A0 INTRUSION LOW-SENSOR
A1 SELF TEST FAIL
A2 OPEN/CLOSE
A3 O/C BY USER
A4 GROUP O/C
A5 AUTOMATIC O/C
A6 KEYSWITCH O/C
A7 DEFERRED O/C
A8 CANCEL
A9 REMOTE ARM/DISARM
AA QUICK ARM
AB
AC CALLBACK REQUEST MADE
AD SUCCESSFUL DOWNLOAD ACCESS
AE UNSUCCESSFUL ACCESS
AF SYSTEM SHUTDOWN
B0 DIALER SHUTDOWN
B1 RESERVED
B2 RESERVED
B3 RESERVED
B4 RESERVED
B5 RESERVED
B6 ACCESS DENIED
B7 ACCESS REPORT BY USER
B8 RESERVED
B9 RESERVED
BA RESERVED
BB RESERVED
BC RESERVED
BD RESERVED
BE GROUP CLOSING
BF GROUP OPENING
C0 ARMED STAY
C1 O/C EXCEPTION

- C2 EARLY O/C
- C3 LATE O/C
- C4 FAIL TO O/C
- C5 AUTO ARM FAIL
- C6 O/C PARTIAL ARMED
- C7 EXIT ERROR
- C8 USER PRESENT
- C9 RECENT CLOSE
- CA SOUNDER/RELAY DISABLED
- CB BELL 1 DISABLE
- CC BELL 2 DISABLE
- CD ALARM RELAY DISABLE
- CE TROUBLE RELAY DISABLE
- CF REVERSING RELAY DISABLE
- D0 RESERVED
- D1 RESERVED
- D2 RESERVED
- D3 RESERVED
- D4 DIALER DISABLED
- D5 RADIO TRANSMITTER DISABLED
- D6 MESSAGE ALARM
- D7 SERVICE ALARM
- D8 RESERVED
- D9 RESERVED
- DA RESERVED
- DB RESERVED
- DC RESERVED
- DD RESERVED
- DE ZONE BYPASS
- DF FIRE BYPASS
- E0 24 HOUR ZONE BYPASS
- E1 BURGLARY BYPASS
- E2 GROUP BYPASS
- E3 SWINGER BYPASS
- E4 UNBYPASS ALARM
- E5 RESERVED
- E6 RESERVED
- E7 RESERVED
- E8 MANUAL TRIGGER TEST
- E9 PERIODIC TEST REPORT
- EA PERIODIC RF TRANSMISSION
- EB FIRE TEST
- EC STATUS REPORT TO FOLLOW
- ED LISTEN-IN TO FOLLOW
- EE WALK TEST MODE
- EF OFF NORMAL CONDITION
- F0 VIDEO TRANSMITTER ACTIVE
- F1 RESERVED
- F2 EVENT LOG OVERFLOW
- F3 TIME/DATE RESET
- F4 TIME/DATE INACCURATE
- F5 PROGRAM MODE ENTRY
- F6 PROGRAM MODE EXIT
- F7 EXCEPTION SCHEDULE CHANGE

- F8 EVENT LOG 50% FULL
- F9 EVENT LOG 90% FULL
- FA EVENT LOG RESET
- FB SCHEDULE CHANGE

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

Option [70]: Automation Common Event Code

Some central station software packages are unable to process the alarm using the event codes listed in the DRL2000 Decoding Library. Where a central station monitors thousands of accounts belonging to different companies, the same reporting codes may have different meanings between 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 follows:

Program Operation

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

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

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

NOTE: Option [70] is ignored when using SIA, ITI, Contact-ID, ACRON, MODEM II, MODEM IIE, MODEM IIIa², FBI Super Fast, BFSK, ADEMCO Super Fast and SK FSK1, 2 formats.

Option [71]: Library Select

Determine how to use Printer Words Options.

- 00 No printer words
- 01 Printer 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.

Option [72]: Reserved

Option [73]: Printer Select

If a printer is not used with the MLR2000, program Option [73] as '00' **(Not for UL Listed applications)**.

If a printer is to be used with the MLR2000, program Option [73] as '01'.

Option [74]: Reserved

Option [75]: Receiver Number

The receiver number is used for sending signals to the central station software.

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

Option [76]: Accounts 3/x to 4/x

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

Value	Function
00	If the alarm is reported in 3/1, 3/1 extended, 3/2 or 3/8 ACRON formats, a leading space will be communicated in front of the 3-digit Account Codes when sent to the computer.
Ex:	101001ssssssAAAsXsssY[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:	1011ssssss0AAAsXsssY[DC4]
02	Alarms communicated to 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 Codes. If the alarm is reported in 3/1 or 4/1 formats, a leading '0' (zero) will be communicated in front of the 1-digit alarm code.
Ex:	1011ssssss0AAAsXss0Y[DC4]

Option [77]: Reserved

Option [78]: Max Inter-digit

Certain old dialers may have difficulties in communicating with the receiver. The DRL2000 provides a possible solution by programming this option. This option should be left as a default and should be changed only on the recommendation of a Sur-Gard technician. . When programmed as 00, the inter-digit time is determined by the baud rate of the format being used, all other values are in 100 ms. intervals.

- 00 determined by baud rate (default)
- 01 100 ms
- 02 200 ms... and so on

Option [79]: Max Inter-burst

Certain old dialers may have difficulties in communicating with the receiver. The DRL2000 provides the possible solution by programming this option. This option should be left as default and should be changed only on the recommendation of a Sur-Gard technician. When programmed as 00, the inter-burst has a time of 100 ms, all other values are in 10 ms increments.

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

Option [7A]: Account Codes to Activate 2-Way Audio

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'.

Option [7A] may be used with any formats supported by the MLR2000. To disable the 2-Way Audio function, program Option [7A] as '00'.

Option [7B]: 3 Digits Account Codes to Activate 2-Way Audio

Option [7B] determines which 3 digits 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 digits

account codes between 300 and 6FF to activate the 2-Way Audio function, program Option [7B] as '36'.

Option [7B] may be used with any 3 digits account code formats supported by the MLR2000. To disable the 2-Way Audio function, program Option [04] as '00'.

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

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, 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, 4/3 and Contact ID formats. Program Option [7C] as '00' to disable this function.

First, to enable the audio feature, the option '[79] AUDIO MIN.' must be programmed. The DRL2000 will initiate audio by the account range, options [7A] and [7B] or by option [7C] ALARM CODE or by both.

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

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

Audio zone code is the range of zone codes that will activate audio. The most significant nibble tells us the lowest code and the least significant nibble tells us the highest zone that will activate audio.

Option [7E] Audio R5232

This is the code sent to the automation software that indicates that two-way audio has been initiated. If 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 '0'.

- 00 No Automation Output
- 01 Send SRLLLL[#AAAA|NLFssoo][DC4]
- 02 Send ORLLLL[#AAAA|NLFssoo][DC4]

Option [7F]: Audio Format Enable

This option will give us 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 formats.
- Bit 1 4 Digit pulse formats.
- Bit 2 DTMF formats.
- Bit 3 Contact ID
- Bit 4 SIA formats
- Bit 5 Modem II formats
- Bit 6 ITI Formats
- Bit 7 Westec format

For example: if the user wants Audio to work only for 3 digit pulse and SIA formats, option A9 would have to be programmed as 11 hex which enables bit 0 and bit 4.

Option 80: Kiss-Off to Hang-up Time

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

The default for this option is:

Options [81] through [88]: Handshake Selection

The DRL2000 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

All other frequencies can be programmed by programming the first two digits. Example:

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

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

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

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

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

The DRL2000 Line Card will usually wait for signals from the control panels for 4 seconds before sending the next handshake, if there is no signals received. In certain applications, control panels can not wait long enough to get their own handshake especially if the handshake is programmed as the fifth or later handshake.

Program Option [91] with one of the following:

- 00 4 second interval
- 01 1 second interval
- 02 2 second interval
- 03 3 second interval

Option [92] to [94]: Reserved

Option [95]: 5 Digit Pulse

The DRL2000 cannot distinguish between 4/1, 3/2 or 3/1 with checksum because all of them contain a total of 5 digits. Therefore, this option must be programmed to inform the DRL2000 which of the 3 formats may be used.

Option 95 (3/2 format)

- 00 select 4/1 format
- 01 select 3/2 format
- 02 select 3/1 with checksum format.

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

Option [96]: 4/1 Extended

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

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

```
1234 3
1234 3
3333 1
3333 1
```

The DRL2000 will interpret this information as: 1234 31

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

Option [97]: 4/2 Extended

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

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

The DRL2000 will interpret this information as 1234 516, or the panel sends:

```
1234 03
1234 03
3333 01
3333 01
```

The DRL2000 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

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

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

123 3
123 3
333 1
333 1

The DRL2000 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

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 DRL2000 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

The default setting of Option [99] is '01'

Option [9A]: S6 4/3 Group Open/ Close

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

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

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

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

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

Option [9B]: S6 4/3 User/ Zone

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

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

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

User Code received	User Code after conversion
00 to 99	00 to 99
B0 to B9	100 to 109
C0 to C9	110 to 119
D0 to D9	120 to 129
E0 to E9	130 to 139
F0 to F9	140 to 149

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

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

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

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

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

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

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

Option [9C]: Reserved

Option [9D]: MODEM II RS232

The DRL2000 is able to decode the Modem II formats. The handshake 0B needs to be programmed as one of the handshakes of the DRL2000 for the Modem II and handshake 0E for Modem IIE or Modem IIIa². 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: ModemII RS232

- 00 6500 protocol: 1RRLLLsssssAAAAXYYYY[DC4]
- 01 SG protocol: 6RRLLLsssssAAAAXYYYY[DC4]
- 02 ModemII to sia protocol
- 03 ModemII to sia protocol, and text is decoded and sent to printer and computer.

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

Option [9E]: Acron RS232

When this option is programmed as '00', the DRL2000 will convert the Acron Super Fast format signal into 3/2 or 4/2 format (Ex: AAAAsXssYY[DC4]). If it is programmed as '01' the Acron Super Fast will be sent to the computer as follows:

9RRLLLssssAAAACCCCCCCC[DC4]

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

Option [9F]: Ademco High Speed RS232

When this option is programmed as '00', the DRL2000 will convert the High Speed format signal into 4/2 format (Ex: 1RRLLSsssssAAAAsXssYY[DC4]). If it is programmed as '01' the Ademco High Speed will be send to the computer as follows:

8RRLLAAAAAsCCCCsCCCCsC[DC4]

Where: 8 Protocol number
RR Receiver number
LLL Line number
AAAA Account code
s Space
CCCC Channel 1-4
s Space
CCCC Channel 5-8
s Space
C Channel 9
[DC4] Terminator

Option [A0]: Reserved

Option [A1]: FBI RS232

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

JRRLLSsssssAAAATZZEss[DC4]

Where: J = FBI protocol identifier
RR = receiver number
LLL = 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]: Reserved

Option [A3]: 06500 RS232

The DRL2000 will emulate the Radionics 6500 RS232 protocol on pulse formats only. (00=disable, 01=enable)

Examples:

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

00 1RRLLSsssss123sAss1[DC4]
01 1RRLLSsssss123sAss1[DC4]

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

00 1RRLLSsssss123sOssB[DC4]
01 1RRLLSsssss123sOssB[DC4]

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

00 1RRLLSsssss1234sAs21[DC4]
01 1RRLLSsssss1234sAs21[DC4]

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

RR = receiver number
00 1RRLLSsssss234sCsC2[DC4]
01 1RRLLSsssss234sCsC2[DC4]

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

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

Option [A4]: BFSK RS232

When programming option [A4] as '01', the BFSK format will convert its Radionics 6500 computer output to a standard protocol output. Default is '00'. TBA ex/ conversion

Note that this option is affected by the Modem II RS - 232 option (90).

Option [A5]: SESCOA Super Speed

00 SESCOA Super Speed enabled, 4/2 checksum
01 SESCOA Super Speed enabled, 4/2 checksum disabled

Default is 01.

Option [A6]: Reserved

Option [A7]: Silent Knight FSK2 RS232

The DRL2000 provides two possible outputs to the computer. Select 00 for protocol #1 or 01 for protocol #2. Please refer to the section 'SG Automation Outputs' for more details.

Options [A8] - [AF]: Dial-Out Number For Two-Way Audio Transfer

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 DRL2000 has recognized the current call as a Two-Way Audio account and alarm code.
- 2. The calling control panel has finished sending it's alarms and switched into Two-Way Audio mode.
- 3. The DRL2000 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 is no more digits to dial.

If a '*' is needed, (i.e. *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 an 'E'.

For Example: To have the line card transfer a Two-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
A9 = AE
AA = 51
AB = 38
AC = 60
AD = 00
AE = 00
AF = 00

DNIS/Caller ID Implementation

The proposition of DNIS input in the number field of NACID (North American Caller ID) is required for the implementation of a virtual receiver. A look-up table is required to translate CID or DNIS to a ten digit number (account prefix) and point to a profile. A profile is a set of preprogrammed line card options unique for a particular 'calling ID number' or DNIS number. A maximum of 64 profiles can be created.

The following steps will briefly describe the requirements to build a CID/ DNIS table.

The telephone switch can send CID, or DNIS, and/or CID + DNIS. (Assumption)

At the point where the CID/DNIS is received, the receiver will:

- a. If the 'Calling id' string is received only, the receiver will try to match it with the 'Calling id' in the look-up table. If it finds a match this number will point to a profile number and a ten-digit number. The user can define the ten-digit number. If no match is found then profile zero will be used.
- b. If a DNIS number is received only, the receiver will try to match it with the DNIS in the look-up table. If it finds a match this number will point to a profile number and a ten-digit number. The user can define the ten-digit number. If no match is found then profile zero will be used.
- c. If 'Calling id' and 'DNIS' is received on the same call, the 'Calling id' string will take precedence since every 'Calling id' is unique. For example if no match is found for the 'Calling id', then the 'DNIS' would be used to select the profile and ten digit number. If no match is found for both the 'Calling id' and the 'DNIS' then profile zero will be used.

For example, the following look-up table can be created to translate CID/DNIS.

Telephone Number	Ten digit data	Profile
111-111-1111	0999000000	0
222-222-2222	0999000000	1
333-333-3333	0999000000	2
343-333-3333	0999000000	31
353-333-3333	0999000000	32
363-333-3333	0999000000	33
373-333-3333	0999000000	34
383-333-3333	0999000000	35
393-333-3333	0999000000	36
403-333-3333	0999000000	37
413-333-3333	0999000000	38
416-465-4101	0999000000	41
444-444-4444	0999000000	4
555-555-5555	0999000000	5
666-666-6666	0999000000	6
777-777-7777	0999000000	7
888-888-8888	0999000000	8
999-999-9999	0999000000	9

DNIS Number	Ten digit data	Profile
0000	0000000000	0
0111	0999000000	1
0222	0999000000	2
0333	0999000000	3
0444	0999000000	4
0555	0999000000	5
0666	0999000000	6
0777	0999000000	7
0888	0999000000	8
0889	0999000000	48
0999	0999000000	49

.....

DRL2000 COMMUNICATION FORMATS

Common Formats

The following formats are commonly used:

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

Example:

3/1 FORMAT

COMPUTER: 101123sssss123sAss1[14]

PRINTER: Jun 26 1998-13:42:32-01/02-SG - 01-123-123-1-FIRE ALARM

3/1 EXTENDED FORMAT

COMPUTER: 01123sssss123sAss32[14]

PRINTER: Jun26 1998-13:49:38-01/02-SG - 01-123-123-32-BURGLARY

4/2 FORMAT

COMPUTER: 101123sssss1234sAss22[14]

PRINTER: Jun 26 1998-15:02:23-01/02-SG - 01-123-1234-22-PANIC ALARM

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 DRL2000.

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: 101123sssss2255sAs266[14][6]

Printer: Jun 25 1998-13:20:42-01/02-SG - 01-123-2255-266-PANIC ALARM

Acron Format

The Acron format is a DTMF format. It can transmit 3 or 4 account digits and 8 digits of channel status at a time.

Shown below are several examples of Acron transmissions.

- Handshake / Kiss-off: 2300 Hz
- 1234: Account Code

Example:

AAAAZZZZZZZ or AAZZZZZZZZ

9RRLLSsssAAAACCCCCC[DC4]

With option disabled

4/8

(Computer) 101123sssss1234sCssA1[14][6]

(Printer) Jun 25 1998-13:25:12-01/02-SG - 01-123-1234-A1-CLOSEsUSERS01

With option enabled

4/8

(Computer) 901123ssss1234AAAAA78A[14][6]

Ademco Contact ID Format

This DTMF format requires a dual tone handshake and 1400 Hz kiss-off, or 1400 Hz handshake and 1400 Hz kiss-off.

NOTE: If the dialer responds to a 2300 Hz handshake by sending the Contact ID Format data, the DRL2000 will accept and decode the format. The DRL2000 will send a 1400 Hz kiss-off tone regardless of the handshake.

CONTACT ID

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 ModLow 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 Succes - download access
- 413 Unsuccessful access
- 414 System shutdown
- 415 Dialer shutdown
- Access Control - 420**
- 421 Access denied
- 422 Access report by user
- Special O/C - 440-450**
- 441 Armed Stay
- 450 O/C by Exception
- 451 Early O/C
- 452 Late O/C
- 453 Fail to O/C
- 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 disabl
- 521 Bell 1 disable
- 522 Bell 2 disable
- 523 Alarm relay disable
- 524 Trouble relay disable
- 525 Reversing relay disable
- System peripheral Disables - 530 and 540**
- Communication Disables - 550 and 560**
- 551 Dialer disabled
- 552 Radio xmitter disabled
- Bypasses - 570**
- 570 Zone bypass
- 571 Fire bypass
- 572 24 Hour zone bypass
- 573 Burg. bypass
- 574 Group bypass
- 575 Swinger Bypass
- Test/Misc. - 600**
- 601 Manual trigger test
- 602 Periodic test report
- 603 Periodic RF Xmission
- 604 Fire test
- 605 Status report to follow
- 606 Listen-in to follow
- 607 Walk Test Mode
- 608 OFF normal condition
- 609 Video transmitter active
- 611 Fire test: point tested
- 612 Fire test: point not tested
- 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
- 629 1& 1/3 day no read log
- 630 Sched change
- 631 Exception Schedule change
- 632 Access Sched change

Example
 COMPUTER: 501123s181234E12200003[14][6]
 PRINTER: Jun 26 1998-16:07:35-01/02-SG - 01-123-1234-
 122-E122-00sSILENT PANIC 003

Ademco Express Format

This format consists of 4-digit Account Codes and 1- or 2-digit alarm codes. The DRL2000 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.

Example:

Option 99 set to 00
 Raw data: 23451726
 Computer Output: 101123 2345 A 172
 Printer output: Jul 20 1998-15:54:31-01/02-SG -01-123-2345-172-FIRE ALARM

Option 99 set to 01
 Raw data: 23451726
 Computer Output: 101123 2345 A 2
 Printer Output: Jul 20 1998-15:48:57-01/02-SG - 01-123-2345-2-PANIC ALARM

Ademco Super Fast or 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 DRL2000 will interpret the signal into 4/2 format. When option [9F] is programmed as '01', the DRL2000 will send the information as it received to the printer and to the computer using High Speed RS232 communication protocol.

8RRLLLLAAAAsCCCCsC[DC4]
 AAAAZZZZ ZZZZ S
 AAAA = Four digit or Three digit account number.
 ZZZZ ZZZZ = Zone Status.
 S = Status Channel indicates the meaning of the message.

AAAAZZZZZZS or AAAZZZZZZS

Example:

With option 9F disabled
 Computer: 101123ssssss1234sAss02[14][6]
 Printer: Jun 25 1998-14:17:50-F3/00-SG-01-123-1234-02-ALARM ZONE02

With option 9F enabled
 Computer: 8011231234s5155s5555s7[14][6]
 Printer: Jun 25 1998-14:21:50-01/02-SG - 01-123-1234 - 51555557

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 DRL2000.

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

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

Note that option [A1] can give a unique FBI RS232 output when enable.

Example:

FBI RS232 Option On
 Computer: JO1123 23452032 [14]
 Printer: 20-Jul-1998 13:12:29 - Jul 20 1998-13:14:51-01/-2-SG - 01-123-2345-003-PANIC

FBI RS232 Option Off
 Computer: 101123 2345 O 001 [14]
 Printer: 20-Jul-1998 13:52:35 - Jul 20 1998-13:54:57-01/02-SG - 01-123-2345-001-OPENING

ITI Format

The ITI format covers ITI panels model RF Commander, Caretaker Plus, SX-V, Commander III, Commander 2000, SX-IVB and UltraGard 5000. In order to receive the ITI format, the handshake #10 must be programmed. Upon a cold boot, the fifth handshake (option [85]) is programmed as 10.

ITI Sensor Library

Sensor #	Printed Out As	Specifics
00	Buddy Alarm	SX-V Only
01-32	ALARM	Caretaker Plus
00-16	Alarm	RF Commander/ Commander III
02-07	Alarm	SX-IVB
01	Bad Sensor #	SX-V Only
02-76	Alm	SX-V
01-18	Alarm	Commander 2000
01-76	Alarm	UltraGard 5000
77	AlarmTmpr	Caretaker Plus, SX-IVB, SX-V, UltraGard 5000 Only
78	Trouble	Caretaker Plus, UltraGard 5000 Only
79	No Activ Alm	Caretaker Plus, UltraGard 5000 Only
80	Alarm	ALL Supported ITI Panels
81	Alarm	ALL Supported ITI Panels
82	Alarm	ALL Supported ITI Panels
83	PhoneTst	ALL Supported ITI Panels
84	OpenUsr xx	ALL Supported ITI Panels
85	CloseUsr xx	ALL Supported ITI Panels
86	SilentDuress	ALL Supported ITI Panels
87	Force Arm, Auto ForceArm	ALL Supported ITI Panels
88	Trouble	Caretaker Plus, UltraGard 5000 Only
89	RF Touchpad	Caretaker Plus, UltraGard 5000 Only
90	AC Fail	ALL Supported ITI Panels
91	Low Battery	ALL Supported ITI Panels
92	AlmTmprLoop	ALL Supported ITI Panels
93	AutoPhoneTst	ALL Supported ITI Panels
94	Recevier Failure	ALL Supported ITI Panels
95	CPU Back In	ALL Supported ITI Panels
98	Event Dump Report	Commander 2000 Only.

NOTE: The UltraGard 5000 and the Security Pro5000 are the same panel with different marketing names. Therefore all references above to the UltraGard 5000 include the Security Pro5000.

Modem II, Modem IIE, Modem IIIAZ and BFSK Formats

Modem II, Modem IIE and Modem IIIAZ formats can be decoded by the DRL2000.

Example:

Modem II RS232 option ON
 Computer output: 601123 7112 T 9[14]
 Printer output: 23-Jun-1998 09:49:02 - Jun 23 1998-09:53:00-01/02-SG - 01-123-7112-BATTERY MISSING

Modem II RS232 option OFF
 Computer output: 101123 7112 R F01[14]
 Printer output: 23-Jun-1998 11:07:47 - Jun 23 1998-
 11:11:45-01/02-SG - 01-123-7112-
 PROG ACCESS OK

BFSK

Example:

Modem II RS232 option ON
 Computer output: 601123 112F 1[14]
 Printer output 22-Jun-1998-11:17:26 - Jun 22 1998-
 11:21:32-01/02-SG-01-123-112-
 FIRE ALARM

Modem II RS232 option OFF
 Computer output: 101123 112F 1[14]
 Printer output 22-Jun-1998 13:05:17 - Jun 22 1998-
 13:09:23-01/02-SG-01-123-112-
 FIRE ALARM

SIA FSK Format

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 DRL2000 can receive Bell 103 modem frequencies. The CCITT V2.1 modem chip will be available on future software.

NOTE: The DRL2000 can accept SIA formats with and without separators. The DRL2000 Version 1.0 Software implements Level 1, Level 2 and Level 3 of the SIA 1993Iib Digital Communication Standard, except that it does not support 'Receiver Call out and Access Passcode Block', 'Reverse Channel Block', and 'V-Channel Communications'.

The DRL2000 supports an account code with a maximum of 16 digits, (including any displayable ASCII characters except the '|') It also supports an Alarm code with a maximum of 4 digits. Usually, the central station automation software will interpret the Alarm Codes. For manual operation, refer 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 DRL2000 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 identical.

Example:

Printer: Jul 20 1998-17:30:16-01/02-SG-01-123-1234 - NM008

Computer: S01123[#1234/NM008]

Silent Knight FSK1, FSK2

Please see page 34 for details.

Sescoa Super Speed

Sescoa Super Speed is a 40 baud communication format. Account Codes are programmed as a 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: JUN 26 1998-15:56:44-F3/01-SG-01-7-1234-
 LOW BATT

Computer: 7017sssss1234sF

For Alarm Message Code		Corresponding 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

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

For Alarm Message Code		Corresponding Event Code (Options 120-1F)
Alarm	0x (Ax)	A PER TEST REPORT
Alarm	1x	A FIRE ALARM
Alarm	2x	A PANIC ALARM
Alarm	3x	A BURGLARY
Alarm	4x	A GENERAL ALARM
Alarm	5x	A GENERAL ALARM
Alarm	6x	A GENERAL ALARM
Alarm	7x	A MEDICAL
Alarm	8x	A SYSTEM TROUBLE
Restr	9x	R RESTORE
Open	Bx	O OPENING
Close	Cx	C CLOSING
Cancel	Dx	/ CANCEL
Restr	Ex	R RESTORE
Trble	Fx	T SYSTEM TROUBLE

4/2 Extended & 4/3 Alarm Library

For Alarm Message Code		Corresponding Event Code (Options 20-2F)
Default	Other *	
Alarm	0xx (Axx)	T 0 PER TEST REPORT
Alarm	1xx	A 1 FIRE ALARM
Alarm	2xx	A 2 PANIC ALARM
Alarm	3xx	A 3 BURGLARY
Close	4xx	C 4 CLOSING
Open	5xx	O 5 OPENING
Alarm	6xx	T 6 SERVICE
Alarm	7xx	A 7 MEDICAL
Alarm	8xx	A 8 MESSAGE
Restr	9xx	R 9 RESTORE
CloseGrp	Bxx	C C GROUP CLOSING
OpenGrp	Cxx	O O GROUP OPENING
Bypas	Dxx	B B CANCEL
UnByp	Exx	H H ZONE BYPASS
Cancel	Fxx	/ / UN BYPASS

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

Event Codes Summary

Code	Event
0	Automatic Test
1	Fire Alarm
2	Panic Alarm
3	Burglary Alarm
4	Closing by User Number
5	Opening by User Number
6	Service
7	Medical Emergency
8	Message
9	Restore
A	Alarm
B	Bypass
C	Closing by User Number
D or /	Cancel
H	Unbypass
O	Opening by User Number
R	Restore
T	Trouble
Z	Common Event Code
20 Hex	Common Event code 'Space'

.....

SG-CPM2000 CENTRAL PROCESSING MODULE

The CPM2000 is the central processing module that monitors the DRL2000 Line Cards and forwards the information from the Line Cards to the computer and printer. The CPM2000 is capable of monitoring a maximum of 255 DRL2000 modules.

General Information

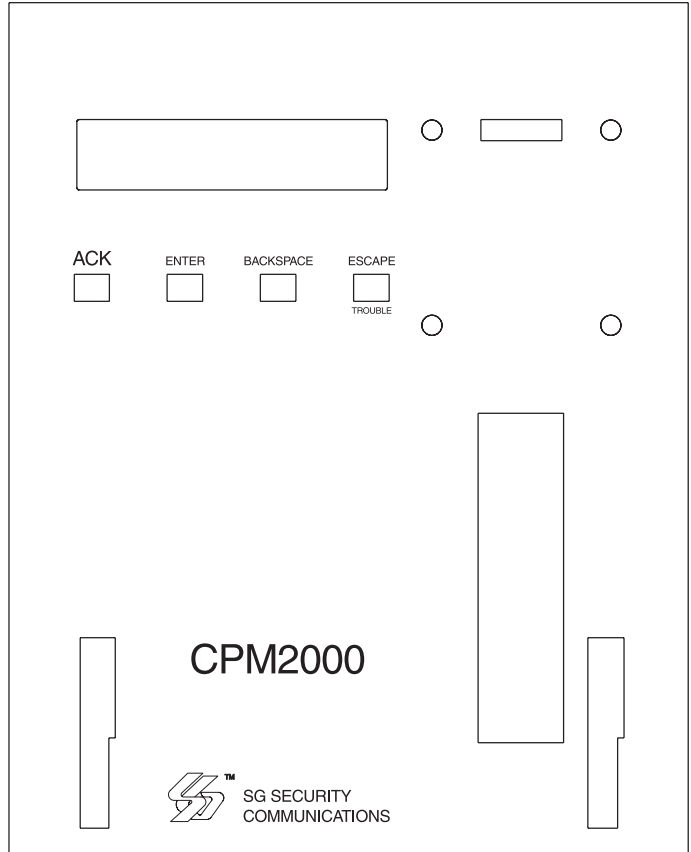
The CPM2000 64-bit micro-controller and real-time language program running at 133 MHz allow the system to quickly and efficiently execute several tasks at the same time. The use of a unique menu display system enhances the system's ease of use for the operator and makes the system configuration and programming simple and efficient. Several diagnostics modes are available to assist the operator in troubleshooting and maintenance, the MLR2000 Console software through windows 95 / 98/NT computer is also available to setup the CPM and Line cards

Features

- Multi-tasking allows the receiver to perform functions that might otherwise be delayed by a slow computer acknowledgement response
- Fast internal communication results in practically no delay in transfer of information between the Line Card and the CPM2000. The CPM2000 is capable of polling more than 200 Line Cards in less than 2 seconds.
- LCD contrast easily adjusted
- Hot switching to secondary CPM2000
- 1/2 floppy drive for data input/ output and software upgrades.
- Ethernet A and B to DRL2000 line-cards
- CP/IP output to automation software and MLR2000 console software.
- Two RS232 ports for automation software
- 11 input/ outputs for BUZZER, ACT, etc.
- 2 relay outputs
- Available COM1 and COM2 baud rates: 110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200 or 38400
- COM1 or COM2 Data bits: 7, 8 or 9
- COM1 or COM2 Parity: Even, odd or none
- COM 1 or COM2 Stop Bits: fixed at 1
- System menu for easy initial programming.
- Software Version 1.0 supports line-cards and CPM2000 programming through TCP/ IP from a computer

CPM2000 Controls

- [ACK] Button: Used to manually acknowledge an alarm event when a computer is not connected to the receiver. Press the [ACK] button to turn the 'ACK' light OFF and silence the buzzer.



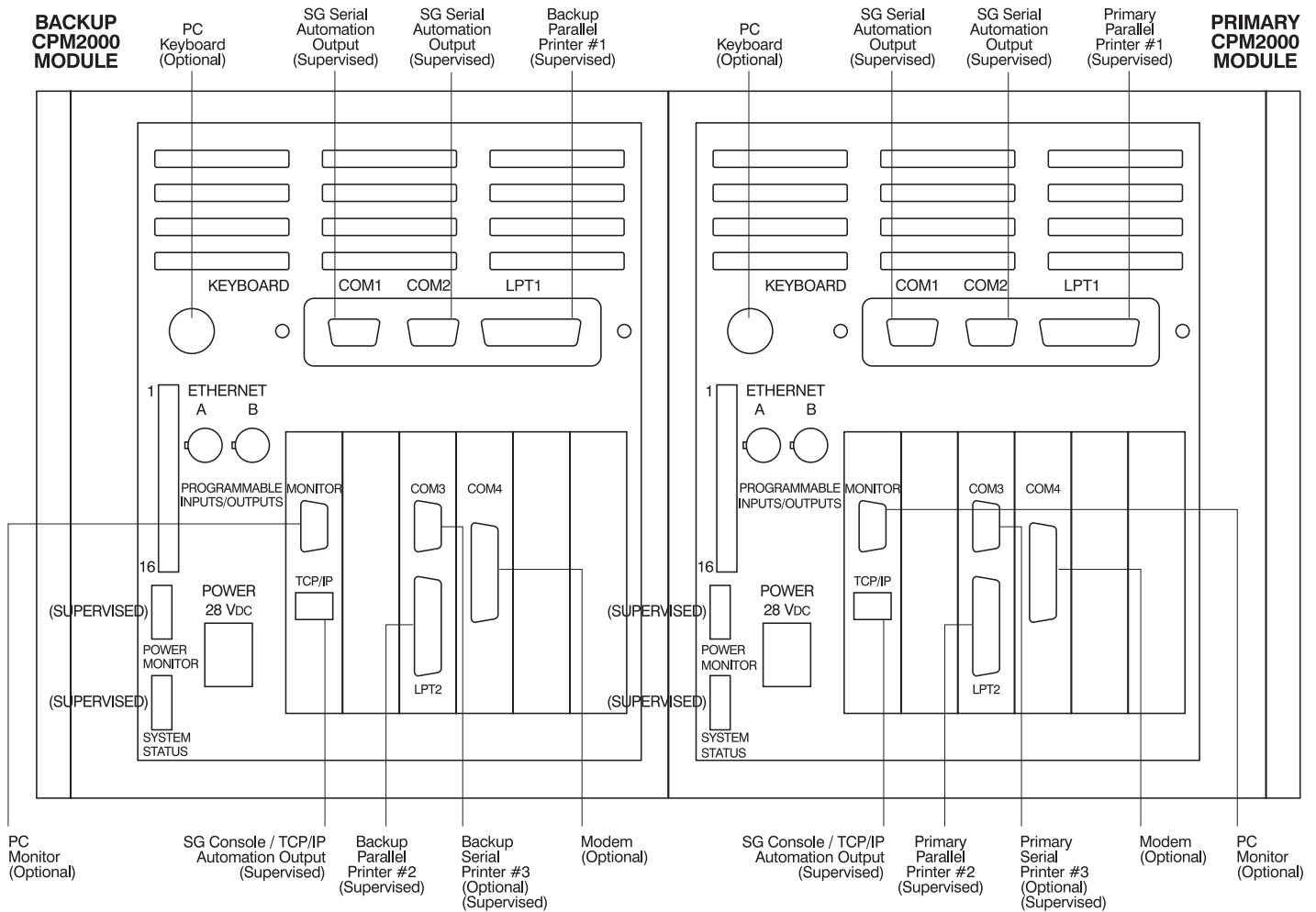
'ACK' Light: Flashes when a message is received from the Line Card and the computer is disconnected.

[Enter] Button: Not used.

[Backspace] Button: Not used.

[Escape] Button: Not used. CPM2000 Wiring Diagram

CPM2000 WIRING DIAGRAM



Programmable Inputs/Outputs

Relay contacts rating: 3 A, 250 Vac
 Non-supervised for connection to power-limited circuits only

- 1 Relay 2 Pin 1
- 2 Relay 2 Pin 2
- 3 Relay 1 Pin 1
- 4 Relay 1 Pin 2
- 5 GND

- Outputs switched to negative
 Max. short circuit current 80 mA/12 Vdc
 Limited by 150 ohm/1 W resistors
- Non-supervised
 - 6 Trouble Output
 - 7 ACK Output
 - 8 Buzzer Output
 - 9 PGMOUT 4
 - 10 PGMOUT 3
 - 11 PGMOUT 2
 - 12 PGMOUT 1

- Max. input voltage 12 V, 10 mA
 Input treshold 1.3 V
 Supervised
- 13 PGMIN 4
 - 14 PGMIN 3
 - 15 PGMIN 2
 - 16 PGMIN 1 (Used for fans supervision)

Notes:

1. PC keyboard and monitor are used only for CPM2000 module configuration
2. SG console is used for software updates on line card
3. All external devices should be installed in the same room as the receiver (within 20 ft.)
4. All circuits are power limited
 - CPU 1150 (Panasonic KX-P1150)
 - SCS-PTR (Okidata Microline 182/184)

Loss of Socket/ Automation

It is estimated that sockets may appear and disappear regularly as processes are terminated and reconstituted. After 5 seconds of loss the CPM2000 shifts to the next connection level. The connection level cases are.

As an Example of Source Destination
 the Fall-down case

Table 1

Slot 1	CPM A TCPIP	Automation TCPIP
Slot 2	CPM A serial 1	Automation serial
Slot 3	END	

Each slot may be populated by a selection. After 5 seconds in a slot not running the CPM2000 will go to the next running resource (i.e. actively polling) until 'END' is encountered. When End is encountered the unit will continuously try to connect to the last entry. One of the switched negative output on the CPM (PGMOUT 1) will be activated when automation fails.

The Manual Restore rule is a command that may be issued on the Sur-Gard console to jump back to the first entry.

The CPM and automation must connect to all resources announced all the time. In the CPM's case this means that a socket is presented for each automation to connect to.

CPM Redundancy

CPM's are directly redundant. The secondary CPM constantly monitors the first CPM by observing polling events. If the primary is considered failed either by loss or by agreed upon takeover, the unacknowledged signals on the systems line-cards are flushed out of the failed CPM. As the secondary CPM resumes polling the previously unacknowledged signals are re-transmitted from the line card in chronological order.

CPM Restoral

All contemplated scenarios for recovery of a CPM except watchdog restart involve a serviceman. It is expected that CPM restoral will be manually switched from the console.

MLR2000 COMPUTER INTERFACE

The CPM2000 is able to send alarm messages to a computer connected to the TCP/IP or serial port. This section describes the communication procedures, and the communication formats available for use.

Virtual Connectivity

Each CPM-2000 has one IP address and a number of associated ports. Each MLR2000 receiver may have up to two CPM-2000's, configured as a primary CPM plus an optional 'hot backup' CPM. Internally, socket programming uses specific ports for expected tasks. The MLR2000 is the 'Server' in a connection-oriented protocol (Berkeley Socket 4.3BSD).

In the case of an IP Fall-down, serial ports will carry the same 'stream' of traffic as TCP/IP, as backup communications channels.

As the CPM does not attempt to save state, when it fails communications are switched to the backup CPM. Line cards will re-transmit unacknowledged packets through the system, restoring any CPM message loss.

Automation Mode

In automation mode it is expected that the primary connection is via TCP/IP networking on the 10BaseT Ethernet connection. To setup this mode a menu will prompt the user for an IP Address. Once the IP address is set up all other options and setups may be done via the Sur-Gard Console Package running on a Windows 95/98/NT platform.

TCP/IP Ports

Each CPM-2000 has a user selectable IP address and Port base address which is applied on the next reboot. Originally the unit will be shipped with IP address 10.0.7.00 on both , the primary and the secondary CPM.

Table 2

Base Port #	Port Name	Base +
1024	Sur-Gard Console Port	Base
1025	SG-Automation Port	Base + 1
1026	2nd-Automation Port	Base + 2
1027	Reserved	Base + 3
1028	Reserved	Base + 4
...
1034	Reserved	Base + 9

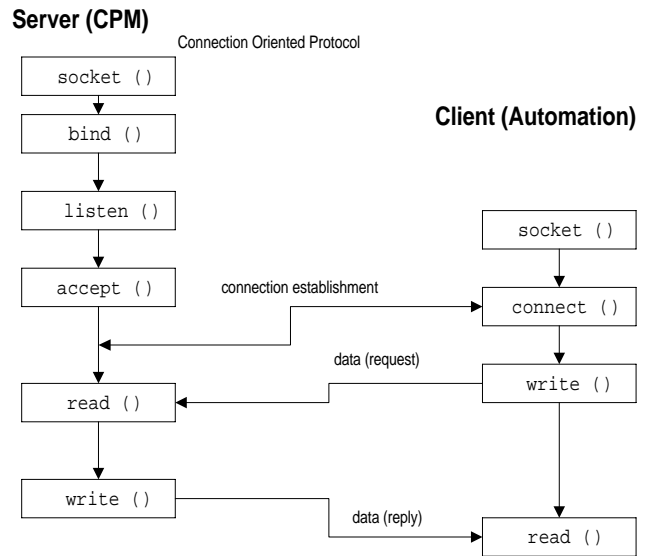
The primary point to be made is that the base port is user configurable as is the IP address.

Client Side Connects

The Automation 'Client' attaches a socket to the CPM 'server' as per the following diagram after Stevens 'UNIX Network Programming' Prentice Hall 1990 section 6.2.

Stream Packet Structure

The stream is an encapsulation of MLR2000 Automation Serial Output.



Status Addressing

Line card status will be reported via physical addressing. The line-cards will be assigned by shelf and slot number. All device status information is in Sur-Gard format. The reporting of status on this port, automation output, CPM display and printer will relate to physical addressing. Physical addressing was chosen to facilitate maintenance, error outputs will include the physical address to assist in maintenance.

Overview of Communication

When the CPM2000 receives data from a Line Card, it forwards the data to the automation and awaits an acknowledgment signal from the computer. The CPM2000 also monitors the connection to the computer by sending a supervisory 'heartbeat' signal to every port every 10 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 Absent! or SG TCP/IP Absent

NOTE: 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 Restored or SG TCP/IP Restored

NOTE: that the message indicates the time and date that communications through COM were determined to be re-established.

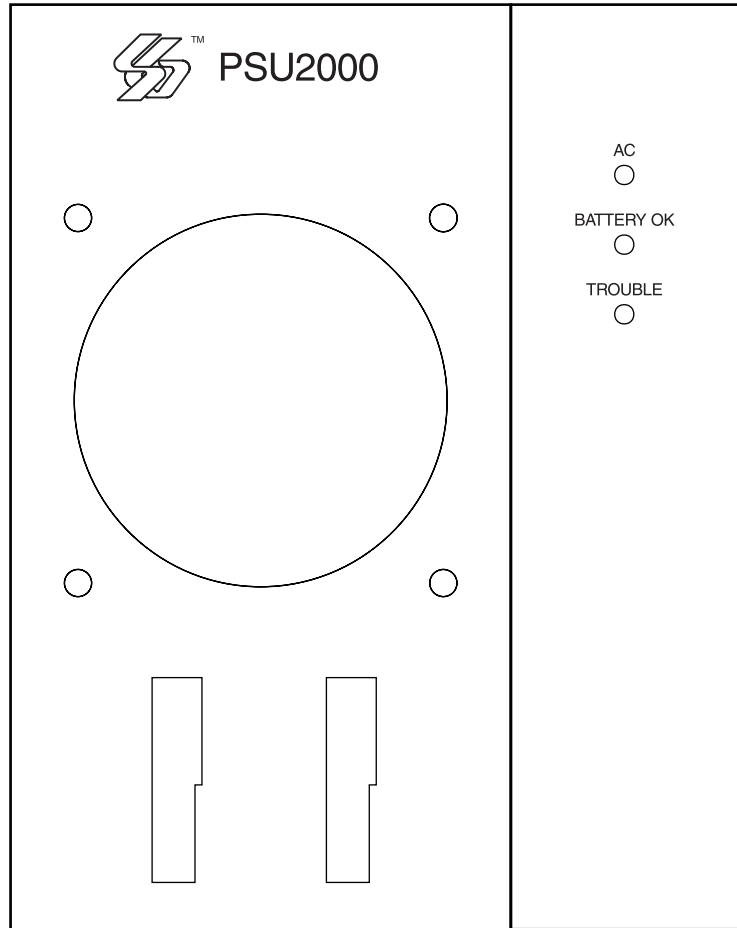
CPM2000 Internal Status Messages:

Description	Printer Message	Automation message
12V Battery Low	12V Battery Low	YT0000
12V Battery Restored	12V Battery Restored	YR0000
5V Failure	5V Failure	YT0001
5V Restored	5V Restored	YR0001
Fan Circuit Failure	Fan Circuit Failure	YX0000
Fan Circuit Restored	Fan Circuit Restored	YZ0000
Operator activity mode.	Programming Entered	LB0000
Primary CPM2000 Failure	Primary CPM2000 Failure	YX0001
Printer #1 Error	Printer#1 Error	VZ0001
Printer #1 Restored	Printer#1 Restored	VY0001
Printer #2 Error	Printer#2 Error	VZ0002
Printer #2 Restored	Printer#2 Restored	VY0002
Printer #x Error	Printer#x Error	VZ000x
Printer #x Restored	Printer#x Restored	VY000x
PSU2000 AC Source A Failure	PSU-AC A Fail	AT0000
PSU2000 AC Source A Restored	PSU-AC A Restored	AR0000
PSU2000 AC Source B Failure	PSU-AC B Fail	AT0001
PSU2000 AC Source B Restored	PSU-AC B Restored	AR0001
PSU2000 DC Source A Failure	PSU-DC A Fail	YP0003
PSU2000 DC Source A Restore	PSU-DC A Restore	YR0003
PSU2000 DC Source B Failure	PSU-DC B Fail	YP0004
PSU2000 DC Source B Restore	PSU-DC B Restore	YR0004
Secondary CPM2000 Failure	Secondary CPM2000 Failure	YZ0002
Serial Port #1 not responding.	COM#1 Absent.	YC0001
Serial Port #1 responded ACK	COM#1 Restored	YK0001
Serial Port #2 not responding	COM#2 Absent.	YC0002
Serial Port #2 started polling	COM#2 Restored	YK0002
TCP/IP Printer error	TCP/IP Printer Error	VZ0000
TCP/IP Printer Restored	TCP/IP Printer Restored	VY0000
TCP/IP Socket 1025 Failed	SG -TCP/IP Failed	NT1025
TCP/IP Socket 1025 Restored	SG -TCP/IP Restored	NR1025
UPS AC Fail (PGM)	UPS AC Fail	AT0002
UPS AC Restored	UPS AC Restored	AR0002
UPS Low Battery Restore	UPS Low Battery Restore	YR0002
UPS Low Battery.	UPS Low Battery.	YT0002

Console Specifies Which SG Automation to Supervise

A selection which defines a combination of SG Sockets, Ports and Protocols may be active. This setup, is saved in the configuration file. Also presented is the selection of ports that may be supervised for the purposes of restorals or fall down.

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PSU2000 POWER SUPPLY MODULE



'AC' LED

It indicates the presence of AC.

'BAT OK' LED

It indicates the battery status (ON when battery is charged).

'Trouble' LED

It indicates a trouble in the power supply.Automation Protocols

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AUTOMATION PROTOCOLS

The Sur-Gard SG-MLR2000 receiver sends a variety of protocols to report signals to the central station computer via a TCP/IP or an RS232 port. A complete list of protocols can be provided upon request.

Data Byte Protocol:

The Sur-Gard MLR2000 receiver uses a default configuration of 9600 baud rate, one start bit, seven data bits, one even parity bit, and one stop bit structure, to transmit and receive signals on the RS232 port. This protocol can be programmed on the receiver to enable different configurations.

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 re-transmission of the same signal three times before giving up. 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 255 times the number of line installed, in its internal memory. The communication is resumed when the first ACKed is received on the heartbeat.

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DETAILED DESCRIPTION OF COM OUTPUTS

COM Responses

When the CPM2000 sends an event to the computer, it checks for 3 responses: Ack, Nack or Unknown/No Response

An ACK tells the CPM2000 the computer got the event successfully. A NACK tells the CPM2000 the computer got the message but didn't understand it. The CPM will attempt to send the message 20 times. If after 20 attempts it continually got NACK from the computer, the CPM and line card will send a communication error event to the printer, and then begin attempting to send the next event in the Line card buffer to the computer. Any other response from the computer, including no response will cause the CPM to attempt to send the message again, up to 4 attempts. If after 4 attempts the CPM got no response or an unknown response, it will assume nothing is connected and generate an alarm.

Automation Absent

When the computer is not responding to transmissions, the CPM will generate a 'COMx Absent' or 'TCP/IP Absent' trouble. When a trouble occurs, the CPM will continue to attempt to send a signal to the computer until it gets a response.

The CPM 2000 will use the heartbeat signal to poll automation for a response. It will make 4 attempts, then wait the next Heartbeat time before making another 4 attempts. The typical heartbeat interval is 30 seconds.

Supervisory Heartbeat Signal Protocol (1):

1RR000ssssssss@ssss[DC4]

RR :Receiver number (Real programmed number. Never virtual).

s :Space Character.

@ :Supervisory Signal.

[DC4] :Terminator, 14 Hex.

This signal is used to supervise the communication between the receiver and the computer. It is sent to the computer about every 30 seconds and is programmable from the receiver. The computer should acknowledge this signal with an [ACK].

The CPM can be programmed to send a test signal to the computer once every 01-99 seconds to test the connection between the CPM and the computer (30 seconds is recommended). If a heartbeat fails to get a response from the computer, the CPM will immediately transmit the heartbeat again, up to 4 attempts.

If all automation outputs failed, the CPM will start the manual mode operation. (See manual mode). If the line-cards buffers are full, the line-cards will stop answering the calls.

APPENDIX A: DRL2000 COMMUNICATION FORMATS

UL has verified the compatibility with the following formats.

NAME	HANDSHAKE	DATA	BAUD	FORMAT	EXTENDED	KISS OFF
Ademco Express	Dual Tone	DTMF	DTMF	4/1(option),4/2	NO	1400 Hz
Ademco Slow	1400 Hz	1900 Hz	10 bps	3/1, 4/1 (or 3/2),4/2	NO	1400 Hz
Ademco Slow	1400 Hz	1900 Hz	10 bps	4/2,4/1,3/1	YES	1400 Hz
* ADT Focus	-	-	-	-	-	-
* ADT Multi-point II	-	-	-	-	-	-
* ADT SIA	-	-	-	-	-	-
Contact ID	Dual Tone	DTMF	DTMF	4/2/1/3/2/3	NO	1400 Hz
FBI Super Fast	2300 Hz	DTMF	DTMF	4/3/1	NO	2300 Hz
Franklin	2300 Hz	1800 Hz	20 bps	3/1, 4/1 (or 3/2),4/2	NO	2300 Hz
Franklin	2300 Hz	1800 Hz	20 bps	4/2,4/1,3/1	YES	2300 Hz
ITI	FSK	FSK	110/300	-	NO	FSK
Modem II	FSK	FSK	110	FSK	NO	FSK
Modem IIE	FSK	FSK	300	FSK	NO	FSK
Modem IIIa ²	FSK	FSK	300	FSK	NO	FSK
Radionics	2300 Hz	1800 Hz	40 bps	3/1,4/2	NO	2300 Hz
Radionics	2300 Hz	1800 Hz	40 bps	4/2,3/1	YES	2300 Hz
Radionics	2300 Hz	1800 Hz	40 bps	3/1+parity	NO	2300 Hz
	-	-	-	4/2+parity	-	-
Radionics	2300 Hz	1800 Hz	40 bps	3/1+parity 4/2+parity	YES	2300 Hz
RadionicsBFSK	1400 Hz	FSK	42	3/2	NO	1400 Hz
RadionicsBFSK	2300 Hz	FSK	42	3/2	NO	2300 Hz
Sescoa S. Speed	2300 Hz	1800 Hz	40 bps	4/3+Checksum	NO	2300 Hz
S.F. Ademco	Dual Tone	DTMF	DTMF	4/8/1	NO	1400 Hz
S.F. Ademco	Dual Tone	DTMF	DTMF	4/8/1 + Checksum	NO	1400 Hz
SIA FSK	FSK mark	FSK mark	110 bps/	Tonal/ data ACK	NO	FSK
Level 1, 2, 3.	-	space	300 bps	-	-	-
Silent Knight Fast	1400 Hz	1900 Hz	14 bps	3/1, 4/1 (or 3/2),4/2	NO	1400 Hz
Silent Knight Fast	1400 Hz	1900 Hz	14 bps	4/2,4/1,3/1	YES	1400 Hz
Silent Knight FSK1	1400 Hz	FSK	110	4/1	NO	1400 Hz
Silent Knight FSK2	1400 Hz	FSK	110	4/2	NO	1400 Hz
Sur-Gard	2300 Hz	DTMF	DTMF	4/3	NO	2300 Hz
Sur-Gard	2300 Hz	DTMF	DTMF	4/3+Checksum	NO	2300 Hz
Sur-Gard	Dual Tone	DTMF	DTMF	4/3	NO	1400 Hz
Sur-Gard	Dual Tone	DTMF	DTMF	4/3+Checksum	NO	1400 Hz
* WESTEC	DTMF					
Contact ID Safety Net	Serial					
SF Ademco Safety Net	Serial					

* Not available on the standard version.

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APPENDIX B: DECIMAL - HEX - BINARY CONVERSION CHART

DEC	HEX	BINARY	DEC	HEX	BINARY	DEC	HEX	BINARY
000	00	0000 0000	058	3A	0011 1010	116	74	0111 0100
001	01	0000 0001	059	3B	0011 1011	117	75	0111 0101
002	02	0000 0010	060	3C	0011 1100	118	76	0111 0110
003	03	0000 0011	061	3D	0011 1101	119	77	0111 0111
004	04	0000 0100	062	3E	0011 1110	120	78	0111 1000
005	05	0000 0101	063	3F	0011 1111	121	79	0111 1001
006	06	0000 0110	064	40	0100 0000	122	7A	0111 1010
007	07	0000 0111	065	41	0100 0001	123	7B	0111 1011
008	08	0000 1000	066	42	0100 0010	124	7C	0111 1100
009	09	0000 1001	067	43	0100 0011	125	7D	0111 1101
010	0A	0000 1010	068	44	0100 0100	126	7E	0111 1110
011	0B	0000 1011	069	45	0100 0101	127	7F	0111 1111
012	0C	0000 1100	070	46	0100 0110	128	80	1000 0000
013	0D	0000 1101	071	47	0100 0111	129	81	1000 0001
014	0E	0000 1110	072	48	0100 1000	130	82	1000 0010
015	0F	0000 1111	073	49	0100 1001	131	83	1000 0011
016	10	0001 0000	074	4A	0100 1010	132	84	1000 0100
017	11	0001 0001	075	4B	0100 1011	133	85	1000 0101
018	12	0001 0010	076	4C	0100 1100	134	86	1000 0110
019	13	0001 0011	077	4D	0100 1101	135	87	1000 0111
020	14	0001 0100	078	4E	0100 1110	136	88	1000 1000
021	15	0001 0101	079	4F	0100 1111	137	89	1000 1001
022	16	0001 0110	080	50	0101 0000	138	8A	1000 1010
023	17	0001 0111	081	51	0101 0001	139	8B	1000 1011
024	18	0001 1000	082	52	0101 0010	140	8C	1000 1100
025	19	0001 1001	083	53	0101 0011	141	8D	1000 1101
026	1A	0001 1010	084	54	0101 0100	142	8E	1000 1110
027	1B	0001 1011	085	55	0101 0101	143	8F	1000 1111
028	1C	0001 1100	086	56	0101 0110	144	90	1001 0000
029	1D	0001 1101	087	57	0101 0111	145	91	1001 0001
030	1E	0001 1110	088	58	0101 1000	146	92	1001 0010
031	1F	0001 1111	089	59	0101 1001	147	93	1001 0011
032	20	0010 0000	090	5A	0101 1010	148	94	1001 0100
033	21	0010 0001	091	5B	0101 1011	149	95	1001 0101
034	22	0010 0010	092	5C	0101 1100	150	96	1001 0110
035	23	0010 0011	093	5D	0101 1101	151	97	1001 0111
036	24	0010 0100	094	5E	0101 1110	152	98	1001 1000
037	25	0010 0101	095	5F	0101 1111	153	99	1001 1001
038	26	0010 0110	096	60	0110 0000	154	9A	1001 1010
039	27	0010 0111	097	61	0110 0001	155	9B	1001 1011
040	28	0010 1000	098	62	0110 0010	156	9C	1001 1100
041	29	0010 1001	099	63	0110 0011	157	9D	1001 1101
042	2A	0010 1010	100	64	0110 0100	158	9E	1001 1110
043	2B	0010 1011	101	65	0110 0101	159	9F	1001 1111
044	2C	0010 1100	102	66	0110 0110	160	A0	1010 0000
045	2D	0010 1101	103	67	0110 0111	161	A1	1010 0001
046	2E	0010 1110	104	68	0110 1000	162	A2	1010 0010
047	2F	0010 1111	105	69	0110 1001	163	A3	1010 0011
048	30	0011 0000	106	6A	0110 1010	164	A4	1010 0100
049	31	0011 0001	107	6B	0110 1011	165	A5	1010 0101
050	32	0011 0010	108	6C	0110 1100	166	A6	1010 0110
051	33	0011 0011	109	6D	0110 1101	167	A7	1010 0111
052	34	0011 0100	110	6E	0110 1110	168	A8	1010 1000
053	35	0011 0101	111	6F	0110 1111	169	A9	1010 1001
054	36	0011 0110	112	70	0111 0000	170	AA	1010 1010
055	37	0011 0111	113	71	0111 0001	171	AB	1010 1011
056	38	0011 1000	114	72	0111 0010	172	AC	1010 1100
057	39	0011 1001	115	73	0111 0011	173	AD	1010 1101

DEC	HEX	BINARY
174	AE	1010 1110
175	AF	1010 1111
176	B0	1011 0000
177	B1	1011 0001
178	B2	1011 0010
179	B3	1011 0011
180	B4	1011 0100
181	B5	1011 0101
182	B6	1011 0110
183	B7	1011 0111
184	B8	1011 1000
185	B9	1011 1001
186	BA	1011 1010
187	BB	1011 1011
188	BC	1011 1100
189	BD	1011 1101
190	BE	1011 1110
191	BF	1011 1111
192	C0	1100 0000
193	C1	1100 0001
194	C2	1100 0010
195	C3	1100 0011
196	C4	1100 0100
197	C5	1100 0101
198	C6	1100 0110
199	C7	1100 0111
200	C8	1100 1000
201	C9	1100 1001
202	CA	1100 1010
203	CB	1100 1011
204	CC	1100 1100
205	CD	1100 1101
206	CE	1100 1110
207	CF	1100 1111
208	D0	1101 0000
209	D1	1101 0001
210	D2	1101 0010
211	D3	1101 0011
212	D4	1101 0100
213	D5	1101 0101
214	D6	1101 0110
215	D7	1101 0111
216	D8	1101 1000
217	D9	1101 1001
218	DA	1101 1010
219	DB	1101 1011
220	DC	1101 1100
221	DD	1101 1101
222	DE	1101 1110
223	DF	1101 1111
224	E0	1110 0000
225	E1	1110 0001
226	E2	1110 0010
227	E3	1110 0011
228	E4	1110 0100
229	E5	1110 0101
230	E6	1110 0110
231	E7	1110 0111
232	E8	1110 1000
233	E9	1110 1001

DEC	HEX	BINARY
234	EA	1110 1010
235	EB	1110 1011
236	EC	1110 1100
237	ED	1110 1101
238	EE	1110 1110
239	EF	1110 1111
240	F0	1111 0000
241	F1	1111 0001
242	F2	1111 0010
243	F3	1111 0011
244	F4	1111 0100
245	F5	1111 0101
246	F6	1111 0110
247	F7	1111 0111
248	F8	1111 1000
249	F9	1111 1001
250	FA	1111 1010
251	FB	1111 1011
252	FC	1111 1100
253	FD	1111 1101
254	FE	1111 1110
255	FF	1111

APPENDIX C: ASCII CHARACTER CHART

Corresponding ASCII on printer (Option 70)	Hex	Character
20		Space
30		0
31		1
32		2
33		3
34		4
35		5
36		6
37		7
38		8
39		9
41		A
42		B
43		C
44		D
45		E
46		F
47		G
48		H
49		I
4A		J
4B		K
4C		L
4D		M
4E		N
4F		O
50		P
51		Q
52		R
53		S
54		T
55		U
56		V
57		W
58		X
59		Y
5A		Z
5C		\

Limited Warranty

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

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

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

Warning

Sur-Gard Ltd. 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.

How to Contact Us:

Sales

For information about additional products, please call our sales number: 1-800-418-7618, or e-mail us at sales@sur-gard.com.

Technical Support

If you have questions or problems when using Sur-Gard products, you can call technical support. If you are within the United States, Puerto Rico, the U.S. Virgin Islands or Canada, you can get support by dialing 1-800-503-5869 ext.1. If you are outside these areas, please call (416) 665-4494 ext.1, or e-mail us at support@sur-gard.com.

Internet

Visit our new Sur-Gard WWW site. You will be able to search the Sur-Gard technical information database and read information about new products. You will also be able to send us your questions. Our World Wide Web address is <http://www.sur-gard.com>.

Industry Canada NOTICE

Notice: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. Industry Canada does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorised Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

User should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

NOTICE: The Load Number assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on an interface may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100.

Ringer Equivalence Number: 0.1

AVIS: L'étiquette de l'Industrie Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme à certaines normes de protection, d'exploitation et de sécurité des réseaux de télécommunications. Industrie Canada n'assure toutefois pas que le matériel fonctionnera à la satisfaction de l'utilisateur.

Avant d'installer ce matériel, l'utilisateur doit s'assurer qu'il est permis de le raccorder aux installations de l'entreprise locale de télécommunication. Le matériel doit également être installé en suivant une méthode acceptée de raccordement. L'abonné ne doit pas oublier qu'il est possible que la conformité aux conditions énoncées ci-dessus n'empêchent pas la dégradation du service dans certaines situations.

Les réparations de matériel homologué doivent être effectuées par un centre d'entretien canadien autorisé désigné par le fournisseur. La compagnie de télécommunications peut demander à l'utilisateur de débrancher un appareil à la suite de réparations ou de modifications effectuées par l'utilisateur ou à cause de mauvais fonctionnement.

Pour sa propre protection, l'utilisateur doit s'assurer que tous les fils de mise à la terre de la source d'énergie électrique, les lignes téléphoniques et les canalisations d'eau métalliques, s'il y en a, sont raccordés ensemble. Cette précaution est particulièrement importante dans les régions rurales.

AVERTISSEMENT: L'utilisateur ne doit pas tenter de faire ces raccordements lui-même; il doit avoir recours à un service d'inspection des installations électriques, ou à un électricien, selon le cas.

L'indice de charge (IC) assigné à chaque dispositif terminal indique, pour éviter toute surcharge, le pourcentage de la charge totale qui peut être recordée à un circuit téléphonique bouclé utilisé par ce dispositif. La terminaison de circuit bouclé peut être constituée de n'importe quelle combinaison de dispositifs, pourvu que la somme des indices de charge de l'ensemble des dispositifs ne dépasse pas 100.

Indices d'équivalence de la sonnerie: 0.1

FCC Compliance Statement

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

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

Important Information

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

Notification to Telephone Company

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

FCC Registration Number: 1VDCAN-25404-AL-N

Ringer Equivalence Number:0.2B

Telephone Connection Requirements

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

Incidence of Harm

Should terminal equipment or protective circuitry cause harm to the telephone network, the telephone company shall, where practicable,

notify the customer that temporary disconnection of service may be required; however, where prior notice is not practicable, the telephone company may temporarily discontinue service if such action is deemed reasonable in the circumstances. In the case of such temporary discontinuance, the telephone company shall promptly notify the customer and will be given the opportunity to correct the situation.

Changes in Telephone Company Equipment or Facilities

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

General

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

Ringer Equivalence Number (REN)

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

Equipment Maintenance Facility

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

U.S. Point of Contact

Digital Security Controls Ltd.
160 Washburn St.
Lockport, NY 14094



© 1999 SG Security Communications
401 Magnetic Drive, Units 24-28
Downsview, Ontario Canada M3J 3H9
(416) 665-4494
(416) 665-4222
1-800-418-7618
www.sur-gard.com

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MLR-2000

VIRTUAL RECEIVER

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**SG SECURITY
COMMUNICATIONS**

A Division of Sur-Gard Security Systems Ltd.



Listed

Installation Manual

Version 1.X

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