MLR-MX and
Sure Signal CSR

Installation and Operation Manual

Version 1.0

FCC Compliance Statement

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

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 residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does not cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/television technician for help

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

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.

Industry Canada Compliance Statementt
This Class A digital apparatus meets all requirements of the Canadian interference-causing equipment regulations.

Cet appareil numerique de la Classe A respecte toutes les exigences de reglement sure le materiel brouilleur du Canada.

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INTRODUCTION

The MLR-MX interfaces to the Mobitex network to provide wireless alarm reception from Sure Signal transmitters.

The MLR-MX'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 are protected by password codes.

CPM2

The CPM2 Central Processing Module oversees operation of the receivers. Along with its built-in keypad and LCD message screen, the CPM2 features one parallel printer, and two serial computer interface capability.

DRL-MX

Provides the interface to the Sure Signal CSR (Central Station Radio) to establish a link on the Mobitex radio. This visual interface will provide all alarm functionality for the Mobitex network.

Supervision

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

The DRL-MX Line Card Module verifies communication with the CPM2. In the event of a malfunction, the operator will be advised with a visual indicator and the Line Cards will continue to function. Each line card will continue to receive information, but will require manual acknowledgement.

The printer is supervised for loss of power, off-line, paper out and other trouble conditions. The communication link to the computer through the RS232 port is monitored by the supervisory "heartbeat" test transmissions.

The DRL-MX supervises the Sure Signal CSR to ensure that the signal strength and communication are always operational. Should the unit register low signal strength (>30%) then unit would display Low Signal Strength.

Compatibility

Central station automation software packages such as:

• M.A.S.   • DICE   • SIMSII   • S.I.S.   • GENESIS

Support the MLR-MX Sur-Gard interface.

CPM2 Outputs/Inputs

The CPM2 features four negative-switched outputs (POUT1 is activated when automation fails), two relay outputs and four inputs.

MLR-MX Backplane Connection Diagram

TO NEXT LINE MODULE

REFER TO DML4 POWER CONNECTIONS

REFER TO DML4 CONNECTIONS

SERIAL OUTPUT TO COMPUTER

PARALLEL PRINTER OUTPUT

TO SURE SIGNAL CSR

TO NEXT LINE MODULE

DML4 POWER CONNECTIONS

Battery 12V Gell Cell 35Ah

External 12VDC input (secondary battery or power supply for CPM2 backlighting. Connect positive to B. Light terminal; negative to GND terminal.

Transformer 16VAC 175VA

110VAC

Chassis GND connect to Earth GND

DML4 CONNECTIONS

Not used on CPM2

Not used on CPM2

+12V 450mA MAX

Switched negative outputs
Maximum short circuit current 70 mA at 12V,
Limited by 150Ω 1W resistor.

System Overview

- Nonvolatile RAM on each DRL-MX card module for programming and event buffer
- Fast communication between line cards and CPM2
- Flash Download for software upgrades
- 2 Large, easy to read 2-line, 16-characters-per-line, Liquid Crystal Display screen
- All modules function individually to help ensure uninterrupted operation during hardware or software upgrades
- Inputs on CPM2 for UPS supervisory
- Maximum 15 lines per receiver
- 256-event memory buffer on each individual line cards
- Real-time clock
- CPM2 features 16-bit micro-controller
- 1 parallel printer port, 2 serial RS232 ports
- Programmable serial port 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
- Negative-switched outputs on CPM2 (special applications)
- AC-lost detection and standby battery supervision
- Low battery detection and automatic low battery disconnect to prevent deep-discharge damage to battery
- Operator Acknowledge option
- Mobitex Network Supervision

Number of Line Cards Supported

The system will support a maximum of 15 DRL-MX.

Approvals

Industry Approvals

The MLR-MX is listed for meeting the following approvals:

UL 864 Control Units for Fire-Protective Signaling Systems

UL 1610 Central Station Burglar Alarm Units

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

UL Manual Mode

For UL manual mode, each event will activate the internal buzzer to be acknowledged manually. Each event will also be sent automatically to the connected printer. For Central Station applications, the signalling performance of each DACT (DIgital Alarm Communication Transmitter) shall be manually tracked. Failure to receive a signal from a DACT over a 24-hour period shall be handled as a trouble signal.

QUICK START

Receiver Setup and Operation Without Programming

Unpacking

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

Bench Testing

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

The following items are required:

- 16VAC 40 VA transformer
- Sure Signal CSR
- Mobitex Network
- Sure Signal

Power Up

When power is applied, the receiver will beep and will indicate one or more trouble conditions on the LCD message screen. If the Line Cards do not have Mobitex network connection, the DRL-MX modules will beep and their "ALARM" lights will FLASH.

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

Printer output

Printer protocol:

LRL-AAAA--NriPMM22

L01-12340Nri|MA00 (x) - no computer output

x = event count

Any parallel 40/80-column printer can be used with the CPM2.

Suggested printers are OKIDATA Microline 182/184 Turbo and Panasonic KXP11xx, STAR DP8340.

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

Printer Connections

The following printers can be used with MLR2-MX:

Brother M-1309	**Olivetti DDM-100-S**
Citizen 180D	**Panasonic KX-P1124**
Epson LQ-570+	**Panasonic KX-P1150**
Okidata ML 182 Turbo	**Roland Raven 9101**
Okidata ML 182 Plus	**Tandy DMP-206**
Okidata ML 184 Turbo	**Star NX-1000**

- **Star DP8340** Sur-Gard part # SG-DP8340 (The SG-1220P power supply should be used)
- The SG-1220P (Sur-Gard part number SG-1220P) is a 12V 2A power supply housed in a metal case with a tamper switch. It requires one 12VDC sealed rechargeable battery (6 to 25 Ah rating) and one 16VAC 40VA Class 2 wire-in transformer (Frost FTC4016 or equivalent).

Connect the parallel printer to the MLR-MX printer output port using a parallel printer cable.

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

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

- Sur-Gard CPU-1150 (Panasonic KX-P1150)
- Sur-Gard CPU DMP-206 (Tandy DMP206)
- DMP SCS-PTR (Okidata Microline 182/184)

Computer Connections

- Connect computer to the MLR-MX RS232 port using a serial cable to COM1. IMPORTANT: Do not use a null modem cable.

DB25 to DB25   DB25 to DB9

pin 3 - Rx Data

pin 2 - pin 3 Tx Data

pin 7 - Ground

pin 2 - Tx Data

pin 7 to pin 5 Ground

pin 3 to pin 2 Rx Data

MLR-MX COM1
Computer Automation Connection

INSTALLATION

Mounting the Receiver

Install the MLR-MX in a closed 19" rack or cabinet with a locking rear access door. Cover all unused spaces with blank metal plates. The LCD screens on the receiver are designed to be viewed below eye level. If the unit must be mounted where the screens are above eye level, angle the unit downwards to improve visibility. The following items can be supplied for a complete installation:
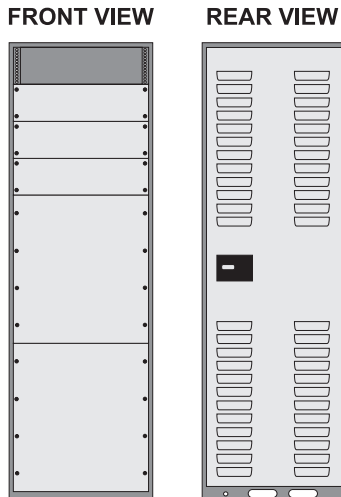
Stand-up Unit (61.25" tall up to 30 telephone lines)

Part # SG-MLR2-CL

Parts:

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

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

FRONT VIEW   REAR VIEW

Desk-mount Unit (28" tall up to 30 telephone lines)

Part # SG-MLR2-CM

Parts:

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

FRONT VIEW   REAR VIEW

NOTES: If 15 modules are not used, cover each unused location with a blank plate.

Use only UL Listed components with programmable output on the MLR-MX.

Ex: UL Listed Buzzer part # PKB5-3A0

UL Listed Relay part # HAS-112-12

Grounding

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

Power Supply

Ensure that all electrical connections are made correctly. After verifying all connections, connect the RED and BLACK leads to a 12VDC sealed rechargeable battery. Be sure to observe polarity when connecting the battery. When the battery is connected, test the system under battery power only.

If a separate DC input is used to power the LCD backlighting during AC power failures, connect it to the BLGT terminal. It must be a listed Fire-Protective Signalling System power supply rated 12VDC. Connect the positive lead from the DC supply to the BLGT terminal; connect the negative lead from the DC supply to the GND terminal.

CAUTION: Connecting a positive (+) terminal to a negative (-) terminal may cause a fire and possibly serious personal harm.

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

Battery Charging Current

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

Radio Connection

NOTE: For UL installation the Sure Signal CSR has been approved with Altronix AL400UL power supply.

SURE SIGNAL CSR

SG WIRELESS™ COMMUNICATIONS
A Division of the SafeLink Corporation

POWER
RX
TX

STRAIGHT THROUGH DB9 MALE TO FEMALE

TO RECEIVER   TO RADIO

To 12V DC +
−

MADE IN CANADA
SUR-GARD SECURITY SYSTEMS LTD.

SG-DML2E
Rev 01

The serial connection is a straight through 9 pin male to 9 pin female connection.

Initialization

It is recommended that a DRL-MX Cold Start-up be performed when the unit is updated with a new program version.

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

Cold Booting

On powered up press both the ACK button and the Select button. The following will be displayed:

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

To cancel the Cold Boot and change the Line Card number, press the [CANCEL] button. To perform the Cold boot, press the [ACK] button. When the [ACK] button is pressed, this message will be displayed for 1 second:

```
CHANGE LN NBR
ACK:yes SEL:no
```

After 1 second, or if the [CANCEL] button was pressed to cancel the Cold Boot, this message will be displayed:

```
LINE CARD #:00
ACK:up SEL:down
```

Press the [ACK] or [CANCEL] buttons to scroll through the list of valid numbers for the line card. The list will scroll through the hexadecimal numbers "01" to "0F" (1 to 15); when the desired number is displayed, press the [ACK] and [CANCEL] buttons together.

DRL-MX Controls

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

LEDs
- **Trouble**: Lights up on Linecard Shutdown, CPM Error Restores when Line Card Reactivated, CPM Restored.
- **RX**: Signal received from the radio.
- **TX**: Signal sent to the radio.
- **Radio Detect**: Lights up when Network is Absent. Restores when Network is Present.
- **TX ACK**: Acknowledge of an alarm LED.
- **Low Signal**: Signifies that the RSSI value is below 30% and can only be restored if it reaches 45%.
- **ACK**: Lit when an Acknowledged is required in manual mode.
- **Watchdog**: Blinks to indicate that the software is operating
- **TX Error**: It indicates Transmission Error. Restores when Transmission Successful is received.
- **Power**: Power will be on when the Line card has power.

Push-buttons
- **Select**: It is used in (menu) scrolling down in standby mode Used in selecting menus.
- **Ack.**: Acknowledging alarms in manual mode. Scroll up in standby.

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

Shutdown of Line Card Communication with CPM2
A Line Card may be temporarily removed from CPM2 polling for testing and maintenance purposes; refer to "CPM2 Utility Modes" for information on shutting down a line card. While in the shutdown mode, the Line Card will retain up to 255 alarm messages in its event buffer. When the Line Card is shut down, the "Trouble" light will come ON and this message will be displayed:

```
DRL-MX - Line #0D
<<-LC SHUTDOWN>>
```

CPM2 Error; Display Alarm Messages
If the DRL-MX cannot detect CPM2 polling and there are no alarm events in the event buffer, this message will be displayed:

```
DRL-MX - Line #0D
<<-CPM ERROR->>
```

If alarm messages cannot be sent to the CPM2 because of the error, the DRL-MX will display the oldest message which has not been manually acknowledged. The "Alarm" light will FLASH and the sounder will beep if the "Mute Buzzer" Option is programmed as [00] or [01].

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

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

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

Display Program Version

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

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

```
SG - DRLMX
Jan 19,99 V 1.10
```

Press [ACK] and [SELECT] together to return to the Stand-By Mode.

Adjust LCD Contrast

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

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

```
   Adjust  CONTRAST
   ****
```

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

Press [ACK] and [SELECT] together to return to the Stand-By Mode.

This section will outline the procedure for enrolling the Mobitex radio onto the network. This section will also outline additional features and functions that are to be added to the MLR-MX in order for the receiver to operate correctly.

Sure Signal CSR Mounting

The following are guides for help placing a radio unit.

Location of the Antenna

The antenna should be placed in a location that will give a signal strength of 80 to 100%. This will have to be flushed out more completely when an antenna kit has been put together.

Location of the Sure Signal CSR Host

The radio host should be mounted on a wall that is away from directly behind the receivers. As well, the radio host needs to be within the required distance of the DRL-MX in order to connect the RS232 cable between the receiver and the radio host. This mounting location will also require ready access to the drop through location of the antenna cable. Maximum distance is 100 feet.

Changing Networks

There may be another network which you wish to use for a radio that is currently operating, or for other radios that are to be installed. In order to change the current provider for the radio that requested the Network List. Once the provider has set up the service the following steps will have to be followed in order to change networks. Using the programming mode at the CPM2, request a Network List. The following steps need to be followed in order to check the network that is currently being used, a list of the networks available and the attempt to change networks.

At the CPM2, enter into programming mode.

Select the line (radio) that needs to be changed from the current network to a new network.

Network options

- **2C**: current network request

  In the code section, a nonuser number needs to be entered. The MLR-2E will send a request network name to the radio. The radio will respond with the current network name. The printer will then print:

                    L11- Cantel

  L11 is the receiver and line number; Cantel is the current network.

Note: *This network name does not need to be saved in the MLR-MX.*

- **2D**: request network list - print list to printer

  In the code section, a nonzero number needs to be entered. The MLR-MX will send a request network list to the radio. The radio will respond with the reply network list. The printer will then print:

                    L11- (01) Cantel
                    L11- (02) Bell
                    L11- (03) BCBell
                    L11- (04) SackBell

- **2E**: change network – enter number of the requested network, or 00 in order to exit the section without changing the network. When a nonzero number is entered, the MLR-MX will send a change to other network to the radio.

  The radio will respond with the current network name.

  If 00 is entered, the receiver will request the network name Once the programming mode has been exited, or a network has been selected, then the network list can be removed from RAM.

DRL-MX Displays

The two displays that are on the DRL-MX display boards will be fully utilized. The top display indicates the status of the Mobitex radio host that is connected to the receiver. The bottom display will only be used to indicate received signals from Sure Signal that are using the Mobitex radio network.

Top Display

The top display is used for displaying the host radio MAN, the radio signal strength, as well as any trouble conditions that occur during operation. The radio signal strength is taken out of the radio status.

The following is an example of how the top display will appear, under normal operation.

```
   5004455      [45%]
   Network  Present
```

In the example, the radio signal strength is 45%, and the network was detected when the radio last communicated a radio status to the receiver.

Bottom Display

The bottom display gives the information of the inbound transmissions from the Sure Signals. The Sure Signal will be the account number in decimal, for format type 1, that will be displayed, and then the SIA event after. Inbound format type 2 will have an account number in the MPAK payload. Also, the line card that the DRL-MX is assigned as will be displayed.

The following is an example of how a received transmission will be displayed on the bottom display.

```
   L11-5004454  Nri1
   MA00
```

In this example, this DRL-MX is receiver 1, line 1 to the CPM2. The Sure Signal MAN, and account number, is 5004454, and the event occurred on partition 1, and the event was a [A] key alarm.

This display will follow the regular options of a line card display on a regular MLR-MX.

ADDITIONAL TROUBLES FOR THE SURE SIGNAL CSR

All of the trouble conditions that occur, will be displayed on the top display, sent to the printer, and sent to the automation package. The information at the printer and the LCD will be plain English messages. The output to the automation package will be SIA, using the account code '0000'.

Loss of Radio

The MLR-MX requests a radio status every 5 seconds from the Sure Signal CSR. If the receiver does not get a radio status back within 250 msec., the radio will be considered as not connected. Also, if there is not a radio status 30 seconds after a transmission is attempted, then the loss of radio trouble will be indicated. The display will show the following.

```
┌─────────────────────┐
│  Radio  Not  Found  │
└─────────────────────┘
```

The printer will output the following error:

L11- Loss of Radio

The receiver will output the following line error message to the automation package.

S011[0000 | Nri1YD00]

When the Sure Signal CSR is restored, the LCD will display the serial number, signal strength, and radio status.

The printer will print:

L11- Radio Restored

The receiver will output the following line restoral message to the automation package.

S011[0000 | Nri1YE00]

Loss of Network

The status of the Network is checked every 5 seconds. If the radio can not find the network, there will be a trouble indicated. The radio must have lost the network one time before a trouble is generated.

The radio status indicates to the receiver whether the Mobitex network is present or not. The display will show the following message.

```
┌─────────────────────┐
│  Network   Absent   │
└─────────────────────┘
```

The printer will output the following error:

L11- Network Absent

The receiver will output the following line error message to the automation package.

S011[0000 | Nri1NT00]

When the network is restored, the LCD will display the serial number, signal strength, and radio status.

The printer will print:

L11- Network Present

The receiver will output the following line restoral message to the automation package.

S011[0000 | Nri1NR00]

Low Signal Strength

The radio status will indicate to the receiver the signal strength between the Sure Signal and the network. The display will show the following message.

```
┌─────────────────────┐
│  5004455 [22%]      │
│  Low  Signal        │
└─────────────────────┘
```

The printer will output the following error:

L11- Low Sig. [22%]

The receiver will output the following line error message to the automation package.

S011[0000 | Nri1XL00]

When the network is restored, the LCD will display the serial number, signal strength, and radio status.

The printer will print:

L11- Sig. Rstr. [45%]

The receiver will output the following line restoral message to the automation package.

S011[0000 | Nri1YE00].

Low signal will occur at 30% and will restore at 45%

Unstable Signal

This status is sent whenever 2 consecutive low signals are received within an hour to indicate that the radio location is not recommended.

Transmission Troubles

There are a number of transmission errors that are possible and will be outlined in this section.

There are 2 locations that the transmission troubles come from; the transmit MPAK status in the radio status in the frame data, and the MPAK flags. The troubles will be divided into both categories.

Before a transmission trouble is indicated, there is an attempt to correct the trouble, with a maximum of 5 retries. If the transmissions do not get through to the destination, the last trouble will display the reason for the failed transmission. The display will show the following message.

```
┌─────────────────────┐
│  5004455     [45%]  │
│  TX.  Error         │
└─────────────────────┘
```

The printer will output the following error for troubles indicated by the MPAK flags: L11- TX. Error 1 (*error type from table*).

The printer will output the following error for troubles indicated by the radio status: L11- TX. Error 2 (*error type from table*).

The receiver will output one of the following line error messages to the automation package.

S011[0000 | Nri1UAxx] for type 1 transmission errors

S011[0000 | Nri1UTxx] for type 2 transmission errors.

xx – error type from the tables below.

When the radio successfully transmits, the trouble will be considered to be cleared. The LCD will display

```
┌─────────────────────┐
│  TX  Successful     │
└─────────────────────┘
```

The printer will print: L11- TX. Successful

The receiver will output the following line restoral message to the automation package.

S011[0000 | Nri1UJ00]

TX Error 1 (from MPAK flags)

TypeError
02 In Mail
03 No Transfer
04 Illegal
05 Congest
06 Error
07 Busy

TX Error 2 (from Radio Status)

TypeError
80 Previous "Transmit MPAK" not complete.
81 LOGON specified an already logged-in PMAN.
82 PMAN not logged in. Can't use it as Source MAN.
83 FlexList Full for LOGON MPAK request.
84 Bad MPAK Type.

Type	Error
85	Bad MPAK Traffic state.
86	Bad MPAK transmit flags.
87	Bad Address List.
88	Bad destination MAN.
89	Incorrect length.
90	No radio coverage.
91	Transmitter is off.
92	Radio is in DIE state.

Alarm Acknowledgment

Alarms are received and decoded to SIA protocol and should also be Acknowledged using SIA DATA ACK.

The SIA DATA ACK is 38h which will be sent with the MPAK packet. This will include the Time bytes and the Source/Destination MAN numbers and an ACK counter.

Radio Status

Radio Status Printer Outputs

The following messages will describe the printer outputs depending if the bit was set high or low.

Bit	Description	Set High	Set Low
7	Network Contact	L11-0000—Network Present	L11-0000—Network Absent
6	Transmission Allowed	L11-0000—Rad Trans: LIVE	L11-0000—Rad Trans: DIE
5	Transmitter is On	L11-0000—Transmitter ON	L11-0000—Transmitter OFF
4	Power Save Enabled	Currently not used	Currently not used
3	Receiver Ready	L11-0000—Rad Rec: Ready	L11-0000—Rad Rec: not Rdy
2	Low Battery	Currently not used	Currently not used
1	Radio Shutdown	L11-0000—Radio Shutdown	L11-0000—Radio Restored
0	Battery Charging	Currently not used	Currently not used

Maximum Account Limits

When the monitoring station is giving the installer a radio MAN for the Sure Signal to report to, there should be no more that 1000 accounts reporting to a single receiver line that has a Mobitex radio host.

User programming

Option 01: linecard number
Option 0F: mute buzzer
Option 02: linecard number length
Option 2C: network name to printer
Option 2D: network list to printer
Option 2E: change to other network
Option 72: com. select
Option 73: printer select
Option 74: equivalent line
Option 75: receiver number
Note: all other options will be set as reserved.

Option 01: Linecard Number, this sets the Physical number on the linecard and all reports are reported using this linecard number.

Option 0F: Mute Buzzer option. This option is for enabling and disabling the buzzer.

Option 02: Linecard Number Length, which sets the length of the physical number on the linecard.

Option 2C: Current Network Request, when this option is enabled to 01, the DRL-MX will send a request network name to the radio. The network will respond with the current network name and the printer will print:

L11-Cantel

L11   - Receiver and linecard number
Cantel - Current Network Name

Option 2D: Request Network list, when this option is enabled

to 01, the DRL-MX will send a network list to the radio. The radio will respond with the reply network list and the printer will then print:

L11- 01 Cantel
L11- 02 Bell
L11- 03 BCBell
L11- 04 SackBell

If option 2E is entered, then the network names should be saved in RAM until programming is exited.

Option 2E: Change Network, in this option enter the number of the requested network, or 00 in order to exit the section without changing the network. When a nonzero is entered, the DRL-MX will send another change to the network via radio. The radio will respond to the current network name:

Accepted – new network name will come up to the printer
Declined – old network name will come up to the printer
If 00 is entered – the receiver will request the network name. Once the programming mode has been exited, or a network has been selected, then the network list can be removed from RAM.

Note: The current network name is not stored in the receiver.

Option 72: Computer Select option. This option is used for enabling and disabling computer output.

Option 73: Printer Select option. This option is used for enabling 40/80 column printer or disabling printer output.

Option set to: 00 Disabled
                01 40 column printer Enabled
                03 80 column printer Enabled

Option 74: Equivalent Line. This option is used for reporting a different line number on the printer and computer, but the linecard still keeps the characteristics of its physical number.

Option 75: Receiver Number, this sets the Physical number on the receiver and all reports are reported using this receiver number.

Entering Commands

Commands are entered on the CPM2 keypad using the following format: LCard; Comd; Op; Cd; Sc

- **LCard**: "Line Card" is the Line Card number; enter a hexadecimal number from 01 to 0E for Line Cards 1 through 14.
- **Comd**: "Command" is the Command; enter a command from the list above
- **Op**: "Option" indicates a function that is part of a command; the following sections of this manual will explain which commands have options. Enter a 2-digit hexadecimal number
- **Cd**: "Code" is the code or value to be programmed for the Option; enter a 2-digit hexadecimal number
- **Sc**: "Second Code" is a code or value that is only used with SCADA commands; if required, enter a 2-digit hex number

Entering Data

The following is how to enter the Programming Password and program an option in the F7 Options Programming section:

- Press and hold the [C] button on the CPM2 until the CPM2 displays the following message:

```
Enter  PASS-WORD
        ****
```

The default password is "CAFE". Enter the password using the CPM2 keypad.

- When the password is entered, the CPM2 will display this message:

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

- Enter the Line Card number. In this example, Line Card 01 will be used. When "01" is keyed in, the number will appear on the display as shown below:

```
LCard:01  Comd:__
Op:__  Cd:__  Sc:__
```

- Enter the Command number. In this example, the F7 Options Programming command will be used. When "F7" is keyed in, the command will appear on the display as shown below:

```
LCard:01  Comd:F7
Op:__  Cd:__  Sc:__
```

- Enter the Option number. In this example, Option [36] will be changed. When "36" is keyed in, the Option will appear on the display as shown below:

```
LCard:01  Comd:F7
Op:36  Cd:__  Sc:__
```

- Enter the value to be programmed at Option 36. In this example, 01 will be programmed at Option [36] to enable it.

When "01" is keyed in, the value will appear on the display as shown below:

```
LCard:01  Comd:F7
Op:36  Cd:01  Sc:__
```

Note that "Sc" is not used and stays blank. After the value is entered at "Cd:", press [ACK] or [Escape] to save the changes.

NOTE: If the [Escape] button is pressed before the value at "Cd:" is entered, the changes will not be saved.

Verifying Data

- To verify the changes just entered, press and hold the [ACK] button on the DRL-MX until this message is displayed:

```
Display  Options
ACK:menu  SEL:sel
```

- Press the [SELECT] button to view the system configuration; this message will be displayed:

```
L01  #00   00
LCard  Numb:  05
```

Press the [ACK] button to scroll forward through the configuration displays until you reach option 36, or press the [SELECT] button to scroll backwards through the configuration displays. Press [ACK] and [SELECT] together to return to the Stand-By Mode.

SG-CPM2 CENTRAL PROCESSING MODULE

The CPM2 is the central processing module that monitors the DRL-MX Line Cards and forwards the information from the Line Cards to the computer and printer. The CPM2 is capable of monitoring a maximum of 14 telephone lines from 7 DRL-MX modules.
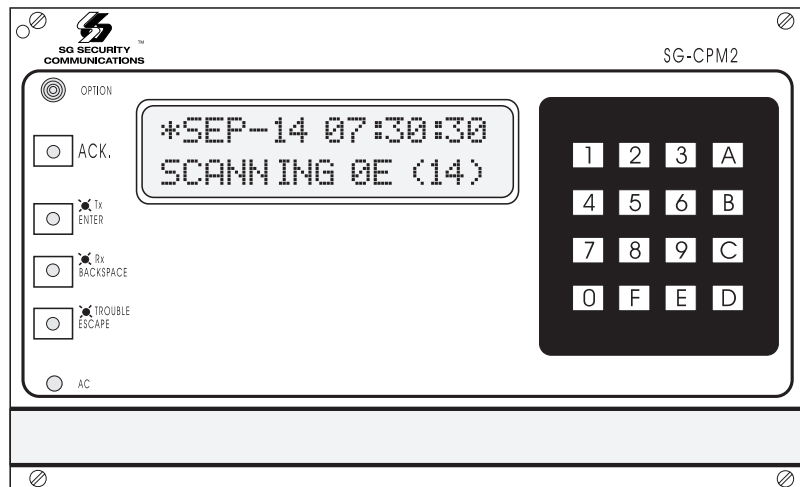
General Information

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

Features

- Multi-tasking allows the receiver to perform functions that might otherwise be delayed by a slow computer acknowledgment response
- Fast internal communication results in practically no delay in transfer of information between the Line Card and the CPM2. The CPM2 is capable of polling 14 Line Cards in 1 second
- 128-event printer alarm message buffer
- 128-event computer alarm message buffer
- LCD contrast easily adjusted

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

---

CPM2 Controls

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

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

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

"ACK" light: Flashes when a message is received from the Line Card and COM1 is disabled or disconnected

[Enter] button: Executes a command or scrolls the display to the next message.

"TX" light: Monitors the COM1 transmission signal

[Backspace] button: Used to erase errors or move the cursor back one character; also used to scroll the display back to the previous message.

"RX" light: Monitors the signal received from the computer connected to COM1.

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

"TROUBLE" light: Illuminates when a trouble condition is present (not used).

"AC" light: Indicates that AC power is present.

CPM2 Operating Mode

Computer Reply

The CPM2 will consider any character other than "06H" or "15H" as the computer being absent.

CPM2 Cold Start-up

The "cold boot" should be performed to install the default system software.

Follow the procedure described here to perform a "cold boot" of the CPM2.

• Remove the CPM2 from the card cage
• Turn the "PROG EN" (Program Enable) switch ON. The Program Enable switch is located on the left side of the CPM2 unit; use a small screwdriver to turn the switch ON by turning it clockwise.
• Reinstall the CPM2 in the card cage, but do not fasten the mounting screws. The CPM2 should power up and this message will be displayed:

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

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

```
SYST COLD BOOT
       Executing!
```

After approximately 1 second, this message will be displayed:

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

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

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

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

CPM2 in Stand-By Mode

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

```
*FEB-23  07:30:45
Scanning  0E  (14)
```

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

CPM2 Configuration Mode

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

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

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

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

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

Configuration Options

The CPM2 features 28 configuration options:

01	System Date and Time
02	System Passwords
03	Number of Line Cards
04	Printer Select
05	COM1 Configuration
06	COM1 Format
07	Acknowledge Wait Delay
08	Heartbeat Select
09	COM2 Configuration
10	COM2 Format
11	Contrast Adjust
12	UL Receiver Option
13	Erase Memory
14	Mute Buzzer
15	Keep Last Message
16	Debug ComPort
17	Test 9v/12v Batt
18	Debug Line Card
19	Program Version
20	Monitor Battery
21	Year / Second
22	Force Reset
23	Change Receiver Number
24	COM1/2 Control
25	Printer Control
26	Printer Test
27	Printer Width
28	Tamper Input

Option 01: Setting the Clock

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

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

Enter the date and time using the numbers 0 through 9 only. Press the [Enter] button to move the cursor one character to the right; press the [Backspace] button to move the cursor one space to the left.

When the date and time are entered, press the [Escape] button; when the [Escape] button is pressed, the next Configuration Option will be displayed on the screen.

Note that if "0" or a number greater than "12" is programmed for the month, the screen will display the word "Nul" in place of the month while in the Stand-By mode. "Nul" will also be displayed for the time if the time has not be programmed properly.

Option 02: Changing System Passwords

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

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

Sixteen 4-digit passwords are available for use on the CPM2. Password 0 is the Master Password, and Passwords 1 through F may be assigned to individual operators. Two letters, representing the initials of the operator, may be assigned to each Password to help in identifying the operator.

When this option is entered, a cursor will appear beneath the first character in the 4-digit Password. Enter a new Password using the 0 through 9 and the A through F keys.

To enter the operator's initials, use the [0] and [1] keys to scroll forward or backward through the alphabet. When the desired letter is displayed, press the [Enter] button; the cursor will move to the next character. To move the cursor to the previous character, press the [Backspace] button.

When the Password and initials have been entered, press the [Escape] button; the next Password will be displayed. When all Passwords have been programmed, the display will advance to the next Configuration Option.

Option 03: Change the Number of Line Cards

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

```
#LnCard Attached
E Change to: x
```

Enter a number from 1 to E to indicate how many Line Cards, from 1 to 14, are to be polled by the CPM2. When the new number is entered, press the [Enter], [Backspace], or [Escape] button; the screen will then display the next Configuration Option.

Option 04: Select Printer Function

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

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

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

Bkup	Enable	Printer Operation
0	0	Bypass printer
0	1	Enable printer (default setting)
1	0	Enable printer only if COM1 is in failure
1	1	Enable printer only if COM1 is in failure (same as above)

If "Bkup" is programmed as "1", messages will only be sent to the printer if an acknowledge signal is not received from COM1.

When using the Star DP8340 printer, the CPM2 is able to print in both red and black. If an IBM compatible printer is selected, the CPM2 will print in black only.

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

Option 05: COM1 Configuration

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

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

Br: Baud Rate	Enter...	for baud rate
	11	110
	15	150
	03	300
	12	1200
	24	2400
	48	4800
	96	9600
	19	19200
	38	38400

Da: Data Bits   Enter a number from 7 through 9 to indicate 7, 8, or 9 data bits.

Pa: Parity	Enter	for parity
	0	no parity
	1	odd parity
	2	even parity

Note: The start and stop bit is fixed at 1.

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

Option 06: COM1 Communication Format

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

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

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

0	COM1 disabled
1	Sur-Gard format (default setting)
2	Sur-Gard format with common event code "A"
3	Sur-Gard format with header 01 Hex.
4	Sur-Gard Clock Signal format

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

Option 07: Wait Time for Acknowledge on COM1

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

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

Enter a decimal number from 4.0 to 9.9. Use the [Enter] and [Backspace] buttons to move cursor forward or backward when editing the acknowledge time.

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

When the <ACK> wait time system option 07 is programmed as "0.0", the CPM2 will not require a "06H" (ACK) from the computer.

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

Option 08: Heartbeat Time for COM1

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

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

Enter a decimal number from 01 through 99 to determine the time interval between heartbeat transmissions. Program this option as "00" to disable the heartbeat transmission.

Use the [Enter] and [Backspace] buttons to move the cursor forward or backward when editing the heartbeat time.

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

Option 09: COM2 Configuration

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

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

Bd: Baud Rate	Enter...	for baud rate
	11	110
	15	150
	03	300
	12	1200

Da: Data Bits Enter a number from 7 through 9 to indicate 7, 8, or 9 data bits.

Pa: Parity	Enter	for parity
	0	no parity
	1	odd parity
	2	even parity

Note that the stop bit is fixed at 1.

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

Option 10: COM2 Communication Format

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

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

Enter a number from 0 to 2 to select one of the following:

0   PC Computer Programming Software capability (default setting).

1   SCADA connection through Com#2 enable

2   SCADA connection through Com#2 with Redundancy Backup enable

Option 11: Adjust LCD Contrast

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

```
Contrast  Level
■■■■■■■
```

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

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

Option 12: UL Receiver Option

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

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

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

1 All signals are sent to the computer and/or the printer if connected.

2 The CPM2 retains alarm messages received from the Line Cards and the CPM2 supervisory signal on the LCD display, and activates the buzzer to alert the operator. The display will also indicate if additional signals are waiting to be displayed and acknowledged.

3 The operator must press the [ACK] button to acknowledge the signal manually. The CPM2 will scroll to the next message if there are more messages to display.

4 The CPM2 returns to the Standby Mode when all signals have been manually acknowledged.

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

Option 13: Erase Alarm Message Buffer

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

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

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

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

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

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

Option 14: Mute Buzzer

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

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

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

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

Option 15: Display Last Message

When an alarm is received, the alarm message will be displayed on the screen until the message is forwarded to the computer and printer. When the message is sent to the computer and printer, the Stand-By Mode message will be displayed.

The most recent alarm message may be retained on the screen until the next alarm message is received. To retain the most recent alarm message, program Option [15] as "1". Press the [ACK] button when the "15: Keep Lst Msg" message is displayed; this message will be displayed:

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

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

Option 16: ComPort Diagnostics

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

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

Enter "1" and press the [Enter] button to enable the diagnostics feature on COM1 (or "2" for COM2). All data being sent through COM1 will now be displayed on the screen. A typical transmission is shown here:

```
1RRL     AAAAsX
YY    N  06
```

• N represents the number of times the CPM2 tries to resend the message to COM1; this value should be "1" during normal communication
• 06 represents the acknowledge received from COM1

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

Option 17: Test 9V/12V Battery

Some earlier CPM2 units provide 9V battery for memory storage while present CPM2 units use different technology for this purpose.

If the unit uses 9V battery , the battery voltage should be supervised by enabling this option. Press [ACK] button when the "17:Test 9V Batt." message is displayed; then the following message will be displayed:

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

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

Option 18: Line Card Diagnostics

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

Enter a hexadecimal number from "1" through "E" to monitor Line Card 01 through 14, or enter "F" to monitor all Line Cards connected to the CPM2.

Stand-By communications between the Line Card and the CPM2 will be displayed with messages similar to this:

```
01
              FE
```

• 01 represents the Line Card number
• FE represents the response from line number 1 to the normal CPM2

Alarm messages transmitted by the Line Cards will be displayed with messages similar to this:

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

NOTE: When diagnostic modes are enabled, messages will be displayed according to the following priority:
• UL message - Acknowledge required
• COM1 Diagnostic messages
• Line Card Diagnostic messages
• "Retain last message" displays
• Internal Troubles messages
• Stand-By Mode message

Refer to "Message Priorities" for more information.

Option 19: Display Software Version

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

```
SG-CPM2 RECEIVER
*June-29-99 V2.40
```

Option 20: Battery Monitor

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

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

If the 12V battery is disconnected, approximately 11.2V will be indicated for that battery. NOTE: If option 17 is at 03, a message similar to this will be displayed:

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

Option 21: Alarm Messages Print Year or Seconds

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

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

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

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

Note that the time (21:24) is represented with just hours and minutes, and that the year is added to the date (24/11/94).

Program Option [21] as "0" to include the seconds in the alarm message time; alarm messages will be printed as follows:

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

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

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

The system option 21 now provides the following choices for the printer time and date format:

0: hh:mm:ss-DD/MM   2: hh:mm:ss-MM/YY

1: hh:mm-DD/MM/YY   3: hh:mm-MM/DD/YY

Option 22: System Reset

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

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

Press the [Backspace] button to cancel the option without resetting the CPM2. To reset the CPM2, press the [Enter] button.

The reset will take approximately 8 seconds to complete. Press the [Backspace] or [Escape] buttons to move to the next Configuration Option.

Option 23: Change Receiver Number

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

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

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

Note that when Option [23] is programmed, the display will return to Option [01].

Option 24: Scada

The acronym «SCADA» stands for Supervisory Control And Data Acquisition. This product consists of a package of SCADA receiver and a CPM2 module. Its function is to transport the alarm data from a local (satellite) central station to the master central station reliably by using linked Modems (like the SG-M1) over leased phone lines. This system is specifically intended for use with a point to point 300 baud Schedule 3A data line (CANADA), but can be used with any data lines.

The CPM2 software version 2.3 supports the data transactions for up to 14 Digital and/or DVACS Compatible lines, but we strongly suggest a maximum of 8 lines on the remote location when used within a SCADA configuration. For the alarms output choices (SYSTEM OPTION [24]) a number corresponding to each of the line cards, one to fourteen, is indicated on the LCD at 14 positions from left to right as follows:

```
123456789ABCDE :
44444444444444
```

Press Enter or Backspace to move the cursor over the digit corresponding to the line card you wish to change. Enter the new digit; the CPM2 will display the change on the LCD, and the cursor will move to the next digit. Change another digit, as above, if desired, or exit and save the changes by pressing <Escape>.

The numbers that can be programmed are:

   0: no route at all - no printer output, no computer output. (Not recommended)

   1: send computer alarm messages only to the Com#1 (local computer) only.

   2: send computer alarm messages only to Master central through Com#2 for transmission to the SCADA of the Master Receiver only.

   3: send computer alarm messages to Com#1 (local computer) and next to Com#2 for the SCADA line card.

   4: send computer alarm messages to Com#1 and Com#2, and send printer alarm messages to Com#2.

Option 25: Printer Control

The Remote Receiver (SCADA) CPM2 sends data to the local printer in the normal way, which can be enable/disable for each line at option [25] as follows:

```
123456789ABCDE:
11111111111111
```

Programming "1" will enable the local printer report for this specific line. "0" will disable the local printer for this specific line.

NOTE: When it routes the data to the serial port Com#2, it needs to insert the checksum calculation and support the protocol described in more detail in the MLR2-SCADA manual.

Option 26: Printer Test

```
26: Printer Test:
Ent:+ Bs:- Ack:S
```

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

When enabled to "1", the CPM2 will send a test message to the local printer every day at 05:00 A.M. and at 17:00 P.M. The following message will be printed:

LR0 Printer Test   hh:mm:ss-DD/MM

Where R represents receiver number.

Option 27: Printer Width

```
27: Printer Width:
Ent:+ Bs:- Ack:S
```

```
40/80 columns: 0/1
0 change to:
```

This new option has been implemented to support the new CIS format. This new format will be available with future line card revisions. Program as "0" if using a 40 columns printer, or program as "1" if using a 80 columns printer.

Please note that the SCADA protocol does not support the 80-column mode.

Option 28: Tamper Input

```
28: Tamper Input:
Ent:+ Bs:- Ack:S
```

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

0 = Tamper Terminal on the SG-DML4 is used to monitor for Low Battery condition on the UPS.

1 = Tamper Terminal on the SG-DML4 is used as another <ACK> button.

Connect a push button switch between the TAMP terminal to the GND terminal. When shorting the Tamper terminal with the ground, the receiver will react the same way as if the front <ACK> push button would have been pressed. This could be used to install a remote acknowledge button when using the receiver in manual mode.

Message Priorities

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

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

UL Requirement Message

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

COM1 Diagnostics

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

Line Card Diagnostics

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

"Retain Last Message" Displays

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

Printer Error

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

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

COM1 Absent

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

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

12V Battery Low

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

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

AC Failure

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

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

Standby Mode Message

During normal standby operation, this message will be displayed:

```
*Feb-23 07:30:45
Scanning 0E (14)
```

CPM2 UTILITY MODES

When the CPM2 is in the Stand-By Mode, the following functions may be accessed by pressing the [A] through [F] keys:

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

[A] Send Computer Messages to Printer

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

```
Dump COM Msg->PRT
Lcard#:F Ent:EXE
```

Enter a hexadecimal number to print the following:

Enter...	to Print
"0"	CPM2 internal supervisory signals (if any)
"F"	Computer messages for all Line Cards and CPM2 internal supervisory signals
"1-E"	Computer messages for specified Line Card

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

Dump Computer Alarm Buffer

1011 ...... 0000 . R .. 06 12:37:31 - 12/10 106

1011 ...... 0000 . A .. 01 12:38:22 - 12/10 106

- "106" indicates the message was successfully sent to the computer and the computer has responded correctly with an [06] acknowledge.

[B] Operator Log-On

Different operators may "log-on" to the system by entering this mode. When an operator logs on, a message similar to this one will be printed:

"Operator on duty S.G. 11:03-21/12/92".

The operator's initials (if programmed) and the time and date will be printed. If the Star 8340 printer is being used, this message will be printed in red.

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

Refer to CPM2 Option [02] for information on programming operator Passwords and initials.

[C] System Command Mode

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

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

- LCard: Enter a 2-digit hexadecimal number from 01 to 0E to indicate which Line Card is to be affected.
- Comd: Enter one of the Line Card Commands described in the DRLMXLine Card Menu Mode section of this manual
- Op: and Cd: "Op" and "Cd" are used to indicate parameters that may be required within certain commands. For example, when using the F7 Line Card programming command "Op" and "Cd" are used to indicate the Option number and the new code programmed for that option.
- Sc: "Sc" is used with SCADA applications.

Enter digits using the keypad; when a digit is entered, the cursor will move one character to the right. Press the [Backspace] button to delete the character presently indicated by the cursor and move the cursor 1 character to the left.

When a command has been entered, press the [Escape] button to send the command to the Line Card.

If more than one command is to be sent, press the [ACK] button to send the command presently displayed on the screen. Another command may now be entered.

[D] Send Printer Messages to the Printer

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

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

Enter a hexadecimal number to print the following:

Enter...	to print
"0"	CPM2 internal trouble messages (if any)
"1" to "E"	Print messages for specified Line Card
"F"	Print messages for all Line Cards

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

Press the [Backspace] or [Escape] button to cancel this function and return to the Stand-By Mode. Or, press the [Enter] button to print the indicated messages. When the [Enter] button is pressed, the CPM2 will print the printer messages, starting with the oldest message first. The messages will be printed in red if the Star DP8340 printer is being used.

If the CPM2 receives new alarms from the Line Card while the buffer is being printed, new alarms will be sent to the printer when the buffer printout is completed.

[E] Examine Printer Messages on Display Screen

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

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

Enter a hexadecimal number to view the following:

Enter...	to view
"0"	CPM2 internal trouble messages (if any)
"1" to "E"	Messages for specified Line Card
"F"	Messages for all Line Cards

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

Press the [Backspace] or [Escape] button to cancel this function and return to the Stand-By Mode. Or, press the [Enter] button to view the indicated messages.

When the [Enter] button is pressed, the CPM2 will display the printer messages, starting with the most recent message. When [Enter] is pressed, a message similar to this will be displayed:

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

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

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

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

[F] Examine Computer Messages on Display Screen

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

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

Enter a hexadecimal number to view the following:

Enter...	to view
"0"	CPM2 internal trouble messages (if any)
"1" to "E"	Computer messages for specified Line Card
"F"	Computer messages for all Line Cards

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

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

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

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

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

MLR-MX Computer Interface

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

Overview of Communication

When the CPM2 receives data from a Line Card, it forwards the data to COM1 and awaits an acknowledgment signal from the computer. If a NAK signal is received from the computer, the CPM2 will make 4 attempts to send the data. If all four attempts fail, CPM2 buzzer will sound and the CPM2 will retain the alarms in its internal buffer until communications are restored. This routing provides reliable and supervised communication between the CPM2 and the Line Cards.

The CPM2 also monitors the connection to the computer by sending a supervisory "heartbeat" signal through COM1 every 30 seconds. If the "heartbeat" transmission determines that the computer is off-line or disconnected, a message similar to this will be sent to the printer:

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

Note that the message indicates the time and date that communications through COM1 were determined to be interrupted.

When COM1 communications are reestablished, a message similar to this one will be printed:

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

Note that the message indicates the time and date that communications through COM1 were determined to be reestablished.

The "heartbeat" feature may be disabled if this feature is not compatible with the central station automation software being used on the computer.

CPM2 COM1 Status Report Messages

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

Sent to COM1	Event
0000 A 00:	Reserved to indicate Operator activity for C or ESC mode
0000 A 01:	Printer Error
0000 R 02:	Printer Restored
0000 A 03:	12V Battery Low
0000 R 04:	12V Battery Restored
0000 A 05:	COM#1 Absent
0000 R 06:	COM#1 Restored
0000 A 07:	UPS Low Battery
0000 R 08:	UPS Low Batt Restr
0000 A 11:	9V Batt. Low
0000 R 12:	9V Batt. Restr
0000 A 13:	COM#2 Absent
0000 R 14:	COM#2 Restored
0000 A 15:	AC Failure
0000 R 16:	AC Restored
0000 A 17:	UPS AC Fail
0000 R 18:	UPS AC Restored
0000 T 19:	CPM2 Master Fail
0000 A C1 to CE:	Internal communication error
0000 A D0:	CPM2 Reset
0000 A F1 to FE:	Line Card 01 to 0E Absent
0000 R E1 to EE:	Line Card 01 to 0E Restored

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

COMMUNICATION PROTOCOL WITH CENTRAL STATION COMPUTER

The Sur-Gard MLR-MX receiver sends the following protocol to report signals to the central station computer via the RS-232 port.

Data Byte Protocol:

The Sur-Gard receiver uses 1200 baud rate, 1 start bit, 7 data bits, 1 even parity bit, and 1 stop bit structure, to transmit and receive signals. The above protocol can be programmed on the receiver by the central station operator to enable different configurations.

Acknowledgment of the Signal:

The Sur-Gard receiver requires an acknowledge signal [ACK] from the computer software within a certain programmable time for each message sent. The waiting period for the [ACK] can be adjusted up to 10 seconds. Failure to receive the [ACK] will result in the retransmission of the same signal three more times before giving up. In case of communication failure with the computer, the Sur-Gard receiver can store up to 256 messages in its Static RAM memory. When communication is resumed, these messages will be automatically sent to the computer.

Basic Signal Protocol:

1RRLssssAAAAAAsXGYYY[DC4]

Where,	1	: Protocol number.
	RR	: Receiver number.
	L	: Line number.
	s	: Space Character.
	AAAAAA	: Account Code, usually 4 digits with 2 leading spaces.
	X	: Event Code. See Table below.
	G	: O/C by Area Number (1-F), or Space.
	YYY	: Zone Number or User Number.
	[DC4]	: Terminator, 14 Hex.

SIA Protocol 2:

The SIA Protocol 1 can not handle certain information in the SIA level 2 and 3. We now provide the optional SIA Protocol 2 as the following: (option [31] enable)

SRRL[#AAAAAA | EMMZZZZ/MMZZZZ/MMZZZZ][DC4]

Where,	S	: Beginning transmission of the new SIA protocol
	RR	: Receiver number 00-FE
	L	: Line number 0-E
	[	: Beginning data delimiter
	#	: Account ID block code
	AAAAAA	: Account ID, maximum sixteen digits.
	|	: Field separator
	E	: Function block code
	MM	: Event code or modifier
	ZZZZ	: Zone code, or user code, or time/date information
	/	: Data code packet separator
	]	: Ending data delimiter
	[DC4]	: Terminator, 14 Hex

The length of the signal varies, and it can support the maximum 63 byte data block transmission from the control panel. When this optional protocol is selected, all SIA information will be sent to the host computer using this protocol.

Examples from a SIA Control Panel:

Standard Transmission:

SRRL[#1234 | Nri1BA01][DC4]

Where,	S	: Protocol identifier for SIA protocol 2
	RR	: Receiver number 01-FE
	L	: Line number 1-E
	[	: Beginning data delimiter
	#	: Account ID block code
	1234	: Account ID
	|	: Field separator
	N	: New event function block
	ri1	: Area/Partition number 1
	BA01	: Burglary Alarm zone 01
	]	: Ending data delimiter
	[DC4]	: Terminator, 14 Hex

CPM2 EPROM PROGRAMMING

Most of the CPM2 options can be changed in the RAM accessed by the system's configuration. However, some less important features are installed in the EPROM. The following features are located in the CPM2 standard EPROM and programmed to the following default settings:

ROM Address	Default	Function
6500H	05H	Printer strobe pulse width Default = 5µs (microseconds)
6501-6502	3E80	Delay time × 0.25ms to resend message to COM1 if heartbeat is not selected. Default = 16000 x 1ms = 16 s delay
6505-6506	0100H	Test Line Card 01 at 01:00
6507-6508	0115H	Test Line Card 02 at 01:15
6509-650A	0130H	Test Line Card 03 at 01:30
650B-650C	0145H	Test Line Card 04 at 01:45
650D-650E	0200H	Test Line Card 05 at 02:00
650F-6510	0215H	Test Line Card 06 at 02:15
6511-6512	0230H	Test Line Card 07 at 02:30
6513-6514	0245H	Test Line Card 08 at 02:45
6515-6516	0300H	Test Line Card 09 at 03:00
6517-6518	0315H	Test Line Card 0A at 03:15
6519-651A	0330H	Test Line Card 0B at 03:30
651B-651C	0345H	Test Line Card 0C at 03:45
651D-651E	0400H	Test Line Card 0D at 04:00
651F-6520	0415H	Test Line Card 0E at 04:15

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

UPS CONNECTION

Supervised AC Input

Chassis

110Vac/ 16ac, 60hZ 175VA
TRANSFORMER

AC OUT   EGND
LOW BATT
GND
AC LOSS
UPS
AC IN   EGND

Listed power supply for protective signalling systems and/or listed burglar alarm power supply, as applicable

110Vac/ 16ac, 60hZ

12 V Battery (Supervised)

TO NEXT LINE MODULE

REFER TO DML4 POWER CONNECTIONS

REFER TO DML4 CONNECTIONS

SERIAL OUTPUT TO COMPUTER

PARALLEL PRINTER OUTPUT

TO SURE SIGNAL CSR

TO NEXT LINE MODULE

DML4 POWER CONNECTIONS

BLK   RED

Battery 12V Gell Cell 17.2 to 38Ah

External 12VDC input (secondary battery or power supply for CPM2 backlighting. Connect positive to B. Light terminal; negative to GND terminal.

Transformer 16VAC 75VA

110VAC or 220VAC

Chassis GND connect to Earth GND

AC OUT   AC IN   BATT   B. LGT GND

DML4 CONNECTIONS

Not used on CPM2

Not used on CPM2

+12V 450mA MAX

GND BUZZ TAMP GND   R SIM   HNDSET B   A   AUX RCA RCB ACK   TRBL OPT AUX   PGM1 PGM2 FAUT L

Switched negative outputs
Maximum short circuit current 70 mA at 12V,
Limited by 150Ω 1W resistor.

APPENDIX A CPM2 QUICK REFERENCE GUIDE

CPM2 Utility Modes

Press [ACK] when "Ack" light flashes to Acknowledge event
- [A]   Send Computer Messages to Printer
- [B]   Operator Log-On
- [C]   System Command Mode
- [D]   Send Printer Messages to the Printer
- [E]   Examine Printer Messages on Display Screen
- [F]   Examine Computer Messages on Display Screen

CPM2 Configuration Mode

Press the [Escape] button when the system is in Stand-By Mode and enter the Master Password.

Press the [Enter] button to display the next menu item; press the [Backspace] button to display the previous menu item. Press the [ACK] button to select the menu item presented shown on the display screen.

Menu Item	Function	Default
01	Set Date and Time	00:00:00 00-00-00 (random)
02	System Passwords	CAFE
03	Number of Line Cards	E
04	Printer Select	Backup=0; Enable=1
05	COM1 Configuration	Baud: 1200, Data: 7 bits, Parity: 2
06	COM1 Format	1
07	ACK Wait Delay	4.0 seconds
08	Heartbeat Select	30 seconds
09	COM2 Configuration	Baud: 300, Data: 8 bits, Parity: 2
10	COM2 Format	0
11	Contrast Adjust	
12	UL Receiver Option	0
13	Erase Memory	
14	Mute Buzzer	0
15	Keep Last Message	0
16	Debug COMPort	0
17	Test 9V/12V Battery	3
18	Line Card Diagnostics	0
19	Display Program Version	Version 2.4
20	Monitor Battery	
21	Select Year/Seconds	0
22	Force Reset	
23	Change Receiver Number	01
24	COM1/2 Control	44444444444444
25	Printer Control	11111111111111
26	Printer Test	0
27	Printer Width	0
28	Tamper Input	0

Line Card Command Descriptions

- [F7]   Line Card Configuration
- [FA]   Print Line Card Buffer
- [FB]   Shutdown Line Card Communication with CPM2
- [FC]   Reactivate Line Card Communication with CPM2
- [FE]   Line Card Buffer Functions

APPENDIX B TROUBLE SHOOTING

Problem: No communication with the central station computer on COM1

Solution: Ensure that the cable connected to COM1 is an RS232 cable; it should not be a null-modem type.

Check the baud rate for COM1 (CPM2 Configuration Option 05)

Check the COM1 communication format (CPM2 Configuration Option 06)

Check the computer software setup

Enable COM1 Diagnostics with CPM2 Configuration Option 16 and examine the communications on the display screen.

Problem: Bad communication with central station computer.

Solution: The central station software is too slow to provide the acknowledgment signal for the CPM2. Contact the software manufacturer for a software upgrade.

Increase the acknowledge wait time with CPM2 Configuration Option 07.

Check COM1 baud rate and communication format using CPM2 Configuration Options 05 and 06

Ensure that the COM1 connection is secure.

Problem: CPM2 displays the COM1 debugging mode and the Master Code is not valid

Solution: The CPM2 needs to be re-booted. Refer to the Cold Boot section of this manual.

Problem: The Line Card displays "<<CPM ERROR>>" and/or alarms are not transmitted to the computer and printer

Solution: Ensure that the Line Card number is not out of the range of the CPM2 scanning

Ensure that the flat cables connected between the DML4 and the Line Cards are connected correctly; ensure that the contact between the connectors is secure.

APPENDIX C DECIMAL - HEX - BINARY CONVERSION CHART

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

APPENDIX D ASCII CHARACTER CHART

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

Limited Warranty

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

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

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

Warning

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

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 SG Communications 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.

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