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Introduction

The MLR2-DV unit consists of a CPM2 Central Processor Module and a DVL2A Receiver Line Card Module. Additional DVL2A Line Cards may be added to enable the CPM2 to monitor up to 14 line cards. The MLR2-DV includes many features, all designed to make the receiver more powerful and easier to use.

The MLR2-DV's real-time clock and calendar "stamps" all information received with the time and date, and all information is displayed on the receiver's LCD screens and may be printed or forwarded to a computer. To ensure security, adjustment of the clock, calendar and other programming is protected by password codes.

CPM2

The CPM2 Central Processing Module oversees operation of the receiver. Along with its built-in keypad and LCD message screen, the CPM2 features both a printer and computer interface.

The CPM2 features a 256-event nonvolatile memory buffer. The buffer may be examined on the LCD screen or printed. If the printer or computer is off-line, the CPM2 will retain events in the buffer and will automatically send the events to the computer or printer when communications are restored.

DVL2A

Each SG-DVL2A module contains 2 line cards. The main function of each line card is to continuously poll the pad and report their alarms to the CPM2. Also, in the event of a failure to communicate with the CPM2, each line card is capable of functioning independently by manual interaction with the central station operator. Each line card has its own unique identification code which allows it to be identified by the CPM2. Each line card in a module can store 256 different printer alarm messages and 256 automation computer alarm messages in memory.

Principal Features

The SG-DVL2A has many options which are fully programmable by sending commands from the CPM2 or by using the SG-DVL2A push buttons.

1. Stores up to 256 printer alarm messages and 256 computer alarm messages for subsequent display during CPM2 trouble period.
2. Multiple alarms are sent to the computer and printer via CPM2 with minimal delay.
3. Monitors the pad with carrier detect. If a pad error occurs, the receiver displays, prints the message and sends a special code to the computer.
4. Automatically goes to stand-alone mode in case the CPM2 is removed for program updating.

5. Built-in watchdog timer continually monitors line card microprocessor operation.
6. "Cold boot" option, to set the receiver's configuration to standard default programming.
7. Built-in storage for one current and one backup system configuration.
8. Big Liquid Crystal Display (LCD), with contrast easily adjusted.
9. Supports a higher security level for more security protection.
10. The data output to the printer/computer can be examined on the Liquid Crystal Display.
11. Built-in buzzer is automatically silent if a successful communication with the CPM2 occurs as normal, or if the "mute buzzer" option is selected.

Power and Supervision

The MLR2-DV requires 16V_{AC}, 40VA TO 75VA, from a 115V or 230 V_{AC} 50/60 Hz transformer. The receiver is equipped with 12V rechargeable standby battery connections and an automatic battery charger.

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 may be sent to the printer and the computer.

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 can be monitored by the supervisory "heartbeat" test transmissions.

Compatibility

Central station automation software packages such as:

- | | | | |
|-------------|----------|-------------|-------|
| • ABM | • CSM | • MONITOR | • SIS |
| • ALARMSOFT | • MAS | • MICRO KEY | • SMS |
| • APROPOS | • MENTOR | • SIMS | |

support the Sur-Gard interface. The receiver also provides a basic communication protocol similar to the RADIONICS 6500 interface for other software packages that have yet to be updated to include the Sur-Gard interface.

CPM2 Outputs

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

Section 1: Quick Start

1.1 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.

Introduction to Operation

Refer to the following sections of this manual for an overview of the operation of the DVL2A DVACS Receiver Line Card and the CPM2 Central Processing Module:

- Sections 3-6: DVL2A Operating Mode
 - Features
 - Installation
 - Controls and Display
- Section 8: CPM2
 - General Information
 - Controls and Display
 - Cold Start-up

If the receiver is to be used with a computer and central station automation software, refer to section 8.10 "MLR2-DV Computer Interface".

Power Up

When power is applied, the receiver will beep and will indicate one or more trouble conditions on the LCD message screen. Press the flashing [ACK] button to silence the buzzer. If there is no computer or printer connected, a trouble message will be displayed on the CPM2 LCD and the "ACK" light will flash. Press the [ACK] button to silence the CPM2 buzzer.

Operation with Default Program

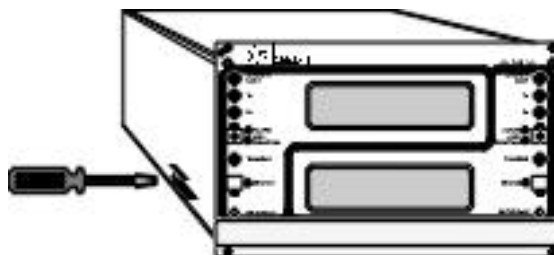
Without any changes to the factory default programming, the receiver operates as follows:

- The master ID password is "CAFE".
- If a computer is not connected, press the [ACK] button on the CPM2 module to silence the buzzer. The time and date of the Acknowledgment will be printed.

Section 2: SG-DVL2A Cold Boot and Changing the Line Card Number

NOTE: Each time you change (update) the Program Version, by replacing the Program EPROM, the "COLD BOOT" operation should be performed. Otherwise, the operating system will not work properly.

Each line card has a program enable switch situated on the circuit board solder side, accessible when the module is partially slid out of the card cage (a small flat blade screwdriver is required to operate this switch).



This switch is used in the procedure to load the default system configuration from EPROM and install it in the working locations in non volatile RAM. When the line card is powered up and the program switch is enabled, the following message will be displayed:

```
SYST COLD BOOT
ACK:Yes  SEL:No
```

To do a "cold boot", press the [ACK] button. The line card will load the default configuration data. The following message will be displayed for 3 seconds.

```
SYST COLD BOOT
SYST COLD BOOT
```

After 3 seconds, or if [SELECT] is pressed, the following message will be displayed:

```
Change LCARD nbr
0F
```

WARNING: If [SELECT] is pressed after a DVL2A Cold Boot was performed, the line card number will be set at "0F" by default.

Press [ACK] or [SELECT] to scroll the line card number up or down. The allowed range is 01 to 0E for a maximum 14 line cards polled by one CPM.

Press both [ACK] and [SELECT] to get out this mode and the display will show:

```
Please Turn Off
PROGRAM SWITCH
```

This message will be displayed until the corrective action is taken, and meanwhile the line card is in a "FROZEN" mode and does not function normally to receive alarms. You must slide out the module and switch the "program enable" to the OFF position and re-insert the module in the card cage.

Section 3: Installation

3.1 Mounting the Receiver

- Install the MLR2-DV 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:

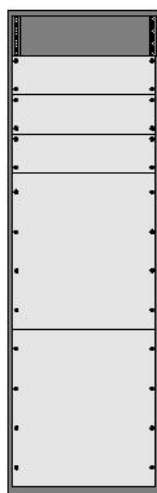
Stand-up Unit (61.25" tall up to 14 lines)

Part # MLR2A-CL

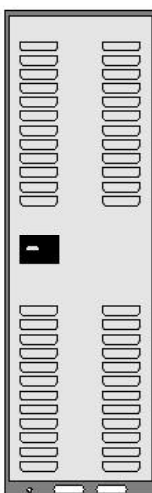
Part

- Rack
- Door with lock and ventilation
- Blank plates 21" (2)
- Blank plate 5.25" (3)
- Screws
- Washers
- Clipnuts
- FROST 16V 75VA transformer (RTFR7516)
- AC Utility Box
- AC Cable Clamps (2)
- 8' Battery Cables
- 18 gauge 3-conductor AC Cable

FRONT VIEW



REAR VIEW



NOTE: If 14 lines are not used, cover each unused location with a blank plate

Desk-mount Unit (28" tall up to 14 lines)

Part # MLR2A-CM

Part

- Rack
- Louvred door back plate
- Blank Plate 1.75"
- Back Plate 7"
- Blank Plates 5.25 (4)
- Screws
- Washers
- Clipnuts
- 16V 75VA Transformer
- AC Utility Box
- AC Cable Clamp for 3/8" cable N/A
- 8' Battery Cable
- 18 gauge 3-conductor AC Cable

FRONT VIEW



REAR VIEW



NOTE: If 14 lines are not used, cover each unused location with a blank plate

3.2 Printer Connections

The following printers can be used with MLR2-DV (ULC Listed):

- **Star DP8340** Sur-Gard part # DCDP8340 (The SG-1220P power supply should be used)
- **The SG-1220P** (Sur-Gard part number XP1220) 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 MLR2-DV printer output port using a parallel printer cable.

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

3.3 Computer Connections

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

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

3.4 Grounding

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

3.5 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 24 hour standby, 12V 17.5Ah rechargeable battery should be used for 6 line configuration, and 12V 38Ah rechargeable battery should be used for 14 line configuration.

3.6 Battery Charging Current

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

3.7 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 CPM2 Module

The CPM2 charges the battery and provides low battery voltage disconnect; removing the CPM2 module will disconnect the battery and shut down the entire system if AC power is not available. If the CPM2 must be removed during an AC power failure, first connect a temporary battery (protected with a 5A fuse and reasonably charged) to the +BATT and GND terminals of the DML2A before removing the CPM2.

Remove the 4 retaining screws on the front panel of the module. Slowly pull the module out of the metal cabinet.

After the CPM2 is replaced, remove the temporary battery so that the CPM2 can properly maintain the main battery.

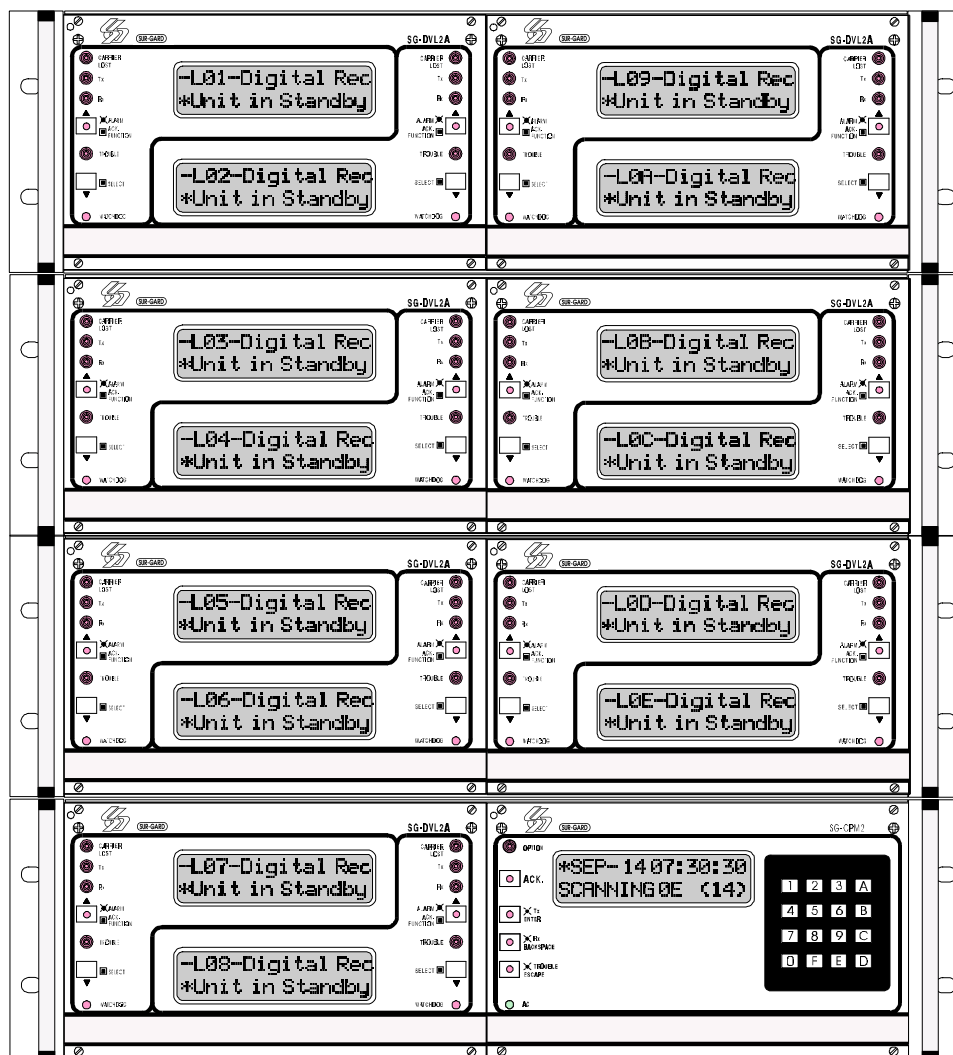
To Remove a Line Card Module

Remove the 4 retaining screws from the front panel of the module. Slowly pull the module out of the metal cabinet.

To Install a Line Card Module

Adding a Line Card Module to the MLR2-DV requires the addition of an MLRX Expansion Card Cage. Each MLRX can hold two DVL2A modules. The MLRX is shipped with power and communications bus cables.

MLR2-DV Installation Maximum Configuration



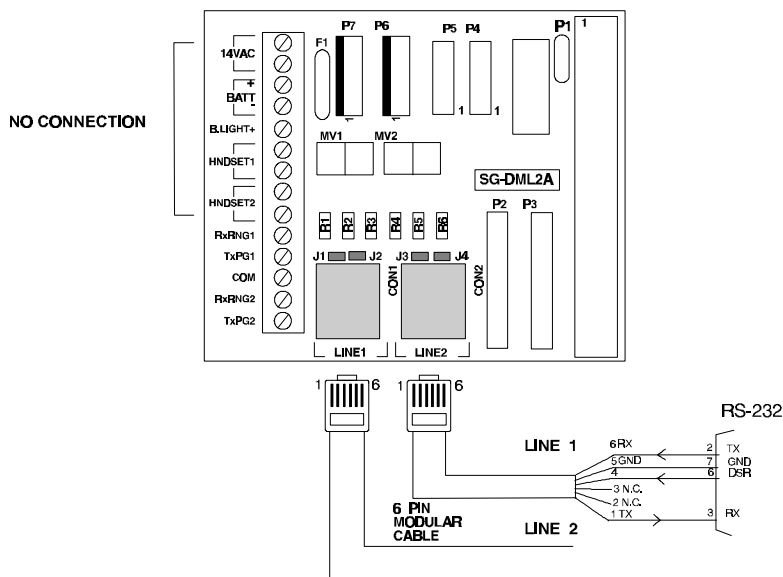
DML4 Connections



AC IN	16V _{AC} power input
AC OUT	16V _{AC} filtered power output
BATT	12V battery
B.LGT	Backlight Power Terminal: connect as secondary 12V power supply to illuminate the LCD screens
GND	Ground
BUZZ	Buzzer Output: this 12V output follows the internal buzzer
TAMP	UPS Low Battery Supervisory
R SIM	UPS AC Failure Supervisory
HNDSET B	Not used

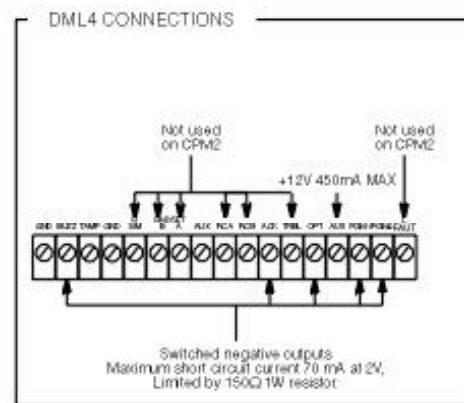
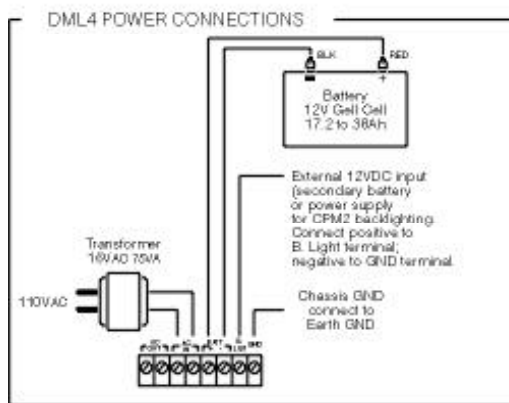
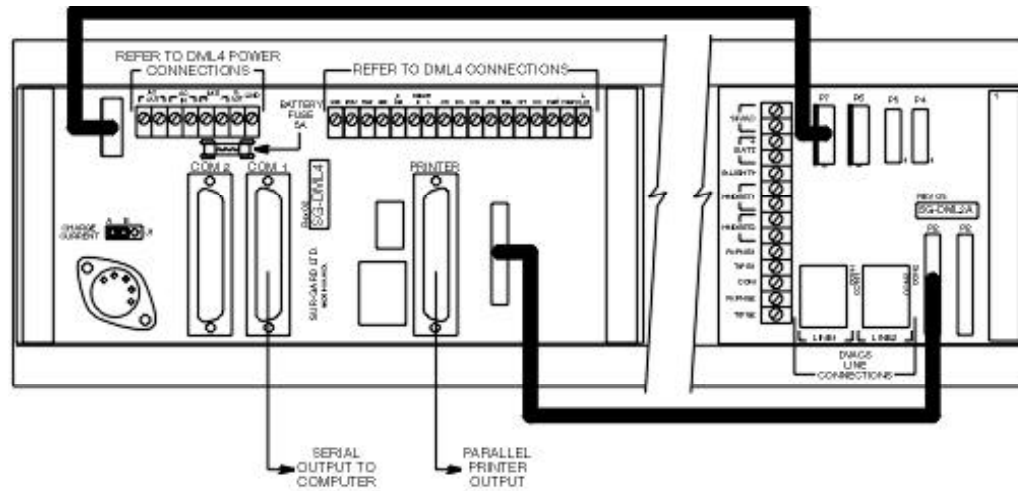
HNDSET A	Not used
AUX	Fused 12V output
RCA	Not Used
RCB	Not Used
ACK	Acknowledge Output: this 12V output follows the "Acknowledge" light
TRBL	Not used
OPT	Option Output: this 12V output follows the "Option" light
PGM1	Output 1 (used for RED1 installation)
PGM2	Output 2 (not used)

DLM2A Backplane Connections to RS-232

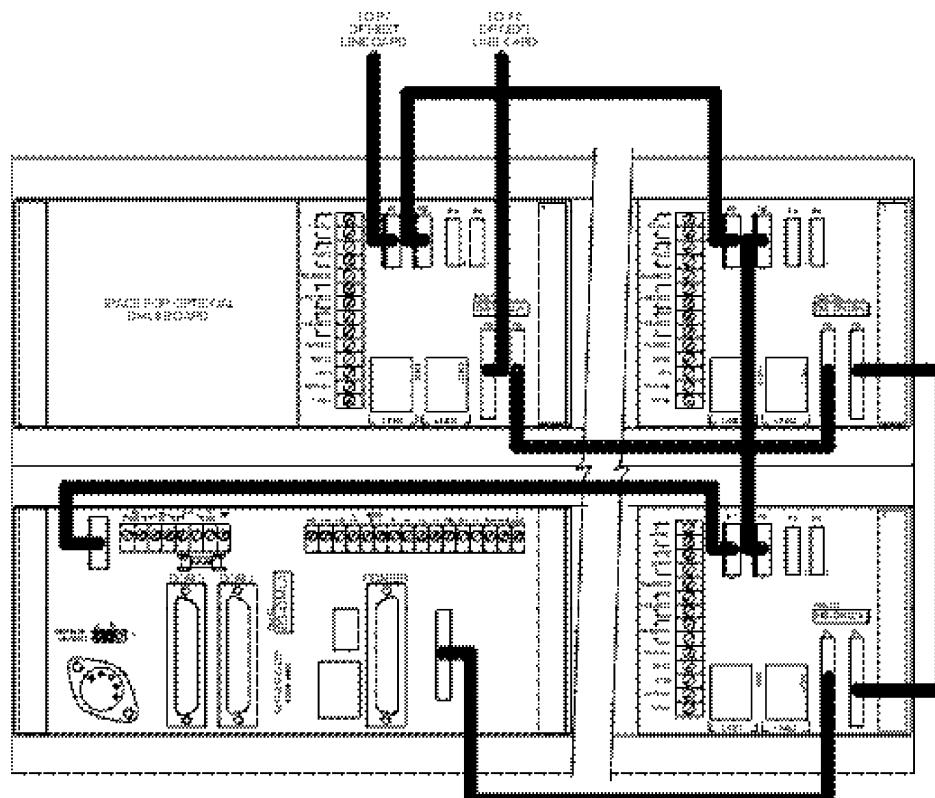


14V_{AC}	May be used as an external AC output.
BATT	May be used as an external 12V power source. Do not connect a battery to these terminals.
B. LIGHT	Backlight power input terminal. Connect a secondary 12V power source to illuminate the LCD screens. A secondary power supply is not required if a 12V supply has already been connected to the DML4 B LGT terminal.

MLR2-DV Backplane Connection Diagram



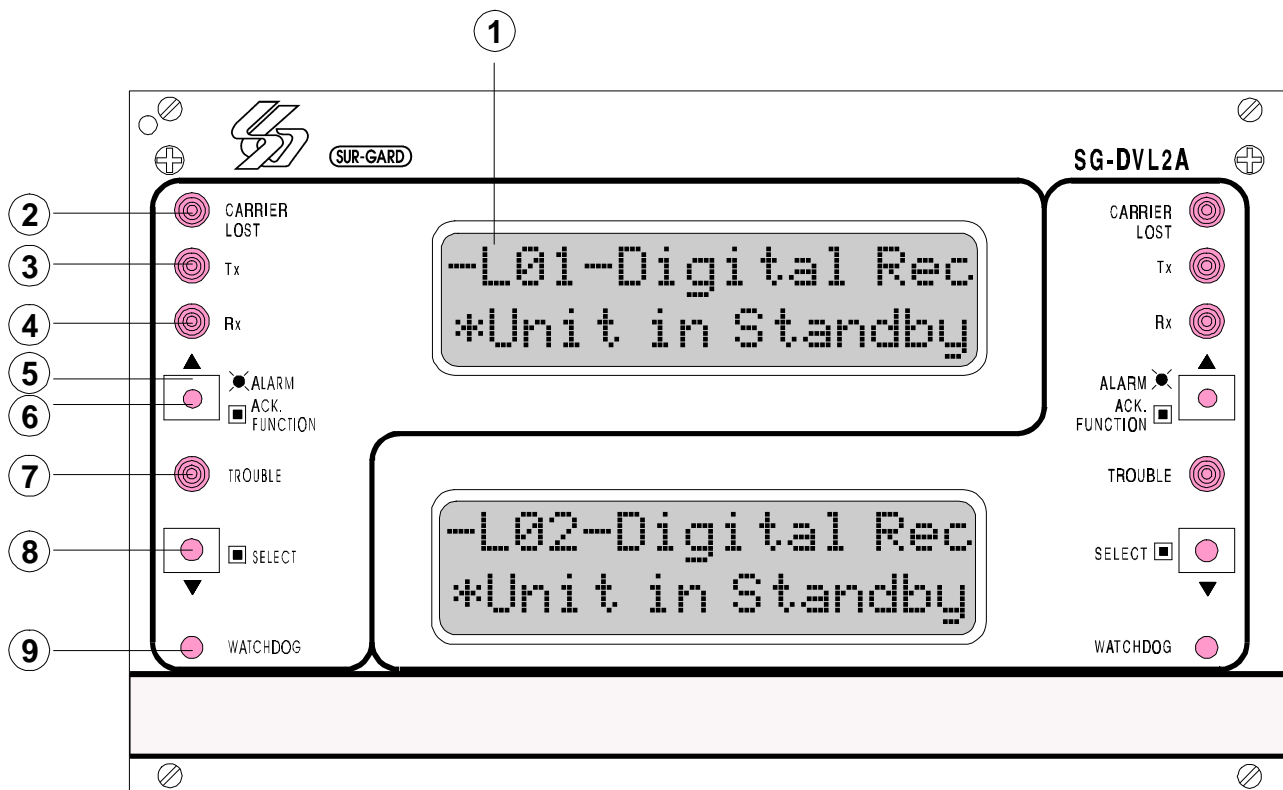
Connections for DML2A Line Card Expansion



Section 4: SG-DVL2A Compatible Line Card

4.1 Switches and LEDs on the SG-DVL2A

Each module of SG-DVL2A has 2 line cards. The LEDs and push button switches on the left side and the upper LCD are for line card #1. The LEDs and push button switches on the right side and the lower LCD are for line card #2.



1. **Liquid Crystal Display** is backlit to help reading in low light level.
2. **CARRIER LOST**: This LED follows the DSR line inversely (when DSR is high LED is off, when DSR is low LED is on).
3. **TX**: This LED monitors the outgoing message transmitted and follows TXD.
4. **RX**: This LED monitors the incoming message received and follows RXD.
5. **ACK/FUNCTION button**: Press this button to acknowledge an alarm in urgent mode (CPM is in failure). In the normal mode, this button provides access to the line card menu.
6. **ALARM LED**: The alarm LED is situated inside the ACK button. It will flash if an alarm is received and it turns off when the alarm is successfully sent to the master CPM.
7. **TROUBLE LED**: Turns on when the line card is shut down by the operator. Turns off when the situation returns to normal.
8. **SELECT button**: In the normal mode, press SELECT has no effect at all. But in the line card menu mode, this button is used to select the menu. Once a menu is selected, the SELECT button acts to go down to the next item.
9. **WATCHDOG LED**: Flashing every 4 seconds to monitor the line card operating system.

Section 5: SG-DVL2A Operating Mode

5.1 DVL2A Standby Mode

With the Line Card installed, apply power to the unit. This message will be displayed on the LCD screen for 1 second:

```
SG-DVL2A CSL-X28
NOV 08,96 U 1.0
```

The following messages are sent to the printer and computer:

Printer: L0x?????Dx LCardReset

Computer: 0000 A Dx

A hexadecimal digit from 1 to E representing the number of the Line Card will be sent for each "x" shown above.

After these start-up transmissions, the Line Card enters the Standby Mode and monitors the telephone line and the CPM2. Depending on the system's status, the following conditions will be indicated:

DSR Lost

PAD Absent

- Shutdown of Line Card communication with CPM2
- CPM2 error; display alarm message
- Keep last alarm message
- System in Standby

5.2 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 256 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:

```
-L01-Digital Rec
LnCard Shutdown!
```

5.3 CPM2 Error; Display Alarm Messages

If the DVL2A cannot detect CPM2 polling and there are no alarm events in the event buffer, this message will be displayed:

```
-L01-Digital Rec
<<-CPM Error!->>
```

If alarm messages cannot be sent to the CPM2 because of the error, the DVL2A will display the oldest message which has not been manually acknowledged. The "Alarm" light will FLASH and the sounder will beep if the "Mute Buzzer" Option is programmed as [00], [02] or [03].

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

Up to 256 alarm messages for the printer and computer will be retained in the CPM2 event buffer. When the event buffer is full, the oldest messages will be deleted as new events are recorded.

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

5.4 Keep Last Alarm Message

The DVL2A may be programmed to leave the last alarm message on the display screen until a new message is received. A typical alarm message is shown below:

```
L03-1234-102
Alarm 240
```

- "L01" indicates Line Card 01
- "1234" is the account code
- In this example, a 4-8-1 communication format is used.
- "240" is the event's location in the event buffer.

5.5 Standby Mode

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

```
_L01-Digital Rec
*Unit in Standby
```

5.6 Data Reception

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

```
In Communication 1234 56
```

The DVL2A will send each message it receives to the printer for review by the system operator.

Section 6: SG-DVL2A Programmable Features

6.1 Line Card Menu Mode

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

```
Dsp PRINTER alm
ACK:menu SEL:sel
```

Press the [ACK] button to scroll through the menu items. Press the [SELECT] button to select the function displayed on the LCD screen. When a function is selected, press [ACK] and [SELECT] together to exit from the Menu Mode. The DVL2A will automatically exit from the Menu Mode if no keys are pressed for 30 seconds.

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

- Display Printer Alarm Buffer
- Display Computer Buffer
- Display Call-ID Buffer
- Display Line Card Configuration
- Display Program Version
- Adjust LCD Contrast

6.2 Display Printer Alarm Buffer

```
Dsp PRINTER alm
ACK:menu SEL:sel
```

With this message displayed, press the [SELECT] button; the most recent alarm message will be displayed.

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

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

```
L01-1234551555557
001
```

- “L01” represents Line Card 01
- “1234” is the Account Code
- In this example, a 4-8-1 communication format is used.
- “001” is the event’s location in the Event Buffer.

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

Press [ACK] and [SELECT] together to return to the Standby Mode. If no keys are pressed, the DVL2A will automatically return to the Standby Mode after 30 seconds.

6.3 Display Caller ID Alarm Buffer

This menu will display the Call Arrival block for each message received.

With this message displayed, press the [SELECT] button; the most recent alarm message will be displayed.

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

Press the [ACK] button to display the Call-ID message:

```
L01-123456789
001
```

- “L01” represents Line Card 01
- In this example, The Pad-ID number would be 123456789
- “001” is the event’s location in the Event Buffer
- Note that “No Call No.” will be displayed if Option 05 is disabled

6.4 Display Computer Alarm Buffer

This menu will display the data that was sent to the computer

6.5 Display System Configuration Buffer

```
Dsp CONFIG syst.
ACK:menu SEL:sel
```

With this message displayed, press the [SELECT] button; the current Line Card Configuration will be displayed. Press the [ACK] button to scroll forward through the configuration displays, or press the [SELECT] button to scroll backwards.

Shown below is a typical configuration display; refer to “DVL2A Programmable Features” for Line Card configuration information.

```
L01 #00 00
RS-232C CD: 000
```

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

6.6 Display Program Version

```
Dsp PROGRAM vers
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-DVL2A CSL-X28
OCT 06,97 V1.00
```

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

6.7 Adjust LCD Contrast

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

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

```
Adjust CONTRAST
■■■■■■■■■■
```

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

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

Section 7: DVL2A Programming Commands

There are 5 main Programming Commands available on the DVL2A Line Card Module:

- F7 Options Programming
- FA Buffer Output
- FB Shutdown Line Card Communications with CPM2
- FC Reactivate Line Card Communication with CPM2
- FE Line Card Buffer Maintenance

Some Programming Commands feature options that provide a variety of different functions; each command is fully explained in the following sections of this manual.

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

Example:

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

Entering Data

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

```
Enter PASS-WORD
      xxxx
```

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 [02] will be changed. When "02" is keyed in, the Option will appear on the display as shown below:

```
LCard:01 Comd:F7
Op:02 Cd:___ Sc:___
```

- Enter the value to be programmed at Option 36. In this example, 01 will be programmed at Option [02] to enable it. When "01" is keyed in, the value will appear on the display as shown below:

```
LCard:01 Comd:F7
Op:02 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 DVL2A until this message is displayed:

```
Dsp CONFIG syst.
ACK:menu SEL:sel
```

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

```
L01 #00      00
RS-232C CD: 000
```

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 Standby Mode.

7.1 F7 Line Card Options Programming: Line Card-F7-Option-Code

The F7 Options Programming command is used to change various operating parameters for the Line Card. Reporting Codes, the Line Card number, buzzer operation and other features. Also functions may be changed using the F7 command.

Refer to the example illustrated in "Entering Commands" in the "DVL2A Programming Commands" section of this manual.

Option [00]: Common Event Code and Library Selection

Some central station software packages are unable to process the alarm using the event codes listed in the DVL2A Decoding Library. Where a central station monitors thousands of accounts belonging to different companies, the same reporting codes may have different meanings between companies. Option [00] may be programmed as follows:

<i>Program</i>	<i>Operation</i>
00	Use Individual Event Codes to computer, with Library enabled on the printer
01	Use Individual Event Codes to computer, without Library on the printer
20, 30-39 and 41-5A	Use Common Event Codes (space, 0-9, A-Z) without Library on the printer.

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 switch over from other brand receivers to Sur-Gard receiver.

Option [01]: Communication Select

If the MLR2-DG Receiver is not to be used with central station automation software and a computer, program Option [01] as "00".

If the MLR2-DG is to be used with central station automation software, program Option [01] with one of the values listed below:

<i>Value</i>	<i>Function</i>
00	No communication to computer
01	Alarms communicated to computer.

Option [02]: Printer Enable: Communicate Information to Printer Through CPM2

If a printer is not used with the MLR2-DG, program Option [02] as "00".

If a printer is to be used with the MLR2-DG, program Option [02] with one of the values listed below:

<i>Value</i>	<i>Function</i>
00	Printer not selected
01	Printer selected

Option [03]: Receiver Number

The Receiver Number is used for sending signals to the central station software. This number should be the same for all DVL2A Line Card modules connected to the same CPM2.

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 [04]: Line Card Number

The Line Card Number provides a unique identification code for each Line Card in the DVL2A module. Since the CPM2 can be connected to a total of 14 Line Cards, it is very important to program a unique code for each of the Line Cards. Failure to do so will cause "clashes", where two Line Cards answer the same CPM2 polling message at the same time. Hexadecimal numbers "01" to "0E" can be programmed in Option [04] to identify Line Cards 01 through 14.

Option [05]: Caller Identification (Call Display) Option

Option [05] allows the Line Card to receive Caller Identification data that is transmitted in the Call Arrival block.

Program "01" to enable this feature, or program "00" to disable it. The "Call Display" service must be available and requested from the Telephone Company for this feature to be operational.

Program Option [36] with one of the following:

00	No reception
01	Normal reception operation

Option [06]: Send Caller-Identification (Telephone number) to Computer

The DVL2A can send the Caller-Identification numbers to the computer. If the telephone number is not received, the Caller Identification information will not be sent to the computer.

To use Option [06], Option [05] must be programmed as "01".

Program Option [06] with one of the following:

00	Do not send Caller Identification
01	Send Caller Identification for every call

Note that option [05] must be programmed as "01".

Option [07]: Send Caller Identification to Printer

To use Option [07], Option [05] must be programmed as "01".

Program Option [07] with one of the following:

00	Do not send Caller Identification to printer
01	Send Caller Identification to printer

Option [08]: Mute Buzzer

Operation of the Line Card's buzzer may be programmed as follows:

00	Buzzer sounds for CPM2 Error, or if an Alarm occurs during a CPM2 error
01	Buzzer does not sound for any events

Option [09]: Last Message On

When Option [09] is enabled, the last alarm message will be retained on the Line Card display screen until a new signal is received. Program Option [09] as "01" to enable this feature, or as "00" to disable it. If Option [09] is disabled, the standby message described in Section 1.4 will be displayed when communication of an event is completed.

Option [0A]: Equivalent Line

Option [0A] is used when an incoming signal can be received on another receiver telephone line if the original line is busy. Information printed and/or sent to computer will indicate that the information was received on the same telephone line. The receiver number does not change. Program 00 at Option [0A], or a number from 01 to 0E.

Examples:

Option [0A] = 00; no equivalent line number

If receiver number is 02, and the line number is 3: the printer message will be "L03-1234..." and the computer message will be: 1023ssssss1234

Option [0A] = 01; equivalent line number is 1

If receiver number is 02 and the line number is 3: the printer message will be "L21-1234..." and the computer message will be: 1021ssssss1234

Option [0A] = 1; equivalent line number is 1

If receiver number is 12 and the line number is 3, the printer message will be "121-1234..." and the computer message will be: 1121ssssss1234

Option [0B]: DSR (min)

Option [0B] is used to check the DSR line. When the receiver is in standby it will monitor the DSR line and check if it has been low for too long. If the DSR line is low for the amount of time programmed in this option an alarm will be generated as follows:

Printer: L01???????20 DSR Lost

Computer: 0000 A 20

On the LCD the following message will be displayed

```
-L01-Digital Rec
<<-DSR Lost->>
```

The DSR line must high for 5 seconds before a Restore signal will be generated. The following signals will be sent to the computer and printer:

Printer L01???????30 PAD Restored

Computer: 0000 R 30

The option can be disabled by programming 00 into option [0B].

Option [0C]: Cr HEARTBEAT

This option will send a <Cr> to the PAD every minute if the option is programmed as 01. If the heartbeat is to be send every 2 minutes this option should be programmed as 02. To disable this option program the option as 00. If the receiver sends out 3 consecutive heartbeat signals with no response the following messages will be generated:

Printer: L01???????0A PAD Absent

Computer: 0000 A 0A

The following message will be displayed on the LCD

```
-L01-Digital Rec
<<-PAD Absent->>
```

Once a valid signal or the command *<cr><lf> is received the following signals will be sent to the computer and printer:

Printer: L01???????30 PAD Restored

Computer: 0000 R 30

Option [0D] RAD Output

This option will determine how the receiver will decode the incoming information. If the option is programmed as 00 the data will be converted to a basic 4-2, 5-2, or 6-2 output. Example:

123456551555557 will be sent

to the computer: 1RRRLssss123456sAss03[DC4]

to the printer: L01-123456-103 Alarm

Note that multiple signals may be generated from a single alarm.

123456551515557 will be sent

to the computer: 1RRRLssss123456sAss03[DC4]

1RRRLssss123456sAss05[DC4]

to the printer: L01-123456-103 Alarm

L01-123456-105 Alarm

If the option is programmed as 01 the data will be sent directly to the computer as follows:

123456551555557 will be sent

to the computer: 8RRRL123456s55155555s7[DC4]

to the printer: L01-123456551555557

7.2 Buffer Output Command: LC-FA-XX-XX

The "FA" command is used to send part of the Line Card buffer to the printer or the computer. The number of messages to be printed is entered as a hexadecimal number.

The time and date of the buffer output is printed on the same line after the event; a typical event along with the time and date it was printed is shown here: L01*1234*12 AlarmZn#2 09:30:15-27/01

- 09:30:15 is the time (hours:minutes:seconds)
- 27/01 is the date (day-month)

Note that the time and date of the event itself may be viewed by printing the CPM2 buffer.

7.2.1 Output Alarm Type Printer Messages to the Printer: LC-FA-01-XX

The LC-FA-01-XX command will send the specified number of printer alarm messages to the printer. "XX" should be a hexadecimal number from 01 to FE to indicate a number of events from 1 to 255.

Shown here are typical alarm messages:

L01*1234*12 AlarmZn#2 21:24:00-27/01

L01*1276*02 PanicZn#2 21:24:01-27/01

7.2.2 Output Alarm Type Computer Messages to the Printer: LC-FA-02-XX

The LC-FA-02-XX command will send the specified number of computer alarm messages to the printer. "XX" should be a hexadecimal number from 01 to FE to indicate a number of events from 1 to 255.

Shown here are typical alarm messages:

L01 COM 1011 0001 A 01 21:24:00-27/01

L01 COM 1011 1234 R 70 21:24:01-27/01

7.2.3 Output Line Card Configuration: LC-FA-04-04

The LC-FA-04-04 command will print the Line Card configuration; this record may be used for future reference. Refer to "Line Card Configuration Command LC-F7-OP-CD" for more information.

7.2.4 Output Caller Identification and Corresponding Alarm Messages to the Printer: LC-FA-05-XX

The LC-FA-05-XX command will send the specified number of Caller Identification and corresponding alarm messages to the printer. "XX" should be a hexadecimal number from 01 to FE to indicate a number of events from 1 to 254.

Shown below is a typical message generated by this command. The first line is the Caller Identification, and the second line is the alarm event:

0816*1619 5551212-21:24:00-27/01

L01*1234*12 Alarm 21:24:01-27/01

7.2.5 Output Computer Alarm Messages to the Computer: LC-FA-06-XX

The LC-FA-06-XX command will send the specified number of computer alarm messages to the computer. "XX" should be a hexadecimal number from 01 to FE to indicate a number of events from 1 to 254.

This command provides a means of manually transferring events to the computer. If the computer goes off-line, the CPM2 will record any events in its own buffer. When the computer returns on-line, the CPM2 will automatically send the computer any alarm messages that were received while the computer was off-line.

7.3 Shutdown Line Card Communication with CPM2: LC-FB

The LC-FB command will shut down communications between the Line Card specified at "LC" and the CPM2. Note that this command does not require an Option or Code number to be entered; simply enter the number of the Line Card to be shut down, the command FB, and then press the CPM2 [Escape] button.

The CPM2 will record the shut down by sending messages to the printer and the computer:

Printer: -L01-Inc.Resp. 11:57:58-15/01

Computer: 1011 0000 A F1

This warning message will also be displayed on the Line Card display:

```
L01-Digital Rec
LnCard Shutdown!
```

7.4 Reactivate Line Card Command: LC-FC

The LC-FC command will reactivate a Line Card that was shut down using the LC-FB command. Note that this command does not require an Option or Code number to be entered; simply enter the number of the Line Card to be reactivated, the command FC, and then press the CPM2 [Escape] button.

7.5 Line Card Buffer Command: LC-FE-XX-XX

The FE command is used to access the Line Card buffers. The following functions may be performed:

7.5.1 Erase Alarm Printer/Computer Messages: LC-FE-00-00

Ensure that a copy of the printer and computer alarms exists before using this command. This command erases all computer and printer alarm messages and Caller Identification messages in the Line Card's memory.

7.5.2 Software Reset: LC-FE-02-02

This command will reset the Line Card.

7.5.3 Backup Current Line Card Configuration: LC-FE-03-03

When the Line Card has been configured, the programming changes can be recorded as a "back up" program. The "back up" configuration may be later used to restore the Line Card's configuration after temporary changes are made.

To store the present Line Card configuration, enter the LC-FE-03-03 command.

7.5.4 Install Backup Configuration as Current Line Card Configuration: LC-FE-04-04

If the Line Card configuration is temporarily changed (for example, to overcome a temporary problem or for experimentation), the configuration stored using the LC-FA-03-03 command may be restored.

To restore the "back up" configuration, enter the LC-FE-04-04 command.

Section 8: SG-CPM2 Central Processing Module

The CPM2 is the central processing module that monitors the DVL2A 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 lines from 7 DVL2A modules.

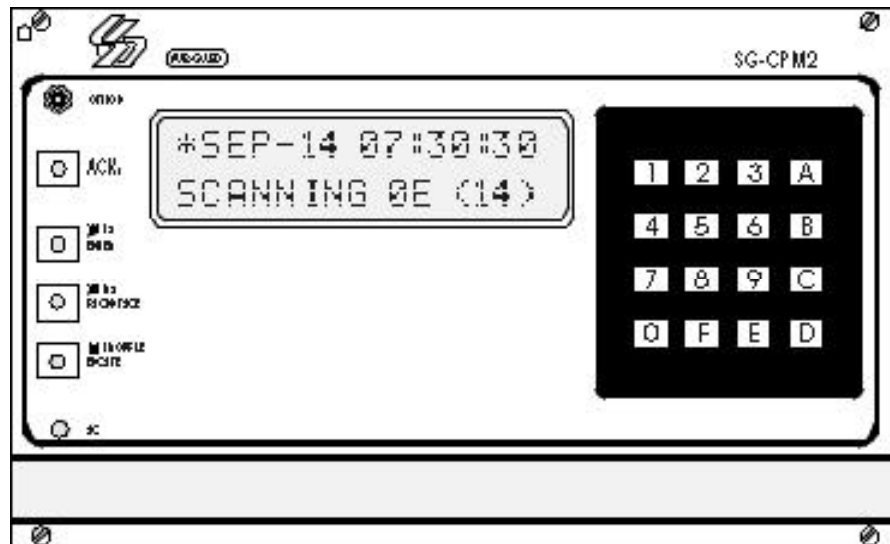
8.1 General Information

The CPM2 16-bit micro-controller and real-time assembly language program running at 16MHz 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.

8.2 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 CPM2. The CPM2 is capable of polling 14 Line Cards in 1 second
- 256-event printer alarm message buffer
- 256-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

8.3 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.

8.4 CPM2 Operating Mode

8.4.1 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.

1. Remove the CPM2 from the card cage
2. 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.
3. 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
```

4. 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.

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

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

8.5 CPM2 in Standby Mode

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

```
*FEB-23 07:30:45
Scanning 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.

8.6 CPM2 Configuration Mode

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

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

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

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

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

8.7 Configuration Options

The CPM2 features 23 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 |

Option 01: Setting the Clock

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

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

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

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

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

Option 02: Changing System Passwords

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

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

Sixteen 4-digit passwords are available for use on the CPM2. Password 0 is the Master Password, and Passwords 1 through F may be assigned to individual operators. Two letters,

representing the initials of the operator, may be assigned to each Password to help in identifying the operator.

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

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

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

Option 03: Change the Number of Line Cards

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

```
#LnCard Attached
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:

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

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

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

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

When using the Star 8340 printer, the CPM2 is able to print in both red and black. If an IBM-compatible printer is selected, the CPM2 will print in black only.

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

Option 05: COM1 Configuration

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

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

Br: Baud Rate **Enter...** **for baud rate**

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

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

Pa: Parity **Enter** **for parity**

0	no parity
1	odd parity
2	even parity

Note 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 06: COM1 Communication Format

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

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

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

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

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

Option 07: Wait Time for Acknowledge on COM1

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

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

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

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

NOTE: It is strongly recommended not to change the default setting (4.0 sec.) unless it is recommended by a Sur-Gard representative 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) See page 63.
---	----------------------------------------------------------------------------

1	SCADA connection through Com#2 enable
---	---------------------------------------

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

Option 11: Adjust LCD Contrast

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

```
Contrast Level
■■■■■■■■■■
```

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

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

Option 12: UL Receiver Option

To have the MLR2-DV 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 Standby Mode message will be displayed.

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

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

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

Option 16: ComPort Diagnostics

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

```
Debug ComPort1,2
0 Change to:1
```

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

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

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

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

Option 17: Test 9V/12V Battery

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

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

```
9V/12V Batt: 0-3
3 Change to:1
```

- | | |
|---|-------------------------------------------|
| 0 | Do not supervise the 12V and 9V batteries |
| 1 | Supervise 9V only |

- | | |
|---|--------------------------|
| 2 | Supervise 12V only |
| 3 | Supervise both batteries |

Option 18: Line Card Diagnostics

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

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

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

```
01      FE
```

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

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

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

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

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

Refer to "Message Priorities" for more information.

Option 19: Display Software Version

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

```
SG-CPM2 RECEIVER
*Sep-15-95 V2.10
```

Option 20: Battery Monitor

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

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

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

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

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

Option 21: Alarm Messages Print Year or Seconds

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

Second" message is displayed; this message will be displayed:

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

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

L01-1234-05 Alarm 21:24-24/11/97

Note that the time (21:24) is represented with just hours and minutes, and that the year is added to the date (24/11/97).

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

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

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

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

Option 22: System Reset

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

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

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

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

Option 23: Change Receiver Number

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

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

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

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

8.8 Message Priorities

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

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

UL Requirement Message

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

COM1 Diagnostics

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

Line Card Diagnostics

If Option [18] is enabled, the screen will display 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 back-up 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)
```

8.9 CPM2 Utility Modes

When the CPM2 is in the Standby 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 DVL2A Line Card Menu Mode section of this manual.

- Op: and Cd: "Op" and "Cd" are used to indicate parameters that may be required within certain commands. For example, when using the F7 Line Card programming command "Op" and "Cd" are used to indicate the Option number and the new code programmed for that option.
- Sc: "Sc" is used with SCADA applications.

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

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

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

[D] Send Printer Messages to the Printer

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

```
Dump PRT Msg->PRT
LCard#: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 re-enter the desired number again on the keypad.

Press the [Backspace] or [Escape] button to cancel this function and return to the Standby Mode. Or, press the [Enter] button to print the indicated messages. When the [Enter] button is pressed, the CPM2 will print the printer messages, starting with the oldest message 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 buffer is being printed, the new alarms will be sent to the printer when the buffer printout is completed.

[E] Examine Printer Messages on Display Screen

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

```
Exam PRINTER msg
LCard#: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 re-enter the desired number again on the keypad.

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

When the [Enter] button is pressed, the CPM2 will display the printer messages, starting with the most recent message. When

[Enter] is pressed, a message similar to this will be displayed:

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

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

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

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

[F] Examine Computer Messages on Display Screen

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

```
Examine COM1 msg
LCard#: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 re-enter the desired number again on the keypad.

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

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

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

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

8.10 MLR2-DV Computer Interface

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

Overview of Communication

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

The CPM2 also monitors the connection to the computer by sending a supervisory "heartbeat" signal through COM1

every 30 seconds. If the "heartbeat" transmission determines that the computer is off-line or disconnected, a message similar to this will be sent to the printer:

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

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

When COM1 communications are re-established, a message similar to this one will be printed:

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

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

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

CPM2 COM1 Status Report Messages

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

Sent to COM1 Event

0000 A 00: Reserved to indicate Operator activity for C or ESC mode (Not Implemented in this program version).

```
0000 A 01: Printer Error
0000 R 02: Printer Restored
0000 A 03: 12V Battery Low
0000 R 04: 12V Battery Restored
0000 A 05: COM#1 Absent
0000 R 06: COM#1 Restored
0000 A 07: UPS AC Fail
0000 R 08: UPS AC Restored
0000 A 11: 9V Batt. Low
0000 R 12: 9V Batt. Restr
0000 A 13: COM#2 Absent
0000 R 14: COM#2 Restored
0000 A 15: AC Failure
0000 R 16: AC Restored
0000 A 17: UPS Low Battery
0000 R 18: UPS Low Batt Restr
0000 T 19: CPM2 Master Fail
0000 A C1 to CE: Internal communication error
```

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

```
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.

Sent to COM1 Event

```
0000 A 20: Line Fault on Line Card
0000 R 30: Line Restored on Line Card
0000 P 0X: Audio on line X
0000 A D1 to DE: Line Card 01 to 0E Reset
xxxx A 0A: Account xxxx not responding
xxxx R 0A: Account xxxx back on-line
```

Section 9: Communication Protocol with Central Station Computer

9.1 Protocols

The Sur-Gard MLR2-DV receiver sends the following protocol to report signals to the central station computer via the RS-232 port.

9.1.1 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.

9.1.2 Acknowledgement 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 re-transmission 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.

9.1.3 DVL2A-CSL Communication Formats

The following is a list of formats available for the CSL-X28 version:

Ademco High Speed protocol

8RRRLAAAAAAsCCCCCCCCsA[DC4]

8RRRLAAAAAAsCCCCCCCCsCCCCCCCCA[DC4]

Where, 8 : Protocol number
RR : Receiver number
L : Line number
AAAA : Account code (may be 4,5 or 6)
s : Space
C : Zone status (8 or 16)
A : Auxiliary Zone
[DC4] : Terminator, 14 Hex.

Channel codes available:

- 1: New event
- 2: New opening
- 3: New restore
- 4: New closing
- 5: Normal
- 6: Previous reported event still in effect
- 0: New Trouble

Auxiliary zones available:

- 7: Zone status report in previous 8 zones
- 8: New low battery
- 9: Test report

note that any other value will be taken as 7.

Basic protocol

1RRLssssAAAAAAsXssYY[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.
YY : Zone Number or User Number.
[DC4] : Terminator, 14 Hex.

Event Code Table

A	Alarm
B	Bypass
C	Closing
O	Opening
R	Restore
T	Trouble

9.1.4 Supervisory Heartbeat Signal Protocol

1011ssssssssss@s[DC4]

Where, 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, programmable on the receiver. The computer should acknowledge this signal with an [ACK]. It is recommended to have this signal running.

9.1.5 Clock Signal Protocol

1RRLssssAAAAAAsXGYYHH:MM:SS-dd/mm[DC4]

3RRLssssAAAAAAsXYYHH:MM:SS-dd/mm[DC4]

Where, HH : Hour.
MM : Minute.
SS : Second.
dd : Day.
mm : Month.

And the other codes are of the same definition as in the previous signal protocols. The supervisory heartbeat signal can also be used along with this protocol, but the structure remains unchanged.

Ask Sur-Gard Technical Support for an information sheet when using the MLR2-DV with one of the following software packages:

- SIMS II
- SIMS CSM
- SIS
- M.A.S.
- Mentor
- Monitor
- Microkey Central-1
- ABM
- Alarm Soft
- Apropos STA

9.2 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
7000H	05H	Printer strobe pulse width Default = 5 μ s (microseconds)
7001-7002	3E80	Delay time \times 0.25ms to resend message to COM1 if heartbeat is not selected. Default = 16000 \times 1ms = 16 s delay
7005-7006	0100H	Test Line Card 01 at 01:00
7007-7008	0115H	Test Line Card 02 at 01:15
7009-700A	0130H	Test Line Card 03 at 01:30
700B-700C	0145H	Test Line Card 04 at 01:45
700D-700E	0200H	Test Line Card 05 at 02:00
700F-7010	0215H	Test Line Card 06 at 02:15
7011-7012	0230H	Test Line Card 07 at 02:30
7013-7014	0245H	Test Line Card 08 at 02:45
7015-7016	0300H	Test Line Card 09 at 03:00
7017-7018	0315H	Test Line Card 0A at 03:15
7019-701A	0330H	Test Line Card 0B at 03:30
701B-701C	0345H	Test Line Card 0C at 03:45
701D-701E	0400H	Test Line Card 0D at 04:00
701F-7020	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.

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 Standby 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 2.10
20	Monitor Battery	
21	Select Year/Seconds	0
22	Force Reset	
23	Change Receiver Number	01

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 RS-232 cable; it should not be a null-modem type.
Check the baud rate for COM1 (CPM2 option 05).
Check the computer software setup.

PROBLEM Bad communication with central station computer.

SOLUTION The central station software is too slow to provide the acknowledgement 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, 06.
Ensure that the COM1 connection is secure.

PROBLEM Data is not being received by the DVL2A.

SOLUTION Ensure that the DML2A to RS-232 connections are correct.
Ensure that all 6 resistors are present on the DML2A backplane.
Ensure that Jumpers J1, J2, J3, J4 are removed on the DML2A backplane.
Ensure that the data being transmitted to the DVL2A is 4800 baud.

PROBLEM The Carrier lost LED is always on.

SOLUTION Ensure that the DSR line of the RS-232 connection is correct to the backplane.

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: 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

ASCII with library on printer (Option 30)	Hex	Corresponding ASCII Character
C9	49	I
CA	4A	J
CB	4B	K
CC	4C	L
CD	4D	M
CE	4E	N
CF	4F	O
D0	50	P
D1	51	Q
D2	52	R
D3	53	S
D4	54	T
D5	55	U
D6	56	V
D7	57	W
D8	58	X
D9	59	Y
DA	5A	Z
DC	5C	\

Appendix D Quick Reference for DVL2A CSL-X28 Options

Option Number	Name	Default Value	Programmed Value
00	RS232C CD	00	_____
01	COM SELECT	01	_____
02	PRT SELECT	01	_____
03	RCVER NUMB	01	_____
04	LCARD NUMB	0F	_____
05	CALLER-ID	00	_____
06	TEL# ->RS-232	00	_____
07	TEL# ->PRTR	00	_____
08	MUTE BUZZER	00	_____
09	LAST MSG ON	00	_____
10	EQUIV LINE	00	_____
11	DSR (min)	03	_____
12	CrHEARTBEAT	01	_____
13	RAD OUTPUT	00	_____
14	RESERVED	00	_____

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