Introduction

The MLR2-DV multi-line DVACS compatible receiver is U.L.C. listed for commercial fire and burglary. The basic unit consists of a CPM2 Central Processor Module and a DVL2A DVACS Receiver Line Card Module. Additional DVL2A Line Cards may be added to enable the CPM2 to monitor up to 14 DVACS lines. The MLR2-DV includes many features, all designed to make the receiver more powerful and easier to use. The messages received from the subscribers' control panels (transmitters) are sent over DVACS compatible Schedule 3A (150 Baud) leased telephone lines with active bridging at hubs in the central offices. The Sur-Gard protocols are used to transport the information.

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 transmitters, receive new changes from DVACS Compatible control panels, 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 master leg with carrier detect, for phone line trouble. If a line fault occurs, the receiver displays, prints the message and sends a special code to the computer. It then stops polling the transmitters to avoid sending a flood of transmitter incorrect response signals 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. Built-in network troubleshooting mode, to examine the overall network or individual transmitter responses.
10. Supports a higher security level for more security protection.
11. The data output to the printer/computer can be examined on the Liquid Crystal Display.
12. Built-in buzzer is automatically silent if a successful communication with the CPM2 occurs as normal, or if the "mute buzzer" option is selected.
13. Two programmable outputs with activation delay are provided. They can be set to monitor a specific transmitter or specific alarm type.
14. Stores and displays on the LCD up to 256 reception error warnings (One memory location for each of the 240 valid ID Codes and 16 for non-valid ID Codes). This feature helps to trouble shoot communication problems.
15. The delay "wait for transmitter reply" can be increased to 2 seconds before polling the next transmitter. This is useful in special applications, such as networks with satellite communication having longer delays.

Power and Supervision

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

The stand-by 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
- ALARMSOFT
- APROPOS
- CSM
- MAS
- MICRO KEY
- SIMS
- SIS
- SMS

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.

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 7: 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 7.10 "MLR2-DV Computer Interface" on page 25.

1.2 Bench Testing

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

The following items are required:

- 16VAC transformer, 40VA to 75VA
- 2 modified telephone cables (see diagram)
- One or more DVACS control panels

Direct connection testing without the use of DVACS lines is possible by using a special cable connection. Then disable option [11] (see page 14).

Power Up

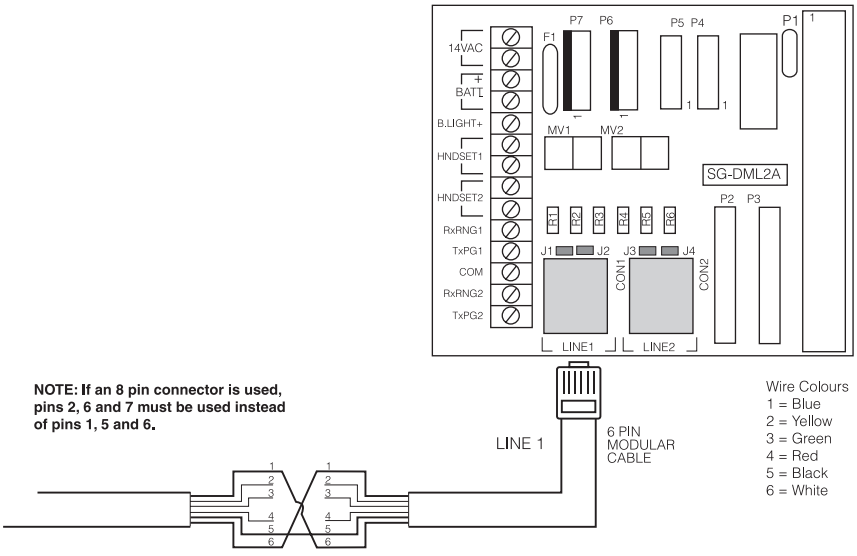
When power is applied, the receiver will beep and will indicate one or more trouble conditions on the LCD message screen. Press the flashing [ACK] button to silence the buzzer. If there is no computer or printer connected, a trouble message will be displayed on the CPM2 LCD and the "ACK" light will flash. 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".
- Polls ID between 01 and 20
- 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.

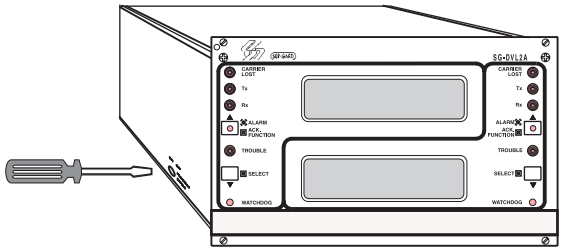
Direct Connect Testing Wiring Diagram



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
FF
```

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

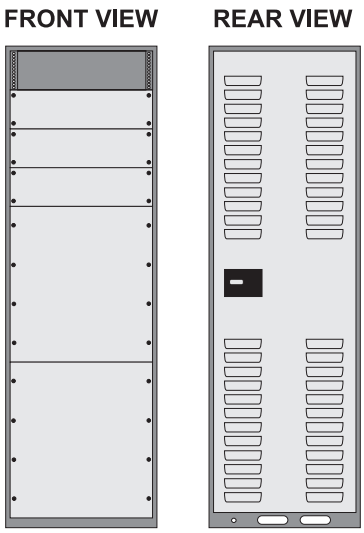
· Install the MLR2-DV in a closed 19" rack or cabinet with a locking rear access door. Cover all unused spaces with blank metal plates. The LCD screens on the receiver are designed to be viewed below eye level. If the unit must be mounted where the screens are above eye level, angle the unit downwards 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

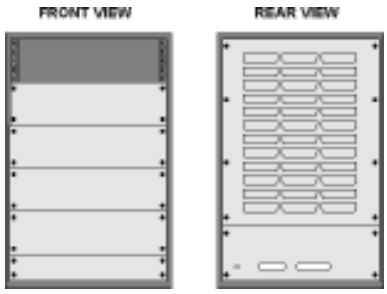
· Rack
· Door with lock and ventilation
· Blank plates 21" (2)
· Blank plate 5.25" (3)
· Screws
· Washers
· Clipnuts
· FROST 16V 75VA transformer (RTFR7516)
· AC Utility Box
· AC Cable Clamps (2)
· 8' Battery Cables
· 18 gauge 3-conductor AC Cable



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

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 12V$_{DC}$ sealed rechargeable battery (6 to 25 Ah rating) and one 16V$_{AC}$ 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 9pin connector
1	1	
2	2	3
3	3	2
7	7	5

3.4 DVACS Line Connections

· With 6-pin modular cables, connect each line module output to its corresponding F1/F2 subset.

3.5 Grounding

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

3.6 Power Supply

· Ensure that all electrical connections are made correctly. After verifying all connections, connect the RED and BLACK leads to a 12V$_{DC}$ 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 12V$_{DC}$. 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 stand-by, 12V 17.5Ah rechargeable battery should be used for 6 line configuration, and 12V 38Ah rechargeable battery should be used for 14 line configuration.

3.7 Battery Charging Current

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

3.8 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.

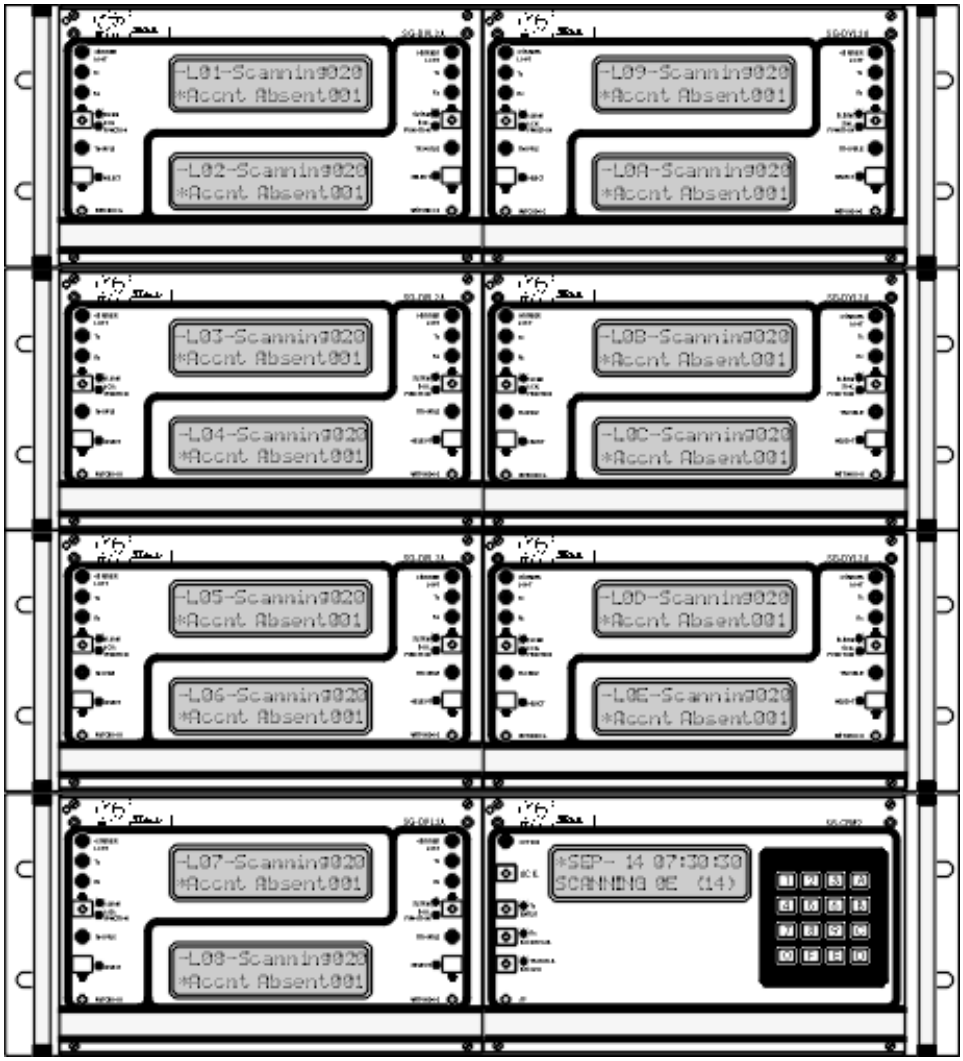
To Install a Line Card Module

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.

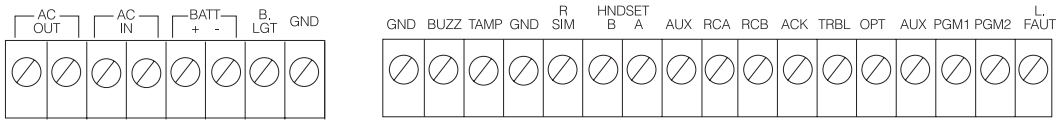
3.9 Installation Checklist

Complete	*Operation*
☐	MLR2-DV installed in 19" Rack Mount Cabinet
☐	19" Rack Mount Cabinet connected to earth ground
☐	SG-1220B Printer Power Supply installed (with transformer and battery) if DP8340 printer is used
☐	6-pin modular cable(s) connected to MLR2-DV and DVACS line
☐	Parallel Printer Cable connected to MLR2-DV Parallel Printer Port
☐	Parallel Printer power connected
☐	Computer connected to MLR2-DV COM1 port using serial cable
☐	CPM2 Cold Start-up completed

MLR2-DV Installation Maximum Configuration



DML4 Connections



AC IN 16VAC power input

AC OUT 16VAC 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

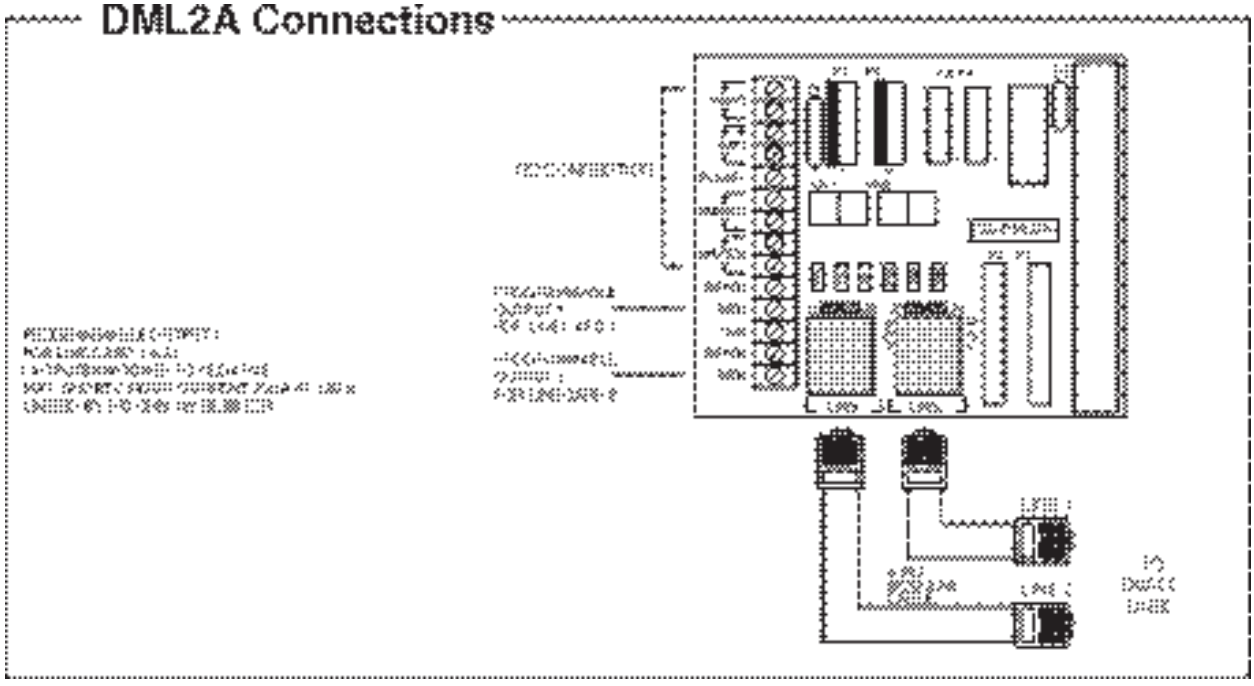
TRBL Not used

OPT Option Output: this 12V output follows the "Option" light

PGM1 Output 1 (used for RED1 installation)

PGM2 Output 2 (not used)

DML2A Connections

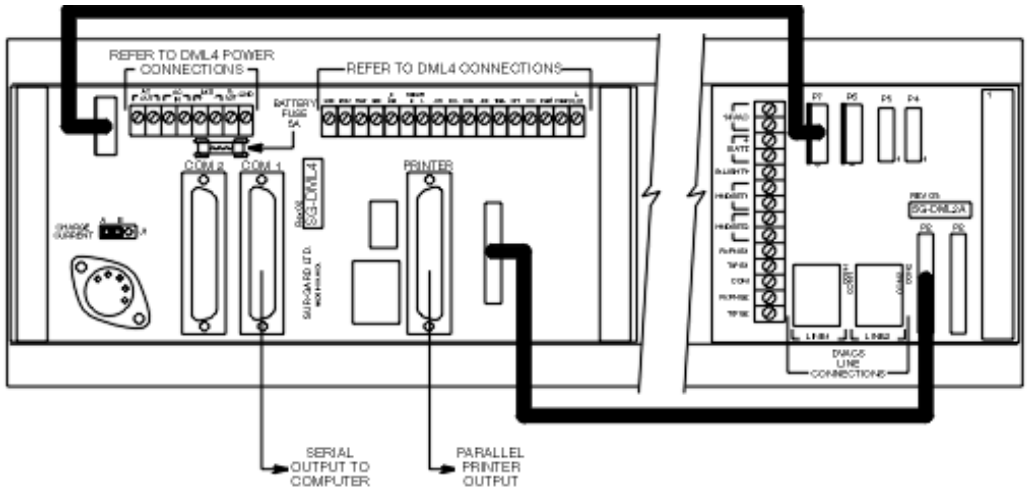


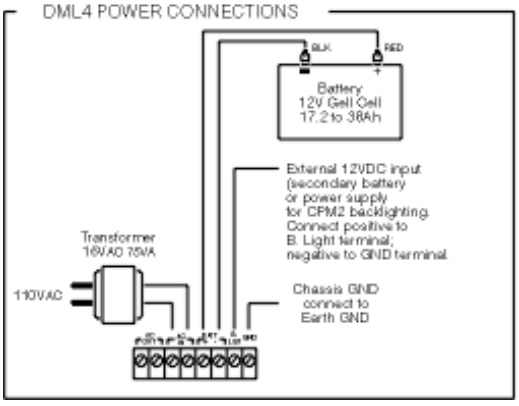
14VAC May be used as an external AC output.

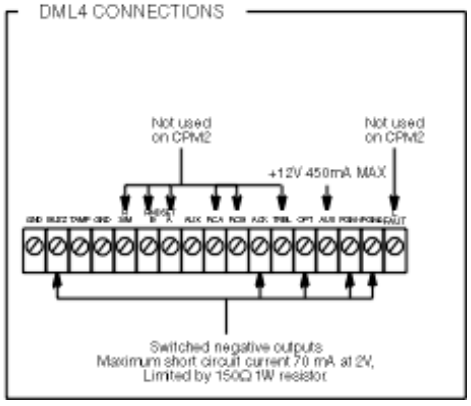
BATT May be used as an external 12V power source. Do not connect a battery to these terminals.

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.

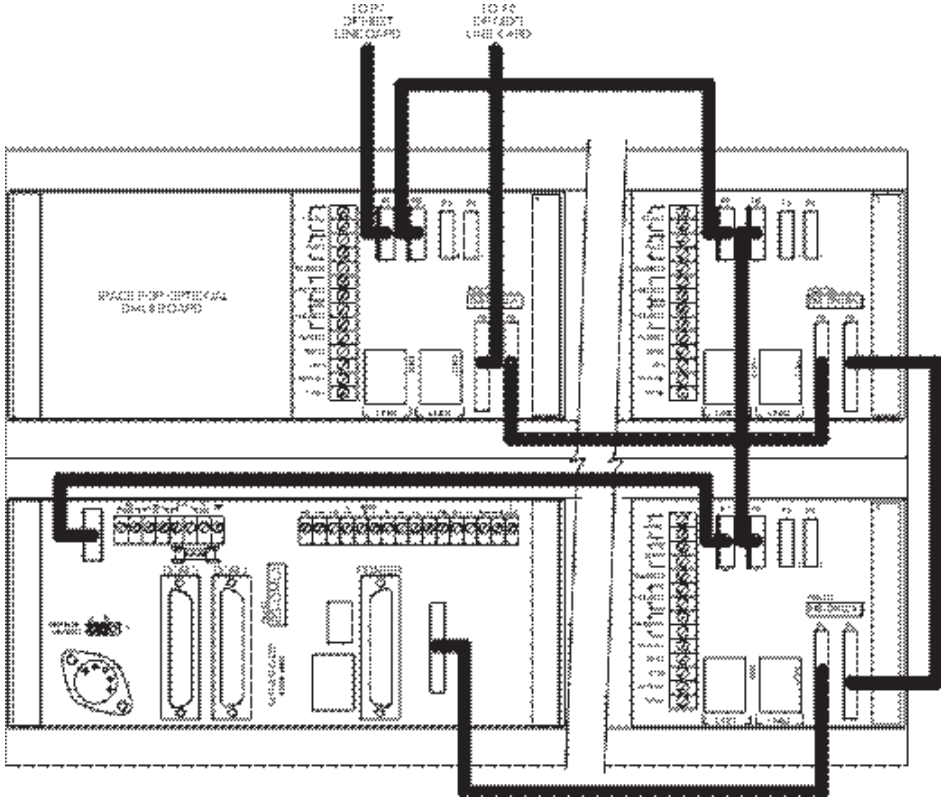
MLR2-DV Backplane Connection Diagram







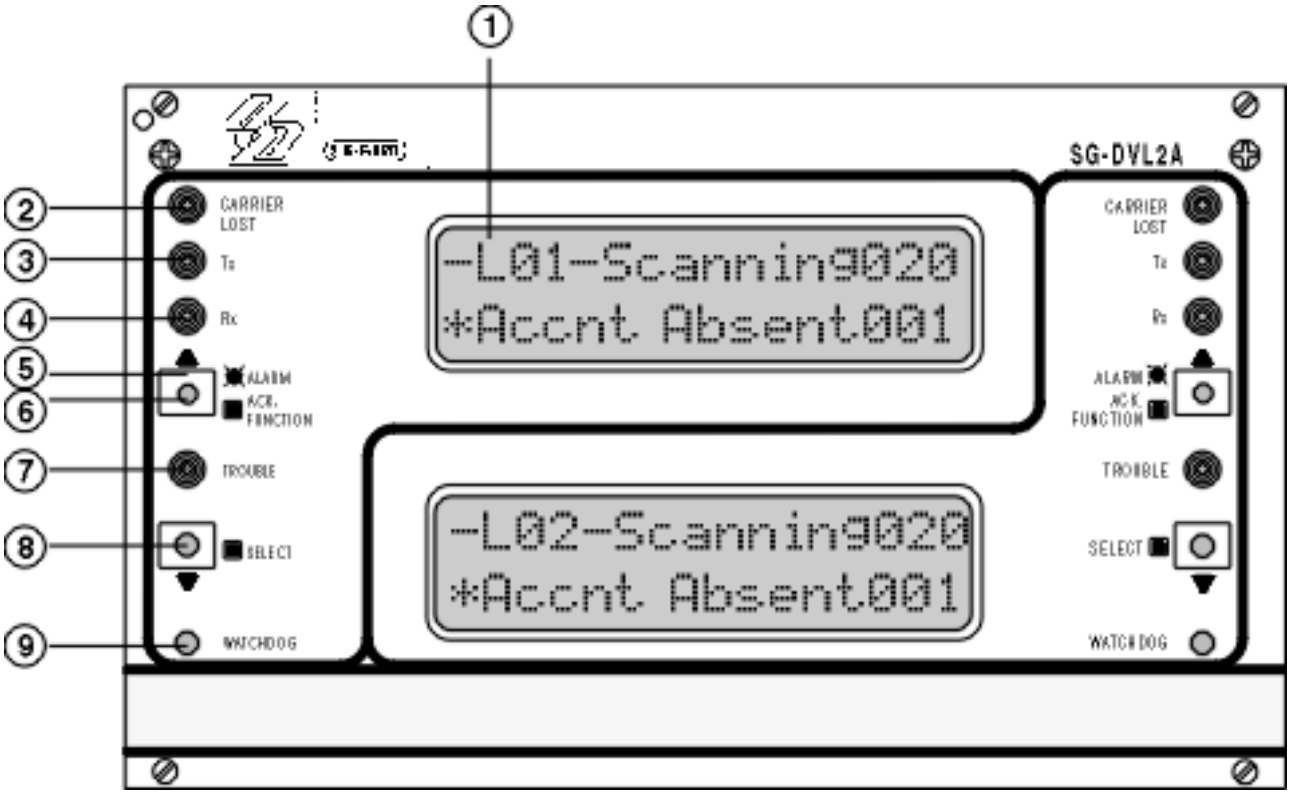
Connections for DML2A Line Card Expansion



Section 4: DVACS Compatible Line Card (SG-DVL2A)

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**: larger, easier to read. The LCD is backlit for ease of reading in low light.
2. **CARRIER LED**: This LED turns on when the carrier is lost.
3. **Tx LED**: Blinking when the unit polls a transmitter.
4. **Rx LED**: Blinking when the unit receives a reply from a transmitter.
5. **ACK./FUNCTION button**: Press this button to acknowledge an alarm in emergency manual mode. In the normal mode, this button provides access to the line card menu.
6. **ALARM LED**: The alarm LED is situated inside of the ACK button. It will flash if an alarm received and it turns of when the alarm is successfully sent to the CPM.
7. **TROUBLE LED**: Turns on when the Dvacs Compatible line is faulty, the line card is shut down or when a communication error occurred. Turns off when the situation returns to normal. (except for the error of data received, which requires an error buffer reset to turn off this LED.
8. **SELECT button**: In the standby mode, pressing [SELECT] has no effect at all. When in the menu mode, this button is used to select the menu. Once a menu is selected, the [SELECT] button scrolls down to the next feature.
9. **WATCHDOG LED**: Flashing every 4 seconds to monitor the line card operating system.

Section 5: SG-DVL2A Operating Mode

5.1 System in Stand-by Mode

When the line card is installed in the rack and power up occurs, the following message is shown on the LCD for 3 seconds:

```
*SG-DVL2A DVACS*
*SEP-27-96  V2.01
```

And the message L0X- ???? DX LCardReset is sent to the printer and 0000 A DX is sent to the computer to denote the line card reset. Where X is the line card number from 1 to E (Hex).

Next, the line card monitors the DVACS Compatible line, and CPM2. Depending on the system status, the following priorities will be warned:

- Line fault.
- Shutdown of Line Card Communication with CPM2.
- CPM2 error, display Alarm message.
- Diagnostic Aid (Debug) for DVL2A - CPM2 Data Transactions.
- Keep last alarm message.
- Diagnostic Aid (Debug) for Data Transactions.
- Communication error status.
- Standby mode.

5.1.1 Line Fault

The SG-DVL2A detects the absence of carrier on the master leg, for a programmable number of milliseconds. If carrier loss occurs, the CARRIER and TROUBLE LEDs turn “ON” and the line card stops polling the transmitters.

```
-L01-Scanning020
<<-Line  Fault->>
```

- Sent to printer: L01 -000- ????? LineCut (Time and Date added by CPM2)
- Sent to computer: 1001 0000 A 20

All examples in this text are given with the line card as #01.

When the line condition becomes normal, the CARRIER and TROUBLE LEDs turn off and the LCD will display the next priority message. For the restore of carrier:

- Sent to printer: L01 -000- ????? LineRst
- Sent to computer: 1001 0000 R 30

5.1.2 ShutDown of Line Card Communication with CPM2

If the operator wishes to temporarily have a line card not answer CPM2 polling, they will send a command from the CPM2 keypad to shut off this line card. The shutdown command is normally only used for testing. Within this mode, the line card has to keep the alarm messages in its buffer. It can contain 256 messages in the memory. The trouble LED will turn on and the shutdown message is displayed on the LCD:

```
LnCard Shutdown!
Please  Restore
```

5.1.3 CPM2 error, display alarm messages

The third priority is CPM2 error. In this situation, the SG-DVL2A can not detect the CPM2 polling. If no alarm remains in the buffer, the line card will display:

```
<<-CPM2 Error!->>
Please  Restore
```

If some alarm messages cannot be sent to the CPM2 due to CPM2 error, the unit will display the oldest message which has not been manually acknowledged. The buzzer will beep and the alarm LED will flash to alert the operator. While this CPM2 error trouble condition exists, a manual acknowledge, by pressing the individual acknowledge button on the line card, is required to acknowledge the alarm in the queue and silence the line card buzzer. If several alarms have been received that cannot be sent to the CPM2, they will have to be acknowledged one by one until all have been processed and the buzzer is silenced. The printer alarm and the RS-232 messages for the computer are kept in memory until the buffer becomes full after storing 256. Once the buffer has been filled, the oldest messages will be overwritten by the newest. Once the CPM2 Error condition is corrected, the unsent printer and RS-232 alarm messages in the buffer will be sent to the CPM2. An arbitrary example:

```
L01  -001-  Fire!
AlmZn01     002
```

The number 002 in the bottom right corner of the display shows the number of alarm messages in the buffer which have not been acknowledged by the operator.

5.1.4 Diagnostic Aid (Debug) for DVL2A - CPM2 Data Transactions

This mode is used to trouble shoot (debug) communication problems on the common bus. This is the fourth priority. It will display the data transaction between the SG-DVL2A and the CPM2. The following is an example for when the unit is in standby:

```
01                  xx
                    FE
```

The SG-DVL2A ID# 01 received a polling code 01 from the CPM2 and it replies its ID complement FE. The xx is the transaction number. This value is increased by one for each data transaction. When it reaches FF, it restarts from 00.

If alarms occur when using the Diagnostic Aid the SG-DVL2A alarms will be passed on to the CPM2. The following is an example for when the unit is in alarm:

```
L01-001-Fire!
AlmZn10             yy
```

If the CPM2 receives the data from the SG-DVL2A, it will reply with the Checksum "yy" displayed at the bottom right of the LCD.

5.1.5 Keep Last Alarm Message

The SG-DVL2A has a user programmable option to keep the last alarm message on the display until the next signal is received (Option #04). This is the fifth priority. For example:

```
L01  -001-  FrTrl
AlmZn01     002
```

002 is the last alarm message number in the memory buffer.

5.1.6 Diagnostic Aid (Debug) for Data Transactions

This mode is used to trouble shoot (debug) communication problems on the network with a certain transmitter. This is the seventh priority (Option #17). It will display the data transaction between the receiver and the transmitters. It can also display a specific transmitter to view its transactions.

An example:

```
01   LL HH TTT
0101000001013F3F
```

The transmitter number 01 was polled by the line card and it replied with 8 data bytes, there are ID=01, OLD STATUS=00, NEW STATUS=01, FUNCT BYTE=3F. A message such as "L01 -001- FrTbl AlmZn57" will be displayed on the print-out. This mode is a powerful aid to verify the matching between the data received and the corresponding messages sent out to the printer or to the RS-232 serial port. It helps the central station to detect incorrect data received from a transmitter, which is causing repeated Incorrect Response troubles.

The LL is the Low Bit Duration (viewed directly from the DVACS compatible line), example 65 for 6.5ms. The HH is the High Duration. The ideal value should be 66 for 6.6ms or 150 baud. If the LL or HH duration is greater than 7.9ms or less than 5.4ms (20% distortion), a message will be generated in the error buffer.

The TTT number at the top right corner indicates the response time in milliseconds of the transmitter. This timing is set to 0 after the receiver polls an ID. It keeps incrementing this timer each ms until the start bit arrives. In the standard application, this value varies between 48 and 96 milliseconds. If you program the Option #0F greater than 32 (reply wait delay greater than 256ms), then this TTT value will be displayed in hexadecimal. So the values 48 and 96 will correspond to the HEX values displayed: 30 and 60 respectively.

5.1.7 Communication error messages

The sixth priority is communication error status display. If the unit detects one of the following errors, it will display it for 10 seconds on the screen, the TROUBLE LED turns "ON" and it requires an error buffer examine action from the operator to turn the TROUBLE LED off.

```
L01  -001-
PARITY ERROR
```

The following is a list of possible errors:

- **PARITY ERROR**: The even parity does not match when the receiver receives a character.
- **CHKSUM ERROR**: The transmitter replies with a long transmission of 6 or 8 bytes but the pairs of bytes do not all match well.
- **ALLCALL ERROR**: The transmitter replies with only one byte for all call commands and the number of repolling attempts is finished without successful communication.
- **OUT OF RANGE**: The transmitter replies with a valid long transmission of 6 or 8 bytes but its ID code is beyond the highest ID number being polled, as programmed in the SG-DVL2A (example the transmitter ID#0 or #F1 to #FF). In this case, the DVL2A sends a kissoff to this transmitter, it routes also this message to printer and to the computer via CPM2.
- **INVALID RPLY**: A reply of 3, 4, 5, 7 or over 8 bytes for a long transmission (Status Change).
- **BAD HI REPLY**: A reply with only 1 byte for an ID programmed in high security level.
- **BAD ID COMPL**: This message will only appear if the ID# Debug mode (Option #17) is selected and if a polling reply with 1 byte, but it does not match what is expected back from the ID polled.
- **BAD LO REPLY**: A reply of 2 bytes for an ID programmed in standard security level.
- **BAD STR SYNC**: A reply of a wrong synchronizing byte for a start of high level command.
- **INTERMITTANT**: This message will only appear if the ID# Debug mode (Option #17) is selected and if a reply of 2 invalid bytes for an ID. This means that an incorrect response was received and that subscriber's unit may have communication difficulties.
- **MARK TOO LONG, SPACE TOO SHORT**: When the DVACS compatible line has a distortion of greater than 20% (Bit duration less than 5.4ms or greater than 7.9ms).

5.1.8 Standby Mode

The last and lowest priority in the warning message modes is the standby mode. This mode occurs only if none of the 7 above modes is in effect. In this mode, it displays:

- Line card number.
- Number of subscribers to poll.
- Absent account numbers or present account numbers.

```
-L01-Scanning020
*Accnt Absent001
```

If the option "account absent report" is selected (Option #03 = 01), it will scan every 2 seconds on the display, the next account ID# from its record of accounts not responding to the line card.

Otherwise, if Option #03 = 00, it will display from its record of the accounts which are present.

```
-L01-Scanning020
Accnt  Present002
```

5.2. Line Card Menu Mode

When the unit is in standby mode, pressing [ACK] will display on the LCD:

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

Continuing to press [ACK] will scan from one menu item to the next. Pressing [SELECT] (SEL is the abreviation for the Select button.) allows you to select the menu item. Once selected, pressing both [ACK] and [SELECT] will exit from the menu. However, it also exits the menu if no key is pressed for 30 seconds. The principle menu items are:

- Display the printer alarm buffer.
- Display the error alarm buffer.
- Display the computer alarm buffer.
- Display the line card configuration.
- Display the program version.
- Adjust LCD contrast.
- Diagnostic Aid (Debug) for DVL2A - CPM2 Data Transactions.

5.2.1 Display The Printer Alarm Buffer

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

Pressing [SELECT], while at the "display printer alarm buffer" menu, will display the most recent alarm message on the LCD. Use [SELECT] now to move back to the previous messages or [ACK] to advance the messages.

```
L01  -001-  FrTrl
AlmZn01      255
```

The 255 on the bottom right is the message number in the buffer. The buffer can hold 256 printer alarm messages. The last message is displayed for 30 seconds if no other key is pressed. If you want to print out these messages, you can send a command to the line card, from the CPM2 keypad. See “System Command Mode” in the CPM2 section of your receiver manual, for more details. Press both [ACK] and [SELECT] to get out this mode.

5.2.2 Display The Communication Error Buffer

```
Dsp ERROR buffer
ACK:menu SEL:sel
```

Pressing [SELECT], while at the “display error alarm buffer” menu, will display the error status of transmitter (subscriber’s unit), which occured when it transmitted to the receiver. There are 256 error messages reserved for 240 transmitter ID numbers and invalid numbers. If no error occured, the messages “BUFFER IS EMPTY!” will be displayed and it exits this mode 5 seconds later. Viewing this mode will turn off the trouble LED if a communication error already occured. Use [SELECT] to scroll back to the previous messages or [ACK] to advance the messages. Press both [ACK] and [SELECT] to get out of this mode. See the communication error section for more details about error messages.

```
L01  -001-
PARITY ERROR  002
```

Once you have viewed the error messages for all the ID numbers in the buffer, we suggest that you obtain a printout of the error buffer by using the command LC-F9 on the CPM2 keypad. The F9 command prints the present/absent/ error report and then erases the error buffer once it is finished printing.

5.2.3 Display The Computer Alarm Buffer

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

Pressing [SELECT], while at the “display computer alarm buffer” menu, will display the most recent RS-232 serial port alarm message on the LCD. Use [ACK] to advance, or [SELECT] to scroll backwards, through the messages. Example:

```
L01 COM    255
1011 0001 A 01
```

Where 255 on the top right is the message number. Press both [ACK] and [SELECT] to get out this mode.

5.2.4 Display System Configuration Buffer

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

Pressing [SELECT], while at the “display line card configuration” menu, will display the current line card configuration options. Use [ACK] to advance or [SELECT] to scroll backwards through the line card configuration options. Example:

```
L01 CFG          00
HEX SELECT: 001
```

Where 00 on the top right is the option number. Press both [ACK] and [SELECT] to get out this mode.

5.2.5 Display Program Version Number

```
Dsp PROGRAM vers
ACK:menu SEL:sel
```

Pressing [SELECT], while at the “display program version number” menu, will display the date and program version number.

```
*SG-DVL2A DVACS*
*SEP-30-96  V2.01
```

Press both [ACK] and [SELECT] to get out this mode.

5.2.6. Adjust LCD display contrast

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

Pressing [SELECT], while at the “adjust LCD contrast” menu, will display the current LCD contrast setting. Press [ACK] to increase or [SELECT] to reduce the display contrast. The display will show the contrast level on the second line.

```
Adjust  CONTRAST

```

Press both [ACK] and [SELECT] to get out this mode.

5.2.7 Diagnostic Aid (Debug) for DVL2A - CPM2 Data Transactions

```
Debug: DVL2A-CPM2
ACK:menu SEL:sel
```

Pressing [SELECT], while at the “Diagnostic Aid (Debug) for DVL2A - CPM2 Data Transactions” menu, will display the Data Transactions between the Line Card and the CPM2.

Section 6: SG-DVL2A Programmable Features

6.1 Line Card Configuration Command: LC-F7-OP-CD

The command F7 is used to change certain configuration parameters in the line card. The format is "LC-F7-OP-CD" where LC is the line card number, OP is the option number and CD is the code or value (data) being programmed for this OP option number.

Example:

Changing the line card #01, Option #0F "REPLY(8ms): 032", data "032" to data "040" (40 decimal = 28 hex).

1. Press the "C" button on the CPM to access the command mode.

```
Enter PASS-ID
ÿÿÿÿ
```

The CPM's factory default Pass-id code is "C-A-F-E".

2. Once the valid Pass-ID code is entered, the display will show:

```
Lcard:__ Comd:__
Op:__ Cd:__ Sc__
```

3. Enter the desired changes:

Enter **Line Card** # *(01)* Enter **Command** # *(F7)*

```
Lcard:01 Comd:F7
Op:0F Cd:28 Sc__
```

Enter **Option** # *(0F)* Enter **Data** # *(28)*

4. Press [ESCAPE] to save the change to the line card configuration.
5. To view the new change, press the [ACK] button on the SG-DVL2A until the following message is displayed:

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

6. Press [SELECT] to view the system configuration. The display will show the first option #00:

```
L01 CFG      00
HEX SELECT: 001
```

7. Used the [ACK] button to advance or [SELECT] to scroll backwards through the option numbers. When you reach the option #0F, the display will now show:

```
L01 CFG      0F
REPLY(8mS): 040
```

6.2 Line Card Configuration Table

Option#	Description	Default (Dec)	Command
00	HEX SELECT	001	F7-00-XX
01	POLL 1-99	000	F7-01-XX
02	COM SELECT	001	F7-02-XX
03	ABSENT REP	001	F7-03-XX
04	LST MSG ON	000	F7-04-XX
05	MUTE BUZER	000	F7-05-XX
06	LIBRARY OP	001	F7-06-XX
07	EXT FORMAT	000	F7-07-XX
08	PRINTER OP	001	F7-08-XX
09	ALM ON SIX	001	F7-09-XX
0A	PARITY CHK	001	F7-0A-XX
0B	ID_CD POLL	032	F7-0B-XX
0C	ABSENT TRY	005	F7-0C-XX
0D	PRSENT TRY	005	F7-0D-XX
0E	STABLE(ms)	020	F7-0E-XX
0F	REPLY(8ms)	032	F7-0F-XX
10	<ACK> (ms)	080	F7-10-XX
11	CARR(50ms)	010	F7-11-XX
12	BUS ERROR	000	F7-12-XX
13	ID# FOR P1	032	F7-13-XX
14	FNT FOR P1	032	F7-14-XX
15	DEL PG1(s)	002	F7-15-XX
16	DEL PG2(s)	002	F7-16-XX
17	ID# DEBUG	000	F7-17-XX
18	LCARD NUMB	255	F7-18-XX
19	RCVER NUMB	001	F7-19-XX
1A	ERROR NUMB	020	F7-1A-XX
1B	ALLCALL OP	001	F7-1B-XX
1C	EQUIV LINE	000	F7-1C-XX

6.3 Options

00: Hexadecimal Option

A value different from 00 at this address will keep the transmitter ID in hexadecimal when it sends the alarm data to the printer or to the computer via CPM. However, if you program 00, the line card will convert the transmitter number from hexadecimal to decimal before sending the alarm message to the printer or to the RS-232 port. Which choice to make is determined by whether the Central Station Automation Software used can accept Hex Account codes. When it can process Hex account numbers, set this option to 01. For example, the transmitter number 0A (hex) (equivalent to 10 decimal) has an alarm:

If the hexadecimal option is selected:

- Sent to printer: L01 -00A- Fire! AlmZn#01
- Sent to computer: 1001 000A A 01

If hexadecimal option is not selected:

- Sent to printer: L01 -010- Fire! AlmZn#01
- Sent to computer: 1001 0010 A 01

The difference is that the line card converts the account number from hexadecimal 00A to decimal 010.

01: Polling from 01 to 99

A value different from 00 at this address will cause the line card to poll only the transmitters with decimal numbers. That means it skips over the hexadecimal transmitter ID numbers such as 0A, 0B ... 0F. A maximum of 99 distinct transmitter ID numbers can be polled this way. This is the recommended choice.

On the other hand, if you program 00 at this location, a maximum 240 transmitter ID numbers (01-F0 in Hex) will be polled by the line card. This choice should only be used if it is necessary to connect more than 99 transmitters to one line card. This choice in combination with option 00 set to "00", will require using Hex numbers for commands cross referenced to decimal numbers sent to the printer and computer.

02: Com Select — Choice of Sending Signals for Central Station Software

If the receiver is not used with a central station automation software package and computer, program "00" at this address. Otherwise, for a value different from 00, the line card will send data to the computer, via the CPM.

03: Transmitter Absent/Present for Diagnostics Report

If you program 01 at this address, the line card display will scroll through the record of transmitters not responding to it (absent), each 2 seconds in stand-by mode. Otherwise, if you program 00, the line card will display all the present transmitters. The status report or 24 hours transmitter present/absent test command will be performed by considering this option. An example follows of what is displayed on the LCD when the line card is in the stand-by mode and the transmitter absent choice is selected:

```
-L01-Scanning020
*Accnt Absent001
```

and the 24 hours report test displayed to the printer:

L01 ABS 002 003 004 005

L01 ABS 013 --- --- ---

Under normal circumstances the number of ID's present is greater than the number absent. The Absent Report is sent by default since it is normally the shorter of the 2 reports. If this is not the case with your central, then program "00" for the Present Report.

04: Last Message ON

This option, when enabled, will "freeze" the last alarm message on the line card LCD, until a new status change signal is received. Program a value of "01" to enable this feature or "00" to disable it. If disabled, the LCD will show the stand-by message described in section 1.6, once communication has ended. The following example (Fire Trouble, Alarm on Zone #01) shows the type of message that will stay on the display when this option is selected:

```
L01 -001- FrTrb
AlmZn01   255
```

05: Mute Buzzer

A value different from 00 at this address will shut down the line card buzzer. (Not recommended for normal applications.) However, the alarm LED continues flashing if an alarm occurred and the line card was unsuccessful in sending it to the CPM. Program a value of "01" to enable this feature or "00" to disable it.

06: Library Option

A value different from 01 at this address will bypass the plain language such as alarm, restore, opening, etc., messages. Program a value of "00" to have no plain language messages from the "Library" of key words, or "01" to print using the library.

07: Extended Format Option

The SG-DV1660LC software versions 3.00 and greater can support the group arm/disarm option. If a value different from 00 is in this address, the line card will poll the subscriber's control unit repeatedly to get the transmitter group number arm/disarm status change and the user number. It will then combine this information together before sending it to the computer. This allows some recently updated automation software to keep track of which partitions are armed or disarmed. Program a value of "01" to enable this feature or "00" to disable it. Following is an example of what will be output if this option is enabled:

- Sent to printer: L01 -012- Grp 1 Arming!B4
  L01 -012- Grp 2 Arming!B5
  L01 -012- Close User# 01
- Sent to computer: 1011 0012 C1 01
  1011 0012 C2 01

08: Sending for the Printer to the CPM2

If the receiver is used with a central station automation software package and no printer is selected, program "00" at this address. It will avoid sending data to the printer, via the CPM2. This option will reduce the delay in sending the alarm reports to the computer in the case of the CPM1. Otherwise, for a value different from 00, the line card will send data to the printer, via the CPM2.

09: Enable 6 Bytes as a Valid Alarm

Certain transmitters may send 6 bytes, instead of 8, as an abbreviated alarm message for the first 8 zones. This option is changed only for special applications to disable the receiving of 6 bytes alarms. The default value is 01 and should only be changed after consulting Sur-Gard technical support.

0A: Parity Check Option

The option #0A is used to enable/disable the parity check for each byte received: Sometimes the DVACS compatible network has poor communication, with early model control panels (DV31 and DV33), and the receiver will get many messages such as "PARITY ERROR". In this case, you can disable this option temporarily by programming 00, to help alarm receiving. The default is 01 to enable this option. It is not recommended to turn off this option in normal communication.

0B: Number of Transmitters Polled by the Line Card

This location shows the highest transmitter ID number which will be polled by the receiver. Program a number in hexadecimal from the CPM and the line card will convert it to the decimal equivalent before displaying it on the LCD. The unit does not accept a value programmed as 00 or a number bigger than F0. (due to the limit of 240 transmitters). For a faster communication with the ID's, we suggest that

you use ID numbers in order (one after another, no spaces between them). The default number of transmitters polled is 32.

0C: Number of Repolls to the Same ID# When this ID was Absent and Now Replies

This location shows the number of times the line card has to successfully repoll a previously absent transmitter, before recognizing this ID as restored. The default value is 5.

0D: Number of Repolls to the Same ID# When this ID was Absent and Now Does Not Reply

This location shows the number of times the line card has to unsuccessfully repoll a previously present transmitter, before recognizing this ID as absent (Incorrect Response). The default value is 5.

0E: Stable Delay (ms)

Before polling a transmitter, the receiver will check that the line is free for a time equal to this programmed value in milliseconds. The default value is 20ms.

0F: Reply Wait Delay (x8ms)

After polling a transmitter, the receiver will wait for its reply. If the delay time programmed at this location has elapsed and the transmitter does not respond then the receiver polls again. To get the actual delay, you have to multiply the value displayed at this location by 8. So, a maximum 255x8=2040ms (FF in Hex) can be programmed and the minimum delay should be 20*8=160 ms. The default value is 32 for 256 milliseconds delay.

10: Reply <ACK> Delay (ms)

When the line card receives a valid long transmission code from a transmitter, it will send it a kissoff to confirm the valid data received. But before sending kissoff, it will wait for the end of the delay time programmed at this location. This delay is also the wait time in ms between each character (byte) of data received. In other words, if a start bit for another character is not detected by the end of this time, the line card assumes the transmission has ended, and processes the data received. The default delay is 100ms.

11: Carrier Lost Delay (x50ms)

The receiver monitors continuously the carrier from the leased phone line (Master Leg). When the carrier is lost, the CARRIER LOST LED turns on. If the carrier is lost for the time programmed at this location (in multiples of 50ms), the TROUBLE LED will turn “ON”. The line card stops polling the transmitters, and the line cut messages will be sent to the printer, to the RS-232 port and to the display. You can program a maximum delay of 255x50ms=12.75 seconds, for carrier loss delay detect. This option is selected to avoid sending a flood of unwanted data, such as “Transmitter Incorrect Response” to the computer and to the printer. You can disable the carrier detect option by programming “00” at this location. The default is 10 for 500 ms delay. A SG-DML2A backplane board is required to use this Option. If you don’t have one, program 00 to enable the polling.

12: Bus Error

This indicates the performance of the communication between the line card and CPM2. It should be 00 over a short test period, but if a missed communication, requiring a repeat, occurred, this value will be increased by one each time, up to a maximum of 255 and then reset to 0. This happens if you set 2 or more line cards as the same number, for example.

13: Transmitter and ID Number to Activate Program Output #1

There are 2 programmable outputs on each SG-DVL2A line card. The programmable output #1 will be activated if the receiver detects an alarm coming from the transmitter number which matches with the value programmed at this location. The activation delay in seconds may be selected at Option #15. The default value is 20 in hex.

14: Function Byte Number to Activat Program Output #2

The programmable output #2 will be activated if it receives an alarm message in which the function byte matches with the value programmed at this location. This means that an alarm of a specific type and/or group of 8 zones has been received. The activation delay in seconds may be selected at Option #16. The default value is 20 (Fire Function Byte) in hex.

15: Activation Delay in Seconds for Program Output #1

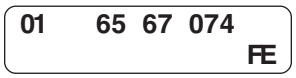
The activation delay for programmable output #1. A value 01 to 255 seconds can be selected. A value of "00" will bypass the program output #1. The default value is "02" for 2 seconds.

16: Activation Delay in Seconds for Program Output #2

The activation delay for programmable output #2. A value 01 to 255 seconds can be selected. A value of "00" will bypass the program output #1. The default value is "02" for 2 seconds.

17: Transmitter ID to Debug

This location contains the transmitter ID number to be monitored for diagnostic help. Program an ID code number in hexadecimal in this location. This will allow you to check on the LCD the data transmit and received over the network concerning this ID. A value of 255 (FF in hex) will display the transactions of the entire network. Enter the value “00” to turn off this option when finished using this special mode. An example if this option is selected:



See section 1.6, on page 5, for more information.

18: Line Card Number

The Line Card number is a unique ID code for the SG-DVL2A. Since the CPM can be linked to a maximum of 14 line cards, it is very important to keep a unique ID code for each of the SG-DVL2A line cards. A hexadecimal number, from “01” to “0E”, can be used for this option. The default is set to FF so as not to conflict when the line card is first installed.

19: Receiver Number

The receiver number is used for sending signals to the central station software. This number should be the same as other DVL2/DVL2A or DRL2/DRL2A line cards connected to the same CPM module. Refer to your central station automation software manual, and check the numbers already used for any other receivers, to select this number. The default is 01.

1A: Error Number

This option allows the operator to program the number of errors to be printed on the night Present/Absent report. The

default is set to 20. If the number of errors occurring are less than the number set in this option, these errors will be printed. If more than the programmed number of errors has occurred, the error buffer will be cleared and these errors will not be printed.

The report will also include a printout showing each kind of error, and the number of times it occurred.

New error definition:

INTERMITTENT: This error indicates panels which have had difficulties communicating with the receiver. This error will only show up when the receiver is in "debug" mode.

Eg.
Tx receiver: 01 02 03 04 05 05 06 07 08 08 09 ...
Rx receiver: FE FD FC FB __ FA F9 F8 __ __ F7 F6

where "__" means the panel does not reply to polling, or replies with an invalid response.

The error buffer will show: 005 INTERMITTENT 01
008 INTERMITTENT 02

which means that transmitter #005 received 1 INTERMITTENT reply and transmitter #008 received 2 INTERMITTENT replies.

1B: All Call Op

This option allows the selection of the polling all-call command (FA, FB).

01 = all-call selected (default)
00 = disable sending all-call command over the DVACS network.

1C: Equivalent Line

This option is used to simulate a physical line card number, and/or to get the receiver number printed with the line number. Information printed and/or sent to computer will indicate that the information was received on the line number programmed at this option. The receiver number does not change. Program 00 at option [1C] or a number from 01 to 0E.

Examples:

[1C] = 00; no equivalent line number

The print out will be L0Z-AAA

Where Z = physical line number
AAA = account number

Eg. If the receiver number is 02 and the line number is 3, the printer message will be "L03-234..." and the computer message will be 1023ssssss234.

[1C] = 0X; equivalent line number is X

The printout will be LRE-AAA

Where R = receiver number (option 19)
x = equivalent line number
AAA = account number

Eg. If receiver number is 02 and the physical line number is 3: the printer message will be "L21-234..." and the computer message will be: 1021ssssss234.

[1C] = 1; equivalent line number is 1, and receiver number is greater than 0F.

The printout will be RRX-AAA

Where RR = receiver number (option 19)
x = equivalent line number

If receiver number is 12 and the line number is 3, the printer message will be "121-234..." and the computer message will be: 1121ssssss234.

6.2 Dump Internal Buffer command: LC-FA-XX-XX

The "FA" command is used to dump a part of the internal line card buffer to the printer or to the computer. The quantity of messages to be printed is entered as a HEX number.

Example: 20 gives 32 messages.
30 gives 48 messages...

The "21:24-08/10/92", shown in the examples below, is the time and date at the time of the dump. Please note that the original time and date can be obtained by dumping the CPM buffer, instead. (see the "CPM" section in the receiver manual for more information).

6.4.1 Dump XX alarm type printer messages to the printer: LC-FA-01-XX

Dump the XX number of printer alarm messages from the line card to the CPM's printer. XX should be a number 01 to FE in Hex for a maximum 254 messages. The result will look like:

L01 *001* Burgl AlmZn01
L01 *002* IDcde Restore

6.4.2 Dump XX alarm type computer messages to the printer: LC-FA-02-XX

Dump the XX number of computer alarm messages from the line card to the CPM's printer. XX should be a number from 01 to FE in Hex. The result will look like:

L01 COM 1011 0001 A 01
L01 COM 1011 0002 A 0A

6.4.3 Dump "IDs in high level" list to the printer: LC-FA-03-03

Dump the list of subscriber's units, polled by this line card, which transmit in high security level. The result will look like:

L01 HLV 002 003 004 005
L01 HLV 006 009 --- ---

6.4.4 Dump the line card configuration to the printer: LC-FA-04-04

Print the line card configuration for verification and future reference. See line card configuration table in section #1 "Line Card Configuration table" for more information.

L01 CFG HEX SELECT: 001

L01 CFG POLL 1-99 : 000

6.4.5 Dump the reception errors buffer to printer: LC-FA-05-05

If no errors are stored in the line card buffer, the receiver will ignore this command. Otherwise, it will send the whole error alarm buffer to the CPM's printer. After the error buffer is dumped, it will automatically be erased. See section #1 "Communication error messages" for more information.

L01 -001- PARITY ERROR

L01 -002- BAD ID COMPL

6.4.6 Dump computer alarm messages to the RS-232 port: LC-FA-06-XX

Dump the XX number of computer alarm messages from the line card to the computer. XX should be a number from 01 to FE in hex for a maximum 254 messages.

6.5 24 Hours ID Absent/Present Report Command: LC-F9-XX-XX

The command format is LC-F9-XX-XX where XX is "don't care", no entry of data required for those fields. You can press [ESCAPE] after entering [F9]. Depending on the absent/present report option programmed at Option #03, the line card will send the following messages to the printer, for example:

L01 ABS 002 003 004 005

L01 ABS 013 --- --- ---

or

L01 PRS 001 007 008 010

L01 PRS 011 --- --- ---

The CPM will perform this command automatically each 24 hours to test the ID absent/present. During the test, if the SG-DVL2A detects any kind of communication error such as parity error, checksum error, high distortion... The SG-DVL2A will send these messages to the printer and then turn off the TROUBLE LED if it is on. After sending the messages successfully to the printer, the CPM will erase all the error buffer messages and be ready for the next 24 hour test.

6.6 Halt Line Card Communication with the CPM (Shutdown): LC-FB-XX-XX

Where XX = don't care. You can press [ESCAPE] after entering "FB". This command will shut down the line card number entered in the LCard position of this command. The CPM will advise the line card shut down to the printer and to the computer. The following warning message will be displayed on the line card LCD:

LnCard Shutdown!
Please Restore

6.7 Line Card Reactivate Command: LC-FC-XX-XX

Where XX = don't care. This command will re-establish the line card in communication with CPM.

6.8 Access to Line Card Internal Buffer Command: LC-FE-XX-XX

The "FE" command is used to access the line card internal buffers, as described below:

6.8.1 Erase alarm printer/computer/error buffer command: LC-FE-00-00

Be sure that you have a copy of the alarm buffer for printer and computer before sending this command. It will erase the 256 printer alarms and the 256 computer alarms and the error buffer, in the line card memory. It also erases the bus error and the communication error buffers.

6.8.2 Erase bus error and communication error buffer command: LC-FE-01-01

This command will reset the bus error counter and clear the communication error buffer in the line card. You can also erase the bus error with the command LC-F7-12-00.

6.8.3 Software reset command: LC-FE-02-02

This command will stop the watch dog timer output, to force the line card to do a reset.

6.8.4 Save current to backup configuration command: LC-FE-03-03

When you change the parameters in the configuration field, it effects immediately the line card processing. This is the current or active configuration. Once you are satisfied with the results, you can send this command to store the current configuration to the backup configuration. This backup might be used in the future in case temporary changes were made and then you want to reload your standards, using the command below.

6.8.5 Load the backup and install it in the active configuration command: LC-FE-04-04

If you wish to try different program configurations, this command can be used afterwards to return the line card to your original operation.

6.9 Command Description for Transmitters

The command bytes are split into two nibbles. Generally, the first digit (most significant digit) specifies the type of command and the second nibble indicates which control point is to execute the command. The command bytes starting with a digit from "0" to "9" are used as follow:

0X : Remote arm, where:
- X=1 For group A or the unit if not divided in groups.
- X=2 For group B.
- X=3 For group C.
- X=4 For group D.
- X=5 To arm all groups (DV1660).

1X : Remote disarm, where X describes as above.

2X : Future use.

3X : Future use.

4X : Future use.

5X : Restore inhibit of zone "X" (zone 1 to 15).

6X-8X : Restore inhibit of zone 16 and up (future).

90 : Stop of high level command.

91 : Start of high level command.

92-9F : Future use.

The command bytes starting with "A" to "E" as the first nibble, are used for Remote Control Point Output Commands. They have been assigned as follows:

AX : Turn on the point X.

BX : Turn off (stop) the point X.

CX : Turn on for 1 second (pulse) the point X.

DX : Flash the point X for 2 seconds on, 2 seconds off until a command is received to stop (BX).

EX : Flash the specified point X for 0.1 second on, 10 seconds off until a command is received to stop (BX).

F0 : Future use.

F1 : Status report from the transmitter.

F2 : Send a kiss off to a transmitter.

F3 : Shut off a transmitter.

F4 : Re-activate a transmitter.

F5 : Outputs and command status from transmitter.

F6 : Clear restore inhibit.

6.9.1 System status command [F1]

The command [F1] is used to request a status report from one or more subscriber's units. The transmitter will reply in the following format:

IDCODE OLDSTATUS NEWSTATUS ARMED-STATUS

Depending on the reply data, you will receive a message similar to the following:

L01 -001- Fnt AA 02000000 14:10-09/10/92 (1)

or

L01 -002-G4 GN__3_ GA_2__ 14:10-09/10/92 (2)

In the example (1) above, the transmitter #001 is armed (Fnt AA for arming, or DD for disarming) and there is a zone #2 which is now open.

The example (2) is applies to SG-DV1660LC subscriber's units, software version 3.0 and up. The transmitter #002 has 4 groups, otherwise called "partitions", in service (G4). The group not ready to arm is 3 (GN__3_) and the group #2 is now armed (GA_2__)

· Sent to computer: Nothing, this output is only sent to the printer.

6.9.2 Output status request command [F5]

The command [F5] is used to request the outputs status from one or more subscriber's units. The transmitter will reply in the following format:

For the SG-DV1660LC, software version 3.0 and up, you will receive a message similar the following:

L01 -001-INH___4 B_____ 14:10-09/10/92 (1)

L02 -002-INH_2__ BS12Z___ 14:10-09/10/92 (2)

That means the transmitter #001 has group #4 with at least one zone having restore inhibit (INH___4) and the BELL output is now activated (B_____)

Depending on the position of the transmitter output status characters, the meaning would be:

"BS12Z12Z", B:Bell on, S:Transmitter shut down by receiver, 1:Program output#1 is on, 2:Program output#2 is on, Z:Buzzer is on, 1:Program output#1 is flashing, 2:Program output#2 is flashing and Z:Buzzer output is flashing.

Since outputs cannot be both on steady and flashing at the same time, some of the positions would actually have to be "_" for "off".

· Sent to computer: Nothing, this output is only sent to the printer.

6.9.3 Start of high level command [91]

The command [91] is used to switch a compatible subscriber's unit to high security level. This level is supported only by the SG-DV1660LC version 3.0 and up, and SG-DV7B version 4.1 and up. If the transmitter does not have this capability, the following message will be printed:

L01 -001- IDcde NOHISEL

· Sent to computer: 1011 0001 T 0D

Otherwise, 2 messages will be printed:

L01 -001- IDcde HILEVEL

L01 -001- IDcde RESYNCH

· Sent to computer: 1011 0001 A 0B

1011 0001 R 0C

and this transmitter is now in high level.

6.9.4 Stop of high level command [90]

The command [90] is used to switch the transmitter from high security level to low security level. If this transmitter was previously in high level, this command will generate these messages:

L01 -001- IDcde DESYNCH

L01 -001- IDcde LWLEVEL

· Sent to computer: 1011 0001 A 0C

1011 0001 R 0B

6.10 Command Description for Line Card

F7 : Access the line card configuration (see SG-DVL2A Programmable Features section 1.0 for more details).

F8 : Future use.

F9 : 24 hours status report test (see SG-DVL2A Programmable Features section 3.0 for more details).

FA : Dump to printer command (see SG-DVL2A Programmable Features section 2.0 for more details).

FB : Shut down a line card (see SG-DVL2A Programmable Features section 4.0 for more details).

FC : Reactivate a line card (see SG-DVL2A Programmable Features section 5.0 for more details).

FD : Reserved.

FE : Access to line card internal buffer (see SG-DVL2A Programmable Features section 6.0 for more details).

FF : Reserved.

Section 7: 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.

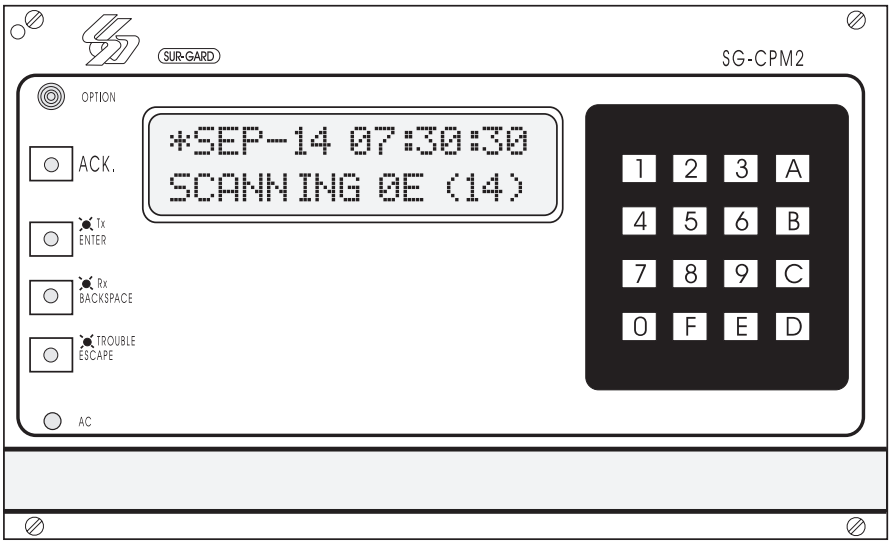
7.1 General Information

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.

7.2 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

7.3 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.

7.4 CPM2 Operating Mode

CPM2 Cold Start-up

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

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

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. Re-install 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. Re-install 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.

7.5 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.

7.6 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.

7.7 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 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

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 Stand-by 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 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: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
*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].

7.8 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 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!>
```

Stand-By Mode Message

During normal stand-by operation, this message will be displayed:

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

7.9 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 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 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 re-enter 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 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 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 re-enter 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 re-enter 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.

7.10 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

8.1 Protocols

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

8.1.1 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.

8.1.2 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.

8.1.3 Basic Signal Protocol:

1RRLssssAAAAAAsXGYYY[DC4]

Where,	1	: Protocol number.
	RR	: Receiver number.
	L	: Line number.
	s	: Space Character.
	AAAAAA	: Account Code, usually 3 digits with 3 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.

EVENT CODE TABLE

0	Automatic Test	A	Alarm
1	Fire Alarm	B	Bypass
2	Panic Alarm	C	Arming by User #
3	Burglary Alarm	F	Auxiliary
4	Arming by User #	H	Unbypass
5	Disarming by User #	O	Disarming by User #
6	Service	R	Restore
7	Medical Emergency	T	Trouble
8	Message	Z	Common Event Code
9	Restore	20(H)	Common Event Code Space Character

The "Space" character (20 Hex) can be used in case the automation software package combines the event code with the zone code, conflicting with the existing account code data base.

When the O/C signals are transmitted by Groups with the user number included, the “G” code, currently from 1-F, will be in effect to show the Group number, including the proceeding Event Code O or C, as well as the User number at the “YYY” position. The computer may then redirect this signal when necessary.

Example: The panel 012 is partially armed on Group #1 and Group #2 by user #128. The Sur-Gard receiver will send following messages to the computer:

1RRLsssssss012sC1128[DC4]

1RRLsssssss012sC2128[DC4]

The computer software could probably redirect these signals to a programmable sub-account, in which an o/c schedule for users can be available.

The user report codes on Sur-Gard receiver can be decimal or hexadecimal digits.

8.1.4 Supervisory Heartbeat Signal Protocol:

1011sssssssssss@ssss[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.

8.1.5 SIA Protocol 1:

3RRLssssAAAAAAXXYYYY[DC4]

Where,	3	: Protocol number.
	RR	: Receiver number.
	L	: Line number.
	ssss	: Spaces.
	AAAAAA	: Six digit account codes. Leading spaces will be sent if account codes are less than six digits
	XX	: Event code, follows the SIA “Event Block Data Code Definitions”.
	YYYY	: Zone codes. Trailing spaces will be sent if zone codes are less than four digits.

8.1.6 Clock Signal Protocol:

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

3RRLssssAAAAAAXXYYYYHH: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.
- Microkey Central-1
- ABM
- Alarm Soft
- Apropos STA

8.2 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 = 5µs (microseconds)
7001-7002	3E80	Delay time 0.25ms to resend message to COM1 if heartbeat is not selected. Default = 16000 x 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.

Section 9: Trouble Shooting

Problem: The receiver does not transmit; the Tx LED is “OFF”.
Solution: Check if the cable to the modem is installed correctly. You need a SG-DLM2A board in the rear of the card cage to enable the carrier present signal to be passed to the SG-DVL2A line cards. If you don’t have a SG-DLM2A, order one from your distributor. To temporarily bypass the problem, you can disable software carrier detect with the option [11] by programming “00” at this location.

Problem: The TROUBLE LED is “ON” and no internal trouble such as “CPM error”, “Line Fault” occurred.
Solution: There was an error in communication. Press [ACK] then select “Dsp ERROR buffer” to view the status of transmitter in error communication. The TROUBLE LED will turn “OFF” when you enter to this error buffer. If the TROUBLE LED is still "ON", enable the Debug mode (Option #17) and use the Diagnostic Aid to view the data transactions.

Problem: The warning message “BAD ID COMPL” shows on the LCD sometimes.
Solution: Increase the reply wait delay with the option [0F].

Problem: A lot of “PARITY ERROR” or "HI DISTORTION" warning messages show on the LCD.
Solution: There is a problem with the network. Call BELL for service or disable Option #0A.

Problem: The warning message “OUT OF RANGE” shows in the error buffer.
Solution: The receiver received a valid alarm from a transmitter responding to an All call command, but this transmitter is out of the range of polling of the line card. For example, ID number 24 is installed, but you are only polling up to 20. Increase the ID_CD POLL option [0B] to cover this transmitter number. Be sure not to program a transmitter ID number as 00 or a number bigger than F0.

Problem: The warning message “CHECKSUM ERROR” shows in the error buffer.
Solution: The transmitter sent a long transmission (status change) of 6 or 8 bytes but one of the pairs of bytes didn’t match well. Select this transmitter ID number in debug mode (program Option #17 with the transmitter number in trouble) and check the 6 or 8 bytes received in long transmission. Check which is the pair of bytes not matched. There is likely a problem with the transmitter, or the network modifying a byte.

Problem: The system configuration was changed to some undesired setting.
Solution: You need to load your backup configuration. See SG-DVL2A Programmable Features, section 6.5 for more information. If you haven’t saved your configuration, then you must perform a “COLD BOOT” operation, to reset to the default system configuration. See the Cold Boot section for more information.

Problem: Information to the CPM printer is missed.
Solution: Verify that you have 2 or more line cards set as the same line card ID number, or check that Option #08 is set to "01".

Problem: The line card does a reset every 8 seconds.
Solution: You should do a cold boot. See Cold Boot section for more details.

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 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 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 A: 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 B: Signals Received for Subscriber Controls with Standard Programming

SG-DV7B

Zone on Panel	Alarm/Restore	Zone on RS-232
Aux	[A/R]	01
Panic (PC)	[A/R]	02
Instant (A)	[A/R]	03
Delay/Instant (D)	[A/R]	04
Delay (B)	[A/R]	05
24 hrs (C)	[A/R]	06
Local Tamper (LT)	[A/R]	07
Low Batt	[A/R]	08
Key Switch (MR) Usr#1	[O/C]	01

SG-DV7F (SG-DV7F-2)

Zone on Panel	Alarm/Restore	Zone on RS-232
Fire Alarm (A1)	[A/R]	01
Fire Alarm (A2)	[A/R]	02
Circuit Trouble (A1)	[A/R]	03
Circuit Trouble (A2)	[A/R]	04
Supervisory (S1)	[A/R]	05
Supervisory (S2)	[A/R]	06
Supervisory (S3) (DV7F-2 ONLY)	[A/R]	07
Supervisory (S4) (DV7F-2 ONLY)	[A/R]	08
AC Fail	[A/R]	07
Low Batt	[A/R]	08
AC Fail (DV7F-2 ONLY)	[A/R]	09
Low Batt (DV7F-2 ONLY)	[A/R]	10

SG-DV7T

Zone on Transmitter	Alarm/Restore	Zone on RS-232
Zone 1 (Instant(A))	[A/R]	01
Zone 2 (Delay(B))	[A/R]	02
Zone 3 (24 hrs(C))	[A/R]	03
Zone 4 (Del/Inst(D))	[A/R]	04
Zone 5 (Aux)	[A/R]	05
Zone 6 (PC)	[A/R]	06
Zone 7 (LT)	[A/R]	07
Low Batt	[A/R]	08
Key Switch (MR) Usr#1	[O/C]	01

SG-DV8000

Zone on Panel	Alarm/Restore	Zone on RS-232
Zn #01 to #08	[A/R]	01-08
Zone trouble Zn#01 to #07	[A/R]	09-15
Usr. Mesg.#1 to 32	[A/R]	A0-AF
Fire Zone Alarm	[A/R]	B0
Aux Inp	[A/R]	C8
Trbl on Fire Zone	[A/R]	D8
AC Cut	[A/R]	D9
Siren Cut / Blown Fuse	[A/R]	DA
Low Batt	[A/R]	DB
Keypad Fire	[A/R]	E8
Keypad Panic	[A/R]	E9
Keypad Medical	[A/R]	EA
Duress	[A/R]	EC
Invalid Entry Code	[A/R]	ED
Alarm on Exit	[A]	E1
EEProm Failure	[A/R]	93
Fail to arm schedule 1	[A/R]	DD
Fail to arm schedule 1	[A/R]	DE
Fail to arm schedule 1	[A/R]	DF
Ground Fault	[A/R]	92
Cancel Alarm	[A/R]	E2
Start/Stop test mode	[A/R]	6C
Open/Close User #1-8	[O/C]	01-08
Open/Close Group #1-4	[O/C]	A5-A8
Bypass/Unbypass Zn#1-08	[B/H]	01-08

SG-DVT-DSC / SG-DVCOM

Zone on Transmitter	Alarm/Restore	Zone on RS-232
Zn#1-4	[A/R]	01-04
Zn#5	[A/R]	05[1]
Zn#6	[A/R]	06[1]
Zn#5-8	[A/R]	05[2]
Zn#9-16	[A/R]	06[3]
Aux	[A/R]	07
Panel wiring fault	[A/R]	08
Keypad Panic	[A/R]	09
Keypad Emergency	[A/R]	10
Keypad Fire	[A/R]	11
Fire Alrm	[A/R]	12
Trouble	[A/R]	13
ByPass	[A/R]	14
Low Batt	[A/R]	15
Pgm Out	[A/R]	16
O/C Partition A	[O/C]	01
O/C Partition B	[O/C]	02

Notes: 1. PC1500/PC1550 only
2. PC2500/PC2525/PC2550/PC3000 only
3. PC3000 only

SG-DV1660 (&F)

Zone on panel	Alarm/Restore	Zone on RS-232
ZN #1 to #16	[A/R]	01-16
Usr. Mesg.#1 to 32	[A/R]	A0-AF
Fire Zone A1	[A/R]	B0
Fire Sup. Zone S1	[A/R]	C0
Aux Inp	[A/R]	C8
Fire Sup. Zone S2	[A/R]	D0
Trbl on A1 Zone	[A/R]	D8
AC Cut	[A/R]	D9
Bell Cut / Blown Fuse	[A/R]	DA
Low Batt	[A/R]	DB
Keypad Fire	[A/R]	E8
Keypad Panic	[A/R]	E9
Keypad Medical	[A/R]	EA
Duress	[A/R]	EC
Invalid Entry Code	[A/R]	ED
Open/Close Usr#1-64	[O/C]	01-64
Bypass/Unbypass Zn#1-16	[B/H]	01-16
(FOR CALCULATE BYPASS SYSTEM OPTION #2 (2nd OPTION) SELECTED)		
Bypass/Unbypass Zn#1-16 *	[A/R]	80-AF
(FOR CALCULATE BYPASS SYSTEM OPTION #2 (2nd OPTION) **NOT SELECTED)**		

***Factory Default**

SG-DV1660LC (&FLC)

Zone on panel	Alarm/Restore	Zone on RS-232
Zn #1 to #64	[A/R]	01-64
Usr. Mesg.#1 to 32	[A/R]	A0-AF
Fire Zone A1	[A/R]	B0
Fire Sup. Zone S1	[A/R]	C0
Aux Inp	[A/R]	C8
Fire Sup. Zone S2	[A/R]	D0
Trbl on A1 Zone	[A/R]	D8
AC Cut	[A/R]	D9
Bell Cut / Blown Fuse	[A/R]	DA
Low Batt	[A/R]	DB
Keypad Fire	[A/R]	E8
Keypad Panic	[A/R]	E9
Keypad Medical	[A/R]	EA
Duress	[A/R]	EC
(FOR DV1660LC VERSION 2.4 AND EARLIER)		
Invalid Entry Code	[A/R]	ED
Alarm on Exit	[A]	99
(FOR DV1660LC VERSION 3.0 AND UP)		
Open/Close User #1-128	[O/C]	01-99, B0-B9, C0-C9, D0-D8 ❶
Open/Close Group #1-4	[O/C]	A5-A8
Bypass/Unbypass Zn#1-64	[B/H]	01-64
(FOR CALCULATE BYPASS SYSTEM OPTION #10 SELECTED IN VERSION 2.4 AND EARLIER) ❷❸		

Default Bypass/Unbypass Codes for v2.4 and earlier

Bypass/Unbypass Zn#1-32	[A/R]	80-9F
Bypass/Unbypass Zn#33-56	[A/R]	68-7F
Bypass/Unbypass Zn#57-64	[A/R]	E0-E7

❶ User numbers 1-99 are reported in decimal, while user numbers 100-128 are reported in Hexadecimal, starting from B0-B9, C0-C9, and D0-D8.

❷ For SG-DV1660LC version 3.0 and up: The calculate bypass report code is now a standard feature and the installer no longer has the option of choosing his own codes.

❸ For SG-DV1660LC version 4.01 and up: The calculate bypass report code is still standard, but the installer has the option of programming EPROM Address [5EDB] with "01", to use the default Bypass/Unbypass codes from version 2.4 and earlier.

Notes:

- Code [A/R] 0A from any transmitter on the RS232 represents an incorrect response.
- This sheet is only valid for transmitters and control panels that have been programmed for automated Central Stations using factory defaults!
- If the letters B/H are unusable by your software, then change them to other letters which do not conflict with pre-existing codes.

PC5400 (PC5010) Extended DVACS Default Programming

ALARMS:

Event Description	Real Zone #	SIA Message
Zone 01 - 32 Alm/RstDefinition Dependent		
Delay		BA0zz / BH0zz
Instant		BA0zz / BH0zz
Interior		BA0zz / BH0zz
Interior Home-Away		BA0zz / BH0zz
Delay Home-Away		BA0zz / BH0zz
Delayed 24-Hr Fire		FA0zz / FH0zz
Standard 24-Hr Fire		FA0zz / FH0zz
24-Hr Supervisory Links		UA0zz / UH0zz
24-Hr Supervisory Buzzer		UA0zz / UH0zz
24-Hr Burglary		BA0zz / BH0zz
24-Hr Hold up		HA0zz / HH0zz
24-Hr Gas		GA0zz / GH0zz
24-Hr Heat		KA0zz / KH0zz
24-Hr Medical		MA0zz / MH0zz
24-Hr Panic		PA0zz / PH0zz
24-Hr Emergency		QA0zz / QH0zz
24-Hr Sprinkler		SA0zz / SH0zz
24-Hr Water		WA0zz / WH0zz
24-Hr Freeze		ZA0zz / ZH0zz
24-Hr Latching Tamper		TA0zz / TR0zz
Duress	99	HA099
Keypad Fire Alm/Rst	99	FA099
Keypad Aux. Alm/Rst	99	MA099
Keypad Panic Alm/Rst	99	PA099
2-Wire Smoke Alm/Rst	33	FA033 / FH033

BYPASSES:

Event Description	SIA Message
Zone 01 - 32 BypassDefinition Dependent	
Delay	BB0zz
Instant	BB0zz
Interior	BB0zz
Interior Home-Away	BB0zz
Delay Home-Away	BB0zz
Delayed 24-Hr Fire	FB0zz
Standard 24-Hr Fire	FB0zz
24-Hr Supervisory Links	UB0zz
24-Hr Supervisory Buzzer	UB0zz
24-Hr Burglary	BB0zz
24-Hr Hold up	HB0zz
24-Hr Gas	GB0zz
24-Hr Heat	KB0zz
24-Hr Medical	MB0zz
24-Hr Panic	PB0zz
24-Hr Emergency	QB0zz
24-Hr Sprinkler	SB0zz
24-Hr Water	WB0zz
24-Hr Freeze	ZB0zz
24-Hr Latching Tamper	TB0zz

Event Description	Real Zone #	SIA Message
Zone 01 - 32 Trouble/Rstdependent		
24-Hr Freeze		ZS0zz / ZJ0zz
24-Hr Latching Tamper		US0zz / UJ0zz
Keypad x Tamper/Rst	41 - 48	TA04z / TR04z
PC5400 Tamper/Rst	64	TA064 / TR064
LINKS Tamper/Rst	65	TA065 / TR065 ·
Delay		BT0zz / BJ0zz
Instant		BT0zz / BJ0zz
Interior		BT0zz / BJ0zz
Interior Home-Away		BT0zz / BJ0zz
Delay Home-Away		BT0zz / BJ0zz
Delayed 24-Hr Fire		FT0zz / FJ0zz
Standard 24-Hr Fire		FT0zz / FJ0zz
24-Hr Supervisory Links		UT0zz / UJ0zz
24-Hr Supervisory Buzzer		UT0zz / UJ0zz
24-Hr Burglary		BT0zz / BJ0zz
24-Hr Holdup		HT0zz / HJ0zz
24-Hr Gas		GT0zz / GJ0zz
24-Hr Heat		KT0zz / KJ0zz
24-Hr Medical		MT0zz / MJ0zz
24-Hr Panic		PT0zz / PJ0zz
24-Hr Emergency		QT0zz / QJ0zz
24-Hr Sprinkler		ST0zz / SJ0zz
24-Hr Water		WT0zz / WJ0zz
24-Hr Freeze		ZT0zz / ZJ0zz
24-Hr Latching Tamper		UT0zz / UJ0zz
Battery Trouble Alm/Rst	01	YT001 / YR001
AC Failure Alm/Rst	01	AT001 / AR001
Bell Circuit Alm/Rst	71	UT071 / UJ071
TLM Alm/Rst Links	00	LT000 / LR000
Phone #1 Alm/Rst	01	LT001
Phone #2 Alm/Rst	02	LT002
Critical Shutdown	00	YT000
Keypad x Suprv./Rst	41 - 48	UT04z / UJ04z
PC5400 Suprv./Rst	No Default Transmission	
(If needed then program)	64	UT064 / UJ064
LINKS Suprv./Rst	65	UT065 / UJ065 ·
ESCORT Suprv./Rs	67	UT067 / UJ067
Opening By User 01 - 06	User #	OP0xx
Closing By User 01 - 06	User #	CL0xx
Keypad Lockout	1D	JA
System Test	37	RX
Cold Start	34	RR
Warm Start	45	YW
Opening After Alarm	11	OR
Partial Closing	04	CG
Police	01	BV019
Delinquency	97	UT097

PC4400 (PC4020)

Please refer to your PC4400 instruction sheet.

AppendixC: Standard DVACS Line Card Alarm Decoding for v2.0

Function Byte	Printer Messages	RS-232 OUT
00- 0B*	Burgl Alm/Rst Zn#01-#96	01 - 96
0C- 0D*	Fire! Alm/Rst Zn#10-#1F	10 - 1F
0E- 0F*	Panic Alm/Rst Zn#20-#2F	20 - 2F
10- 11*	Inst. Alm/Rst Zn#30-#3F	30 - 3F
12- 13*	Mtion Alm/Rst Zn#40-#4F	40 - 4F
14- 15*	24Hrs Alm/Rst Zn#50-#5F	50 - 5F
16- 17*	Tampr Alm/Rst Zn#60-#6F	60 - 6F
18- 19*	Delay Alm/Rst Zn#70-#7F	70 - 7F
1A- 1B*	Optn1 Alm/Rst Zn#80-#8F	80 - 8F
1C- 1D*	Optn2 Alm/Rst Zn#90-#9F	90 - 9F
1E- 1F*	Optn3 Alm/Rst Zn#A0-#AF	A0 - AF
20- 2B	Fire! Alm/Rst Zn#01-#96	01 - 96
2C- 2D**	Fire! Alm/Rst Zn#97-#12	97 - 12
2E- 2F	Fire: Alm/Rst Zn#B0-#BF	B0 - BF
30- 33	Water Alm/Rst Zn#01-#32	01 - 32
34	Hpres Trb/Rst Zn#C0-#C7	C0 - C7
35	Lpres Trb/Rst Zn#C8-#CF	C8 - CF
36	Valve Trb/Rst Zn#D0-#D7	D0 - D7
37	Other Trb/Rst Zn#D8-#DF	D8 - DF
38- 3F	FrTrb Alm/Rst Zn#01-#64	01 - 64
40- 4B	Tempr Alm/Rst Zn#01-#96	01 - 96
4C- 4F**	Tempr Alm/Rst Zn#97-#28	97 - 28
50- 5B	—— Alm/Rst Zn#01-#96	01 - 96
5C- 5F**	—— Alm/Rst Zn#97-#28	97 - 28
60- 67	Medic Alm/Rst Zn#01-#64	01 - 64
68- 69	Trble Alm/Rst Zn#01-#16	01 - 16
6A (a)	SG-DV7B Alm/Rst Messages	01 - 08
6B (b)	KeypadAlm/Rst Messages	E8 - EF
6C (c)	----- Alm/Rst Zn#E0-E7	E0 - E7
6D (d)	.....,LowBt Alm/Rst Zn#01-08	01 - 08
6E- 6F	Fture Alm/Rst Zn#33-#48	33 - 48
70- 77***	Close User#01-#128	01-99[C] DEC B0-B9, C0-C9, D0-D8[C] HEX
78- 7F***	Open!User#01-#128	01-99[O] DEC B0-B9, C0-C9, D0-D8[O] HEX

Function Byte	Printer Messages	RS-232 OUT
80- 8B*	Burgl Byp/Unb Zn#01-#96	01-96[B/H]
8C- 8D*	Fire! Byp/Unb Zn#10-#1F	10-1F[B/H]
8E- 8F*	Panic Byp/Unb Zn#20-#2F	20-2F[B/H]
90- 91*	Inst. Byp/Unb Zn#30-#3F	30-3F[B/H]
92- 93*	Mtion Byp/Unb Zn#40-#4F	40-4F[B/H]
94- 95*	24Hrs Byp/Unb Zn#50-#5F	50-5F[B/H]
96- 97*	Tampr Byp/Unb Zn#60-#6F	60-6F[B/H]
98- 99*	Delay Byp/Unb Zn#70-#7F	70-7F[B/H]
9A- 9B*	Optn1 Byp/Unb Zn#80-#8F	80-8F[B/H]
9C- 9D*	Optn2 Byp/Unb Zn#90-#9F	90-9F[B/H]
9E- 9F*	Optn3 Byp/Unb Zn#A0-#AF	A0-AF[B/H]
A0- AB	Fire! Byp/Unb Zn#01-#96	01-96[B/H]
AC- AD**	Fire! Byp/Unb Zn#97-#12	97-12[B/H]
AE- AF	Fire: Byp/Unb Zn#B0-#BF	B0-BF[B/H]
B0- B3	Water Byp/Unb Zn#01-#32	01-32[B/H]
B4	Hpres Byp/Unb Zn#C0-#C7	CO-C7[B/H]
B5	Lpres Byp/Unb Zn#C8-#CF	C8-CF[B/H]
B6	Valve Byp/Unb Zn#D0-#D7	D0-D7[B/H]
B7	Other Byp/Unb Zn#D8-#DF	D8-DF[B/H]
B8- BF	FrTrb Byp/Unb Zn#01-#64	01-64[B/H]
C0- CB	Tempr Byp/Unb Zn#01-#96	01-96[B/H]
CC- CF**	Tempr Byp/Unb Zn#97-#28	97-28[B/H]
D0- DB	—— Byp/Unb Zn#01-#96	01-96[B/H]
DC- DF**	—— Byp/Unb Zn#97-#28	97-28[B/H]
E0- E7	Medic Byp/Unb Zn#01-#64	01-64[B/H]
E8- E9	Trble Byp/Unb Zn#01-#16	01-16[B/H]
EA	SG-DV7B Byp/Unbp Messages	01-08[B/H]
EB	KeypadByp/UnBp Messages	E8-EF[B/H]
EC	----- Byp/Unb Zn#E0-E7	E0-E7[B/H]
ED	....,LowBt Alm/Rst Zn#01-08	01-08[B/H]
EE- EF	Fture Byp/Unb Zn#C1-#D0	33-48[B/H]
F0- F1 (e,f)	CONTL Act/Rst Zn#F1-#00	F1 - 00
F2- F3 (g,h)	Remote Arming/DisarmB0-BF	B0-B3[O/C] & [O/C]1-C xx
****F4- FE	—— Byp/Unb Zn#01-#08	A1 - A8

* The printer messages can be changed to "-----" with the word Alm/Rst or Byp/Unb and zone#.

** Not recommended, since it may cause zone number duplication.

*** User numbers 1-99 are reported in decimal, while user numbers 100-128 are reported in Hexadecimal, starting from B0-B9, C0-C9, and D0-D8.

**** Where xx = User Number.

a) Function Byte 6A	Printer's Message	RS-232 OUT
1) Auxil (Auxiliary)	Alm/Rst Zn#01	01
2) Panic (Panic)	Alm/Rst Zn#02	02
3) Inst. (Instant Loop)	Alm/Rst Zn#03	03
4)Tampr (Supervisory)	Alm/Rst ZN#04	04
5)Delay (Delay Loop)	Alm/Rst Zn#05	05
6)Mtion (Motion Detector)	Alm/Rst Zn#06	06
7)24Hrs (24 Hrs Loop)	Alm/Rst Zn#07	07
8)LwBat (Low Battery)	Alm/Rst Zn#08	08

b) Function Byte 6B	Printer's Message	RS-232 OUT
1) FIRE.	Alm/Rst Zn#E8	E8
2) PANIC	Alm/Rst Zn#E9	E9
3) MEDIC	Alm/Rst Zn#EA	EA
4) TAMPR	Alm/Rst Zn#EB	EB
5) DURES	Alm/Rst Zn#EC	EC
6) INVCd	Alm/Rst Zn#ED	ED
7) PWRCt	Alm/Rst Zn#EE	EE
8) Z1Trb	Alm/Rst Zn#EF	EF

c) Function Byte 6C	Printer's Message	RS-232 OUT
1) -----	Alm/Rst Zn#E0	E0
2) -----	Alm/Rst Zn#E1	E1
3) -----	Alm/Rst Zn#E2	E2
4) -----	Alm/Rst Zn#E3	E3
5) -----	Alm/Rst Zn#E4	E4
6) -----	Alm/Rst Zn#E5	E5
7) -----	Alm/Rst Zn#E6	E6
8) -----	Alm/Rst Zn#E7	E7

d) Function Byte 6D	Printer's Message	RS-232 OUT
1)	Alm/Rst Zn#01	01
2)	Alm/Rst Zn#02	02
3)	Alm/Rst Zn#03	03
4)	Alm/Rst Zn#04	04
5)	Alm/Rst Zn#05	05
6)	Alm/Rst Zn#06	06
7)	Alm/Rst Zn#07	07
8)	Alm/Rst Zn#08	08

e) Function Byte F0	Printer's Message	RS-232 OUT
1) *CONTL (Control Point#01)	Act/Rst Zn#F1	F1
2) *CONTL (Control Point#02)	Act/Rst Zn#F2	F2
3) *CONTL (Control Point#03)	Act/Rst Zn#F3	F3
4) *CONTL (Control Point#04)	Act/Rst Zn#F4	F4
5) *CONTL (Control Point#05)	Act/Rst Zn#F5	F5
6) *CONTL (Control Point#06)	Act/Rst Zn#F6	F6
7) *CONTL (Control Point#07)	Act/Rst Zn#F7	F7
8) *CONTL (Control Point#08)	Act/Rst Zn#F8	F8

f) Function Byte F1	Printer's Message	RS-232 OUT
1) *CONTL (Control Point#09)	Act/Rst Zn#F9	F9
2) CONTL (Control Point#10)	Act/Rst Zn#FA	FA
3) CONTL (Control Point#11)	Act/Rst Zn#FB	FB
4) CONTL (Control Point#12)	Act/Rst Zn#FC	FC
5) CONTL (Control Point#13)	Act/Rst Zn#FD	FD
6) CONTL (Control Point#14)	Act/Rst Zn#FE	FE
7) CONTL (Control Point#15)	Act/Rst Zn#FF	FF
8) CONTL (Control Point#16)	Act/Rst Zn#00	00

g) Function Byte F2	Printer's Message	RS-232 OUT
1) Remot (Remote)	Arming/DisarmB0	B0 [C/O]
2) Alrdy (Already)	Arming/DisarmB1	B1 [C/O]
3) Inhib (Inhibit)	Arming/DisarmB2	B2 [C/O]
4) Total (Total)	Arming/DisarmB3	B3 [C/O]
5) Grp 1 (Group 1)**	Arming/DisarmB4	[C/O]1 xx
6) Grp 2 (Group 2)**	Arming/DisarmB5	[C/O]2 xx
7) Grp 3 (Group 3)**	Arming/DisarmB6	[C/O]3 xx
8) Grp 4 (Group 4)**	Arming/DisarmB7	[C/O]4 xx

· Where xx = User Number

f) Function Byte F1	Printer's Message	RS-232 OUT
9) Grp 5 (Group 5)	Arming/DisarmB8	[C/O]5 xx
10) Grp 6 (Group 6)	Arming/DisarmB9	[C/O]6 xx
11) Grp 7 (Group 7)	Arming/DisarmBA	[C/O]7 xx
12) Grp 8 (Group 8)	Arming/DisarmBB	[C/O]8 xx
13) Grp 9 (Group 9)	Arming/DisarmBC	[C/O]9 xx
14) Grp A (Group A)	Arming/DisarmBD	[C/O]A xx
15) Grp B (Group B)	Arming/DisarmBE	[C/O]B xx
16) Grp C (Group C)	Arming/DisarmBF	[C/O]C xx

· Where xx = User Number

*** CONTROL OUTPUTS:**

SG-DV7B

CONTL#01 : Programmable Output
CONTL#02 : Kissoff Ouput.
CONTL#03 : Buzzer Output
CONTL#04 : Bell Output.

SG-DV1660LC (& FLC)

CONTL#01 : Programmable Output #1
CONTL#02 : Programmable Output #2
CONTL#03 : Keypad Buzzer
CONTL#04 : Bell Output
CONTL#05 : Programmable Output #3
CONTL#06 : Programmable Output #4
CONTL#07 : Programmable Output #5
CONTL#08 : Programmable Output #6
CONTL#09 : Programmable Output #7

** Groups A, B, C, and D in the earlier version are now called Groups 1, 2, 3, and 4 respectively.

Description of Abbreviations for Appendix C

Burgl : Burglary
Inst. : Instant Loop
Mtion : Motion Detector
24Hrs : 24 hrs Loop
Tampr : Tamper Loop
Optn1 : Feature Option
Trble : Trb (Trouble)
Water : Sprinkler
Hpres : High Pressure
Lpres : Low Pressure
[O/C] : Open/Close
FrTrb : Fire Trouble
Tempr : Temperature
Medic : Medical
Fture : Future Option
Close : Closing
Open! : Opening
CONTL : Control Point
Alm/Rst : Alarm/Restore
Byp/Unb : Bypass/Unbypass
Act/Rst : Active/Restore
Dures : Duress Code
InvCd : Invalid Code
PwrCt : Power Cut
Z1Trb : Zone #1 in trouble
TLwBt : Trouble Low Battery
ACcut : AC cut
BelCt : Bell cut
SecSW : Memory security switch

REMARKS:

1) If no Function Byte or the Function Byte FF is sent, the function byte 50 will be performed.
2) The data output on RS-232 is sent according to the Sur-Gard format. See the receiver manual for more details.
3) All RS-232 outputs are sent with A for “Alarm” or R for “Restore”, except those marked as [C],[O],[B] or [H].
4) The transmitter Incorrect Response/Restore will be sent as (A/R) 0A to RS-232.

Appendix D: New DVACS SIA Protocol

The following describes the computer output protocol:

3RRLssssss0AAAEEZZZs[DC4]

Where:

3 = SIA protocol 1 identifier
RR = Receiver number
L = Line number (1-E)
s = Spaces
AAA = Account number. (if less than 3 digits, leading"0"s will be inserted)
EE = Alarm identifier
ZZZ = 3 digits zone/user identifier

Printer and computer libraries available:

ALARM REPORTING TYPES :

Rep.Type	Printer Message		Computer Message
00	Fire	Alm/Rst/Byp/Unb Zn000-999	FA/FH/FB/FU 000-999
01	Sprnklr	Alm/Rst/Byp/Unb Zn000-999	SA/SH/SB/SU 000-999
02	Panic	Alm/Rst/Byp/Unb Zn000-999	PA/PH/PB/PU 000-999
03	Hold up	Alm/Rst/Byp/Unb Zn000-999	HA/HH/HB/HU 000-999
04	Medical	Alm/Rst/Byp/Unb Zn000-999	MA/MH/MB/MU 000-999
05	Emergen	Alm/Rst/Byp/Unb Zn000-999	QA/QH/QB/QU 000-999
06	Burglar	Alm/Rst/Byp/Unb Zn000-999	BA/BH/BB/BU 000-999
07	DelayHA	Alm/Rst/Byp/Unb Zn000-999	BA/BH/BB/BU 000-999
08	Delay	Alm/Rst/Byp/Unb Zn000-999	BA/BH/BB/BU 000-999
09	Instant	Alm/Rst/Byp/Unb Zn000-999	BA/BH/BB/BU 000-999
0A	Interio	Alm/Rst/Byp/Unb Zn000-999	BA/BH/BB/BU 000-999
0B	InterHA	Alm/Rst/Byp/Unb Zn000-999	BA/BH/BB/BU 000-999
0C	Motion	Alm/Rst/Byp/Unb Zn000-999	BA/BH/BB/BU 000-999
0D	Water	Alm/Rst/Byp/Unb Zn000-999	WA/WH/WB/WU 000-999
0E	Freeze	Alm/Rst/Byp/Unb Zn000-999	ZA/ZH/ZB/ZU 000-999
0F	Gas	Alm/Rst/Byp/Unb Zn000-999	GA/GH/GB/GU 000-999
10	Heat	Alm/Rst/Byp/Unb Zn000-999	KA/KH/KB/KU 000-999
11	24 hrs	Alm/Rst/Byp/Unb Zn000-999	UA/UH/UB/UU 000-999
12	System	Alm/Rst/Byp/Unb Zn000-999	UA/UH/UB/UU 000-999
13	Auxil.	Alm/Rst/Byp/Unb Zn000-999	UA/UH/UB/UU 000-999
14	Untyped	Alm/Rst/Byp/Unb Zn000-999	UA/UH/UB/UU 000-999
15	-------	Alm/Rst/Byp/Unb Zn000-999	UA/UH/UB/UU 000-999
16	24hrLat	Alm/Rst/Byp/Unb Zn000-999	TA/TR/TB/TU 000-999
17	Tamper	Alm/Rst/Byp/Unb Zn000-999	TA/TR/TB/TU 000-999
18	Supervi	Alm/Rst/Byp/Unb Zn000-999	UA/UH/UB/UU 000-999
19	BrgVerf	Alm/Rst/Byp/Unb Zn000-999	BV/BR 000-999
1A	-------	Alm/Rst/Byp/Unb Zn000-999	UA/UH/UB/UU 000-999
1B	-------	Alm/Rst/Byp/Unb Zn000-999	UA/UH/UB/UU 000-999
1C	-------	Alm/Rst/Byp/Unb Zn000-999	UA/UH/UB/UU 000-999
1D	Test	Alm/Rst/Byp/Unb Zn000-999	UX/UR/UB/UU 000-999
1E	Unsecur	Alm/Rst/Byp/Unb Zn000-999	YY/UR/UB/UU 000-999
1F	Cancel	Alm/Alm/Byp/Unb Zn000-999	OC/OC/UB/UU 000-999

TROUBLES REPORTING TYPE :

Rep.Type	Printer MSG		Computer MSG
20	Fire	Trb/T_R/Byp/Unb Zn000-999	FT/FJ/FB/FU 000-999
21	Sprinkl	Trb/T_R/Byp/Unb Zn000-999	ST/SJ/SB/SU 000-999
22	Panic	Trb/T_R/Byp/Unb Zn000-999	PT/PJ/PB/PU 000-999
23	Hold up	Trb/T_R/Byp/Unb Zn000-999	HT/HJ/HB/HU 000-999
24	Medical	Trb/T_R/Byp/Unb Zn000-999	MT/MJ/MB/MU 000-999
25	Emergen	Trb/T_R/Byp/Unb Zn000-999	QT/QJ/QB/QU 000-999
26	Burglar	Trb/T_R/Byp/Unb Zn000-999	BT/BJ/BB/BU 000-999
27	DelayHA	Trb/T_R/Byp/Unb Zn000-999	BT/BJ/BB/BU 000-999
28	Delay	Trb/T_R/Byp/Unb Zn000-999	BT/BJ/BB/BU 000-999
29	Instant	Trb/T_R/Byp/Unb Zn000-999	BT/BJ/BB/BU 000-999
2A	Interio	Trb/T_R/Byp/Unb Zn000-999	BT/BJ/BB/BU 000-999
2B	InterHA	Trb/T_R/Byp/Unb Zn000-999	BT/BJ/BB/BU 000-999
2C	Motion	Trb/T_R/Byp/Unb Zn000-999	BT/BJ/BB/BU 000-999
2D	Water	Trb/T_R/Byp/Unb Zn000-999	WT/WJ/WB/WU 000-999
2E	Freeze	Trb/T_R/Byp/Unb Zn000-999	ZT/ZJ/ZB/ZU 000-999
2F	Gas	Trb/T_R/Byp/Unb Zn000-999	GT/GJ/GB/GU 000-999
30	Heat	Trb/T_R/Byp/Unb Zn000-999	KT/KJ/KB/KU 000-999
31	24 hrs	Trb/T_R/Byp/Unb Zn000-999	UT/UJ/UB/UU 000-999
32	System	Trb/T_R/Byp/Unb Zn000-999	UT/UJ/UB/UU 000-999
33	Auxil.	Trb/T_R/Byp/Unb Zn000-999	UT/UJ/UB/UU 000-999
34	Untyped	Trb/T_R/Byp/Unb Zn000-999	UT/UJ/UB/UU 000-999
35	-------	Trb/T_R/Byp/Unb Zn000-999	UT/UJ/UB/UU 000-999
36	24hrLat	Trb/T_R/Byp/Unb Zn000-999	UT/UJ/TB/TU 000-999
37	Tamper	Trb/T_R/Byp/Unb Zn000-999	UT/UJ/TB/TU 000-999
38	Supervi	Trb/T_R/Byp/Unb Zn000-999	UT/UJ/UB/UU 000-999
39	Expans.	Trb/T_R/Byp/Unb Zn000-999	ET/ER/UB/UU 000-999
3A	AC Cut	Trb/T_R/Byp/Unb Zn000-999	AT/AR/UB/UU 000-999
3B	WirLBat	Trb/T_R/Byp/Unb Zn000-999	XT/XR/UB/UU 000-999
3C	PwSuply	Trb/T_R/Byp/Unb Zn000-999	YP/YQ/UB/UU 000-999
3D	SysLBat	Trb/T_R/Byp/Unb Zn000-999	YT/YR/UB/UU 000-999
3E	Line	Trb/T_R/Byp/Unb Zn000-999	LT/LR/UB/UU 000-999
3F	ZnFault	Trb/T_R/Byp/Unb Zn000-999	UT/UJ/UB/UU 000-999
40 TO 5F	RESERVED		

SUPERVISORY REPORTING TYPE :

Rep.Type	Printer MSG		Computer MSG
60	Fire	Sup/S_R/Byp/Unb Zn000-999	FS/FJ/FB/FU000-999
61	Sprinkl	Sup/S_R/Byp/Unb Zn000-999	SS/SJ/SB/SU 000-999
62	Panic	Sup/S_R/Byp/Unb Zn000-999	PS/PJ/PB/PU 000-999
63	Hold up	Sup/S_R/Byp/Unb Zn000-999	HS/HJ/HB/HU 000-999
64	Medical	Sup/S_R/Byp/Unb Zn000-999	MS/MJ/MB/MU 000-999
65	Emergen	Sup/S_R/Byp/Unb Zn000-999	QS/QJ/QB/QU 000-999
66	Burglar	Sup/S_R/Byp/Unb Zn000-999	BS/BJ/BB/BU 000-999
67	DelayHA	Sup/S_R/Byp/Unb Zn000-999	BS/BJ/BB/BU 000-999
68	Delay	Sup/S_R/Byp/Unb Zn000-999	BS/BJ/BB/BU 000-999
69	Instant	Sup/S_R/Byp/Unb Zn000-999	BS/BJ/BB/BU 000-999
6A	Interio	Sup/S_R/Byp/Unb Zn000-999	BS/BJ/BB/BU 000-999
6B	InterHA	Sup/S_R/Byp/Unb Zn000-999	BS/BJ/BB/BU 000-999
6C	Motion	Sup/S_R/Byp/Unb Zn000-999	BS/BJ/BB/BU 000-999
6D	Water	Sup/S_R/Byp/Unb Zn000-999	WS/WJ/WB/WU 000-999
6E	Freeze	Sup/S_R/Byp/Unb Zn000-999	ZS/ZJ/ZB/ZU 000-999
6F	Gas	Sup/S_R/Byp/Unb Zn000-999	GS/GJ/ZB/ZU 000-999
70	Heat	Sup/S_R/Byp/Unb Zn000-999	KS/KJ/KB/KU 000-999
71	24 Hrs	Sup/S_R/Byp/Unb Zn000-999	US/UJ/UB/UU 000-999
72	System	Sup/S_R/Byp/Unb Zn000-999	US/UJ/UB/UU 000-999
73	Auxil.	Sup/S_R/Byp/Unb Zn000-999	US/UJ/UB/UU 000-999
74	Untyped	Sup/S_R/Byp/Unb Zn000-999	US/UJ/UB/UU 000-999
75	Exp. Mod.	Sup/S_R Zn000-999	ES/EJ 000-999

OPEN/CLOSE REPORTING TYPE :

76	Open	User000-999	OP 000-999
F6	Close	User000-999	CL 000-999
77	Open	Group000-999	OG 000-999
F7	Close	Group000-999	CG 000-999

MISCELANEOUS REPORTING TYPE :

78	By	User	000-999	No transmission
79	Control	Act/Rst	Pt000-999	RC/RO 000-999
7A	Service	Req	Zn000-999	YX 000-999
7B	NoEntry	Usr	000-999	NL 000-999
7C	User	Msg	Zn000-999	CE 000-999
7D	Instal	Msg	Zn000-999	DU 000-999

7E: Specific Messages Reporting Type

For reporting type 7E, The reporting code specified the message to be printed and transmitted to the Computer. The zone send to the computer is always 000.

Rep. Code	Printer Message	Computer Message
01	Automat Closing	CA
02	Automat Open	OA
03	Closing Extend	CE
04	Partial Closing	CG
05	Forced Closing	CF
06	Forced arming	CW
07	Fail to Close	CI
08	Fail to Open	OI
09	Late Close	CJ
0A	Late Open	OJ
0B	Late to Close	OT
0C	Late to Open	CT
0D	Early Close	CK
0E	Early Open	OK
0F	F. Arm Perimeter	NF
10	Perimeter Arm	NL
11	Disarm From Alm	OR
12	Access Closed	DC
13	Access Denied	DD
14	Access Granted	DG
15	Access Lockout	DK
16	Access Open	DO
17	Access Trouble	DT
18	Door Forced	DF
19	Door Station	DS
1A	Alm On Exit	UA
1B	Fire test begin	FI
1C	Fire test end	FK
1D	User cd Tamper	JA
1E	Log Threshold	JL
1F	Log Overflow	JO
20	Schedul Execute	JR
21	Schedul Change	JS
22	Time Changed	JT
23	Date Changed	JD
24	Holiday Changed	JH
25	User cd Changed	JV
26	User cd Deleted	JX
27	Local Prg Begin	LB
28	Local Prg Denied	LD
29	Local Prg Succes	LS
2A	Local Prg Fail	LU
2B	Local Prg Ended	LX
2C	Listen-In begin	LF
2D	Listen-In ended	LE
2E	Remote P.C.F	RA
2F	Remote P.begin	RB
30	Remote P.Denied	RD
31	Remote P.Success	RS
32	Remote P.Fail	RU
33	Remote Reset	RN
34	Power Up	RR
35	Data Lost	RT
36	Automatic Test	RP
37	Manual Test	RX
38	Test Start	TS
39	Test End	TE
3A	Printer Papr In	VI
3B	Printer Papr Out	VO
3C	Printer Restore	VR
3D	Printer Trouble	VT
3E	Printer Test	VX
3F	Printer On Line	VY
40	Printer Off Line	VZ
41	Extra Point	XE
42	Extra RF Point	XF
43	Sensor Reset	XI
44	Forced Point	XW
45	Watch Dog Reset	YW
46	Service Required	YX
47	Status Report	YY
48	Downlook Start	None

Line Card Configuration Command: F7-Option#-(Hex)

Option# (Decimal)	Description (Decimal)	Default (Hexadecimal)	User Change	User Change
00	HEX SELECT	001	|__|__|__|	|__|__|
01	POLL 1-99	000	|__|__|__|	|__|__|
02	COM SELECT	001	|__|__|__|	|__|__|
03	ABSENT REP	001	|__|__|__|	|__|__|
04	LST MSG ON	000	|__|__|__|	|__|__|
05	MUTE BUZER	000	|__|__|__|	|__|__|
06	LIBRARY OP	001	|__|__|__|	|__|__|
07	EXT FORMAT	000	|__|__|__|	|__|__|
08	PRINTER OP	001	|__|__|__|	|__|__|
09	ALM ON SIX	001	|__|__|__|	|__|__|
0A	PARITY CHK	001	|__|__|__|	|__|__|
0B	ID_CD POLL	032	|__|__|__|	|__|__|
0C	ABSENT TRY	005	|__|__|__|	|__|__|
0D	PRSENT TRY	005	|__|__|__|	|__|__|
0E	STABLE(ms)	020	|__|__|__|	|__|__|
0F	REPLY(8ms)	032	|__|__|__|	|__|__|
10	<ACK> (ms)	080	|__|__|__|	|__|__|
11	CARR(50ms)	010	|__|__|__|	|__|__|
12	BUS ERROR	000	|__|__|__|	|__|__|
13	ID# FOR P1	032	|__|__|__|	|__|__|
14	FNT FOR P1	032	|__|__|__|	|__|__|
15	DEL PG1(s)	002	|__|__|__|	|__|__|
16	DEL PG2(s)	002	|__|__|__|	|__|__|
17	ID# DEBUG	000	|__|__|__|	|__|__|
18	LCARD NUMB	255	|__|__|__|	|__|__|
19	RCVER NUMB	001	|__|__|__|	|__|__|
1A	ERROR NUMB	020	|__|__|__|	|__|__|
1B	ALL CALL OP	001	|__|__|__|	|__|__|
1C	EQUIV LINE	000	|__|__|__|	|__|__|

Appendix F: CPM2 Quick Reference Guide *(v2.0)*

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

Line Card Command Descriptions

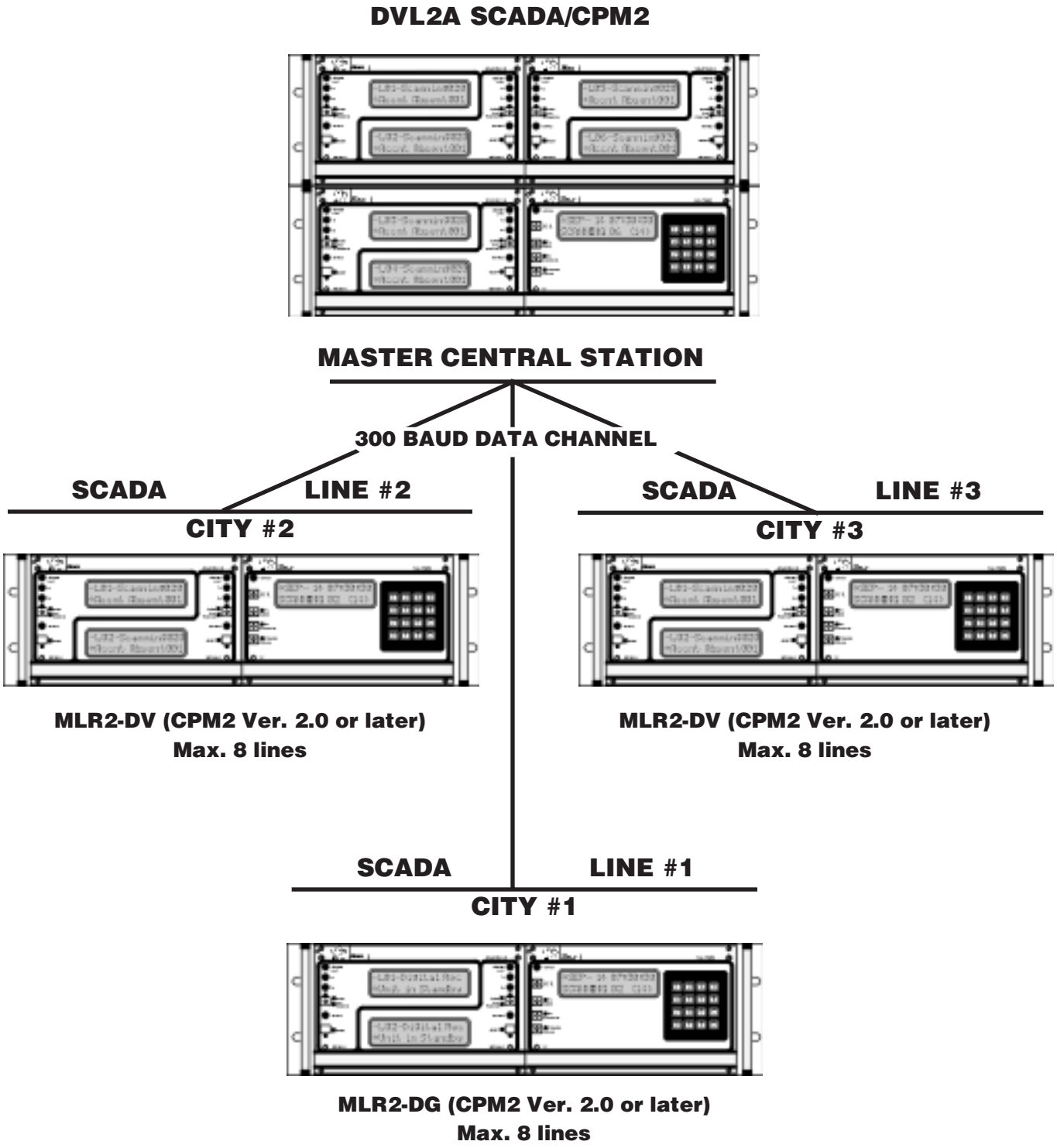
- [F7] Line Card Configuration
- [FA] Print Line Card Buffer
- [FB] Shutdown Line Card Communication with CPM2
- [FC] Reactivate Line Card Communication with CPM2
- [FE] Line Card Buffer Functions

Special Applications

SUR-GARD Network (SCADA)

A complete package to allow one or more receivers in distant cities to communicate their alarm information to a master receiver and to be remotely controlled by the master receiver.

The acronym "SCADA" stands for Supervisory Control And Data Acquisition. It is used to transport the alarm data from a local (satellite) central station to the master central station reliably by using linked Modem over leased phone lines. This system is specifically intended to be used with a point to point 300 baud Schedule 3A data line.



MLR2-DG Receiver Programming Software

The MLR2-DG can be programmed through the serial port #2 on the CPM2 from a computer, with the DOS-based MLR2-DG programming software. This method of programming is more user friendly, faster and each installation configuration can then be saved on disk. For more information or ordering, please contact your distributor.

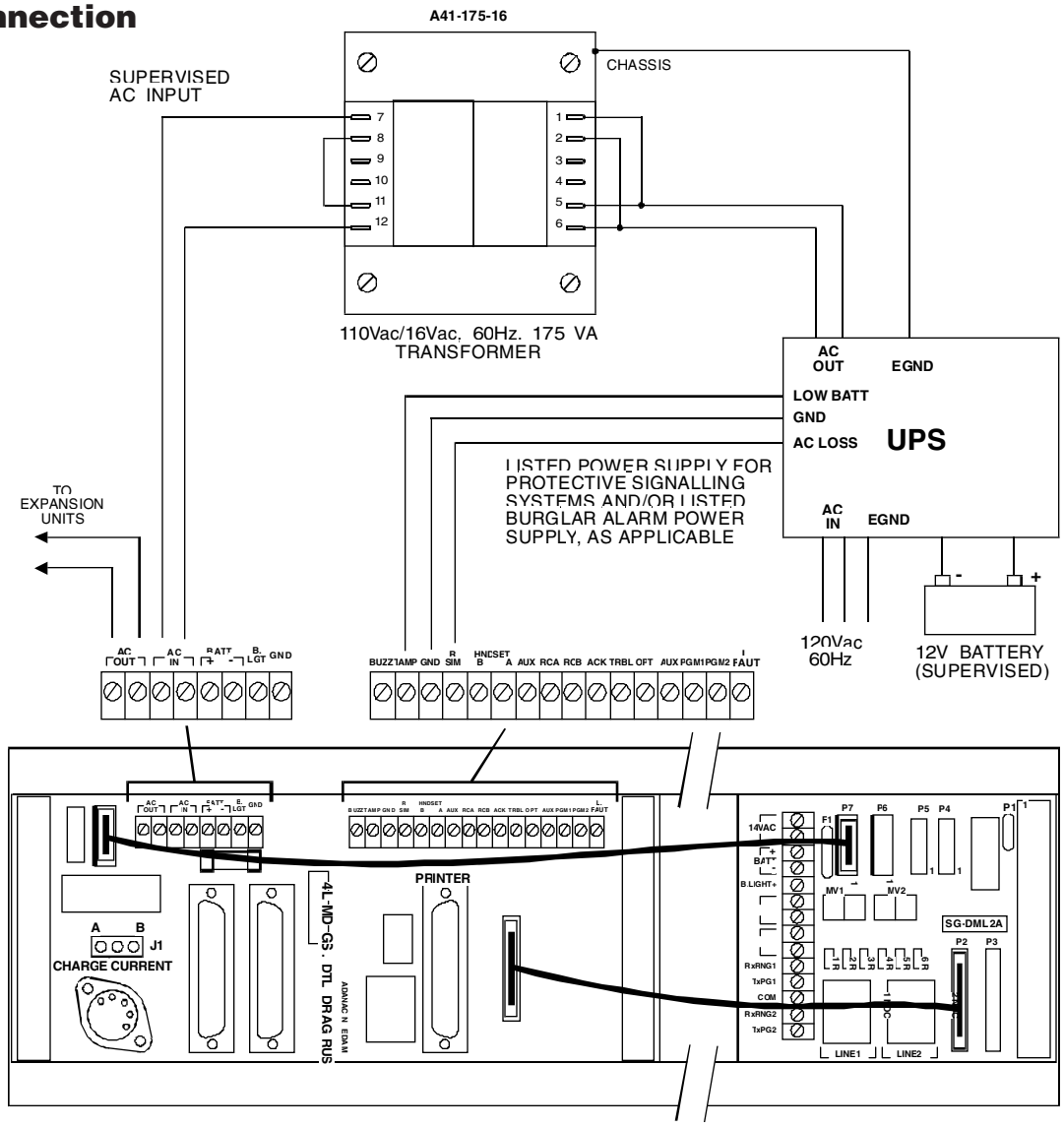
Quick Start

The following steps must be taken so as to utilize the receiver PC software :

· Update the CPM2 firmware to version 2.10 or later if necessary (Cold Boot).
· Manually set the CPM2 COM2 to 300 baud, 8 data bits, even parity and 1 stop bit (Default).
· Manually set the CPM2 COM2 format to 0 (zero) (Default).
· Make sure the CPM2 and computer are well connected (COM2).
· Insert the diskette in Drive A and type A:INSTALL <ENTER>.
· Hit any key when prompted by the Sur-Gard Logo.
· Choose File-New and press <ENTER> to create a new data file.
· Choose the Setup function to select the COM port.
· Choose the Edit/View-CPM2 function to edit and program the CPM2 options.
· Choose the Edit/View-Line function to define type of line cards that need to be programmed.
· When in the Line Card Selection window choose the Edit function to edit and program the line card options.
· Repeat the previous step for every card installed in the receiver.
· Close the Line Card Selection window by pressing Alt-C and exit by pressing Alt-X.

NOTE: The software manual may be accessed through the Help menu.

UPS Connection



MLR2-DG BACKPLANE BOARDS

Appendix G 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

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

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

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

WARNING

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

How to Contact Us:

Sales

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

Calling Technical Support

If you have questions of problems when using Sur-Gard products, you can call technical support. If you are within the United States, Puerto Rico, the U.S. Virgin Islands or Canada, you can get support by dialling 1-800-503-5869. If you are outside these areas, please call (416) 665-4494.

Internet

Sur-Gard will soon have a WWW home page. Here, you will be able to search the Sur-Gard technical information database and read information about new products. You will also be able to send us your questions. Our World Wide Web address is http://www.sur-gard.com.

Products

The MLR2-DV central station receiver was designed to suit your needs. If you ever have a suggestion about the MLR2-DV or about any one of our products, please contact us. We genuinely appreciate your comments. Write to:

Sur-Gard Security Systems Ltd.
Receiver Product Manager
401 Magnetic Drive, Units #24
Downsview, Ontario, Canada
M3J 3H9

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Downsview, Ontario, Canada M3J 3H9

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NEW Software Version

Installation Manual

SUR-GARD™

ULC Listed

MLR2-DV

Version 2.0

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