

### **CERBERUS PYROTRONICS™**

## **System CXL**

# Operation, Installation, and Maintenance Manual

The **CERBERUS PYROTRONICS™ SYSTEM CXL OPERATION, INSTALLATION, AND MAINTENANCE MANUAL** is designed to familiarize the operator with the CXL System. The operator should read the entire manual before installing the System.

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## INTRODUCTION

The **CERBERUS PYROTRONICS™** System CXL Command Center is a microprocessor based system designed to monitor alarm and trouble status from as many as twenty-eight XL3 or MXL systems. The CXL provides two monitors:

1. Color CRT with Keyboard
2. Logging Printer

The **CRT** and **keyboard** for the System CXL allow the operator to direct commands to any XL3 or MXL connected to the CXL and to perform every operation from the CXL that is usually done from a printer connected locally to an XL3 or MXL system. (Normally, any commands the user enters through the CXL keyboard are directed to the CXL Command Center.)

To direct commands to a specific XL3 or MXL system, the user must first identify the desired XL3 or MXL control panel. This method of identifying the selected XL3 or MXL is referred to as **linking**. Linking is accomplished by using the **LIN** command. Each XL3 or MXL system connected to the CXL (twenty-eight possible) has an identification number that must be used when linking with that XL3 or MXL.

The CXL **printer** provides hard copy of all messages received from all linked XL3 or MXL systems, the CXL panel, and all keyboard inputs.

Table 1 lists the modules that are located within the CXL enclosure. Table 2 lists the hardware located outside the enclosure necessary to complete the system. Figure 1 illustrates the System CXL components

| TABLE 1<br>HARDWARE IN THE CXL ENCLOSURE |                          |
|--|--------------------------|
| CXC-1                                    | First computer module    |
| CXC-2                                    | Second computer module   |
| CXP-1                                    | Memory module            |
| CXM-1                                    | Quad modem module        |
| CXB-1                                    | Motherboard              |
| CXA-1                                    | Power supply/Front panel |
| EBX-1                                    | Single card cage backbox |
| EDX-1                                    | Single card cage door    |

| TABLE 2<br>HARDWARE OUTSIDE THE ENCLOSURE |  |
|---|--|
| RC-318                                    | CRT with keyboard  |
| RC-319                                    | Logging-only printer<br>or   |
| PAL-1/PIM2                                | Logging-only printer and PIM-2 interface                               |
| MMX-1                                     | System XL3 modem module (One MMX-1 is located in each XL3 enclosure)   |
| CMI-300                                   | System MXL modem module (One CMI-300 is located in each MXL enclosure) |

### CXC-1/-2 MODULES (See Figures 2 and 3)

The CXC-1/-2 modules contain the microprocessor and its related peripheral logic. These modules function together to control and supervise the CXL system and the connected XL3 systems.

### CXP-1 MODULE (See Figure 4)

The CXP-1 Memory module contains 36K bytes of RAM and 48K bytes of erasable, programmable read only memory (EPROM). The EPROM contains the standard operating program for the CXL system. (The CXL contains no customized software.)

### CXM-1 MODULE (See Figure 5)

The CXM-1 module contains four modems that provide the means to communicate with any four XL3 or MXL systems. Four wires are used for Class A communications, and two wires are used for Class B communications.

### CXA-1 MODULE (See Figure 6)

The CXA-1 is the power supply/front panel assembly of the CXL. The front panel, Model CXF-1, provides annunciation and limited control should a problem occur with the CRT. The power supply provides all regulated voltages required by the CXL system.

### CXB-1 MODULE (See Figure 7)

The CXB-1 module is the card cage and motherboard interconnection module for the CXL system. The motherboard provides ten connectors for receiving CXL modules and one eight-pin connector for receiving power from the power supply.

**RC-319 PRINTER**

The RC-319 printer is a lightweight, compact, micro-processor-driven impact printer. The printer utilizes a 9 by 7 dot matrix print head to form the characters at a maximum speed of 120 characters per second.

**PAL-1 PRINTER WITH PIM-2 INTERFACE**

The PAL-1 parallel printer is a wide carriage dot matrix printer that is UL listed for fire applications when used with the PIM-2. The characters print at a maximum speed of 250 characters per second. The PIM-2 interface converts the CXL's serial printer data into parallel data that the PAL-1 can receive and print. The PIM-2 enables the CXL to supervise the PAL-1.

**RC-318 MODULE**

The RC-318 CRT and keyboard provide the operator with the means to access the CXL system. The CRT can describe, in color coded text, the status of all the XL3 systems connected to the CXL.

**MMX-1 MODULE (Figure 8)**

The MMX-1 Modem module, which is installed in a System XL3 card cage, contains three serial ports: The first communicates with the XL3, the second communicates with the CXL, and the third communicates with an optional 20mA current loop local printer.

**CMI-300 MODULE (Figure 9)**

The CMI-300 Modem module, which is installed in a System MXL card cage, contains two serial ports: The first communicates with the MXL, and the second communicates with the CXL.

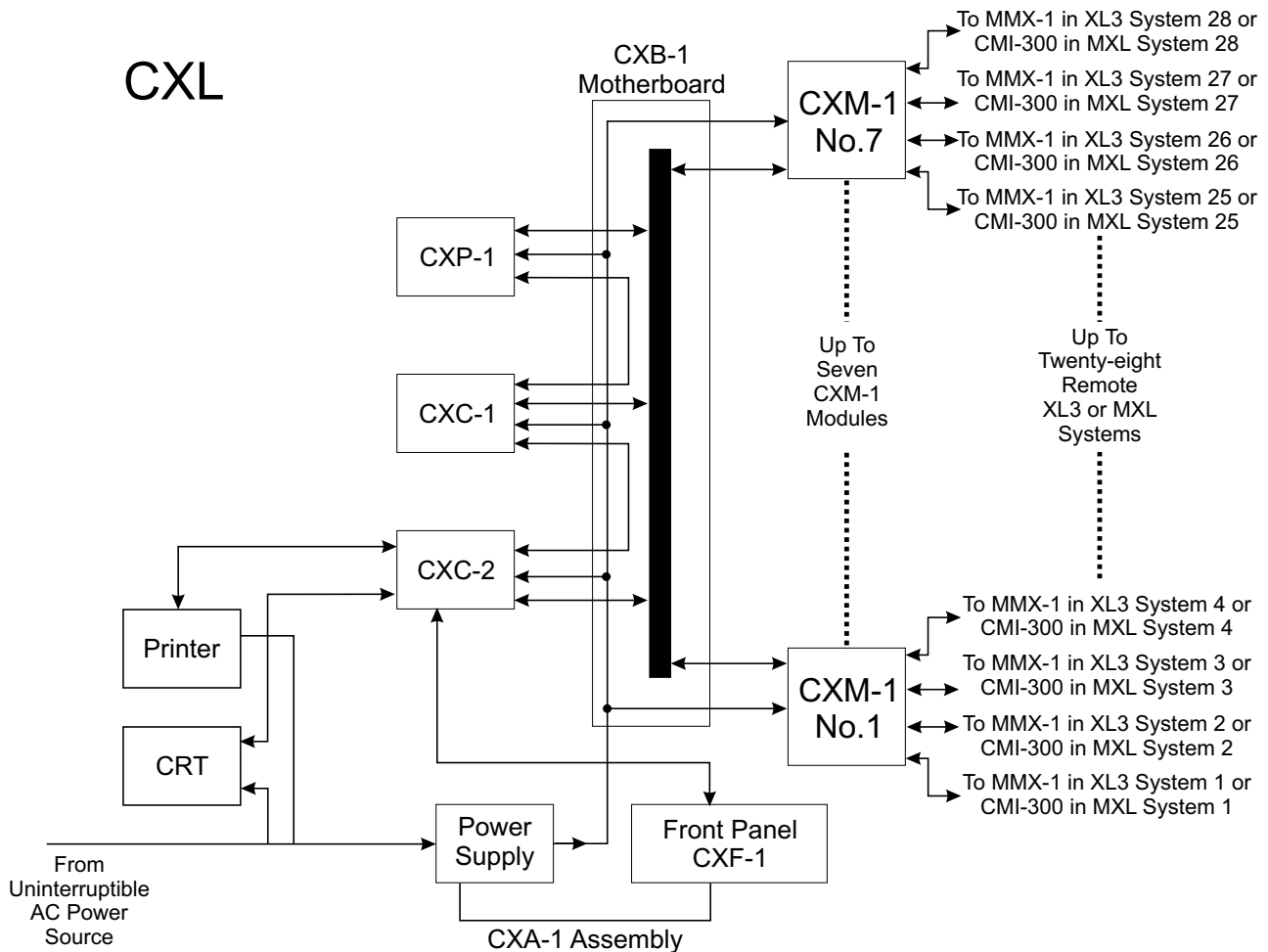


Figure 1  
System CXL Operation Block Diagram

## THEORY OF OPERATION

This section presents an overview of CXL system operation.

### SYSTEM HARDWARE

(Refer to the **System CXL Operation Block Diagram, Figure 1.**)

The CXL contains the following modules: CXC-1 and CXC-2 Central Processing modules, CXP-1 Memory module, CXA-1 assembly with power supply, CXF-1 Front Panel module, CXB-1 Motherboard, CXM-1 Modem modules (from one to seven modules per system), the printer, and the color CRT. Power is supplied from an Uninterruptible Power System (UPS).

The CXL is a microprocessor based command center controlled by CXC-1 and CXC-2 Central Processing modules and the CXP-1 Memory module, which contains operating firmware (operating instructions stored in these ROMS). The CXM-1 Modem modules communicate with remote XL3 or MXL systems via MMX-1 or CMI-300 Intelligent Modem modules located in the XL3 or MXL card cages respectively. The Power Supply module (part of the CXA-1 assembly) is an open frame, switching, multi-output power supply that provides the required DC power to the CXL system. The Uninterruptible Power System (UPS) provides uninterrupted AC power to the power supply, printer, and CRT, when either brownout or blackout conditions affect the AC power source. The color CRT monitors alarm and trouble status from up to 28 XL3 or MXL systems. The printer provides hard copy of all messages received from the XL3s and MXLs and all operator inputs from the CRT keyboard.

### SYSTEM SOFTWARE

When power is applied to the CXL system, the following tasks are initiated:

1. Tests of the watchdog circuit and memory RAM and EPROM are performed. If a memory error is found, a message is displayed on the CRT indicating this.
2. All inputs and outputs are set up, including those on the CXM-1 boards for every XL3 and MXL port. Also, the printer port, the CRT port, the front panel LEDs and audible signal, and the crystal clock divider are set up.
3. When all setups are complete, the System prints the software revision number and date.

The CRT screen then sets up, and communications to the XL3s and MXLs begin.

A maximum of three attempts are made to start communications with an MMX-1 (at an XL3) or CMI-300 (at an MXL). If all three attempts are unanswered in 24 seconds, a CXL trouble is displayed and printed, indicating the XL3 or MXL is not reporting (if the switch on the CXM-1 board indicates that this port exists). Once communications are started, the CXL system is capable of receiving reports from the XL3 or MXL. A **reporting** message indicates that communications have resumed from a previously **not reporting** XL3 or MXL.

The communications to an MMX-1 (at an XL3) or CMI-300 (at an MXL) involve asking the status and receiving the response. This indicates whether the XL3 or MXL has an alarm, trouble, or other message. The CXL, through the MMX or CMI, allows the XL3 or MXL to talk or send its messages, or to send a silence or hold to stop the sending of messages. Also through the MMX or CMI, the CXL sends commands to the XL3 or MXL.

Commands that can be sent to the XL3 or MXL include all those that can be sent from a local XL3 or MXL printer. These include acknowledging, listing, and changing commands. Commands are generally sent to an XL3 or MXL when the CXL is linked to it.

All communications to and from the MMX-1 of an XL3 or to a CMI-300 of an MXL are error-checked automatically, and a communications acknowledge or negative acknowledge is sent. A communications error occurs if a message has an error four times in a row.

The CXL software handles one XL3 or MXL per software loop, but it is so fast that communications with all XL3s or MXLs appear to be simultaneous. (It takes approximately a quarter second to process all 28 XL3s or MXLs.) However, the communication of an alarm or trouble message from the MMX-1 or CMI-300 takes 2 seconds, so the CXL is delayed for that long in reporting it. Communication delays add only slightly to this time. The CXL does not process an XL3 or MXL message until it has received the whole message so that the message can be error-checked.

Any change in XL3 or MXL status or data triggers the color video terminal software to life by updating that part of the CRT affected. If the CXL system is linked to an XL3 or MXL, only data from that linked XL3 or MXL appears in the linked area. In addition, once every second, the time is updated.

Next, keyboard commands are processed. If the CXL system is linked, the command data displays on the linked screen. If the command is to go to the XL3 or MXL, the command message is set up for the next transmit to this XL3 or MXL. If the CXL is not linked, the command data displays on the bottom command area. Errors in entry or illegal commands cause error messages to display on the bottom line (line 25).

The printer is processed next. If there is anything to print, first set the print size on the printer: Use expanded print for the printer interface operational message; standard print for everything else except voltages—print voltages in compressed type.

Supervision is done next. The following are checked for their presence and/or failure.

- Printer
- Color video terminal
- AC power
- RAM and EPROM memory
- Internal modems
- Class A loop wiring to an XL3 or MXL

The software loop is completed when the software returns to the beginning, and communications from the next XL3 or MXL are processed.

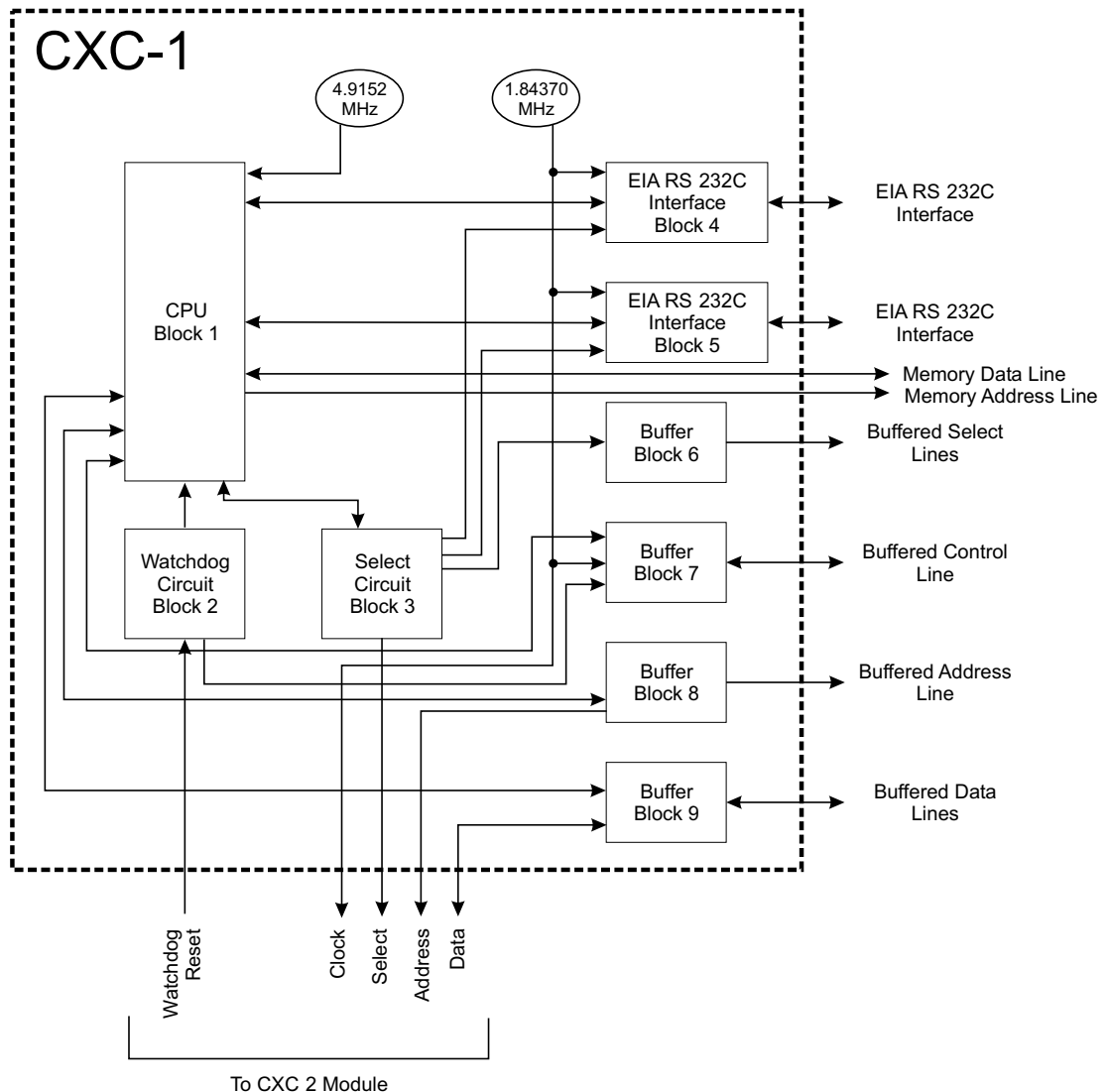


Figure 2  
Model CXC-1 Functional Block Diagram

## MODULES

### CXC-1 MODULE

The CXC-1 provides the processing required to control the CXL system. The CXC-1 module works in direct connection with the CXC-2 module. (Refer to **Figure 2, CXC-1 Functional Block Diagram.**) The CXC-1 module contains the following functional blocks:

**Block 1:**

68A09 microprocessor based Central Processing Unit (CPU)

**Block 2:**

Special timing circuit called a **watch-dog** which resets the CPU if the program fails to restart the timer periodically

**Block 3:**

Select circuit which selects one of the seven CXM-1 Modem modules and controls internal logic

**Block 4:**

Simplified EIA RS-232C interfaces

**Block 5:**

Simplified EIA RS-232C interfaces

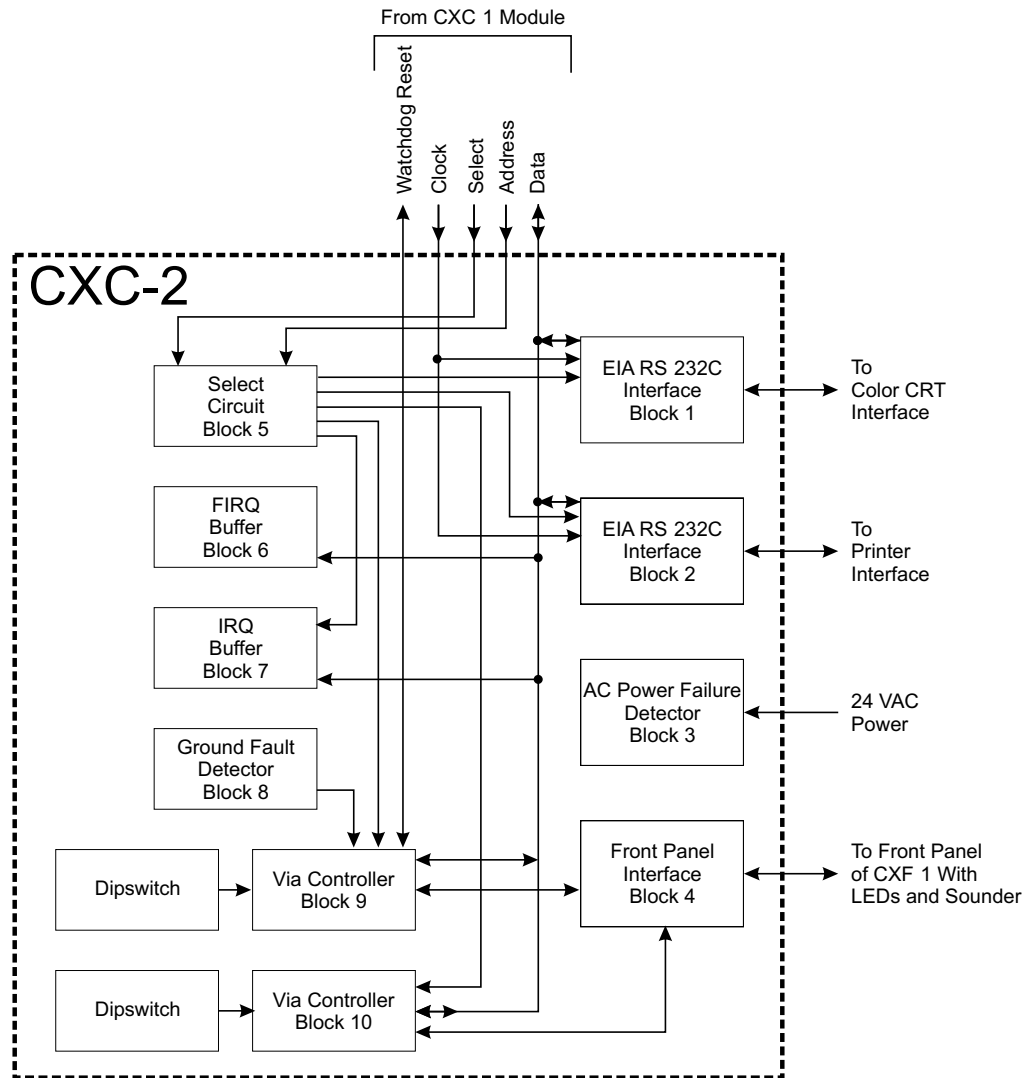


Figure 3  
Model CXC-2 Functional Block Diagram

**Block 6:**  
Unidirectional buffer for select lines

**Block 7:**  
Unidirectional buffer for control lines

**Block 8:**  
Unidirectional buffer for address lines

**Block 9:**  
Bidirectional buffer for data lines.

### CXC-2 MODULE

The CXC-2 module, together with the CXC-1 module, provides the processing required to control the CXL system. (Refer to the **Figure 3, CXC-2 Functional Block Diagram.**) The CXC-2 module contains the following blocks:

**Block 1:**  
Simplified EIA RS-232C interface for connection with the CRT

**Block 2:**  
Simplified **EIA RS-232C** interface for connection with the printer

**Block 3:**  
Circuit which detects loss of AC power and provides a 60 Hz square wave signal for the CXL Real Time Clock (When AC power is lost, the clock is controlled by the signal from an internal crystal oscillator.)

**Block 4:**  
Circuit interfacing between the CXC-2 module and the CXF-1 Front Panel module (with LEDs and an audible device)

**Block 5:**  
Select circuit

**Block 6:**  
FIRQ (fast interrupt request) interrupt buffers

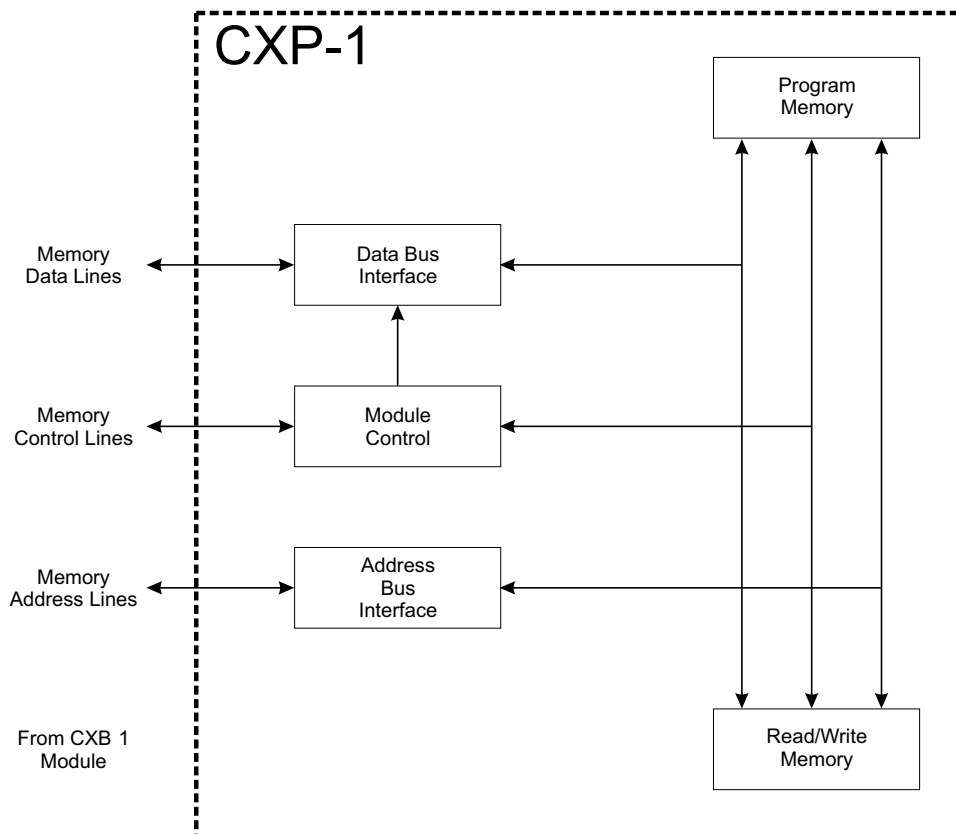


Figure 4  
Model CXP-1 Functional Block Diagram



**Block 7:**

IRQ (interrupt request) interrupt buffers

**Block 8:**

Ground Fault Detector circuit which detects any unwanted connection between chassis ground and signal ground (common return) or chassis ground and any DC power source (+5V, -5V, +12V, -12V)  
NOTE: This circuit is not used by the CXL, as the CRT and printer RS-232C connections provide constant ground faults.

**Block 9:**

Two 8 position dipswitches, connected to one Versatile Interface Adapter (VIA)

**Block 10:**

One 4 position dipswitch, connected to another Versatile Interface Adapter (VIA).

**CXP-1 MODULE**

The CXP-1 Memory module provides the CXL system with program memory for operating the firmware and read/write memory as data storage.

(Refer to **Figure 4, CXP-1 Functional Block Diagram.**) The CXP-1 contains the following modules: the Program Memory (48K EPROM) which is the same for every CXL, the Read/Write Memory (36K RAM) which is used as temporary storage for data, and the Data Bus Interface, Address Bus Interface, and internal logic which control functions of the entire CXP-1 module.

**CXM-1 MODULE**

The CXM-1 module provides modem communications between the CXL system and the XL3 or MXL system via the MMX-1 or CMI-300 Intelligent Modem module located in the XL3 or MXL. The CXM-1 has four inde-

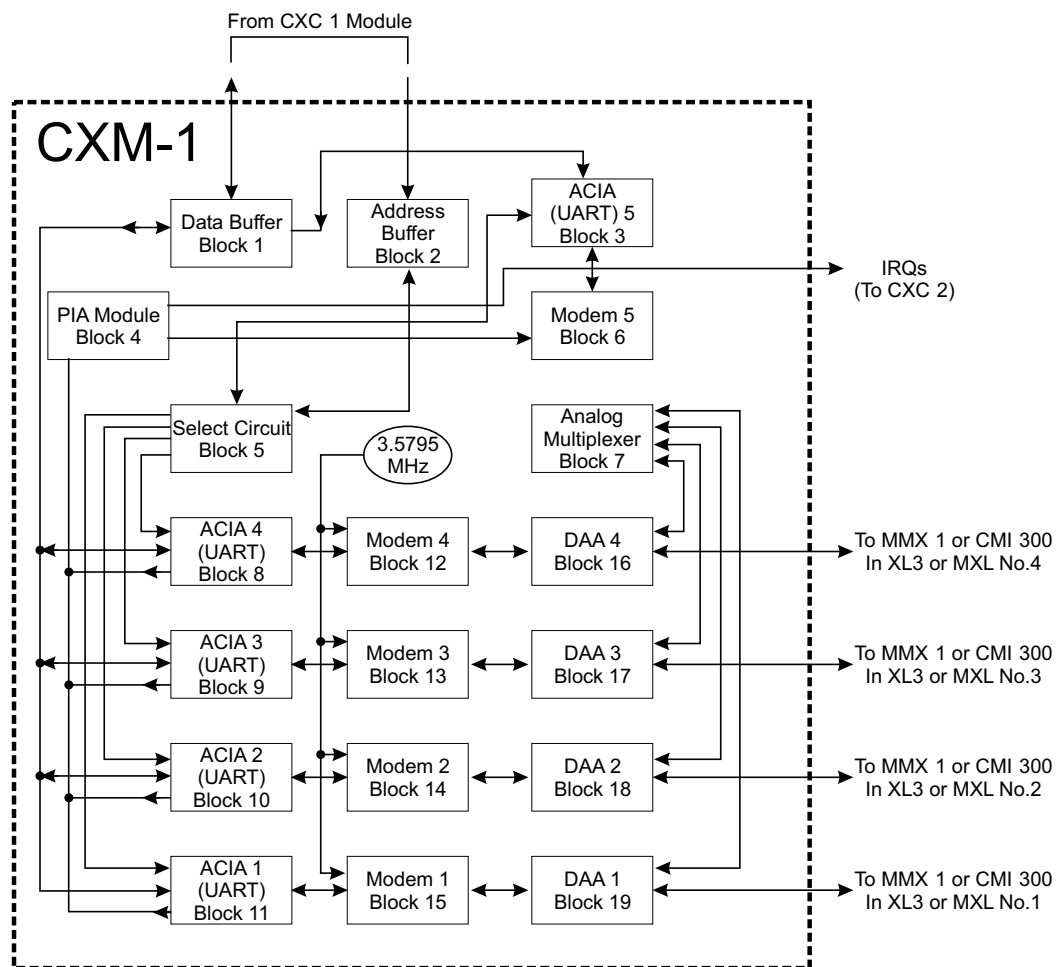


Figure 5  
Model CXM-1 Functional Block Diagram

pendent modem channels which allow communication with up to four XL3 or MXL systems.

(Refer to **Figure 5, CXM-1 Functional Block Diagram.**) The CXM-1 operates as follows:

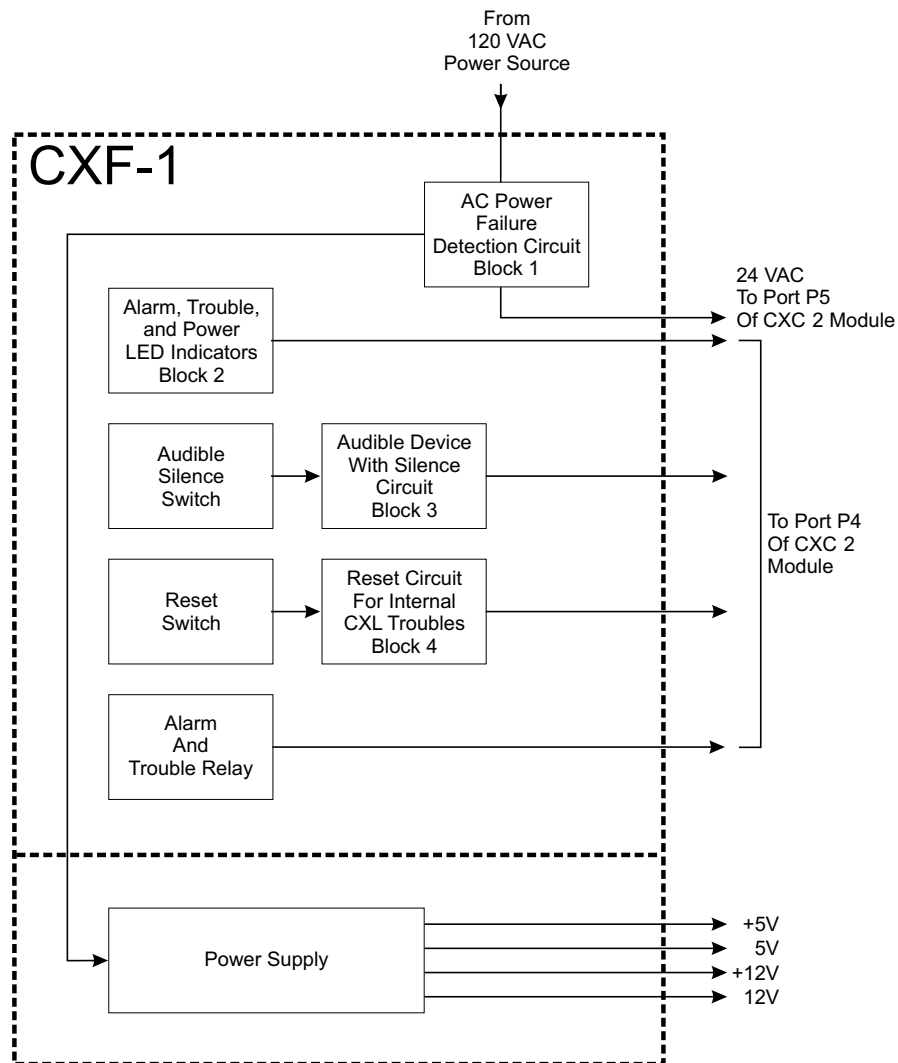
There are four modem circuits (Blocks 12 through 15) for communication and one modem (Block 6) with an analog multiplexer (Block 7) for Class A and internal modem supervision. The data communication is a full duplex 300 baud. Each modem channel can be Class A with four wires or Class B with two wires. Asynchronous serial data to and from the modem are controlled by an Asynchronous Communication Adapter (ACIA) (Block 3 and Blocks 8 through 11). The Internal CXM-1 module logic is controlled by the Peripheral Interface Adapter

(PIA) (Block 4) and the Select circuit (Block 5). The modems (Blocks 12 through 15) are connected to the line via a Data Access Arrangement—DAA (Blocks 16 through 19). The data lines are interfaced by the bidirectional buffer (Block 1) and the address lines by an unidirectional buffer (Block 2).

### CXA-1 ASSEMBLY

The CXA-1 Power Supply/Front Panel Assembly contains the CXF-1 Front Panel module and the power supply.

The open frame switching power supply provides the CXL system DC power source for +5V, -5V, +12V, and -12V (See **Figure 6**).



*Figure 6  
Model CXA-1 Power Supply and Model CXF-1 Front Panel Assembly Functional Block Diagram*

The CXF-1 Front Panel module contains three LED indicators: red for alarm, yellow for trouble, and green as a power indicator. An audible device has an additional circuit with a silence switch. There is also a Reset switch to reset CXL system software if desired.

An alarm relay and a trouble relay supply dry contacts for a remote indication of an alarm or trouble.

**CXB-1 MOTHERBOARD**

The CXB-1 module provides the electrical interconnection for all plug-in modules on the CXL system.

The system bus locations on the CXB-1 are shown in **Figure 7**. Slot J1 is assigned for the CXP-1 module. Slot J2 is assigned for the CXC-1 module and the slot J3 is assigned for the CXC-2 module. The data and address lines between the CXC-1 and CXP-1 modules are unbuffered. A control line bus between the CXC-1 and CXC-2 modules is also unbuffered. The slots J4 through J10 are assigned for the CXM-1 modules.

One of the seven CXM-1 modules is selected by the select line bus. The IRQ interrupts from all CXM-1 modules are connected to the CXC-2 module via an IRQ interrupt bus. The bidirectional 8 bit data bus and the unidirectional address bus (for A0-A7) connect the CXC-1, CXC-2, and CXM-1 modules. Four DC power supply lines (+5V, -5V, +12V, -12V) are distributed to slots J1 through J10.

**MMX-1 MODULE** (Refer to Figure 8)

The MMX-1 is an intelligent modem module — it contains its own microprocessor. The MMX-1 provides (along with the CXM-1) modem communication between the XL3 and CXL systems. The MMX-1 module is located at the XL3 site and translates signals from user friendly 20mA loop output of the CPX-1 to computer friendly modem signals for transmission along suitable cable to the CXM-1 module located at the CXL site. An auxiliary 20mA loop port is provided for communications to a printer.

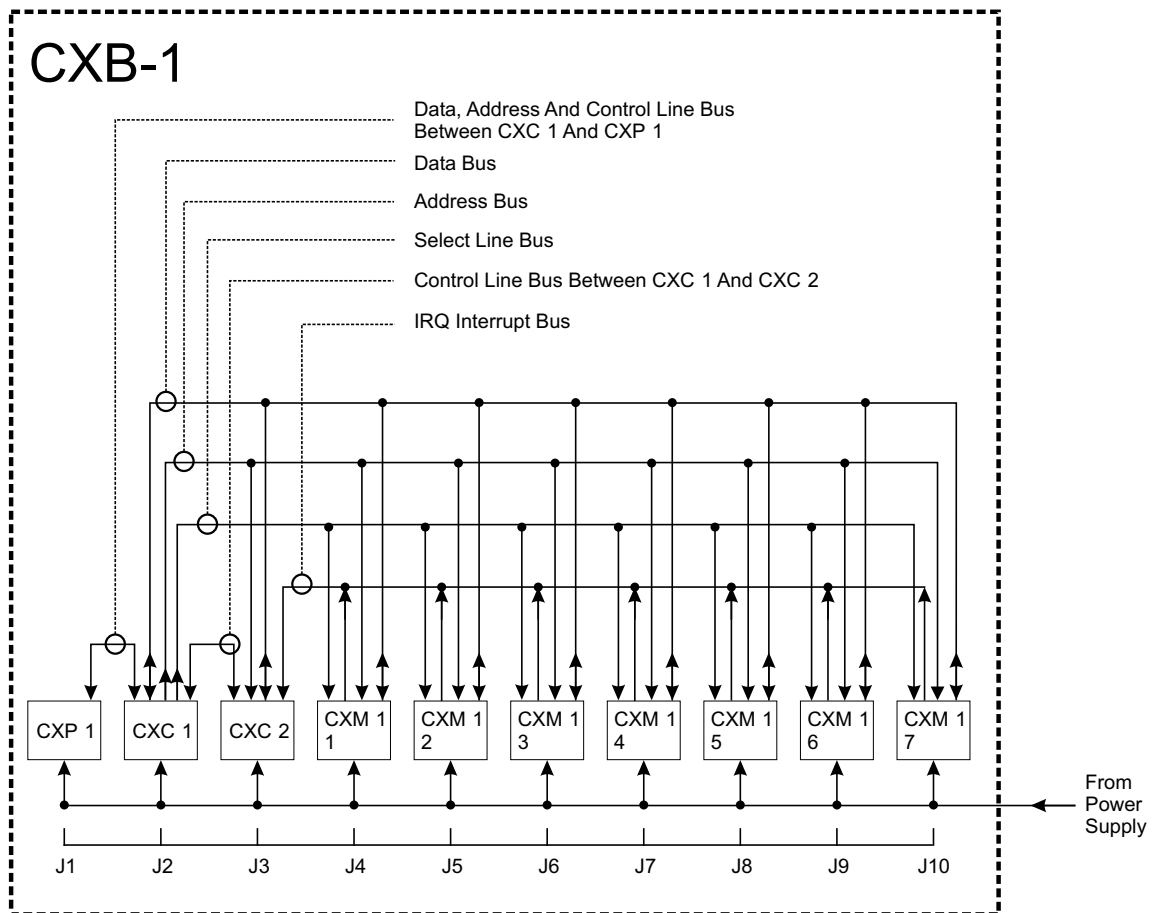


Figure 7  
Model CXB-1 Bus Configuration

The MMX-1 module requires a System XL3 to operate and can be located in any slot of the XL3 card cage (MBX-1). Required power is provided by the XL3 bus.

The module is a modem with intelligence provided by a 68A09 microprocessor. Input/output on this board is memory mapped. The Select circuit (Block 3) selects, according to the memory map, the appropriate ACIA (part of Blocks 5, 6, and 7) or memory devices (Block 9). The MMX-1 has three communication channels. Two are 20mA loop interfaces (Blocks 5 and 6). Block 6, which is passive, is intended for connection to the CPX1 module of the System XL3, which is active. Block 5 is an auxiliary port intended for a printer. The third channel (Block 7) is for modem communication with the CXL system. The memory section (Block 9) is comprised of EPROM, EEPROM, and RAM; all are addressable from the 68A09 microprocessor. In order to prevent unwanted writing to the EPROM due to low voltage supply levels, the protection circuit (Block 8) is included.

**CMI-300 MODULE** (Refer to Figure 9)

The CMI-300 used by the MXL is similar to the MMX-1 intelligent modem module used by the XL3. The CMI-300 provides (along with the CXM-1) modem communication between the MXL and the CXL systems. The CMI-300 module is located at the MXL site and translates signals from the MXL's serial communications link used by all the MXL's modules to modem signals for transmission along suitable cable to the CXM-1 module located at the CXL site.

The CMI-300 module operates with an MXL system and can be located in any MOM-4 slot. The required power is provided by the MXL or a PSR-1 (if located remotely). Refer to the MXL/MXLV OIM manual, P/N 315-092036.

The CMI-300 module is similar to the MMX-1 in its function. The microprocessor (CPU) used by the CMI-300 is a 68HC705C8. It differs only in that the communications to the MXL system are through the

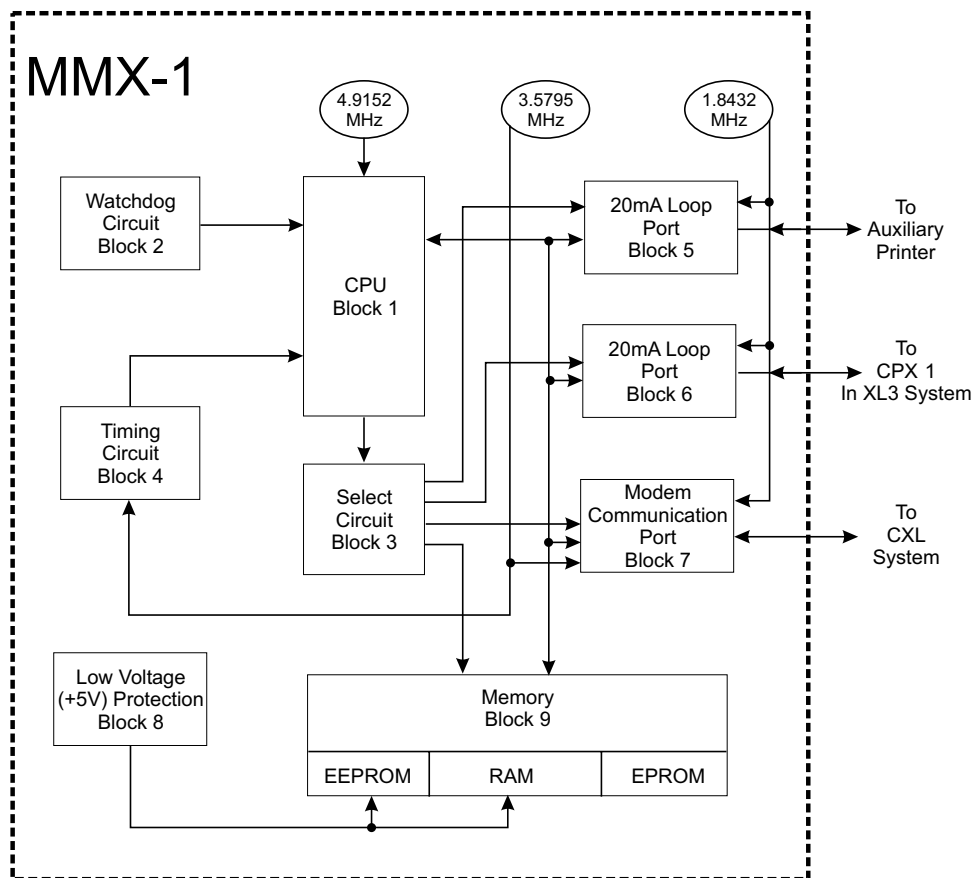


Figure 8  
Model MMX-1 Functional Block Diagram

custom RS485 serial communication port (instead of through a 20mA loop port used by the XL3) and the fact that there is no auxiliary printer port. MXL provides the port.

### OPERATING INSTRUCTIONS

This section provides instructions on how to interpret the CRT display and how to use the keyboard at the CRT. Each command available is listed, and the results of using that command are explained.

**NOTE:** The CXL must be **linked** to an XL3 or MXL when directing a command to that XL3 or MXL. Use F3 to link; that is, to tell the CXL which panel the command should be sent to. The panel linked is displayed in the upper left corner of the screen.

### DISPLAY AREAS

The following display lines are typical of a System CXL CRT display. The lines have been numbered to simplify the explanation of the display.

### LINES 1 - 4

In line 1, proceeding from left to right, the first field (block of information), **Linked XL** or **Linked MX** (for MXL), displays the XL3 or MXL system with which the CXL is linked. If no XL3 or MXL system is linked, the area where the XL3 or MXL number would be displayed is left blank, as it is below. If the CXL is linked to itself, the letter **C** is displayed.

The next field in line 1 displays the total number of troubles in the CXL system. The third field gives the total number of devices in alarm on all the XL3s or MXLs. The fourth field gives the total number of troubles on all the XL3s or MXLs. The next field gives the date, and the last field gives the CXL time.

Line 2 displays the identification numbers (1 - 28) of all those XL3 or MXL systems with at least one alarm. (The XL3 or MXL identification number is determined by the way in which the XL3 or MXL is wired into the CXL system.) If an alarm is *not* acknowledged, the corresponding XL3 or MXL number displayed blinks; if an alarm *is* acknowledged, the corresponding XL3 or MXL number displayed is steady.

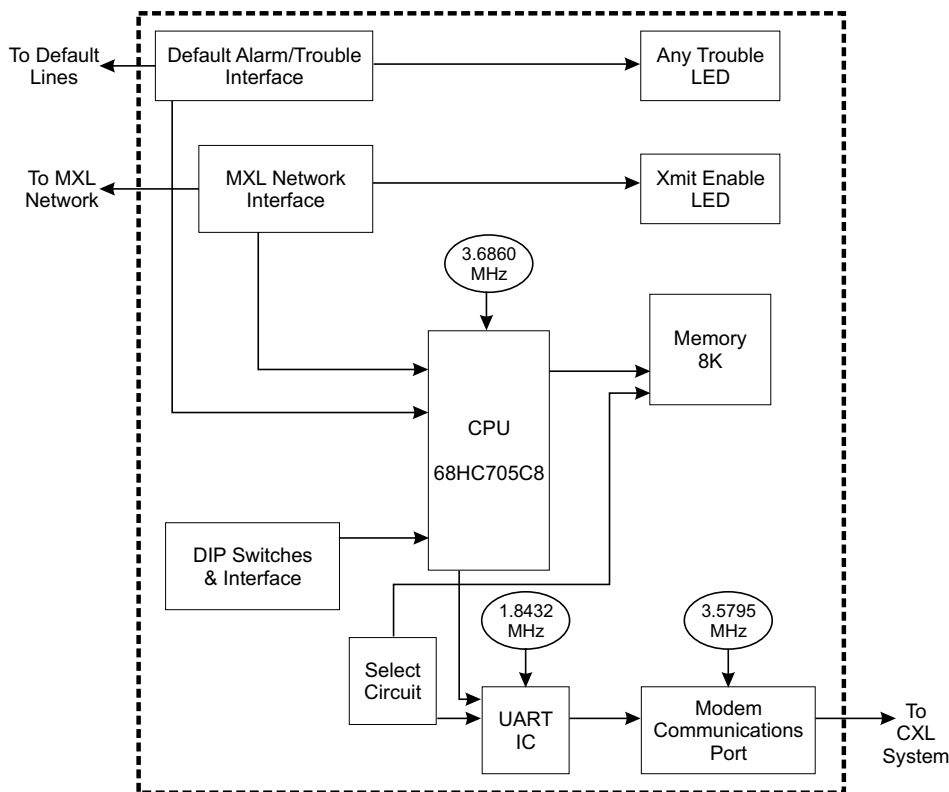


Figure 9  
Model CMI-300 Functional Block Diagram

Line 3 displays the identification numbers of the XL3 or MXL systems with at least one trouble. If a trouble is not acknowledged, the XL3 or MXL number blinks; if a trouble is acknowledged, the XL3 or MXL number is steady. In the example shown in Figure 10, only XL3 7 has a trouble condition.

Line 4 gives the numbers of all the XL3s or MXLs that have alarm audibles on. The numbers displayed here are always blinking. When the audibles corresponding to an XL3 or MXL number displayed are silenced for that XL3 or MXL, the number is no longer displayed.

### ACKNOWLEDGE AREA (Lines 5 and 6)

Lines 5 and 6 of the display together form the **acknowledge area** of the screen. Alarm and trouble messages use only one line (line 5). Line 6 is left blank to help line 5 to stand out. The oldest message (alarm or trouble) with the highest priority to be acknowledged is displayed in the acknowledge area. Whichever XL3 or MXL is displayed here is the XL3 or MXL acknowledged when the Acknowledge key **[Tab]** is pressed. When nothing needs to be acknowledged, this area is blank.

In the acknowledge area (lines 5 and 6) an XL3 or MXL alarm display overrides an XL3 or MXL trouble display. In other words, if an XL3 or MXL trouble is not acknowledged and an alarm is received, the alarm overrides the XL3 or MXL trouble in the acknowledge area. Likewise, an XL3 or MXL alarm or trouble overrides a CXL trouble. Also, a CXL trouble overrides an XL3 or MXL reset.

The acknowledgement of XL3 or MXL resets is required at the CXL even though it is not required at the XL3 or MXL. Acknowledgement of resets at the CXL ensures that notice of the restoration of the XL3

or MXL involved is made. The acknowledgement of a reset is not communicated to the XL3 or MXL involved, but it is printed. Acknowledgement of XL3 or MXL alarms and troubles, however, is communicated to the XL3 or MXL involved.

### MODES OF DISPLAY (Lines 7-21)

The area of the screen from lines 7 to 21 has three modes of display to choose from for monitoring the 28 XL3s or MXLs. A user can decide to:

- (1) display the latest device alarms and troubles (on all XL3s or MXLs),
- (2) display the queue of XL3 or MXL panels to be acknowledged, or
- (3) display the list of alarms and troubles for the XL3 or MXL being acknowledged only. The latter two modes of display also display the individual alarm and trouble counts of all XL3s or MXLs when all alarms and troubles have been previously acknowledged. In all three modes, CXL troubles are also handled in similar form to that of the XL3 or MXL troubles. The system defaults on power-up to the first mode, the display of the latest device alarms and troubles on all XL3s or MXLs.

There is a command available for entering each of the three modes of display. The modes can be switched at any time except when operating in a command. The Device Display command displays the latest device alarms and troubles on all XL3s or MXLs. The Acknowledge Queue command displays the queue of XL3 or MXL panels to be acknowledged. The List Display command displays the list of alarms or troubles for the XL3 or MXL being acknowledged. These commands are described below and also more fully on page 26.

```

1) Linked XL      Total CXL Trbl      Total Alarm  Total Trbl  001      Date Time
2) ALRMS
3) TRBLS 7
4) BELLS
5) 07-BUILDING 2 SOUTH WING          TROUBLE          JUL 08,20XX WED 14:18:40
6)
7) 07- BUILDING 2 SOUTH WING - 001  MODULE PSX OUT OF TROUBLE ACK WED 14:18:40
8) CPX PRINTED CIRCUIT BOARD-R.T.  CLOCK ON INTERNAL CRYSTAL          JUL 08,20XX

```

Figure 10  
Lines 1-6 and Device Display Mode

A user can link in any one of the three modes of display. If the CXL is linked to an XL3 or MXL, lines 7-21 become the area of the screen where commands entered by the operator are displayed. Data to be received by the linked XL3 or MXL in response to the commands is also shown in this area. When first linked, this area of the screen blanks, and the message **ENTER COMMAND** appears on line 7. Commands entered here are sent to the linked XL3 or MXL after all the data has been entered.

### Device Display Mode

The Device Display mode is the default display mode for lines 7 through 21. In this mode alarms and troubles display as they are shown on lines 7 and 8 in Figure 10. The fields on the screen display give the same information as on the XL3 printer, but they have been shifted to accommodate the size of the screen.

The first field gives the identification number of the XL3 or MXL involved. The next field is the custom message for that XL3 or MXL; in the case of the example: `BUILDING 2 SOUTH WING`.

The third field on line 7 gives the trouble number (001) in the XL3 or MXL system, followed by the trouble message `MODULE PSX OUT OF TROUBLE`, and then `ACK`, which signifies that the Trouble has been acknowledged. The next field, `WED 14:18:40`, gives the day and time at which the trouble occurred at the XL3 or MXL, not the time the trouble was received at the CXL. Line 8 completes the description of the trouble condition and is followed by the date it was originally received.

Since trouble and alarm messages received from XL3 or MXL systems use 132 characters, they require two lines of the 80 character screen of a CXL. CXL trouble messages are fully described in one line, however. A

typical one line CXL trouble message is:  
`CXL TROUBLE-1 XL 7 NOT REPORTING-JUL 08, 20XX`

CXL trouble messages involve supervision or communications problems—communications with XL3 systems, or supervision of internal CXL hardware (such as memory or modems) or of the printer or CRT.

Alarms and troubles appear on the CXL for an MXL in much the same way as an XL3. However, for the MXL a separate trouble type list is kept in the CXL for the MXL troubles. The addressing of an MXL device is displayed the same as an XL3 device, which is as follows:

`DEVICE MM-DD`, where MM is a 2 digit module address, and DD is the device address.

Note that the 2 digit module address is referred to with 3 digits at the MXL, but is shortened to agree with the 2 digit addressing of an XL3. A device address would appear in the third field in the Device Display mode in place of the `MODULE PSX` shown in the example.

### Acknowledge Queue Display Mode

The numbered display lines shown in Figure 11 are a typical screen display when operating in the Acknowledge Queue mode of display.

The area in lines 7 through 21 lists the XL3s or MXLs in need of acknowledgement in the typical example shown. XL3s or MXLs 06 and 12 are to be acknowledged after XL3 or MXL 07 is acknowledged. The fields for the Acknowledge Queue display are exactly the same as for the acknowledge area on lines 5 and 6 because the XL3s or MXLs shown are the XL3s or MXLs to be acknowledged next. The fields are the XL3 or MXL number, followed by the system custom message for that XL3 or MXL, the words **ALARM**,

| 1) Linked XL                | Total CXL Trbl | Total Alarm | Total Trbl | 002         | Date Time    |
|-----------------------------|----------------|-------------|------------|-------------|--------------|
| 2) ALRMS                    |                |             |            |             |              |
| 3) TRBLS 7 6                |                |             |            |             |              |
| 4) BELLS                    |                |             |            |             |              |
| 5) 07-BUILDING 2 SOUTH WING |                | TROUBLE     |            | JUL 08,20XX | WED 14:18:40 |
| 6)                          |                |             |            |             |              |
| 7) 06-BUILDING 3 NORTH WING |                | TROUBLE     |            | JUL 08,20XX | WED 14:33:02 |
| 8) 12-LIBRARY               |                | RESET       |            | JUL 08,20XX | WED 14:31:54 |

Figure 11  
 Acknowledge Queue Display Mode

**TROUBLE**, or **RESET**, and then the date and time. The date and time are taken from the XL3's or MXL's first alarm or trouble to arrive at the CXL from that XL3 or MXL. For **RESET**, the date and time displayed are from the CXL.

The advantage to this mode of display is that the operator can see the XL3 or MXL panels, in priority order, where an alarm, a trouble, or a reset occurs. No device information is given in this mode of display.

Note that no matter what display mode a user has on the screen, the printer always prints the same thing for an alarm or trouble—the information always includes both the XL3 or MXL and the device (or module) involved.

### List Display Mode

The numbered display lines shown in Figure 12 describe typical line displays when the List Display mode is used.

In this mode of display, lines 7 through 21 display the list of alarms or troubles for whatever appears in the acknowledge area, whether it is an XL3 or MXL, or the CXL (troubles only).

In the typical example shown, XL3 07 appears in the acknowledge area. Line 7 gives the title for the list shown. Only two types of lists are possible here—an alarm list and a trouble list. In this mode when XL3 resets need to be acknowledged, lines 7-21 are blank, since there are no alarms or troubles to be acknowledged.

Line 9 starts the list. The list in the example displays two troubles for XL3 07. The first field gives the XL3 count of the alarm or trouble. This is followed by the

device (or module) and its address. Next is the custom message for the device, followed by the type of trouble, if a trouble, or by the time and date, if an alarm.

The advantage of this mode of display is that the operator gets to see the alarms or troubles for only one XL3 or MXL, the one that is to be acknowledged.

The MXL displays its alarm or trouble list in the same format as that described for XL3 alarms or troubles. Maximum storage at the CXL is 128 alarms and 128 troubles. The List (LST) mode indicates PARTIAL LIST when more troubles (or alarms) than that amount exist on the system. All alarms and troubles can still be recalled through the List Alarms and Troubles commands (referred to in the Command section). The screen scrolls up through the full amount of alarms/troubles at an XL3 (128 max) or at an MXL (300 max).

## GENERAL COMMAND INFORMATION

### COMMAND FORMAT

Commands to an XL3 or MXL use two letters; commands to the CXL use three letters, except in the case of acknowledging or listing troubles or resetting. All commands are followed by pressing the Return key **[Return]** to enter the command. Most commands can also be entered by using a function key. A function key is indicated by **F**, followed by **n**, where **n** is a number from 1 through 12 indicating the function key that is used for that command. A function key command does not need to be followed by **[Return]**.

```

1) Linked XL   Total CXL Trbl   Total Alarm   Total Trbl   002   Date Time
2) ALRMS
3) TRBLS 7
4) BELLS
5) 07-BUILDING 2 SOUTH WING   TROUBLE           JUL 08-20XX WED 14:18:40
6)
7)                               TROUBLE LIST FOR XL 07
8)
9) 001 DEVICE 11-27 WAREHOUSE NORTH           -SUPERVISORY INPUT OFF NORM
10) 002 DEVICE 11-27 WAREHOUSE NORTH           -SUPERVISORY INPUT NOW NORM

```

Figure 12  
List Display Mode



## FUNCTION IN PROGRESS MESSAGE

The **FUNCTION IN PROGRESS** response on linked commands means that the command was sent to the XL3 or MXL involved. If the message **TIMEOUT ERROR** appears prior to this message, the command was sent to the XL3 or MXL, but the XL3 or MXL did not acknowledge its arrival. If this happens, check that the linked XL3 or MXL is powered up and that the communications line is connected. For any additional problems, refer to the **TROUBLESHOOTING GUIDE** on page 35.

## FUNCTION COMPLETE MESSAGE

The **FUNCTION COMPLETE** response on linked commands means that the command is completed. This response is displayed and printed out whether the command was completed correctly or not. It indicates that the XL3 or MXL has ended the command.

If a **TIMEOUT ERROR** message appears prior to this message, the XL3 or MXL did not respond to the

command. If this happens, retry the command. If the problem continues, refer to the **TROUBLESHOOTING GUIDE** on page 35.

## EXITING THE COMMANDS WHEN LINKED TO AN XL3 (or MXL)

On all commands entered when the CXL is linked to an XL3 or MXL, the message:

DEPRESS RETURN TO CONTINUE

appears at the bottom of the screen. To exit the command, press **[Return]**. Or, if there is no activity in the command for 1 minute, the system times out, aborts the command, and unlinks.

## CXL COMMANDS

The commands for the CXL are listed below in alphabetical order. Each command is described in corresponding order in the paragraphs following.

| COMMAND ENTRY | FUNCTION KEY | COMMAND DESCRIPTION         | COMMAND ENTRY | FUNCTION KEY | COMMAND DESCRIPTION               |
|---------------|--------------|-----------------------------|---------------|--------------|-----------------------------------|
| AA            | F4           | Acknowledge/Silence Alarms  | LA            | Shift F4     | List Alarms                       |
| AT            | F5           | Acknowledge Troubles        | LD            | Shift F6     | List Detector Voltage             |
| ^C            |              | Abort Command               | LF            |              | List Sensitivity                  |
| CH            |              | Change Holiday Schedule     | LIN           | F3           | Link                              |
| CLR           | F7           | Clear Command               | LOF           | F8           | Log Off                           |
| CO            |              | Change Output/Relay Control | LON           | Shift F8     | Log On                            |
| CR            | F6           | Reset                       | LS            | Shift F3     | List Status                       |
| CS            | Shift F2     | Change Sensitivity          | LT            | Shift F5     | List Troubles                     |
| CT            | Shift F7     | Set Time                    | LX            |              | Obtain XL3 or MXL Custom Messages |
| EL            |              | Enable Local Control        | MEN           | F12          | Command Menu                      |
| ^F            |              | Form Feed                   | REF           | Shift F9     | Refresh Screen                    |
| FUN           | Shift F12    | Function Key Assignment     | STA           | F2           | Status Display                    |
| HLT           | Shift F1     | Halt an XL3 or MXL          | [Tab]         |              | Acknowledge                       |
| IDS           | F1           | ID Display                  | UT            |              | Update Time                       |
| KL            |              | Kill Local Control          |               |              |                                   |

**CERBERUS PYROTRONICS™**  
**System CXL WIRING DIAGRAM**

The System CXL is a proprietary receiving unit meeting NFPA 72 requirements, with Styles 4 and 7 signaling, and Styles B and D initiating. It is suitable for installation as a proprietary multiplex system. Installation limits are under the jurisdiction of local authorities.

**NOTE 1:**  
 RS232C Interface Connections (SUPV)  
 P2 of CXC-1 is not used  
 P2 of CXC-1 is the CXL's auxiliary port  
 P2 of CXC-2 is assigned for the printer (RC-319) or (PIM-2/PAL-1)  
 P3 of CXC-2 is assigned for the CRT (RC-318)

**NOTE 2:**  
 Slot position of the CXL-1 determines the XL3 or MXL system number assignment as shown below

| Slot | Port | XL3 System Number | Slot | Port | XL3 System Number |
|------|------|-------------------|------|------|-------------------|
| 4    | 1    | 1                 | 8    | 1    | 17                |
| 4    | 2    | 2                 | 8    | 2    | 18                |
| 4    | 3    | 3                 | 8    | 3    | 19                |
| 4    | 4    | 4                 | 8    | 4    | 20                |
| 5    | 1    | 5                 | 9    | 1    | 21                |
| 5    | 2    | 6                 | 9    | 2    | 22                |
| 5    | 3    | 7                 | 9    | 3    | 23                |
| 5    | 4    | 8                 | 9    | 4    | 24                |
| 6    | 1    | 9                 | 10   | 1    | 25                |
| 6    | 2    | 10                | 10   | 2    | 26                |
| 6    | 3    | 11                | 10   | 3    | 27                |
| 6    | 4    | 12                | 10   | 4    | 28                |
| 7    | 1    | 13                |      |      |                   |
| 7    | 2    | 14                |      |      |                   |
| 7    | 3    | 15                |      |      |                   |
| 7    | 4    | 16                |      |      |                   |

**Wire Specifications for RS232C Interface**  
 Multiconductor cable overall shielded, 80° C, 300V, 22 AWG, stranded copper with maximum of seven strands should be used. Eight conductor cable is required for RS232C Interface. Recommended cable is P/N 465-986412. UL requires that the printer, CRT, and keyboard be in the same room as the CXL panel.

**NOTE 3:**  
 Relay terminals are shown below with no power applied. When system is powered, the trouble relay is normally energized, and the alarm relay is normally de-energized. Contacts are rated 3A, 125 VAC; 3A, 110 VDC; and 1A, 30 VDC.

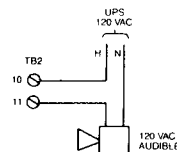
**TB1 Alarm Relay    TB2 Trouble Relay**

|      |       |
|------|-------|
| 1 NC | 7 NC  |
| 2 C  | 8 C   |
| 3 NO | 9 NO  |
| 4 NC | 10 NC |
| 5 C  | 11 C  |
| 6 NO | 12 NO |

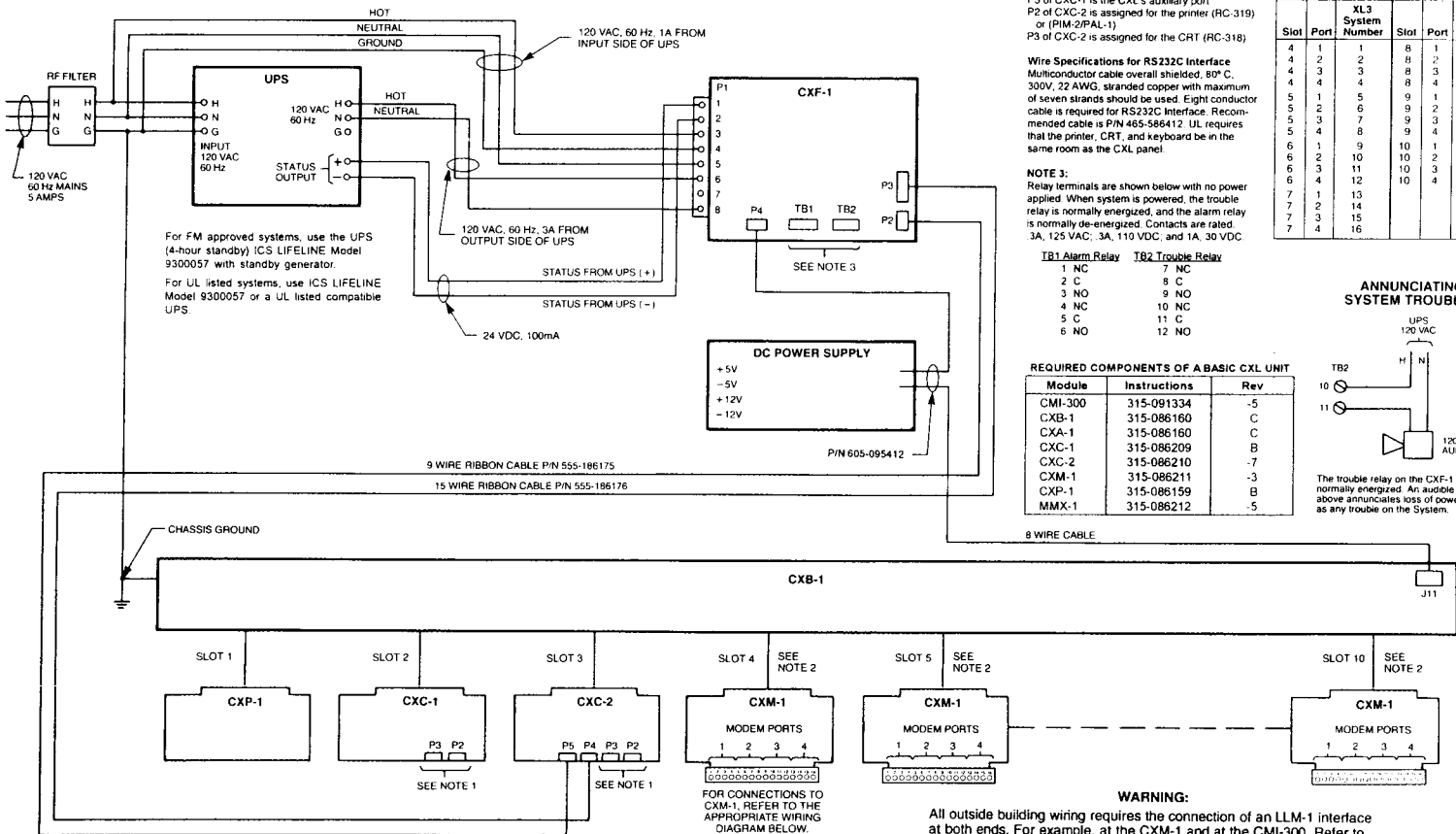
**REQUIRED COMPONENTS OF A BASIC CXL UNIT**

| Module  | Instructions | Rev |
|---------|--------------|-----|
| CMI-300 | 315-091334   | -5  |
| CXB-1   | 315-086160   | C   |
| CXA-1   | 315-086160   | C   |
| CXC-1   | 315-086209   | B   |
| CXC-2   | 315-086210   | -7  |
| CXM-1   | 315-086211   | -3  |
| CXP-1   | 315-086159   | B   |
| MMX-1   | 315-086212   | 5   |

**ANNUNCIATING SYSTEM TROUBLES**

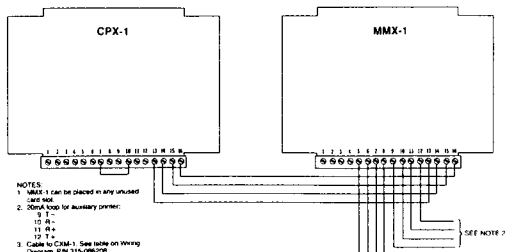


The trouble relay on the CXL-1 board is normally energized. An audible bell as above annunciates loss of power as well as any trouble on the System.



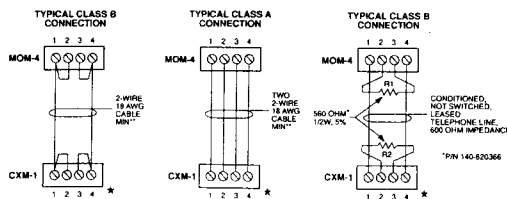
**WARNING:**  
 All outside building wiring requires the connection of an LLM-1 interface at both ends. For example, at the CXM-1 and at the CMI-300. Refer to the LLM-1 Installation Instructions, P/N 315-093530.

**WIRING INSIDE AN XL3 SYSTEM**



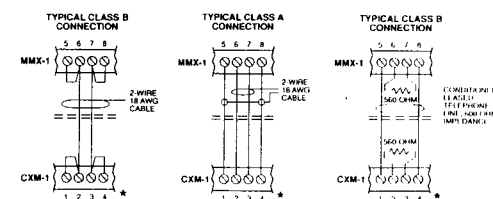
**NOTES:**  
 1. MMX-1 can be placed in any unused slot.  
 2. Check loop for auxiliary printer:  
 10 3+  
 11 3+  
 12 3+  
 3. Cable to CXM-1. See note on wiring diagram, P/N 315-086208.

**CONNECTIONS TO CXM-1 AND CMI-300**



Use 2-wire copper cable, 105°C, 300 V, 18 AWG, shield or stranded. Do not use phone plant service wire. Two 2-wire 18 AWG cable min. 560 OHM 100K 5% \*P/N 140-820366

**CONNECTIONS TO CXM-1 AND MMX-1 (SUPV)**



\* Terminals 5, 8, 9, 12, or 11, 16 may also be used

For additional information refer to the SYSTEM CXL OPERATION, INSTALLATION, and MAINTENANCE MANUAL, P/N 315-085683.

Siemens Building Technologies, Inc.  
 8 Fernwood Road  
 Florham Park, New Jersey 07932

Siemens Building Technologies, Ltd  
 50 East Pearce Street  
 Richmond Hill, Ontario L4B 1B7 CAN P/N 315-086208-7

## AA - ACKNOWLEDGE/SILENCE ALARMS

### Acknowledging and Silencing an XL3 or MXL alarm (AA [Return] or F4 or [Tab])

To acknowledge an XL3 or MXL alarm, enter **AA [Return]** or depress **F4** or the **[Tab]** key. The **[Tab]** key is recommended for acknowledgement since it acknowledges whatever is in the acknowledge area—alarm, trouble, or reset.

Alarm acknowledgement silences the local CXL audibles and asks the question:

SILENCE ALARM AUDIBLES=

This question refers to the audibles at the XL3 or MXL. Press **Y** if YES is desired or **N** for NO. If NO is answered, the audibles can be silenced at any later time by linking with the same XL3 or MXL, performing the AA command, and answering YES to silence the audibles.

**The AA command can be used for an XL3 or MXL to either turn audibles back on or to turn them off even after the XL3 or MXL alarm is acknowledged.**

After the silence alarm audible question is answered, the Alarm Acknowledge command gets sent to the XL3 or MXL involved. It also brings the next item to be acknowledged up in the acknowledge area (lines 5 and 6). If there is nothing else to be acknowledged, the area clears.

## AT-ACKNOWLEDGE TROUBLES

### Acknowledging an XL3 or MXL trouble or a CXL trouble (AT [Return] or F5 or [Tab])

To acknowledge an XL3, MXL, or CXL trouble, enter **AT [Return]** or press **F5** or the **[Tab]** key. The **[Tab]** is recommended for acknowledgement since it acknowledges whatever is in the acknowledge area—alarm, trouble, or reset.

Trouble acknowledgement silences the local CXL audible and brings the next item to be acknowledged up in the acknowledge area (lines 5 and 6). If there is nothing else to be acknowledged, this area clears.

## ^C —ABORT A COMMAND (Control C—[Ctrl] C)

To abort any command at any time, depress and hold down the Control key **[Ctrl]**, while at the same time depressing **C**. This aborts, or exits the operator out of, the command currently in progress. If the command was acting on an XL3 or MXL, the abort is sent down to the XL3 or MXL. The message **COMMAND ABORTED** then appears on line 25 of the screen. Use ^C to exit any command that does not automatically terminate such as the CH, CO, or CS commands.

## CH —CHANGE HOLIDAY SCHEDULE (CH [Return])

The command for changing the holiday schedule of an XL3 is **CH [Return]**. To use this command on a particular XL3, link to that XL3 before entering the command. The printer logs and the screen displays the following:

```
HOLIDAY SCHEDULE ENTRY MODE
VALID COMMANDS: ENTER E, DELETE D, LIST ?, KILL K
ENTER CHANGE HOLIDAY COMMAND =
```

At this point, the CXL is waiting for entry of one of the change holiday commands. A **K** will erase the holiday table; **?** will list the holidays currently in the XL3 memory. (Note: These holidays are not stored in the CXL.) Entry of the **E**

or **D** command requires that a holiday date be entered after it in the form **mmdd**, where **mm** is the month and **dd** is the day.

A maximum of 30 holidays can be entered on any XL3. A sample Enter Holiday command entry is **E0101** (enter January 1). Another example is **D1225** (delete December 25). A response of **FUNCTION COMPLETE** after each entry or deletion indicates the XL3 has taken the command. If there is an error, the XL3 sends an error message that appears before the **FUNCTION COMPLETE** response.

**NOTE:** This command causes the system to remain in the Change Holiday mode until ^C is entered.

**Use AccuLINK (CSG-M) to set holidays in an MXL.**

### **CLR —CLEAR (CLR [Return] or F7)**

The Clear command, **CLR [Return]** or **F7**, is used to see the unlinked screen when the CXL is linked. Using the command once causes the CXL to unlink and to remember the XL3 or MXL linked. To return to the linked XL3 or MXL, enter the CLR command again. [Note that the Clear command actually uses the LIN Command—on first use, it links to **0** (unlinks), and on second use, it links to the previously linked XL3 or MXL.]

### **CO —CHANGE OUTPUT/RELAY CONTROL (CO [Return])**

The command to change an output or input state is **CO [Return]**. This command requires that the CXL be linked with an XL3 or MXL. The command provides the capability to disarm an output or input from an XL3 or MXL system and to energize or de-energize an output. The act of disarming causes a trouble in the associated XL3 or MXL for the device disarmed.

When the **CO** command is entered for an XL3, the CXL displays and prints:

```
CHANGE OUTPUT MODE
VALID CONTROL ITEMS: SPX RELAY -1, POX RELAY -2, POX S.S. -3
ADDRESSABLE RELAY -4, CHANGE STATE OF INPUT -5, LOOP DISARM -6
ENTER DESIRED FUNCTION =
```

The change output command (**CO**) used with an MXL differs slightly from the XL3 use. There are only two valid control item choices: Inputs -1 or Outputs -2. There is no loop disarm feature for MXL.

Loop Disarm disarms all smoke detectors on an INX loop of an XL3 when the loop address is specified.

Select a valid control item by entering the number desired. The following questions then display and print:

```
ENTER ADDRESS =
ARM OR DISARM =
DESIRED STATE OF OUTPUT, ENERGIZED E, OFF D =
```

### **XL3**

At **ENTER ADDRESS**, enter a valid address for the device specified—a three digit address for SPX and POX outputs, a four digit address for addressable relays and input devices, and the two digit loop address for loop disarm.

## MXL

Enter the address for an MXL device to be controlled as follows: **MMDD** where **MM** is the module number 01-99, and **DD** is the device number 01-99.

At **ARM** or **DISARM**, enter **A** or **D** for **arm** or **disarm**, respectively. If **disarm** is chosen, and the operator previously selected items 1, 2, 3, or 4, which require an output, the next question shown, **DESIRE STATE OF OUTPUT, ENERGIZED E, OFF D =** appears. An answer of **E** energizes the output; **D** de-energizes the output. A response **FUNCTION COMPLETE** indicates the XL3 or MXL took the command.

To rearm a device that has been disarmed, either repeat the command or reset the XL3 or MXL. Resetting the XL3 or MXL rearms all disarmed devices unless **DISARM THROUGH A RESET** was chosen as a CSG/AccuLINK (CSG-M) in the XL3 or MXL, respectively.

**NOTE:** This command causes the system to remain in the Change Output mode until ^C is entered.

## CR —RESET

**Reset or Change reset an XL3, MXL, or a CXL (CR [Return] or F6)**

The command for resetting an XL3, MXL, or CXL is **CR [Return]**. The XL3 or MXL to be reset must be linked with the CXL. The CXL must be linked to itself to be reset. The command is only accepted after the XL3 system, MXL system, or CXL system has one or more alarms or troubles, all alarms and troubles are acknowledged, and all audibles are silenced. Typical XL3, MXL, or CXL error messages for this command are:

```
ALL ALARMS NOT ACKNOWLEDGED
ALARM AUDIBLES NOT SILENCED
ALL TROUBLES NOT ACKNOWLEDGED.
```

If a reset is not accepted, an error message appears before **FUNCTION COMPLETE**. When the command is accepted, the reset response must be acknowledged. The acknowledgement ensures that the reset is recognized.

## CS —CHANGE SENSITIVITY (CS [Return] or Shift F2)

This command changes the sensitivity of a smoke detector at an XL3 or MXL. The XL3 or MXL involved must be linked to the CXL. When the command is entered, the following display appears:

```
CHANGE SENSITIVITY MODE
ENTER INX OR ALD AND DETECTOR NUMBER =
ENTER DESIRED SENSITIVITY 1, 2, 3 =
```

Enter the INX or ALD and detector number in the form **nnxx**, where **nn** is the loop number and **xx** is the device number. For example, **1102** is loop 11, device 02.

Enter the desired level of sensitivity. The **0** is the lowest sensitivity and **3** is the highest sensitivity (most sensitive to smoke).

Typical error messages that might appear are **INPUT DEVICE ID MISMATCH** (means device is not of a type that has sensitivity) or **DEVICE PRESENTLY NOT ON SYSTEM**. If **FUNCTION COMPLETE** is displayed with no error message preceding it, the command is complete.

**NOTE:** This command causes the system to remain in the Change Sensitivity mode until C is entered.

## **CT—CHANGE TIME/SET TIME (CT [Return] or Shift F7)**

The command for setting the time at the CXL and at all the connected XL3s (when not linked to any XL3) or for MXLs is **CT [Return]**. The screen displays:

```
DATE 01-JAN-01 TIME 00:01
```

Place the cursor on the date, using the arrow keys to move the cursor. Enter the correct date in the form **dd-mmm-yy**, where **dd** is the day of the month (01-31), **mmm** is the month (usual abbreviations), and **yy** is the year (00-99). The "-"s can be entered as hyphens or as spaces (with the space bar). Until the entry is set by pressing **[Return]**, the arrow keys should be used to move the cursor within the entry to make corrections.

Place the cursor on the time. Enter the time in the form **hh:mm**, where **hh** is the hour in military time (00-23) and **mm** is the minutes (00-59). The seconds time is set at 00 by pressing **[Return]** when the command is completed.

The correct day of the week should appear at the beginning of the line in the form **www**, where **www** is the first three letters of the day. At this point any errors in the entry can still be corrected. Otherwise, depress **[Return]** again to set the time for the CXL and for all the connected XL3s or MXLs.

## **EL—ENABLE LOCAL CONTROL (This command does not apply to MXL)**

### **Enabling control from the XL3 local printer (EL [Return])**

This command enables performing commands with the XL3 local printer. The XL3 involved must be linked to the CXL. Once the command is sent, a user has 15 minutes to log on at the XL3 printer. This is done by going to the printer and typing **LI [Return]** and then entering a password.

When the user has logged on and entered a password, a message is sent to the CXL saying that the printer has taken control. This causes the CXL to clear out any alarms and troubles it is displaying for this XL3, provided that they have been acknowledged (and also silenced in the case of alarms). A trouble appears for this XL3 saying **LOCAL PRINTER CONTROL ENABLED**. This requires acknowledgement at the CXL. However, no other activity reports to the CXL until the MMX local printer has its control disabled.

The user at the MMX printer can then enter commands at the XL3 as if it were connected directly to the CPX-1. No command activity or troubles report to the CXL. Alarm reporting depends on the access level the user logged in at. In any case, the local printer logs everything.

## **^F—FORM FEED (Control-F [Ctrl] F)**

This command sends a form feed message to the printer so that the printer is set at the top of a new form. To execute the command, depress and hold down the Control key and at the same time depress **F**.

## **FUN-FUNCTION KEY ASSIGNMENT (FUN [Return] or Shift F12)**

The command for displaying the function key assignment for the CXL is **FUN [Return]**. The list appears on lines 7 through 21 of the screen. Depressing **[Return]** wipes the display off the screen and returns the previous display. If **[Return]** is not pressed, the menu times out in 30 seconds.

## **HLT—HALT AN XL3 or MXL FROM COMMUNICATING (HLT [Return] or Shift F1)**

This command can be used at any time to disconnect a particular XL3 or MXL system if desirable; for example, where an XL3 or MXL is continually reporting already known troubles. When the command is entered, the screen displays:

```
ENTER XL TO HALT =  
ARE YOU SURE? [Y OR N]=
```

Enter the XL3 or MXL number desired and answer **yes** or **no**.

The XL3 or MXL which is halted gives a CXL trouble message within 24 seconds:

```
XL (or MXL) xx NOT REPORTING (where xx is the XL3 or MXL number)
```

The XL3 or MXL number now appears on the trouble status line, and the command is printed out indicating the XL3 or MXL is halted.

Linking to the halted XL3 or MXL restarts it. A CXL trouble:

```
XL (or MXL) xx REPORTING
```

appears within 8 seconds to signal the restoration of the XL3 or MXL communications. (This type of trouble is actually a message to inform the operator of a change in the system, not a problem that needs attention.)

**WARNING:** This command should only be used when any XL3 or MXL activity affects the ability of the CXL to properly report on the entire system.

## **IDS —DISPLAYING ALL XL3 or MXL CUSTOM MESSAGES (IDS [Return] or F1)**

The IDS command is used to display the custom messages for all XL3s or MXLs on the system on lines 7 through 21. Once the messages are displayed, depressing **[Return]** returns the screen to its previous display. If no key is depressed for 1 minute after the messages are displayed, the screen times out and returns automatically to the previous display.

## **KL —KILL LOCAL CONTROL (This command does not apply to MXL)**

Killing control from the XL3 local printer (KL [Return])

This command disables the ability to do commands through the XL3 local printer. The CXL must be linked to the XL3 involved. Other ways control can be returned to the CXL are:

1. User logs off the MMX printer.
2. User leaves the printer logged on and does not make a keyboard entry for 1 hour (automatic log off).
3. A hardware reset of the XL3 has occurred.
4. An alarm has come in to the XL3 system and the user logged on with the password access level that causes alarms to pass through to the CXL. Control is also returned to the CXL in this case. The maximum amount of alarms for an XL3 is 128. The maximum amount of alarms for an MXL is 300.

Control is returned to the CXL with the MMX sending the message **LOCAL PRINTER CONTROL DISABLED**. The CXL prints and handles this message as an XL3 trouble. When control is returned to the CXL, the MMX also performs a list status for the XL3 that it is connected to. This allows the CXL to be updated with respect to this

XL3, as when the MMX local printer was in control and nothing was reporting through to the CXL. This updates the CXL status lines only.

### LA —LIST ALARMS FOR AN XL3 or MXL (LA [Return] or Shift F4)

The LA command is used to list the alarms for an XL3 or MXL. It is necessary for the CXL to be linked to the XL3 or MXL if the command is to work. The list of alarms is sent from the XL3 or MXL, not the CXL, and is both displayed and printed. The time it takes for the information to be sent results in some delays during the listing of the alarms. The maximum amount of alarms for an XL3 is 128. The maximum amount of alarms for an MXL is 300.

### LD —LIST DETECTOR VOLTAGES (LD [Return] or Shift F6)

To list detector voltages, enter **LD [Return]**. It is necessary for the CXL to be linked to the XL3 or MXL.

For an XL3 the following questions display and print:

```
DETECTOR VOLTAGE LIST MODE
CHOOSE DESIRED VOLTAGE 0-DET, 1-2ND ID, 2-CAL., 3-ID =
CHOOSE DESIRED ZONE TO BE READ =
```

Answer the first question (line 2) to indicate the desired type of voltage:

- 0 = sensor voltage
- 1 = second identification voltage for device
- 2 = device calibration voltage
- 3 = device identification voltage

Next, respond to line 3 by entering the two digits for the desired INX loop of the XL3 selected. If **AZ** is entered for line 3, the voltages for all loops on the linked XL3 print out, and the voltage for the last loop of that XL3 display.

The requested voltages display and print with a header line identifying the device numbers (**00- 31**). The voltages display under the header and print under the header in compressed type.

**NOTE: XXXX** is always printed for devices 00 and 31, as well as for any devices not defined on the system.

For an **MXL** the following questions display and print:

```
DETECTOR VOLTAGE LIST MODE
CHOOSE DESIRED ZONE TO BE READ=
```

For an MXL, respond to line2 by entering the two digits for the desired ALD loop of the MXL linked. If **AZ** is entered for line 2, the voltages for all the loops on the linked MXL print out, and only the voltages for the last loop of that MXLdisplay. The MXL displays the detector voltage only because calibration and ID voltages have no meaning in an MXL.

Next, for an MXL, the following question displays and prints:

```
CHOOSE DESIRED HALF OF LOOP 1-ST 1 TO 30, 2-2ND 31 TO 60
```

For an MXL, the requested voltages display and print with a header line identifying the device numbers 00-31 or 30-61, depending on which half of the loop is selected. The voltages display under the header and print under the header in compressed type.

**NOTE: XXXX** is always printed for devices 00 and 61, as well as for any devices not defined on the system.



## LF —LIST SENSITIVITY (LF [Return])

To list sensitivities, enter **LF [Return]** when linked to an XL3 or MXL. The information displayed and printed is:

```
LIST SENSITIVITY MODE
CHOOSE DESIRED ZONE TO BE READ =
```

To display and print the sensitivity voltages for the whole loop, enter the INX or ALD loop number desired for the XL3 or MXL.

The LF list is a voltage list related to that obtained from the List Detector Voltages command described above. The voltage listed for a device using LF indicates how far that device is from the alarm threshold, while LD indicates the sensor voltage.

## LIN —LINKING WITH AN XL3, MXL, OR CXL (LIN [Return] or F3)

Entering the command **LIN [Return]** to link with an XL3 or MXL results in the display:

```
LINK, ENTER XL =
```

Enter an XL3 or MXL number followed by **[Return]** to link the CXL to that XL3 or MXL.

Entering the command **LIN [Return]** to link with a CXL results in the same display. Enter **C** followed by **[Return]** to link the CXL to itself.

Entering the XL3 or MXL number **0** or no number at all automatically unlinks the CXL. The CXL also unlinks if there is no activity on the keyboard or from the XL3 or MXL that it is linked to for 1 minute.

Linking with an XL3 or MXL holds up the printing of all new alarms and troubles from other XL3s or MXLs until the CXL is unlinked. An attempted link to a new XL3 or MXL could cause the message **WAIT FOR PRINTER** on line 25 if the printer has not caught up from a previous link.

If the memory buffer in the CXL fills up with XL3 or MXL alarms and troubles while still linked to another XL3 or MXL, the message **MEMORY BUFFER FULL, UNLINK** might display on line 25. In this case, the CXL does not accept any more alarms or troubles from XL3s or MXLs until the CXL is unlinked, so as to allow the printer to catch up.

## LOF —LOGGING OFF (LOF [Return])

To log off, enter **LOF [Return]**. The command prints and **CTRL MODE** is removed from line 25 of the screen; thus indicating that the operator is no longer in the Control Mode. As a result, any change command or command that starts with a **C** won't be accepted; for example, resetting an XL3 (**CR**) or changing the time (**CT**) won't be allowed.

## LON —LOGGING ON (LON [Return])

To log on and permit **C** commands, enter **LON [Return]**. The message **ENTER PASSWORD =** appears on the screen. Enter the correct password for that CXL system.

**NOTE:** Refer to the Installation Instructions for the CXC-2 module (P/N 315-086209) for instructions on selecting passwords.

An incorrect password entry prevents re-entry of the LON command for 15 seconds. This feature prevents an operator from making rapidly repeated attempts to find the correct password.

When the correct password is entered, followed by **[Return]**, the words **CTRL MODE** reappear on the screen, and the message **KEYBOARD UNLOCKED** appears on the printer, indicating **C** commands may be used.

### **LS —LIST STATUS (LS [Return] or Shift F3)**

Entering the command **LS [Return]**, displays and prints the number of alarms, the number of troubles, and the number of alarms and troubles acknowledged for a linked XL3 or MXL. The maximum number of alarms or troubles for an XL3 is 128, and the maximum number of alarms or troubles for an MXL is 300.

### **LT —LIST TROUBLES FOR AN XL3, MXL, OR CXL (LT [Return] or Shift F5)**

The **LT** command is used to list the troubles for an XL3, MXL, or CXL. The CXL must be linked to the XL3, MXL, or to itself for the command to work. The list of troubles is both displayed and printed. The XL3 or MXL trouble list is sent from the XL3 or MXL, not from the CXL. The time it takes for the information to be sent from the XL3 or MXL results in delays during the listing. The maximum number of troubles for an XL3 is 128, and the maximum number of troubles for the MXL is 300.

### **LX —OBTAIN XL3 or MXL SYSTEM CUSTOM MESSAGES (LX [Return])**

The command for obtaining the XL3 or MXL system custom messages is **LX [Return]**. This command can be done either unlinked, to all XL3s or MXLs, or linked, to one XL3 or MXL. No response is shown on the terminal to this command. However, 10 seconds after this command is entered, using the **IDS** command should show all current XL3 or MXL system custom messages.

### **MEN —COMMAND MENU DISPLAY (MEN [Return] or F12)**

The command used to display the Command menu is **MEN [Return]**. The list of commands appears on lines 7 through 21 of the screen. Depressing **[Return]** wipes the menu off the screen and returns the previous display. If **[Return]** is not pressed, the menu times out in 30 seconds.

### **REF —REFRESH THE SCREEN (REF [Return])**

The **REF [Return]** command should be used if the screen appears distorted or if the CRT was shut down or had been in the Test Mode.

**NOTE:** A powered down color terminal does not automatically restore itself—the Refresh command must be run to restore the screen display.

### **STA —STATUS DISPLAY (STA [Return] or F2)**

To display the status of all of the XL3s or MXLs on a CXL, enter **STA [Return]**. Lines 7 through 21 of the screen then display the numbers of alarms and troubles for all the XL3s or MXLs on the CXL.

## **[Tab] Key —ACKNOWLEDGE ([TAB] Key or [Tab] [Return])**

The **[Tab]** key acknowledges anything in the acknowledge area of the screen. For approximately 1 second after an acknowledge area message changes, a **[Tab]** acknowledge is non-operational to make sure the CXL operator has time to recognize that there is a new message.

A **[Tab]** acknowledge silences a local CXL audible immediately. Nothing else results from the acknowledge until the response from the XL3 or MXL involved is received. For example, the flashing XL3 or MXL number and the flashing **NAK** on an XL3 or MXL trouble message are not removed until the acknowledge response is received from the XL3 or MXL.

## **UT —UPDATE THE TIME (UT [Return])**

The command **UT [Return]** updates the time at an XL3 or MXL. The XL3 or MXL involved must be linked to the CXL. When the command is entered, the screen displays the following message for 2 seconds:

XL TIME UPDATED

The printout that results is the same as the printout received from the CT command. A return of the status of the XL3 or MXL to the printer following this command indicates that the XL3 or MXL took the time correctly.

The operator does not have to enter the time when using the UT command because the time on the CXL is sent to the XL3 or MXL. This feature makes the UT command more efficient than the CT command.

## **CHANGE DISPLAY MODE COMMANDS**

### **DEVICE DISPLAY MODE (DEV [Return] or F9)**

To enter the mode which displays the latest device alarms or troubles, use the command **DEV [Return]** or **F9**. In this Device Display mode, lines 7 through 21 display the latest device alarms and troubles occurring from all 28 XL3s or MXLs in order of arrival. (In this mode there is no priority other than the order of arrival.)

Acknowledging alarms and troubles is always the same since the acknowledge area (lines 5 and 6) does not change when modes are changed. The priority of acknowledging does not change either; that is, the XL3 or MXL alarms have the highest priority, followed by the XL3 troubles, the CXL troubles, and then the XL3 or MXL resets.

In the Device Display mode all XL3 or MXL alarms and XL3 or MXL troubles are two lines long. The alarms have a red background and the troubles have a yellow background. The information included in these reports is the XL3 or MXL number, the XL3 or

MXL system custom message, the count number, the device or module address involved, the device custom message, the type of trouble or the words **NEW ALARM**, and the time and date.

The CXL troubles are only one line long and display with a yellow background. They include the words **CXL TROUBLE**, the date, the count number, the type of trouble (including the XL3 or MXL number if it pertains to an XL3 or MXL), and the time.

### **ACKNOWLEDGE QUEUE DISPLAY MODE (ACQ [Return] or F10)**

Enter the Acknowledge Queue Display mode to display the XL3 or MXL panels, in order of priority, that are not acknowledged yet. Use the command **ACQ [Return]** or **F10**. Each XL3 or MXL report requiring acknowledgment is one line long. Each displays the XL3 or MXL number, the XL3 or MXL system custom message, the type of report (alarm, trouble, or reset), and the time and date. Alarms have a red background,

troubles a yellow background, and resets a green background.

The display in this mode starts with the report to be acknowledged next after the report that is in the acknowledge area. If the acknowledge area contains the final report or is blank, the Acknowledge Queue Display mode has nothing to display. In this case, instead of a blank screen, the screen displays the Status list (See **STA** above).

### **LIST DISPLAY MODE (LST [Return] or FI 1)**

To display the list of device alarms or troubles for the XL3 or MXL being acknowledged only, enter the command **LST [Return]** or **F11**. The alarms or troubles are displayed as one line reports. Each report includes the count number, the device or module address, the device custom message, and for alarms, the time and date, or for troubles, the type.

This mode is used to show the CXL operator what he is acknowledging at an XL3 or MXL. The list appears almost simultaneously with the XL3 or MXL to be acknowledged in the acknowledge area. If additional information is desired, or if the list displayed is not complete, the operator can link and use the List Alarms or List Troubles command.

If there are more alarms and/or troubles at the XL3 or MXL than can fit on the screen, line 25 displays **DEPRESS RETURN TO CONTINUE**. Press **[Return]** for the next screen of reports. When the display reaches the last alarm or trouble, line 25 displays **DEPRESS TAB TO ACKNOWLEDGE**. Press **[Return]** to go to the beginning of the list. At any time in this mode an alarm or trouble can be acknowledged by pressing the **[Tab]** key.

The display list in this mode comes from a buffer of the latest 128 XL3 or MXL alarms and 128 XL3 or MXL troubles. If more troubles exist than are in this buffer, only a partial list displays for the XL3 or MXL. In that

case, the words **PARTIAL LIST** appear at the top of the screen. They also appear any time the list that is shown on the screen does not start from the beginning.

### **PRINTER FORMAT**

All XL3 or MXL messages printed on the CXL printer consist of two lines. The first line records the XL3 or MXL identification number and the System custom message for that XL3 or MXL. The second line gives the message as it would print on a local XL3 or MXL printer (Refer to the XL3 **Manual**, P/N 315-083206 or the **MXL/ MXLV Manual**, P/N 315-092036); that is, it gives the message using four fields, separated by a dash (-).

The first field gives:

The count (if there is an alarm or trouble), the device or module number (if it applies), and/or the type of message (such as IN ALARM, IN TROUBLE, etc.).

The second field gives:

The custom message (if there is one).

The third field gives:

An expanded type of message information.

The fourth field gives:

The time and date.

CXL troubles and commands print in a manner similar to how they appear on the color terminal screen.

Devices programmed into an XL3 or MXL as Status Reporting Devices log on the printer only. No display appears on the color terminal. The printer prints these reports in a format similar to that of all XL3 or MXL printer messages. The words **STATE CHANGE** appear as the type of message in the first fields, and the words **DEVICE IN** (or **NOT IN**) **NORMAL STATE** appear in the third field.

## INSTALLATION

This section provides the instructions for mounting, for wiring, and for the checkout procedure for the CXL system.

Review this section before installing the equipment, as the reliability and integrity of the System depend on proper equipment installation. The **INTRODUCTION** section should also be reviewed if the installer is not familiar with the equipment. Any questions should be addressed to an authorized Siemens Building Technologies, Inc. Representative. The System should be installed and used in accordance with the appropriate local, NFPA, and NEC code requirements.

**CAUTION:** Refer to page 35 in this manual for a Warning note that is required by the FCC for all commercial Class A computing equipment producing a clock frequency of 10 KHz or more.

### INSTALLING THE SYSTEM

1. Install the EBX-1 enclosure.

The enclosure should be securely fastened to a clean, dry, shock- and vibration-free surface. Consider the following factors when mounting: height, as it relates to the display annunciator and operator controls, weight, size, and local mounting codes.

The EBX-1, System XL3/CXL enclosure, is designed for surface or flush mounting and should be positioned clear of obstructions so that the cabinet door can open freely and the indicators and controls are easily accessible.

2. Pull all field wiring into the enclosure.
3. Connect power sources.

System CXL is designed to operate from a 120 VAC, 60 Hz power source. A separate or dedicated circuitbreaker must be used. Wire in accordance with local codes and/or Article 760, **Fire Protection Signalling Systems** of the National Electrical Code NFPA No. 72, latest edition.

An earth ground must be run from a suitable source to the chassis (terminated at the line filter). Check local requirements.

### MAKE SURE THAT ALL POWER IS OFF BEFORE CONNECTING LEADS.

When using an uninterruptible power system (UPS), run the following wires in one dedicated conduit from the UPS to the CXL enclosure.

- AC mains from the input of the UPS
- AC from the output of the UPS
- UPS status

Wire sizes must conform to the local wiring codes. When not using a UPS, run the AC mains in conduit to the CXL enclosure.

4. Install the RF line filter.

### MAKE SURE THAT ALL POWER IS OFF BEFORE CONNECTING LEADS.

As per FCC requirements, AC power must be connected to the line filter to minimize radio frequency interference. Wire the line filter as shown in Figure 3 of the **CXB-1/CXA-1 Installation Instructions**, P/N 315-086160, before mounting the assembly on the AC input conduit in the enclosure. Keep the **line** side wires as short as possible and position the **load** side wires away from the **line** side wires. The UPS status wires should enter the line filter, and then exit through the small hole on the **line** side of the filter.

5. Install the CXA-1 and CXB-1 as follows:

Mount the CXA-1 in the top section and the CXB-1 in the middle section of the enclosure. Use the studs on the back of the enclosure and the washers and hex nuts provided. Refer to Figures 7 and 8.

6. Install and dress power wires:

Route the power wires from the load side to the 8 pin screw terminal on the left side of the CXF-1 module.

7. Mount module handles:

Note carefully the slot assignments. Refer to **TABLE 3, SLOT ASSIGNMENT TABLE** for module placement. Use the blank handles supplied for any unused slots.

| TABLE 3<br>SLOT ASSIGNMENT TABLE |       |       |        |
|----------------------------------|-------|-------|--------|
| CXP-1                            | CXC-1 | CXC-2 | CXM-1  |
| J1                               | J2    | J3    | J4-J10 |

8. Install and dress the CXF-1 cables to the CXC-2 cables:

Note that each of these connectors has a different size polarized connector so they cannot be confused. Connect the cables to the CXF-1 module. Route the cables to the right rear of the enclosure, down along the right side and under the CXB-1 to slot 3 and up to the front of the handle. Since the module is not in place, temporarily fasten the cable to the handle with tape that will not damage the cable.

9. Install and dress field wiring to the module handles. Route the field wiring from the XL3 or MXL systems along the bottoms of the handles. Break the wires for each of the CXM-1 modules out of the main bundle and route them along the sides of their respective handles. Be sure that no wires cross in front of any handle other than the one to which they are connected. Be sure to leave a small amount of slack in the wires to form a service loop.

10. Connect the power cable:

Push the 9 pin in-line connector onto the power supply pins. The connector key is located at the lower end. Dress the end of the cable terminated with the 6 position connector to the right and down through the top of the CXB-1. Push the connector onto J11 on the CXB-1; the connector is keyed. Dress the end of the cable with the 2 wire connector to the left and forward to the lower edge of the CXF-1. Push it onto P4 on the CXF-1. This connector is also keyed.

11. To set up the RC-318 CRT, follow the assembly directions for the IBM Display Station Setup shipped with the terminal (Section 9, page 8).
- a. Follow the IBM instructions to display the SETUP menu shown below. Depress the **[Ctrl]** and **[Select]** keys simultaneously.

### SETUP MENU

|                        |           |                |
|------------------------|-----------|----------------|
| Machine mode: IBM 3164 |           |                |
| Operating mode: Echo   |           |                |
|                        | Main Port | Auxiliary Port |
| Interface              | RS-232C   |                |
| Line control           | PRTS      |                |
| Line speed             | 9600      | 9600           |
| Parity                 | ODD       | ODD            |
| Turnaround character   | CR        |                |
| Stop bit               | 1         | 1              |
| Word length            | 7         | 7              |
| Response delay         | 100       |                |
| Break signal           | 500       |                |

Terminal ID: \_\_\_\_\_

The menu items are shown as they should be set. Use the arrow keys to reach each item. Depress the space bar to view the choices and to set the correct choice. (Refer to Section 9d of the IBM instructions.) When the CRT display duplicates the menu above, depress the **[Send]** key to program the terminal. The terminal will now power up in this format.

- b. The SELECT menu must be programmed also. Depress the **[Select]** key. The menu shown below (Menu 1) will appear at the bottom of the screen. The cursor will appear to the left of the menu. Menu 1 is:

```
SELECT:  ENTER=RETURN; RETURN=FIELD;
NEWLINE=CR; TAB=FIELD; LINE WRAP=OFF
```

Duplicate Menu 1 using the cursor keys and the space bar. Then press the **[Send]** key to display Menu 2:

```
AUTO LF=OFF; SEND=PAGE; SEND NULL=ON;
INSERT=MODE; TRACE=ALL; CRT SAVER=NO
```

Duplicate Menu 2 and depress **[Send]** to display Menu 3:

```
SCROLL=JUMP; PRINT=PAGE; PRINT NULL=ON;
PRINT EOL=ON; LINE END=CR LF
```

Duplicate Menu 3 and press **[Send]** to set the menu. Depress **[Select]** to exit from the menu. The terminal is now set up to work with System CXL.

Also set the type of cursor being displayed. The cursor type changes when the operator depresses **[Ctrl]** and presses **[Jump]** simultaneously. Holding **[Ctrl]** down, press **[Jump]** until the cursor displayed is a flashing bar.

Connect the CXL RS232C cable into the terminal's logic element 2 connector as shown in the IBM directions (Section 14, page 12). IBM refers to our cable as the "communication cable." The CXL is then powered up.

**NOTE:** If the CXL has been run previously, the Refresh command (press **REF** and **[Return]**) will refresh the screen.

12. Setup the RC-319 printer by turning it on, switch to Local (**LCL**) mode, and depress the **CNFG** switch on the keyboard. Enter the following number sequence:

```
13 [CR]
28 [CR]
35 [CR]
81 [CR]
83 [CR]
```

Depress the **OPER** switch on the keyboard when done. Switch to Line mode.

When using the PIM-2 and PAL-1 on the system's printer port, install them in accordance with the PIM-2/PAL-1 Installation Instructions, P/N 315-092408.

Install the PIM-2 in a CXL system by using the P2 connector on the CXC-2 card in the CXL. Refer to the CXC-2 Installation Instructions, P/N 315-086210. Set the dipswitches on the back of the PIM-2 for 9600 baud, odd parity, 7 data bits, 1 stop bit and software flow control (XON/OFF). See PIM-2/PAL-1 Installation

Instructions, P/N 315-092408. Revision 7.0 or higher of CXL firmware is required for this option.

No hardware setup is required at the CXL for an MXL connection. Only rev 6.0 CXL software or a higher rev is required. Connect an MXL at any CXL port. All rules that applied to the XL3 for hardware still apply to the MXL. The corresponding switch on the CXM-1s must be set to ON for the port used by the MXL or XL3 for the CXL to report supervision problems.

The CXL places some restrictions on the MXL. These restrictions are indicated in AccuLINK (CSG-M) which supports the CIM-300 or CXL connection. Because of the two digit addressing, no modules greater than 99 can be addressed except for the MMB-1/-2 and the annunciator, which are fixed at addresses 253 and 251, respectively, and can't be moved. Supervisory, OS&Y, and security uses are not allowed because the CXL does not have status lines nor storage for them. Also, Block Acknowledge must be enabled at the MXL.

## CHECKOUT PROCEDURE

The checkout procedure is divided into two parts: the **Field Wiring Checkout** (with sections for Class A and/or Class B) and the **System Operation Checkout**. The **Field Wiring Checkout**, which ensures that the XL3s or MXLs are properly wired to the CXL, **must** be done first to ensure that the field wiring is correct before attempting the **System Operation Checkout**.

Follow the **CHECKOUT PROCEDURE** until a failure occurs. Stop at that point and refer to the **TROUBLESHOOTING GUIDE** (pages 34-35).

Troubleshoot the problem, correct the problem, and continue the Checkout Procedure.

1. Check and troubleshoot all field wiring using the appropriate **Field Wiring Checkout** procedure.
2. Check out the System by following the procedure as outlined in the **System Operation Checkout**, page 33.
3. Install the modules configured for the System as called for in the **System Operation Checkout**. Note the card slot assignments (Refer to the **SLOT ASSIGNMENT TABLE**, page 29). The following module installation instructions are general guidelines.

For each module (one at a time) perform the following:

Release the module handle top and bottom lock-in tabs and remove the handle with attached (and tested) field wiring. Set all module switches. Refer to the individual module Installation/Wiring diagrams.

### FIELD WIRING CHECKOUT FOR A CLASS A SYSTEM

The status of the CXL System prior to the start of the **Field Wiring Checkout** must be:

1. NO power applied to the CXL System.

2. NO modules installed in the CXL enclosure.
3. NO MMX-1 modules installed in the XL3 systems. No CMI-300 modules installed in MXL systems.
4. Jumpers connected from 5 to 8 and from 6 to 7 of the MMX-1 handle (for testing only).

Jumpers connected from 1 to 4 and from 2 to 3 on the MOM-4 connector for the CMI-300 module in the MXL.

| CXM-1 EXTERNAL CLASS A WIRING CHECKOUT AND TROUBLESHOOTING GUIDE  |   |     |                      |  |  |
|---|---|-----|----------------------|--|--|
| TYPE  | MEASURE RESISTANCE BETWEEN TERMINALS AS INDICATED |     | DESIRED RESULTS      | PROBABLE CAUSE IF RESULTS DIFFER       |  |
| Class A Loop Check  | <b>Terminal</b><br>1                              | and | <b>Terminal</b><br>4 | <2K                                    | Line open<br>or<br>Line length too long  |
|   | 2   | and | 3                    | <2K                                    |  |
|   | 5   | and | 8                    | <2K                                    |  |
|   | 6   | and | 7                    | <2K                                    |  |
|   | 9   | and | 12                   | <2K                                    |  |
|   | 10  | and | 11                   | <2K                                    |  |
|   | 13  | and | 16                   | <2K                                    |  |
|   | 14  | and | 15                   | <2K                                    |  |
| Interport Check   | <b>Terminal</b><br>1                              | and | <b>Terminal</b><br>5 | >1M                                    | Line wiring mixed<br>or<br>Lines shorted |
|   | 4   | and | 8                    | >1M                                    |  |
|   | 5   | and | 9                    | >1M                                    |  |
|   | 8   | and | 12                   | >1M                                    |  |
|   | 9   | and | 13                   | >1M                                    |  |
| <b>NOTE:</b> To perform the following checkout, first remove the jumpers between terminals 5 and 8 and between 6 and 7 on the MMX-1 module handle in the XL3 or remove the jumpers 1 to 4 on the MOM-4 connector for the CMI-300 module in the MXL. | <b>Terminal</b><br>1                              | and | <b>Terminal</b><br>2 | >1M                                    | Lines shorted                            |
|   | 2   | and | 3                    | >1M                                    |  |
|   | 3   | and | 4                    | >1M                                    |  |
|   | 4   | and | 5                    | >1M                                    |  |
|   | 5   | and | 6                    | >1M                                    |  |
|   | 6   | and | 7                    | >1M                                    |  |
|   | 7   | and | 8                    | >1M                                    |  |
|   | 8   | and | 9                    | >1M                                    |  |
|   | 9   | and | 10                   | >1M                                    |  |
|   | 10  | and | 11                   | >1M                                    |  |
|   | 11  | and | 12                   | >1M                                    |  |
|   | 12  | and | 13                   | >1M                                    |  |
|   | 13  | and | 14                   | >1M                                    |  |
|   | 14  | and | 15                   | >1M                                    |  |
|   | 15  | and | 16                   | >1M                                    |  |
| Class A Loop Shorted Check  |   |     |                      |  |  |
| Ground Fault  | All terminals and chassis                         |     | >1M                  | Short or<br>Shunt from wire to chassis |  |



5. ALL field wiring to the XL3 or MXL systems installed and connected at the XL3 handle of the XL3 or at the MOM-4 terminals of the MXL and at the CXL handle.
6. ALL handles inserted in their respective card cages.
7. ALL XL3 or MXL systems individually checked out and operational.

All resistance checks are made at the handle screw terminals of the module wiring being checked. The test equipment required is:

Simpson 260 VOM, or equivalent

The tabulated test results are given in the **CXM-1 External Class A Wiring Checkout and Troubleshooting Guide** on page 31.

### FIELD WIRING CHECKOUT FOR A CLASS B SYSTEM

The status of the CXL System prior to the start of the Field Wiring Checkout **must** be:

1. NO power applied to the CXL System.

2. NO modules installed in the CXL enclosure.
3. NO MMX-1 modules installed in the XL3 systems. No CMI-300 modules installed in MXL systems.
4. A jumper installed on the MMX-1 handle between terminals 5 and 8 for test purposes only and a jumper installed on the MOM-4 connector for the CMI-300 between 1 and 4 for test purposes only.
5. ALL field wiring to the XL3 or MXL systems installed and connected at the XL3 handle on the XL3 or at the MOM-4 terminals on the MXL and at the CXL handle.
6. ALL handles inserted in their respective card cages.
7. ALL XL3 or MXL systems individually checked out and operational.

All resistance checks are made at the handle screw terminals of the module wiring being checked. The test equipment required is:

Simpson 260 VOM, or equivalent

The tabulated test results are given below.

| <b>CXM-1 EXTERNAL CLASS B WIRING CHECKOUT AND TROUBLESHOOTING GUIDE</b>   |  |  |  |   |
|---|--|--|--|---|
| <b>TYPE</b>   | <b>MEASURE RESISTANCE BETWEEN TERMINALS AS INDICATED</b> |  | <b>DESIRED RESULTS</b>   | <b>PROBABLE CAUSE IF RESULTS DIFFER</b> |
| Class B Loop Continuity Check   | <b>Terminal</b><br>1<br>5<br>9<br>13                     | and<br><br>and<br>and<br>and           | <b>Terminal</b><br>4<br>8<br>12<br>16<br><br><2K<br><2K<br><2K<br><2K                          | Line open<br>or<br>Line length too long |
| Interport Check   | <b>Terminal</b><br>1<br>4<br>5<br>8<br>9<br>12           | and<br>and<br>and<br>and<br>and<br>and | <b>Terminal</b><br>5<br>8<br>9<br>12<br>13<br>16<br><br>>1M<br>>1M<br>>1M<br>>1M<br>>1M<br>>1M | Line wiring mixed                       |
| <b>NOTE:</b> To perform the following checkout, first remove the jumpers between terminals 5 and 8 on the MMX-1 module handle in the XL3 or remove the jumpers 1 to 4 on the MOM-4 connector for the CMI-300 module in the MXL. Then do the following test. |  |  |  |   |
| Class B Loop Shorted Check  | <b>Terminal</b><br>1<br>5<br>9<br>13                     | and<br>and<br>and<br>and               | <b>Terminal</b><br>4<br>8<br>12<br>16<br><br>>1M<br>>1M<br>>1M<br>>1M                          | Lines shorted                           |
| Ground Fault  | All terminals and chassis                                |  | >1M  | Short or Shunt from wire to chassis     |

## SYSTEM OPERATION CHECKOUT

The status of the CXL System prior to the start of the System Operation Checkout **must** be:

1. AC power wiring should be installed and connected, but the UPS and the AC mains should be turned off.
2. CXA-1 assembly installed with the power cable from the power supply to the CXB-1.
3. No plug-in modules should be installed in the CXL card cage.
4. All handles should be inserted in their proper positions in the CXL card cage.
5. All field wiring to the XL3 or MXL systems installed and checked out as described in the **Field Wiring Checkout**.
6. All XL3 or MXL systems individually checked out and operational.
7. All MMX-1 modules have been installed in the XL3 systems and all CMI-300 modules have been installed in the MXL systems.
8. CXL printer and CRT are not connected. The method for bringing up the CXL System is described in the following steps. If any problems occur, refer to the **TROUBLESHOOTING GUIDE** on pages 34-35.

| ACTION   | RESULTS  |
|--|--|
| 1. Turn on the UPS (or AC power if no UPS).  | 1. Check the voltages at the motherboard for +/-12V, and also for +/-5V. Since there is no load, the +/- voltages will not equal the rated voltage, but the magnitude of the voltages will be equal.                                       |
| 2. Turn off the UPS. Wait for 20 seconds. Install the CXP-1, CXC-1, and CXC-2 and connect the CRT and printer. Turn on the UPS.                        | 2. Enter REF on the keyboard to bring up the screen. Verify that the printer printed the software version number and the date it was released. Turn off the UPS if it is OK, or refer to the TROUBLESHOOTING GUIDE.                        |
| 3. Turn off the UPS. Install the CXM-1 in the next available card slot (locations J4-J10) and connect its handle. Turn on the UPS. Wait for 2 minutes. | 3. Display the XL3 or MXL custom messages by entering IDS. Each connected XL3 or MXL system will have its custom message displayed. Refer to the TROUBLESHOOTING GUIDE if there is no message for any XL3 or MXL system that is connected. |
| 4. If there are more CXMs to connect up, turn off the UPS, and return to Step 3 until all CXMs have been tested.                                       | 4. Check each XL3 or MXL, as in Step 3.  |
| 5. Turn on the AC mains.   | 5. Verify that all AC power troubles are clear and that the green LED on the CXF-1 panel is on.  |
| 6. Operate every keyboard command on each XL3 or MXL to gain familiarity with the CXL operations and to ensure operation of each XL3 or MXL.           |  |

## TROUBLESHOOTING GUIDE

The following guide lists the trouble messages associated with the CXL and leads the technician through the probable cause for each to the effective corrective action.

| TROUBLE MESSAGE  | PROBABLE CAUSE  | CORRECTIVE ACTION   |
|--|---|---|
| AC power fail  | Main power not available or below spec at P1 on the CXF-1 (input side of UPS).          | Check for main power at CXF-1. Check that all connections are properly seated.  |
| CRT not responding   | Color video terminal did not respond to supervisory check.                              | Check for:<br>Terminal cable connected to CXC-2, P3<br>Open in cable<br>Terminal programmed correctly<br>Wrong terminal<br>Connector 2 or terminal used - not the auxiliary (1)<br>Fault on CRT<br>Terminal powered   |
| Hourly verification XL3s or MXLs XX, etc., did not respond | Time not set at this XL3 or MXL.  | Set time for this XL3 or MXL. If still no response, check MMX-1 or CMI-300 by applying other commands to this XL3 or MXL. Replace MMX-1 or CMI-300 if no response.  |
| Internal memory failure EPROM                              | Bad EPROM on CXP-1 board  | Replace CXP-1.  |
| Internal memory failure RAM                                | Bad RAM on CXP-1 board  | Replace CXP-1.  |
| Internal modem failure                                     | A modem has failed on a port.   | Replace CXM-1 board containing this port.   |
| Printer not responding                                     | Printer did not respond to supervisory check  | Check for:<br>Printer cable connected to CXC-2 P2<br>Open in printer cable<br>Printer on line<br>Printer powered<br>Printer properly wired<br>Fault light on printer<br>Wrong printer<br>Printer programmed correctly<br>Printer paper problem<br>(If these checks do not solve the problem, replace printer or CXC-2.) |
| Soft restart initiated                                     | Soft restart switch was depressed or is defective                                       | Replace CXF-1 if defective.   |
| Watchdog circuit triggered                                 | Bad CXP-1 or CXC-1  | Replace CXP-1 or CXC-1.   |
| XL or MXL XX Class A loop failure                          | XL3 or MXL responding, but supervision has detected a problem on two of the four wires. | Check for:<br>Wiring and connectors at the CXM-1 and at XL3's MMX-1 or MXL's CMI-300<br>See <b>CHECKOUT PROCEDURE</b> for CXM-1 and MMX-1 or CMI-300  |
| XL or MXL XX communications error                          | Incorrect data - noisy or weak signal from MMX-1 in XL3 or CMI-300 in MXL.              | See <b>XL or MXL XX not reporting.</b>  |
| XL or MXL XX halted  | XL3 or MXL communication was manually halted at keyboard.                               | Link with this XL3 or MXL to resume communications.   |
| XL or MXL XX not reporting                                 | No communications to MMX-1 in this XL3 or CMI-300 in this MXL.                          | Check for:<br>XL3 or MXL powered and MMX-1 or CMI-300 installed<br>Wiring between CXM-1 and MMX-1 or CMI-300<br>Connectors at the CXM-1 and MMX-1 or CMI-300<br>Replace MMX-1 or CMI-300.<br>If still trouble, replace CXM-1.   |

In addition to the troubles listed above, all XL3 or MXL trouble messages (unless noted otherwise) can appear at the CXL. For the XL3 troubles, refer to the **Operation Troubleshooting Directory** in the XL3 Manual (P/N 315-083206) or the **Trouble Messages** in the MXL/MXLV Manual (P/N 315-092036). In addition to those, some new troubles were created for the CXL. The new troubles are:

| TROUBLE MESSAGE   | PROBABLE CAUSE   | CORRECTIVE ACTION   |                |                |                     |                       |    |    |               |                 |    |    |               |               |
|---|--|---|----------------|----------------|---------------------|-----------------------|----|----|---------------|-----------------|----|----|---------------|---------------|
| Command aborted   | A command was aborted at the CXL by a [Ctrl] C.  | If a [Ctrl] C was not done, replace MMX-1 or CMI-300 at the XL3 or MXL.   |                |                |                     |                       |    |    |               |                 |    |    |               |               |
| CPX-1 communication fail (This message does not apply to MXLs)    | Communications in an XL3 between the MMX-1 and the CPX-1 have failed.  | Check MMX-1 to CPX-1 wiring. If OK, replace CPX-1 in the XL3.   |                |                |                     |                       |    |    |               |                 |    |    |               |               |
| Entry error, re-enter data  | An error has occurred in the entry of data in the CXL or in the relaying of the data from the MMX-1 or CMI-300 to the CPX-1 or MMB-1 in the XL3 or MXL.  | Try again. Check if an illegal value was entered. If error message still appears, check wiring as follows:<br><table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;"><u>For XL3</u></td> <td style="text-align: center;"><u>For MXL</u></td> </tr> <tr> <td style="text-align: center;">From CPX-1 to MMX-1</td> <td style="text-align: center;">From CMI-300 to MMB-1</td> </tr> <tr> <td style="text-align: center;">or</td> <td style="text-align: center;">or</td> </tr> <tr> <td style="text-align: center;">Replace MMX-1</td> <td style="text-align: center;">Replace CMI-300</td> </tr> <tr> <td style="text-align: center;">or</td> <td style="text-align: center;">or</td> </tr> <tr> <td style="text-align: center;">Replace CPX-1</td> <td style="text-align: center;">Replace MMB-1</td> </tr> </table> | <u>For XL3</u> | <u>For MXL</u> | From CPX-1 to MMX-1 | From CMI-300 to MMB-1 | or | or | Replace MMX-1 | Replace CMI-300 | or | or | Replace CPX-1 | Replace MMB-1 |
| <u>For XL3</u>  | <u>For MXL</u>   |   |                |                |                     |                       |    |    |               |                 |    |    |               |               |
| From CPX-1 to MMX-1   | From CMI-300 to MMB-1  |   |                |                |                     |                       |    |    |               |                 |    |    |               |               |
| or  | or   |   |                |                |                     |                       |    |    |               |                 |    |    |               |               |
| Replace MMX-1   | Replace CMI-300  |   |                |                |                     |                       |    |    |               |                 |    |    |               |               |
| or  | or   |   |                |                |                     |                       |    |    |               |                 |    |    |               |               |
| Replace CPX-1   | Replace MMB-1  |   |                |                |                     |                       |    |    |               |                 |    |    |               |               |
| Function not implemented  | A command was not performed due to an error in communications from MMX-1 or CMI-300 to CPX-1 or MMB-1 in the XL3 or MXL.   | Try again. If repeated, replace the MMX-1 or CPX-1 in XL3 or CMI-300 or MMB-1 in MXL.   |                |                |                     |                       |    |    |               |                 |    |    |               |               |
| MMX-XL communications error (This message does not apply to MXLs) | An error in communications was detected between the MMX-1 and the XL3 through the CPX-1.   | Try again. If repeated, check wiring or replace MMX-1 or CPX-1.   |                |                |                     |                       |    |    |               |                 |    |    |               |               |
| Timeout error   | This trouble originates at the CXL and, appearing before a FUNCTION IN PROGRESS, indicates that no acknowledge was received from the XL3 or MXL. Before a FUNCTION COMPLETE, it indicates that the command response was late or not present. | Try again. If repeated, check wiring from MMX-1 or CMI-300 to CPX-1 or MMB-1 or replace MMX-1 or CMI-300 or CPX-1 or MMB-1.   |                |                |                     |                       |    |    |               |                 |    |    |               |               |
| XL or MXL busy  | A command was sent to an XL3 or MXL that was busy doing either another command or handling alarms or troubles.   | Wait at least 8 seconds; try command again. If XL3 or MXL is repeatedly busy, replace MMX-1 or CMI-300.   |                |                |                     |                       |    |    |               |                 |    |    |               |               |
| CMI-300 General Trouble (This message does not apply to XL3)      | The CMI-300 has detected trouble either communicating with the CXL (in the past) or with the MXL.  | Check MOM-4 and CXL to CMI-300 wiring. If OK, replace the CMI-300 in the MXL.   |                |                |                     |                       |    |    |               |                 |    |    |               |               |

Although System CXL has been verified by Siemens Building Technologies, Inc. to comply with Docket 20780, Part 15, the following Warning Note is still required for all acceptable equipment in this category.

**WARNING:** This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the Instruction Manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference; in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

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