Form 278.7

OPTO 22

SHAPING THE FUTURE OF CONTROL

G4LC4

Model 100 Processor User's Guide

This technical document describes the features, specifications, and operations of the product.

> For specific wiring connections, dimensions, and operational specifications of I/O modules, please refer to the following G4 Module Data Sheets:
> Form 251, Form 252, Form 253 and Form 254

The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for possible inaccuracies or omissions. Specifications are subject to change without notice.

OPTO 22 warrants all its products to be free from defects in material or workmanship for 24 months from the manufacturing date code.

This warranty is limited to the original cost of the unit only and does not cover installation labor or any other contingent costs.

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THE G4LC4 MODEL 100 PROCESSOR

INTRODUCTION

The G4LC4 Model 100 Processor is a modular assembly that consists of a mounting base, a processor (microcomputer) board, an I/O board (G4LC4 I/O Bus Interface) and a cover. It is called a 'brick' because it's unique size and shape is similar to a brick.

The G4LC4 Model 100 Processor contains a powerful, low cost single board computer designed and manufactured by OPTO 22 to be used with the ***mistic*** Model 100 Controller. The G4LC4 has been designed to incorporate many features found in personal computers.

BASIC ARCHITECTURE

The heart of the G4LC4 is a 64180 8-bit microprocessor operating at a clock frequency of 6.144 MHz. For memory, the G4LC4 uses 64 Kilobytes of CMOS Static RAM which is battery backed up for non-volatile storage of user programs and data. The G4LC4 contains a Cyrano 100 EPROM. This allows the G4LC4 the ability to communicate with a remote PC workstation running Cyrano 100 and to run your applications programs that are compiled and downloaded from Cyrano 100. Typically the application software is developed on the PC workstation using Cyrano 100 and then downloaded to the G4LC4 Model 100 Processor via a serial communication link. After the application program has been downloaded and debugged (using the Cyrano 100 debugger), the PC workstation is no longer needed. The G4LC4 Model 100 Processor runs the application stand alone.

The G4LC4 features four serial ports; two RS-485/422 ports and two RS-232 ports. Baud rates from 300 to 38,400 can be selected by means of jumpers. Address jumpers allow selection of the G4LC4 address in the range of 0 to 255.

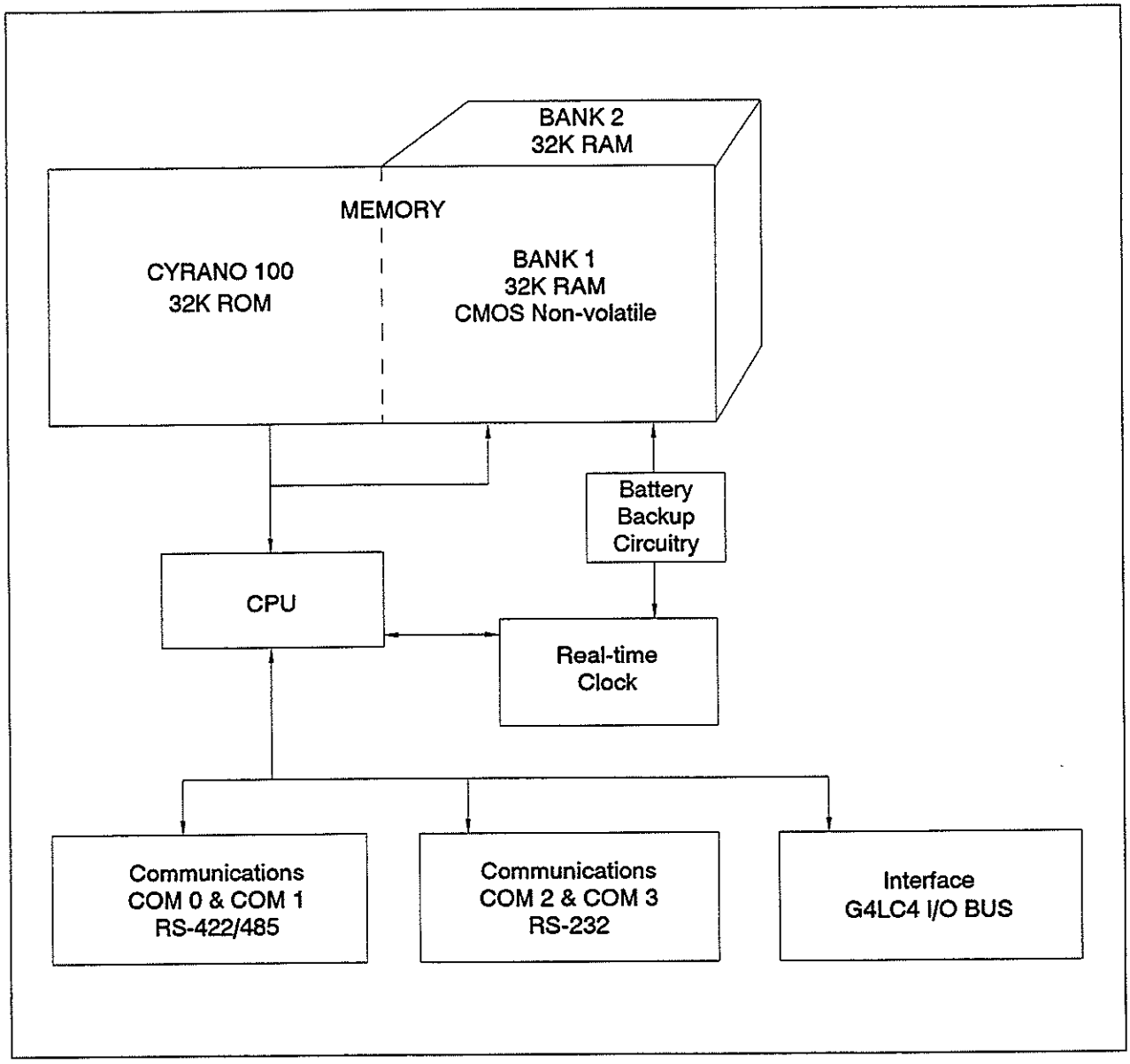
One of the two RS422/485 communications ports, COM 0, is totally dedicated for communications with the remote PC workstation. The other RS422/485 port is for use by your applications program. It would typically be used when multidrop is required. As many as 100 devices can be connected to this port in a multidrop application. Other typical usages for the RS422/485 port are (1)for applications requiring a high degree of noise immunity, (2) the capability of transmitting over longer line lengths (up to 5000 ft) and (3) transmission at higher baud rates.

The two RS-232 ports can be used by your application program to communicate with standard serial devices such as printers, bar code readers, etc.

A battery backed up real time clock is provided for time dependent tasks.

The G4LC4 I/O Bus is a 40-conductor, flat-ribbon cable which connects the Digital and Analog I/O Units to the G4LC4 Model 100 Processor. The cable can be up to 200 feet in length. Up to 32 Digital and Analog I/O Units can be daisy-chained from one flat ribbon cable.

The figure on the following page shows a block diagram of the G4LC4 Model 100 Processor.



G4LC4 Block Diagram

SPEED

The high speed I/O bus can communicate with analog bricks and acquire 16 channels of data in less than 6 milliseconds. A digital brick can communicate 16 channels in 150 microseconds.

DENSITY

A G4D16P Digital I/O Unit for MISTIC 100 can accommodate 16 high density photo-isolated G4 digital modules. A G4A8P Analog I/O Unit for MISTIC 100 can accommodate 8 high density photo-isolated G4 analog modules. Another 8 analog modules can be added by using the G4PAX Analog 8 Point Expansion Brick.

DISTRIBUTED SYSTEM

mistic 100 is a distributed system. Using a 40-conductor, ribbon cable, I/O Units may be located up to 500 ft. from the G4LC4 Controller.

ENVIRONMENTAL SPECIFICATIONS:

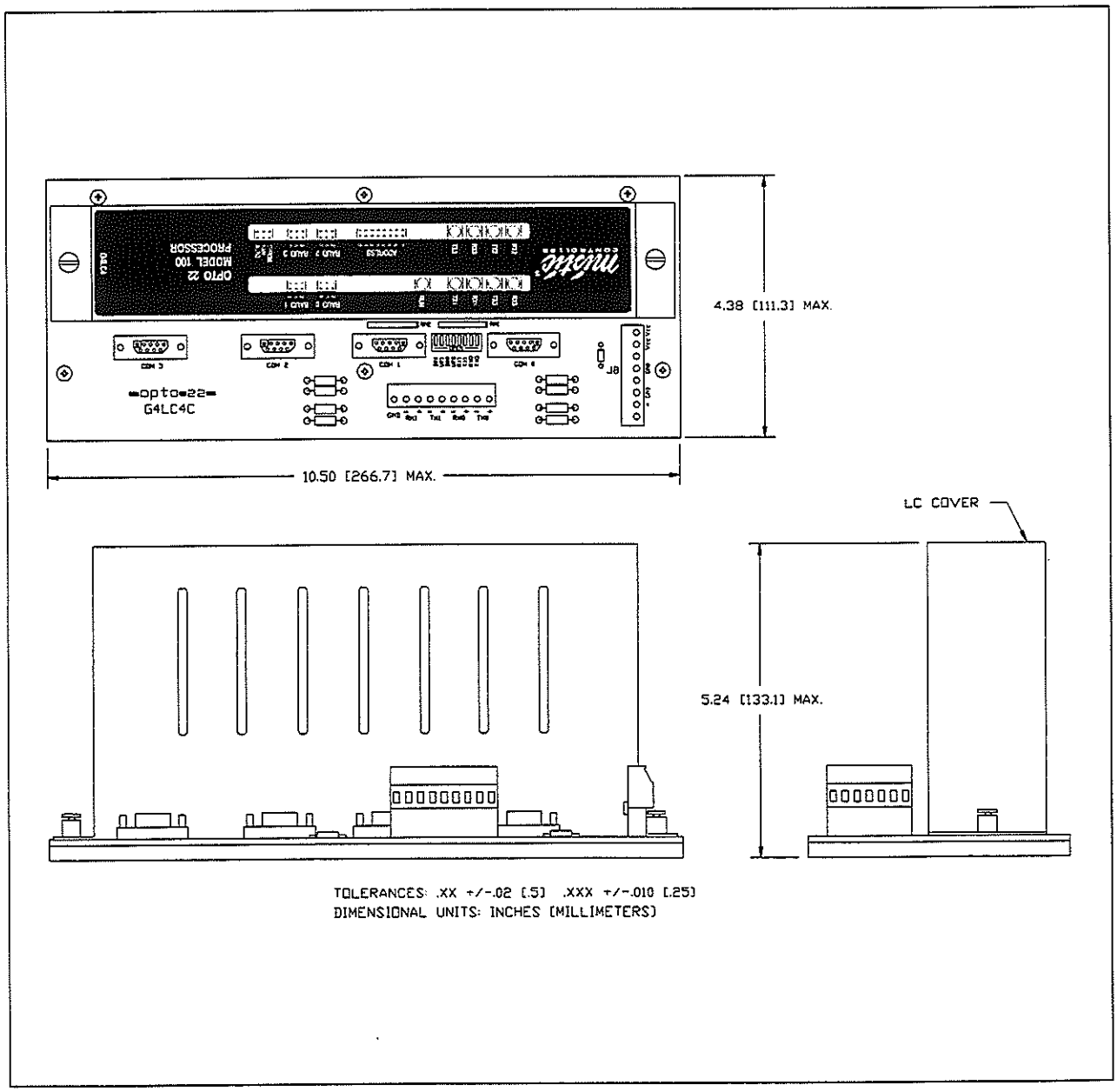
Temperature	0 to 60° C
Relative Humidity	0 to 95% non-condensing

MODULAR CONSTRUCTION

The G4LC4 Model 100 Processor for ***mistic*** 100 Controller is a modular assembly that consists of four major subassemblies (1) a mounting base with mother board and I/O connectors, (2) a single microcomputer processor card, (3) an I/O card and (4) a cover.

OUTLINE DIMENSIONS

Because of its unique size and shape It is called a 'brick'. The following figure shows the outline dimensions. The size and mounting dimensions for the G4LC4 Model 100 Processor are the same as those for the G4D16P Digital and the G4A8P Analog I/O Units. All bricks in this series will have the same mounting footprint and overall outline dimensions.



G4LC4 Model 100 Processor

BASE PLATE SUBASSEMBLY

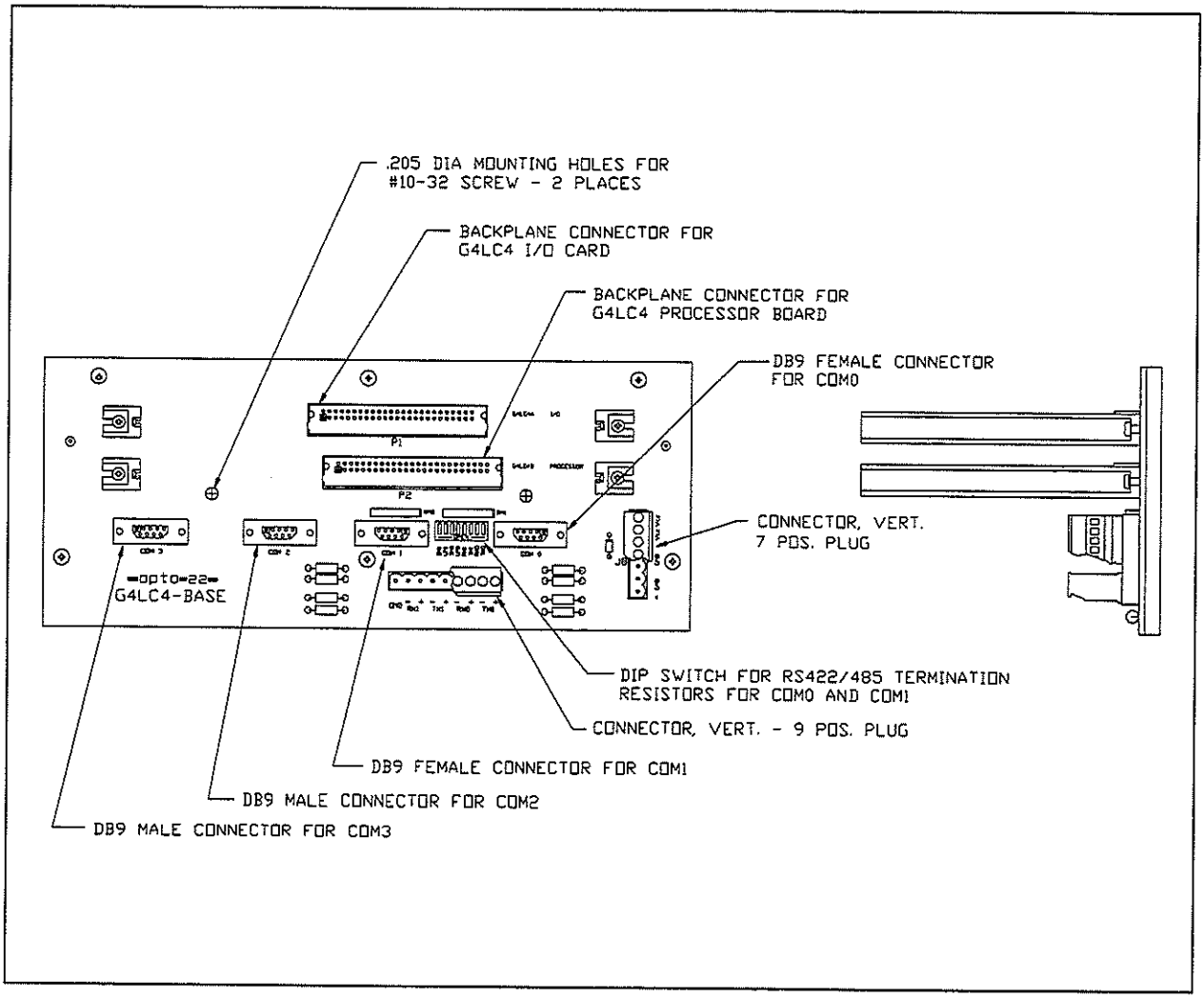
The base plate is a subassembly that can be mounted, installed and wired separately from the rest of the G4LC4 Model 100 Processor. The base plate subassembly can easily be installed on a panel (or other flat mounting surface) by means of just two mounting screws.

The base plate contains pluggable screw type barrier strips. Once all the base plates have been installed, the wiring installer has easy access to all the barrier strips for installing the wiring and cables. The barrier strips can accommodate up to #12 AWG wires.

After the wiring has been installed and checked out, the processor and the I/O boards are plugged into the base and finally the cover is installed.

Details on setting the DIP switches and on installing the wiring for the communications lines are given in the section "Installation and Wiring".

The following drawing shows the layout of the Base Plate Subassembly.



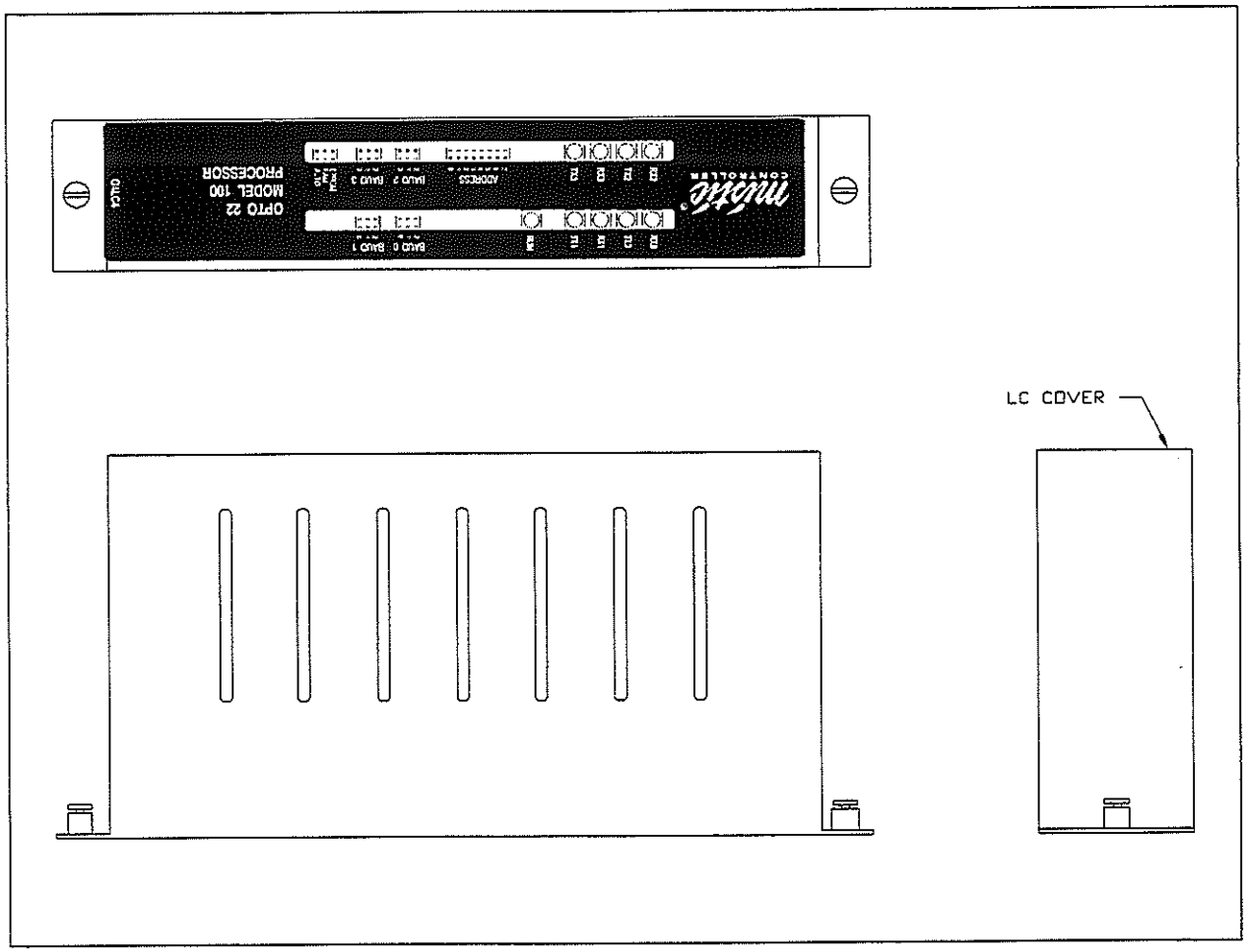
G4LC4 Base Plate Subassembly

COVER SUBASSEMBLY

The cover completely shields and protects the processor board and the I/O board. It has a slot for the 40-conductor, flat-ribbon cable.

A label on the top of the cover identifies the unit, the lights and the switches. It has a transparent window for the LEDs and jumpers to show through.

The cover is installed by means of two captive screws mounted to the cover.



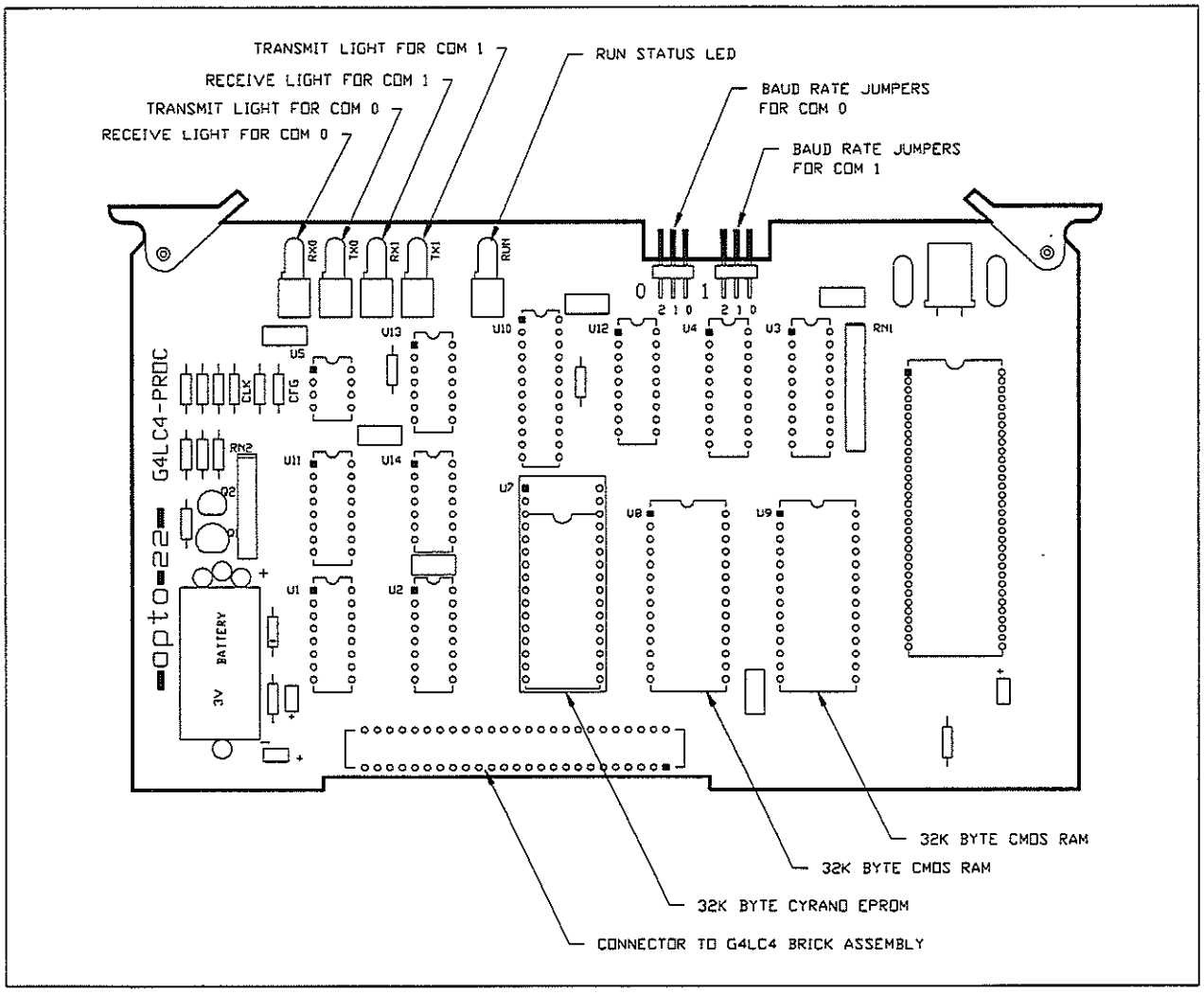
G4LC4 Cover

PROCESSOR BOARD

The G4LC4B Processor Board is a PC board subassembly that contains a microcomputer, the Cyrano 100 EPROM, battery backed up CMOS ram and the components for the 2 RS422/485 serial ports, COM 0 and COM 1. The connectors for COM 0 and COM 1 are located on the base plate subassembly.

There is a female connector at the bottom of the processor board used for connecting to the processor board to the mother board on the base plate subassembly.

On the top of the brain board are the TX and RX status LEDs for COM 0 and COM 1, the "RUN" LED, and the jumpers for setting the baud rates for COM 0 and COM 1. The details for setting the baud rate jumpers for the desired baud rate are given in the section "Installation and Wiring".

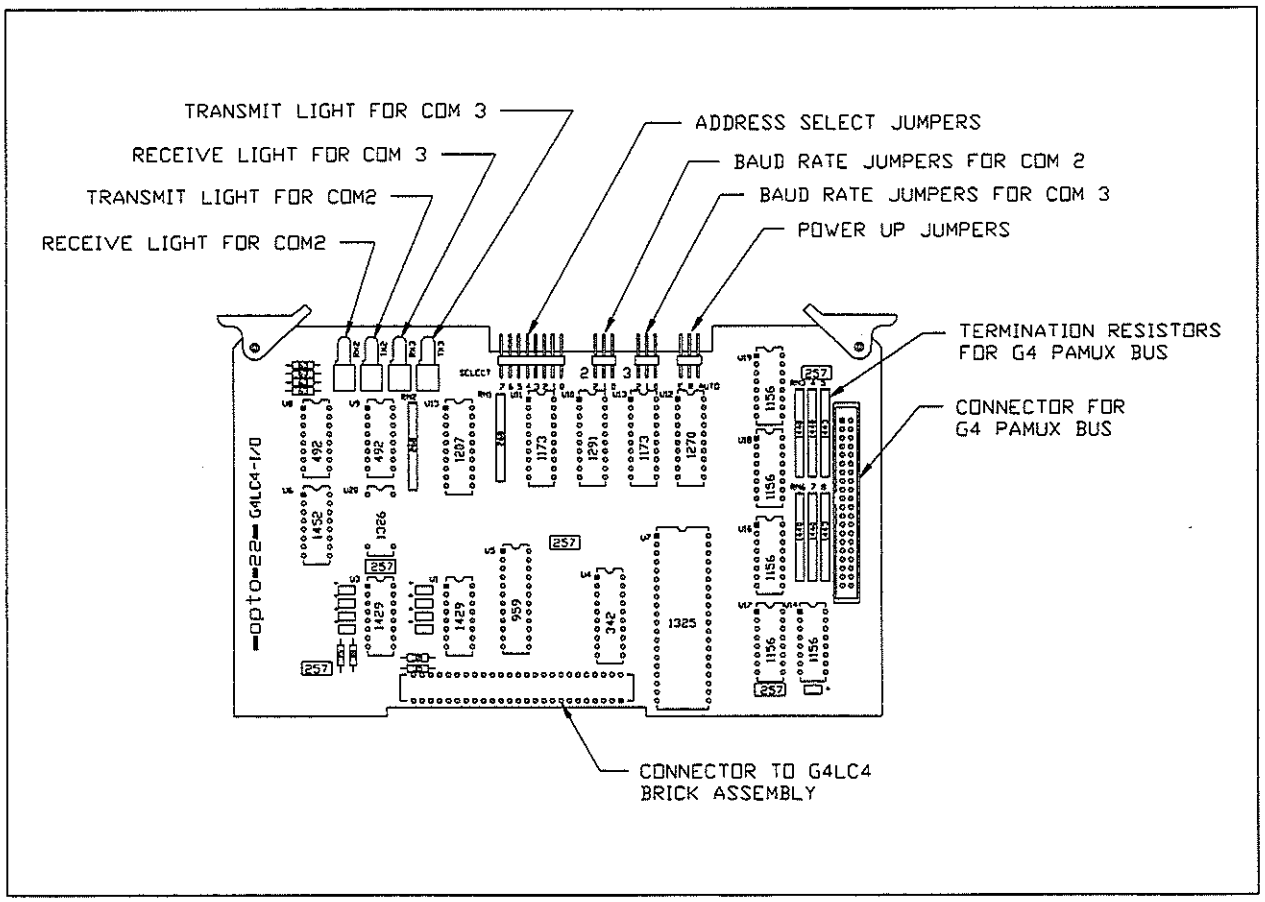


G4LC4B Processor Board

I/O BOARD

The G4LC4A I/O Board is a PC board subassembly that contains the interface electronics for the G4LC4 I/O Bus. It also has the components for the two RS-232 serial ports, COM 2 and COM 3. Four LEDs at the top of the board indicate the status of the communications on the RS-232 serial ports. There is a separate light for the transmit and receive lines for each of the two ports. The TX light is illuminated whenever there is data being transmitted from the G4LC4 Model 100 Processor. The RX light is illuminated whenever there is data being received by the G4LC4 Model 100 Processor.

There are "ADDRESS" jumpers at the top of the board for setting the address of the G4LC4 Model 100 Processor, "BAUD 2" jumpers for setting the baud rate for COM 2, "BAUD 3" jumpers for setting the baud rate for COM 3, a "R" (RAM) jumper for clearing all ram upon power up, an "A" jumper for running a downloaded Cyrano 100 program upon powerup, and an "E" jumper which is reserved for future use. Details on setting the jumpers can be found in the section "Installation and Wiring".



G4LC4A I/O Board

POWER SUPPLY

Power for the G4LC4 Model 100 Processor is supplied from a G4PS245 Power Supply. The G4PS245 Power Supply can supply enough power for 7 Digital and/or Analog I/O Units or 6 Digital and/or Analog I/O Units and 1 G4LC4 Model 100 Processor.

G4LC4 I/O BUS LAYOUT

The G4LC4 I/O Bus is used to connect the G4LC4 Model 100 Processor to all of the G4D16P Digital and G4A8P Analog I/O Units. It is implemented using a 40 conductor flat ribbon cable. There are 17 active lines, 8 data lines, 6 address lines, a read strobe line, a write strobe line and a reset line. The pinouts for the G4LC4 I/O Bus header connector is as follows:

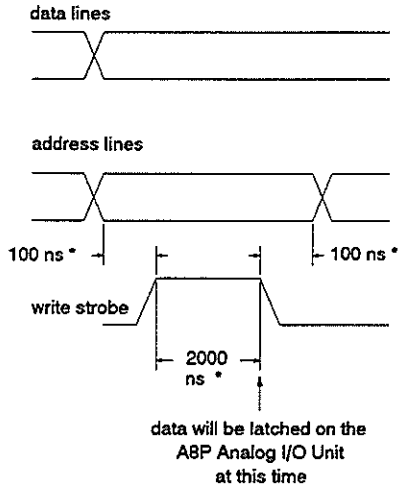
pin	signal function
3	address line 0
5	address line 1
7	address line 2
9	address line 3
11	address line 4
13	address line 5
15	write strobe line
17	read strobe line
19	data line 7
21	data line 6
23	data line 5
25	data line 4
27	data line 3
29	data line 2
31	data line 1
33	data line 0
35	reset line

NOTE: All even numbered pins on the connector are connected to logic ground.

BUS TIMING

WRITE TIMING

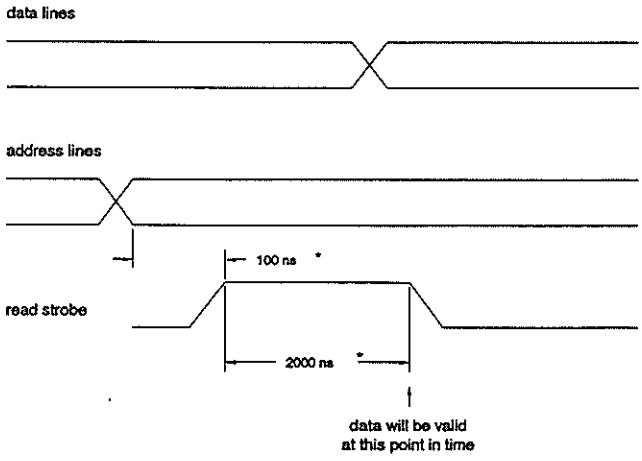
The G4LC4 I/O Bus write timing is very simple. The first thing to do is to apply the address and data on the bus, wait for at least 100 nanoseconds, then activate the write strobe for at least 2000 nanoseconds. When you deactivate the write strobe, the data will be latched on the addressed G4D16P Digital or G4A8P Analog I/O Unit. The address lines must be held stable for a minimum of 100 nanoseconds after the write strobe is brought low. The following diagram shows the minimum bus timing for a G4LC4 I/O Bus write cycle. Normally you would not have to worry about the write timing, it is taken care of by the G4LC4.



* = minimum times for 500 foot cable

READ TIMING

To generate the G4LC4 I/O Bus read cycle, first apply the G4D16P Digital or G4A8P Analog I/O Unit address to the bus, wait for at least 100 nanoseconds, then activate the read strobe. After 2000 nanoseconds, the data will be available. Read the data and then deactivate the read strobe. The following diagram shows the minimum bus timing for a G4LC4 I/O Bus read cycle. Normally you would not have to worry about the read timing, it is taken care of by the G4LC4.



* = minimum times for 500 foot cable

SOFTWARE

The G4LC4 Model 100 Processor and the G4D16P Digital and G4A8P Analog I/O Units are designed to be used with OPTO 22's Cyrano 100 Visual Control Language. Cyrano 100 allows users to quickly and easily develop and debug their control applications without having to know computer programming.

An inexpensive and readily available PC workstation equipped with color graphics and a mouse, is all that you need to run Cyrano 100. A complete list of the hardware needed is given in the Cyrano 100 manual. By making selections from Cyrano 100's color graphic menus on your PC workstation and using your mouse to draw interconnections, you create a control chart that defines how you want your application to work. Cyrano 100 then completes all the rest of the work for you by creating the computer program that runs your application on the G4LC4 Model 100 Processor. You can use Cyrano 100 to download and run your program on the G4LC4 Model 100 Processor.

The PC is a convenient, low cost and readily available workstation. However, once the application is completed and fully debugged, the PC is no longer required. The G4LC4 Model 100 Processor is stand alone and can run the application without assistance from the PC.

INSTALLATION AND WIRING

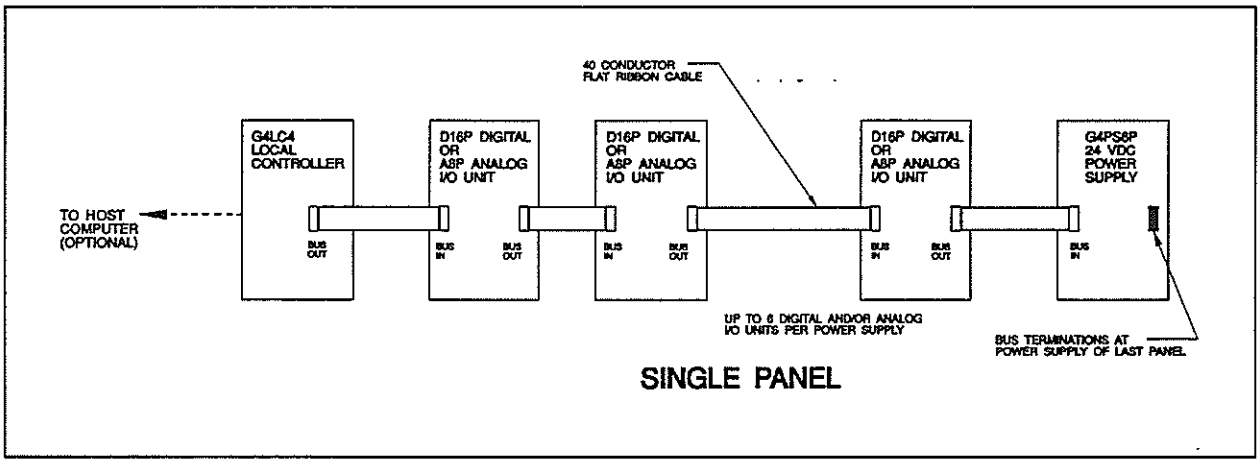
The following steps will describe how to properly configure, install and wire your G4LC4 Model 100 Processor.

G4LC4 I/O BUS WIRING

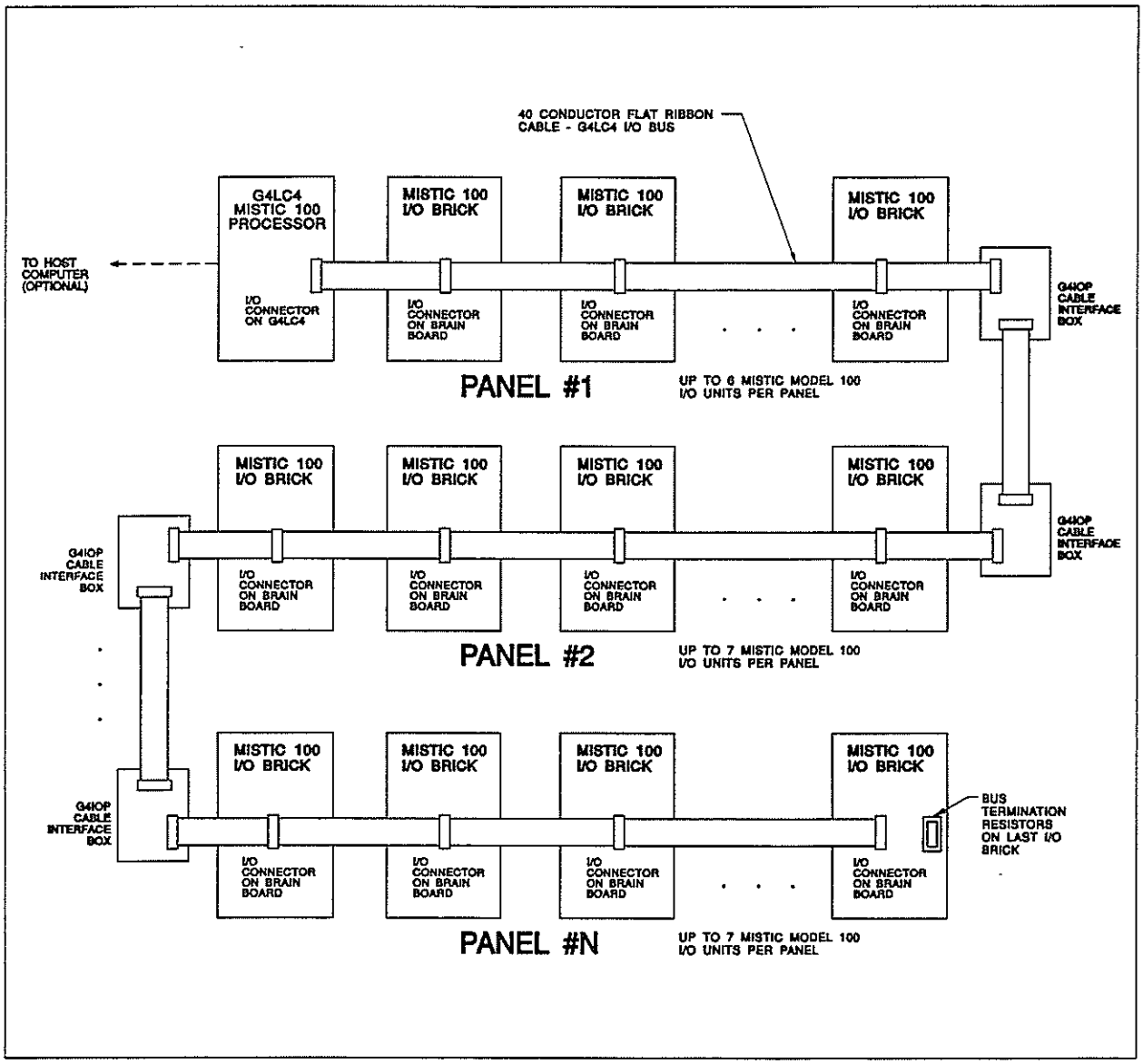
The high cost of electrical wiring makes it desirable to place the control or monitoring point as close to the controlled device as possible. The use of a G4LC4 Model 100 Processor connected to G4D16P Digital and G4A8P Analog I/O Units makes this concept possible.

As long as the total cable length is less than 500 feet, I/O Units for MISTIC 100 can be installed anywhere along the G4LC4 I/O Bus, a 40-conductor, flat ribbon cable. G4D16P Digital and G4A8P Analog I/O Units may be mixed as needed. The figures below illustrate some possible system configurations.

G4LC4 I/O Bus Wiring - Single Panel



G4LC4 I/O Bus Wiring - Multiple Panels



TERMINATOR BOARD

For the G4LC4 I/O Bus to operate correctly, both ends of the bus MUST be terminated. The G4LC4 Controller and the last brick (see "System wiring") on the bus are the only devices that should have termination resistors installed. The G4LC4 has built in termination resistors. You will need to install a MISTIC 100 Bus Terminator Board on the last brick.

mistic 100 CABLES AND CONNECTORS

The G4LC4 Model 100 Processor is connected to the G4D16P Digital and G4A8P Analog I/O Units via a 40-conductor, flat-ribbon cable. OPTO 22 provides a number of pre-made cables. Examine the table below for the OPTO 22 cables:

Local Cable 100	- for panel wiring
HHG4H1	- for linking panels next to each other
HHG4V1	- for linking panels on top of each other

The maximum allowable length of the G4LC4 I/O Bus is 500 feet. If the cables offered by OPTO 22 do not meet your needs, the table below lists several cable types available.

manufacturer	3M part #	ALPHA part #
regular	3365/40	3580/40 or 3583/40
ground planed	3469/40 or 3476/40 or	3584/40
jacketed	3603/40	3589/40
jacketed and ground planed	3517/40	3590/40

The following connectors will work with any of the above ribbon cables:

manufacturer	connector part #
3M	3417-7000
Circuit Assembly	CA-40IDS-B

COMMUNICATIONS WIRING

The G4LC4 Model 100 Processor features four serial ports; two RS-485/422 ports and two RS-232 ports. Baud rates from 300 to 38,400 can be selected by means of jumpers.

One of the two RS-422/485 communications ports, COM 0, is totally dedicated for communications with the remote PC workstation. The other RS422/485 port is for use by your applications program. It would typically be used when multidrop is required. As many as 100 devices can be connected to this port in a multidrop application. Other typical usages for the RS422/485 port are (1)for applications requiring a high degree of noise immunity, (2) the capability of transmitting over longer line lengths (up to 5000 ft) and (3) transmission at higher baud rates.

The two RS-232 ports can be used by your application program to communicate with standard serial devices such as printers, bar code readers, etc.

All of the connectors for communications are of the 9 pin "D" shell DB9 type. The two RS-422/485 connectors (COM 0 and COM 1) are female 9-pin "D" shell connectors and the two RS-232 connectors (COM 2 and COM 3) are male 9-pin "D" shell connectors.

Communications cables are not supplied with any of the MISTIC 100 units. You must supply your own communications cables. Information on cable connections and pin assignments are shown below and on the following wiring diagrams.

COMMUNICATIONS CABLES FOR RS422/485 PORTS

To insure reliable and trouble-free communications, the following is recommended:

(1) Shielded twisted pair wires are recommended for the communications wiring. Typical wire types are:

A. Two-Pair - Individually Shielded Pairs (2 Pair) PVC Chrome Jacket
   1. BELDEN p/n 9729 (#24 ga. - 7x32 stranded, 100 ohm Nom. Imp., 12.5 pf./ft.)

A. Two-Pair - Individually Shielded Pairs (2 Pair) and Overall Shield
   1. BELDEN p/n 8162 (#24 ga. - 7x32 stranded, 100 ohm Nom. Imp., 12.5 pf./ft.)
   2. Manhattan p/n M3475 (#24 ga. - 7x32 stranded, 100 ohm Nom. Imp., 12.5 pf./ft)
   3. Manhattan p/n M39249 (#24 ga. - 7x32 stranded, 100 ohm Nom. Imp., 12.5 pf./ft)

B. Four-Pair - Individually Shielded Pairs (4 Pair) PVC Chrome Jacket
   1. BELDEN p/n 9728 (#24 ga. - 7x32 stranded, 100 ohm Nom. Imp., 12.5 pf./ft.)

B. Four-Pair - Individually Shielded Pairs (4 Pair) PVC Chrome Jacket
   1. BELDEN p/n 8164 (#24 ga. - 7x32 stranded, 100 ohm Nom. Imp., 12.5 pf./ft.)
   2. Manhattan p/n M3477 (#24 ga. - 7x32 stranded, 100 ohm Nom. Imp., 12.5 pf./ft.)
   3. Manhattan p/n M39251 (#24 ga. - 7x32 stranded, 100 ohm Nom. Imp., 12.5 pf./ft.)

(2) The communication and DC power wiring should be routed or kept separate from any high volt age field wiring.

If you are connecting one end of the cable to the green (9 terminal) terminal block on the G4LC4, then strip one-eighth to one-quarter inch insulation from the end of each wire. Use the diagrams to follow to connect the RS422/485 communications wires between the adapter card on the PC and the G4LC4.

CAUTION: Make sure that the power is off while making or removing all connections to the G4LC4.

COMMUNICATIONS CABLES FOR RS-232 PORTS

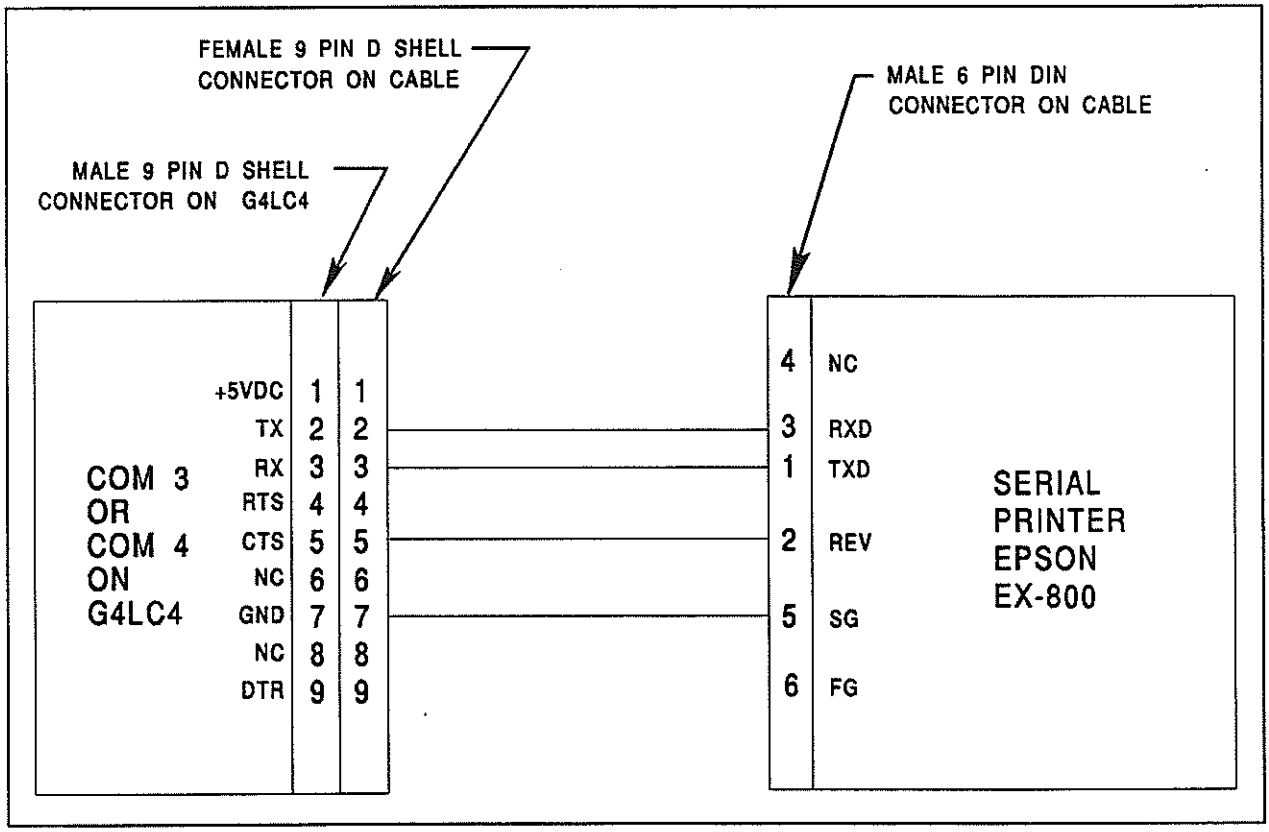
Cables suitable for RS-232 wiring are: Belden #8132 (4 conductor #28 GA), Belden #8133 (6 conductor #28 GA), Belden # 8134 (8 conductor #28 GA), Belden # 8102 (4 conductor # 24 GA), Belden # 8103 (6 conductor #24 GA) and Belden # 8104 (8 conductor #24 GA).

RS-232 PIN CONNECTIONS

The G4LC4 is supplied with two RS-232 ports (COM 2 and COM 3) offering RTS/CTS handshake capability. The RS-232 option is offered for users who want to use the more commonly available RS-232 devices (i.e. terminals, printers...). The RS-232 connector uses a male nine pin D shell, its pinout is:

Pin	Description
1	+5 VDC
2	Transmit (TX)
3	Receive (RX)
4	Request-to-Send (RTS)
5	Clear-to-Send (CTS)
6	No Connection
7	Ground (GND)
8	No Connection
9	Data Terminal Ready (DTR)

The following diagram shows a typical application for the RS-232 serial port on the G4LC4. In this case the serial port is connected to an Epson printer.



Typical Application for RS232 Port

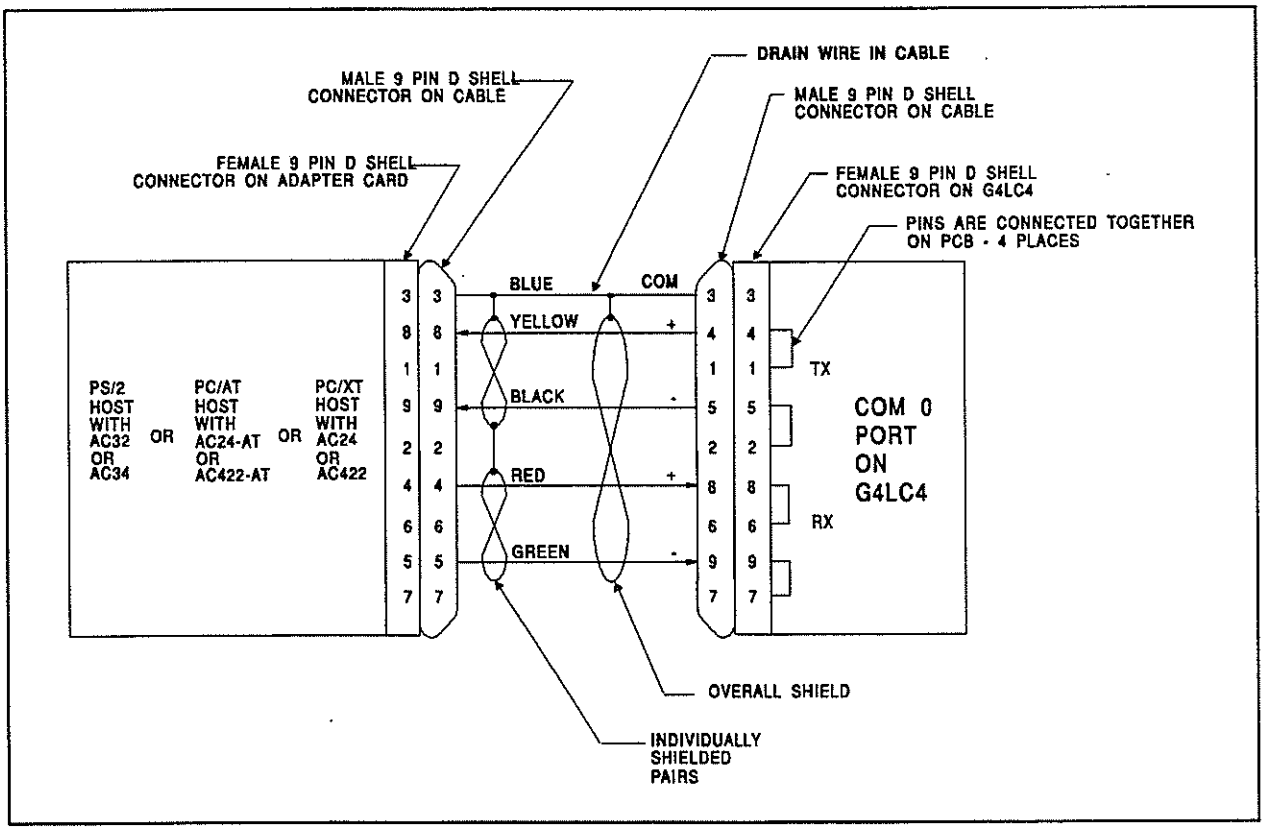
RS-422/485 PIN CONNECTIONS

The RS-422/485 connectors (COM 0 and COM 1) on the G4LC4 uses a female nine pin D shell, its pinout is:

Pin	Description
1	TX + (Connected to pin 4)
2	TX - (Connected to pin 5)
3	Ground (GND)
4	TX + (Connected to pin 1)
5	TX - (Connected to pin 2)
6	RX + (Connected to pin 8)
7	RX - (Connected to pin 9)
8	RX + (Connected to pin 6)
9	RX - (Connected to pin 7)

RS-422/485 COMMUNICATIONS WIRING TO PC WORKSTATION

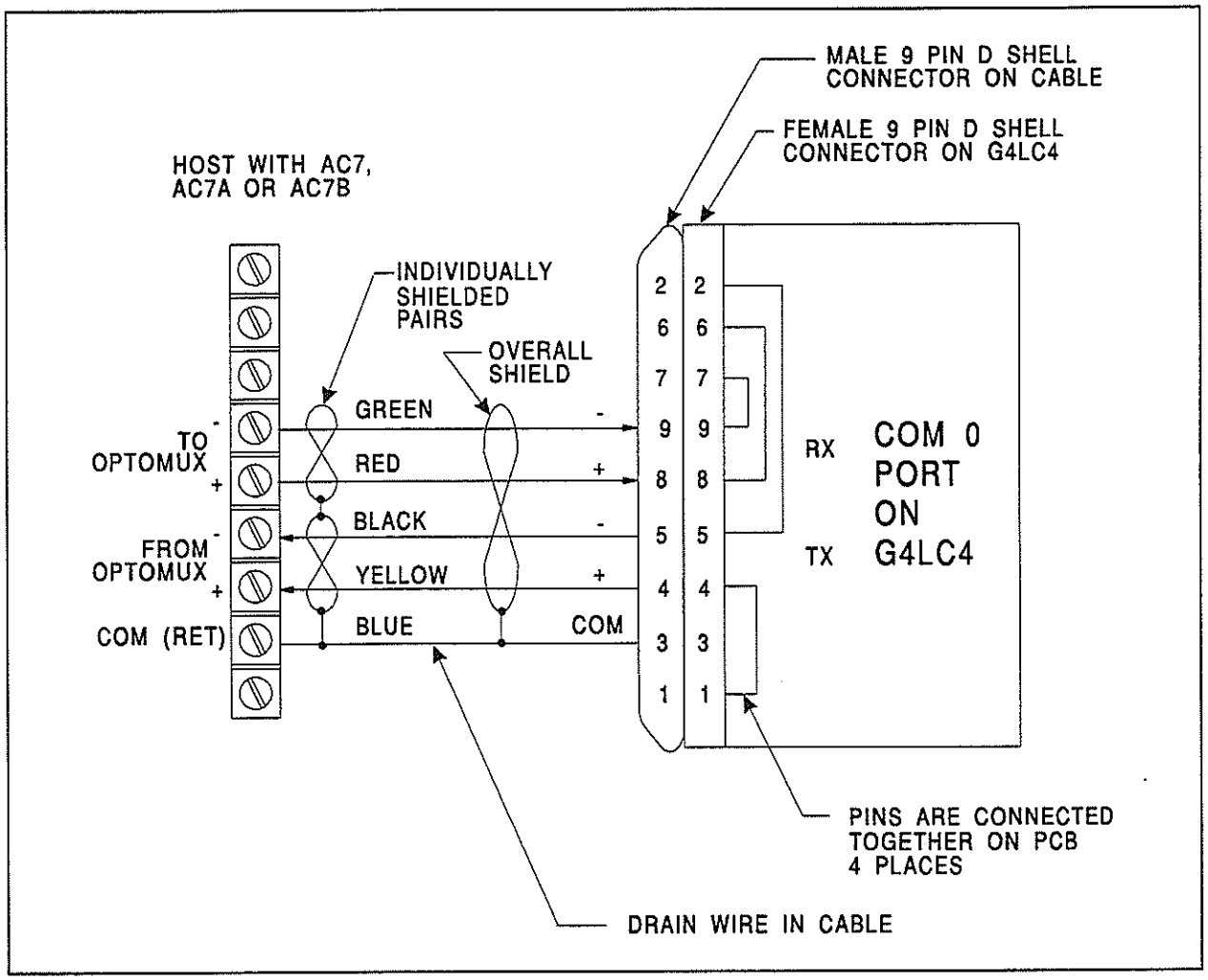
If you are using an OPTO 22 RS422 card (Model AC24 or AC422), the cable will have male 9 pin "D" shell connectors at each end. The cable is wired straight through as shown on the diagram below. The same pin numbers are used at each end making it easy to fabricate and test. The cable is symmetrical. Either end can be used for the PC workstation or the G4LC4. Recommended cable and connector part numbers are given below. Double check your wiring after it is complete, then continue with the next step.



Wiring to PC Workstation With Internal Adapter Card

RS-422/485 COMMUNICATIONS WIRING TO OTHER HOST COMPUTER

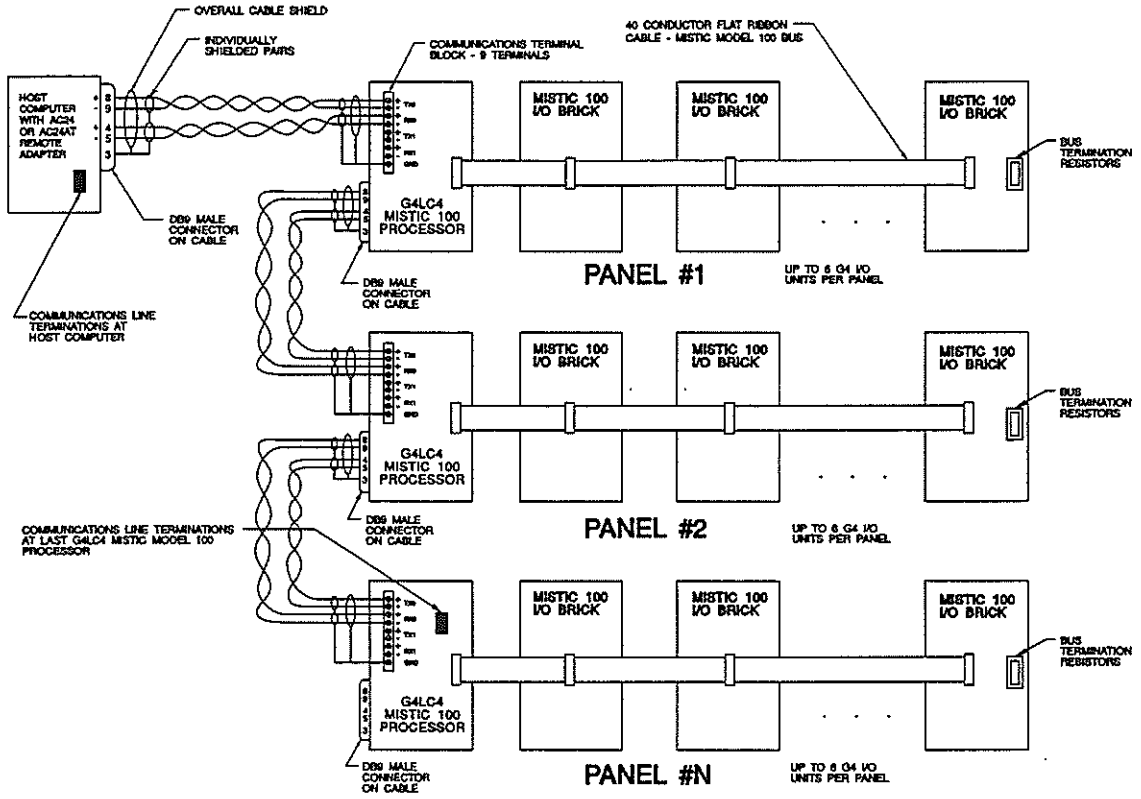
If you are using a computer other than a PC/XT, PC/AT or PS/2, then you must use an external AC7, AC7A or AC7B Adapter Card as shown below. These cards are manufactured by OPTO 22. These cards are typically used to interface with STD Bus systems, Multibus systems, etc. In order to run Cyrano 100, you must be able to run MSDOS and have an EGA or VGA monitor.



Wiring to Host Computer with External Adapter Card

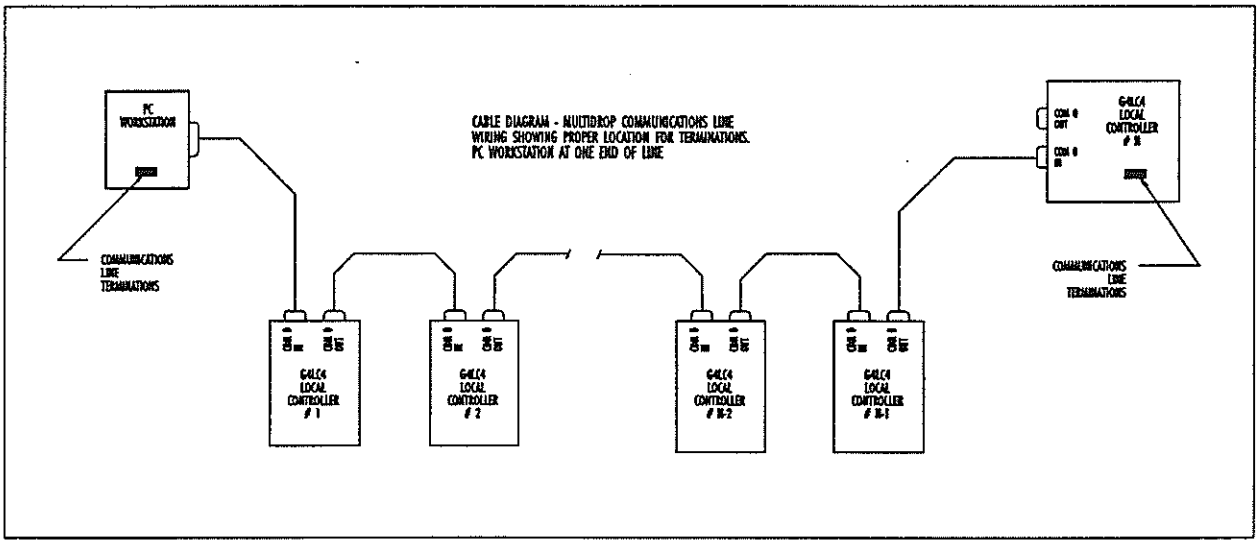
RS-422/485 MULTIDROP COMMUNICATIONS WIRING

As many as 256 G4LC4 Model 100 Processors can be connected to a single PC Workstation. When more than 100 G4LC4's are connected to the same multidrop cable, a Multidrop Network Repeater is required. The OPTO 22 part number is AC30A (115 VAC) or AC30B (220 VAC). Some of the possible multidrop connections are shown below.



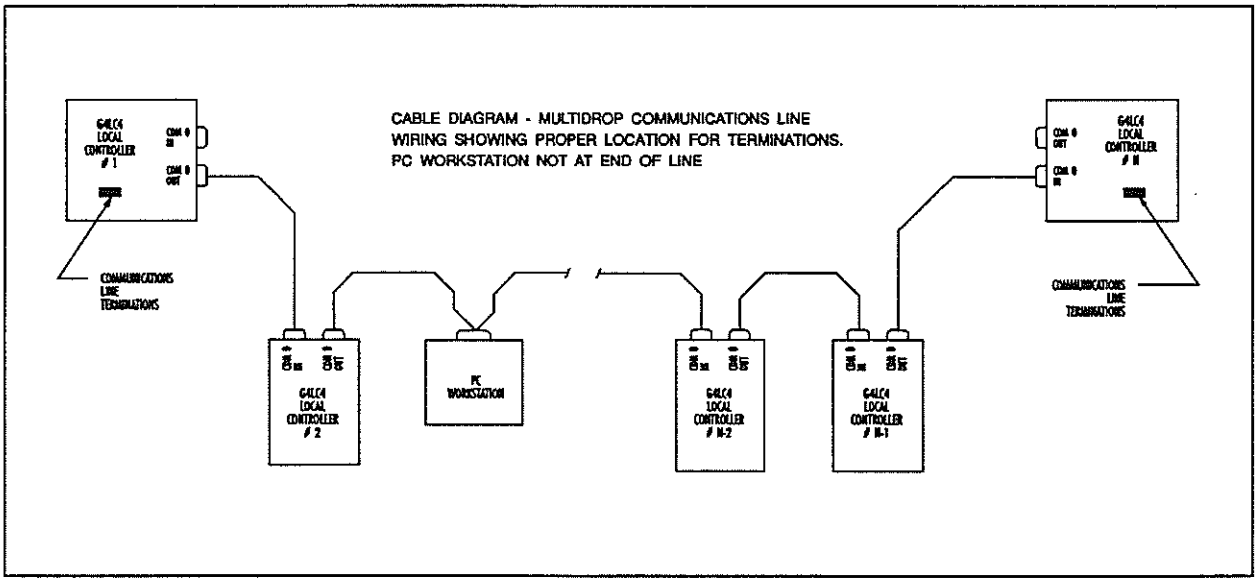
G4LC4 MULTIDROP CONFIGURATION - TYPICAL

The following diagram shows a typical multidrop communications line with the PC Workstation located at one end of the line. This is probably the most common connection.



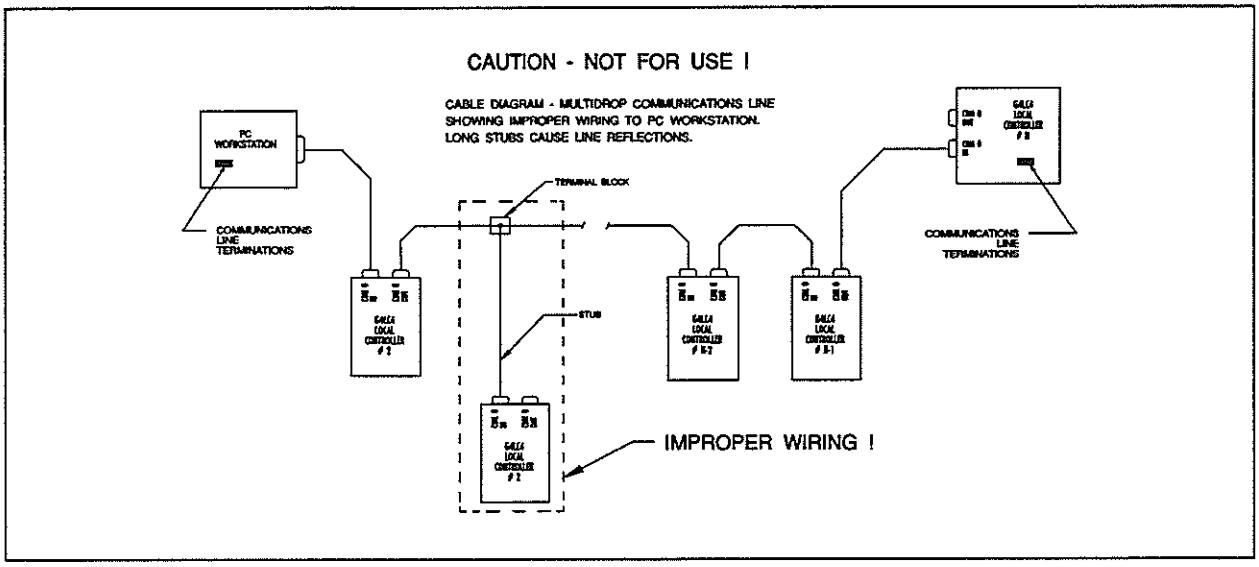
Multidrop - PC Workstation at End of Line

The following diagram shows a cable multidrop communications line when the PC Workstation is located somewhere in the middle of the line.



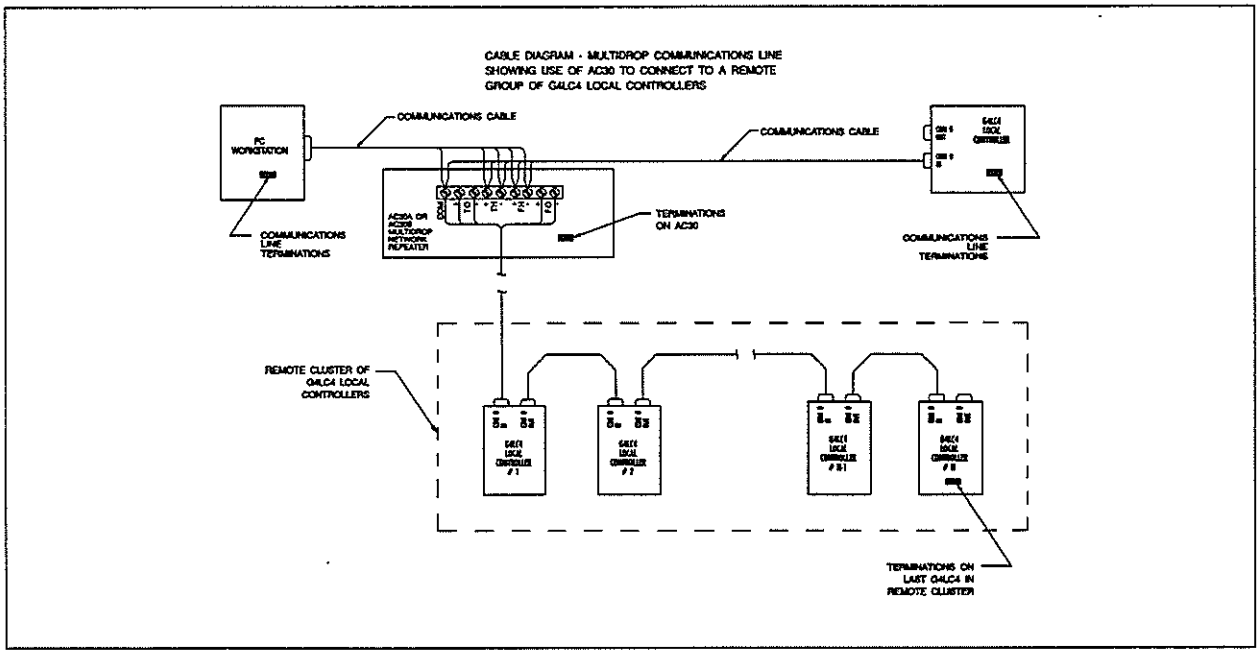
Multidrop - PC Workstation Not at End of Line

When wiring a multidrop communications cable, you must keep in mind that the cable is a high speed data transmission line. The line must be terminated properly at both ends in order to reduce reflections. All stubs must be less than 3 inches. A common mistake is to tap the cable using a terminal block and then connect another G4LC4 as shown below. The problem with this connection is that the stub is typically longer than 3 inches. This will result in line reflections that will degrade data transmission and may result in communications failure.



Example of Improper Multidrop Wiring

The proper way to tap the communications line cable is to use an OPTO 22 AC30A or AC30B Multidrop Network Repeater as shown below. You can also use this connection diagram whenever you have more than 100 G4LC4 Processors connected to a multidrop communications line. A third use for the AC30 is to extend the communications line beyond 5000 feet. Each AC30 repeater can extend the line an additional 5000 feet.



Use of AC30 in Multidrop Application

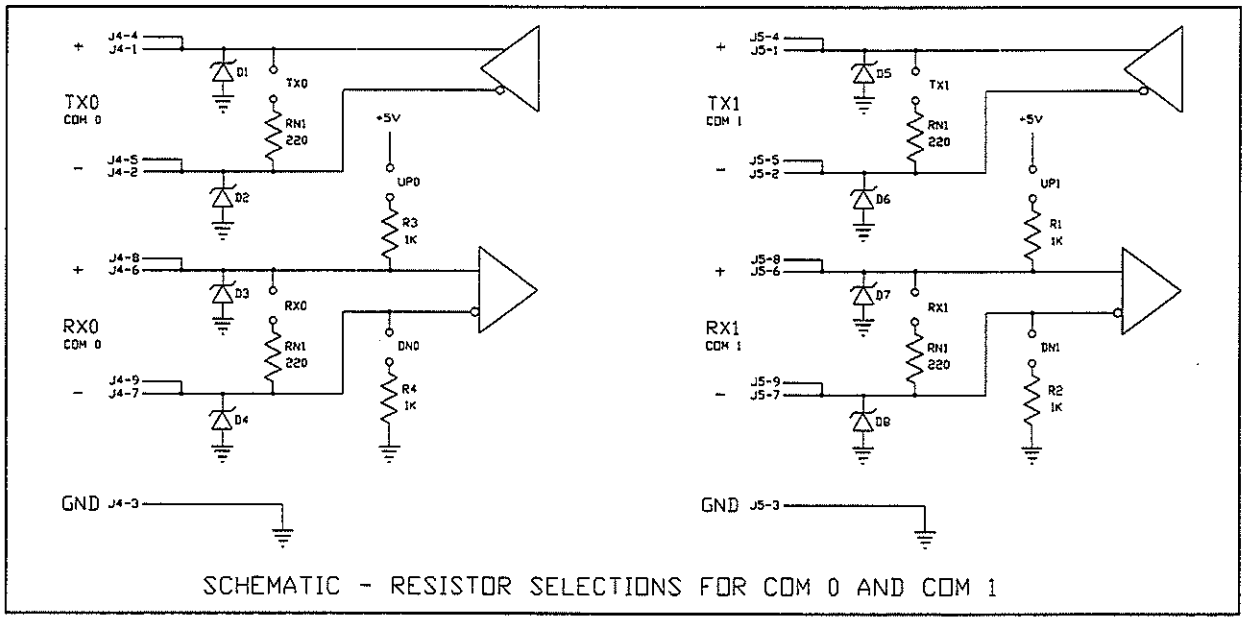
G4LC4 JUMPER AND DIP SWITCH DESCRIPTIONS

SETTING THE "COMMUNICATION LINES" DIP SWITCHES

The "Communication Lines" DIP switches on the G4LC4 Baseplate are used to add termination resistors and appropriate pull-up or pull-down resistors to the RS422/485 communication lines (COM 0 & Com 1).

SWITCH NUMBER	DESCRIPTION
1	DN1 - Pull Down Resistor (to gnd.) for COM 1
2	UP1 - Pull Up Resistor (to +5 V) for COM 1
3	DN0 - Pull Down Resistor (to gnd.) for COM 0
4	UP0 - Pull Up Resistor (to +5 V) for COM 0
5	RX1 - Termination Resistor for Receive Lines for COM 1
6	TX1 - Termination Resistor for Transmit Lines for COM 1
7	RX0 - Termination Resistor for Receive Lines for COM 0
8	TX0 - Termination Resistor for Transmit Lines for COM 0

The schematic below shows the termination resistors for the RS422/485 communications lines. The diagram shows each DIP switch (as marked on the baseplate) and its corresponding terminating resistor.



SCHEMATIC - RESISTOR SELECTIONS FOR COM 0 AND COM 1

Pull-up and pull-down resistors are used to place the communications lines in a known state when all the transmitters (connected to the line) are in a high-impedance state. In contrast to the termination resistors, which are connected at each end of the line, pull-up resistors and pull-down resistors are installed at only one place on a communication line. They are usually installed at the receiver which is the furthest away from the transmitter. If you are using COM0, and want to install pull-up and pull-down resistors, then close switches UP0 and DN0. If you are using COM 1, and want to install pull-up and pull-down resistors, then close switches UP1 and DN1.

When one or more G4LC4's is connected in a multidrop configuration on one RS485 communication line, you must terminate the line at each end. If you are installing the G4LC4 unit at one end of the communications line which uses COM 0, then close switches RX0 and TX0. If you are installing the G4LC4 unit at one end of the communications line which uses COM 1, then close switches RX1 and TX1.

The proper setting of the DIP switches depends upon your system configuration. In order to properly balance the communications line, the termination resistors should be installed only on the devices at each end of the link. The following examples illustrate which jumpers should be installed for specific applications.

EXAMPLE 1

One G4LC4 connected to a PC workstation with an OPTO 22 RS-422/485 Adapter Card. COM 1 is not used.

DIP Switch Settings at the G4LC4 Model 100 Processor

TX0	RX0	TX1	RX1	DN0	UP0	DN1	UP1
ON	ON	OFF	OFF	OFF	OFF	ON	ON

Jumper Settings at the PC Workstation

For AC24, AC24AT, AC422, AC422AT and AC34 Adapter Cards install the following jumpers:

B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	C7
0	X	0	X	X	X	0	0	0	0	0	0	0	0

Where X indicates that the jumper is installed and 0 indicates that the jumper is not installed.

For AC32 Adapter Cards install the following jumpers if you are using Channel A on the AC32 card:

A1	A2	A3	A4	A5	A6	A7
0	X	0	X	X	X	0

Where X indicates that the jumper is installed and 0 indicates that the jumper is not installed.

For AC32 Adapter Cards install the following jumpers if you are using Channel B on the AC32 card:

B1	B2	B3	B4	B5	B6	B7
0	X	0	X	X	X	0

Where X indicates that the jumper is installed and 0 indicates that the jumper is not installed.

Refer to the manual for the adapter card that you are using at the PC workstation for configuring the adapter card for COM 1 or COM 2 and setting the interrupt jumpers.

EXAMPLE 2

Multidrop configuration with PC workstation at one end of line as shown in a previous diagram. The PC workstation is equipped with an OPTO 22 RS-422/485 Adapter Card. COM 1 on the G4LC4 is not used.

DIP Switch Settings at the *last* G4LC4 Model 100 Processor on the Line

TX0	RX0	TX1	RX1	DN0	UP0	DN1	UP1
ON	ON	OFF	OFF	OFF	OFF	ON	ON

DIP Switch Settings at all the other G4LC4 Model 100 Processors on the Line

TX0	RX0	TX1	RX1	DN0	UP0	DN1	UP1
OFF	OFF	OFF	OFF	OFF	OFF	ON	ON

Jumper Settings at the PC Workstation

For AC24, AC24AT, AC422, AC422AT and AC34 Adapter Cards install the following jumpers:

B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	C7
0	X	0	X	X	X	0	0	0	0	0	0	0	0

Where X indicates that the jumper is installed and 0 indicates that the jumper is not installed.

For AC32 Adapter Cards install the following jumpers if you are using Channel A on the AC32 card:

A1	A2	A3	A4	A5	A6	A7
0	X	0	X	X	X	0

Where X indicates that the jumper is installed and 0 indicates that the jumper is not installed.

For AC32 Adapter Cards install the following jumpers if you are using Channel B on the AC32 card:

B1	B2	B3	B4	B5	B6	B7
0	X	0	X	X	X	0

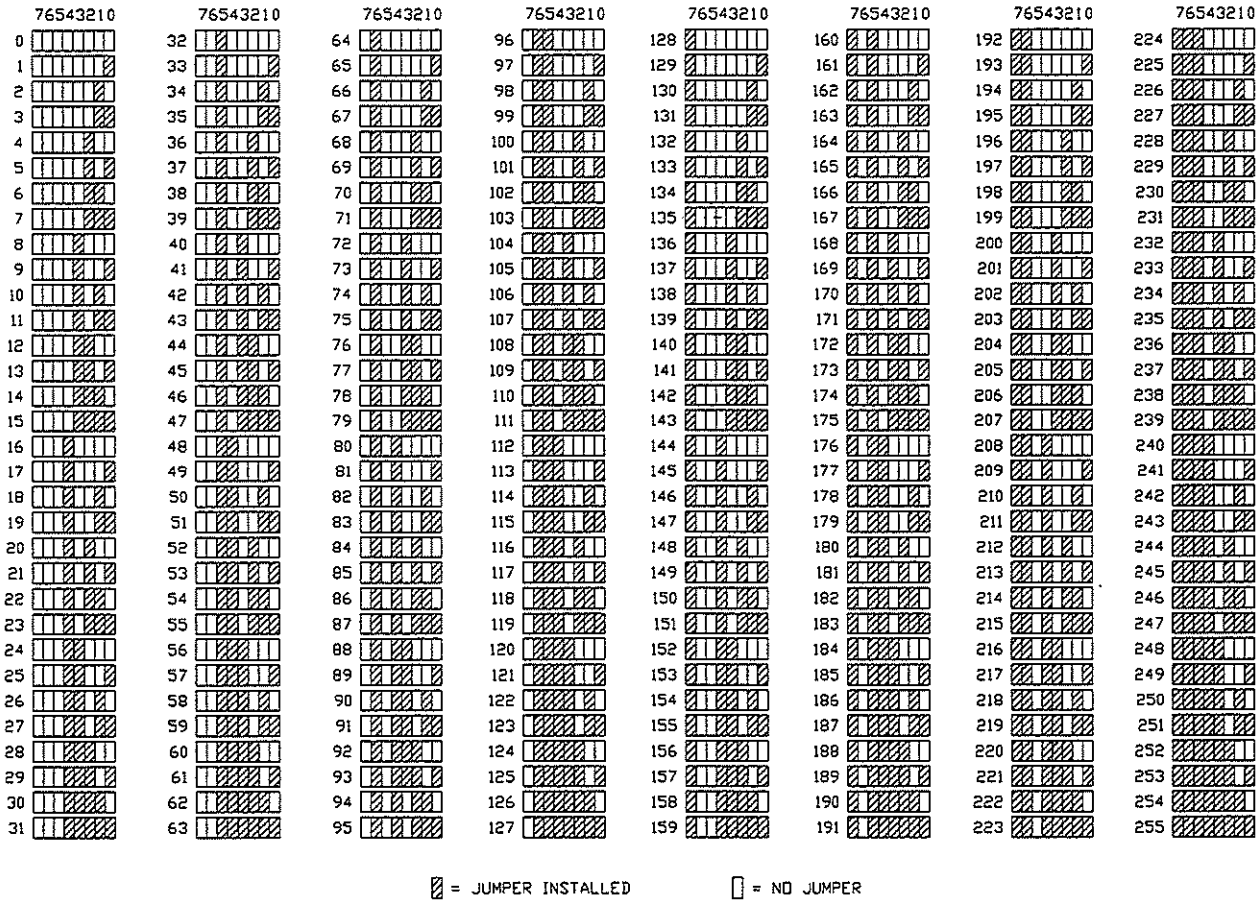
Where X indicates that the jumper is installed and 0 indicates that the jumper is not installed.

Refer to the manual for the adapter card that you are using at the PC workstation for configuring the adapter card for COM 1 or COM 2 and setting the interrupt jumpers.

SETTING THE G4LC4 ADDRESS JUMPERS

The address jumpers for the G4LC4 are located on the G4LC4A I/O card as shown previously. As many as 256 G4LC4's can be connected to one host PC. Each G4LC4 must be given a unique address in the range of 0 to 255. In order for the PC to be able to send to communicate with a particular G4LC4, it first sends out an address on the communications line, then it sends a command. Cyrano 100 is designed to take care of these details for you. The only thing that you need to do make sure that you have set your address jumpers correctly on the G4LC4's to agree with the address that you are using at the PC workstation for Cyrano 100. The factory default setting is for address 00 hex (no jumpers).

The following table shows how to set the jumpers on the G4LC4 for a specific address:



G4LC4 Address Jumper Selection Chart

SETTING THE G4LC4 BAUD RATE JUMPERS

The G4LC4 also has 4 serial communications ports. Ports are numbered 0, 1, 2 and 3. Ports 2 and 3 are RS-232 and Ports 0 and 1 are RS485. All ports have user-selectable baud rates. The selection jumpers for Ports 2 and 3 baud rates are located on the G4LC4A I/O Card. The selection jumpers for Ports 0 and 1 are located on the G4LC4B Processor Card. Use the following baud rate jumper chart to configure.

Baud Rate	Description	Jumper Settings		
		2	1	0
300	Selects 300 BAUD	0	X	X
1200	Selects 1200 BAUD	X	0	X
2400	Selects 2400 BAUD	0	0	X
4800	Selects 4800 BAUD	X	X	0
9600	Selects 9600 BAUD	0	X	0
19.2K	Selects 19200 BAUD	X	0	0
38.4K	Selects 38400 BAUD	0	0	0
No Clock	Reserved for Future Use.	X	X	X

NOTE: X means that a jumper is installed, 0 means that no jumper is installed.

Refer to the Operations Manual of your host terminal or computer for configuring and initializing the host's serial port. The host should be set up with the following parameters:

BAUD RATE:	300, 1200, 2400 4800, 9600, 19200 or 38400
START BITS:	1
STOP BITS:	1
DATA BITS:	8
PARITY:	NONE

SETTING THE POWER UP STATUS JUMPERS

These jumpers are located on the G4LC4A I/O Card as show on the drawing for the G4LC4A.

Install "Auto" Jumper if you wish G4LC4 to begin executing the current program in memory upon power-up.

When jumper 'R' is installed, then all battery backed RAM is cleared upon power up. The 'R' jumper should never be installed on a permanent basis. It is meant to be used for trouble shooting and/or debugging purposes *only*. If you want to clear (erase) all battery backed RAM, then follow these steps: (1) install the 'R' jumper, (2) cycle power ON for a few seconds, (3) turn power OFF and (4) remove jumper 'R'.

Do *not* install jumper 'E', it is reserved for future use.

CONFIGURING THE HOST AND APPLYING POWER

Refer to the Operations Manual of your host terminal or computer for configuring and initializing the host's serial port. The host should be set up with the following parameters:

BAUD RATE: 300, 1200, 2400 4800, 9600, 19200 or 38400
START BITS: 1
STOP BITS: 1
DATA BITS: 8
PARITY: NONE

If you are using an IBM Personal Computer or compatible as a host, install Cyrano 100 software in accordance with your Cyrano 100 manual.

After the host is configured, apply power to G4LC4. If everything is working correctly, you should be able to compile and download your control applications programs to the target G4LC4. You can then use the Cyrano 100 Debugger if needed to debug your programs. You can also use the debugger to just look at your I/O points and variables to see their current status.

If you are not communicating with the addressed G4LC4, make sure that you have the G4LC4 address jumpers correctly installed and make sure the "AUTO" jumper is NOT installed. If it is installed, turn power off on G4LC4, remove the jumper, and turn power back on. Double-check the wiring, G4LC4 configuration and host configuration to make sure there are no errors.

Every G4LC4 is tested thoroughly and operated at elevated temperatures for an extended period of time. If after checking the wiring and jumper selections, you are still having difficulty and are in need of further assistance, call our toll-free number listed on the back.

G4LC4 HARDWARE SPECIFICATIONS

CPU:	Hitachi 64180 8-Bit Microprocessor
CPU CLOCK FREQUENCY:	6.144 MHz
EPROM:	64 Kilobytes (Intel 27512 or Equivalent)
RAM:	64 Kilobytes, CMOS w/Battery Backup
WATCHDOG TIMER:	Standard, Hardware
REAL TIME CLOCK:	Clock/Calendar, Epson 62421A, w/Battery Backup
COMMUNICATIONS:	2 Full Duplex, RS422/485 Serial Ports 2 Full Duplex RS-232 Serial Ports
RAM/CLOCK BATTERY:	3 Volt Lithium, Non-Rechargeable, (RAYOVAC BR-2/3A)
BATTERY LIFE:	10+ Years under normal operating conditions
POWER REQUIREMENT:	1.7 Amps @ 5 VDC ± 0.1V (at 25° C Ambient)
POWER DISSIPATION:	Less than 7.5 Watts @ 25 Deg. C.
TEMPERATURE:	0 to 60 Degrees C. (Operating)

NOTE: Operation at or near maximum rated temperature for extended periods of time may adversely affect reliability.

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Fax: 714-695-2712

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