PROCON

MODEL 8230

NETWORK
I/O
MODULE

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DRAWINGS

PROCON
MODEL 8230
NETWORK I/O MODULE

The NETWORK I/O MODULE is a small yet very powerful unit that provides a remote I/O interface for a central control system. It has totally configurable digital I/O that will allow its use in a wide variety of applications. It is totally controlled from either its internal RS232 or Ethernet port.

Numerous modules can be used in a system to provide monitoring and control on a large number of different units. Since each module set has its own IP address, the only practical limits on the system size is the network to which they are attached. Also, since each module operates independently, there is no reduction in data collection performance as the system grows.

The system has both master and slave modules. Slave modules may be connected to the master via the RS485 port. The user has no additional communications interface requirements when using slaves. The master module will handle all I/O with the slave(s) and present all information via the single RS232 or Ethernet port. Control of the outputs on the slaves is handled in the same manner. The user just talks to the master and it handles the slave(s).

The I/O is brought out on DB25 connectors. All I/Os may be configured as either inputs or outputs. Any or all of them may be set as optically isolated inputs. Any or all may be configured as outputs. Half may be configured as optically isolated transistor outputs. Half may be configured as relay outputs. These configuration patterns allow the user to apply the unit in an almost endless variety of applications.

There may be up to 7 slave units tied to the master via the RS485 slave link to allow a maximum of 512 I/0 points to be tied to one Ethernet port.

The DB25 connector wiring is fully compatible with SEMI E84-0701. When configured for this application the relays are disabled and the optical isolated inputs and outputs provide an interface suitable for both the Hardwired Connection and Optical Transmission Device connection (as called out in Figures 23 and 24 of the standard).

The unit also has the ability to run interactive local programs. These operational sequences are held in the internal flash memory and may be activated by a simple configuration command.

Some of the features are:

*UP TO 64 INPUT/OUTPUTS PER UNIT
        EACH ACCEPTS 24 VDC DIGITAL INPUTS
        32 MAY BE SETUP WITH 1 AMP 24 VDC RELAYS
        32 MAY BE SETUP WITH OPTICALLY ISOLATED
         TRANSISTORS OUTPUTS

*I/O CONNECTIONS ARE MADE VIA FEMALE DB25
 CONNECTORS

*MASTER AND SLAVE UNITS AVAILABLE

*MASTERS HANDLE 2 AND 4 LOADING PORT SYSTEMS

*MASTER AND MULTIPLE SLAVES MAY BE USED FOR LARGE I/O
 APPLICATIONS, ADDING 64 NEW I/Os WITH EACH SLAVE.

*UP TO 7 SLAVES MAY BE HANDLED BY ONE MASTER

*512 I/O POINTS MAY BE TIED TO ONE ETHERNET PORT

*MASTER UNIT AUTOMATICALLY HANDLES ALL SLAVE
 OPERATION AND CONFIGURATION

*MULTIPLE OPERATIONAL PROGRAMS MAY BE RESIDENT IN
 FLASH MEMORY

*MULTIPLE AUTO CONFIGURATION MAY BE RESIDENT IN FLASH
 MEMORY

*ETHERNET INTERFACE, IEEE 802.3, 10BaseT/100BaseTX, RJ-45
 CONNECTOR

*SEMI E84-0701 INTERFACE COMPATIBLE FOR BOTH HARDWIRE
 AND OPTICAL INTERFACES

*TCP/IP PROTOCOL

*24VDC INPUT POWER

*SMALL PACKAGE SIZE (11.5x5.9x2.0 inches – 32 I/O)
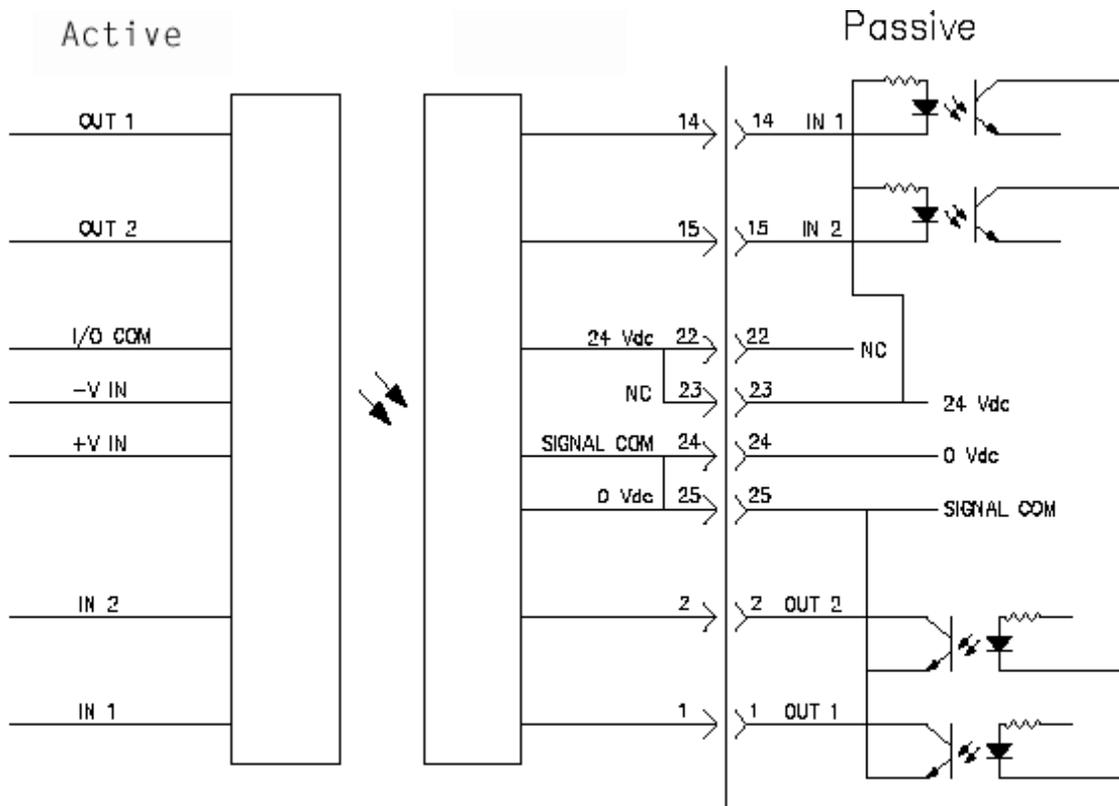
*OPEN BOARD CONSTRUCTION

*NO SOFTWARE TO WRITE – ALL FUNCTIONS ARE BUILT-IN.

*NO OPERATING SYSTEM – DEDICATED CODE FOR GREATER
 RELIABILITY AND SPEED.

*FAST STARTUP – OPERATIONAL IN 5 SECONDS AFTER POWER
 IS APPLIED.

*LED INDICATORS

Figure 23
Optoisolated Implementation Using an Optical Transmission Device
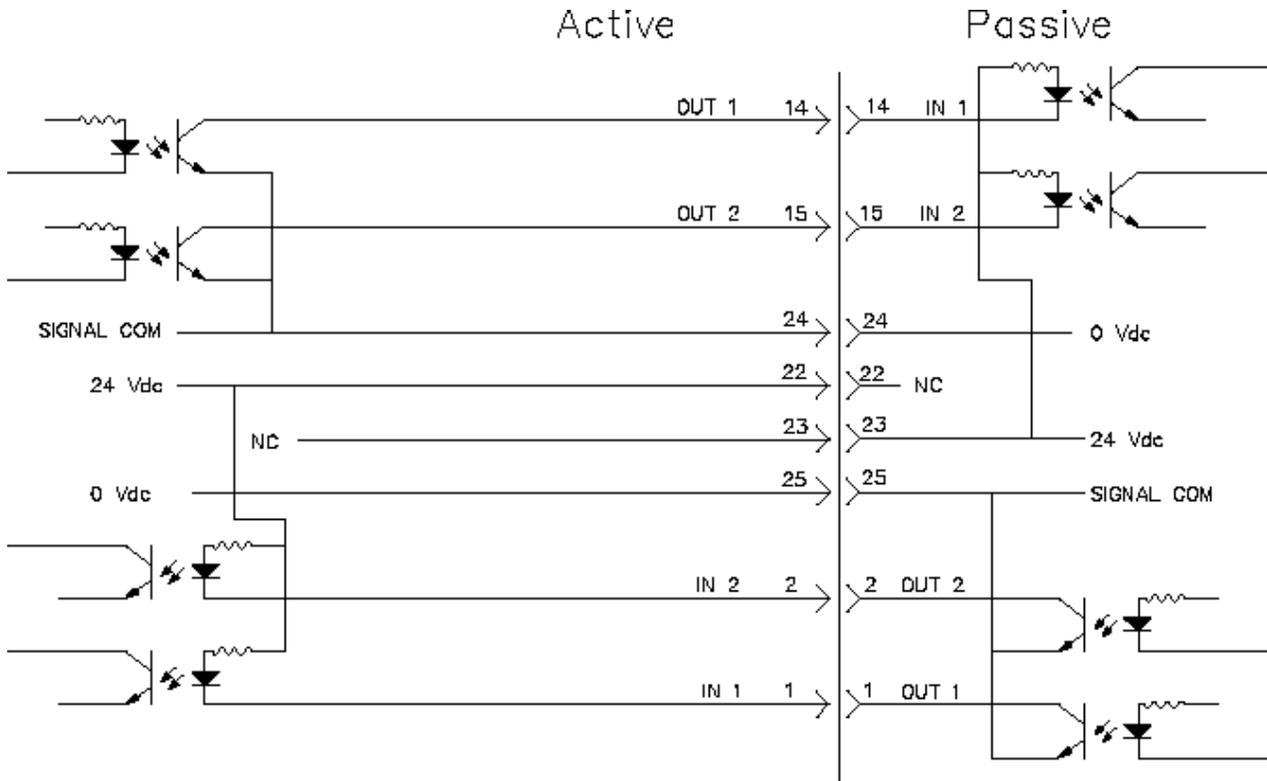
Figure 24
Optoisolated Implementation Using Hardwired Connection
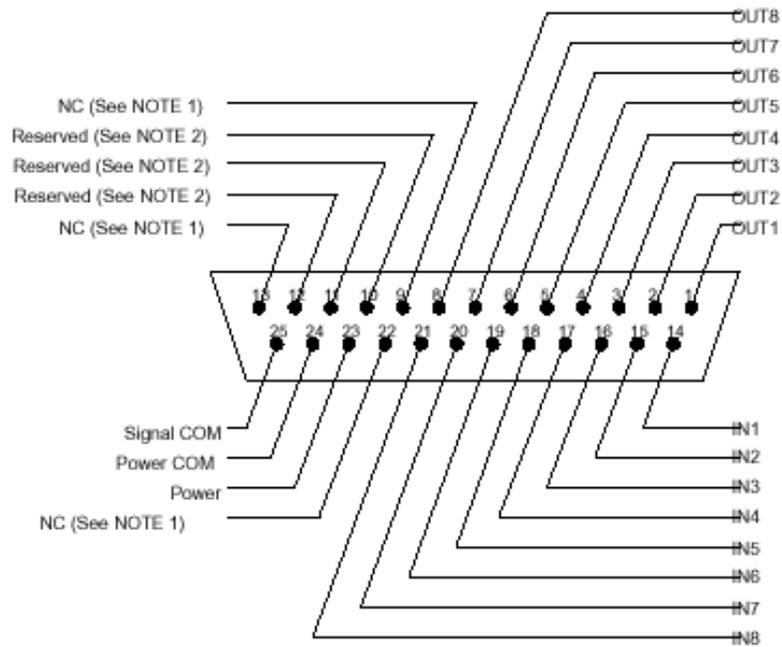
NOTE 1: NC = Not Connected

NOTE 2: Reserved = The pin may be used to support the signal required for a type of any interface unit. It cannot be used for current or future implementations of this specification.

Figure 26
Pin Assignments for Connector of Passive Equipment Side (Pin Side View)

LED INDICATORS

Six to ten discrete LEDs are provided to indicate the current system status, depending on the unit configuration. They are Power, Status, Link, 10BaseT, 100BaseTX, Over Current 1, Over Current 2, Over Current 3 and Over Current 4.

Power - Indicates that the module has line power.

Status - Indicates that the micro controller chip is functioning and executing the program. The LED will flash.

Link – Indicates that the communications link has been established.

10BaseT - Indicates that the communications link is running at 10BaseT. The LED will flash when data is being transmitted or received.

100BaseTX - Indicates that the communications link is running at 100BaseTX. The LED will flash when data is being transmitted or received.

Over Current 1 - Indicates that an over current condition has been detected on connector 1 and the outputs has been restricted.

Over Current 2 - Indicates that an over current condition has been detected on connector 2 and the outputs has been restricted. (on daughter board 1)

Over Current 3 - Indicates that an over current condition has been detected on connector 3 and the outputs has been restricted. (on daughter board 2)

Over Current 4 - Indicates that an over current condition has been detected on connector 4 and the outputs has been restricted. (on daughter board 3)

I/O CONFIGURATION

The unit I/O is grouped based on the DB25 connectors. Each connector has 16 I/O pins. These pins are shared as both inputs and outputs. The inputs are always active and the outputs may be enabled or disabled.   Eight of the outputs are OCT (open collector transistor) and 8 are relays. The mother board has one set built in. Additional sets of 16 I/O are added via stackable daughter boards. A maximum of 3 daughter boards may be stacked on each unit.

Additionally, there may be up to 7 slave units tied to the master via the RS485 slave link to allow a maximum of 512 I/0 points to be tied to one RS232 or Ethernet port. Note that the slave link is totally controlled by the master unit and the system appears to the RS232 or Ethernet port as one unit.

INPUTS

DIGITAL INPUTS – The digital inputs are continuously scanned by the controller. The controller determines if the input is high or low. Each input has full ESD protection. Each group of 16 digital inputs are treated as a double byte, scanned into the microprocessor and stored for retrieval by the host PC. Note that a closure on the input pin results in a 1 in the corresponding bit. An open results in a 0.

OUTPUTS

The outputs are inactive unless enabled. Each I/O pin may be an output. Within each 16 I/O grouping there are 8 relay and 8 OCT outputs.

RELAY OUTPUTS – Each relay is rated at 1 amp, 24vdc. Each group of 8 relays has a maximum total current of 3 amps.

OCT OUTPUTS –   Each output is rated at 100 ma, 24vdc.

MASTER / SLAVE CONNECTION

The master/slave connection is accomplished via an RS-485 link. A total of 7slaves can be wired to the master via the RS-485 master / slave port. Each slave adds an identical set of I/O to the master controller. All slaves are configured and controlled by the master. Slaves can be daisy chained to the master controller.

COMMUNICATIONS

The unit allows for two methods of communications: Ethernet and RS232. The protocol that is used is the same for both methods. The RS232 port has full access to the Ethernet parameters, so it can be used as the actual interface or it may be used just to configure the Ethernet. Note that the RS232 is not required when using the Ethernet mode, since all configuration may be done through the Ethernet connection, but the RS232 is available as an alternate.

Ethernet:
The Ethernet connection will run on either 10BaseT or 100BaseTX. TCP/IP is used as the network protocol. It uses Port 1025 and has a 2.5 sec timeout.

The interface requires the setting of an IP Address, Subnet Mask and Gateway IP Address. These are handled by the I, S and G Commands (see below). Setting the unit Configuration Switch Position 1 to "ON" forces the unit to use the defaults (IP = 192.168.1.30 , Subnet = 255.255.255.0 and Gateway = 0.0.0.0). This is provided so the user can gain direct control of the Ethernet to configure it. Note that the switch must be turned off and the unit power cycled (or the reset switch depressed) before the new configuration takes affect.

With the Configuration Switch Position 1 "Off", the setup information may be changed via the Ethernet using the I, S and G Commands and it will after 5 seconds automatically reconfigure itself without cycling power or resetting.

Each command sent to the controller will receive a single packet response from the controller. The response will consist of an echo of the incoming command, the command response, and an End of Transmission character. The end of transmission character will be a "*". The following is an example of the "Read" command. The full details of the command will be explained later:

> Command sent from host PC:
> R001<cr>
>
> Response from 8230 (single packet of data):
> R001<cr><lf>
> 00000<cr><lf>
> *

RS232:
The Com1 port has two functions. It may be used to gather data or as the central communications port. The unit Configuration Switch Position 3 is used to select this option. The port runs at 115200 Baud, 8 bit, 1 stop and 1 start bit, no parity. Note that the activation of this port as the communication port does not disable the Ethernet port.

Protocol:

Since this system does not handle a great deal of data, the link has been optimized to allow the user, through very simple instructions, to control and interrogate the unit. The following section describes the JPC Protocol used by the controller.

The JPC Protocol consists of 10 basic commands:

> R   - READ
> W   - WRITE
> U   - UPLOAD
> D   - DOWNLOAD
> Q   - QUICKSEND
> I   - IP ADDRESS
> S   - SUBNET MASK
> G   - GATEWAY ADDRESS
> X   - CANCEL
> V   - VERSION

The data format is standard ASCII and all data are BCD values.

The following is a breakdown of each of the commands and the way they are accessed. The unit will echo all characters that are typed to it. When used with a terminal, this will provide the appropriate display. When used with a computer system, this will provide direct feedback of the fact that unit has accepted the data.

All commands are completed with a carriage return from the computer. All commands will be acknowledged by a carriage return, line feed ($0D,$0A). If a command is not valid, the system will respond with "??". All commands are not case sensitive.

To accommodate the multiple slave units, an ID number is used in the Read, Write, Upload, Download, and Quicksend commands. The following table shows the meaning of the Identifier

ID#	Description
0	- MASTER
1	- SLAVE 1
2	- SLAVE 2
3	- SLAVE 3
4	- SLAVE 4
5	- SLAVE 5
6	- SLAVE 6
7	- SLAVE 7

READ COMMAND

The READ command is utilized to read from the System any of the gathered data. The command is entered as a letter followed the Identifier, followed by the 2 digit location, followed by a carriage return:

R(ID)(Location)(Return)

The 'R' indicates to the Controller that the command is to be a READ command. The ID indicates which device is to be read. The next two digits indicate data location that is to be read. The carriage return indicates that the command is to be activated. The following is a listing of the data locations that may be read:

LOCATION	ACCESS	DESCRIPTION	RANGE
01	R	I/O CONNECTOR 1 INPUTS	0-65535
02	R/W	I/O CONNECTOR 1 OUTPUTS	0-65535
03	R/W	I/O CONNECTOR 1 OUTPUT ENABLE	0-65535
04	R	I/O CONNECTOR 2 INPUTS	0-65535
05	R/W	I/O CONNECTOR 2 OUTPUTS	0-65535
06	R/W	I/O CONNECTOR 2 OUTPUT ENABLE	0-65535
07	R	I/O CONNECTOR 3 INPUTS	0-65535
08	R/W	I/O CONNECTOR 3 OUTPUTS	0-65535
09	R/W	I/O CONNECTOR 3 OUTPUT ENABLE	0-65535
10	R	I/O CONNECTOR 4 INPUTS	0-65535
11	R/W	I/O CONNECTOR 4 OUTPUTS	0-65535
12	R/W	I/O CONNECTOR 4 OUTPUT ENABLE	0-65535

Example:

R104(Return)

This will return the value in location 04 in Slave 1.

Format - All data is returned in ASCII format with 5 BCD characters.

Digital I/O - When converted to binary, each bit of the Digital Inputs, Outputs, and Output Enable represents a specific I/O. The following table is used to identify each bit. It also provides an example of decoding an input.

Bit Pattern Layout															
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
I/O 16	I/O 15	I/O 14	I/O 13	I/O 12	I/O 11	I/O 10	I/O 9	I/O 8	I/O 7	I/O 6	I/O 5	I/O 4	I/O 3	I/O 2	I/O 1

Example Data															
00072_D															
0048_H															
0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0

In this example, the data 00072 was read from Location 01. Breaking it down illustrates that inputs 4 and 7 have detected a switch closure.

WRITE COMMAND

The WRITE command allows the user to update the Analog and Digital outputs. The locations for this data are shown in the table for the READ command.

The following is the format for this command:

W(ID)(Location)(Data)(Return)

The command essentially follows the same format as all the previous commands. The 'W' indicates that it is a WRITE command. The ID indicates which device is to be written. The next two characters indicate the location that is to be written to and the last five characters indicate the data value that is to be entered. Again, the data is in BCD and transmitted in an ASCII format. All leading zeros must be included in the command. Only the Output and Output Enable locations can be written to. In the example above, the Outputs 4 and 7 on I/O connector 1 would be turned on, if they were enabled.

Example:

W00500072(Return)

This will write the value 00072 in location 05 in the Master.

UPLOAD COMMAND

The Upload command allows the user to read all of the selected device data from locations 1 through 12 with a single command. The data will be transmitted as a single block with each location separated by a carriage return, linefeed ($0D,$0A).

The following is the format for this command:

U(ID) (Return)

The ID indicates which device is to be read. See the table in the Read Command section for details on the data structure.

DOWNLOAD COMMAND

The Download command allows the user to write all of the selected device outputs with a single command. The data will be transmitted as a single block with each location separated by a carriage return, linefeed ($0D,$0A).

The following is the format for this command:

D(ID)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX (Return)

The ID indicates which device that is to be written. The X's represent the output settings according to the following table. Leading zeros must be included so that each setting is 5 characters

I/O CONNECTOR 1 OUTPUTS	I/O CONNECTOR 1 OUTPUT ENABLE	I/O CONNECTOR 2 OUTPUTS	I/O CONNECTOR 2 OUTPUT ENABLE	I/O CONNECTOR 3 OUTPUTS	I/O CONNECTOR 3 OUTPUT ENABLE	I/O CONNECTOR 4 OUTPUTS	I/O CONNECTOR 4 OUTPUT ENABLE

QUICKSEND COMMAND

Quicksend is a feature that allows the user to receive an automatic update of all of the system data without any user interaction. When the Quicksend feature is turned ON, the system will automatically send all of the device data every half second. The Quicksend feature is toggled ON and OFF with the Quicksend command.

The following is the format for the 'Q' command:

Q(ID) (RETURN)

See the table in the Read Command section for details on the data structure.

.

IP ADDRESS COMMAND

The IP Address command allows the user to read and set the unit IP Address.

To read the IP address, the following syntax is used:

I (RETURN)

To set (write) the IP address, the following syntax is used:

Ixxx.xxx.xxx.xxx (Return)

The x's denote the IP address to be written (E.G. I192.168.1.30). NOTE: While the IP address is being written, the STATUS LED will stop blinking. There should be no communications with the controller until the STATUS LED resumes blinking (~ 5 sec).

SUBNET MASK COMMAND

The Subnet Mask command allows the user to read and write the system Subnet Mask.

To read the Subnet Mask, the following syntax is used:

S (RETURN)

To write the Subnet Mask, the following syntax is used:

Sxxx.xxx.xxx.xxx (Return)

The x's denote the mask to be written (E.G. S255.255.255.0). NOTE: While the Subnet Mask is being written, the STATUS LED will stop blinking. There should be no communications with the controller until the STATUS LED resumes blinking (~ 5 sec).

GATEWAY ADDRESS COMMAND

The Gateway Address command allows the user to read and write the Gateway IP Address.

To read the Gateway Address, the following syntax is used:

G (RETURN)

To write the Gateway Address, the following syntax is used:

Gxxx.xxx.xxx.xxx (Return)

The x's denote the Gateway IP address to be written (E.G. G192.168.1.1). NOTE: While the Gateway Address is being written, the STATUS LED will stop blinking. There should be no communications with the controller until the STATUS LED resumes blinking (~ 5 sec).

CANCEL COMMAND

The CANCEL command is simply a way to re-establish proper control, should an error occur or an incorrect command be transmitted. For the most part, an incorrect command will simply be ignored and the controller will prepare for an additional command. However, a command may be cancelled midstream by transmitting an 'X' (ASCII). This command does not require a carriage return, nor will it acknowledge with a carriage return. However, it will echo an 'X' to indicate that the CANCEL command has been received.

The command may also be utilized as a clear and/or acknowledgement of the Controller being on line.

VERSION COMMAND

The Version command allows the user to read the Software Version that the unit is running.

To read the Version, the following syntax is used:

V (RETURN)

VISUAL BASIC SAMPLE CODE

The following code will send the Upload command to the 8230 controller. To utilize the following code, create a new project in Visual Basic 6.0 and add a Command Button, a Textbox, and a Winsock Control to Form1. Then copy the following code to the Form1 Code window and run the program.

```
Private Sub Command1_Click()
On Error Resume Next
Text1.Text = ""  ' clear last response
If Winsock1.State = sckClosing Then Winsock1.Close

' Invoke the Connect method to initiate a
' connection.
If Winsock1.State <> sckConnected Then

   Winsock1.Protocol = sckTCPProtocol

   ' Note: to specify a remote host, you can use
   ' either the IP address (ex: "121.111.1.1") or
   ' the computer's "friendly" name
   Winsock1.RemoteHost = "192.168.1.29"
   Winsock1.RemotePort = 1025
   Winsock1.LocalPort = 1025
   Winsock1.Connect
   If Err.Number = 10048 Then ' address in use?-yes
      Winsock1.Close
      Winsock1.LocalPort = 0
      Winsock1.Connect
      Err.Clear
   End If
   While Winsock1.State = sckConnecting  'wait for connection to be established
      DoEvents
   Wend

End If

Winsock1.SendData "XU0" & vbCr    ' clear 8230 receive buffer and send upload master
data command

End Sub
```

```
Private Sub Winsock1_Close()
    Winsock1.Close  ' 8230 is closing connection
End Sub

Private Sub Winsock1_DataArrival(ByVal bytesTotal As Long)
Dim TempString As String  ' define temporary string for returned data

Winsock1.GetData TempString  ' get data from tcp buffer

Text1 = Text1 & TempString  ' put it in the text box

End Sub
```

SETTINGS

While most of the configuration of the system is done in software, there are a few switches and jumpers that are used to modify the operation of the hardware.

CONFIGURATION BIT SWITCH

There is a three position bit switch on the circuit board that provides the following options:

Switch 1 – Off
The TPC/IP configuration for the Ethernet is obtained from the internal programmed registers.

Switch 1 – On
The TCP/IP configuration for the Ethernet is set to the following defaults:

IP address	192.168.1.30
Subnet Mask	255.255.255.0
Gateway	0.0.0.0

Switch 2 – Off
Default

Switch 2 – On
Reserved for Factory use.

Switch 3 – Off
The Com1 RS232 Port may be used as either a unit input for connection to a device that is being monitored (i.e. particle counters) or as the unit communication to the central PC when the Ethernet is not being utilized.

The Off position sets Com1 to be used as a Device Monitoring Input.

Switch 3 – On
The On position sets Com1 to be used as the main communications port to the user PC. The commands that are used in the RS232 control mode are exactly the same as the Ethernet commands.

Note that in this mode, the Ethernet Port is still active.

COM1 JUMPER

In connecting RS232 devices, there is a common problem based on which device is the DTE
(Pin 2 Input, Pin 3 Output) and which is the DCE (Pin 2 Output, Pin 3 Input). This commonly results in the need for a Null modem cable adapter. To eliminate this issue, jumpers are provided to independently configure the COM ports as either.

COM jumpers swap the function of Pins 2 and 3 on the COM1 connectors.

When set to DTE position, external devices may be connected to the data collection module using the same cabling used to connect the device to a PC COM port. (The COM port is configured identically to a PC port.)

When set to DCE position, the data collection module may be connected to a PC COM port using a straight wired cable. A Null Modem cable is not required.

RESET SWITCH

The momentary switch may be used to reset the unit without having to cycle the power. This is useful when changing switch settings.

SLAVE ADDRESS BIT SWITCH

There is a four position bit switch on the circuit board that provides the address for the slave units. It is set as a binary address:

0000	Master
0001	Slave 1
0010	Slave 2
0011	Slave 3
0100	Slave 4
0101	Slave 5
0110	Slave 6
0111	Slave 7

GETTING STARTED

Getting started is just a matter of getting the unit from the box to it's basic functional condition. The details of hooking it to the actual application hardware and structuring the application software are outside the scope of this section. Here we will just address how to set it up to check that it is working.

The process consist of 9 steps:

       (1) Read the manual

       (2) Unpack and check for physical damage

       (3) Wire to power supply

       (4) Wire RS232 link

       (5) Configure RS232 Communications

       (6) Test RS232

       (7) Wire Ethernet link

       (8) Configure Ethernet Communications

       (9) Test Ethernet

<u>Read the Manual</u>

The manual contains all of the information necessary to setup and operate the unit. A basic understanding of its function and the terminology will prove very helpful.

<u>Unpack and check for physical damage</u>

Unpack and examine the unit. If there is any physical damage do not turn it on. Contact the shipper and file a claim. Then contact the factory for repair or replacement.

<u>Wire to power supply</u>

The unit is powered by 24 VDC. Hook up to an electrically clean 24 VDC source, one free from excessive electrical noise. Insure that a good earth ground is provided. Wire per the wiring diagram in the rear of the manual.

Wire RS232 Communications link

The unit allows for two methods of communications: Ethernet and RS232. The protocol that is used is the same for both methods. The RS232 port has full access to the Ethernet parameters, so it can be used as the actual interface or it may be used just to configure the Ethernet. Note that the RS232 is not required when using the Ethernet mode, since all configuration may be done through the Ethernet connection, but the RS232 is available as an alternate.

While the Ethernet may be addressed directly, the method presented here is a better starting point for the new user. It is easier to use the RS232 port to checkout the unit and then configure it for Ethernet applications than to start on the Ethernet. An experienced user may want to skip this method and address the unit using the default address via the Ethernet and directly reconfigure it from there. That method works very well but will not be used here.

Connect COM1 (J2) to a PC COM port using a 9 pin serial cable. Use a direct cable, not a num modem cable.

Configure RS232 Communications

Set the Configuration Switch Position 3 to the ON position. This enables the setup mode using COM1 (J2). Again, refer to Wiring Diagram 12-823009-30-02 at the rear of the manual and the Settings section for more information.

On the PC, open a terminal emulator program such as Hyperterminal or Teraterm. Set the communication parameters to 115.2kbps, 8 bits, no parity and one stop bit. Select the COM port to which the cable is attached. (Hyperterminal requires the program be restarted after settings are changed.)

Test RS232

Apply power to the device. The power LED will light.

All of the commands listed in the Communications section are now available. No prompt is displayed on the screen. Any of the commands may be used without value to verify that the serial link is working correctly. Line editing is not available in the setup mode. If a typing mistake is made, enter an "X" followed by a carriage return to cancel the command.

Type V (Return).

This should be echoed on the screen followed by the units response of the current version of the software that the unit is running. Work with the other commands a called out in the command section to further test the unit.

Wire Ethernet link

Turn off the power.

Connect the unit to a network hub using a CAT5 patch cable to the RJ-45 connector. This assumes that there is a functional Ethernet network running. If desired this test can be run on a PC by directly connecting to the Ethernet port with a Cross Over cable.

Configure Ethernet Communications

Turn on the unit power.

Three commands are available through the RS232 port that set the configuration of the Ethernet interface. The commands are used to set the unit IP address, the subnet mask and the gateway IP address. The commands are not case sensitive. Each command is a single letter followed by an IP address or mask. The command must be the first character in a line followed by (optionally) a single space and the value to be set. Values must be sent in the dotted quad format. The command is completed with the carriage return (press the enter key). If the command is sent without a value the current setting is displayed.

No prompt is displayed in the COM setup mode. Any of the commands may be used without value to verify that the serial link is working correctly. Line editing is not available in the setup mode. If a typing mistake is made, enter an "X" followed by a carriage return to cancel the command.

The IP address of the Ethernet interface is set using the "I" command. Using the terminal program enter "I" followed by the IP address and a carriage return.

Example:
       I 192.168.1.28<CR>

This command sets the IP address to 192.168.1.28. Set it to the desired network address.

When the command is sent the new address is saved and the Ethernet interface is restarted using the new IP address. The restart process takes about five seconds. If there is any communication on the Ethernet interface when the command is sent it will be interrupted. Communication can continue using the new IP address.

The subnet mask of the Ethernet interface is set using the "S" command. Using the terminal program enter "S" followed by the subnet mask and a carriage return.

Example:
       S 255.255.255.0<CR>

This command sets the subnet mask to 255.255.255.0. Set it to the desired subnet mask

When the command is sent the new mask is   saved and the Ethernet interface is restarted using the new subnet mask. The restart process takes about five seconds. If there is any communication on the Ethernet interface when the command is sent it will be interrupted. Communication will resume if the new mask is compatible with the network mask.

The gateway IP address of the Ethernet interface is set using the "G" command. Using the terminal program enter "G" followed by the gateway IP address and a carriage return.

Example:
          G 192.168.1.254<CR>

This command sets the gateway IP address to 192.168.1.254. Set it to the desired gateway IP address.

When the command is sent the gateway IP address is saved and the Ethernet interface is restarted using the new gateway address. The restart process takes about five seconds. If there is any communication on the Ethernet interface when the command is sent it will be interrupted. Communication will resume when the interface restarts.

Set the Configuration Switch Position 3 to the OFF position.

Test Ethernet

Turn unit power off.

Set the Configuration Switch Position 3 to the OFF position.

Remove the RS232 cable.

Turn the unit power on.

The link LED and the 10baseT or 100baseTX LED should be on.

Open a command prompt window and use the PING command to test the Ethernet interface configuration. Use the IP address that you set with the I command.

Example:
          PING 192.168.1.28<CR>

The command should reply with round trip times for the ping reply. If a timeout error occurs check the IP configuration using the COM port.

To further test the commands over the Ethernet, a TCP/IP interface package is necessary. This will allow the unit to do all of the same things that the RS232 link allows, but to do it over the network.

MANUAL REVISIONS

Revision #	Program #	Engineering #	Revisions Made
REV01			PRELIMINARY MANUAL

LIMITED WARRANTY

WARRANTY: JPC CONTROLS WARRANTS ITS NEW PRODUCTS TO BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP UNDER THE SERVICE FOR WHICH THEY ARE INTENDED. THIS WARRANTY IS EFFECTIVE FOR TWELVE MONTHS FROM THE DATE OF SHIPMENT.

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REMEDIES: THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY SHALL BE: (1) THE REPAIR OR REPLACEMENT OF DEFECTIVE PARTS OR PRODUCTS, WITHOUT CHARGE. (2) AT THE OPTION OF **JPC CONTROLS**, THE REFUND OF THE PURCHASE PRICE.

P:\manuals\procon\manual_procon_8230_rev01.doc

MODULE INTERFACE PHOTOGRAPHS

Configuration Switch
(RS 485)
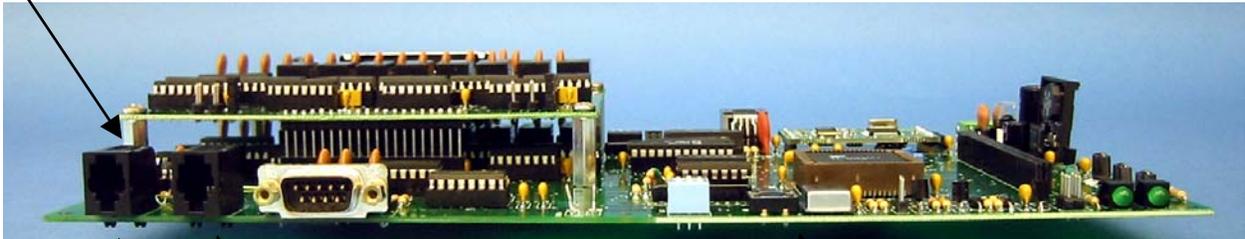
To Slave Module
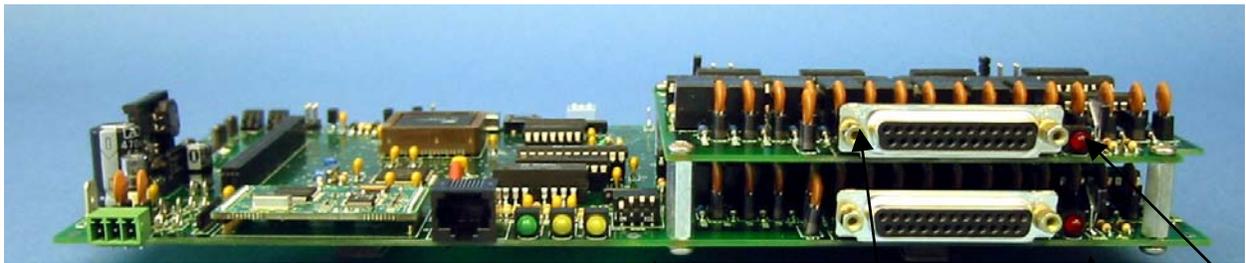(RS-485
Connector)

Com 1
(9 pin male
Connector)

Configuration
Switch

Status LED

Power LED

From Master Module
(RS-485 Connector)
-Not applicable if used
as Master Module -

I/O Module
Reset Switch

Power
24 VDC
(Phoenix
Connector)

Ethernet
10/100BaseTX
(RJ-45
Connector)

Link LED

10BaseT LED

100BaseTX LED

Slave
Address
Switch

Input/Output
Connector 2
(24 Pin
Female
Connector)

24 VDC
Overcurrent
Connector 2
LED

Input/Output
Connector 1
(24 Pin Female
Connector)

24 VDC
Overcurrent
Connector 1
LED

CONFIGURATION SWITCH

I/O MODULE RESET SWITCH

COM 1

JU2
JU3

JU6

JU7

RS485 CONFIGURATION SWITCH

EARTH GROUND (1/4" QC TAB)

SLAVE ADDRESS SWITCH
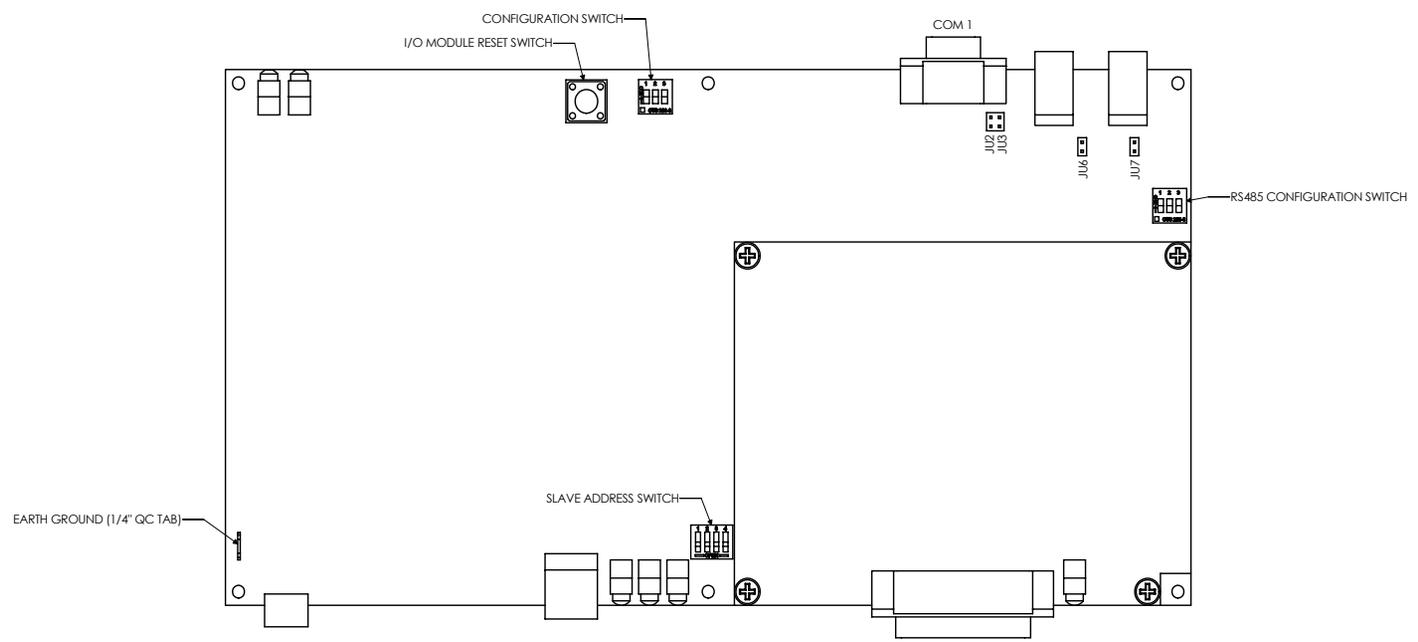
CONFIGURATION SWITCH

POSITION	FUNCTION	OFF	ON
1	IP ADDRESS	PROGRAMMED	FIXED
2	RESERVED	DEFAULT	—
3	COM 1	INPUT	COMMUNICATIONS

SLAVE ADDRESS SWITCH

ADDRESS	4	3	2	1
0	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON

RS485 CONFIGURATION SWITCH

POSITION	FUNCTION	OFF	ON
1	TERMINATOR	MID POINT	END POINT
2	ECHO MODE	ECHO	NORMAL
3	RESERVED	DEFAULT	—

TWISTED PAIR BIAS - REMOVE JUMPERS JU6 AND JU7 ON ALL SLAVES

COM 1 JUMPER SETTINGS

JU2
JU3
DTE - PIN 2 INPUT
PIN 3 OUTPUT

JU2
JU3
DCE - PIN 2 OUTPUT
PIN 3 INPUT

MATING CONNECTOR FOR PHOENIX CONTACT PLUG IN
TERMINAL BLOCK IS PHOENIX CONTACT MODEL MC 1,5/3-ST-3,81
(ORDER NO. 1803581)

POWER

24 VDC
+ - G

RJ-45 CONNECTOR

25 PIN FEMALE D-SUBMINATURE CONNECTOR
(TYPICAL TWO PLACES)

INPUT/OUTPUT CONNECTOR 2

24 VDC OVERCURRENT CONNECTOR 2 LED

INPUT/OUTPUT CONNECTOR 1

ETHERNET
10/100baseTX

100baseTX LED

10baseT LED

LINK LED

24 VDC OVERCURRENT CONNECTOR 1 LED
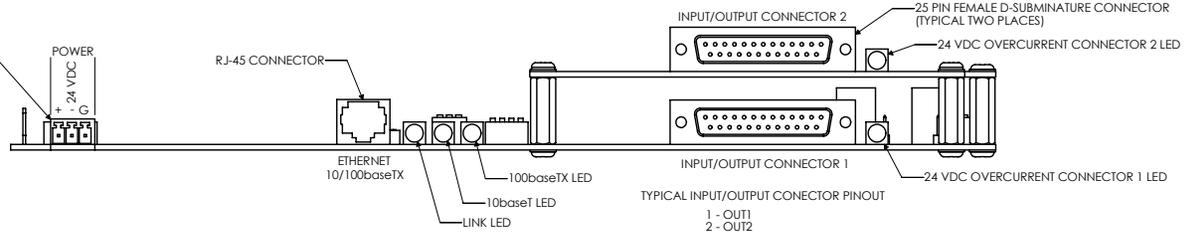
TYPICAL INPUT/OUTPUT CONECTOR PINOUT

1 - OUT1
2 - OUT2
3 - OUT3
4 - OUT4
5 - OUT5
6 - OUT6
7 - OUT7
8 - OUT8
9 - NO CONNECTION
10 - RESERVED
11 - RESERVED
12 - RESERVED
13 - NO CONNECTION
14 - IN1
15 - IN2
16 - IN3
17 - IN4
18 - IN5
19 - IN6
20 - IN7
21 - IN8
22 - NO CONNECTION
23 - 24 VDC
24 - 0 VDC
25 - SIGNAL COM

INPUT WIRING

INx (POSITIONS 1 - 8, 14 - 21)   SWITCH RATED AT 30 VDC, 10mA

0 VDC (POSITION 24)

2.5mA LOAD

OUTPUT WIRING (EXTERNAL SUPPLY)

OUTx (POSITIONS 1 - 8, 14 - 21)

24 VDC

SIGNAL COM (POSITION 25)

RELAY OUTPUTS (POSITIONS 14 - 21) MAXIMUM LOAD RATED AT 1 A DC
OPEN COLLECTOR OUTPUTS (POSITIONS 1 - 8) MAXIMUM LOAD RATED AT 100mA
NOTE: TOTAL CURRENT THROUGH SIGNAL COM PIN RATED AT 6 A MAXIMUM

OUTPUT WIRING (INTERNAL SUPPLY)

24 VDC (POSITION 23)

LOAD

OUTx (POSITIONS 1 - 8, 14 - 21)

SIGNAL COM (POSITION 25)

0 VDC (POSITION 24)

NOTE: MAXIMUM CURRENT SOURCE 24 VDC PIN RATED AT 1 A

COM 1

1 - NO CONNECTION
2 - RxD (IN)
3 - TxD (OUT)
4 - DTR (OUT)
5 - SIGNAL GROUND
6 - NO CONNECTION
7 - RTS (OUT)
8 - NO CONNECTION
9 - NO CONNECTION

9 PIN MALE D-SUBMINATURE CONNECTOR

RS-485 TO SLAVE MODULE

RS485 FROM MASTER MODULE
(NOT APPLICABLE IF USED AS
MASTER MODULE)

TYPICAL RS-485 CONNECTOR PIN OUT

1 - NO CONNECTION
2 - -
3 - +
4 - COM

POWER LED

STATUS LED

TOLERANCES UNLESS OTHERWISE SPECIFIED

ALL DIMENSIONS ARE IN INCHES

PATH =E:\CC\PROCON-8230\8230W10.SLDDRW

JPC CONTROLS

102 COMPASS PT. DR. SUITE D, ST. CHARLES, MO 63301
(636) 946-3300 FAX (636) 724-2492 www.jpccontrols.com

PROCON 8230 NETWORK I/O MODULE WIRING DIAGRAM

APPROVAL		DWN BY	MPJ	DATE 10/03/02	SCALE 1=1	CHKD BY
ENG	DATE	SHEET				
QA	DATE	1 OF 2	12	823009	30	00

11.100

10.800

5.400

.150 (REF.)

.150 (REF.)

.150 (REF.)

5.900

5.600

MOUNTING HOLE FOR 6-32 HARDWARE
(TYPICAL SIX PLACES)

TOP VIEW OF CIRCUIT BOARD ASSEMBLY

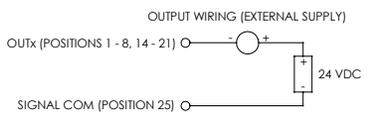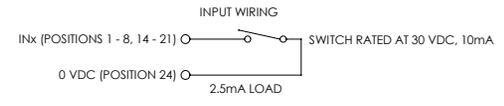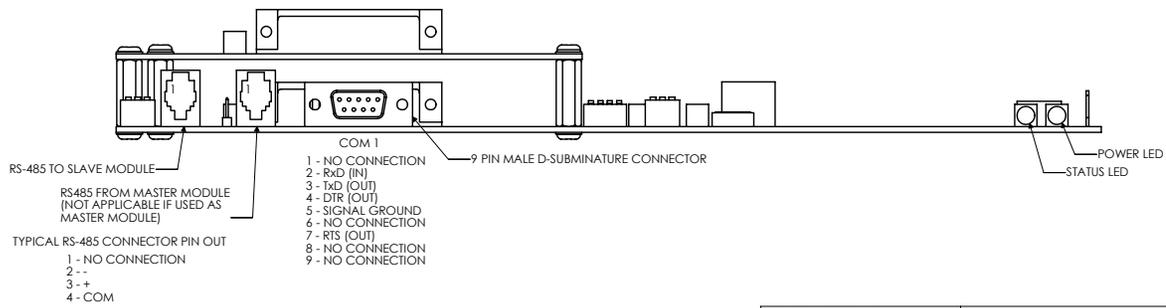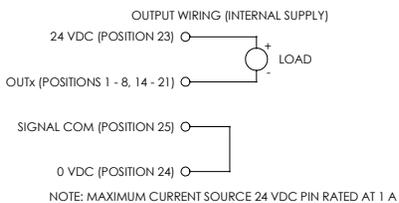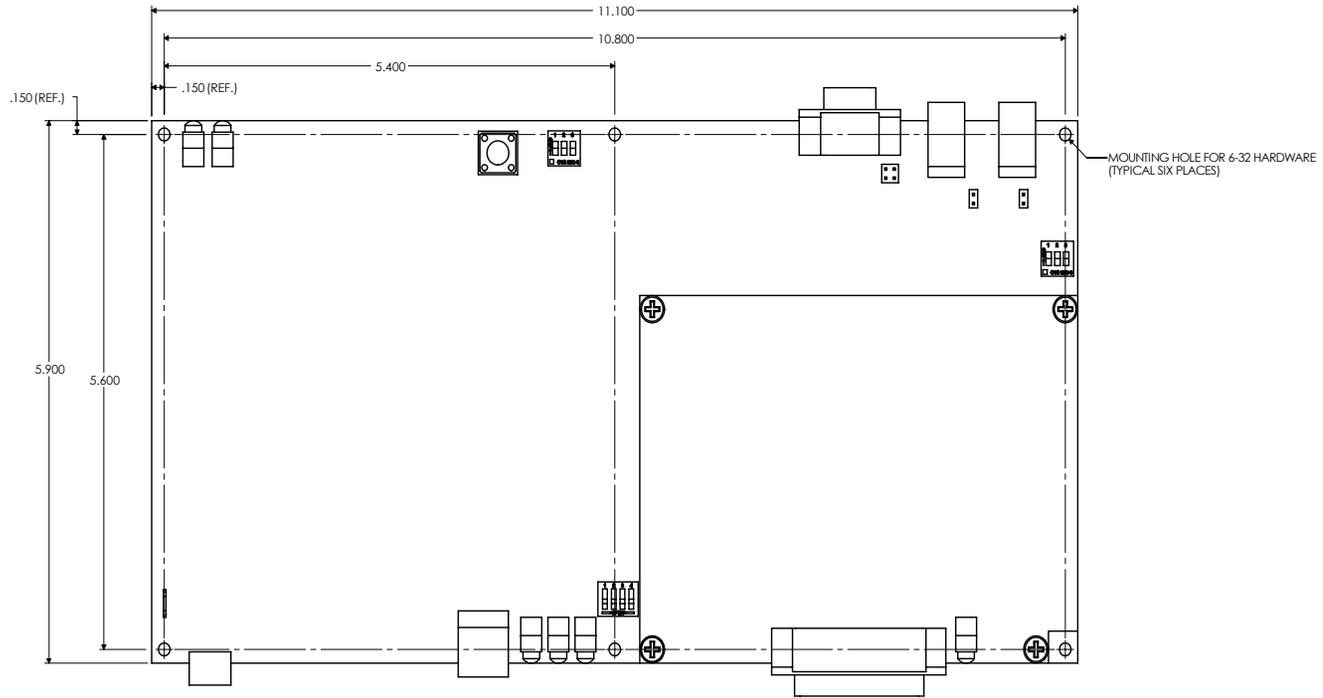NOTE: MAXIMUM COMPONENT HEIGHT = 1.3875"

TOLERANCES UNLESS OTHERWISE SPECIFIED		JPC CONTROLS	102 COMPASS PT. DR. SUITE D, ST. CHARLES, MO 63301 (636) 946-3300 FAX (636) 724-2492 www.jpccontrols.com			
		PROCON 8230 NETWORK I/O MODULE CIRCUIT BOARD ASSEMBLY PHYSICAL DIMENSIONS				
	APPROVAL	DWN BY MPJ	DATE 10/03/02	SCALE 1=1	CHKD BY	
ALL DIMENSIONS ARE IN INCHES	ENG DATE					
PATH =E:\CC\PROCON-8230\8230P10.SLDDRW	QA DATE	SHEET 1 OF 1	44	823008	30	00