

PROCON

MODEL 8220



NETWORK DATA COLLECTION MODULE

12/15/02
Rev 01

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iii **NOTICE** iii

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<p style="text-align: center;">PROCON MODEL 8220 NETWORK DATA COLLECTION MODULE</p>
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The NETWORK DATA COLLECTION MODULE is a small remote unit that can gather large amounts of data and forward it to a central system. The user can interrogate a wide variety of industrial equipment by monitoring a host of analog and digital sensors. This information is then transferred via an RS232 or ETHERNET connection.

Numerous modules can be used in a system to provide monitoring and reporting on a large number of different units. Since each module 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.

Some of the features are:

- *16 ANALOG INPUTS
EACH INPUT ACCEPTS A 4 –20mA SIGNAL
- *16 DIGITAL INPUTS
RATED TO OPERATE AT 24VDC
- *16 BIT A/D CONVERTERS
- * 2 RS232 PORTS WITH DB-9 CONNECTORS
- *DATA COLLECTION RATE OF <450 MSEC TOTAL FOR ALL INPUTS
- *ETHERNET INTERFACE, IEEE 802.3, 10BaseT/100BaseTX, RJ-45
CONNECTOR
- *TCP/IP PROTOCOL
- *24VDC INPUT POWER
- *SMALL PACKAGE SIZE (11x5.9x2.5 inches)
- *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.

*QUICK DISCONNECT TERMINAL BLOCKS, GROUPED TO ALLOW INDIVIDUAL SENSORS TO BE PLUGGED AND UNPLUGGED EASILY.

*LED INDICATORS

LED INDICATORS

Five discrete LEDs are provided to indicate the current system status. They are labeled POWER, STATUS, LINK, 10BaseT and 100BaseTX.

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.

INPUTS

The controller has a total of 34 inputs. These inputs are continuously scanned, the data converted and then presented to be read at the communications connector. The inputs consist of 16 4-20 ma inputs, 16 digital inputs and 2 RS232 inputs. The state of these inputs can be monitored by the host PC via an RS232 or ETHERNET connection.

ANALOG INPUTS – The sixteen 4-20 ma inputs are continuously scanned by the controller. The sixteen analog signals are passed through ESD protection circuitry and then filtered. This signal is then processed by a high speed A/D converter and passed into the microprocessor. Internally it is digitally filtered and stored for retrieval by the host PC.

Each channel provides an independent 16 bit output that is linear over the range of 3.5 ma to 20.5 ma. The overlap of the standard 4-20 ma range allows for detection of bad sensors. It also allows the user to compensate for sensor tolerance.

DIGITAL INPUTS – The sixteen digital inputs are continuously scanned by the controller. The controller determines if the input is high or low. Each input has full ESD protection. The sixteen digital inputs are treated as 2 bytes, 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.

RS232 INPUTS – There are two RS232 communications ports in the controller. The purpose of these ports is to monitor equipment via an RS232 link. The devices may be Particle Counters or any variety of sensors that have a RS232 communications port. The exact protocol for these ports will be determined at a later date. The data from the inputs will be stored for retrieval by the host PC.

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:

R01<cr>

Response from 8220 (single packet of data):

R01<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 9 basic commands:

- R - READ
- W - WRITE
- U - UPLOAD
- 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.

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 by 2 numbers, followed by a carriage return:

R07(Return)

The 'R' indicates to the Controller that the command is to be a READ command. 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	ANALOG INPUT #1	0-65535
02	R	ANALOG INPUT #2	0-65535
03	R	ANALOG INPUT #3	0-65535
04	R	ANALOG INPUT #4	0-65535
05	R	ANALOG INPUT #5	0-65535
06	R	ANALOG INPUT #6	0-65535
07	R	ANALOG INPUT #7	0-65535
08	R	ANALOG INPUT #8	0-65535
09	R	ANALOG INPUT #9	0-65535
10	R	ANALOG INPUT #10	0-65535
11	R	ANALOG INPUT #11	0-65535
12	R	ANALOG INPUT #12	0-65535
13	R	ANALOG INPUT #13	0-65535
14	R	ANALOG INPUT #14	0-65535
15	R	ANALOG INPUT #15	0-65535
16	R	ANALOG INPUT #16	0-65535
17	R	DIGITAL INPUTS	0-65535
18	R	RESERVED	
19	R	RESERVED	
20	R	RESERVED	
21	R	RESERVED	
22	R	RESERVED	

LOCATION	ACCESS	DESCRIPTION	RANGE
23	R/W	DIGITAL FILTER CHANNEL 1	0-65535
24	R/W	DIGITAL FILTER CHANNEL 2	0-65535
25	R/W	DIGITAL FILTER CHANNEL 3	0-65535
26	R/W	DIGITAL FILTER CHANNEL 4	0-65535
27	R/W	DIGITAL FILTER CHANNEL 5	0-65535
28	R/W	DIGITAL FILTER CHANNEL 6	0-65535
29	R/W	DIGITAL FILTER CHANNEL 7	0-65535
30	R/W	DIGITAL FILTER CHANNEL 8	0-65535
31	R/W	DIGITAL FILTER CHANNEL 9	0-65535
32	R/W	DIGITAL FILTER CHANNEL 10	0-65535
33	R/W	DIGITAL FILTER CHANNEL 11	0-65535
34	R/W	DIGITAL FILTER CHANNEL 12	0-65535
35	R/W	DIGITAL FILTER CHANNEL 13	0-65535
36	R/W	DIGITAL FILTER CHANNEL 14	0-65535
37	R/W	DIGITAL FILTER CHANNEL 15	0-65535
38	R/W	DIGITAL FILTER CHANNEL 16	0-65535

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

Analog Inputs – Each 4-20mA input is actually capable of reading from 3.5 to 20.5 mA. This expanded range allows for the detection of faulty devices. The Analog Input Data Locations will be scaled linearly from 0 to 65535 counts across the 3.5 to 20.5 mA input range. The following equation can be used to convert direct counts to mA:

$$Current (mA) = 3.5 + \left(17.0 \left(\frac{Counts}{65535} \right) \right)$$

For example, if 32768 was read from Location 5, the corresponding current for Analog Input 5 would be 12.0 mA.

Digital Inputs - When converted to binary, each bit of the Digital Inputs represents a specific input. 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
Input 16	Input 15	Input 14	Input 13	Input 12	Input 11	Input 10	Input 9	Input 8	Input 7	Input 6	Input 5	Input 4	Input 3	Input 2	Input 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 17. Breaking it down illustrates that inputs 4 and 7 have detected a switch closure.

Digital Filter - When converted to binary, the Upper byte of the Digital Filter is the Range and the lower byte is the Depth. (See Digital Filter Option). Each analog input channel has independent digital filter settings.

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:

W2304104 (Return)

The command essentially follows the same format as all the previous commands. The 'W' indicates that it is a WRITE command, 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 Digital Filter location can be written to. In the example above, the Range would be set to 16 and the Depth would be set to 8. (See Digital Filter Option)

UPLOAD COMMAND

The Upload command allows the user to read all of the system data from locations 1 through 17 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 (Return)

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

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 system 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 (RETURN)

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

Note that the command opens a session with the activating IP address and will continuously send data to that IP without any further action by the caller.

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. S255.255.255.000). 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 8220 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

    ' The name of the Winsock control is tcpClient.
    ' 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 "XU" & vbCr ' clear 8220 receive buffer and send upload command

End Sub
```

```
Private Sub Winsock1_Close()  
    Winsock1.Close ' 8220 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.

BIT SWITCH

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

Switch 1 – Off

The TCP/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/COM2 JUMPERS

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 and COM2 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.

The ports run at 115200 Baud, 8 bit, 1 stop and 1 start bit, no parity.

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.

DIGITAL FILTER OPTION

The 4-20 ma inputs have the option of an internal digital filter. This filter does an averaging of the readings to minimize jitter in the output. Each analog input has an independent digital filter.

The filter is set using the WRITE Command to locations 23 through 38 (See Write Command). The structure of the data is the composite of the two factors controlling the filter performance (Range and Depth). The data is 16 bits or 65535 counts.

The Range sets the band over which the filter is active. The Range may be set from 0 to 100 counts. This factor determines how the filter reacts to a step change. The Default value is set to 16.

For an input step change larger than the "Range" setting, the digital filter will be automatically bypassed, to allow a faster response time. Any change in the analog input that is less than or equal to the "Range" setting will be filtered, resulting in a "jitter free" sampling.

The Depth sets the number of samples used in the averaging. The setting may be from 1 to 255. The Default value is set to 16.

The Value that is sent to the unit is a decimal representation of the double byte value of Range/Depth. The following is an example of the setting value:

Range Byte	Depth Byte
16 _D	16 _D
10 _H	10 _H
1010 _H	
4112 _D	

The value 04112 is sent to location 23 to set the filter for the analog input channel 1.

GETTING STARTED

Getting started is just a matter of getting the unit from the box to its 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**

Read the Manual

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.

Unpack and check for physical damage

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.

Wire to power supply

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 null modem cable.

Configure RS232 Communications

Set the Configuration Switch Position 3 to the ON position. This enables the setup mode using COM1 (J2). COM 2 cannot be used for setup. Again, refer to Wiring Diagram 12-822009-30-02 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

<u>Revision #</u>	<u>Program #</u>	<u>Engineering #</u>	<u>Revisions Made</u>
Rev 01			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.

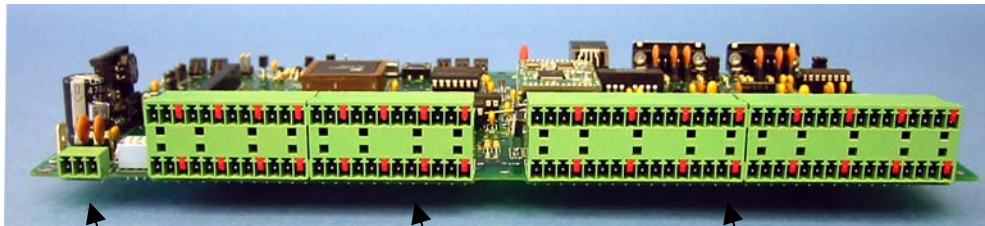
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NO PERSON OTHER THAN AN OFFICER IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR ASSUME ANY LIABILITY.

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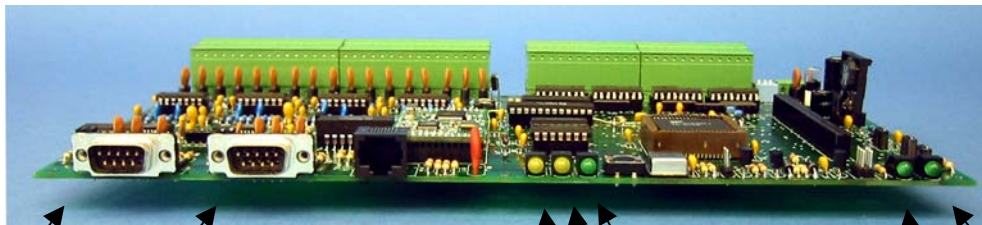
MODULE INTERFACE PHOTOGRAPHS



Power
(Phoenix Contact
Connector)

Digital Inputs
(Phoenix Contact
Connectors)

Analog Inputs
(Phoenix Contact
Connectors)



Com 2
(9 pin male
Connector)

Com 1
(9 pin male
Connector)

Ethernet
10/100BaseTX
(RJ-45
Connector)

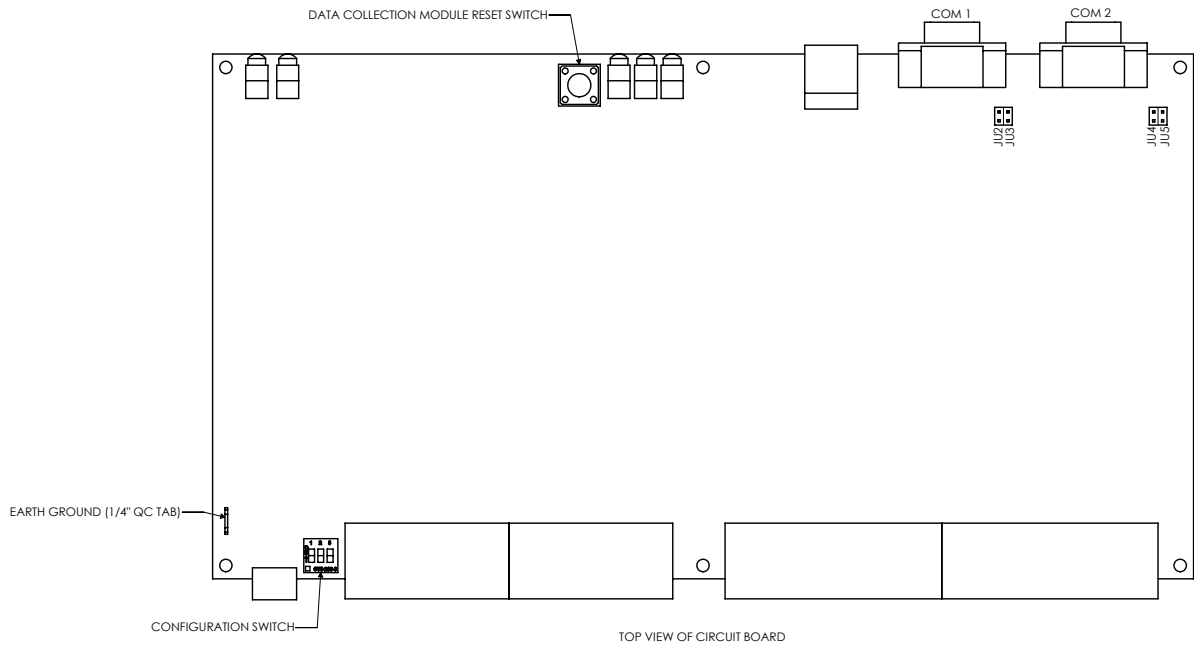
Link LED

Power LED

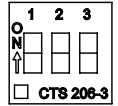
10BaseT LED

Status LED

100BaseTX LED

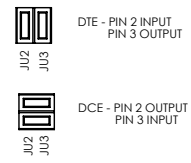


DETAIL OF CONFIGURATION SWITCH

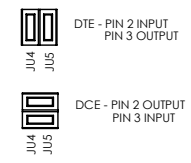


POSITION	FUNCTION	OFF	ON
1	IP ADDRESS	PROGRAMMED	FIXED
2	RESERVED	DEFAULT	_____
3	COM 1	INPUT	COMMUNICATIONS

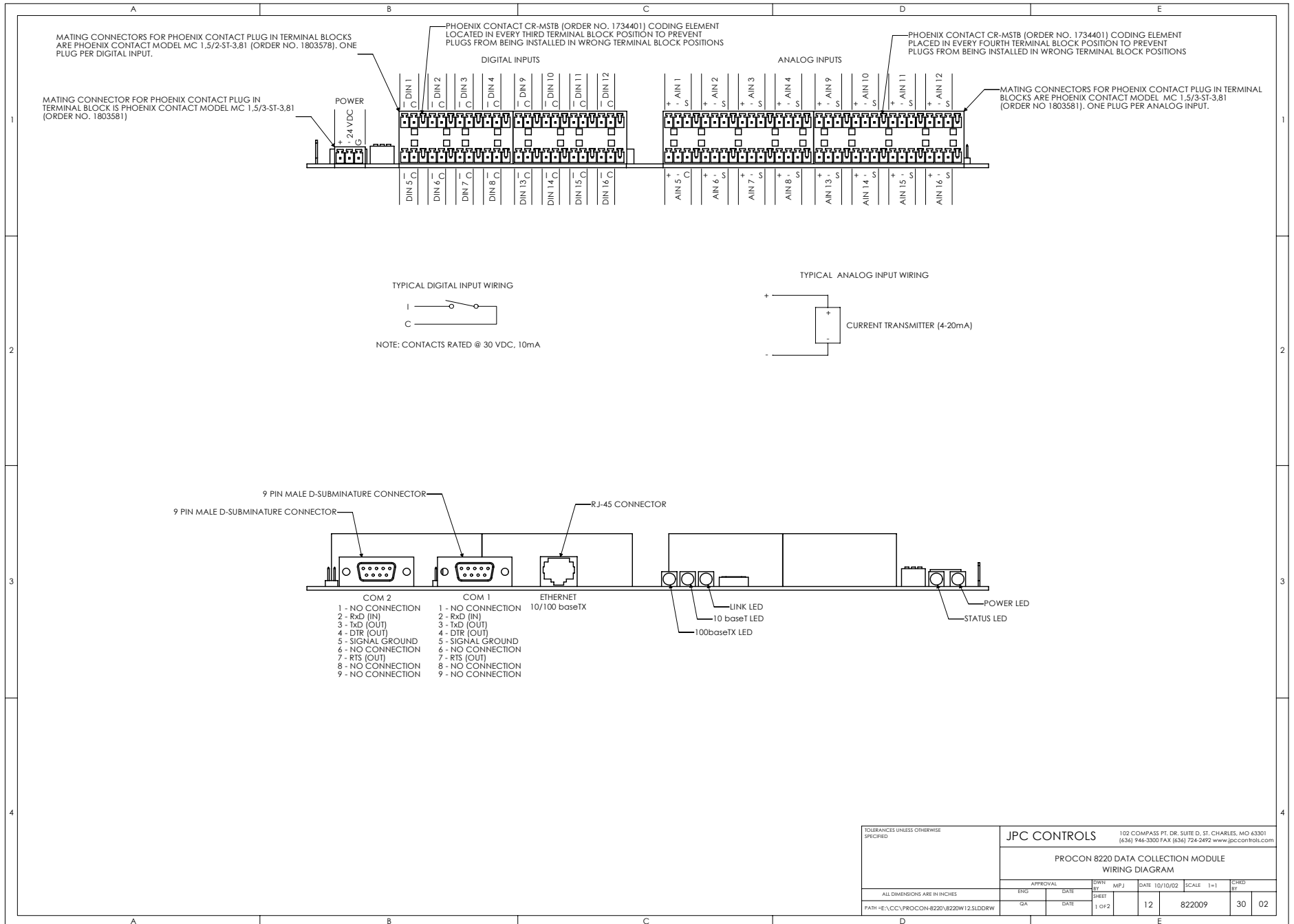
COM 1 JUMPER SETTINGS

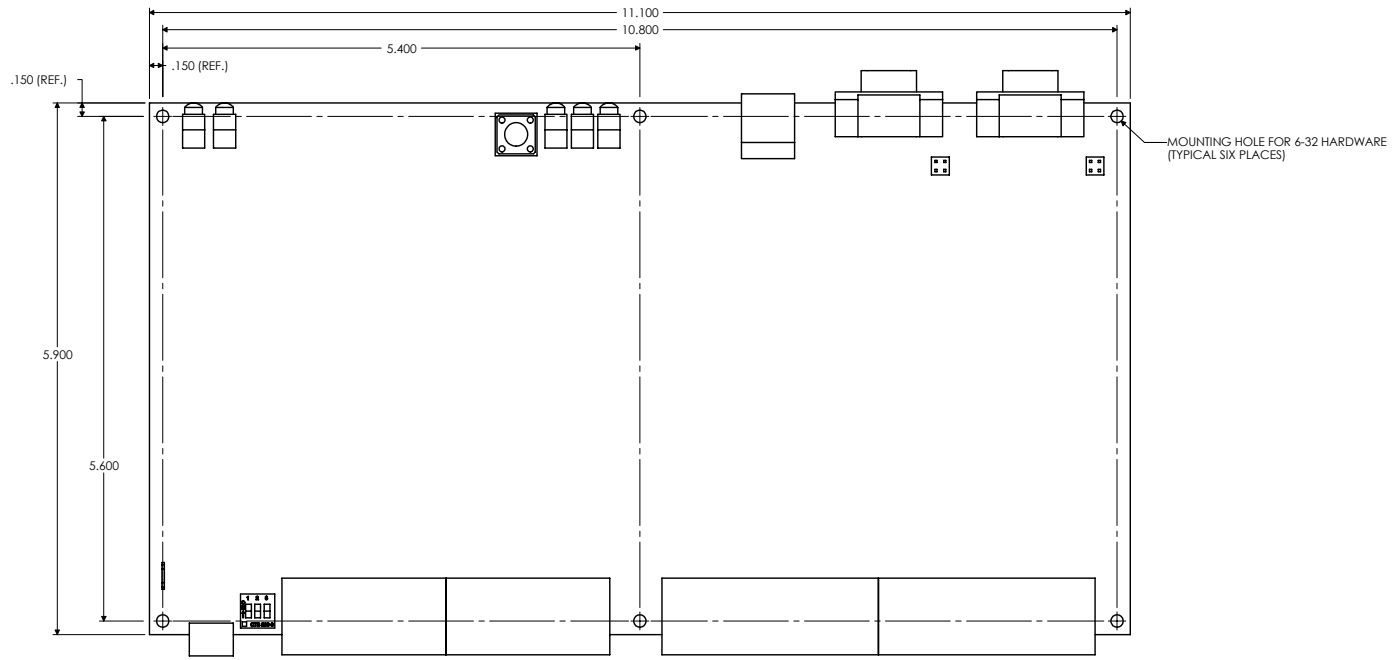


COM 2 JUMPER SETTINGS



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 8220 DATA COLLECTION MODULE WIRING DIAGRAM					
APPROVAL		ENGR BY	MPJ	DATE	10/10/02
DATE	GA	DATE	SHEET	SCALE	1=1
ALL DIMENSIONS ARE IN INCHES		2 OF 2	12	822009	30 02
PATH = E:\C.C.\PROCON-8220\8220W12.SLDRAW					





TOP VIEW OF CIRCUIT BOARD

NOTE: MAXIMUM COMPONENT HEIGHT = 1.050".

TOLERANCES UNLESS OTHERWISE SPECIFIED		JPC CONTROLS		102 COMPASS PT. DR. SUITE D, ST. CHARLES, MD 63301 (634) 746-3300 FAX (634) 724-2492 www.jpccom106.com	
PROCON 8220 NETWORK DATA COLLECTION MODULE CIRCUIT BOARD PHYSICAL DIMENSIONS					
APPROVAL		DRN BY	MPJ	DATE 09/25/02	SCALE 1=1
ENG	DATE	SHEET			CHEK BY
GA	DATE	1 of 1		44	30 00
PATH = E:\C\C\PROCON-8220\8220P10.SLDORW					