MAQ®20
Industrial Data Acquisition and Control System

Quick Start Guide



DATAFORTH®

MAQ®20 Industrial Data Acquisition and Control System Quick Start Guide
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Errata Sheets

Refer to the Technical Support area of Dataforth's website (www.dataforth.com) for any errata information on this product.

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1.0 Unpacking

Each MAQ®20 Data Acquisition System is shipped in electro-static discharge (ESD) protective packaging. Use appropriate ESD protection measures while unpacking. Check visually for physical damage. If physical damage is noted, file a claim with the shipping carrier.

2.0 Package Contents and Physical Description

A MAQ®20 Data Acquisition System must have as a minimum a Communications Module, a Backbone, and one I/O Module. Examples include:

MAQ20-COM2 Communications Module with Ethernet, USB and RS-232 Interface

MAQ20-COM4 Communications Module with Ethernet, USB and RS-485 Interface

MAQ20-DIO Discrete Input and Discrete Output Module

MAQ20-xTC Type x Thermocouple Input Module

MAQ20-VDN Differential Voltage Input Module

MAQ20-IDN Process Current Input Module

MAQ20-IO Process Current Output Module

MAQ20-VO Process Voltage Output Module

MAQ20-BKPLx x Channel System Backbone

Refer to www.dataforth.com for a complete listing of available modules and accessories.

The following software and manuals are available for download from www.dataforth.com.

- MAQ®20 Software
  - ReDAQ® Shape for MAQ20
  - Configuration Software Tool
  - Windows Driver for USB Interface
  - LabVIEW VIs (coming soon)
- MAQ®20 Documentation Set
  - MA1036 MAQ20 Quick Start Guide (this manual)
  - MA1037 MAQ20 Configuration Software Tool User Manual
  - MA1038 ReDAQ® Shape for MAQ®20 User Manual
  - MA1039 MAQ20 LabVIEW VI Examples User Manual (coming soon)
  - MA10xx MAQ20 Hardware User Manual (I/O Module specific)

For detailed installation and configuration instructions, reference the *MAQ®20 Hardware User Manual* specific to the Communications and I/O modules used.

For rapid verification of basic functionality, continue with the next section.

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3.0 Verifying Basic Operation

The steps required to verify basic operation are:

1. Install system software and USB driver
2. Configure the communications port
3. Select and install a MAQ®20 Communications Module
4. Select and install a MAQ®20 Input or Output Module
5. Connect an input signal or an output measuring instrument to the module
6. Apply power to the MAQ®20 Data Acquisition System

The following sections detail these steps.

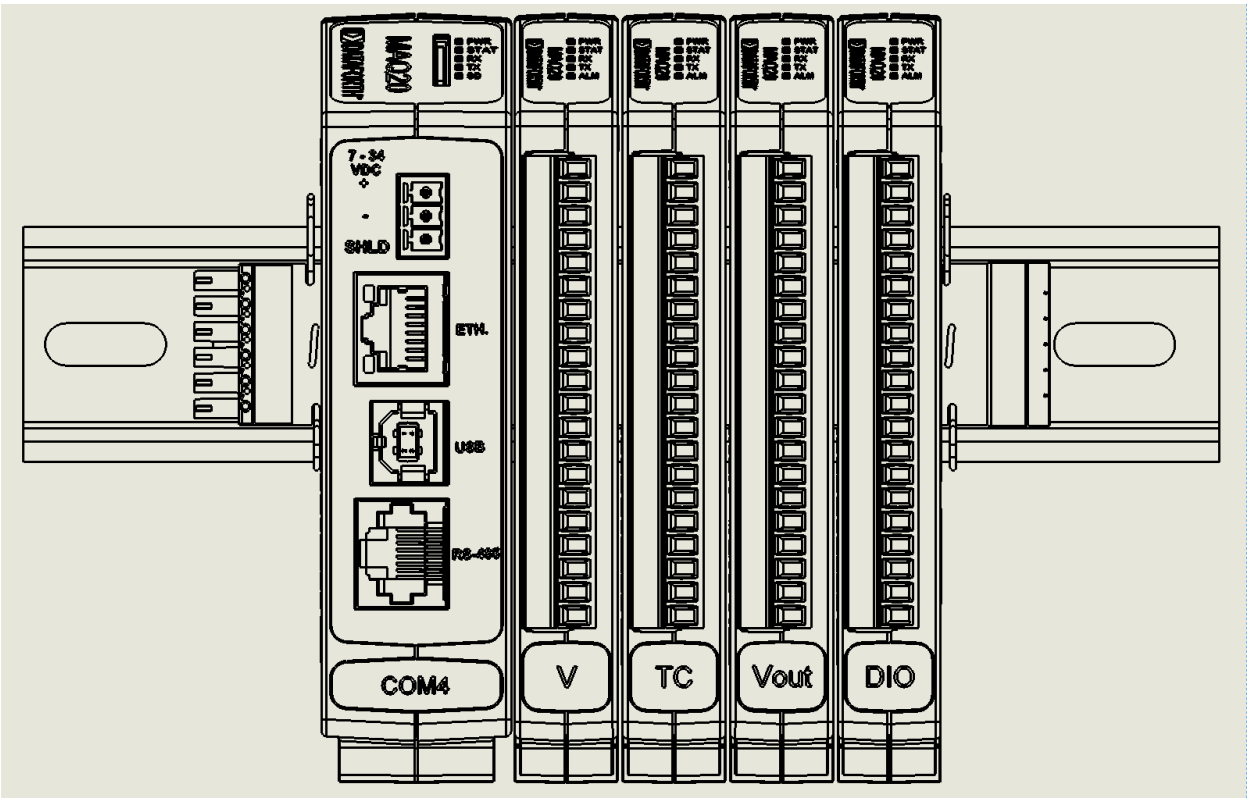


Figure 1: MAQ20 4-Module System

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3.1 Minimum Host Computer Requirements

The host computer must be running the Windows 2000, Windows XP, Windows Vista or Windows 7 operating system and must have the minimum hardware to support the operating system.

Host Computer Communication Ports:

- MAQ20-COM2 based systems interface to a host PC using an Ethernet, USB or RS-232 port.
- MAQ20-COM4 based systems interface to a host PC using an Ethernet, USB or RS-485 port.

3.2 Software Installation – Configuration Software Tool & USB Driver

Download the Configuration Software Tool from the Dataforth website, www.dataforth.com

If the system will be used with a USB connection to the host PC, the **USB Driver** must be installed prior to connecting the system to the computer. Download the driver from www.dataforth.com and follow the installation instructions.

3.3 Hardware Configuration

Install a MAQ®20 backbone into a 35mm DIN rail and then install a MAQ®20 Communications Module into the left-most position of the backbone. Install a MAQ®20 Input or Output Module into one of the open slots in the backbone. Connect an appropriate sensor or calibration signal source to the MAQ®20 Input Module field connector and/or connect a measurement device to the MAQ®20 Output Module field connector. Refer to the individual module Hardware Manuals for I/O connection diagrams.

Connect the MAQ®20 Data Acquisition and Control System to the host PC according to the interface chosen.

USB: Install an SLX147-xx cable (USB type A to type B)

Ethernet: Install an SLX141-Xxx crossover CAT5 cable or an SLX141-xx straight through CAT5 cable. Alternately, obtain an Ethernet switch or hub which is not connected to the enterprise Ethernet, and two SLX141-xx straight through or SLX141-xx crossover CAT5 cables. Connect one CAT5 cable between the host computer Ethernet port and the Ethernet switch or hub, and connect the other CAT5 cable between the MAQ20 and the Ethernet switch or hub.

Serial, RS-232 (MAQ20-COM2): Install an SLXyyy-xx RJ-45 to DB-9 cable for RS-232 communications.

Serial, RS-485 (MAQ20-COM4): Install an SLXyyy-xx RJ-45 to DB-9 cable for RS-485 communications.

Reference the *MAQ20-COMx Hardware User Manual* for the RS-232 and RS-485 connector pin assignments. The MAQ20-COMx factory default configuration for RS-232 and RS-485 communications is 115.2kbps, 8 data bits, 1 stop bit, even parity, Slave ID 31.

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3.3.1 Establishing Communication with the MAQ®20 System

IMPORTANT: If the MAQ®20 system is to be used with a USB connection to the host computer, ensure that the USB driver provided on the Dataforth website has been installed before connecting the system to the host computer. Refer to Section 3.2 for details.

Apply power the MAQ®20 system and ensure it is connected to the host computer over the interface chosen. Double click the **MAQ20 Config SW Tool** icon on the desktop. Once started, the initial screen displays with the View Pane disabled, indicating that the application is not yet connected to the MAQ®20 system, reference Figure 2.

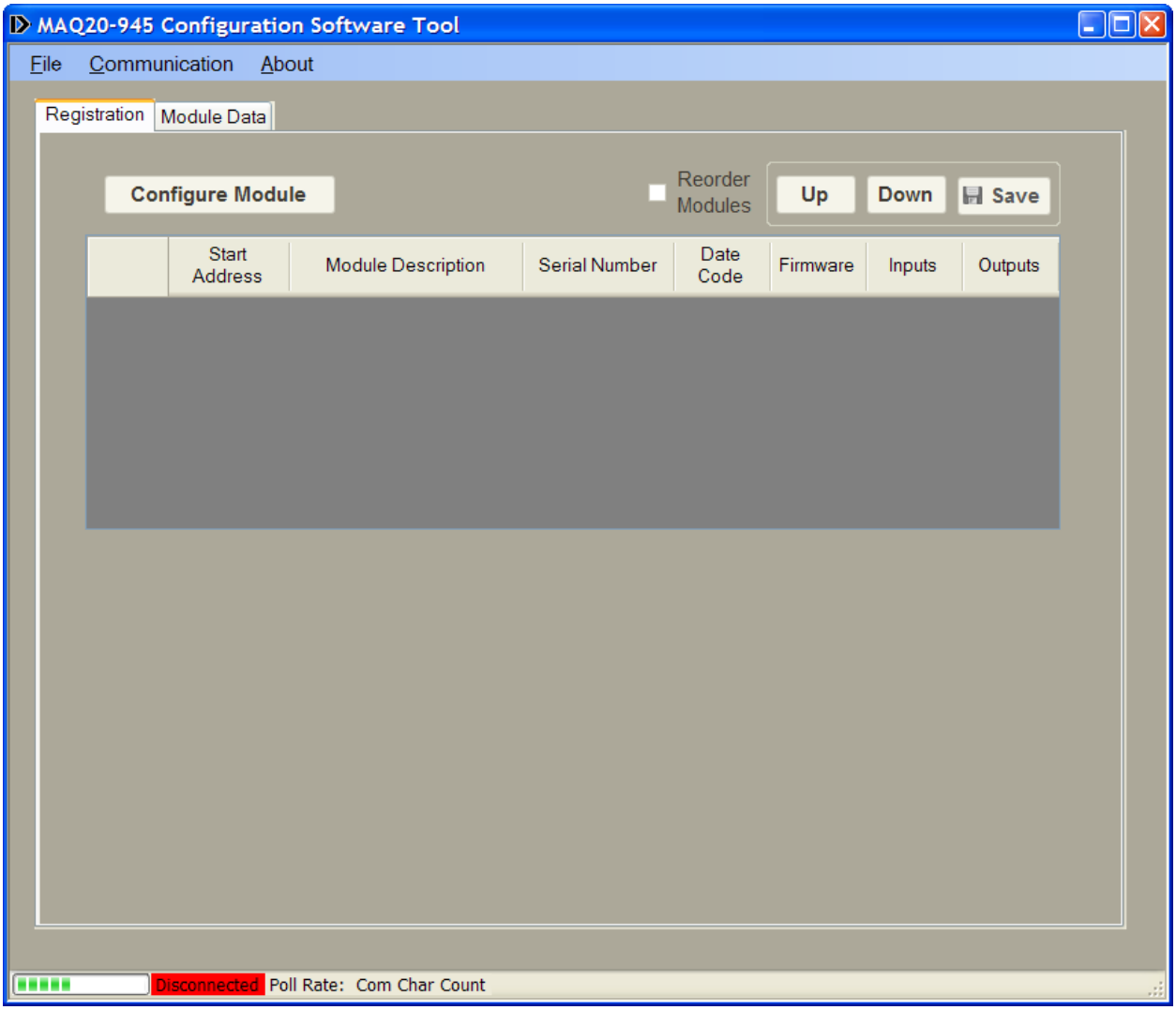


Figure 2: MAQ20 Configuration Software Tool Window, View Pane Disabled

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From the **Communication** pull-down menu, select **Configure**. The **Communication Setup** window will appear giving the user the ability to configure the communication port. Reference Figure 3.

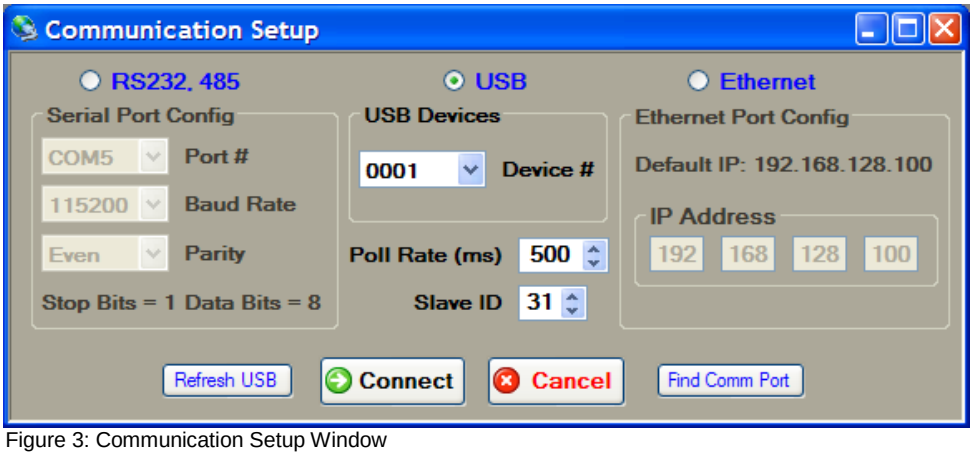


Figure 3: Communication Setup Window

If the system is connected via RS-232 or RS-485, ensure the **RS232, 485** radio button is selected. Select the appropriate Communication Port number from the **Port #** drop-down menu. For the initial connection leave the **Baud Rate**, **Parity** and **Slave ID** unchanged.

If the serial communication port number is not known, press the Find Comm Port button. This will execute a process that will search through the Serial Comm Ports on the host computer and detect which port the MAQ®20 system is connected to.

If the system is connected via USB, the USB devices found will be populated in the **Device #** drop down box. Select one and click the **Connect** button.

The Refresh USB button will execute a process to detect any new USB Communication Ports that have been added to the system and populate them in the **Device #** drop down list found in the USB Devices group box. If the MAQ®20 system was not connected prior to opening this setup screen, click on this button prior to continuing.

If the system is connected via Ethernet, ensure the **Ethernet** radio button is selected. For initial connection leave the **IP Address** unchanged. The host computer Ethernet port must be configured with a fixed IP Address of 192.168.xxx.xxx, which does not match the static IP Address of the MAQ®20 and Subnet Mask of 255.255.0.0.

Once the communication parameters have been set, click the **Connect** button. The MAQ®20 **Software** window will come to center screen. If the connection and setup are correct, the bar graph on the bottom left corner of the window will start moving and the main screen will show the MAQ®20 I/O modules present in the system. If these actions do not occur, the connection to the system failed. Verify the communication cable connections and communication setup parameters and try connecting again.

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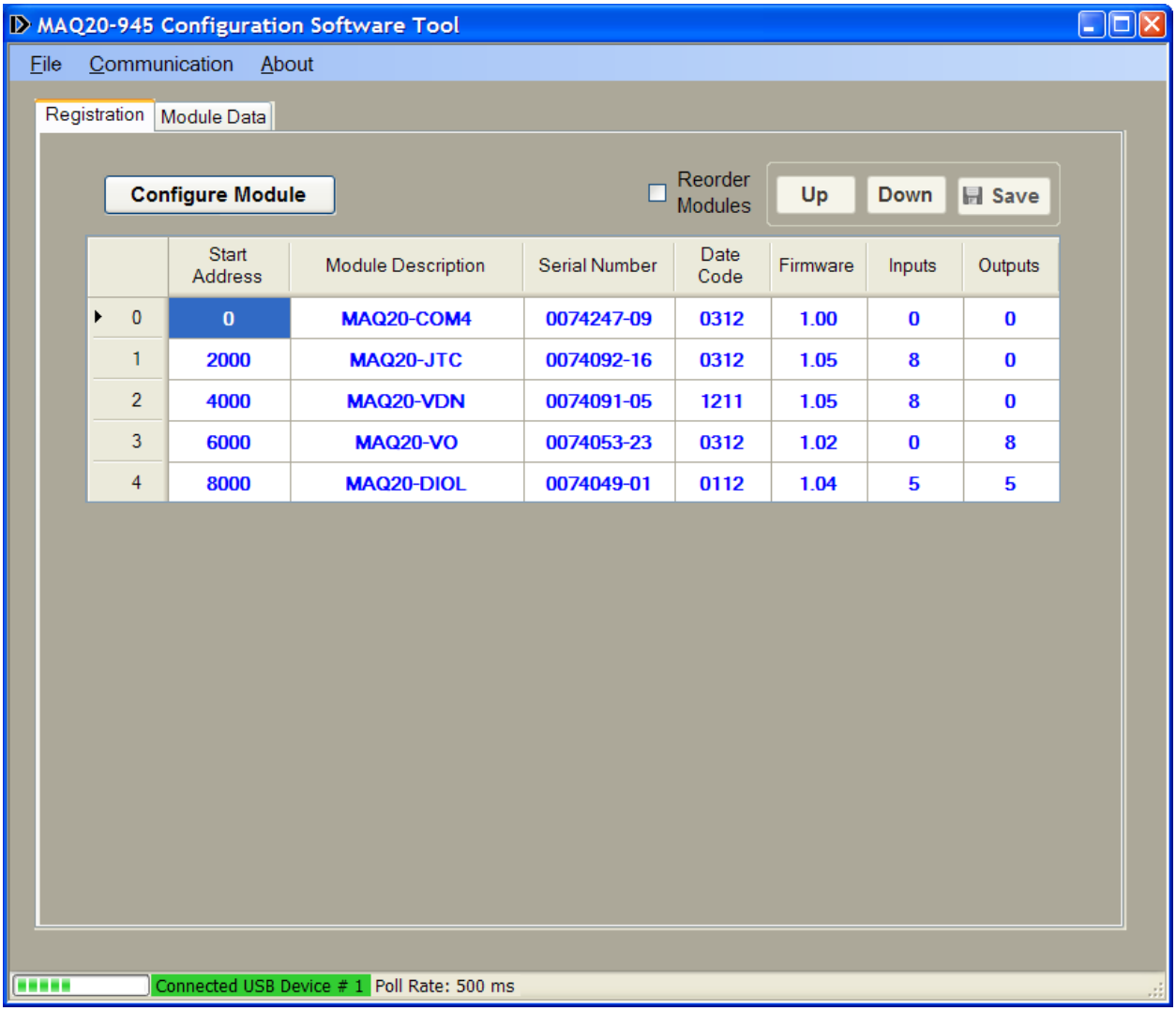


Figure 4: MAQ20 Configuration Software Tool Window, View Pane Enabled

Once communications have been established, the MAQ®20 input and output modules installed in the system are shown on the main screen. To access the configuration and perform basic operations for any of the installed modules, select any cell in the row of the desired module and click the **Configure Module** button. Multiple module configuration screens can be open at the same time but they must be from different module types i.e. (Voltage Input and Voltage Output).

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3.3.2 Configuring the MAQ20 Voltage Input Modules

To access the configuration and perform basic operations for the Voltage Input module, select any cell in the row where the MAQ20-VDN, -VSN, or -MVDN module is listed and then click the **Configure Module** button. The following configuration window will open.

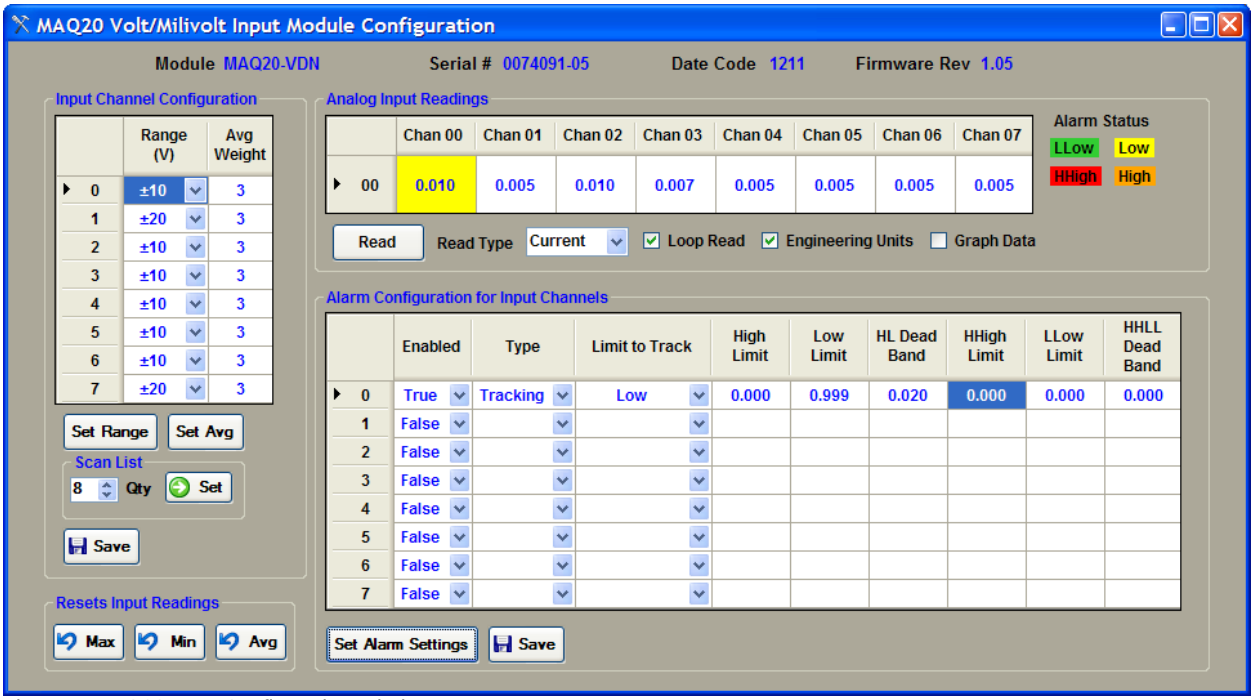


Figure 5: MAQ20-VDN Configuration Window

Using the tools in this window the Input Range, Average Weight and Alarms can be selected on a per-channel basis. Input readings and alarm limits are displayed in counts or Volts by using the Engineering Units check box. When an alarm is enabled and the limits are exceeded, the cell holding the value of the active alarm will change color to indicate which limit has been exceeded. By default, input readings are obtained from the module every 0.5 second. Refer to the *MAQ20 V,I,TC Input Module Hardware User Manual* for further details on module features and operation.

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3.3.3 Configuring the MAQ20 Voltage Output Module

To access the configuration and perform basic operations for the Voltage Output module, select any cell in the row where the MAQ20-VO module is listed and then click the **Configure Module** button. The following configuration window will open.

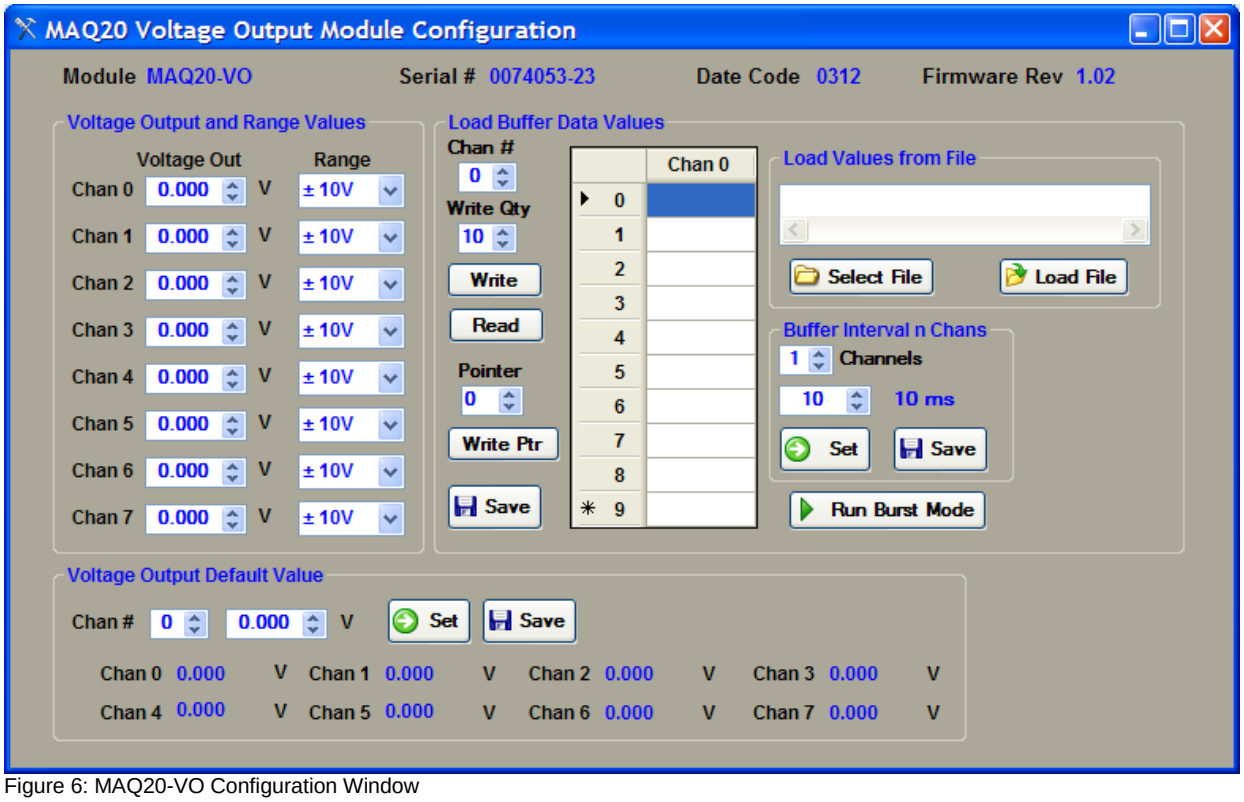


Figure 6: MAQ20-VO Configuration Window

The range for each of the output channels is selected using the drop down boxes under the **Range** heading. To change the voltage being output from a particular channel, use the up and down arrows next to the **Voltage Out** display box or type the desired value in the **Voltage Out** display box and press enter. The Voltage Output module has the capability to output data sequences and waveforms using buffer writes of data from this configuration window or from files. Refer to the *MAQ20-VO Hardware User Manual* for details.

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3.3.4 Configuring the MAQ20 Discrete Input/Output Module

To access the configuration and perform basic operations for the Discrete Input/Output module, select any cell in the row where the MAQ20-DIOL module is listed and then click the **Configure Module** button. The following configuration window will open.

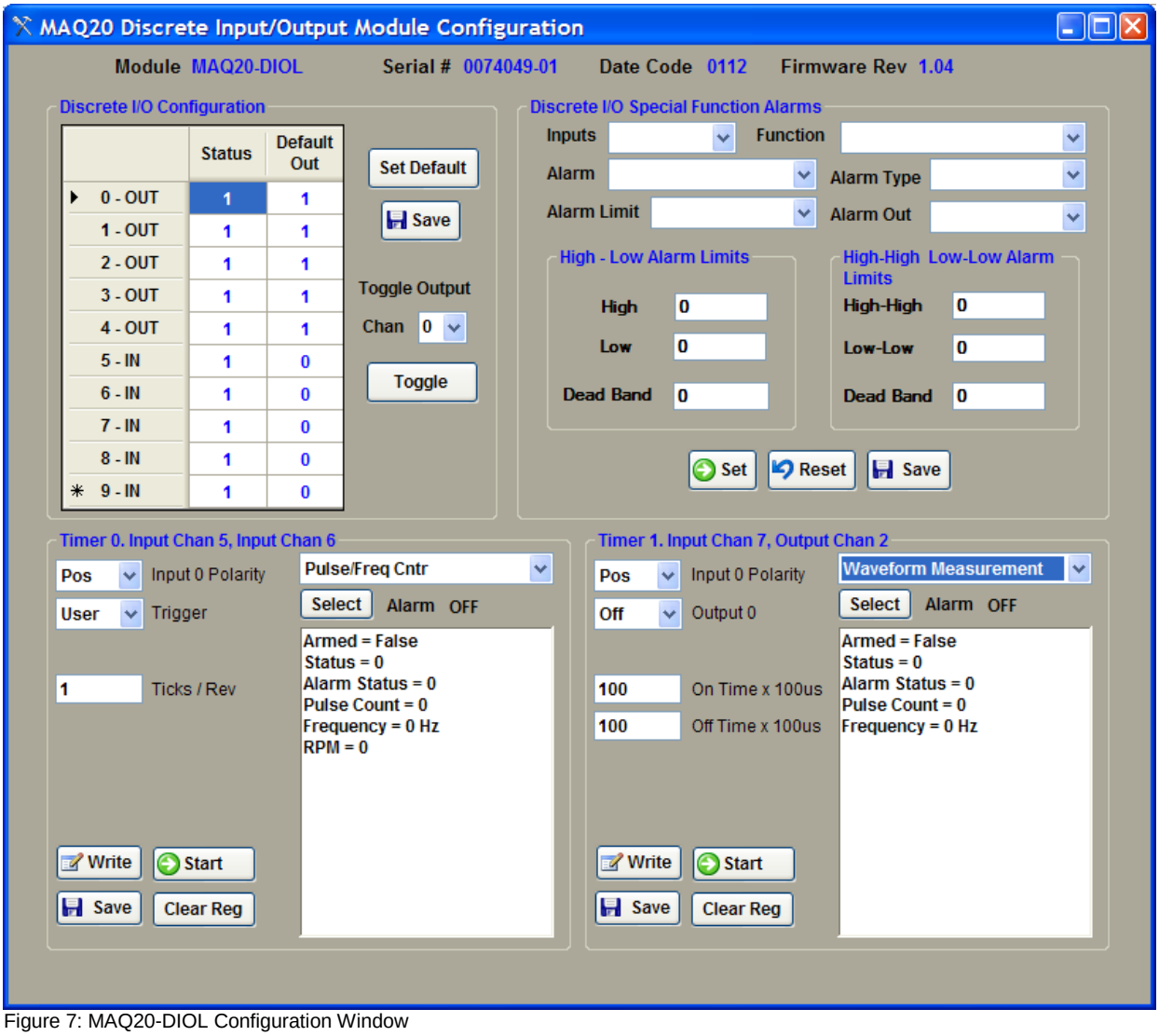


Figure 7: MAQ20-DIOL Configuration Window

The state of a discrete output channel is changed by selecting the **Status** box next to the channel and then clicking the **Toggle** button. Discrete input channel states are shown in the **Status** boxes next to the channel. In addition to standard discrete I/O, this module performs advanced special functions including Pulse/Frequency Counter with or without de-bounce, Waveform Measurement, Time Between Events, Frequency Generator, PWM Generator, and One-Shot Pulse Generator. Alarms can be set on the discrete input channels. Refer to the *MAQ20-DIOx Hardware User Manual* for details.

For further details on software operation and functionality, refer to the *MAQ®20 Configuration Software Tool User Manual*.

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4.0 ReDAQ® Shape for MAQ®20 Installation and Operation

Download the **ReDAQ® Shape for MAQ®20** Developer version User version software from the Dataforth website, www.dataforth.com.

If the system will be used with a USB connection to the host PC, the **USB Driver** must be installed prior to connecting the system to the computer. Download the driver from www.dataforth.com and follow the installation instructions.

After installation has completed, double click the blue ReDAQ Shape icon on the desktop. When the software starts up, the **Acquire** Panel and the **MAQ20-System** tab will be selected.

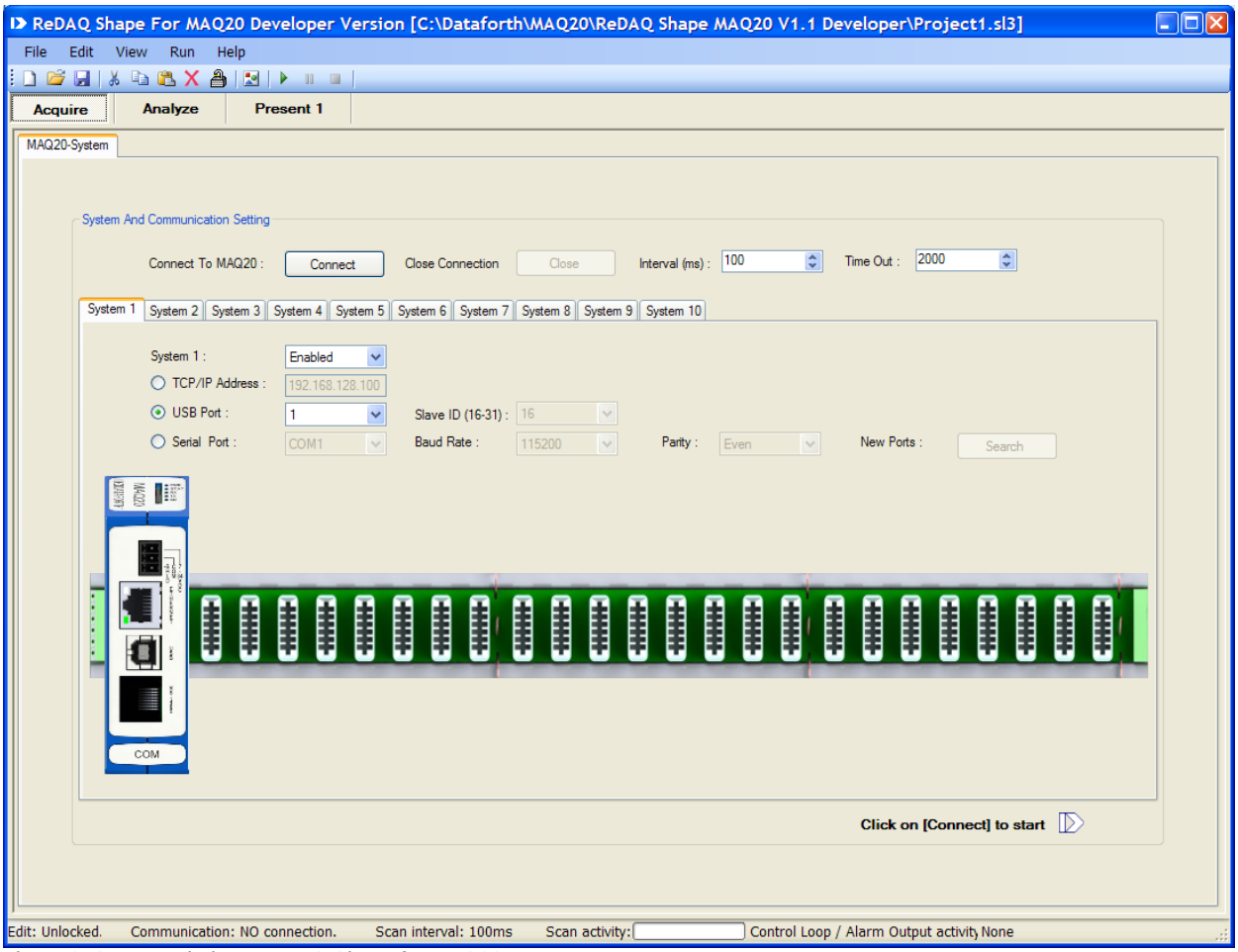


Figure 8: Start up window, ReDAQ Shape for MAQ20

If the system is connected via USB, ensure the **USB Port** radio button is selected.

If the system is connected via RS-232 or RS-485, ensure the **Serial Port** radio button is selected. Select the appropriate Communication Port number from the drop-down menu. For the initial connection leave the **Baud Rate**, **Parity** and **Slave ID** unchanged.

If the serial communication port number is not known, press the **New Ports: Search** button. This will execute a process that will search through the Serial Comm Ports on the host computer and detect which port the MAQ®20 system is connected to.

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If the system is connected via Ethernet, ensure the **TCP/IP Port** radio button is selected. For initial connection leave the **TCP/IP Address** unchanged. The host computer Ethernet port must be configured with a fixed IP Address of 192.168.xxx.xxx, which does not match the static IP Address of the MAQ®20 and Subnet Mask of 255.255.0.0.

Press the Connect button. If connection is successful, the message “Communication: Connected” will appear at the bottom left area of the window.

To communicate with the system, use **Run** or press the Play button on the top menu bar. The **Scan activity** progress bar will scroll at the bottom of the window showing active communications. Select the Analyze Panel to view active readings from installed Analog Input modules.

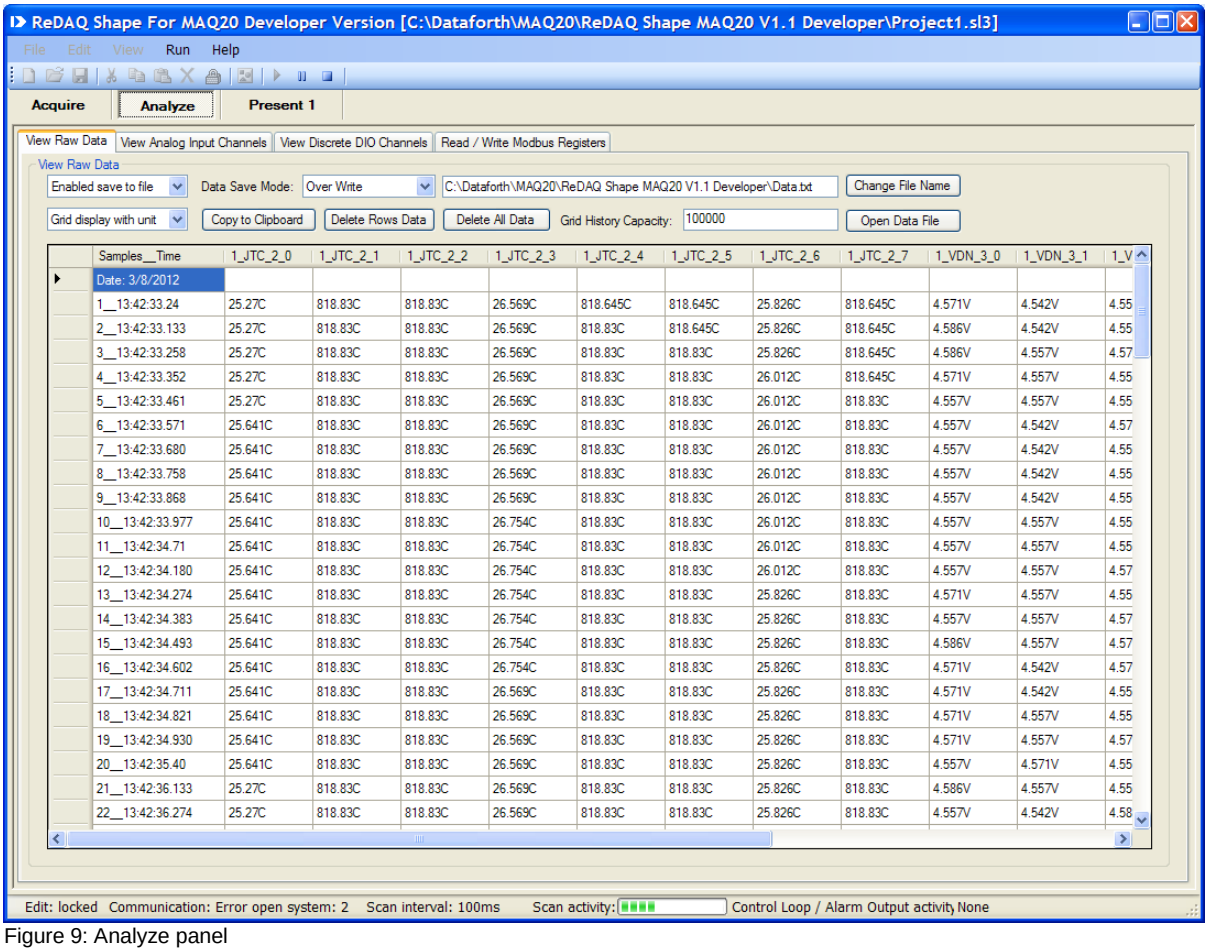


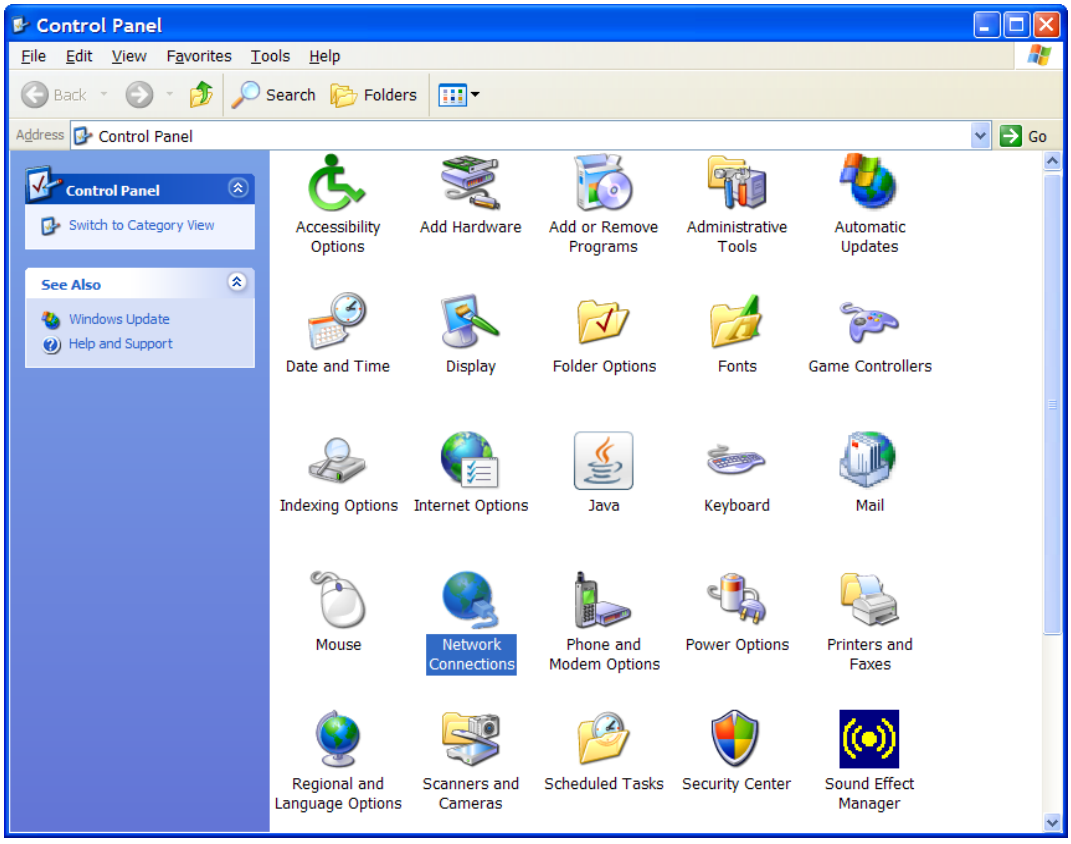
Figure 9: Analyze panel

For further details on software operation and functionality, refer to the *ReDAQ Shape for MAQ®20 User Manual*.

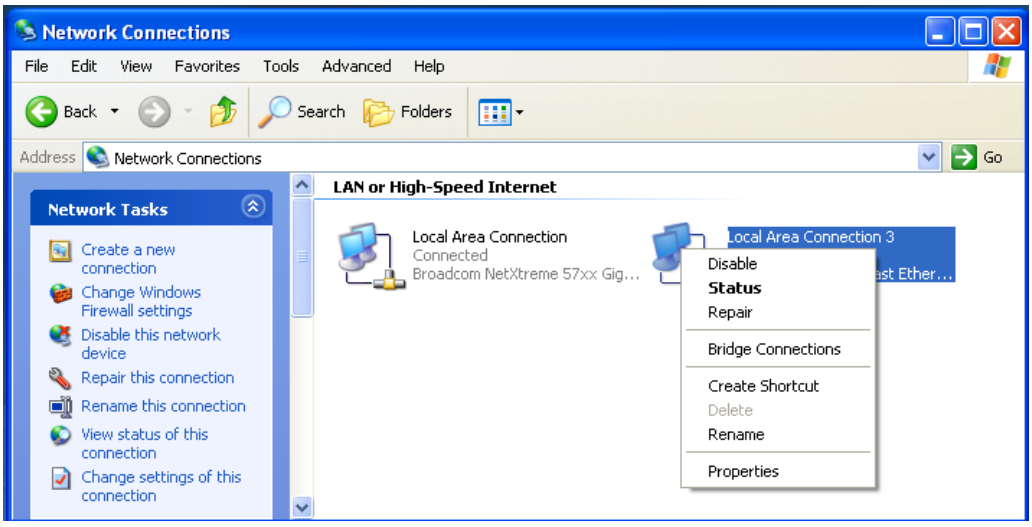
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5.0 Configuring the Host Computer Ethernet Port for a Static IP Address

Go to Control Panel and click on **Network Connections**.

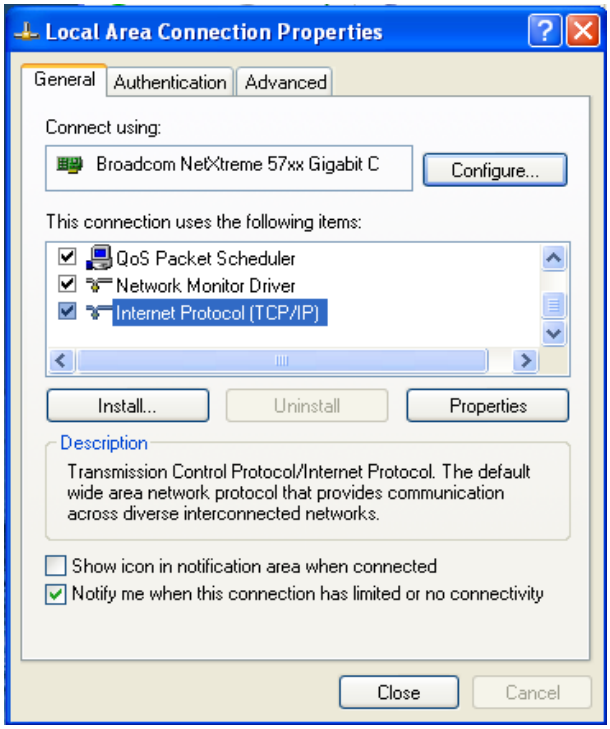


Left click on the port that will be used for MAQ®20 system interface and click on **Properties.**

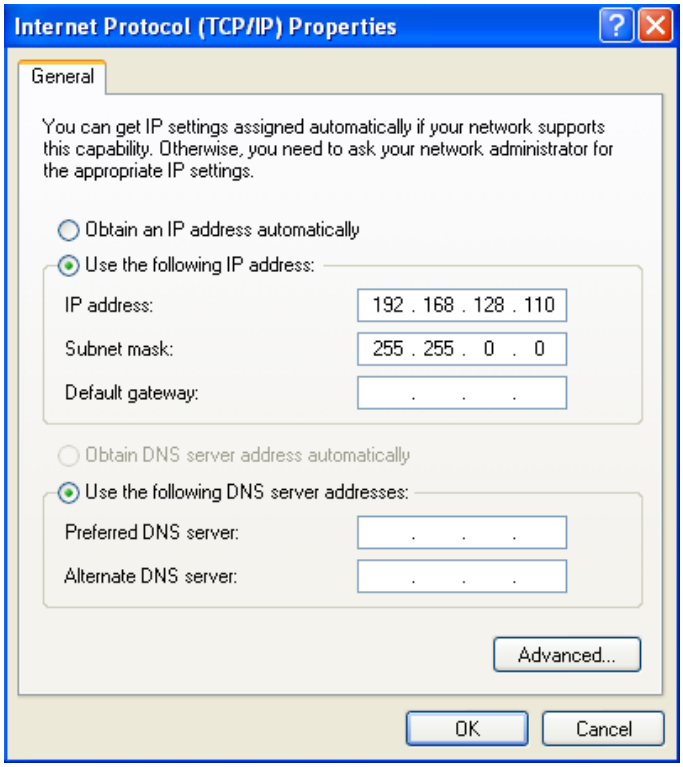


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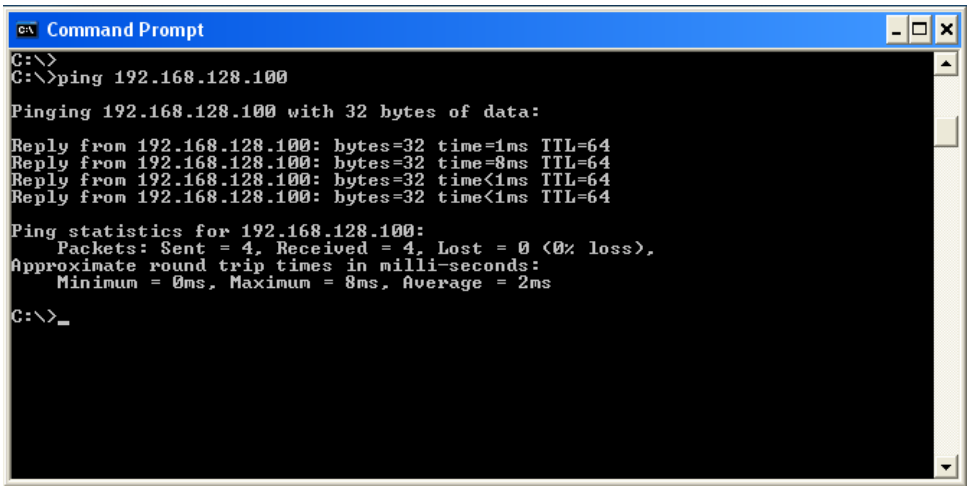
Select Internet Protocol (TCP/IP) and then click on **Properties.**



Select **Use the following IP Address** and input the IP address, Subnet mask. The MAQ®20 system default address 192.168.128.100 cannot be used.



Test the connection by using the ping command. Open a Command Prompt window, type **ping 192.168.128.100,** and hit Enter.



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e. **Warranty Procedures**. Buyer shall notify Dataforth of any products which it believes to be defective during the applicable warranty period and which are covered by the Warranty set forth above. Buyer shall not return any products for any reason without the prior authorization of Dataforth and issuance of a Return Material Authorization ("RMA") number. After issuance of a RMA number, such products shall be promptly returned by buyer (and in no event later than thirty (30) days after the Warranty expiration date), transportation and insurance prepaid, to Dataforth's designated facility for examination and testing. Dataforth shall either repair or replace any such products found to be so defective and promptly return such products to buyer, transportation and insurance prepaid. Should Dataforth's examination and testing not disclose any defect covered by the foregoing Warranty, Dataforth shall so advise buyer and dispose of or return the products in accordance with buyer's instructions and at buyer's sole expense, and buyer shall reimburse Dataforth for testing expenses incurred at Dataforth's then current repair rates.

f. **Repair Warranty**. Dataforth warrants its repair work and/or replacement parts for a period of ninety (90) days from receipt by buyer of the repaired or replaced products or for the remainder of the warranty period for the initial delivery of such order as set forth in paragraph a above, whichever is greater.

g. **Critical Applications**. Certain applications using Dataforth's products may involve potential risks of death, personal injury, or severe property or environmental damage ("Critical Applications"). DATAFORTH'S PRODUCTS ARE NOT DESIGNED, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS, SAFETY EQUIPMENT, NUCLEAR FACILITY APPLICATIONS OR OTHER CRITICAL APPLICATIONS WHERE MALFUNCTION OF THE PRODUCT CAN BE EXPECTED TO RESULT IN PERSONAL INJURY, DEATH OR SEVERE PROPERTY DAMAGE. BUYER USES OR SELLS SUCH PRODUCTS FOR USE IN SUCH CRITICAL APPLICATIONS AT BUYER'S OWN RISK AND AGREES TO DEFEND, INDEMNIFY AND HOLD HARMLESS DATAFORTH FROM ANY AND ALL DAMAGES, CLAIMS, PROCEEDINGS, SUITS OR EXPENSE RESULTING FROM SUCH USE.

h. **Static Sensitive**. Dataforth ships all product in anti-static packages. Dataforth's Warranty as hereinabove set forth shall not cover warranty repair, replacement, or refund on product or devices damaged by static due to buyer's failure to properly ground.

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Application Support

Dataforth provides timely, high-quality product support. Call 1**-800-444-7644 TOLL-FREE**.

Returns/Repair Policy

All warranty and repair requests should be directed to the Dataforth Customer Service Department at (520) 741-1404. If a product return is required, request a Return Material Authorization (RMA) number. You should be ready to provide the following information:

1. Complete product model number.
2. Product serial number.
3. Name, address, and telephone number of person returning product.
4. Special repair instructions.
5. Purchase order number for out-of-warranty repairs.

The product should be carefully packaged, making sure the RMA number appears on the outside of the package, and ship prepaid to:

Dataforth Corporation
3331 E. Hemisphere Loop
Tucson, AZ 85706 USA

The information provided herein is believed to be reliable; however, DATAFORTH assumes no responsibility for inaccuracies or omissions. DATAFORTH assumes no responsibility for the use of this information, and all use of such information shall be entirely at the user's own risk. Application information is intended as suggestions for possible use of the products and not as explicit performance in a specific application. Prices and specifications are subject to change without notice. No patent rights or licenses to any of the circuits described herein are implied or granted to any third party. DATAFORTH does not authorize or warrant any DATAFORTH product for use in life support devices and/or systems.

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