TABLE OF CONTENTS

OVERVIEW

The Model 3700 data acquisition system is designed to allow owners and managers of commercial and industrial facilities with a cost-effective means of gathering crucial information in a timely manner. To meet these requirements, the Model 3700 system provides the installer with all the tools necessary to install and configure the hardware and software with a minimum of time and investment.

Installation Checklist

A Model 3700 system installation has the following components:

Required hardware
- Model 3700 (required).
- Data connection (ethernet or phone line).
- Ethernet Cat 5 standard or crossover cable (required for lan or direct laptop-to-Model 3700 connection); or
- Phone line and cord (required for modem connection).

Optional hardware
- Analog sensors for temperature, humidity, etc.
- Pulse output transducers for measuring water, electricity, gas, etc. from existing meters and sensors.
- Additional Modbus RTU devices (e.g., Badger Meter, Veris Enercept, PML Ion, Emon ProMon, etc).

Next, choose one or more of the following connection methods.

For LAN installations only:
- Ethernet 10/100Mbit connection point (hub or switch).
- IP address and Netmask (check with system administrator).
- Gateway address (check with system administrator).
- DNS server address (check with system administrator).
- HTTP Proxy address (optional), may be required if the Model 3700 is behind a firewall (check with system administrator).

For dial-out installations only: (Model 3700 initiates a phone call to your ISP or modem server).
- Phone line with dialtone. May be shared with other devices such as a fax machine.
- Phone cord for connection to phone system.
- Dial-out access prefixes, and long distance access code if required (i.e. dial 9 for local line).
- ISP account or Modem Server phone number (check with ISP).
- DNS server address (check with ISP).
- Time to dial if phone line is shared, choose a time of day when other devices are not in use, such as 4 a.m.
- A regular telephone for line testing and diagnostics.

For dial-in installations only: (Model 3700 receives/answers a phone call from your computer)
- Phone line with dialtone must be NOT shared with other devices (or use appropriate line sharing device).
- Phone cord for connection to phone system.
- Telephone number for the phone line that the Model 3700 will be attached to (so you can call the Model 3700).
- Make note of the Model 3700 dial-in IP/Netmask for future use.
- A regular telephone for line testing and diagnostics.

HARDWARE OVERVIEW
### Model 3700 Features and Specifications

Processor	Arm9 embedded CPU, Arm7 io coprocessor
Operating System	Linux
Flash Memory	16 MB flash
Memory	32 MB ram
LED	8x input, 4 modem activity, Modbus TX/RX, power, system, IO status
Console	2 x 16 character LCD, two pushbuttons
LAN	RJ45 10/100 Ethernet, full half duplex, auto polarity
Modem	V.34 bis, 33,600 bps (A8812-1 only) GSM/GPRS Cellular (A8812-GSM only)
Protocols	Modbus/RTU, Modbus/TCP, TCP/IP, PPP, HTTP/HTML, FTP, NTP, XML
Power Supply	24VDC, 1A, class 2 wall brick transformer. North America: 110-120VAC, 60hz, primary. (standard, included) CE/Europe: 100-240VAC, 50-60hz, primary, with interchangeable plug adapters. (optional)
Interval Recording	User selectable 1-60 minutes. Default 15 minute interval
Serial Port1	RS-485 Modbus, supports up to 32 external devices (expandable)
Inputs[1]	8 flex-IO inputs with multiple modes: voltage, current, resistance, pulse and status.
Voltage mode:	0-10vdc (min/max/average/instantaneous data) accuracy: +- 0.25% of full scale at 20°c
Current mode:	4-20mA (min/max/average/instantaneous data) accuracy: +- 0.25% of full scale at 20°c
Resistance mode:	100 ohms to 100k. accuracy: 100Ω-1kΩ +- 1% of 1kΩ at 20°c 1kΩ - 10kΩ +- 1% of 10kΩ at 20°c 10kΩ - 47.5kΩ +- 1% of 47.5kΩ at 20°c 47.5kΩ - 100kΩ +- 1% of 100kΩ at 20°c 100kΩ −10MΩ accuracy unrated.
Pulse mode:	intended for use with dry contact outputs. (consumption/rate/runtime/status) Standard and KYZ modes for form A and C relay outputs Maximum rate: 10hz Adjustable contact closure threshold: 100Ω to 10kΩ
Outputs[1]:	2 optically isolated outputs type: opto-fet, dry contacts. rating: 30VDC, 150mA max.
Isolation[2]:	The RJ45 ethernet, RJ11 Modem, pulse outputs, and the primary side of the power adapter are electrically isolated from the Model 3700 main PCB board and inputs.
Environmental	North America: Indoor, temperature 0° - 50°c, 0 - 95% humidity, non-condensing. CE/Europe: Indoor, temperature 5° - 40°c, 0 - 90% humidity, non-condensing.
Size	8" x 9.25" x 2.5" (203mm x 235mm x 64mm)
Mass	5lbs (2.3kg)

[1] Inputs are intended for low voltage class II outputs.

[2] If the product is used in a manner not specified by the manufacture, the protection provided by the equipment may be impaired.

Model 3700 A8812 Internal View
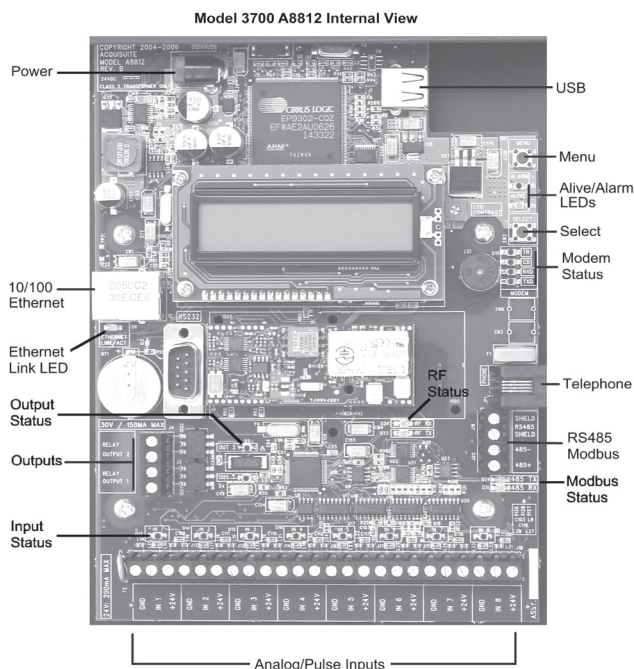
Hardware Installation

Step 1 - Unpack materials: Remove all materials from shipping box and verify all required components are available

Step 2 - Mount the Model 3700 on the wall or other appropriate location.

Step 3 - (optional) Connect any analog or pulse output sensors you may have. For Analog sensors, 0-10V or 4-20mA sensor types are allowed. The combined power consumption of all the analog sensors attached to the Model 3700 must not exceed 200mA. If more current is required, use an external power supply as shown in the wiring diagram for each input type later in this section.

Step 4 - (optional) - Connect the Modbus network loop as shown in the wiring diagram on the following page. Follow the manufacturer's instructions for installing and powering the Modbus devices. Verify that the Modbus address settings are unique for each device (i.e., no two devices with the same address) and power up the device. Connect each device in the chain by "daisy-chaining" the devices together. Observe + and - polarity on the Modbus devices.

NOTE: Low Voltage analog, pulse, and RS485 wiring that enters electrical panels must have a minimum insulation rating that exceeds the voltage inside the panel. In addition, other regulations may apply; consult the building codes in your area prior to installation.

NOTE: Some Modbus devices do not use the same label notation as the Model 3700. Rather than +,-,S, Emon uses Low, High, and Gnd. To attach an Emon meter, use + to High, - to Low, and shield to Gnd.
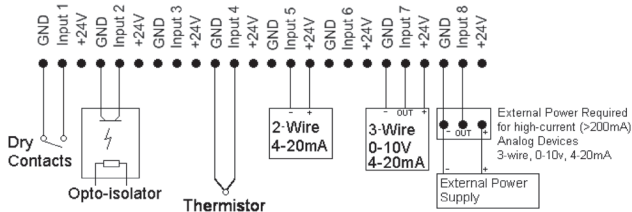
Note: The Model 3700 internal I/O module (analog and pulse inputs) uses Modbus address 250, and will show up in the Modbus device count as a single Modbus device. Additional A8923-4 IO modules may be added to the Modbus loop as needed.
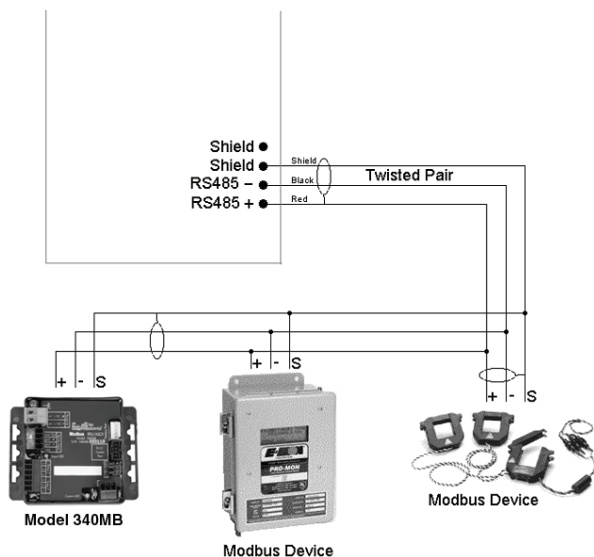
Step 5 - Power-up and diagnostics: Attach the power supply to the power input jack on the Model 3700, and plug the power brick into a wall outlet. The power brick should be in a location that is accessible for connection and disconnection. After power is applied, the green alive light in the upper right of the Model 3700 should come on and the LCD display will display a series of diagnostic screens ending with the following message on the LCD display (this boot sequence may require up to 20 seconds to complete):

```
Model 3700 Ready
192.168.40.50
```

This indicates that the Model 3700 has loaded properly and is ready for configuration and connection to the network and sensors. If the "power" light does not come on or the LCD display does not cycle to the above screen, verify that the power cord is plugged in. If after cycling the power the unit still does not power

up (or if an error message appears in the LCD display) contact technical support. After the Model 3700 has been powered up for a minute, the green Alive LED should blink slowly once per second during normal operation.

- **Modbus TX/RX:** The Modbus TX and RX LEDs blink to indicate data on the RS485/Modbus loop. The RX LED blinks only when data is received by the Model 3700.
- **Modem RTS:** The modem is being monitored or operated by the Model 3700, off when the modem is idle. This LED will be on when a dial-out call is in progress, or when dial-in is enabled and waiting for an inbound call.
- **Modem CD:** The modem has a carrier connection to a remote system.
- **Modem TX/RX:** Data is being sent or received on the modem.
- **Alive:** Blinks once per second while the system is operating correctly.
- **Alarm:** Blinks to indicate a problem.
- **Inputs 1-8:** In pulse or status mode, the LED is on when contacts are closed. In analog 4-20mA and 0-10V mode, the LED blinks quickly (2hz) to indicate an over-range alarm error. In 4-20mA mode when the input current is less than 4mA, or in resistance mode where the input resistance is above 10Mohm, the LED will blink a pattern (blink, blink, off) to indicate a broken wire alarm.
- **Ethernet Link/Act:** On when connected to a hub or switch, off when not connected. Blinks when LAN traffic is being sent or received.
- **RS485 RX/TX:** The 485TX LED should blink slowly once per second during normal operation. The RX LED will blink when external modbus devices communicate with the Model 3700.
- **RF TX / RF RX:** If the A8812 has a built-in option with an on-board radio, the RF LEDs will blink showing transmit and receive packets.

Step 6 - Verify connected devices: To verify that the Modbus devices are installed and reporting correctly, use the Modbus status utility on the Model 3700 server. To do this test, follow these steps:

A. Press and release the menu (top) button on the Model 3700. The following will appear on the LCD display:

```
[Main Menu]
TCP/IP Config
```

B. Press the menu (top) button several more times until the LCD display shows the following message:

```
[Main Menu]
Modbus Status
```

C. Press the select (bottom) button on the server and the unit will begin the diagnosis of the Modbus loop. After the check is completed, the unit will display the following message:

```
X devices OK
X fail, X new
```

D. Verify that the number of devices located by the server (the total of OK, fail and new) matches the number of devices actually installed and connected. For a first

time installation, all devices should appear as "new". The Model 3700 Internal I/O (pulse and analog inputs) appear as one device in this list. (NOTE: A "device" is the Modbus connected device, not necessarily the sensor. For example, an A8923-4 I/O module with 4 sensors connected is only one modbus device, not four.) For further information on the LCD console, please review the console section of this manual.

E. The Model 3700 completes a background scan for new Modbus devices every 2-5 minutes. Increasing the RS485 Modbus timeout may increase the time required to detect new devices. If the Modbus devices are connected after the server is booted up, the devices may not appear on the screen for several minutes. In the worst case, allow up to 5 minutes for the Model 3700 to locate all the connected devices.

F. If all devices are reporting properly, it is now time to connect the server to the network or phone line for remote reporting and configuration.

BASIC NETWORK CONFIGURATION

Step 1 - Determine the IP addressing needs: The IP address of the Model 3700 server can be implemented using one of three methods. Check with the network administrator to determine which method applies. For phone installations, use "direct connection to laptop" to allow initial configuration.

- Static IP address - this is a fixed IP address which is assigned by a network administrator and "hard-coded" into the Model 3700; or
- Dynamic Host Configuration Protocol (DHCP) address - this process assigns an IP address dynamically to the Model 3700 when it is connected to the network from a host DHCP server; or
- Direct connection between the Model 3700 and a single temporary computer such as a laptop. (primary connection will be dialin or dialout by modem)

You will need the following information from your network administrator: The addresses will be in the form of "###.###.###.###"), where "#" refers to the numbers 0 to 9.

Step 2 - Configure the IP address as selected from the table above. For Direct Connection to a Laptop, the address settings above are set as the factory default, and you may be able to skip to the Laptop/Computer Setup section if the factory default settings are present.

To begin configuration, make sure that the server displays the start screen:

```
Model 3700 Ready
192.168.40.50
```

If this screen does not appear on the LCD display, press and hold the menu (top) button on the server for several seconds and the message should appear. To change the IP address to the static address assigned by the network administrator, do the following:

A. Press the menu (top) button once to get the TCP/IP configuration menu

```
[Main Menu]
TCP/IP Config
```

B. Press the select (bottom) button twice to get the IP config menu:

```
[TCP/IP Config]
IP Address
```

C. Press the select button again to see the IP address menu:

```
[IP Address]
192.168.40.50
```

D. At this point, the cursor on the display will be blinking on the first number in the IP address on the second line.

E. To change the number, press the menu (top) button and the display will cycle through the digits 0-9 as well as ".". Once the correct digit is displayed, press the select (lower) button to advance to the next digit and repeat the process until all the digits are correct.

F. Once the IP address on the server matches the assigned IP address, press the select (bottom) button once more to return to the main TCP/IP menu.

Static IP Address
IP address: ___.___.___.___
Netmask: ___.___.___.___
Gateway: ___.___.___.___
DNS server: ___.___.___.___
DNS server: ___.___.___.___
HTTP Proxy _____
proxy server port: _____

DHCP
P address: (dhcp assigned)
Netmask: (dhcp assigned)
Gateway: (dhcp assigned)
DNS server: (dhcp assigned)
HTTP Proxy _____
proxy server port: _____

Direct Connection to Laptop
IP Address: 192.168.40.50
Netmask: 255.255.255.0
Gatway: 192.168.40.1
DNS: 198.107.56.37
HTTP Proxy: [blank]

(factory default settings)

Network Address Worksheet

Step 3 - Set the Netmask, gateway, and DNS server(s) addresses as noted in the chart "Network Address Worksheet" using the same technique as shown on the previous page. The only change is that after Step B, press the menu (top) button multiple times to see the netmask, gateway, and dns setup menu, then push the select button to set the option.

NOTE: If DHCP configuration is selected, the IP, netmask, gateway, and DNS server addresses will be obtained automatically. Simply select the Enable DHCP from the first TCP/IP configuration manu.

Step 4 - After the address information has been set, you must reboot the Model 3700. Select the (Previous Menu) option after step B on the previous page. The menu will then state that the Model 3700 must be rebooted to take effect. Press 'select' to allow the Model 3700 to reboot.

Once the Model 3700 has rebooted, the new IP address will be displayed on the console. If DHCP addressing was specified, the server assigned address will be displayed.

NOTE: If DHCP is unable to obtain an IP address, the Model 3700 will use the fallback address of 192.168.0.100.

LAPTOP/COMPUTER SETUP
Step 1 - You must have a computer to access and configure the Model 3700. This computer must have an ethernet connection (on the LAN or by direct connection) and must have a web browser installed such as Internet Explorer® or Netscape®.

NOTE: If your building already has an existing LAN that the Model 3700 is attached to, you can use an existing computer on that LAN. Check with your network administrator for details. If this option is available, use a LAN connected computer and skip to the Model 3700 Administration Overview section on the next page.
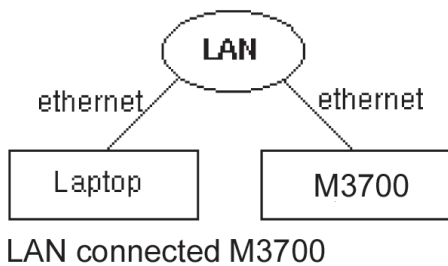
LAN connected M3700
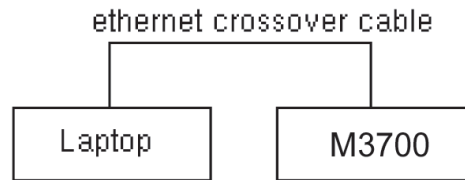
Direct connected M3700

The remainder of this section will assume the installer has brought a laptop to the site, and will connect the laptop to the building LAN, or directly to the Model 3700. Attach the laptop to the Model 3700 or LAN as shown above, Ethernet hookup.

Step 2 - Attach the Laptop to the Model 3700 or to the LAN. The Model 3700 will automatically detect whether a direct or crossover cable is required, and will reverse polarity accordingly. This feature will allow you to use either a straight cable or a crossover LAN cable interchangeably.
If the Laptop is to be attached to an existing LAN, obtain a static IP address (or use DHCP addressing) from the network administrator.

Step 3 - Configure the laptop IP address using the following steps. Note: Only Windows® XP is detailed below, however you can use any OS/Browser you wish such as MacOS or Linux. Details on network setup for non-windows operating systems is beyond the scope of this document however.

A. From the Windows start menu, select the "Settings", "Network Connections" option. Double click the 'Local Area' network connection icon in the network folder, then click the "Properties" button.

Static IP Address	DHCP	Direct Connection to Laptop
Specify an IP address	Obtain an IP address automatically.	IP Address: 192.168.40.1
IP address: ___.___.___.___	(All other required settings are	Netmask: 255.255.255.0
Netmask: ___.___.___.___	assigned by the DHCP server)	(Model 3700 factory default settings)

Laptop Address Worksheet

B. In the network setup dialog, there should be a list of items including adapters, clients and protocols. Locate the item labeled "Internet Protocol (TCP/IP)".
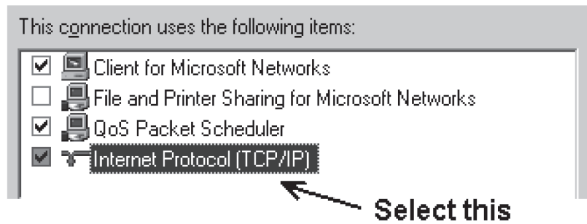
Note: If you have multiple ethernet cards, you may have multiple lines labeled TCP/IP —> ethernet card. Locate the ethernet card that corresponds to the physical connection to the Model 3700 and then select the TCP/IP option that is linked with that ethernet card.

C. Double click the TCP/IP option you selected in step B above. The Internet Protocol properties dialog will be shown. This page allows you to select DHCP (obtain an ip address automatically) or configure an address manually.

D. Select the option for "Use the following IP address" as shown in the picture to the right. Set the IP and Netmask from the Laptop Address Worksheet above. It would be helpful to make note of your previous settings in this dialog so you may set them back after you are done with the Model 3700 Configuration.

E. Close the TCP/IP settings dialog, and Network dialog.

MODEL 3700 ADMINISTRATION OVERVIEW
The Model 3700 should now be available on the local area network for you to access using a web browser such as Internet Explorer® or Netscape®.

Step 1 - Use your web browser to connect to the Model 3700 by entering
http://192.168.40.50/setup/
Where 192.168.40.50 is the IP address displayed on the on the Model 3700 LCD display.

Step 2 - When prompted, use the following default login information
Login: admin
Password: admin

Step 3 - Your web browser should now display the Model 3700 configuration menu. To the left, a list of configuration options are available. On the right, a specific configuration page will be shown. The first page is a welcome message with some system status information. Proceed with the configuration of the Model 3700 using your web browser.

Step 4 - Click on the + mark next to the accounts menu. Select the Admin account, and click Change Password. All units are shipped with the same factory default password, and it should be changed to prevent unwanted access.

Step 5 - Expand the Networking option, and select setup. Verify the addresses are consistent with those in the Network Address Worksheet.

Step 6 - Expand the Modbus option, and select Device List. You should see a list of each Modbus device attached to the Model 3700. Before the Model 3700 can begin logging data, each Modbus device must be assigned a unique name.
  A. Click the device number to the left of the unconfigured Modbus device.
  B. A page with the current device status and readings will be displayed. Click on the 'configure' button at the bottom of the page.
  C. Enter a name for the device in the supplied field.
  D. Change any low and high range alarm settings you may need. (optional)
  E. Click the 'Save' button at the bottom of the page to save your changes.
  F. Repeat these steps for each Modbus device.

Some devices may require additional information. The Veris H8238 Multi circuit power meter allows the CT size to be specified. The Model 3700 internal IO module has additional configuration options on each data point line to specify the details of the analog or pulse input. These include the 4-20mA device scale, multipliers and engineering units. Each 4-20mA or 0-10V sensor should be supplied with technical information including the low and high range values that can be used to configure the Model 3700. Also, the Model 3700 has many common sensor types pre-programmed that can be selected from a drop down list. Review the Modbus Advanced Configuration Options section of this manual for further configuration details.

Step 7 - Select the Modbus/Setup menu option. Specify the Modbus Loop Name. This will become the name of the Model 3700. This is the name that will appear on the BMO website service (if subscribed). Please contact Badger Meter for more information on BMO. Specify the data logging period. The default is 15 minutes.

Step 8 - Decide upon a method of data transfer. (see section later in this document). If you select the HTTP/Post method to send data to the BMO website, you can configure this by selecting the LogFileData, Setup/Upload page.

  A. Make note of the Model 3700 serial number.
  B. Select upload options as needed for time of day to upload the data and retry control.
  C. Check the checkbox to allow remote configuration. This will allow you to reconfigure the Model 3700 from the BMO web site without having to connect directly to the Model 3700.
  D. Specify the Target address to upload data. This is the website address where the Model 3700 will send the collected data. If you have an in-house data collection service, you should enter the address of your data server in this field. Contact Badger Meter about a service called Building Manager Online that can collect and report data for you. If you are using the BMO service, the target address to upload data should be set to http://www.buildingmanageronline.com/upload.php
  E. When configuring the Model 3700 to send data to the BMO site or your own data collection server, the Model 3700 will authenticate itself with the server by using the serial number and a password. This password must be supplied here, and can be obtained when you subscribe for the BMO service, or by your database administrator.
  F. Click Apply to save your changes.

If you select a manual transfer method, remove (blank out) the target address in the Modbus/Upload Data page.

SECURITY
The Model 3700 has three levels of security. These are operator, user and admin. When using a browser to access the Model 3700, basic http authentication is used to prompt your browser for a username and password. The admin account uses admin as the default password. To change the password, select the Accounts menu from the left side tree display. Next, select the account name. Click the Change Password button to set a new password for the selected account.

Admin: This account has full access to modify any of the system settings. The default password is admin.

Operator: This account may view settings, however may only change modbus alarm ranges and device names.

User: This account can view some system settings including the modbus device status pages and can change nothing.

When using FTP to access the Model 3700, you may use the admin account username/password for read-only access. Log information is stored in /var/log/modbus. For read-write-delete access, use the login name "root" and the admin password.

The three usernames specified are not able to be changed or renamed, nor can arbitrary usernames be added to the Model 3700. Access is only controlled by setting the password for the three existing usernames noted above.

The Operator and User accounts are disabled by default. These accounts are activated when you first set a password for each.

MODBUS
Modbus Device List
The Model 3700 automatically searches for Modbus devices on the RS485 serial loop. The Modbus Device List page will show a listing of all the currently detected or configured devices the Model 3700 has found. The device list will show the Modbus address number, status (OK, Error, Alarm, Unconfigured), the device name (user specified) and the device identification string.

Click on the Modbus address number for any of the devices for specific device details.
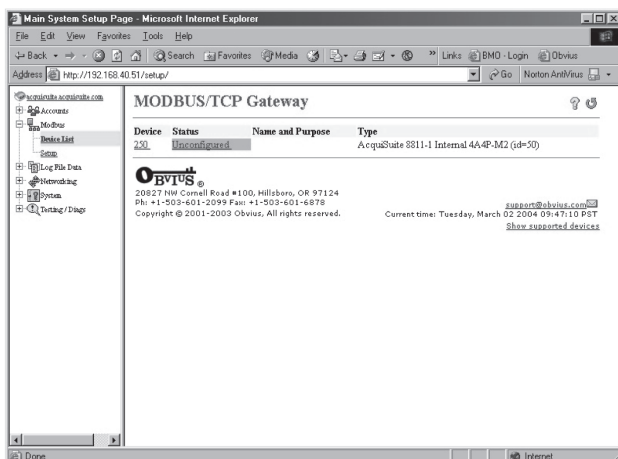
NOTE: Not all Modbus devices are supported by the Model 3700. If a device appears in the list with Unsupported in the status column, you may need to upgrade the firmware on the Model 3700 to access the device. At the bottom, right corner of the device list page, a link is shown that will enumerate all the supported modbus devices in the installed version of the firmware. Use the System/Firmware update page to check for newer versions of the firmware.

At the bottom of the device list, there is an option to allow you to rename all the devices listed. This is useful for initial deployments. There is also a troubleshooting link that will look for common configuration problems and alert you to the appropriate solution.

Device Details
The device detail page will show a list of all the meter data points, alarm settings and console options. The data point names for most devices are automatically entered. Some devices such as the A8923-4 io module have generic inputs, and will be labeled as Pulse Input #1. At the top of the page, the status of the device is shown. This usually reports ok however it can include error information if the device is not responding properly. A list of device errors is available in the log file details section of this manual. At the bottom of the page, several buttons are present.

Done: Returns you to the device list page.

Log File: Will display a tabular view of the most recent data in the current log file. Use the log file export page for complete log data access.

Configure: This button will allow you to change the device parameters such as the name, alarm and console settings.

Device Configuration
When the configure button is clicked from the device details page, the screen will be refreshed, with the same information, however the device name, alarm settings and console checkbox will be available.

Device Name: This field allows you to specify a name for the device such as Main Building Power or other useful name to indicate the location or function of the device. A name must be assigned to a device before the Model 3700 will log data for it.

Low Alarm, High Alarm: Specify a threshold for the alarm. If the data point is recorded below the Low Alarm, or above the High Alarm levels at the time a log entry is taken, the point will be considered in an alarm state.

Console: Checking this checkbox will cause the Model 3700 to display this data point on the LCD console. Multiple data points are rotated about every 10 seconds. The values on the LCD console are updated when the next log interval occurs.

Point Config: Some devices have configurable point features. The A8923-4 IO module has 4 pulse and 4 analog inputs that require additional configuration as detailed in the next section. The H663/704 BCM product only requires the circuit breaker name in this menu. Most device points are automatically configured and this option may not be displayed.

Advanced: At the lower right corner of the page, an advanced configuration button may be present depending on the Modbus device features.

Advanced Configuration Options

The advanced configuration page contains special options specific to the device you are configuring. For the A8923-4 io module, you may specify the pulse rate speed that the pulse inputs will work at, as well as review the 4-20mA/0-10v input status. On power meters, the CT size and orientation options may be present. The device serial number and other specific parameters will be displayed if available.

Internal IO Configuration

The Model 3700 provides 8 multipurpose inputs on board. The onboard IO inputs will always be device 250 in the device list.

1. Click on the device number 250 in the device list. A page showing the device inputs will be presented. Each input has 5 lines on this page. Analog inputs have one line each for an instantaneous, min, max and average value. Pulse inputs have a line for the accumulated value, rate, runtime and status.
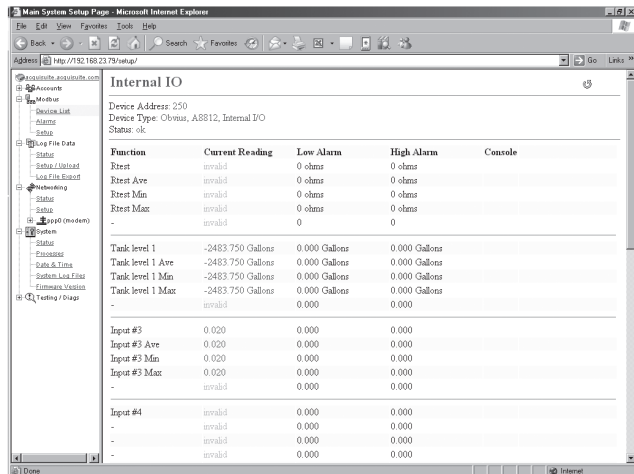
2. Click the Configure button at the bottom of the page. The page will be displayed again, however the device name and alarm level fields will allow editing.

    Type in a name for the device in the space provided at the top of the page. The name should describe the purpose or location of the IO module. For device 250, you may want to use the name Internal IO.
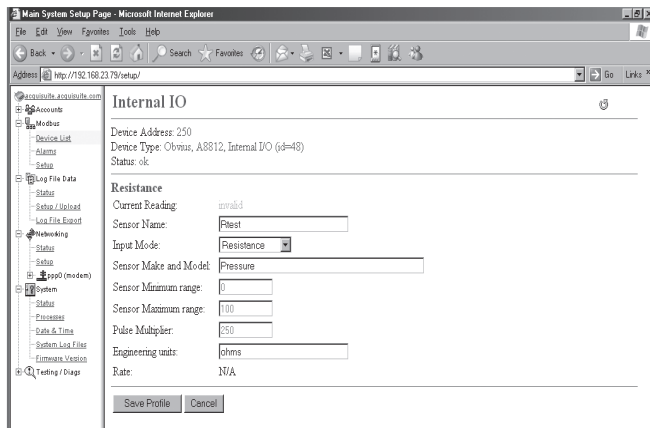
3. For each input that you wish to use, click the Config Point button to the right of the input.

4. The input configuration requires several options. The input mode will control how the input functions. This includes measuring voltage, current, resistance, pulse, or runtime. Use the dropdown menu to select the mode that is appropriate for your sensor. The input configuration must be completed for each input that is in use.

    Sensor Name: Change this to describe the input. This can be anything you wish, such as Indoor Temperature
    Input Mode: Select from one of the following: Voltage 0-10v, Current 4-20mA, Resistance, Pulse, Pulse-KYZ, status or Unconfigured.
    Sensor Make and Model: This entry is a space for the model number of the sensor. It is only used for reference.
    Sensor Minimum Range: All Analog Sensors have min/max range values. For example, a temp sensor may have a range of 50 to 95 degrees F. Enter the low range number here.
    Sensor Maximum Range: Enter the high range value of the analog sensor here.
    Pulse Multiplier: For pulse mode inputs, this option specifies the multiplier for the input.
    Pulse Rate: For most units, this feature is an automatic rate field. For KWH points, the rate is KW.
    Engineering Units: Enter the units of measure. i.e., Degrees F, %RH, etc.

5. After saving the sensor profile, the device configuration page will be displayed again. The input values should now be scaled correctly and the names will be updated to your new configuration. You may wish to set any alarm thresholds required, or check the Console checkbox for any data points that should be displayed on the LCD console.
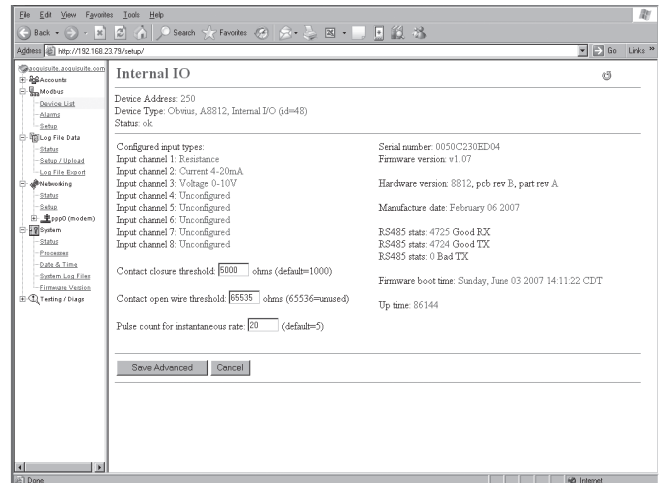
6. Click the Advanced button in the lower right corner of the page. For the Model 3700 onboard IO, there are several options.

    Input Types: this list shows the status of the 8 analog inputs, either 0-10V, 4-20mA, resistance, pulse, status, etc.

    The **Contact Closure Threshold** allows you to set a maximum resistance to be counted as a Closed contact. This is helpful when using intrinsic barrier devices.

The **Contact Open Threshold** can be used in conjunction with a 20K resistor in parallel with the contact closure. When the contact is open, the Model 3700 will read 20K, when closed, it will read <100ohms. If the wire is broken, the reading will go above 20k ohms, and will cause an alarm condition.

The **Pulse count for instantaneous rat**e value specifies the number of pulses to use to calculate the instantaneous rate, min, and max fields in pulse mode.

7.   After returning to the device configuration page, click Save at the bottom of the page to return to the device display page.

Troubleshooting Modbus Devices
If the device you have attached does not appear in the Modbus device list, check the following:

- Verify the + (red), - (black), and Shield connections are correct on all connections. Look for any connection in the middle of the loop that may have the wires reversed, or shorted together. Check the Modbus FAQ on the www.dataindustrial.com website for further details on wiring a Modbus serial connection.

- Verify the address settings of every Modbus device. No two devices may have the same address. Note: the Model 3700 uses the address 250 for the internal IO module. Do not assign this address to any other Modbus device.

- If only one device is not working, try disconnecting all the other devices on the Modbus loop to isolate the problem. If possible, bring the failed device adjacent to the Model 3700 and attach it with a short stub of wire to eliminate possible wiring problems. If the Model 3700 can find a device on the short stub, the problem is probably a wiring related issue on the RS485 loop.

- Check to verify the Modbus device is supported by the Model 3700. Usually, the Model 3700 will locate the device and display Unsupported in the device status column if the device is not recognized by the Model 3700 firmware drivers. In the lower right corner of this screen, there is a link that will show a list of supported devices. Use this to verify the Modbus device in question is supported by the Model 3700 firmware version. If not, check for firmware upgrades online with the Firmware Update configuration page.

- Remember, the Model 3700 may take between 2 and 5 minutes to detect a new device that has been attached to the Modbus RS 485 loop. Rebooting the Model 3700, refreshing the device list page, or using the console 'Modbus status' menu will not speed up the recognition process.

- Click the Troubleshooting link at the bottom of the Modbus device list page for further diagnostics.

Modbus Setup
The Modbus setup page provides several options related to the Modbus RS485 serial port.

Loop Name: This is the name of the Model 3700. This name will be present on all log file descriptors when uploaded to a central database website such as BMO. It is helpful to name the Model 3700 based on the physical location of the system, or building.

Data Logging Period: This option sets the log interval for the Model 3700. Options range from once per minute to once per hour. All of the selections are even divisions of one hour. The Model 3700 calculates the next log time by finding the next multiple of the log period past the start of the hour. For example, if the log period is 15 minutes, log readings will be taken at 0, 15, 30 and 45 minutes past the hour. The log period is not calculated based on 15 minutes after the last reading.

When the Model 3700 is first started, it will take an initial reading of all the Modbus devices immediately. Following that, the next log reading will be calculated as a multiple of the log period after the hour. The initial reading is taken to allow the Model 3700 to gather information for meters that require demand calculations, as well as provide accurate information starting when the Model 3700 is booted.

Modbus/TCP Access: The Model 3700 has a Modbus TCP gateway feature that allows other systems to send queries to all attached Modbus RS485 devices. This feature allows control of what systems have access to the Modbus TCP gateway feature. The settings include No Access, Local Subnet Only and Allow Any.   This basic security feature only allows control based on the IP address of the system making the request. The Modbus TCP protocol does not have provisions for any authentication password or other methods of security. By default, the gateway feature is disabled, and set to No Access.

The Modbus TCP gateway is a feature that allows the Model 3700 to share the attached Modbus RS485 devices with other systems such as PCs with software and building control systems. The gateway receives incoming TCP requests, verifies the length of the packet does not exceed 255 bytes, and forwards the packet to the Modbus RS485 loop. The gateway does not verify the contents of the packet, nor the target address specified in the request.   If the Modbus RS485 device sends a valid response back, the gateway will return this information to the the system requesting it via TCP. If no response is received, a timeout failure will be sent to the requester. Because the gateway does not process the contents of the request or reply, it is possible to query devices on the Modbus RS485 loop that are not specifically supported by the Model 3700.

Modbus RS 485 Baud Rate: This feature allows the configuration of the RS485 serial port speed which the Model 3700 uses to communicate with modbus devices. Options include 9600, 19200, and Opportunistic/Multi-speed. The default is 9600, most Modbus devices communicate at this speed as well.   In Opportunistic mode, the Model 3700 will automatically detect the baud rate of each modbus device, and will continue to communicate with that specific device at the detected speed. This feature will allow you to mix multiple devices on the same RS485 loop with different baud rates. Modbus devices must be configured at baud rates of 9600 or 19200, other baud rates are not supported.

NOTE: Modbus device manufacturers usually do not officially support this configuration, however we have not seen any problems with this in any of the modbus devices we provide drivers for. If you are experiencing modbus communications problems, you should set the baud rate to a fixed 9600 before troubleshooting.

Modbus Parity: This feature allows alternate parity options to be set. Default is no parity.

Modbus Stopbit: This feature allows alternate stop bit options to be set. Default is one stop bit.

Search for Acromag Devices: This feature allows Acromag brand devices to be detected with alternate serial port settings of 8 data bits, even parity and one stop bit. Leave this feature disabled unless you have Acromag brand Modbus devices attached to the 485 chain.

Modbus Debug: This feature records modbus transaction data in the system debug log file. You must click the start log button on the system/log files page to record this information.

Modbus RS485 Timeout: This feature sets the period of time the Model 3700 will wait for a response from any device on the Modbus RS485 serial loop. The default of 200ms is long enough for most Modbus devices. Longer timeouts may be required if you have a very slow device, or if you have a Modbus repeater device in the serial loop. Devices such as the Model 345WT and the Veris H8936 Local Display, and RS485 wireless link repeaters provide access to downstream Modbus devices with a substantial delay. Setting the delay longer than the default will increase the time required to auto-detect new Modbus devices when attached to the Model 3700. For Model 345WT connections, use a minimum setting of 1.5 seconds. The allowed range is 100ms to 5 seconds.

Alarm Setup
The Modbus Alarms section provides the ability to send messages when alarm levels are exceeded. Messages can be sent by email, snmp or displayed on the LCD console. Alarms are processed at the end of the data logging period. For more frequent alarms, shorten the data log interval. Log readings and alarm processing can be set to as often as once per minute.

Display All Alarms on LCD Console: When checked, all alarm messages are shown on the LCD display of the Model 3700.

SNMP Trap Send Enabled: When checked, SNMP Trap messages are sent after every log period for each data point that is in an alarm state. The trap includes information about the Model 3700 system data point, and alarm state. A full MIB is located on the Model 3700, click the MIB link to the right of this option.

SNMP Trap Host 1 (2,3): When SNMP traps are enabled, a trap message is sent to each of the trap host addresses. Specify the trap host by IP address, not DNS name.

Direct email on alarm. When checked, the Model 3700 will send an email message when any data point changes its alarm state.

SMTP Mail Server Address: The ip address of the email server on the LAN that will process and forward the email message to the recipient.

Sender Address: The address that will be used in the From: line of the email. This is helpful in identifying the source of the alarm email message. If your SMTP mail server has junk filtering, you may be required to use a sender address that matches a mailbox

address on the SMTP mail server; check with your mail server administrator for specific details on this issue.

Recipient Address 1 (2,3): The Model 3700 can send a copy of the alarm notice to multiple email addresses. Specify one, two or three email addresses in the fields provided for the recipient addresses.

NETWORKING
Network Status
This page displays the current status of the Model 3700 network connections. Several interfaces may be shown if both Ethernet and PPP dial-in/dial-out are active at the same time. Each interface will report the IP address, number of packets sent and received, and other details specific to the interface. For the ethernet interface, the MAC address (HWaddr) will be shown as well as a network collision count.

Ethernet Network
```
eth0    Link encap:Ethernet HWaddr
        00:99:99:0E:C1:CA
        inet addr:192.168.10.50
        Bcast:192.168.10.255
        Mask:255.255.255.0
        UP BROADCAST RUNNING MULTICAST
        MTU:1500  Metric:1
        RX packets:2624171 errors:6 dropped:0
        overruns:0 frame:0
        TX packets:220342 errors:0 dropped:0
        overruns:0 carrier:0
        collisions:1 txqueuelen:100
        RX bytes:174674347 (166.5 Mb)  TX
        bytes:50607122 (48.2 Mb)
        Interrupt:5 Base address:0x320
```

NOTE: the Lo or Loopback interface is the internal network and is always present, Eth0 is the ethernet segment, and Ppp0 is the dial-out or dial-in connection. In addition, the current gateway and DNS server information will be shown. These items will provide information about DHCP assigned configuration information.

Ethernet Setup
The ethernet setup page has the following options:
- IP Address: The IP address of the ethernet interface: Default 192.168.40.50
- Netmask: The netmask of the ethernet network. Default 255.255.255.0
- Gateway Address: The gateway is the routing device that moves traffic from the LAN to the internet. The default is 192.168.40.1. If you do not have an internet connection for your LAN, or you are using a crossover ethernet cable, leave this field blank.
- DNS 1, DNS2: These are the primary and secondary DNS servers. If you are using a dial-out connection, these must be set to the DNS server provided by your dialup ISP. If you only use the Model 3700 on a crossover cable and/or dial-in mode, you should leave these blank.
- DHCP (enable/disable) If you LAN has a DHCP server, you may enable this option and remove the previous options for IP, netmask, gateway, and DNS. Check with your LAN administrator first.
- HTTP Proxy. If your LAN is connected to the internet using a sophisticated firewall, you may need to use the HTTP proxy feature. Check with your LAN administrator first, however if

you don't have a proxy set on your computer (MSIE/Tools/ Connections-tab/LAN-Settings) then you most likely don't need to configure the Model 3700 to use a proxy. If in doubt, leave this blank first, and try the connection test. If it fails, ask your LAN administrator about proxy servers, if any.

After changing any of the settings on this page, you will be required to reboot the Model 3700. Use the system/status web configuration page, or the LCD console to reboot the Model 3700.

Troubleshooting Ethernet Problems

After reconfiguring the ethernet settings you experience problems accessing the Model 3700 with your web browser, check the following items.

- Verify that you rebooted the Model 3700 after making the changes to the network settings.
- Use the Model 3700 LCD console. Check the IP address and netmask. Verify these are correct.
- Verify the ethernet link/act LED is on. It should blink with activity.
- Verify the network connection in your computer has the proper IP address, on the same subnet, to access the Model 3700.
  NOTE: One common mistake is configuring the Laptop IP to the same address as the IP address of the Model 3700. In order for the laptop and Model 3700 to communicate, the IP addresses should not be identical. (see the basic network config for suggested IP addresses.)
- Use the LCD console to run the Network Status test. This will attempt a number of things including a ping query to the gateway address. If the Model 3700 can ping an external machine such as a gateway, the ethernet port is most likely connected properly. If the Model 3700 does not use a gateway, try adding a gateway address, and make it the address of your computer.

Modem Status

The modem status page will show the connection status of a dialin/dialout session if any is currently active. Also included are two buttons.

Dial-Out Now: This button will cause the Model 3700 to initiate a dial-out connection if dial-out networking is enabled. This will not initiate a data upload to a webserver database such as BMO. If you manually start a connection with this button, you will need to manually disconnect when you are finished.

Hangup Now: This button will cause the modem dial-out or dial-in connection to be disconnected immediately.

Modem Setup

This configuration option will allow you to configure specific features in the modem if needed. For most applications, the default settings are ok. The options are as follows:

Modem Type: MTSMG-G or MT5600SMI: This shows the type modem that is attached to the Model 3700. The MTSMC-G is the GSM/GPRS cellular modem option. MT5600SMI is the default modem on most Model 3700 systems.

Max Serial Port Speed: This feature allows you to specify the maximum speed at which th modem can communicate at. The default is 57.6 kbps. This is useful in diagnosing noisy phone lines, you may be able to get a more reliable connection by slowing down the maximum rate of data transfer.

Modem Setup String: This option allows the use of specialized modem setup strings. The default AT is sufficient for most applications

Modem Speaker Enabled: This option sets whether the speaker is on or off when dialing out or answering a call.

Debug PPP Messages: Checking this option will allow the system debug log to show a complete report of the PPP connection status. This will include the PPP session negotiation for an IP address and other connection parameters. You must click the Start Log button on the system/log files page to record this information.

Debug Modem Chat: Checking this option will record information about the modem setup and call summary. This includes modem line quality and setup parameters. You must click the Start Log button on the system/log files page to record this information.

Modem Diagnostics: This button will run a diagnostic test on the modem to verify that it is working and report the modem firmware version number. On A8812-GSM cellular systems, this feature will also report the cell tower signal strength, SIM card status, and cellular modem serial number.

Modem PPP Dial-Out

The Model 3700 has a dial-out feature that will allow the Model 3700 to place an outbound call and upload data to a central database server. If the dial-out feature is enabled, the dial-out connection will be initiated before the data upload process is started. Dial-out connections allow the Model 3700 to connect to a generic PPP server such as a RAS system, or an ISP (AT&T® Worldnet®, Earthlink®, Netcom®, etc.) Internet services that require custom software such as AOL®, Juno®, and AT&T Global are not supported. To test if a dial-up service is supported, simply use the MS Windows® built-in dial-up-networking feature and attempt to establish a connection. If successful, the Model 3700 should work with the service. You may wish to test the dial-up account phone number, username and password with windows first to verify that the account works correctly.

Enable/Disable: Turn on or off the ability to place an outbound call to an ISP. Note, when enabling this feature, the default ethernet gateway in the network setup webpage is removed. You must reboot after enabling or disabling dialout support to make the change take effect.

Phone Number To Dial: This is the phone number to call. A comma can be used to pause for 1 second, useful after dialing 9 for an outside line.

Username: The login or username of the dial-up account at your ISP.

Password: The password for the ISP account.

Example Dial-Out to an ISP or RAS

The Model 3700 has the ability to place phone calls to a Remote Access Server (RAS) or ISP in order to upload data that has been collected from the Modbus devices. This feature is useful when using the Model 3700 on a phone line with the Building Manager Online service, or with your own data collection server. Dial-out configuration is not useful if you do not have a central database server to send the data to.

Step 1: Collect the necessary information. You will need some details about the ISP or RAS you will be calling.

Step 2: Plug a regular telephone into the phone line that the Model 3700 is to use. Verify the line has dial-tone. Attempt dialing the ISP or RAS phone number, and confirm a modem answers the phone. If so, hangup, attach the Model 3700 to the phone line and proceed to the next step.

Step 3: Select the Network/PPP0/ModemSetup option from the Model 3700 configuration webpage. Set the Setup String by clicking on the Use Default button. The default is simply "AT". Click apply changes to save the setting.

Step 4: Select the Network/PPP0/DialoutSetup option from the Model 3700 configuration webpage. Verify the basic configuration page is shown (the default). If the Show Basic button is present in the lower right, click it to reduce the number of choices to the following.
  A. Check the box to enable dialout.
  B. Enter the phone number in the space provided.
  C. Enter the login name and password to the ISP dialup account in the space provided.
  D. Click Apply Changes to save the settings.

Step 5: Reboot the Model 3700 (using the system/status page, or the console pushbutton menu.)

Step 6: Use the Connection Test page in the Testing/Diags menu on the Model 3700 for a full report of the dial-out connection progress. Even if you are not using the BMO service, you can still test dial-out with this feature. You may however receive an error that the Model 3700 is not allowed to transfer data to the BMO server. Further information on the connection test is provided in the connection test section of this manual.

GSM/GPRS Cellular Modem (A8812-GSM only)
The Model 3700 model number A8812-GSM includes a GSM/GPRS cellular modem. GPRS can provide the Model 3700 a connection to the internet without using a land base phone line or LAN connection. This is often helpful in providing communications in remote areas or in customer sites that will not allow LAN connections for security purposes.

The GSM/GPRS cellular option is very similar to the standard modem configuration. Both provide the Model 3700 a way to place a call and get an internet connection. For the GPRS services, the cellular provider handles the internet connectivity part, so all you need to do is set up the cellular service account.

To enable your GSM/GPRS modem, you must sign up for a data-only account with your cellular provider. You may need to supply the MEI number for the cellular modem which is located on the modem section of the Model 3700. Alternatively, the modem/diagnostics section will print the modem's IMEI number as well. When requesting service, it is often easiest to explain that you need data only service for internet access. You should receive a SIM card from your service provider. Install the SIM card in the slot provided on the right side of the cellular modem inside the Model 3700.

Run the modem diagnostics test to confirm the SIM card is installed and working correctly. Also note the diagnostics page prints the current cellular provider's name, as well as the strength and quality of the cellular tower signal.

Enable/Disable: Turn on or off the ability to place an outbound call to an ISP. Note, when enabling this feature, the default ethernet gateway in the network setup webpage is removed. You must reboot after enabling or disabling dial-out support to make the change take effect.

APN: This is the access point name for the GPRS service provider.
     For cingular, this is "CINGULAR"

Login Name: The login or username of the dialup account at your cellular provider.
     For Cingular, this is
     "CINGULAR@CINGULARISP.COM"

Password: The password for the ISP account.
     For Cingular, this is "CINGULAR"

Once GPRS dial-out is configured, use the Diagnostics / Connection Test to confirm the cellular service porviders connection is working properly.

Modem PPP Dial-in
The Model 3700 is designed to allow incomming connections from any generic PPP system including MacOS, Linux, Windows® 9x, XP and 2000. The dial-in feature is disabled by default, and must be enabled from LCD console or the dialin options menu in order to receive calls. Dial-in options include the following.

Dial-in Enabled: Check this checkbox to enable dial-in support. When checked, the Model 3700 will answer any ring on the phone line, after the first ring. If not checked, the Model 3700 will never answer a ring on the phone line.
Local IP Address: This is the IP address assigned to the Model 3700 side of the dial-in connection. This address is the one which you must use on the computer in the web browser address line when remotely accessing the Model 3700 with a dial-in connection. The default is 192.168.238.1
Remote IP address: This is the IP address assigned to the calling computer. The default is 192.168.238.2
Netmask: The Netmask that defines the subnet for both the local and remote IP addresses. This is set to 255.255.255.0 unless you have specific requirements, the default IP, remote IP should be sufficient.

NOTE: GSM/GPRS products do not allow dial-in communications.

Dial-In From a Computer to the Model 3700
The Model 3700 has the ability to receive and answer phone calls from a Windows computer in order to allow remote configuration, or to collect data that has been logged from the modbus devices. This feature is useful when using the Model 3700 on a phone line and a central database server is not present. The dial-in feature

will support the Windows built-in dial-up networking features, and can be used as easily as a dial-up ISP service.

Step 1: Collect the necessary information. You will need some details about the ISP or RAS you will be calling.

Dial-In Details
A dedicate phone line is required, and can not be shared with a fax machine or other device.
Telephone number:_____ (the phone line the Model 3700 is attached to)
Static IP address: 192.168.238.1 (the Model 3700 PPP IP address)
Static Netmask: 255.255.255.0
Remote Address: 192.168.238.2 (the IP address assigned to the calling computer)
Admin password: _____

Dial-in Address Worksheet

Step 2: Plug a regular telephone into the phone line that the Model 3700 is to use. Verify the line has dial-tone. Use a second telephone and dial the Model 3700 phone number and verify the first telephone rings, and can be answered. If it does not ring, verify the telephone number dialed is actually associated with physical phone line. If the line tests okay, hang up, attach the Model 3700 to the phone line and proceed to the next step.

Step 3: Select the Network/PPP0/ModemSetup option from the Model 3700 configuration webpage. set the Setup String by clicking on the Use Default button. Click apply changes to save the setting.

Step 4: Select the Network/PPP0/DialinSetup option from the Model 3700 configuration webpage.
A. Check the Dial-in Enabled option.
B. Set the IP, Netmask, and Remote Address as shown in Dialin Address Worksheet. The IP addresses shown (factory default) will work for most dialup connections. If you make changes to the IP address, make note of it for future use.
C. Click Apply to save your changes.

Example Dial-In From a WinXP Computer
The Model 3700 is designed to allow connections from any generic PPP system including MacOS, Linux, Windows 9x, XP and 2000. We have found that windows XP/2000 has a timeout issue that affects some computers but not others. When calling the Model 3700 with Windows XP/2000 you may receive an error message stating that a loopback error was detected, preceded by windows hanging up promptly after connecting to the Model 3700. If that is the case, a slight delay in the dial process for windows will correct the problem. Adding this delay in a dial script is detailed below.

Step 1: Using notepad, create a text file called "c:\windows\system32\ras\Model 3700.scp". In that text file, add the following script

```
proc main
   delay 2
endproc
```

Save and close the file

Step 2: Create a windows networking connection.
A. From the control panel, select Network Connections. Click Create a New Connection.
B. The Connection Wizard will appear with a welcome screen and no options. Click Next.
C. Select Connect To the Internet and click Next.
D. Select Set Up My Connection Manually and click Next.
E. Select Connect Using a Dial-up Modem and click next.
F. Enter My Model 3700 for the ISP name. (you may want to name each Model 3700 connection by the name of the building where it resides.) Click Next.
G. Enter the phone number of the phone line attached to the Model 3700. Click Next.
H. Enter admin for the username, and the admin password in the password field. Uncheck the option Make This The Default Internet Connection. Click Next.
I. The connection wizard will show you that the setup is complete. Click Finish.

Step 3: Configure connection details.
A. Right click on the My Model 3700 connection icon you created in Step 2 above. (You may also click the properties button in the dial-out dialog box.)
B. General Tab: defaults are okay.
C. Options Tab: Verify the option Include Windows® Login Domain is not checked. Set any timeout values if desired.
D. Security Tab: Security: Use Typical, allow unsecured password. At the bottom of the dialog box, in the section Interactive Login and Scripting. Check the Run Script checkbox. Click the browse button below the script name. Select the Model 3700.scp file created in step one above. Click the Open Button. The script name should appear to the right of the Run Script checkbox.
E. Networking Tab: defaults are okay.
F. Advanced Tab: defaults are okay.
G. Click Okay to save the changes.

Step 4: Dial the connection.
A. Double click the My Model 3700 connection icon.
B. Complete the password field if it is blank. The password is the Admin password of the Model 3700.
C. Click the dial button. The modem usually takes between 40 and 60 seconds to establish a connection.

Once the connection is established, use your web browser to connect to the Model 3700 by entering
http://192.168.238.1/setup/
Where 192.168.238.1 is the Static IP address listed in the Dial-in Address Worksheet.

Your browser will now be able to access the Model 3700 the same way as you did in the LAN/Direct Connection setup in previous sections of this manual.

SYSTEM OPTIONS
Status
The system status page shows the current memory and flash disk utilization values, system up-time, and load average. Also included on this page are two buttons for Reboot and Shutdown. It is important to use the shutdown option prior to removing power from the Model 3700. The LCD console will report the reboot or shutdown status.

Processes

The system process table is shown in both tree and tabular formats. The process list is useful when contacting Badger Meter Technical Support.

Date and Time

The Model 3700 keeps time using UTC or Universal time. All log files are recorded in UTC time as well. Time stamps shown on the Model 3700 local configuration pages are converted to local time for the convenience of the installer. The date/time configuration page provides the following options.

Date/Time: In UTC and Local time.
Date/Time: Dropdown menus to select the current (Local) time manually.
Timezone: a drop down list of the supported time zones.
Time Sync Protocol: Select NTP or Rdate. Most Linux/Unix systems provide Rdate, however many provide NTP as well. Windows domain servers can also provide NTP. If possible use NTP as it is a more robust protocol.
Time Server: Specify the DNS name or IP address of your time server. You may need to verify if your firewall will allow NTP or Rdate packets to pass through. Generally, it is better to use a local time server if possible.

Universal Time Is Your Friend

Log data is stored in UTC time. UTC is sometimes referred to as Greenwich Mean Time (GMT). This allows data collection services such as BMO to collect data from multiple sites in different time zones. If you are operating your own database system to store log data from the Model 3700, it is best to store the data in UTC time in the database as well, and only convert it to local time when generating the final report or graph for the user.

If you store data in local time, you will have the following issues.

1) Local time is relative. Is local the time where the Model 3700 exists, or local to where the data is stored. If local to the Model 3700, you must shift each Model 3700 data set depending on its location.
2) There are about 11 time zones in the US. Some observe DST, others do not. These include Alaska, Aleutian, Arizona, Central, Eastern, Hawaii, Indiana, Michigan, Mountain, Pacific, and Samoa.
3) When converting to local time, there will be one hour of overlapping data in the fall when the time is adjusted for Daylight Savings time. (i.e. Log entries run 12:45, 1:00, 1:15, 1:30, 1:45, 1:00, 1:15, 1:30, 1:45, 2:00am. This will prevent you from sorting your data by time in your database.)
4) In the spring, you will have a gap in the data from 1:59 to 3:00 am. This can cause problems if you are calculating demand values based on consumption.
5) Converting local time to any other time zone usually involves converting it to UTC first.

Using UTC time solves these problems elegantly. The best practice is to store data in the database in UTC format and then convert the information when generating a report for the user.

For example, if you wish to draw a graph of KW over time, prompt the user for a date range, say Jan 1 midnight to Jan 2 midnight. Take the user specified end points and convert these times from local time to UTC. Next, create an SQL query using the new UTC formatted data as your select statement. i.e.:

```
SELECT * from TABLE where time > '2003-01-01 08:00:00'
          and time < '2003-01-02 08:00:00'
```

Note the time is 8 hours ahead of local time. This example is for Pacific which is 8 hours off from UTC. This will return a list of data points between the two specified time ranges. Next, plot the data on a graph, using the UTC times for start and end points. Lastly, when drawing the 'time' legend on the graph, convert the values back to Local time before displaying. Ie, 2003-01-01 00:00:00 to 2003-01-02 00:00:00. Any division lines on the time axis can be handled the same way. The advantage of using this technique is that it will properly draw a graph across DST change boundaries. The graph axis is based on UTC time with no DST, and will not show a gap or overlap a the time of the change. The axis labeling will be correct as well, matching the UTC times precisely.

Another way to handle the conversion is to query and convert all the returned time stamps to local time before drawing the graph. This is useful if you do not have detailed control over the graph legend drawing process. This technique will not properly graph across DST changes as the graph is based on local time including DST changes.

System Logs

The Model 3700 can keep several log files that report the general operation of the system, not related to the normal data logs. These include the following:

Debug Messages: The Model 3700 can run a Syslog process to record more detailed information about its operations, however this log consumes vast quantities of memory quickly, and is disabled by default. Click the Start Log button to enable the feature. Click the End Log button to disable.
NOTE: when the Model 3700 is rebooted, the debug log will be disabled on startup.
Kernel Boot log: Startup messages about the Linux operating system startup. This log shows what hardware items were detected and initialized.
Ftp Connection log: This log shows a list of files transferred by FTP on the Model 3700.
Last Data Upload log: This log file contains a report from the last data upload attempt to remote database/webservers such as BMO. This log will show if any log files are being rejected by the dabase/webserver, or if the network is not allowing a connection.
Last Modem Connection log: This log file shows the details of the modem operation including modem connection quality parameters. This is updated ever time the modem makes a dial-in or dial-out connection.
Time Change Log: This log contains a list of time change events. When the Model 3700 system clock is changed either manually or by automated time sync, and the change is more than a few seconds, the event is recorded here.
System Boot Log: This log shows when the Model 3700 was started, and lists process events such as remote logins, or logger process restarts. This log is most useful for detecting when the Model 3700 was restarted, and whether there was a proper shutdown event prior to rebooting (if not, possibly a power outage).
Start/End logging: This button allows the user to start detailed logging or disable it if it is running.

Purge Log Files: This button will clear all the system log files listed on this page, but not the meter data log files. (deletes kernel, boot, ftp, messages, upload log files) This does not clear the interval log data from attached meter devices.

Firmware Update - Please contact Badger Meter for Firmware updates.

The Model 3700 can upgrade its own firmware using the firmware update page. The Model 3700 must have an Internet connection to communicate with the www.dataindustrial.com website for firmware updates. If a LAN connection is present and configured, it will be used by default. If the Model 3700 uses a dial-out connection, you must first enable the dialout by clicking the Dial-out Now button on the Networking/Modem-ppp/Status page.

After clicking the Check For Updates button, the Model 3700 will contact the www.dataindustrial.com webserver and attempt to download a list of firmware files. The list is compared to the firmware versions installed, and a listing of the files will be displayed. If any firmware updates are available, a button to the right will be shown labled Upgrade. The firmware files are as follows:

asarm.cramfs	The main Model 3700 firmware file including the modbus and data logging software
usrarm.cramfs	High level system support files such as FTP, and timezone information
ramdisk.gz	Low level system files and system libraries
zImage	The Linux operating system.
a8812io.hex	The analog/pulse io co-processor firmware.

When clicking on the Upgrade button, the Model 3700 will again contact the www.dataindustrial.com website and download the requested firmware image file. The Model 3700 will take a few seconds to verify the file checksum and prompt you with an Install button. Click the Install button and the Model 3700 will install the firmware update and reboot itself to make the changes take effect.

Do not power down the Model 3700 during any step of the Model 3700 firmware update process. Doing so may corrupt the system and render the Model 3700 unusable.

DIAGNOSTICS
Host Lookup

The Host Lookup page provides the ability to do some basic network tests. These are as follows:

Ping: Send an echo request to the specified host.
Traceroute: Send an echo request to the target address and attempt to locate every router in between the Model 3700 and that address.
Nslookup: Convert the DNS name to an IP address, useful for testing the functionality of the DNS server configured in the Network/Setup webpage.

To run a network test, enter the IP address or DNS name in the field provided, check the checkbox next to the test you wish to use, and click the OK button. Multiple tests can be specified.

Connection Test

The connection test page will attempt to establish an HTTP session with the specified upload server. Click the Begin Test to start this process. Information will be printed in black. Success responses will be printed in green, failure messages will be printed in red. A sample upload test follows:

```
Ping localhost [127.0.0.1]: Success
Ethernet IP address [192.168.10.50], mask
[255.255.255.0]
Local subnet [192.168.10.0] to
[192.168.10.255]
Ping ethernet ip address [192.168.10.50]:
Success
Starting system debug logger
Dialout not enabled, using ethernet LAN
connection.
Ping ethernet gateway [192.168.10.1]:
Success
Ping DNS #1 [192.168.10.1]: Success
The DNS #2 server address is not configured.
Resolving time server [time.Badger Meter.
com] to an IP address: Success. Got
[198.107.56.37]
Ping time server [time.Badger Meter.com]:
Success
Testing time server
SyncTime: Sync system time with time.Badger
Meter.com.
        16 Dec 19:49:36 ntpdate[3165]:
adjust               time server
198.107.56.37 offset
0.009985 sec
        new time: Tuesday, December 16
2003          19:49:36 PST, drift 1
seconds.
Processing upload url.
No proxy specified, using direct connect
method.
Upload URL looks ok: http://www.
buildingmanageronline.com/upload.php
Resolving web server [www.
buildingmanageronline.com] to an IP address:
Success. Got [198.107.56.37]
Ping web server [www.buildingmanageronline.
com]: Success
Connecting to server at [198.107.56.37:80]:
Success
Sending HTTP request: Success
Reading response:
Upload test completed.  Got:

  HTTP/1.1 200 OK
  Date: Wed, 17 Dec 2003 03:49:38 GMT
  Server: Apache/1.3.23 (Unix) PHP/4.1.2
  AuthMySQL/2.20
  X-Powered-By: PHP/4.1.2
  Connection: close
  Content-Type: text/html

  SUCCESS - Test Successful

Closing TCP connection
Shutting down system debug logger

Test complete
```

Note in the last section where SUCCESS is indicated. The failure is due to the password not being correct.

LCD Console
The Model 3700 has an LCD console and two push buttons labeled Menu and Select. These can be used to configure some of the basic features of the Model 3700. The intended purpose of the console is to configure the Model 3700 to a point where a computer can communicate with it for further detailed configuration.

When the Model 3700 is running, it will show Model 3700 Ready and the current time alternated with the ethernet IP address. If you choose to enable the console display of data points, the LCD will also show the selected point names and current reading values. The display will change to the next listed item about once every 10 seconds. If a data point name is longer than will fit on the 16 character wide display, it will be scrolled. Pressing the Select button will cause the display to change to the next configured item. Pressing the Select button quickly will skip through multiple display points.

Pressing the Menu button will cause the main menu to appear. Once [Main Menu] is shown on the console, the Menu button will change the menu option, and the select button will take action on the currently displayed option. Some options provide sub menus, others allow you to edit the option value. The following is a tree display of the main menu and sub menus.

```
          [Main Menu]
         TCP/IP Config
                        [TCP/IP Config]
                        IP Address
                        Netmask
                        Gateway
                        DNS Server #1
                        DNS Server #2
                        (previous menu)
         Network Status
            Dialin
         Modbus Status
         Upload Data Now
            Shutdown
             Reboot
         (previous menu)
```

The TCP/IP sub menu will allow you to configure the ethernet settings for the Model 3700. To edit the IP settings, use the menu button to change options, and press the select button to edit the option. Once selected, you will see the current value displayed and a blinking square cursor on the first character. Press the Menu button to change the character or digit. Press the Select button to use the digit and move the cursor to the right one space. If you press the Select button multiple times, the cursor will move right a similar number of spaces, allowing you to skip over characters that may be correct based on the previous settings. When you are finished entering the IP address, select a blank space with the menu button, and press Select. Any characters still remaining to the right of the cursor will be eliminated. (i.e., If changing 128.193.100.200 to 10.0.0.1, the new IP address will be several digits shorter than the old one.)

Network Status: This option will test the ethernet connection by attempting to ping the following addresses: localhost, ethernet IP address, gateway, dns1, dns2. The localhost ping will verify the

kernel IP stack is properly initialized. The ethernet ping will verify the ethernet card's IP address is set and communicating with the kernel. The ethernet ping test does not send any packets over the ethernet cable however. The gateway ping test will verify that the gateway address responds to queries. This test is the first one that actually sends packets over the ethernet wire. The gateway test does not verify the IP address of the gateway is correct, or that the gateway is working correctly, it only tests that the address specifed as a gateway responds to a ping request. The DNS1 and DNS2 ping tests verify the IP addresses listed for DNS servers respond to ping requests. This test does not verify if the DNS servers can actually resolve DNS names to IP addresses.

For a more complete test, use the connection test web page in the Model 3700 diagnostics menu.

Dial-in: This menu provides the ability to enable or disable dial-in support. From the console, the installer can enable dial-in support and allow a remote user the ability to call the Model 3700 and configure the options without requiring a computer on site. For more information on connecting to the Model 3700 review the "Modem/PPP Dial-in" section of this manual.

Modbus Status: This option will report the number of devices currently detected by the Model 3700. The display will show a device count for Devices OK, New, and Failed. These are as follows:

Devices OK: The number of Modbus devices that are presently working, and have been configured.
New: Devices that the Model 3700 supports and are working, but have not yet been given a name.
Failed: The number of Modbus devices that either stopped responding, or are not supported by the Model 3700.

NOTE: Selecting the Modbus status option from the Model 3700 console does not cause the Model 3700 to search for new devices. The Model 3700 checks for new devices in the background all the time, taking about 2.5 minutes to complete each pass through all 255 possible addresses. The Modbus test console option simply displays the number of devices the Model 3700 presently knows about.

The Model 3700 has a built-in IO module with 4 analog and 4 pulse inputs. This module shows up in the Modbus listing as device 250, and is counted in the number of devices OK or New. For example, if you have 1 Model 3700 with a single Modbus power meter, the device count will be 2. (One for the meter, and one for the Model 3700 on board IO.)

Upload Data Now: If the Model 3700 is configured to upload data using HTTP/POST to a webserver/database such as BMO, this option will cause the Model 3700 to upload all stored data immediately. If the dial-out option is enabled, an outbound phone call will be initiated, and disconnected after the transfer is complete.

Reboot: This option will reboot the Model 3700.

Shutdown: This option will stop the data logging processes and secure the flash memory. When secured, the console will state that the power may be disconnected. It is important to shut down the Model 3700 cleanly prior to disconnecting the power from the device.

The Model 3700 has an advanced menu that can be used to perform system checks and clear all configuration options to the default settings. To access the advanced menu, wait until the LCD shows Model 3700 Ready and press both the Menu and Select buttons at the same time. Hold both down together for about 10 seconds. When the advanced menu is displayed, you may release the two buttons. The following is a tree display of the advanced menu.

```
[Advanced Menu]
Console on COM1   (RS485 port)
Check flash disk
Erase Log/Config
(previous menu)
```

The Check Flash Disk option will force the Model 3700 to check the entire flash disk for file system integrity. This will require you to reboot the Model 3700.

The Enable Console feature will provide a shell prompt on the serial port for remote diagnostics. This is intended to be used by Badger Meter technical support only.

The Reset Configuration option will remove all the user settings, data, and passwords that have been configured and will return the Model 3700 to the factory default settings. This is mainly useful when reconfiguring an Model 3700 that has been used previously on a different job or project.

LOG FILE DATA
The Model 3700 stores data from the Modbus devices in text (csv) log files. One log file is created for each modbus device on the system. On a daily basis, the log files are rotated, that is the current log file is renamed and compressed with gzip compression, and a new log file is started. This allows the Model 3700 to make efficient use of the flash memory. When the storage capacity is beyond 95% full, the oldest log file will be removed from the system.

Log File Status
The Model 3700 can display a list of log files in the Log File Data/ Status web configuration page. A bar graph will show the amount of storage capacity that is used by the existing log data. Below, a list of Modbus device log file will be displayed along with the file size and timestamp when the file was last modified.

Each Modbus device may have multiple log files. The log file name starts with "mb-xxx." where xxx is the Modbus device ID number. One file, with the .log extension is the file where the most recent data is being stored. Other log files have a .gz extension. These are older log data files that have been compressed to save space.

The file name will be a link that will open up a browser window to view the contents of the single log file. Clicking on the single log file will only show the contents of that log file, and not all historical data for the device. Use the log export feature if all log data is required.

Log File Format
Once you have downloaded the data from the Model 3700, you will need to process it. The file is an ASCII text file with comma delimited data. One line is recorded for each log cycle. The file will look something like the following example from a 4A4P-M IO Module.

'2002-01-31 18:30:00',0,0,0,-0.00,89.29,39.05,49.11,0,0,0,0
'2002-01-31 18:35:00',0,0,0x02,0.01,104.24, 39.05,49.11, 0,0,0,0
'2002-01-31 18:40:00',0,0,0,NULL,87.82,39.05,49.11,0, 0,0,0
'2002-01-31 18:45:00',139,NULL,NULL,NULL,NULL,NULL, NULL,NULL,NULL,NULL,NULL

In this example, the first line shows a regular log entry. The second line shows a high range alarm for data point 2. The third column shows point 1 as invalid, and the fourth line shows the Modbus device is not responding.

Notice the following columns are shown.

1. Date/Time in UTC (GMT) time. This field is quoted to handle the space in the middle.
   The format is YYYY-MM-DD HH-MM-SS
2. Modbus error (if any). 0=no-error, see table below.
3. Low Range alarm bitmap (hex notation).
4. High Range alarm bitmap (hex notation)
5. Data point 1
6. Data point 2
7. - - -
8. Data point N

Comments:
Date/Time: The date/time column reports the time at which data was logged from the Modbus device.

NOTE: This is not necessarily the time at the start of the log cycle. Users with large number of devices may notice some of the Modbus devices at higher address numbers report 1 or 2 seconds after the first modbus devices. This is because the 9600 baud speed of the Modbus loop is not fast enough to log all modbus devices in less than 1 second. If a device does not respond during a log cycle, the Model 3700 will attempt to query the device several more times. If a subsequent query is successful, the time of the successful query will be used in the log file but may be several seconds after the initial log cycle.

The log date/time is in Universal Time (UTC). This means that the data is logged with no shift for daylight savings time, and must be converted to local time for reporting purposes. When importing into a database, data should be kept in UTC time for ease of use. When reporting the final data, you should adjust the time to reflect the local timezone for which you are reporting. The data export option on the BMO website will prompt you for a time zone when you export the data, and will adjust the log date/time accordingly.

NOTE: UTC is sometimes referred to as Greenwich Mean Time (GMT).

Modbus Error: If the error value is not 0, the remainder of the columns for this line will be reported as NULL.
1   Operation not permitted
2   No such file or directory
3   No such process
4   Interrupted system call
5   Input/output error

6	No such device or address
9	Bad file descriptor
11	Resource temporarily unavailable
12	Cannot allocate memory
13	Permission denied
16	Device or resource busy
19	No such device
23	Too many open files in system
24	Too many open files
26	Text file busy
28	No space left on device
32	Broken pipe
101	Network is unreachable
110	Connection timed out
111	Connection refused
113	No route to host
129	Illegal function (function was not allowed by the slave device)
130	Illegal data address (the data address is not allowed by the slave device)
131	Illegal data value
132	Illegal response length
139	Device failed to respond (the Modbus device may be off or disconnected)
160	Start log (entry in log file after Model 3700 starts up)
161	Stop log (entry in log file if Model 3700 is shut down properly)

Low/High Range Alarms: This number is a hex representation showing which data points are out of range. 0x01 shows data point 1 in alarm state. 0x04 shows data point 3 in alarm state.
Data Points: Data points are shown in the same order as the Modbus device configuration display in the Modbus/device list page. Data is displayed in floating point form. When a specific point is unavailable (4A4P-M broken wire alarm) or the point is not supported as part of the configuration (phase B current on a single phase H8163 meter hookup) the point will be logged as NULL. This preserves the column structure of the file, and allows notation of invalid data. SQL databases often accept NULL as a valid entry in a data table to represent invalid data.

For data exported from the BMO website, the columns that are invalid (NULL) are reported as blank fields. This makes it easier to import into MS Excel® as blank cells. At some point in the future, the Model 3700 will be converted to report blank fileds rather than "NULL" to make direct import of data from the Model 3700 easier, as well as reduce the file size. Developers intending to use data files from the Model 3700 should handle both the word "NULL" as well as a blank column as indications of an invalid data point.

Log Storage Capacity
The Model 3700 uses approximately 8 Mbytes of flash disk for log file storage. As data from the modbus meters is collected, it is appended to log files on this flash chip. Once a day (at the first call-out period for uploading data) the log files are rotated. This action renames each log file and compresses the old file using gzip. The net result is a smaller file for storage or modem/ethernet transfer.

Because the files are compressed, the actual size of the data on the flash chip will vary depending on the data itself. For example, if a device is reporting 25KWh, it will use fewer bytes than a log entry that has 9,999,999KWh.

We have measured a typical installation with 5 H8036 power meters and 5 A8923 IO modules, and determined the system will run for well over a hundred days with a 15 minute log cycle. Changing the number of meters, the type of log data, or the log cycle period will affect your results accordingly. Please read Technote "TN-03" at www.dataindustrial.com for more information about log file storage capacity.

When the Model 3700 storage area on the flash starts to run out of space, the following action is taken:
- When the 8 Mbyte log file storage area is 75% full, the Model 3700 will immediately compress the log files and attempt to upload the data to the BMO website or user specified site. This action will not wait until the next scheduled upload time.
- When the storage area is 95% full, the Model 3700 will immediately attempt to upload the data, and if unsuccessful, will purge the oldest (rotated) log data file.

Log files are deleted automatically if the Model 3700 has successfully uploaded the log file to a database server using the HTTP/Post protocol. If you do not configure the Model 3700 to automatically push the log files to your server, you must manually delete them. To delete log files, refer to the FTP method of downloading log files. One step detailed in the FTP section is how to delete a log file from the Model 3700.

Uploading Data to the BMO Website
After the Model 3700 has been configured and has logged some data, you will want to collect the data for analysis. There are several ways of collecting the data from the Model 3700 including the Building Manager Online service. Other methods are noted in the data collection FAQ. This section details configuring the Model 3700 for use with the BMO service.

Step 1: First, use your browser to connect to the Model 3700. Select the Modbus/Setup section from the menu on the left. In the field titled Modbus Loop Name enter a name for this Model 3700 to uniquely identify it on the BMO website. Because the BMO site can show multiple Model 3700 devices, it is important to have a descriptive name in this field.

Step 2: Select the Log File Data, Setup/Upload menu option. The following features are available:
- Model 3700 Serial Number: This is the serial number that uniquely identifies this Model 3700. This number can not be changed. When uploading data to the BMO website, this serial number is used to identify the Model 3700 to the BMO server.
- Scheduled upload time: This option allows you to control when the Model 3700 will initiate the upload process. You can select any hour of the day, and the Model 3700 will select some time at random within that hour to start the upload. The random feature allows multiple Model 3700 devices to share a single dialup account or phone line by not starting the dialout at the same time for all devices. If the Model 3700 is on a LAN connection (DSL, cable Modem, T1, etc) an upload time of Hourly may be selected.
- Upload data on alarm status change will cause the Model 3700 to initiate the upload process if any point on any modbus device enters or leaves an alarm state. This allows the Model 3700 to send data when an alarm is detected, and will upload that information to the BMO website in a timely manner. The BMO website will then send email notifications

if necessary. If this option is disabled, the BMO website may not be able to send notifications until the end of the day when the Model 3700 calls in at its specified upload time.

- Upload data on low disk alarm: This feature will cause the Model 3700 to attempt a data upload immediately if the log file storage area is more than 75% full.
- Allow remote Modbus device configuration: If enabled, users may remotely configure alarms and other Modbus device features on the BMO website. When the Model 3700 uploads data to the BMO website, it will also download any new configuration information as needed. NOTE: if configuration changes are made to the Model 3700, those changes will be uploaded to the BMO site. If configuration changes are made at both the Model 3700 and the BMO website, the most recent changes will be used.
- Target address to upload data: This is the website URL to upload data to. This should always be set to http://www.buildingmanageronline.com/upload.php unless you are configuring the Model 3700 to send data to your own internal database server.
- Password to upload data: This password is used by the BMO webserver to verify the Model 3700 device authentication before accepting the uploaded data. You should select a password other than the default, and make note of it for future reference.
- Number of times to retry: In the event of a failure (often due to dial-up problems, busy signals, etc) this option specifies the number of retries to attempt the upload again. If all retries fail, the Model 3700 will wait until the next scheduled upload time before trying again.
- Time to wait before retry: In the event of a failure, the Model 3700 can be configured to wait for a specified period of time before attempting another connection. This option specifies how long to wait before retrying.

Step 3: Contact the Badger Meter Technical Support department. Please have the Model 3700 serial number and password to upload data. Your tech support representative will confirm your BMO account and will add the Model 3700 to one of your client databases.

Step 4: Click the Upload Data Now button. Your data should be sent to the BMO webserver.

Step 5: For more detailed information about the transfer process, use the Connection Test page in the Testing/Diags menu on the Model 3700 for a full report of the data upload progress.

Retrieving Data From the Model 3700
Overview of how the system was designed to work.
Now that you have installed your Model 3700 and configured it to collect data from your meters and sensors, you will want to collect the data from your Model 3700. This document will provide an overview for collecting data from the Model 3700. Processing the data for billing reports, summaries, and other data processing are beyond the scope of this document.

Three basic ways to collect data from the Model 3700:
- HTTP download from the Model 3700 with a browser. (pull)
- FTP download from the Model 3700. (pull)
- Enertrax DL download from the Model 3700. (pull)
- HTTP Post: The Model 3700 uploads data to a database/webserver. (push)

HTTP Direct From the Model 3700
The Model 3700 has the ability to export log file data to a web browser directly from the setup web pages. To use this feature, access the Model 3700 setup menu with your web browser. Select the Log File Export page from the Log File Data menu on the left side of the page.

For each device, a separate log file will be saved. Select the device from the dropdown list provided. Specify Comma or Tab delimited data, and indicate if column headers are required. Click the download button to download the data.

The log file format is the same as is provided by FTP and by the BMO web site. Note: All time stamps are in UTC.

When importing log files into Microsoft® Excel®, be sure to specify the log data is comma separated, and use a single quote mark as the text delimiter.

FTP Direct From the Model 3700
The Model 3700 will allow inbound connections for transfer of log data files using the FTP protocol. FTP to the Model 3700 and log in using the system admin password. Files are located in /var/log/modbus.

Enertrax Download Direct From the Model 3700
Badger Meter provides a free tool called Enertrax DL that can automate the process of downloading log data from the Model 3700 to your Windows® PC hard drive. Enertrax DL can merge new log data into existing log files on your computer as well as provide configuration information about the Model 3700. Enertrax DL can also be configured to make LAN or dial-up call to one or more Model 3700. Enertrax DL can be obtained from www.dataindustrial.com.

HTTP/Post Upload to Building Manager Online
- Model 3700 sends data to the BMO website
- The BMO Website stores the data in a SQL database.
- Quick reporting from our website
- Includes remote Model 3700 configuration service.
- Includes alarm notification by email.
- Data available for download in CSV/tab delimited format upon your request.
- For pricing and to sign up for service, contact Badger Meter for more information.

HTTP/Post Upload to Your Database Server
- Model 3700 uploads data directly to your webserver or database server.
- You must supply a script to process the incoming data. Sample script for ASP and PHP are available upon request.
- Requires Webserver, CGI Scripting and, database (SQL) knowledge
- Alarm processing available by processing data on your server when data is uploaded
- Designed for integration with existing energy reporting systems.
- Contact Badger Meter technical support for further details and sample scripts.

Removing Data From the Model 3700
When using an HTTP/Post method to allow the Model 3700 to push data to a database server, the Model 3700 will automatically remove log files from its' flash memory once the Model 3700 has confirmed that the file was received by the database server.

If you are using the Model 3700 with a standalone mode, you can use FTP or Enertrax DL to delete log files from the flash memory.

With EnertraxDL, simply check the setup checkbox to delete log data after download.

For FTP, the process is essentially the same process as the manual FTP data download.

Steps for Microsoft® Windows® command prompt ftp.
Use the following commands.

```
ftp 192.168.40.50     Use the IP address
                      of your Model 3700
username: root
password: admin        The same as the admin
                       password
cd /var/log/modbus
dir                   view a list of log files.
mdel *.gz             remove the log file  to
                      free up flash space
bye
```

The mdel command will tell the FTP software to delete all files ending in .gz in the current directory. Some FTP clients will allow you to specify a command Prompt prior to using mdel that will prevent the FTP client software from asking if you are sure you wish to delete each file.

Linking to Model 3700 Device Status Pages
It may be helpful to create a shortcut or a hyperlink on another web page that will direct the browser to bring up a specific device status page in your browser. To do this, right click on the page and select properties. The URL for the page will be shown on that dialog. Simply copy/paste this URL into your link.

The Model 3700 can provide Modbus device data in XML format. This feature, coupled with browser based AJAX (Javascript) can provide a very powerful tool to allow the creation of custom web pages.

(This page intentionally left blank.)

(This page intentionally left blank.)

Due to continuous research, product improvements and enhancements, Badger Meter reserves the right to change product or system specifications without notice, except to the extent an outstanding contractual obligation exists.

Data Industrial®

Please see our website at **www.badgermeter.com**
for specific contacts.

BadgerMeter, Inc.
P.O. Box 581390, Tulsa, Oklahoma 74158
(918) 836-8411 / Fax: (918) 832-9962
www.badgermeter.com