

MicroGate™ Online Kitchen™ Gateway



E-Control Systems, Inc.

User Guide MG1-1000

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I. Introduction



- Everything you need for full NAFEM protocol compliance
- Translates and organizes your legacy equipment's data into the NAFEM Data Protocol framework
- Supports all of the MIBs defined by the NAFEM Data Protocol Group
- Built-In Web Server
- Optional Modem for installations without a network infrastructure
- Connect up to 253 equipment with one MicroGate™
- Firmware Upgradeable in the field as protocol standards change

E-Control Systems MicroGate™ is one of the most cost-effective and versatile gateways for adding the NAFEM (North America Association of Food Equipment Manufactures) Data Protocol and Ethernet connectivity into any equipment. Whether you're an equipment manufacturer, systems integrator, or IT manager, the cost, functionality, and flexibility of the MicroGate™ makes it the ideal product for any Online Kitchen™ application.

The MicroGate™ incorporates all essential networking functions including a full-featured TCP/IP stack, 10Base-T Ethernet connection, real-time operating system, embedded Web Server, optional modem, and battery-backed memory.

Feature-Rich Cost-Effective Solution

The MicroGate™ incorporates the latest in Flash and SDRAM technology to give the best feature/price/performance ratio on the market. Using the latest in memory technologies allows up to 253 pieces of equipment to be connected to one MicroGate, further reducing the cost of the overall system. Complex menu recipe changes, firmware updates, or set point changes can be done without disrupting any of the other services running on the MicroGate™.

Flexibility

As the demand for updates and new features arise, the MicroGate™ can be updated from any location on the Ethernet network. This eliminates the need to call for service or replace the hardware itself. All updates and features are added using a standard Web Browser, like Microsoft® Internet Explorer, or through bulk transfer facilities specified in the NAFEM data protocol.

Total Online Kitchen™ Solution Package

Coupled with E-Control Systems' enterprise Raptor Web Software™, equipment manufacturers, systems integrators, and IT professionals have a total Online Kitchen™ system to help manage a fully integrated restaurant. Never before has there been such a synergy between all aspects of the restaurant.

II. Features and Specifications

Architecture

CPU: Advanced High Performance Motorola 32-bit embedded PowerPC™ Network Processor with 66 MIPS at 50 MHz
Memory: 16 Mbytes of SDRAM (expandable to 64 Mbytes)
2 Mbytes of Flash (expandable to 16 Mbytes)
512 Kbytes of battery-backed SRAM (optional)
Real time clock with battery backup

Serial Interface Port #1 and Port #2

Interface Type: CMOS, RS232, or RS485
Data Rates: 300 to 115.2 kbps
Characters: 7 or 8 bits
Stop Bits: 1 or 2
Control Signals (for CMOS and RS232 only): RTS, CTS, DTR, DSR, and DCD
Protocols: MODBUS™ RTU, MODBUS™ ASCII, BACNET®, or any custom proprietary protocol

Network Interface

Interface: 10Base-T Ethernet (IEEE 802.3)
Connector: RJ45
Protocols: TCP, UDP, IP, DHCP, BOOTP, ICMP, IGMP, ARP, PPP, SNMP, SMTP, FTP (client and server), TFTP (client and server), HTTP, and TELNET

NAFEM Data Protocol MIB Compatibility

Administration
Asset Management
Bulk Transfer
Clock Calendar
Inventory Management
Maintenance
Monitor (with history)
Notify
Security
Traps
Utility

Power

Input Voltage: 5VDC +/-5%
Without Modem:
Input Current (25 MHz Clock): 330mA max
Input Current (50 MHz Clock): 450mA max

With Modem:

Input Current (25 MHz Clock): 490mA max

Input Current (50 MHz Clock): 610mA max

Environmental

Operating: 0 C to 70 C (32 F to 158 F)

Storage: -40 C to 85 C (-40 F to 185 F)

Humidity: Maximum 95% Relative Humidity, non-condensing

Altitude: 10,000 ft (3048 m) max

Physical Specifications

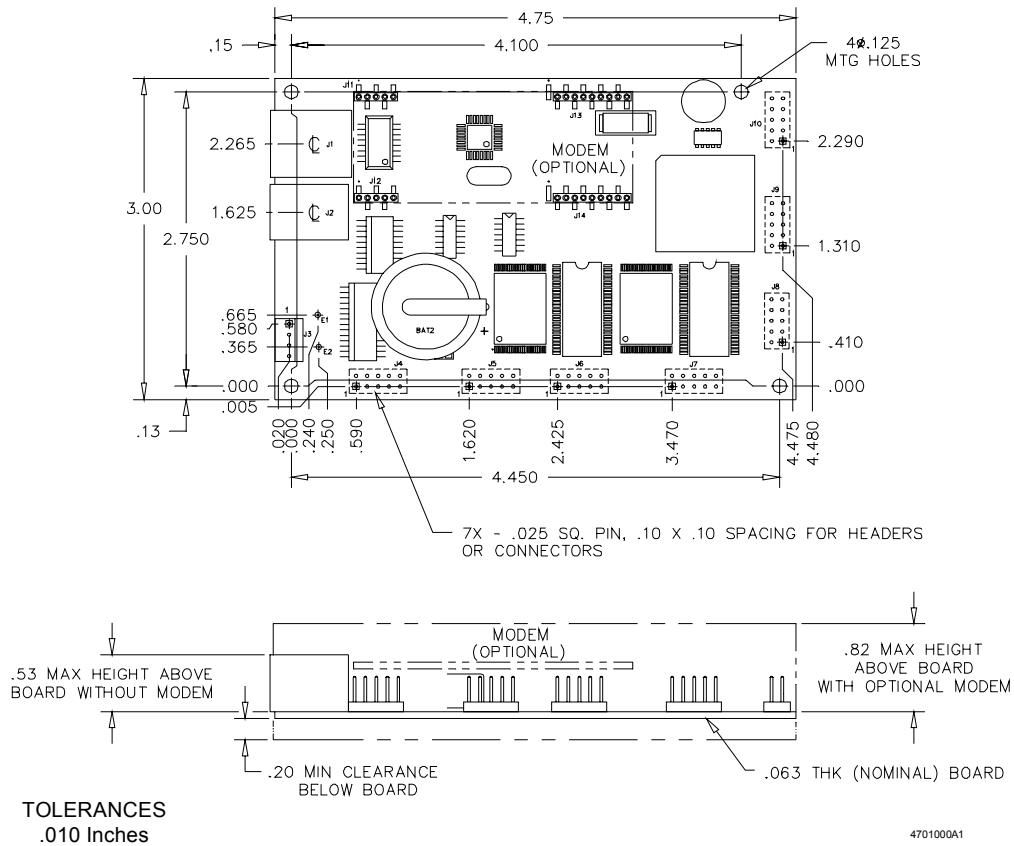


Figure 1

Without Modem:

Dimensions: 4.75x3.00x0.80 inches (120.7x76.2x20.4 mm)

Weight: 3.1 oz (88 grams)

With Modem:

Dimensions: 4.75x3.00x1.09 inches (120.7x76.2x27.7 mm)

Weight: 3.3 oz (94 grams)

Warranty

1-year limited warranty

III. Hardware Description

The MicroGate™ is meant to be connected between a local network/internet (using the LAN Port) and the equipment(s) (using any of the serial interfaces). The MicroGate™ also includes 4 LED indicators to simplify installation and network troubleshooting. The following figure shows the components/connectors of the gateway:

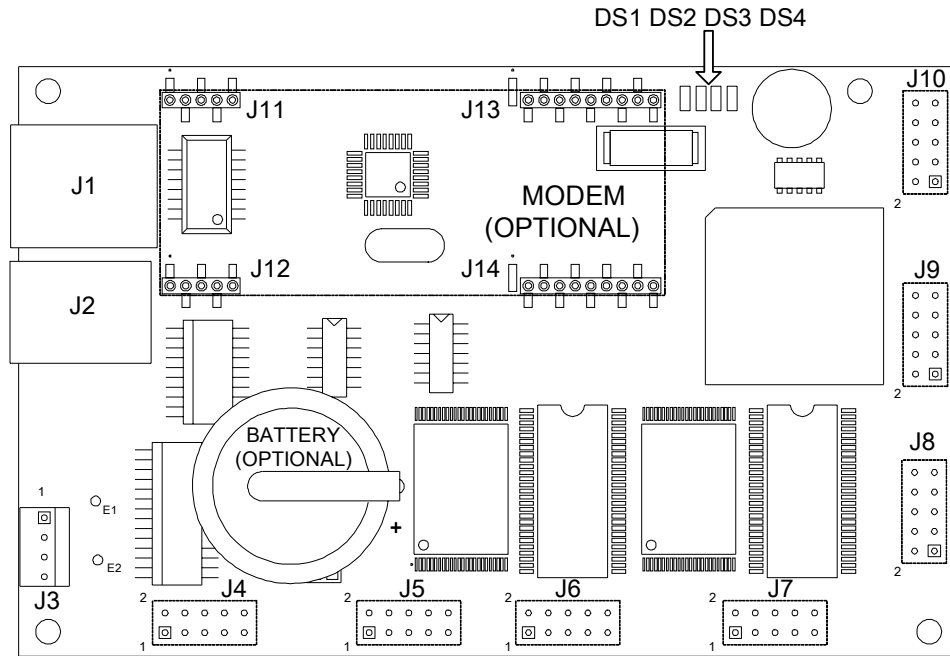


Figure 2

Table 1 - Component List		
Designator	Item	Description
J1	LAN/Ethernet Port	10 MBit Ethernet Port (RJ45). Connects gateway to the Internet, LAN, or WAN.
J2	Modem Port (Optional)	Modem Port (RJ11). Connects gateway to the Internet or an external PC using a telephone line (Optional)
J3	Power Connector	Supplies +5V power to board
J4	RS232 Serial Ports #1	RS232 Levels for Serial Port #1
J5	3.3V TTL Serial Port #1	3.3V TTL Levels for Serial Port #1
J6	3.3V TTL Serial Port #2	3.3V TTL Levels for Serial Port #2
J7	RS485 Serial Port #1 and #2	RS485 Levels for Serial Port #1 and #2
J8	Do Not Connect	Do not connect. Used for future expansion
J9	RS232 Serial Ports #2	RS232 Levels for Serial Port #2
J10	Do Not Connect	Do not connect. Used for factory programming
J11-J14	Modem	Used to connect optional Modem Module
DS1-DS4	Diagnostic LEDs	Used for installation and troubleshooting.

LED Indicators

Table 2 - LED Indicators			
Designator	Name	Condition	Status
DS1	Link (green)	On	The Ethernet Port has established a valid network connection
		Off	Network connection does not exist, or bad cable.
DS2	Activity (green)	Flashing	The Ethernet Port is transmitting or receiving traffic
DS3	Heartbeat (green)	Flashing (1 sec rate)	Gateway is alive and running
DS4	Power (green)	On	The MicroGate is receiving power
		Off	The MicroGate is not receiving power

Power Connectors Pin Assignment

Table 3 - J3 Power Connector		
Pin Number	Name	Description
1	GND	Signal/Power Ground
2	+5V	+5V power (must be regulated +/-5%)
3	+5V	+5V power (must be regulated +/-5%)
4	GND	Signal/Power Ground

Table 4 - Flying Leads Power Connector (Special Order)		
Designator	Name	Description
E1	GND	Signal/Power Ground
E2	+5V	+5V power (must be regulated +/-5%)

RS232 Serial Port Pin Assignment

Table 5 - J4 (RS232 Channel #1) or J9 (Channel #2)			
Pin Number	Name	Description	Type
1	CD	Carrier Detect	Input
2	DSR	Data Set Ready	Input
3	RX	Receive	Input
4	RTS	Request To Send	Output
5	TX	Transmit	Output
6	CTS	Clear To Send	Input
7	DTR	Data Terminal Ready	Output
8	RI	Ring Indicator	Input
9	Ground	Ground	Power
10	+5V	Supply voltage, Must be regulated if power to board is being supplied from this pin (Option must be specified when ordering)	Input

RS485 Serial Port Pin Assignment

Table 6 - J7 RS485 Channel #1			
Pin Number	Name	Description	Type
1	RS485_RX+	Non-Inverting Receiver Input (Full Duplex Mode)	Input
3	RS485_RX-	Inverting Receiver Input (Full Duplex Mode)	Input
5	RS485_GND	RS485 Ground (Not signal Ground!!!)	Power
7	RS485_TX+	Non-Inverting Driver Output (Full Duplex mode)	Output
	RS485_TX/RX+	Non-Inverting Receiver Input / Driver Output (Half Duplex mode)	Input/Output
9	RS485_TX-	Inverting Driver Output (Full Duplex mode)	Output
	RS485_TX/RX-	Inverting Receiver Input / Driver Output (Half Duplex mode)	Input/Output

Table 7 - J7 RS485 Channel #2			
Pin Number	Name	Description	Type
2	RS485_RX+	Non-Inverting Receiver Input (Full Duplex Mode)	Input
4	RS485_RX-	Inverting Receiver Input (Full Duplex Mode)	Input
6	RS485_GND	RS485 Ground (Not signal Ground!!!)	Power
8	RS485_TX+	Non-Inverting Driver Output (Full Duplex mode)	Output
	RS485_TX/RX+	Non-Inverting Receiver Input / Driver Output (Half Duplex mode)	Input/Output
10	RS485_TX-	Inverting Driver Output (Full Duplex mode)	Output
	RS485_TX/RX-	Inverting Receiver Input / Driver Output (Half Duplex mode)	Input/Output

Ethernet (RJ45) Cable Specifications and Pin Assignments

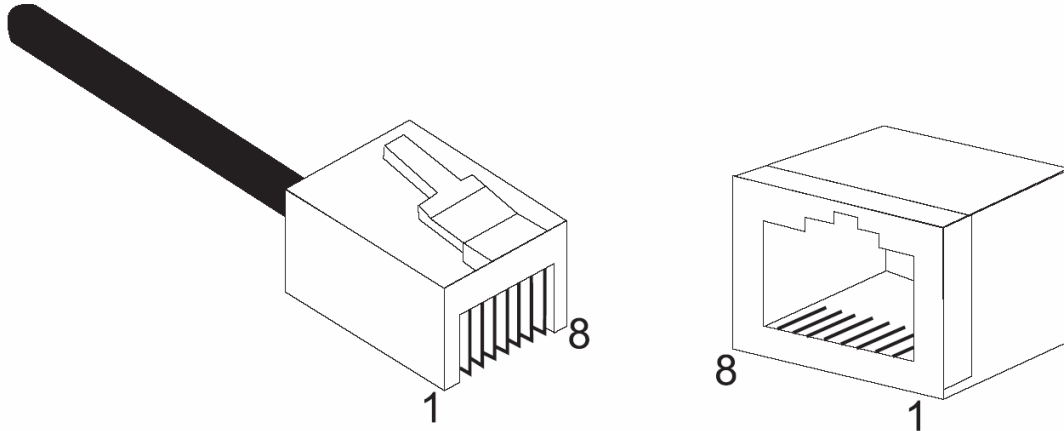


Figure 3

Table 8 - Cable Specification			
Cable	Type	Max. Length	Connector
10BASE-T	Cat. 3, 4, 5 100-ohm UTP	100 m (328 ft)	RJ45

Table 9 - J1 Ethernet		
Pin Number	MDI Signal Name	MDI-X Signal Name
1	Transmit Data (TD+)	Receive Data (RD+)
2	Transmit Data (TD-)	Receive Data (RD-)
3	Receive Data (RD+)	Transmit Data (TD+)
6	Receive Data (RD-)	Transmit Data (TD-)

Pins 4, 5, 7, and 8 are not connected.

Table 10 Straight-Through RJ-45 Pin Assignments	
End 1	End 2
1 (TD+)	1 (TD+)
2 (TD-)	2 (TD-)
3 (RD+)	3 (RD+)
6 (RD-)	6 (RD-)

Table 11 Crossover RJ-45 Pin Assignments	
End 1	End 2
1 (TD+)	3 (RD+)
2 (TD-)	6 (RD-)
3 (RD+)	1 (TD+)
6 (RD-)	2 (TD-)

IV. Installation and Configuration

System Requirements

You must meet the following requirements to install and configure the MicroGate™:

- Static IP address, Subnet Mask, and Gateway Address to assign the MicroGate™
- A computer equipped with a 10 Mbps, 100 Mbps, or 10/100 Mbps Fast Ethernet Card, or USB-to-Ethernet converter. Computer must have TCP/IP protocols installed and have a fixed (static) or dynamic IP Address assigned to it.
- MicroGate Discovery Utility CD (might be bundled with Raptor Web Software™ CD)
- Network Cable connecting MicroGate™ directly to the computer (use a Crossover type cable, see **Table 11**), or network cable connecting to the same hub/switch that the computer is connected to (use Straight-Through type cable, see **Table 10**).
- +5VDC Power Supply with mating connector
- Serial cable connecting your device(s) to one of the serial ports (see **Table 5**, **Table 6**, and **Table 7**)

Connect the System

The MicroGate™ can be placed at any convenient location in the kitchen or office. No special cooling requirements are needed, but you should keep the MicroGate™ away from any heating device, dusty or wet environments. If the MicroGate™ needs to operate in a dusty or wet environment, it should be placed in a NEMA box. Make sure to disconnect the power, remove the power cord from the outlet, and keep your hands dry when handling the MicroGate™.

Basic Installation Procedure

1. Connect an Ethernet Cable from the MicroGate™ to one of the following:
 - a. Ethernet Port on computer using a Crossover type cable (see **Table 11**)
 - b. Ethernet Port on hub, switch, or router using a Straight-Through type cable (see **Table 10**)
2. Connect a serial cable from your device(s) to one of the serial ports on the MicroGate (see **Table 5**, **Table 6**, and **Table 7** for pin assignments)
3. Connect the power cable to the MicroGate (see **Table 3** or **Table 4**)
4. Plug the other side of the power cable to a +5VDC source, or to a wall outlet if you are using a cable with power supply
5. Verify that DS1(Link) and DS4(Power) LEDs are on (see **Table 2**)
6. After approximately 30 seconds, verify that DS3 (Heartbeat) LED is flashing

Basic Network Configuration Procedure

1. Start the Discovery Utility by selecting **Start > Programs > Raptor Web Software > ECSDiscovery** – This utility might reside in a different location depending on how it was installed.

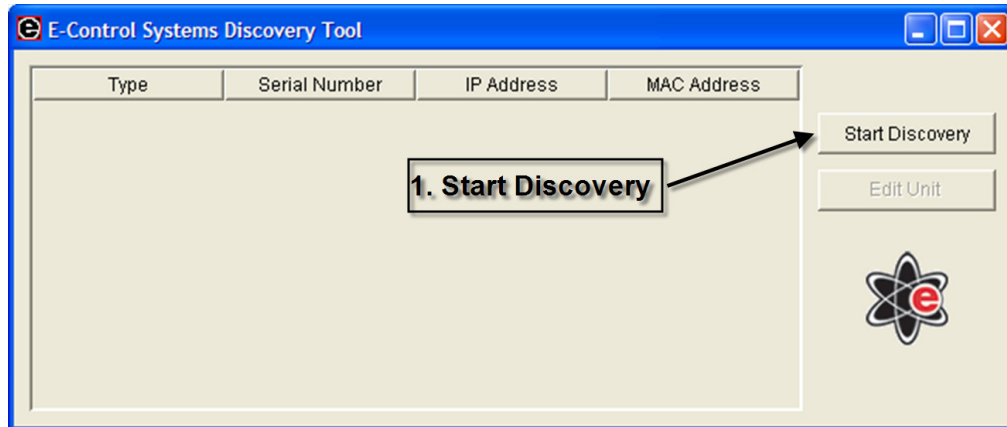


Figure 4

2. Click on Start Discovery (see **Figure 4**, note #1) to start looking for E-Control Systems' units on your network. Note: This could take up to 30 seconds to complete

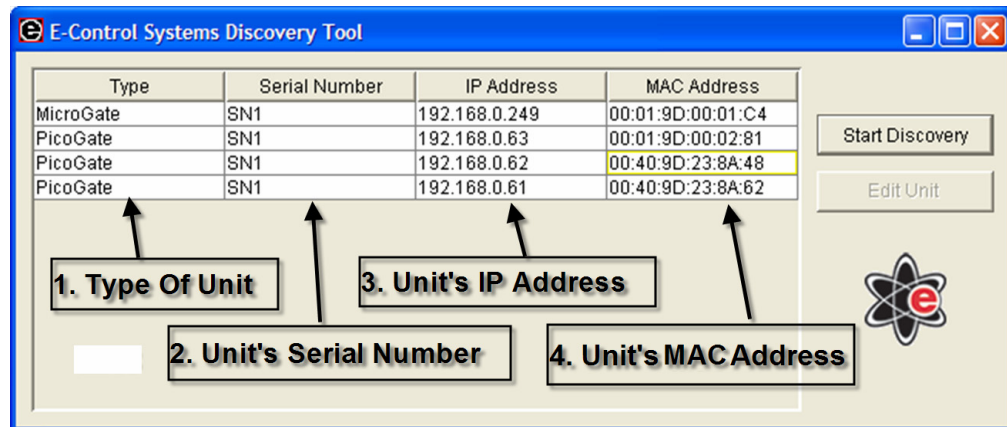


Figure 5

3. A list of all of the ECS units on the network is listed sorted by their MAC Address (see **Figure 5**, note #4). Find the MAC address of the MicroGate™ that you want to configure (the MAC address is shown on a white label on the underside of the MicroGate™). Highlight the row in the table that corresponds to the correct MAC Address/Unit you want to re-configure.

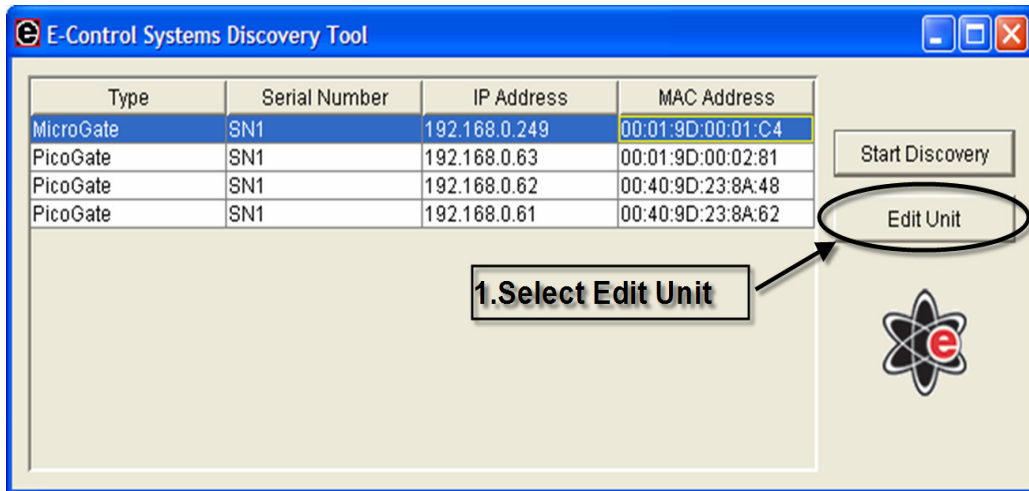


Figure 6

- Once the row corresponding to the unit to be configured is highlighted, click on **Edit Unit** (see Figure 6, note #1) to bring up the Unit's Properties

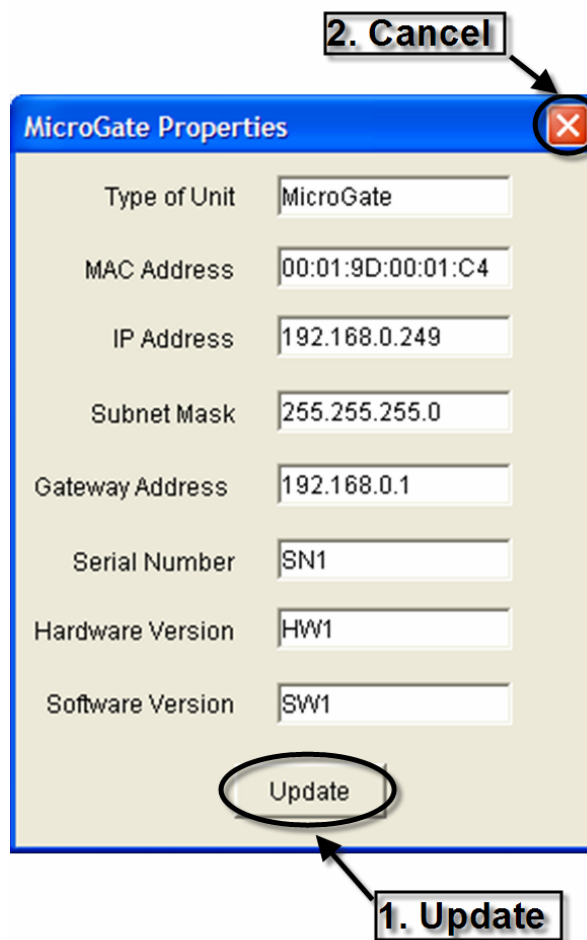


Figure 7

5. Change the IP Address, Subnet Mask, and Gateway Address as needed and then click on **Update** (see **Figure 7**, note #1) to send configuration to the unit. To quit without updating the unit, click on the **X** (see **Figure 7**, note #2)
6. Writing the configuration and restarting the unit can take as long as 2 minutes. In that time you will see DS3 stop flashing. When it starts flashing again you are done configuring the MicroGate™. Note: You can also verify that the MicroGate's configuration changed by clicking on **Start Discovery** (see **Figure 4**, note #1), and verifying that the corresponding value in the IP address column of the MicroGate that was configured changed to the new value.

Congratulations! You have successfully configured the MicroGate™. For advanced configuration information, please see the Raptor Web Software™ Users Manual.

V. Part Number Selection

See Figure 8 for configuration options and suggestions. For custom configurations please consult E-Control Systems.

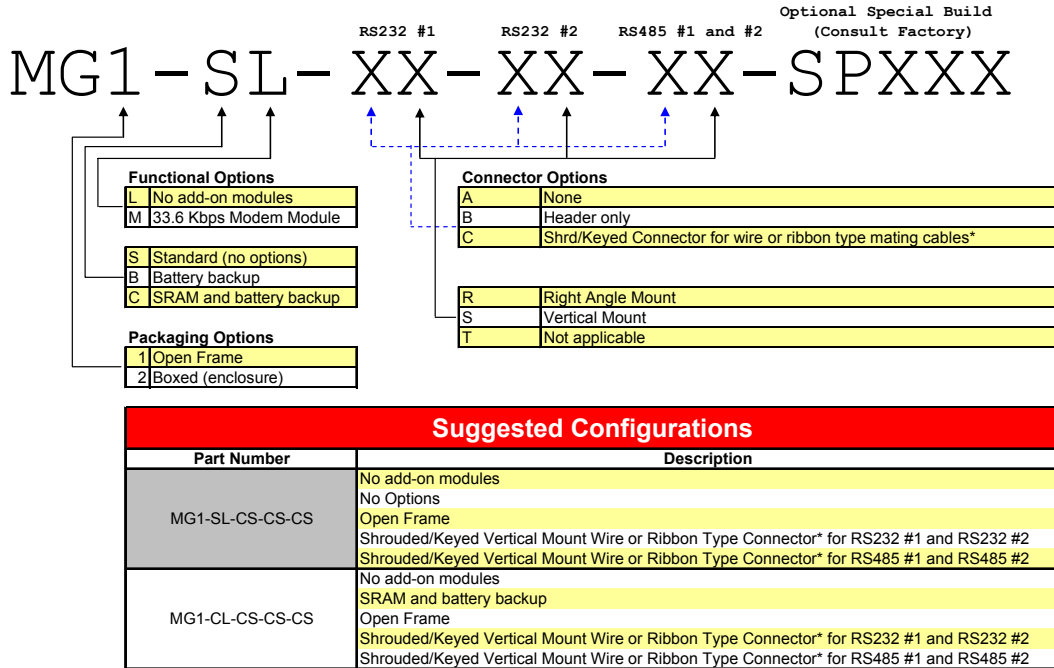


Figure 8

VI. Limited Warranties

E-Control Systems' Limited Warranty Statement

Limited Warranty Statement: E-Control Systems ("ECS") warrants its products to be free from defects in workmanship and materials, under normal use and service, for the applicable warranty term. All ECS products carry a standard 1 year limited warranty from the date of purchase from ECS or its Authorized Reseller/Distributors. ECS may, at its own discretion, repair or replace any product not operating as warranted with a similar or functionally equivalent product, during the applicable warranty term. ECS will endeavor to repair or replace any product returned under warranty within 30 days of receipt of the product. As new technologies emerge, older technologies become obsolete and ECS will, at its discretion, replace an older product in its product line with one that incorporates these newer technologies

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