INTERMATIC®

ET9500 BEMS Interface Box
Configuration Guide

APPLICABILITY & EFFECTIVITY

Explains how to install and configure ET9500 BEMS Interface Box.
The instructions are effective for the above as of August, 2015

Thank you for purchasing the ET9500.

Technical Support Contact Information:

Intermatic Inc.
7777 Winn Rd
Spring Grove, IL 60081

Intermatic Service:
815-675-7000

Email: CustomerSupport@intermatic.com

Website: www.intermatic.com

⚠ WARNING ***Risk of Fire or Electric Shock***

- Disconnect power at the circuit breaker(s) or disconnect switch(es) before installing or servicing.
- Installation and/or wiring must be in accordance with national and local electrical code requirements.

Contents

1

1 BACnet® and Metasys® are registered in the US Patent and Trademark Office

1 INTRODUCTION

1.1 ET9500

ET9500 is an external, high performance multi-protocol interface box that is preconfigured to automatically communicate between Intermatic ET90000 Series Time Switches (hereafter called "device") connected to the ET9500 and automatically configures them for BACnet®1MS/TP, BACnet®/IP, Metasys®2N2 by JCI, Modbus TCP/IP or Modbus RTU.

It is not necessary to download any configuration files to support the required applications. The ET9500 is pre-loaded with tested Profiles/Configurations for the supported devices.
NOTE: Network connection required.

Figure 1: System Configuration

[1]BACnet is a registered trademark of ASHRAE
[2]Metasys is a registered trademark of Johnson Controls Inc.

1.2 DEVICES SUPPORTED

- The ET9500 supports 1,2,4,8,12 and 16 circuit ET90000's.
- The total number of devices attached to one ET9500 cannot be more than 40 devices.
- See **Figure 2** for Profile Name that correlates to the ET90000 installed.

Intermatic Part Number	# of Circuits	Profile Name
ET90115	1	…ET90115 01 Circuit
ET90215	2	…ET90215 02 Circuits
ET90415	4	…ET90415 04 Circuits
ET90815	8	…ET90815 08 Circuits
ET91215	12	…ET91215 12 Circuits
ET91615	16	…ET91615 16 Circuits

Figure 2: Devices Supported

2 COMMUNICATION PROTOCOL SETUP

2.1 Collecting ET90000's IP Addresses

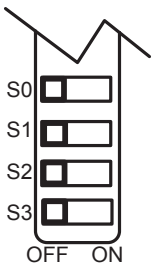
- Write down the IP Address for each of the ET90000 devices attached to the ET9500. These addresses will be required for configuration in a later step below.
- Note the following:
  - o All of the ET90000 devices connected to ET9500 must be on the same IP subnet.
  - o The PC that runs the Web Configurator must be on the same IP subnet. This is the Web Server used to configure the ET9500.

2.2 Selecting the Desired Field Protocol

- ET9500 uses the "S" bank of DIP switches (S0 – S3) to select the Field Protocol.
- The default configuration is BACnet/IP (S0-S3 are off).
- If you have a different Protocol remove the white label (A0-7, B0-3, S0-3) to access DIP switches.

NOTE: When setting DIP Switches, please ensure that power to the board is OFF.

- See **Figure 3** for the switch settings to select BACnet MS/TP, BACnet/IP, Modbus TCP/IP, Modbus RTU or Metasys N2.
- Set the DIP switches to the positions that match the Protocol required.



S0 - S3 DIP Switches

S Bank DIP Switch Location

	S Bank DIP Switches			
Field Protocol	**S0**	**S1**	**S2**	**S3**
BACnet/IP	Off	Off	Off	Off
BACnet MS/TP	On	Off	Off	Off
Modbus TCP/IP	Off	On	Off	Off
Modbus RTU	On	On	Off	Off
Metasys N2	Off	Off	On	Off

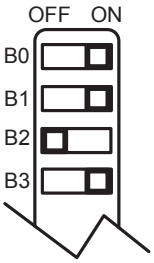
Figure 3: Switch Configuration for Field Protocol

2.3 Setting the Baud Rate (ONLY USED for BACnet MS/TP and Modbus RTU)

- ET9500 uses the "B" bank of DIP switches (B0 – B3) to set the baud rate of the ET9500 to match the baud rate required by the BEMS for BACnet MS/TP or Modbus RTU.
- The default configuration is 38400 baud (B0,B1,B3 on and B2 off).
- If you have a different baud rate remove the white label (A0-7, B0-3, S0-3) to access DIP switches.

NOTE: When setting DIP Switches, please ensure that power to the board is OFF.

- See **Figure 4** for the switch settings to select 9600, 19200, 38400, 57600, 76800.
- Set the DIP switches to the positions that match the baud rate required.



B0 - B3 DIP Switches

B Bank DIP Switch Location

Baud	B0	B1	B2	B3
9600	On	On	On	Off
19200	Off	Off	Off	On
38400	On	On	Off	On
57600	Off	Off	On	On
76800	On	Off	On	On

Figure 4: Switch Configuration for Baud Rate

2.4 Setting the MAC Address (ONLY USED for BACnet MS/TP)

- ET9500 uses the "A" bank of DIP switches (A0 – A7) to assign the MAC Address for the ET9500.
- The default configuration is Address 3 (A0, A1 on and A2-7 off).
- If you need a different address remove the white label (A0-7, B0-3, S0-3) to access DIP switches.

NOTE: When setting DIP Switches, please ensure that power to the board is OFF.

- Note the following:
  - Only 1 MAC address is set for ET9500 regardless of how many devices are connected to ET9500.
  - Set the MAC address of the ET9500 to a value between 1 to 127 (Master MAC address); this allows the BEMS Front End to find ET9500 via BACnet auto discovery.
  - Note: Never set a BACnet MS/TP MAC Address of the ET9500 to a value from 128 to 255. Addresses from 128 to 255 are Slave Addresses and can not be discovered by BEMS Front Ends that support Auto-Discovery of BACnet MS/TP devices. This restriction does not apply to the Modbus RTU or Metasys N2.
- See **Figure 5** for the switch settings to select Address. Please refer to Appendix C.1 for the complete range of MAC Addresses and DIP switch settings.

A0 - A7 DIP Switches

A Bank DIP Switch Location

Address	A0	A1	A2	A3	A4	A5	A6	A7
1	On	Off	Off	Off	Off	Off	Off	Off
2	Off	On	Off	Off	Off	Off	Off	Off
3	On	On	Off	Off	Off	Off	Off	Off
4	Off	Off	On	Off	Off	Off	Off	Off
5	On	Off	On	Off	Off	Off	Off	Off
6	Off	On	On	Off	Off	Off	Off	Off
..								

Figure 5: Switch Configuration for MAC Address

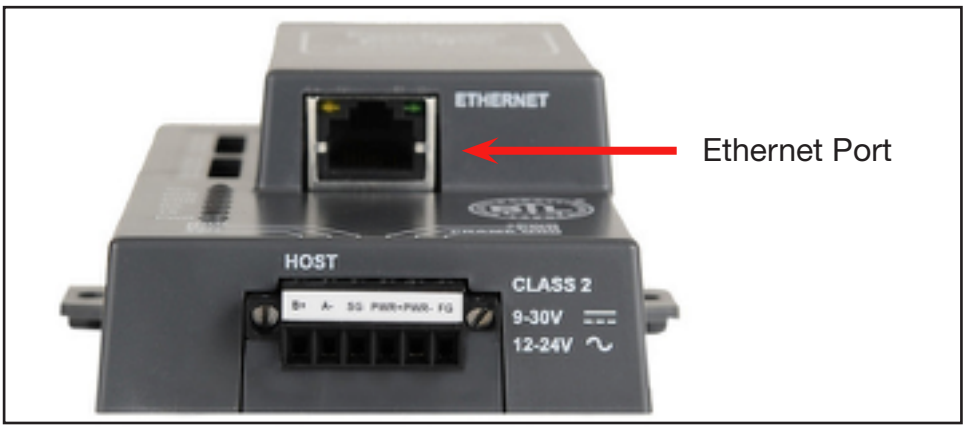
3 ET9500 NETWORK WIRE CONNECTIONS

3.1 ET9500 Ethernet Connection to Network (For ET90000 and BEMS that uses Ethernet)

- Connect the ET9500 using a standard CAT5 Ethernet cable via a hub, switch or router to the connector on the bottom of ET9500 (see **Figure 6**).

NOTE:

- The ET90000's MUST be installed and communicating on an Ethernet network.
- **All connections need to be on the same subnet. (Section 4.1 & 4.3)**



(Bottom View) **Figure 6: Ethernet Connections**

3.2 ET9500 RS485 Connection to Network (For BEMS that uses RS485)

- Connect the ET9500 to the RS-485 network wires at the 3-pin RS-485 (Field) connector on the top of ET9500 (see **Figure 7**).
  - o Connect RS-485+ and RS-485 – to Field connector.
  - o The RS-485 GND (Pin 3) is not typically connected.

BMS RS-485 Wiring	ProtoNode Pin #	Pin Assignment
+	Pin 1	RS-485 +
-	Pin 2	RS-485 -
GND	Pin 3	RS-485 GND

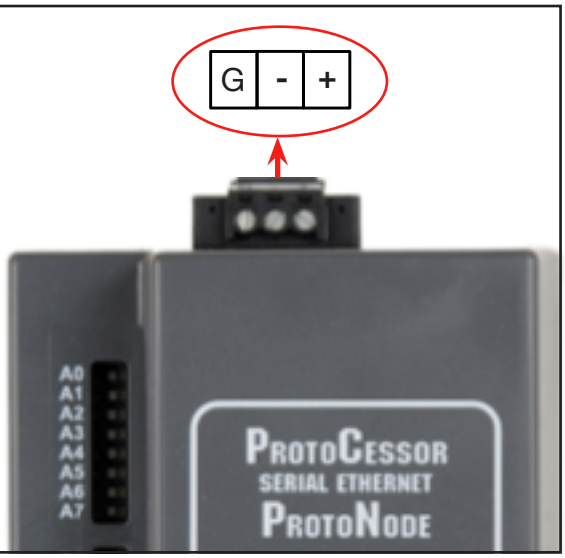


Figure 7: Connection from ET9500 to RS-485 Field Network

- If the ET9500 is the last device, then the End-Of-Line Termination Switch needs to be enabled (see **Figure 8**).
    - o Remove housing cover
        - Pry top left or top right side outward to release cover latches.
    - o To enable the EOL Termination, turn the EOL switch ON (switch position = left side).
    - o Install housing cover.

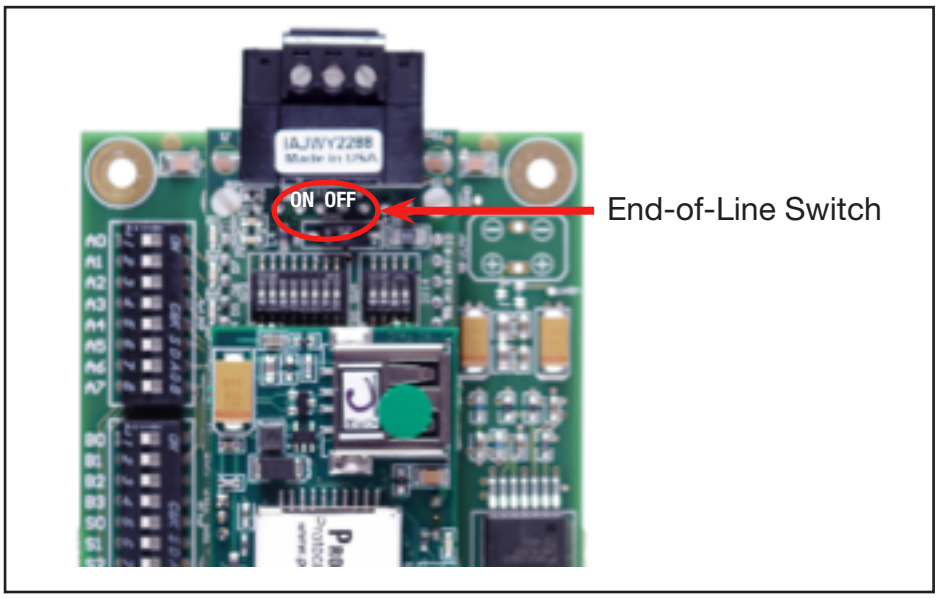
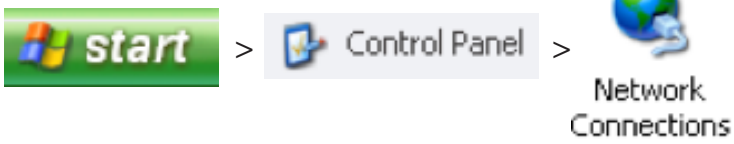


Figure 8: RS-485 EOL Switch

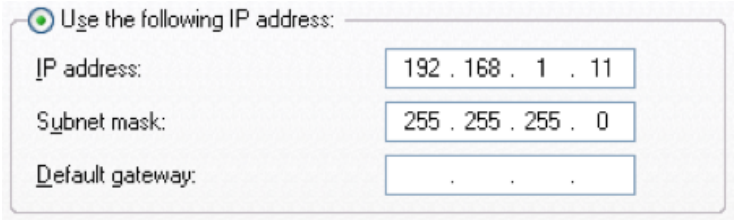
4 SETTING UP NETWORK SETTINGS

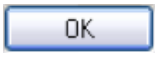
4.1 Setting PC Network IP for Windows XP

- Connect a standard Cat 5 Ethernet cable (Straight through or Cross-Over) between the PC and ET9500.
- The Default IP Address of ET9500 is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and ET9500 are on different IP Networks, assign a static IP Address to the PC on the 192.168.1.xxx network. ***NOTE:*** xxx cannot equal 24.
- Go to 

- Right-click on Local Area Connection > Properties
- Highlight 

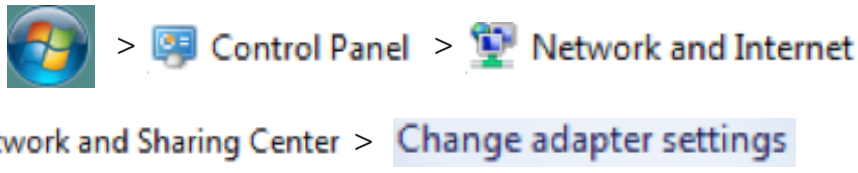
- Select: Use the following IP address



- Click 

twice

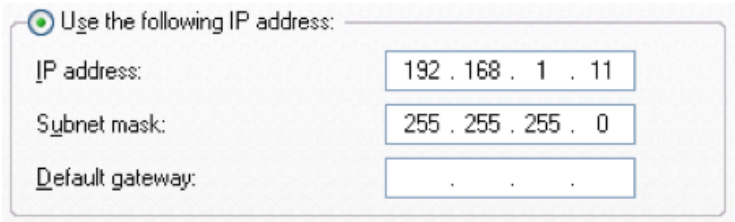
4.2 Setting PC Network IP for Windows 7

- Go to 

- Right-click on Local Area Connection > Properties

  Highlight 

- For Windows XP and Windows 7, select: Use following IP address



- Click 

twice

4.3 Setting IP Address for Field Network for BACnet/IP and Modbus TCP/IP

- Open a PC web browser, enter the default IP address of the ET9500 192.168.1.24 into the URL field to connect to the ET9500.
- To set IP Address for Field Network select the “Network Settings” Tab from the toolbar (**Figure 9**).

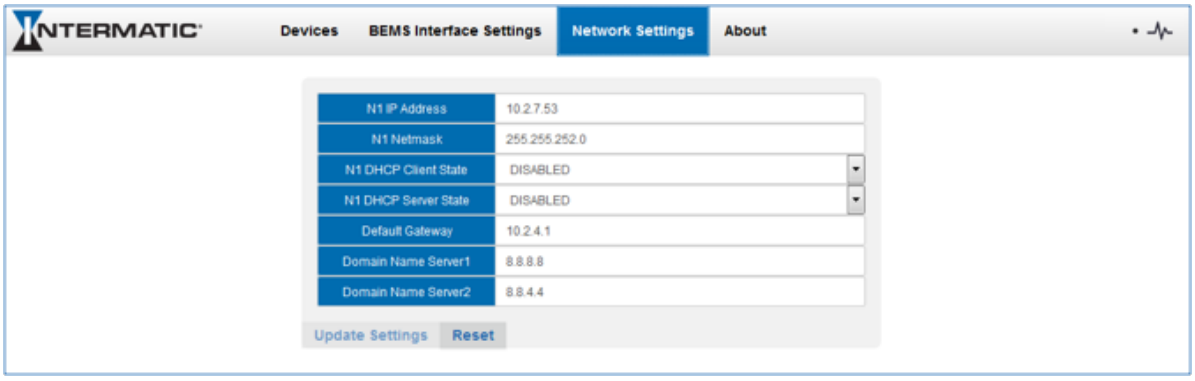


Figure 9: Changing IP Adress

- Modify the IP address (N1 IP Address field) of the ET9500 Ethernet port.
- If necessary, change the Netmask (N1 Netmask field).
- Type in a new Subnet Mask
- If necessary, change the IP Gateway (Default Gateway field)
- Type in a new IP Gateway

  Note: If the ET9500 is connected to a router, the IP Gateway of the ET9500 should be set to the IP address of the router that it is connected to.
- Once new IP Address has been entered, click on the newly highlighted button “Update Settings” (Figure 19).
- Reset ET9500
- Remove Power before Unplugging the Ethernet cable from PC and connecting it to the network hub or router
- **Record the IP address assigned to the ET9500 for future reference.**

4.4 Setting up the Device Instance using the Web Configurator

- After setting your PC to be on the same subnet as the ET9500 (Section 4.1), open a web browser on your PC and enter the IP address of the ET9500; the default address is 192.168.1.24.

4.4.1 Setting the Device Instance for BACnet/IP Network

- The BACnet Device Instances will be calculated by adding the Node_Offset (default value is 90,000) to the unique device's Node ID (See Section 5.2).
- The Node_Offset is found in the Web Configurator.
- The BACnet Device Instance can range from 1 to 4,194,303.
- **To assign specific Device Instance values, change the Node_Offset value. (Section 5)**

Example:

- Node_Offset value (default) = 90,000
- Device 1 has a unique Node-ID of 1
- Device 2 has a unique Node-ID of 22
- Device 3 has a unique Node-ID of 33
- **Given that: Device Instance = Node_Offset + unique Node_ID**
- Device Instance, Device 1 = 50,000 + 1 = 90,001
- Device Instance, Device 2 = 50,000 + 22 = 90,022
- Device Instance, Device 3 = 50,000 + 33 = 90,033

4.4.2 Setting the Device Instance for BACnet MS/TP Network

- The BACnet Device Instances will be calculated by adding the Node_Offset (default value is 90,000) to the unique device's Node ID (See Section 5.2).
- The Node_Offset is found in the Web Configurator.
- The BACnet Device Instance can range from 1 to 4,194,303.
- **To assign specific Device Instance values, change the Node_Offset value. (Section 5)**

Example:

- Node_Offset value (default) = 90,000
- Device 1 has a unique Node-ID of 1
- Device 2 has a unique Node-ID of 22
- Device 3 has a unique Node-ID of 33
- **Given that: Device Instance = Node_Offset + unique Node_ID**
- Device Instance, Device 1 = 50,000 + 1 = 90,001
- Device Instance, Device 2 = 50,000 + 22 = 90,022
- Device Instance, Device 3 = 50,000 + 33 = 90,033

5 WEB CONFIGURATOR

5.1 Start WEB Configurator Application

- Type the IP address of the ET9500 into your web browser to open the WEB Configurator Application.
- Once entered, screen below will be displayed.

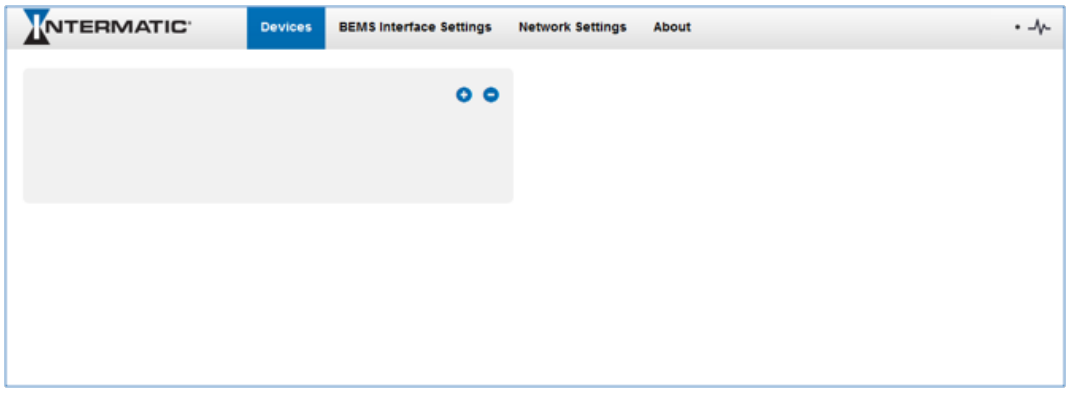


Figure 10: Changing IP Adress

5.2 Adding Profiles for Devices Connected to ET9500

- Each ET90000 connected to the ET9500 must have a device profile created. To add a profile select the 'Device' Tab from the toolbar.
- The Active Profiles section lists the currently active device profiles, including previous device additions. This list will be empty for new installations or after clearing all.
- To add an active profile to support a device, click the "+" button under Devices Tab.

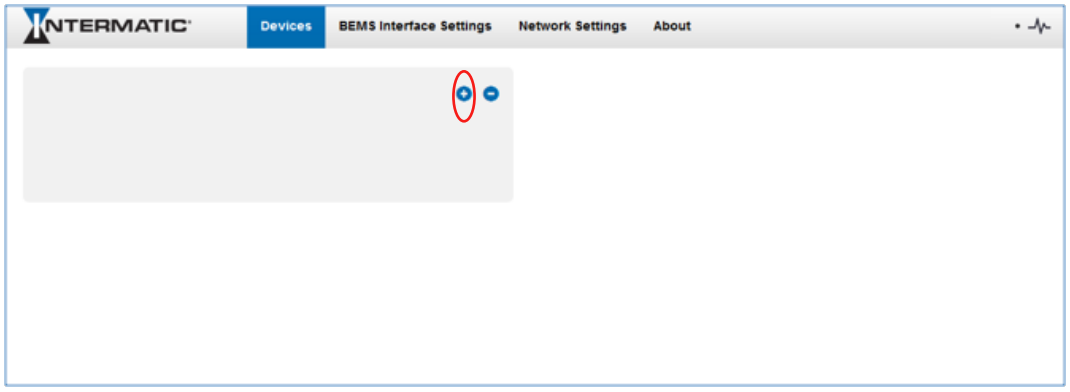


Figure 11: Changing IP Adress

- Type in a name for the device being added in the Device Name field. Shown in **Figure 12.**

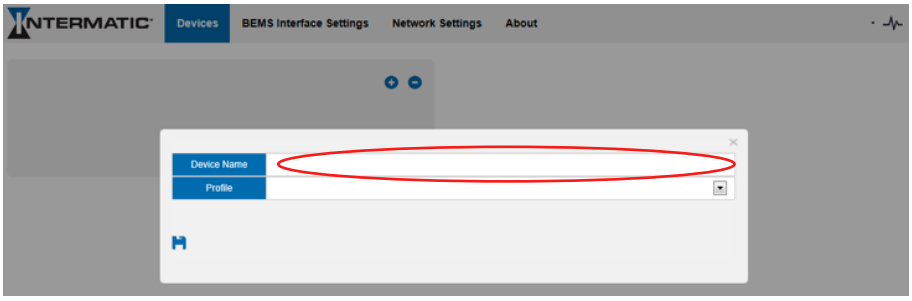


Figure 12: Naming a Device

- Once device name has been entered, click the down arrow to select the Profile of device connected. Shown in **Figure 13**.
- This will present a drop-down box underneath the Current Profile column that lists all the available profiles.
  - o Profiles for supported devices will be offered in the drop-down box only for the Field protocol option selected with the S bank of DIP switches in **Section 2.2**.

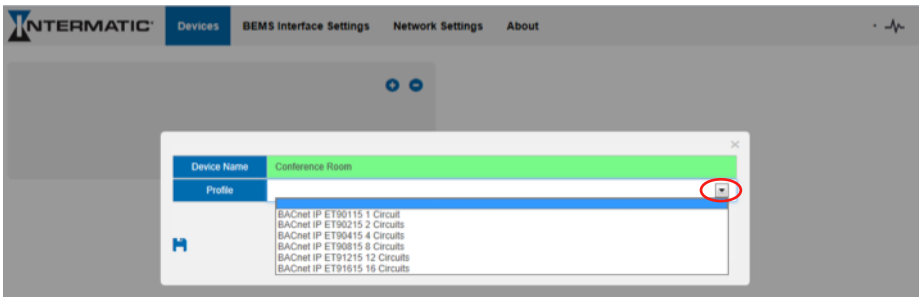


Figure 13: Selecting Profile of Device

- Specify the IP Address of the ET90000 device and unique Field Protocol Node-ID for BACnet, Modbus and Metasys N2.
- The value of the device's unique Node-ID is from 1 to 255.
- Do not re-use any ET9500 MAC adresses assigned with the "A" bank of DIP switches.

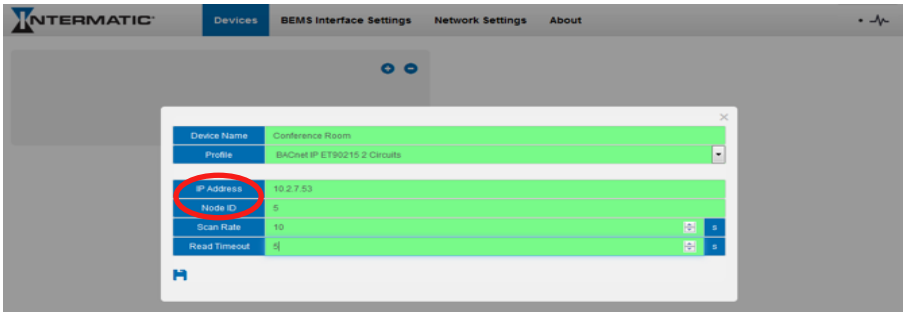


Figure 14: Specifying IP Address and Node-ID

- Enter the Scan Rate and Read Timeout.
- The Scan Rate is the interval at which the ET90000 device is scanned. Minimum value is 2 seconds, maximum is 20 seconds; the default value is 10 seconds.
- Read Timeout is the time before an error is reported when no response is received. Minimum value is 1 second, maximum is 10 seconds; the default value is 5 seconds.

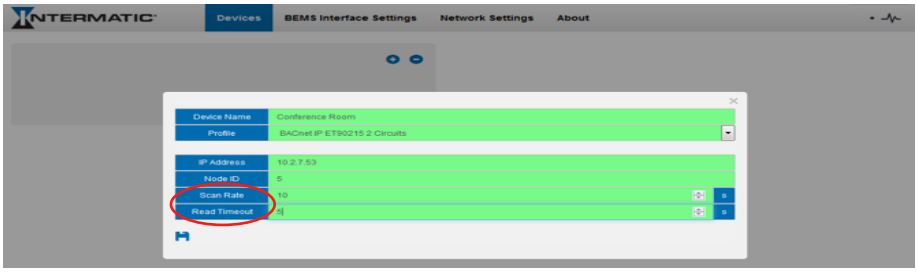


Figure 15: Web Configurator Showing Node ID

- Press the Save button to add the Profile to the list of devices to be configured.

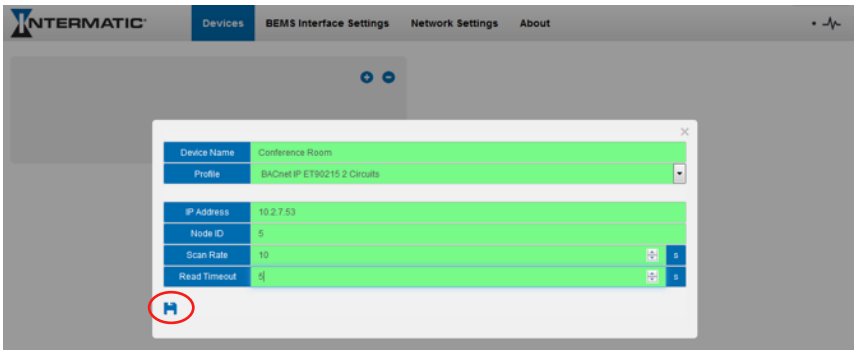


Figure 16: Web Configurator Showing Save Icon

- Repeat this process until all the devices have been added.
- Completed additions will be listed under Devices. Once all devices are added select the 'restart system' icon to load the new configuration into the ET9500. See **Figure 17**.

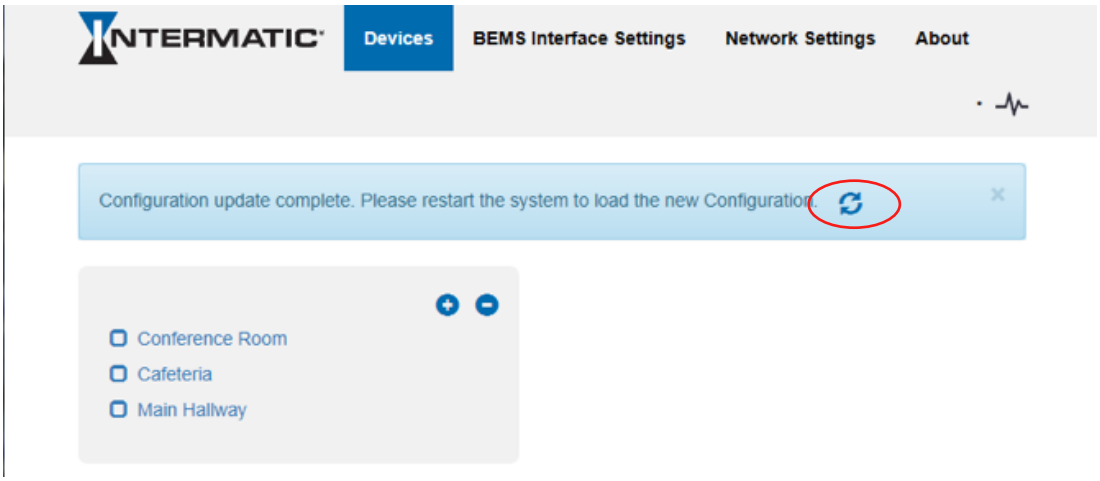


Figure 17: Web Configurator Showing System Restart to Load Configuration

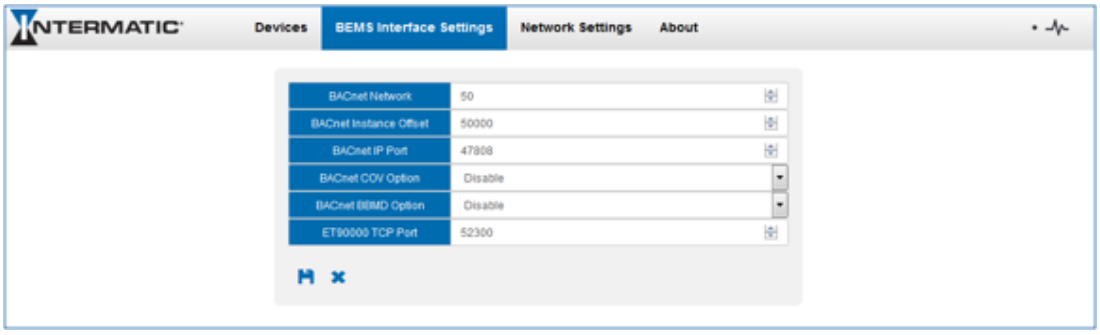


Figure 18: BEMS Interface Settings

6 HOW TO START THE INSTALLATION OVER: CLEARING THE PROFILES

- Check the profiles you want to delete then click the "-" icon to delete. See **Figure 19**.

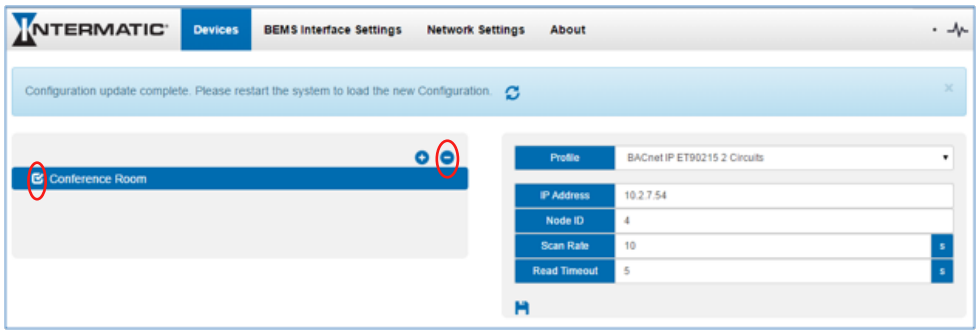


Figure 19: BEMS Interface Settings

- Once restart is complete, all the devices that were added via the Web configurator will be deleted. The unit is now ready to be reinstalled.

Appendix A. Troubleshooting

Appendix A.1. Viewing Diagnostic information

- Type the IP address of the ET9500 into your web browser.
- Click on “Diagnostics and Debugging” Icon , then click on view, and then on connections. 

- If there are any errors showing on the Connection page, please refer to **Appendix A.2** for the relevant wiring and settings.
    - o If the Rx messages for the N1 Intermatic Ethernet connection are static go to **Appendix A.2**

Appendix A.2. Checking Wiring and Settings

- No COMS on ET90000 device side: If Ethernet LED is not flashing then there is a COM issue on the Ethernet side and you need to check the following things:
    - o Ethernet Cable
    - o Switch or Router
    - o All devices are on the same subnet as the ET9500 (See Section 4)
    - o Intermatic device IP setting match the Web configuration settings for that device profile added
- Field COM problems:
    - o Visual dip switch settings (using correct baud rate, MAC address and Device Instance)
    - o Verify IP address setting
    - o Verify wiring

Appendix A.3. BACnet IP Settings

On the main Web Configurator screen, update the BACnet details and hit the save icon. Please note that the BACnet Network default value is 50.

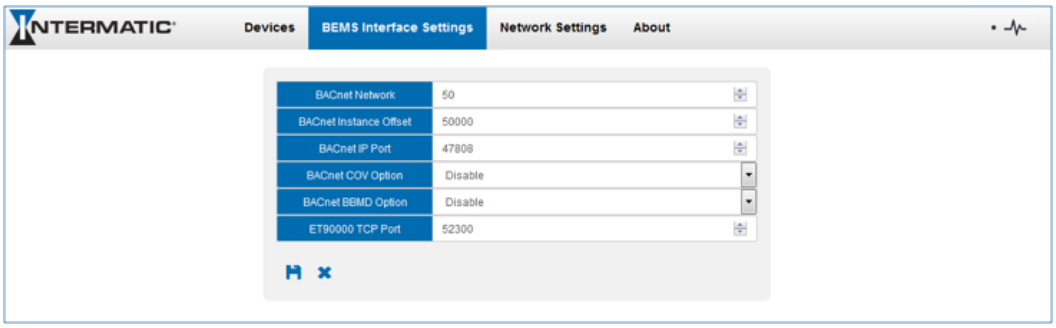


Figure 20: Web Configurator showing setting the network number for BACnet IP

Appendix A.4. Setting up the ET9500 for BBMD on the BACnet/IP Network

The ET9500 is capable of being a BACnet BBMD Client on a BACnet network. When this function is enabled, other BACnet networks on different subnets and other remote BACnet networks can access the devices on the particular Subnet that the ET9500 is connected to. Here are the steps to set up a BACnet BBMD Client:

- Create the bdt.ini file. You can get a sample bdt.ini file from Intermatic.
- Here is a format of the BDT.ini file to create:
  // BBMD IP_Address , BBMD port , BBMD subnet Mask
  24.90.48.179 , 47808 , 255.255.255.255
  64.80.115.156 , 47808 , 255.255.255.255

- The last line of the bdt.ini file should be empty.

On the main Web Configurator screen, set the BACnet BBMD option to enable.

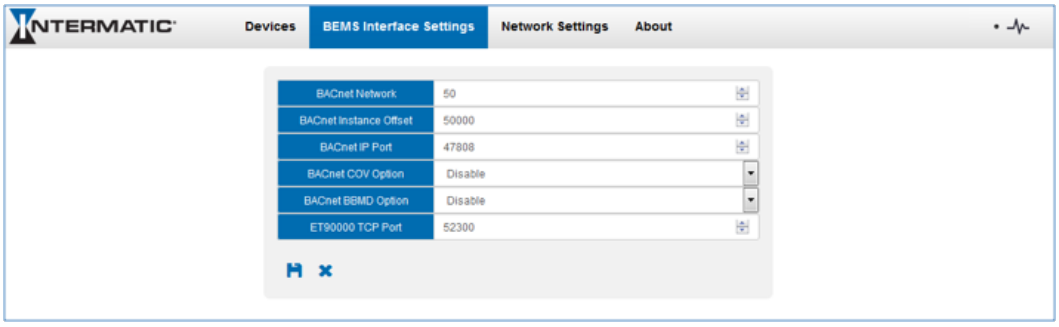
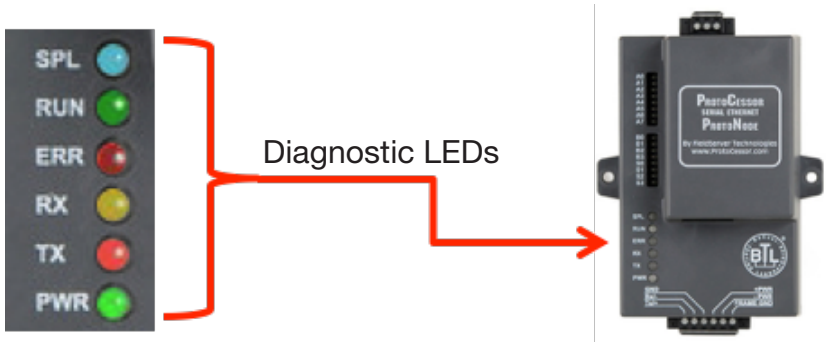


Figure 21: Setting up the ET9500 for BBMD on the BACnet IP Network

- Click on the Diagnostics & Debugging button.

- In the Navigation tree, click on Setup. Click on File Transfer. Then click on the General Tab.
- Then click on browse and select the bdt.ini file.
- Click on submit.
- When the download is complete, power cycle the unit.

Appendix A.5. LED Diagnostics for Serial Communications Between ET9500 and Devices



Tag	Description
SPL	The SPL LED will light if the ET9500 is off line.
RUN	The RUN LED will start flashing 20 seconds after power indicating normal operation.
ERR	The SYS ERR LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. A steady red light will indicate there is a system error on ET9500
RX	Not used – ignore
TX	Not used – ignore
PWR	This is the power light and should show steady green at all times when ET9500 is powered.

Figure 22: Diagnostic LEDs

Appendix A.6. Passwords

Access to the ET9500 can be restricted by enabling a password. There are 2 access levels defined by 2 account names: Admin or User.

- The Admin account has unrestricted access to the ET9500.
- The User account can view any ET9500 information, but cannot make any changes or restart the ET9500.

Appendix A.6.1 Password setup

For setting the password:

- Click on the Diagnostics & Debugging button. 
- In the Navigation tree, choose “Setup, Passwords”.
- Click on the account name drop box to set up the password for Admin or User.

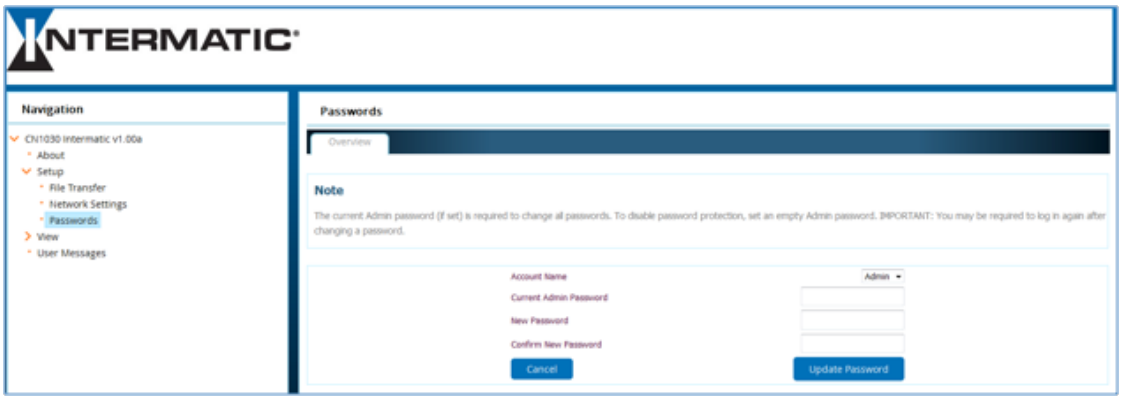


Figure 23: Password setup page

Appendix B. ET90000 Device Mapping

Appendix B.1. ET90115_01 Circuit ET90000 Device Mappings to BACnet MS/TP, BACnet/IP and Metasys N2

Point Name	BACnet Object Type	BACnet Object ID	N2 Data Type	N2 Point Address	Modbus Register
Ckt 1 Status	BV	1	DO	1	1

Appendix B.2. ET90215_02 Circuits ET90000 Device Mappings to BACnet MS/TP, BACnet/IP and Metasys N2

Point Name	BACnet Object Type	BACnet Object ID	N2 Data Type	N2 Point Address	Modbus Register
Ckt 1 Status	BV	1	DO	1	1
Ckt 2 Status	BV	2	DO	2	2

Appendix B.1. ET90115_01 Circuit ET90000 Device Mappings to BACnet MS/TP, BACnet/IP and Metasys N2

Point Name	BACnet Object Type	BACnet Object ID	N2 Data Type	N2 Point Address	Modbus Register
Ckt 1 Status	BV	1	DO	1	1
Ckt 2 Status	BV	2	DO	2	2
Ckt 3 Status	BV	3	DO	3	3
Ckt 4 Status	BV	4	DO	4	4

Appendix B.4. ET90815_08 Circuits ET90000 Device Mappings to BACnet MS/TP, BACnet/IP and Metasys N2

Point Name	BACnet Object Type	BACnet Object ID	N2 Data Type	N2 Point Address	Modbus Register
Ckt 1 Status	BV	1	DO	1	1
Ckt 2 Status	BV	2	DO	2	2
Ckt 3 Status	BV	3	DO	3	3
Ckt 4 Status	BV	4	DO	4	4
Ckt 5 Status	BV	5	DO	5	5
Ckt 6 Status	BV	6	DO	6	6
Ckt 7 Status	BV	7	DO	7	7
Ckt 8 Status	BV	8	DO	8	8

Appendix B.5. ET91215_12 Circuits ET90000 Device Mappings to BACnet MS/TP, BACnet/IP and Metasys N2

Point Name	BACnet Object Type	BACnet Object ID	N2 Data Type	N2 Point Address	Modbus Register
Ckt 1 Status	BV	1	DO	1	1
Ckt 2 Status	BV	2	DO	2	2
Ckt 3 Status	BV	3	DO	3	3
Ckt 4 Status	BV	4	DO	4	4
Ckt 5 Status	BV	5	DO	5	5
Ckt 6 Status	BV	6	DO	6	6
Ckt 7 Status	BV	7	DO	7	7
Ckt 8 Status	BV	8	DO	8	8
Ckt 9 Status	BV	9	DO	9	9
Ckt 10 Status	BV	10	DO	10	10
Ckt 11 Status	BV	11	DO	11	11
Ckt 12 Status	BV	12	DO	12	12

Appendix B.6. ET91615_16 Circuits ET90000 Device Mappings to BACnet MS/TP, BACnet/IP and Metasys N2

Point Name	BACnet Object Type	BACnet Object ID	N2 Data Type	N2 Point Address	Modbus Register
Ckt 1 Status	BV	1	DO	1	1
Ckt 2 Status	BV	2	DO	2	2
Ckt 3 Status	BV	3	DO	3	3
Ckt 4 Status	BV	4	DO	4	4
Ckt 5 Status	BV	5	DO	5	5
Ckt 6 Status	BV	6	DO	6	6
Ckt 7 Status	BV	7	DO	7	7
Ckt 8 Status	BV	8	DO	8	8
Ckt 9 Status	BV	9	DO	9	9
Ckt 10 Status	BV	10	DO	10	10
Ckt 11 Status	BV	11	DO	11	11
Ckt 12 Status	BV	12	DO	12	12
Ckt 13 Status	BV	13	DO	13	13
Ckt 14Status	BV	14	DO	14	14
Ckt 15 Status	BV	15	DO	15	15
Ckt 16 Status	BV	16	DO	16	16

Appendix C. “A” Bank DIP Switch Settings

Appendix C.1. “A” Bank DIP Switch Settings

Address	A0	A1	A2	A3	A4	A5	A6	A7
1	On	Off	Off	Off	Off	Off	Off	Off
2	Off	On	Off	Off	Off	Off	Off	Off
3	On	On	Off	Off	Off	Off	Off	Off
4	Off	Off	On	Off	Off	Off	Off	Off
5	On	Off	On	Off	Off	Off	Off	Off
6	Off	On	On	Off	Off	Off	Off	Off
7	On	On	On	Off	Off	Off	Off	Off
8	Off	Off	Off	On	Off	Off	Off	Off
9	On	Off	Off	On	Off	Off	Off	Off
10	Off	On	Off	On	Off	Off	Off	Off
11	On	On	Off	On	Off	Off	Off	Off
12	Off	Off	On	On	Off	Off	Off	Off
13	On	Off	On	On	Off	Off	Off	Off
14	Off	On	On	On	Off	Off	Off	Off
15	On	On	On	On	Off	Off	Off	Off
16	Off	Off	Off	Off	On	Off	Off	Off
17	On	Off	Off	Off	On	Off	Off	Off
18	Off	On	Off	Off	On	Off	Off	Off
19	On	On	Off	Off	On	Off	Off	Off
20	Off	Off	On	Off	On	Off	Off	Off
21	On	Off	On	Off	On	Off	Off	Off
22	Off	On	On	Off	On	Off	Off	Off
23	On	On	On	Off	On	Off	Off	Off
24	Off	Off	Off	On	On	Off	Off	Off
25	On	Off	Off	On	On	Off	Off	Off
26	Off	On	Off	On	On	Off	Off	Off
27	On	On	Off	On	On	Off	Off	Off
28	Off	Off	On	On	On	Off	Off	Off
29	On	Off	On	On	On	Off	Off	Off
30	Off	On	On	On	On	Off	Off	Off
31	On	On	On	On	On	Off	Off	Off
32	Off	Off	Off	Off	Off	On	Off	Off
33	On	Off	Off	Off	Off	On	Off	Off
34	Off	On	Off	Off	Off	On	Off	Off
35	On	On	Off	Off	Off	On	Off	Off
36	Off	Off	On	Off	Off	On	Off	Off
37	On	Off	On	Off	Off	On	Off	Off
38	Off	On	On	Off	Off	On	Off	Off
39	On	On	On	Off	Off	On	Off	Off
40	Off	Off	Off	On	Off	On	Off	Off
41	On	Off	Off	On	Off	On	Off	Off
42	Off	On	Off	On	Off	On	Off	Off
43	On	On	Off	On	Off	On	Off	Off
44	Off	Off	On	On	Off	On	Off	Off
45	On	Off	On	On	Off	On	Off	Off
46	Off	On	On	On	Off	On	Off	Off

Address	A0	A1	A2	A3	A4	A5	A6	A7
47	On	On	On	On	Off	On	Off	Off
48	Off	Off	Off	Off	On	On	Off	Off
49	On	Off	Off	Off	On	On	Off	Off
50	Off	On	Off	Off	On	On	Off	Off
51	On	On	Off	Off	On	On	Off	Off
52	Off	Off	On	Off	On	On	Off	Off
53	On	Off	On	Off	On	On	Off	Off
54	Off	On	On	Off	On	On	Off	Off
55	On	On	On	Off	On	On	Off	Off
56	Off	Off	Off	On	On	On	Off	Off
57	On	Off	Off	On	On	On	Off	Off
58	Off	On	Off	On	On	On	Off	Off
59	On	On	Off	On	On	On	Off	Off
60	Off	Off	On	On	On	On	Off	Off
61	On	Off	On	On	On	On	Off	Off
62	Off	On	On	On	On	On	Off	Off
63	On	On	On	On	On	On	Off	Off
64	Off	Off	Off	Off	Off	Off	On	Off
65	On	Off	Off	Off	Off	Off	On	Off
66	Off	On	Off	Off	Off	Off	On	Off
67	On	On	Off	Off	Off	Off	On	Off
68	Off	Off	On	Off	Off	Off	On	Off
69	On	Off	On	Off	Off	Off	On	Off
70	Off	On	On	Off	Off	Off	On	Off
71	On	On	On	Off	Off	Off	On	Off
72	Off	Off	Off	On	Off	Off	On	Off
73	On	Off	Off	On	Off	Off	On	Off
74	Off	On	Off	On	Off	Off	On	Off
75	On	On	Off	On	Off	Off	On	Off
76	Off	Off	On	On	Off	Off	On	Off
77	On	Off	On	On	Off	Off	On	Off
78	Off	On	On	On	Off	Off	On	Off
79	On	On	On	On	Off	Off	On	Off
80	Off	Off	Off	Off	On	Off	On	Off
81	On	Off	Off	Off	On	Off	On	Off
82	Off	On	Off	Off	On	Off	On	Off
83	On	On	Off	Off	On	Off	On	Off
84	Off	Off	On	Off	On	Off	On	Off
85	On	Off	On	Off	On	Off	On	Off
86	Off	On	On	Off	On	Off	On	Off
87	On	On	On	Off	On	Off	On	Off
88	Off	Off	Off	On	On	Off	On	Off
89	On	Off	Off	On	On	Off	On	Off
90	Off	On	Off	On	On	Off	On	Off
91	On	On	Off	On	On	Off	On	Off
92	Off	Off	On	On	On	Off	On	Off

Address	A0	A1	A2	A3	A4	A5	A6	A7
93	On	Off	On	On	On	Off	On	Off
94	Off	On	On	On	On	Off	On	Off
95	On	On	On	On	On	Off	On	Off
96	Off	Off	Off	Off	Off	On	On	Off
97	On	Off	Off	Off	Off	On	On	Off
98	Off	On	Off	Off	Off	On	On	Off
99	On	On	Off	Off	Off	On	On	Off
100	Off	Off	On	Off	Off	On	On	Off
101	On	Off	On	Off	Off	On	On	Off
102	Off	On	On	Off	Off	On	On	Off
103	On	On	On	Off	Off	On	On	Off
104	Off	Off	Off	On	Off	On	On	Off
105	On	Off	Off	On	Off	On	On	Off
106	Off	On	Off	On	Off	On	On	Off
107	On	On	Off	On	Off	On	On	Off
108	Off	Off	On	On	Off	On	On	Off
109	On	Off	On	On	Off	On	On	Off
110	Off	On	On	On	Off	On	On	Off
111	On	On	On	On	Off	On	On	Off
112	Off	Off	Off	Off	On	On	On	Off
113	On	Off	Off	Off	On	On	On	Off
114	Off	On	Off	Off	On	On	On	Off
115	On	On	Off	Off	On	On	On	Off
116	Off	Off	On	Off	On	On	On	Off
117	On	Off	On	Off	On	On	On	Off
118	Off	On	On	Off	On	On	On	Off
119	On	On	On	Off	On	On	On	Off
120	Off	Off	Off	On	On	On	On	Off
121	On	Off	Off	On	On	On	On	Off
122	Off	On	Off	On	On	On	On	Off
123	On	On	Off	On	On	On	On	Off
124	Off	Off	On	On	On	On	On	Off
125	On	Off	On	On	On	On	On	Off
126	Off	On	On	On	On	On	On	Off
127	On	On	On	On	On	On	On	Off
128	Off	Off	Off	Off	Off	Off	Off	On
129	On	Off	Off	Off	Off	Off	Off	On
130	Off	On	Off	Off	Off	Off	Off	On
131	On	On	Off	Off	Off	Off	Off	On
132	Off	Off	On	Off	Off	Off	Off	On
133	On	Off	On	Off	Off	Off	Off	On
134	Off	On	On	Off	Off	Off	Off	On
135	On	On	On	Off	Off	Off	Off	On
136	Off	Off	Off	On	Off	Off	Off	On
137	On	Off	Off	On	Off	Off	Off	On
138	Off	On	Off	On	Off	Off	Off	On
139	On	On	Off	On	Off	Off	Off	On
140	Off	Off	On	On	Off	Off	Off	On

Address	A0	A1	A2	A3	A4	A5	A6	A7
141	On	Off	On	On	Off	Off	Off	On
142	Off	On	On	On	Off	Off	Off	On
143	On	On	On	On	Off	Off	Off	On
144	Off	Off	Off	Off	On	Off	Off	On
145	On	Off	Off	Off	On	Off	Off	On
146	Off	On	Off	Off	On	Off	Off	On
147	On	On	Off	Off	On	Off	Off	On
148	Off	Off	On	Off	On	Off	Off	On
149	On	Off	On	Off	On	Off	Off	On
150	Off	On	On	Off	On	Off	Off	On
151	On	On	On	Off	On	Off	Off	On
152	Off	Off	Off	On	On	Off	Off	On
153	On	Off	Off	On	On	Off	Off	On
154	Off	On	Off	On	On	Off	Off	On
155	On	On	Off	On	On	Off	Off	On
156	Off	Off	On	On	On	Off	Off	On
157	On	Off	On	On	On	Off	Off	On
158	Off	On	On	On	On	Off	Off	On
159	On	On	On	On	On	Off	Off	On
160	Off	Off	Off	Off	Off	On	Off	On
161	On	Off	Off	Off	Off	On	Off	On
162	Off	On	Off	Off	Off	On	Off	On
163	On	On	Off	Off	Off	On	Off	On
164	Off	Off	On	Off	Off	On	Off	On
165	On	Off	On	Off	Off	On	Off	On
166	Off	On	On	Off	Off	On	Off	On
167	On	On	On	Off	Off	On	Off	On
168	Off	Off	Off	On	Off	On	Off	On
169	On	Off	Off	On	Off	On	Off	On
170	Off	On	Off	On	Off	On	Off	On
171	On	On	Off	On	Off	On	Off	On
172	Off	Off	On	On	Off	On	Off	On
173	On	Off	On	On	Off	On	Off	On
174	Off	On	On	On	Off	On	Off	On
175	On	On	On	On	Off	On	Off	On
176	Off	Off	Off	Off	On	On	Off	On
177	On	Off	Off	Off	On	On	Off	On
178	Off	On	Off	Off	On	On	Off	On
179	On	On	Off	Off	On	On	Off	On
180	Off	Off	On	Off	On	On	Off	On
181	On	Off	On	Off	On	On	Off	On
182	Off	On	On	Off	On	On	Off	On
183	On	On	On	Off	On	On	Off	On
184	Off	Off	Off	On	On	On	Off	On
185	On	Off	Off	On	On	On	Off	On
186	Off	On	Off	On	On	On	Off	On
187	On	On	Off	On	On	On	Off	On
188	Off	Off	On	On	On	On	Off	On

Address	A0	A1	A2	A3	A4	A5	A6	A7
189	On	Off	On	On	On	On	Off	On
190	Off	On	On	On	On	On	Off	On
191	On	On	On	On	On	On	Off	On
192	Off	Off	Off	Off	Off	Off	On	On
193	On	Off	Off	Off	Off	Off	On	On
194	Off	On	Off	Off	Off	Off	On	On
195	On	On	Off	Off	Off	Off	On	On
196	Off	Off	On	Off	Off	Off	On	On
197	On	Off	On	Off	Off	Off	On	On
198	Off	On	On	Off	Off	Off	On	On
199	On	On	On	Off	Off	Off	On	On
200	Off	Off	Off	On	Off	Off	On	On
201	On	Off	Off	On	Off	Off	On	On
202	Off	On	Off	On	Off	Off	On	On
203	On	On	Off	On	Off	Off	On	On
204	Off	Off	On	On	Off	Off	On	On
205	On	Off	On	On	Off	Off	On	On
206	Off	On	On	On	Off	Off	On	On
207	On	On	On	On	Off	Off	On	On
208	Off	Off	Off	Off	On	Off	On	On
209	On	Off	Off	Off	On	Off	On	On
210	Off	On	Off	Off	On	Off	On	On
211	On	On	Off	Off	On	Off	On	On
212	Off	Off	On	Off	On	Off	On	On
213	On	Off	On	Off	On	Off	On	On
214	Off	On	On	Off	On	Off	On	On
215	On	On	On	Off	On	Off	On	On
216	Off	Off	Off	On	On	Off	On	On
217	On	Off	Off	On	On	Off	On	On
218	Off	On	Off	On	On	Off	On	On
219	On	On	Off	On	On	Off	On	On
220	Off	Off	On	On	On	Off	On	On
221	On	Off	On	On	On	Off	On	On
222	Off	On	On	On	On	Off	On	On
223	On	On	On	On	On	Off	On	On
224	Off	Off	Off	Off	Off	On	On	On
225	On	Off	Off	Off	Off	On	On	On
226	Off	On	Off	Off	Off	On	On	On
227	On	On	Off	Off	Off	On	On	On
228	Off	Off	On	Off	Off	On	On	On
229	On	Off	On	Off	Off	On	On	On
230	Off	On	On	Off	Off	On	On	On
231	On	On	On	Off	Off	On	On	On
232	Off	Off	Off	On	Off	On	On	On
233	On	Off	Off	On	Off	On	On	On
234	Off	On	Off	On	Off	On	On	On
235	On	On	Off	On	Off	On	On	On
236	Off	Off	On	On	Off	On	On	On

Address	A0	A1	A2	A3	A4	A5	A6	A7
237	On	Off	On	On	Off	On	On	On
238	Off	On	On	On	Off	On	On	On
239	On	On	On	On	Off	On	On	On
240	Off	Off	Off	Off	On	On	On	On
241	On	Off	Off	Off	On	On	On	On
242	Off	On	Off	Off	On	On	On	On
243	On	On	Off	Off	On	On	On	On
244	Off	Off	On	Off	On	On	On	On
245	On	Off	On	Off	On	On	On	On
246	Off	On	On	Off	On	On	On	On
247	On	On	On	Off	On	On	On	On
248	Off	Off	Off	On	On	On	On	On
249	On	Off	Off	On	On	On	On	On
250	Off	On	Off	On	On	On	On	On
251	On	On	Off	On	On	On	On	On
252	Off	Off	On	On	On	On	On	On
253	On	Off	On	On	On	On	On	On
254	Off	On	On	On	On	On	On	On
255	On	On	On	On	On	On	On	On

Appendix D. Limited 3-Year Warranty

LIMITED THREE-YEAR WARRANTY

If within the warranty period specified, this product fails due to a defect in material or workmanship, Intermatic Incorporated will repair or replace it, at its sole option, free of charge. This warranty is extended to the original purchaser only and is not transferable. This warranty does not apply to: (a) damage to units caused by accident, dropping or abuse in handling, acts of God or any negligent use; (b) units which have been subject to unauthorized repair, opened, taken apart or otherwise modified; (c) units not used in accordance with instructions; (d) damages exceeding the cost of the product; (e) sealed lamps and/or lamp bulbs, LED's and batteries; (f) the finish on any portion of the product, such as surface and/or weathering, as this is considered normal wear and tear; (g) transit damage, initial installation costs, removal costs, or reinstallation costs.

INTERMATIC INCORPORATED WILL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES. ALL IMPLIED WARRANTIES, INCLUDING THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY MODIFIED TO EXIST ONLY AS CONTAINED IN THIS LIMITED WARRANTY, AND SHALL BE OF THE SAME DURATION AS THE WARRANTY PERIOD STATED ABOVE. SOME STATES DO NOT ALLOW LIMITATIONS ON THE DURATION OF AN IMPLIED WARRANTY, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

This warranty service is available by either (a) returning the product to the dealer from whom the unit was purchased or (b) completing a warranty claim online at www.intermatic.com. This warranty is made by: Intermatic Incorporated, Customer Service 7777 Winn Rd., Spring Grove, Illinois 60081-9698. For warranty service go to: http://www.intermatic.com or call 815-675-7000.