

E-Link Gateway Commissioning and Troubleshooting Technical Bulletin

The Johnson Controls® Equipment Link (E-Link) Gateway is an economical and versatile communications device that provides a connection between YORK equipment, such as chillers and Remote Terminal Unit (RTUs), and open standard protocols. Specifically, the E-Link Gateway provides access to BACnet® Master-Slave/Token-Passing (MS/TP), N2, Modbus® RTU, and LON FTT10 Building Automation System (BAS) protocols. The E-Link Gateway has been designed with the same physical dimensions and power requirements as the MicroGateway, which enables it to be used in many instances as a direct replacement part.

Note: The E-Link Gateway does not support the ISN, American Standard Code for Information Interchange (ASCII), or York Talk I protocols

The E-Link Gateway has four serial ports, one of which can host an optional LON FTT10 ProtoCessor module. Ports 1 and 4 are designated for BAS networking, and Port 2 is used to connect to the equipment. Port 3 provides access for auxiliary monitoring and control.

To simplify installation and setup, the E-Link Gateway is pre-configured with a series of chiller and rooftop profiles that can be chosen by selecting the correct DIP switch settings.

Functional Overview

The E-Link Gateway is available as a stand-alone circuit board or as a circuit board mounted within a metal enclosure (Table 1).

Table 1: E-Link Gateway Product Code Numbers

Product Code Number	Description
YK-ELNK100-0	Circuit Board with Serial Communications, BACnet MS/TP, Modbus RTU, and N2
YK-ELNK101-0	Circuit Board with LON FTT10 Communications
YK-ELNKE00-0	YK-ELNK100-0 in an Enclosure
YK-ELNKE01-0	YK-ELNK101-0 in an Enclosure
YK-ELNKOLK-0	OptiView/Latitude Installation Kit

The E-Link Gateway consists of two boards. The IPU-II (processor module) is mounted on the System Interface Module (SIM) (interface module). Do not separate these boards in the field.

The circuit board measures 4 x 6 in. (101 x 152 mm), whereas the dimensions of the enclosure are 6 x 11 x 2.5 in. (152 x 279 x 63 mm).

The E-Link Gateway can be powered from these voltage sources:

- 12 VDC (circuit board)
- 24 VAC (circuit board)
- 110 VAC (in an enclosure)
- 220 VAC (in an enclosure)

User Selections and Indicators

Each communication port is serviced by two Light-Emitting Diodes (LEDs): one red and one green. The red LED flashes to indicate that the port is transmitting data. A green flashing LED indicates that the port is receiving data. These LEDs are connected to the actual TX and RX signal lines and only indicate electrical activity by the specific port. The LEDs do not indicate error-free data reception or transmission.

The status and power LED provides information about current operation and the presence of electrical power.

Three DIP switches enable a user to set the E-Link Gateway's MAC address, the desired equipment profile, and the output protocol. A momentary push button is used to activate the chosen selection.

Port 1, Port 2A, and Port 3 have End-of-Line (EOL) switches that allow their respective RS-485 networks to be correctly biased and terminated.

Port Configuration

From a functional perspective, the E-Link Gateway offers four communication ports. Each port is Quick Start configurable to support the protocols listed in Table 2.

Table 2: Port Configuration

Port 1	Port 2	Port 3	Port 4
BACnet MS/TP	York Talk III	BACnet MS/TP	LON FTT10
Modbus RTU Server	York Talk II	Modbus RTU Server	
N2	BACnet MS/TP	N2	
		VT-100	

The E-Link Gateway's ports support specific driver technologies as described in Table 3.

Table 3: Port Drivers

Port 1	Port 2A	Port 2B	Port 3	Port 4
RS-485	RS-485	RS-232	RS-485	TTL/FTT-10A

Software Revision Control

The E-Link Gateway software consists of two primary parts, the Firmware (ELF) and the Application (CNF). Both of these parts are delivered from the factory as a Johnson Combined File (JCF) shown in Figure 1. A label on the E-Link Gateway defines the version of JCF loaded in the factory.

Note: The JCF is factory loaded and due to its data format cannot be reloaded in the field

Each part of the JCF, with the exception of REDBOOT, can be reloaded individually in the field. The Firmware file uses an ELF extension, whereas the Application uses a CNF extension.

Flash Organization

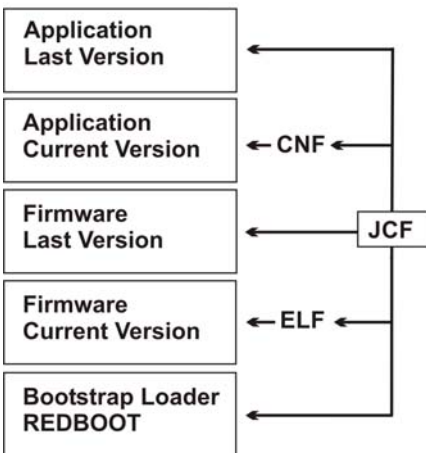


Figure 1: Flash Organization

The Firmware file contains the object engine, the operating system, and all the parts required to support the various communication protocols. The Application file contains the preprogrammed Quick Start configurations of the supported field equipment.

Every time a new Firmware file is built, it is renamed using the following convention:

FIRMWARE REV: PPPP.FFFF.MMMM.BBBB-CCC, where PPPP is the platform, FFFF is the major functionality, MMMM is the minor functionality, BBBB is the build number, and CCC is the Feature, Section, and Page (FSP) mix.

The Application file, when modified, is also renamed using a 12-character string that adheres to the following convention:

APPLICATION REVISION: TTT.MMMM.BBB, where TTT is the Application type shown in Table 4, MMMM is the major release, and BBB is the build number.

Table 4: Application Types

Type	Description
STD	A standard production Application that is released through the normal process
CUS	A custom Application that is released and supported by the SIS organization
ENG	An engineering Application as used during the development process

Figure 2 shows an example of the output a user sees after selecting System Diagnostics after logging onto an E-Link Gateway. The actual Firmware revision and Application revision relate to the current release.

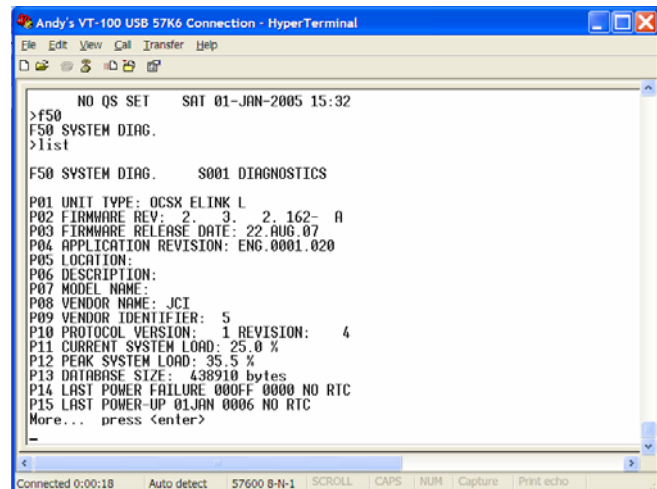


Figure 2: Terminal View of System Diagnostics

Quick Starts

The Quick Start feature provides a simple method of configuring an E-Link Gateway for a specific type of equipment and output protocol. No external devices (laptops) are required because the Quick Start feature is self-contained and is invoked by setting specific addresses on a set of switches. A push button is then used to activate the functionality.

Note: When activating a LON FTT10 Quick Start, cycle the power on the E-Link Gateway to activate the Quick Start and the LON FTT10 ProtoCessor. The LON FTT10 ProtoCessor does not recognize the push button as a trigger to reset and load the correct conversion file.

Field Maintenance

Implement a field edit if you need to correct an E-Link Gateway's Quick Start script. Two Quick Starts have been reserved for this purpose, allowing the E-Link Gateway's Application to be adjusted to address a profile issue, a protocol selection issue, or both.

User Access

Use a computer with a VT-100 interface to view, track, debug, make changes, or access the operation of the E-Link Gateway. To invoke this function, set way 8 of the MAC address switch to ON and connect a computer with a VT-100 emulation program to Port 3.

User Reports

Certain parameters require adjustments on site. Users that have established a VT-100 interface on Port 3 can edit parameters. Any edits that may have been made are saved to flash when a user exits the User Report or the User Report has timed out. Only parameters previously defined in a User Report can be edited and saved to flash.

Loading New Firmware and Application

If the E-Link Gateway's Firmware and/or Application require reloading, the preferred way is to establish a VT-100 terminal session and then use an X-modem utility to transfer the file. When using a Microsoft® Windows® Operating System (OS) based computer, X-modem capabilities already come packaged within the HyperTerminal Application so proprietary tools are not required.

Applications

The E-Link Gateway's Applications are designed to provide connectivity to an established base of York chillers that use York Talk II and III as their internal protocol. Native BACnet and Modbus RTU protocol speaking equipment can also use the E-Link Gateway

to offer N2 and LON FTT10 communications. An example of this type of equipment is the YPAL rooftop unit.

BAS Networks

An E-Link Gateway can be connected to a BAS network after it has been Quick Started and is then ready to serve up data. The E-Link Gateway acts as a server and the BAS system must initiate any requests.

The information required by the BAS is partially dependent on the protocol, but in all cases the BAS must know the E-Link Gateway's network address (the address that uniquely identifies it on the network) and which internal data it can access.

MS/TP

The E-Link Gateway supports dynamic device binding. The BAS integrator requires the Device Object address (also known as the Device Object instance or the DE address) for device binding. This literal address allows the BAS system to connect to the E-Link Gateway using an automatic discovery process (a WHO-IS, I-AM exchange) that establishes the E-Link Gateway's Media Access Control (MAC) address. The MAC address is then used in all future requests.

The E-Link Gateway's Device Object address is generated automatically and is based on adding 5,000 to the MAC address switch setting. Sometimes the integrator may require the E-Link Gateway to have a specific Device Object address (due to site-specific policy) and in these cases the E-Link Gateway must be site-configured. User Report 1 allows you to enter a specific Device Object address.

N2 and Modbus RTU

In case of both N2 and Modbus RTU, the E-Link Gateway is identified on the network by its MAC address, which you can set to any address between 1 and 127 using switches. Although these protocols have a wider address space, the MAC address switch limits them to 127. You can set the MAC address using software, which is discussed in a later section.

Note: Changes to MAC address switches are updated live, so take care to align any Client Application with the E-Link Gateway's MAC address.

LON FTT10

Press the service pin on the ProtoCessor to identify the E-Link Gateway on the LON FTT10 network, which is the easiest way to determine the Neuron® ID for third-party configuration tools. For Network Automation Engine (NAE)-based systems, the XIF resource file makes it simple to discover the device.

Equipment Point Maps provide the data that a BAS system can access. These maps are available on the Johnson Controls Portal. The Point Maps are presented as spreadsheets, which define the parameters, their associated variable addresses, and a brief description of what the data actually represents for each type of equipment.

Each protocol references these variables in different ways. BACnet protocol uses the Multistate Value (MSV), Analog Value (AV), and Binary Value (BV) objects. N2 uses the Analog Data Input (ADI), Analog Data Float (ADF), and Binary Data (BD) objects. Modbus RTU protocol uses registers. LON FTT10 uses Standard Network Variable Type (SNVT). Each protocol contains different amounts of information. BACnet protocol is the most data-rich and Modbus RTU protocol is the most basic.

Figure 3, Figure 4, and Figure 5 show examples of Point Maps available on the Johnson Controls Portal.

Figure 3 shows an example of an OptiView Point Maps spreadsheet. The GPIC Object Type defines the object within the OptiView micro panel that is associated with this parameter.

Item	Ref.	Version	Date	YORK P/N	Checksum	Baud	COMMENTS
1	C.A.M.0100						
2	C.A.M.0100.003						
3	C.A.M.0100.003						
4	C.A.M.0100.003						
5	C.A.M.0100.003						
6	C.A.M.0100.003						
7	C.A.M.0100.003						
8	C.A.M.0100.003						
9	C.A.M.0100.003						
10	C.A.M.0100.003						
11	C.A.M.0100.003						
12	C.A.M.0100.003						
13	C.A.M.0100.003						
14	C.A.M.0100.003						
15	C.A.M.0100.003						
16	C.A.M.0100.003						
17	C.A.M.0100.003						
18	C.A.M.0100.003						
19	C.A.M.0100.003						
20	C.A.M.0100.003						
21	C.A.M.0100.003						
22	C.A.M.0100.003						
23	C.A.M.0100.003						
24	C.A.M.0100.003						
25	C.A.M.0100.003						
26	C.A.M.0100.003						
27	C.A.M.0100.003						
28	C.A.M.0100.003						
29	C.A.M.0100.003						
30	C.A.M.0100.003						

Figure 3: OptiView Point Maps Spreadsheet

Figure 4 shows an example of a YCAS Point List spreadsheet. The ENG PAGE REF refers to the actual York Talk Feature (F54) page reference.

The N2 address is the N2 Open address that is associated with that particular parameter. Columns I to R columns in versions 1 through 10 of the YCAS chiller Firmware indicate whether this parameter is standard, optional, or unavailable with this version of Firmware.

Item	Ref.	Version	Date	YORK P/N	Checksum	Baud	COMMENTS
1	C.A.M.0100						
2	C.A.M.0100.003						
3	C.A.M.0100.003						
4	C.A.M.0100.003						
5	C.A.M.0100.003						
6	C.A.M.0100.003						
7	C.A.M.0100.003						
8	C.A.M.0100.003						
9	C.A.M.0100.003						
10	C.A.M.0100.003						
11	C.A.M.0100.003						
12	C.A.M.0100.003						
13	C.A.M.0100.003						
14	C.A.M.0100.003						
15	C.A.M.0100.003						
16	C.A.M.0100.003						
17	C.A.M.0100.003						
18	C.A.M.0100.003						
19	C.A.M.0100.003						
20	C.A.M.0100.003						
21	C.A.M.0100.003						
22	C.A.M.0100.003						
23	C.A.M.0100.003						
24	C.A.M.0100.003						
25	C.A.M.0100.003						
26	C.A.M.0100.003						
27	C.A.M.0100.003						
28	C.A.M.0100.003						
29	C.A.M.0100.003						
30	C.A.M.0100.003						

Figure 4: YCAS Point List Spreadsheet

Figure 5 shows how a chiller's Point Map is mapped to provide the required BACnet object ID references and their BACnet object names.

ENG Page Ref	Chiller Point Type	BACnet Object Type and Instance	Priority Array Support	YORK TALK 1 Section 1 (Refer to 4)	YORK TALK 2 Section 1 (Refer to 4)	YORK TALK 3 Section 1 (Refer to 4)	YORK TALK	ENG Page Ref
P03	Analog Input	AV1	YES	Y1_S01_P03	Y1_S01_P03	Y1_S01_P03	See appropriate York Talk points listing	P03
P04	Analog Input	AV2	YES	Y1_S01_P04	Y1_S01_P04	Y1_S01_P04	See appropriate York Talk points listing	P04
P05	Analog Input	AV3	YES	Y1_S01_P05	Y1_S01_P05	Y1_S01_P05	See appropriate York Talk points listing	P05
P06	Analog Input	AV4	YES	Y1_S01_P06	Y1_S01_P06	Y1_S01_P06	See appropriate York Talk points listing	P06
P07	Digital Input	BD1	YES	Y1_S01_P07	Y1_S01_P07	Y1_S01_P07	See appropriate York Talk points listing	P07
P08	Digital Input	BD2	YES	Y1_S01_P08	Y1_S01_P08	Y1_S01_P08	See appropriate York Talk points listing	P08
P09	Digital Input	BD3	YES	Y1_S01_P09	Y1_S01_P09	Y1_S01_P09	See appropriate York Talk points listing	P09
P10	Digital Input	BD4	YES	Y1_S01_P10	Y1_S01_P10	Y1_S01_P10	See appropriate York Talk points listing	P10
P11	Analog Output	AV5	NO	Y1_S01_P11	Y1_S01_P11	Y1_S01_P11	See appropriate York Talk points listing	P11
P12	Analog Output	AV6	NO	Y1_S01_P12	Y1_S01_P12	Y1_S01_P12	See appropriate York Talk points listing	P12
P13	Analog Output	AV7	NO	Y1_S01_P13	Y1_S01_P13	Y1_S01_P13	See appropriate York Talk points listing	P13
P14	Analog Output	AV8	NO	Y1_S01_P14	Y1_S01_P14	Y1_S01_P14	See appropriate York Talk points listing	P14
P15	Analog Output	AV9	NO	Y1_S01_P15	Y1_S01_P15	Y1_S01_P15	See appropriate York Talk points listing	P15
P16	Analog Output	AV10	NO	Y1_S01_P16	Y1_S01_P16	Y1_S01_P16	See appropriate York Talk points listing	P16
P17	Analog Output	AV11	NO	Y1_S01_P17	Y1_S01_P17	Y1_S01_P17	See appropriate York Talk points listing	P17
P18	Analog Output	AV12	NO	Y1_S01_P18	Y1_S01_P18	Y1_S01_P18	See appropriate York Talk points listing	P18

Figure 5: Point Maps and Object ID/References

Figure 6 shows how a chiller's Point Map is mapped to provide the required Modbus RTU addresses, supported function codes, and associated scaling.

ENG Page Ref	Chiller Point Type	Modbus References Supported	Modbus Function Types Supported	Modbus Address	YORK TALK 1 Scaling	YORK TALK 2 Scaling	YORK TALK 3 Scaling	YORK TALK 3 Scaling	YORK TALK 3 Scaling	YORK TALK 3 Scaling	YORK TALK 3 Scaling
P03	Analog Input	4X	03, 06, 16	0001	Div 10	Div 10	Div 10	Div 10	Div 10	Div 10	Div 10
P04	Analog Input	4X	03, 06, 16	0002	Div 10	Div 10	Div 10	Div 10	Div 10	Div 10	Div 10
P05	Analog Input	4X	03, 06, 16	0003	Div 10	Div 10	Div 10	Div 10	Div 10	Div 10	Div 10
P06	Analog Input	4X	03, 06, 16	0004	Div 10	Div 10	Div 10	Div 10	Div 10	Div 10	Div 10
P07	Digital Input	0X, 4X	01, 03, 05, 16, 06, 16	0001	NA	NA	NA	NA	NA	NA	NA
P08	Digital Input	0X, 4X	01, 03, 05, 16, 06, 16	0002	NA	NA	NA	NA	NA	NA	NA
P09	Digital Input	0X, 4X	01, 03, 05, 16, 06, 16	0003	NA	NA	NA	NA	NA	NA	NA

Figure 6: Point Maps and Modbus RTU Addresses

Theory of Operation

The E-Link Gateway is designed to express equipment data from one protocol (typically, York Talk, BACnet, or Modbus RTU) into a BAS protocol. To normalize the data received from or sent to the equipment, three standard BACnet object types (AV, BV, and MSV) are used. Although the E-Link Gateway contains more complex objects, these serve no function in a gateway Application.

Note: The E-Link Gateway is based on the ConneXsys object engine that uses FSP as its programming method.

The E-Link Gateway always serves as a master with respect to the equipment that it supports. In the case of the York Talk Feature (F54), the E-Link Gateway polls the chiller panel to request data from and write data to it.

When applied with BACnet enabled equipment (YPAL), the Acquisition Feature (F65) is used to read the present value of objects resident within the equipment and assign them to AV, MSV, or BV objects. Analog and Digital Transfers (F28 and F29) are used to write data to the equipment.

For Modbus RTU-enabled equipment, the Modbus RTU Feature (F66) polls the equipment to request data from and write data to it. As in previous cases, all the data retrieved from the equipment is assigned to AV, MSV, and BV objects.

Figure 7 shows the three major client features that are used in the E-Link Gateway. Table 5 shows the normalizing variables and the output protocols.

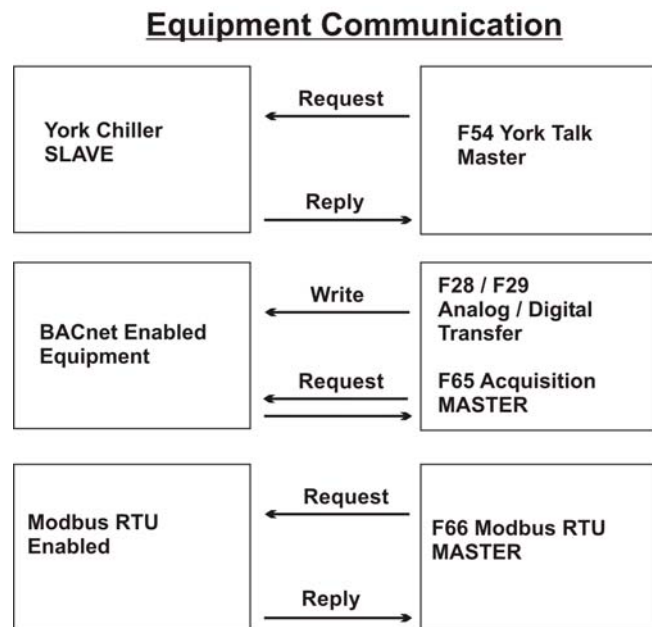


Figure 7: Client Features

Table 5: Normalizing Variables and Output Protocols

INPUT	Normalized Data	OUTPUT
York Talk Data	AV, MSV, BV	N2, Modbus RTU, BACnet, and LON FTT10
BACnet Data	AV, MSV, BV	
Modbus RTU Data	AV, MSV, BV	

Equipment Profiles

These are defined as collections of data points, which provide a BAS system access to certain equipment functionality when exposed on a network.

E-Link Gateway Application

To provide flexibility, the E-Link Gateway does not hardcode the equipment profiles but allows them to be easily configured by factory designated resources. These profiles are stored as E-Link Gateway Applications that can be restored using a BACnet atomic write service or by an X-modem transfer. The assigned Application revision number reflects the state of the profile.

Principle of Operation

The E-Link Gateway's Application links features together to create a predefined behavior that is executed once every system cycle. Figure 8 and Table 6 show Firmware Features used.

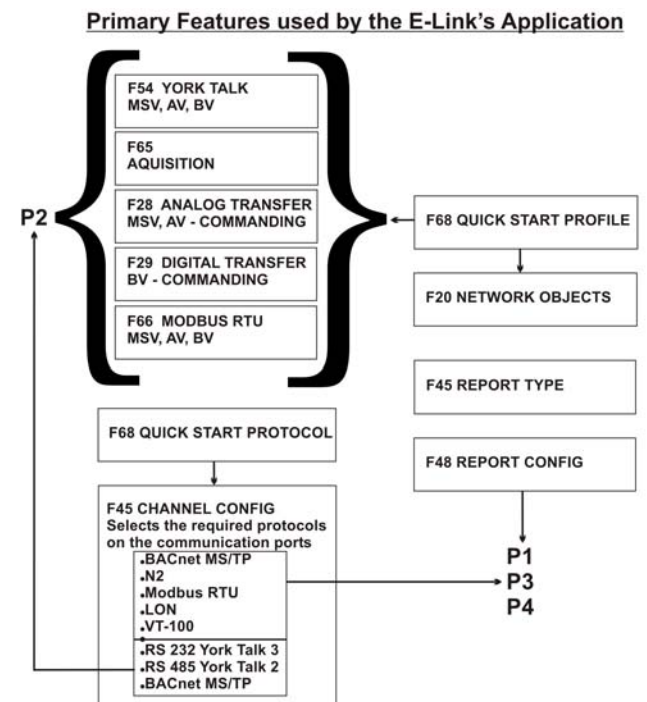


Figure 8: Features

Table 6: Features

Feature	Description
F01	MULTI STATE VALUE
F04	ANALOG VALUE
F06	BINARY VALUE
F09	BINARY OUTPUT
F20	NETWORK OBJECTS
F28	ANALOG TRANSFER
F29	DIGITAL TRANSFER
F45	CHANNEL CONFIG
F48	REPORT CONFIG
F49	USER TYPE
F50	SYSTEM DIAG.
F54	YORK TALK
F60	SYSTEM STRUCTURE
F65	ACQUISITION
F66	MODBUS RTU
F67	QUICK START PROTOCOL
F68	QUICK START PROFILE
F69	MSV COMPANION
F70	QUICK START CONTINUATION

Accessing the E-Link Gateway

A user must first establish communications with the E-Link Gateway to access the Application. This is done by connecting a computer to Port 3 through a converter that provides an RS-485 interface.

Next, the protocol on Port 3 must be set to Terminal mode. This is accomplished by setting the T-switch (Way 8) of the MAC switch to ON (Figure 9).

System Interface Module (SIM)



Figure 9: MAC Address Switch

Any VT-100 emulation program can be used to access the Applications, but HyperTerminal provides a well-proven tool for Windows OS users.

Note: All screenshots in this document were taken via HyperTerminal.

Set the terminal emulation software to the following settings once the computer and E-Link Gateway are connected:

- Baud rate = 57600

- Parity = None
- Data format = 8 bits, 1 stop bit
- Set terminal for Half Duplex mode of operation
- Set for a linefeed after a carriage return

System Levels

A system of hierarchical levels offers access to the FSP of an E-Link Gateway. There are four primary system levels:

- Advisory Level
- Feature Level
- Section Level
- Page/Data Entry Level

Access all FSP data via a series of key presses from a terminal.

Advisory Level

The Advisory Level is the default of the E-Link Gateway and consists of the unit name, the current date/time, and one of the following messages:

- System Unconfigured
- System Halted
- System Monitor

The only operations that may be performed at Advisory Level are as follows:

- Password Access
- Alarm review (not applicable for standard E-Link Gateway operation)

Terminal Command Structure

The E-Link Gateway's terminal command set is based on two types of commands: base commands and extended commands.

Base commands comprise a single character and provide the basic navigation through the E-Link Gateway. They can also take the form of a string of base command characters.

Extended commands comprise complete words and provide more flexible methods of interrogating the E-Link Gateway. Extended commands cannot be strung together.

Note: All commands consist of lowercase characters. Uppercase characters are reserved for text entry. Commands are executed by pressing the <CR> key.

Logging On

Once the terminal program has been activated, the user can then establish a session with the E-Link Gateway. Send either a logon or login command to initiate the session.

You are prompted to enter a password upon entering the logon/login command. The general user password (default 5555) can be used to investigate the system for general troubleshooting activities.

Additional passwords are available for login access. The following table summarizes the available passwords, access levels, and functionality.

Table 7: Password Access Levels

Password	Access Levels
5555	General access to all FSP functionality. User can make queries into the E-Link Gateway for troubleshooting activities. Any changes are not saved to flash.
1111	Gains access to User Report 1
2222	Gains access to User Report 2
3333	Gains access to User Report 3
4444	Gains access to User Report 4

Once a session is activated, there are two ways to terminate the session. The first way is simply to execute the **logout** or **logoff** command. Invoking either of these results in the following action by the E-Link Gateway:

```
Link closed
Reversing database changes...
Restarting system...
```

The second way to terminate the session is a period of inactivity. If there is no keyboard activity for 20 minutes, the session expires and you must log in again.

Help Command

The help command (Figure 10) accesses the E-Link Gateway's help screen and is accomplished by typing help at the prompt. The help command can be invoked any time the user is at the prompt.

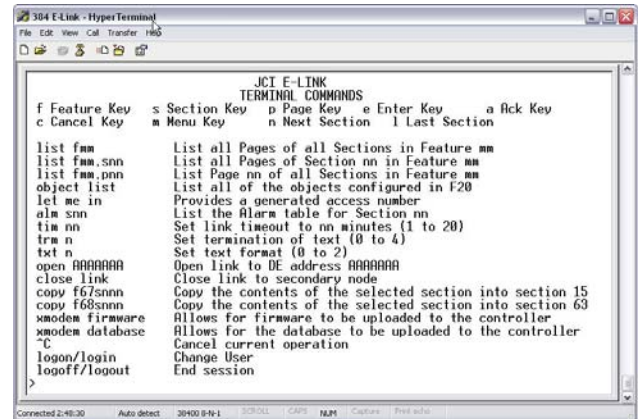


Figure 10: Terminal Commands

General Navigation Commands

The E-Link Gateway's Terminal interface supports a series of easy-to-use generic commands that allow access to the hierarchically presented data. Data in the E-Link Gateway is addressed by referencing a Feature, a Section and a Page.

Basic FSP commands can be appended to achieve a higher degree of functionality. This guide focuses on the fundamentals, as these are sufficient to enable all functions. As a user becomes more familiar with the navigation, more elaborate sequences can be used.

You can only access the E-Link Gateway's features after entering a valid password. Although the password can be changed in F60, the E-Link Gateway's Applications do not allow you to save the password; therefore, default password 5555 is always valid.

Feature Command

Feature Command (f) – The feature command can be issued in two ways. The first method is to enter `fnn`, where `nn` is the specific two-digit feature number.

The second method is to type `f`, which advances the Application to the next feature in sequence. The feature cycles back to F01 upon reaching F99. You can type a minus symbol at the Feature level to select the previous feature.

Section Command

Section Command (s) – The section command can be issued in two ways. The first is simply to enter the command `snnn`, where `nnn` is the specific three-digit section number.

The second method is to type `s`, which advances the Application to the next section. The section cycles back to section 1 upon reaching the maximum section of a particular feature. If you enter a section number

beyond the limit of a particular feature, then you are prompted with error 07 – Section number out of range.

Figures 11 and 12 show two basic ways of viewing different Features and Sections.

```
>Login
PLEASE ENTER PASSWORD - 5555
VD SI-F SAT 01-JAN-2005 01:30
>F15
F15 ANALOG HISTORY
>F
F16 DIGITAL HISTORY
>F
F17 OPTIMAL HISTORY
>F
F18 UTILITY PERFORM.
>F
F19 UTILITY SUPPLY
>F
F20 NETWORK OBJECTS
>F
F21 EVENT CONFIG.
>F
F22 EVENT DATA
>
F21 EVENT CONFIG.
>-
F20 NETWORK OBJECTS
>-
>
```

Figure 11: Features List

```
>Login
PLEASE ENTER PASSWORD - 5555
VD SI-F SAT 01-JAN-2005 01:28
>F04
F04 ANALOG VALUE
>S020
S020 CONDSAT_TEMP
>S
S021 DISCH_TEMP_1
>S
S022 DISCH_TEMP_2
>S
S023 SUMP_OIL_T
>S
S024 REFRIG_LEVEL
>S
S025 UNIT_OP_HRS
>S
S026 UNIT_STARTS
>S
S027 SUMP_OIL_PRS
>S
S028 PUMP_OIL_P_1
>-
>
```

Figure 12: Sections List

You can type a minus symbol at the Section level to select the previous section.

Page Command

Page Command (p) – The page command can be issued in two ways. The first is simply entering pnn, where nn is the specific two-digit page number. The number of valid pages per section varies by the particular feature that has been selected.

If you select a page number beyond the limit of a particular section, then you are prompted with error 08 – Page number out of range.

The second method is to type p. The E-Link Gateway advances to the next page in sequence of the currently selected feature and section. Upon reaching the last page for a particular section, the page cycles back to page 1. You can type a minus symbol at the Page level to select the previous page.

Enter Command

Enter Command – The Enter command is issued to begin editing a particular field in a given Feature, Section, and Page. The editing process follows the following steps:

1. Issue the required FSP command to bring the required page into focus.
2. Type e and press Enter. The page is returned as before except that the contents of the user-enterable data field are replaced with an appropriate data entry prompt (see Table 8).

Table 8: Data Entry Prompts

“t.....t”	This represents an ASCII text entry.
“v.....v”	This represents either a Real or an Integer value. Real Value: 8 digits may be entered. A decimal point or minus sign reduces the effective length by 1. Integer Values: Only positive values are accepted. If a Real Value is entered, error 02 – Invalid data is returned.
“ssss”	This represents a point address (for example, 4001 or 3064).
“m...m”	This represents a menu selection (for example, ON, OFF, FIR).

Once you edit a field, type e and press Enter to close it. Some pages have multiple editable fields, which are sequentially opened and closed using e.

Figure 13 illustrates the editing sequence for all data types. It also shows how the e command is used to open an edit session, move through all available editable fields, and close the session.

```
VD SI-F SAT 01-JAN-2005 01:32
>f04s001p01
P01 LCHW_SP 6.0 C 0
>e
P01 tttttttttt 6.0 C 0
>ANDY'S ELINKe
P01 ANDY'S ELINK 6.0 C 0
>p04
P04 DIRECT INPUT: 0000
>e
P04 DIRECT INPUT: ssss
>3001e
P04 DIRECT INPUT: 3001 AV5 STEER 0.0
>p07
P07 DEFAULT VALUE: 6.0 ENG UNITS: C
>e
P07 DEFAULT VALUE: vvvvvvvv ENG UNITS: C
>67.2e
P07 DEFAULT VALUE: 67.2 ENG UNITS: mmmmm
>m
P07 DEFAULT VALUE: 67.2 ENG UNITS: M
>m
P07 DEFAULT VALUE: 67.2 ENG UNITS: KW
>-
>
```

Figure 13: Editing Sequence

Menu Command

Menu Command (m) – The menu command selects the next selection of the menu enumeration. Certain fields are driven by a menu depending on the feature. If the user needs to adjust one of these fields, the m command cycles through all available enumerations.

Next Section Command

Next Section Command (n) – The n command takes the user to the next section of the selected feature. The command can be used to examine the same page across multiple sections.

For example, viewing p07 (Defaults and Engineering Units) on all F04 objects could be done by first viewing p07 then typing n and pressing enter for the number of sections that need to be viewed.

Other Commands

Last Command (l) – The l command takes the user to the last section of the current feature.

List Command – This command is used to view a list of E-Link Gateway parameters sorted by the way the command is constructed. For example:

- list f04 – This command lists all Pages of all Sections in F04 (Figure 14).

```
PLEASE ENTER PASSWORD - 5555
VD SI-F SAT 01-JAN-2005 01:23
>list f04
F04 ANALOG VALUE S001 LCHW_SP
P01 LCHW_SP 6.0 C 0
P02 DESCRIPTION:NVICOLSETPT
P03 SOURCE: R SETPOINT CNTR: 0000 ACT: R SETPOINT CNTR 0 0
P04 DIRECT INPUT: 0000
P05 ALARM FUNCTION: 0
P06 NET 0 MAC 0.0.0.0.0.0
P07 DEFAULT VALUE: 6.0 ENG UNITS: C
P08 OUT OF SERVICE WRITABLE: YES
P09 RESET ON POWERUP: NO
P10 MIN PV: -20.0 MAX PV: 100.0
P11 SETPOINT: 6.0
P12 SENSOR INPUT SECTION: 3 DEGC TO DEGF
P13 SENSOR INPUT ENABLE: 9004 IN-SI CONVRT OFF
P14 COV INCREMENT 1.0
P15 MODBUS ADDR: 1 DATA TYPE: SIGNED SCALE: X10
P16 BACNET INSTANCE: 0
Next Section... press <enter>
```

Figure 14: List of All Pages of All Sections

- list f04,s001 – This command lists all Pages of Section 001 in Feature 04 (Figure 15).

```
Logon
PLEASE ENTER PASSWORD - 5555
VD SI-F SAT 01-JAN-2005 00:29
>list f04,s001
F04 ANALOG VALUE S001 LCHW_SP
P01 LCHW_SP 6.0 C 0
P02 DESCRIPTION:NVICOLSETPT
P03 SOURCE: R SETPOINT CNTR: 0000 ACT: R SETPOINT CNTR 0 0
P04 DIRECT INPUT: 0000
P05 ALARM FUNCTION: 0
P06 NET 0 MAC 0.0.0.0.0.0
P07 DEFAULT VALUE: 6.0 ENG UNITS: C
P08 OUT OF SERVICE WRITABLE: YES
P09 RESET ON POWERUP: NO
P10 MIN PV: -20.0 MAX PV: 100.0
P11 SETPOINT: 6.0
P12 SENSOR INPUT SECTION: 3 DEGC TO DEGF
P13 SENSOR INPUT ENABLE: 9004 IN-SI CONVRT OFF
P14 COV INCREMENT 1.0
P15 MODBUS ADDR: 1 DATA TYPE: SIGNED SCALE: X10
P16 BACNET INSTANCE: 0
>
```

Figure 15: List All Pages of Section 001 in Feature 04

- list f04,p01 – This command lists Page 01 of all Sections in Feature 04 (Figure 16).

```
Logon
PLEASE ENTER PASSWORD - 5555
VD SI-F SAT 01-JAN-2005 00:26
>list f04,p01
F04 ANALOG VALUE
P01 LCHW_SP 6.0 C 0
P01 XCURR_LIMIT 100.0 PCT 0
P01 VT_S01_P05 0.0 0
P01 VT_S01_P06 45.0 0
P01 LCHL_TEMP 0.0 C 0
P01 RCHL_TEMP 0.0 C 0
P01 EVAP_PRESS 0.0 KPA 0
P01 COND_PRESS 0.0 KPA 0
P01 OIL_DP_1 0.0 KPA 0
P01 OIL_DP_2 0.0 KPA 0
P01 RCNDL_TEMP 0.0 C 0
P01 LCNDL_TEMP 0.0 C 0
P01 XFLA_1 0.0 PCT 0
P01 XFLA_2 0.0 PCT 0
P01 EVAP_REF_T 0.0 C 0
More... press <enter>
```

Figure 16: List Page 01 of All Sections in Feature 04

Note: Enter Control+C (^C) to terminate any List Command.

Copy Commands

Two commands are used to copy the contents of a given Quick Start section of either F67 or F68 into the last available section supported by that Quick Start feature (Figure 17). (See the *Quick Starts* section for additional information.)

- copy f67snnn is used to copy the contents of section nnn (where nnn is the three-digit section number) into section 15, the last section of F67.
- copy f68snnn is used to copy the contents of section nnn (where nnn is the three-digit section number) into section 63, the last section of F68.

```
Logon
PLEASE ENTER PASSWORD - 5555
VD SI-F SAT 01-JAN-2005 00:03
>copy f67s010
Section 10 copied into section 15
>copy f68s024
Section 24 copied into section 63
>
```

Figure 17: Copy Commands

X-modem Firmware

The E-Link Gateway Firmware can be reloaded in the field using a VT-100 terminal session. The command for initiating the load is xmodem firmware.

A prompt indicates when the E-Link Gateway is ready to receive the Firmware file (Figure 18).

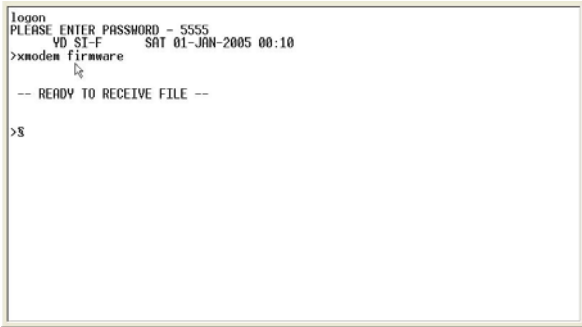


Figure 18: X-Modem Firmware

Hyper Terminal has a Transfer selection that allows you to access a Send File window (Figure 19 and Figure 20). The filename (*.ELF) and desired protocol (Xmodem) must be entered in this window.

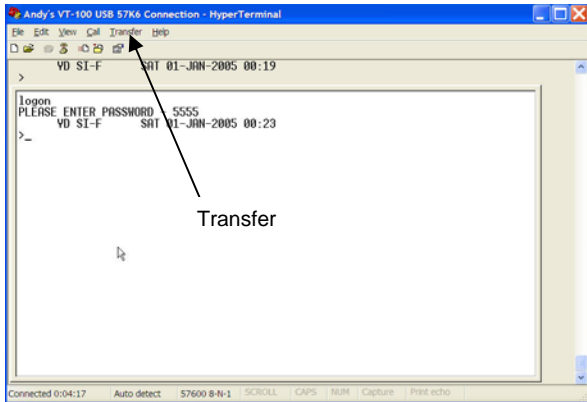


Figure 19: Transfer Option

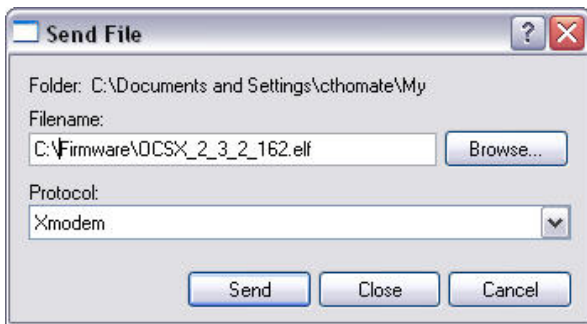


Figure 20: Send File Window

Figure 21 shows the progress of transferring data to the E-Link Gateway.

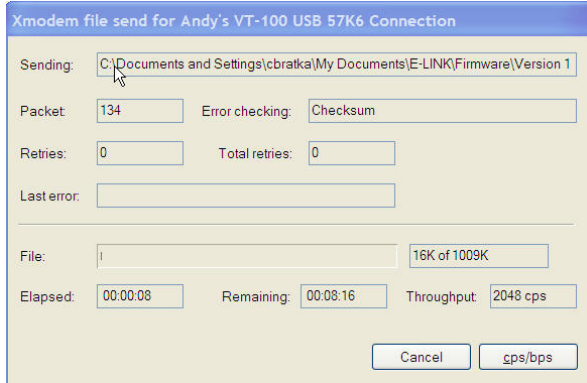


Figure 21: Data Transfer Progress

The system writes the new file to flash and then restarts after the the E-Link Gateway receives the completed Firmware file. The current session is closed because the E-Link Gateway is going through a warm start.

Figure 22 shows the HyperTerminal feedback during the process of updating the Firmware. The user must wait until the RESTARTING message is displayed and the E-Link Gateway has reset to perform any other tasks.

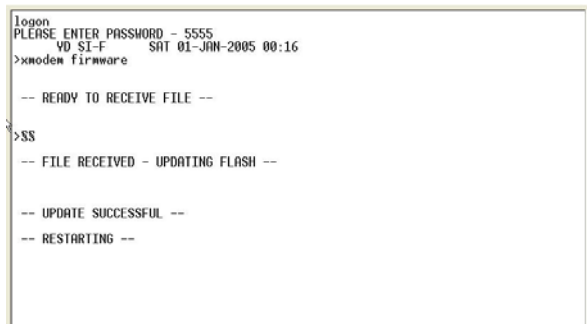


Figure 22: Messages during Firmware Update

X-modem Database

The E-Link Gateway's Application can be reloaded in the field through a VT-100 terminal interface. The command for initiating the load is xmodem database. The user is prompted when the E-Link Gateway is ready to receive the Application file (Figure 23).

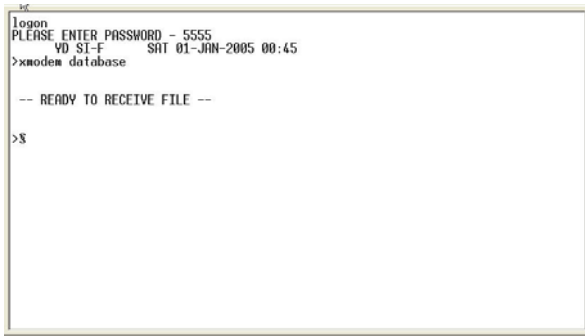


Figure 23: Ready to Receive File Message

Hyper Terminal has a Transfer selection that allows a user to access a Send File window (Figure 24), in which the filename (*.CNF) and desired protocol (Xmodem) must be entered.

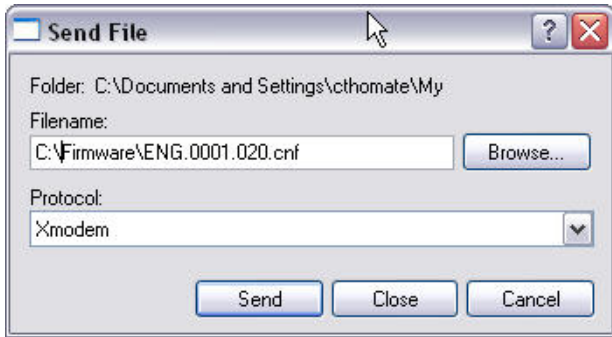


Figure 24: Send File Window

Figure 25 shows the progress of transferring data to the E-Link Gateway.

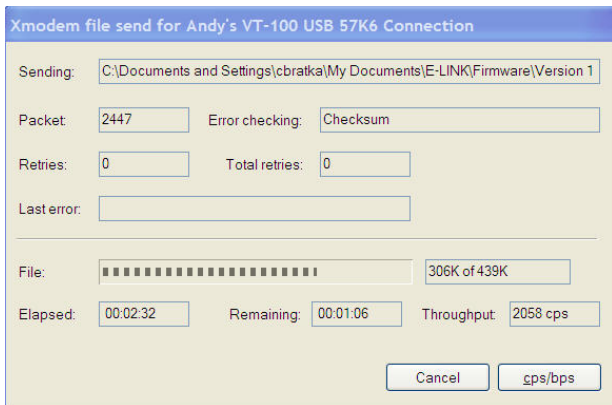


Figure 25: Data Transfer Progress

The system writes the new file to flash and then restarts after the E-Link Gateway receives the completed Application file. The current session is closed because the E-Link Gateway is going through a warm start.

Figure 26 shows HyperTerminal feedback during the process of updating the Application. The user must wait until the RESTARTING message is displayed and the E-Link Gateway has reset to perform any other tasks.

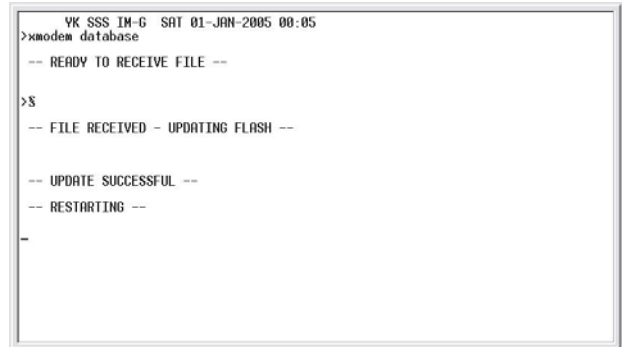


Figure 26: Messages during Application Update

Object List Command

The object list command requires an established VT-100 session to be active. The object list command is used to display all the objects that have been activated in F20 (Figure 27).

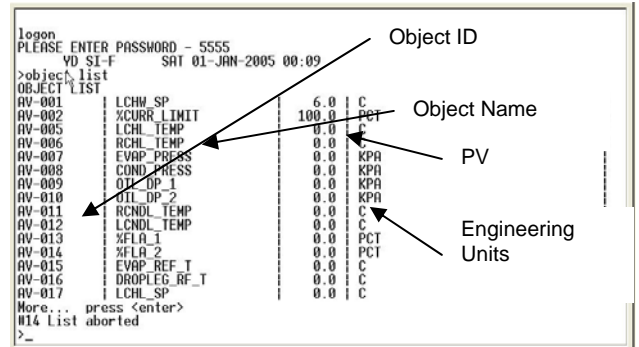


Figure 27: Object List Command

Let Me In Command

The let me in command is used to generate an access code which can be used to obtain a password from an authorized support center. The system creates a password that stays active for a period of 120 minutes after the command is entered. Figure 28 shows the different codes that are generated each time the let me in command is entered.

```

login
PLEASE ENTER PASSWORD - 5555
VD SI-F SAT 01-JAN-2005 00:24
>let me in
Access Code = 10-66-84-81
>let me in
Access Code = 136-822-966-18225
>let me in
Access Code = 80-486-574-6241
>let me in
Access Code = 212-1278-1498-44521
>let me in
Access Code = 205-1236-1449-41616
>let me in
Access Code = 51-312-371-2500
>let me in
Access Code = 230-1386-1624-52441
>let me in
Access Code = 98-594-700-9409
>let me in
Access Code = 56-342-406-3025
>

```

Figure 28: Let Me In Command

Quick Starts

Quick Start is the method used in the field to set up and configure the operation of the E-Link Gateway. The desired modes of operation are selected on two DIP switches. Each bank of switches is used to invoke a specific behavior.

APP GROUP A switches are used to select the required equipment profile. APP GROUP B switches are used to select the desired output protocol. The binary weight of each switch (its address) is associated with a unique instance of two Application editor features.

Two features (F67 and F68) are associated with APP GROUP A and APP GROUP B and allow a user to create a script that, when executed, modifies the E-Link Gateway's base configuration.

Base Configuration

The base configuration is contained within the factory-installed Application and is designed to set up objects (Features) within the E-Link Gateway that can later be modified by executing a Quick Start. The E-Link Gateway does not use Battery Random Access Memory (BRAM), so any time the power is cycled the base configuration that is stored in FLASH is copied into SDRAM ready for execution; therefore, there is always a known starting point for the Quick Start features to work from.

Quick Start Execution

To invoke a Quick Start, set a desired address on the Application switches and press a momentary invoke push button or cycle power. When this occurs, the base configuration is loaded from Flash into SDRAM, and then modified according to the Application edits that are associated with the selected Quick Start settings.

In most cases, the base configuration has all the desired objects fully configured but disabled. The Quick Start feature creates the desired functionality by enabling the required functionality in the objects.

Every time a new Quick Start is invoked, the unedited base configuration is reloaded from Flash before being modified by the Quick Start script.

Quick Start features F67 and F68 use a collection of one-line statements that can be programmed to alter the contents of the Base Configuration. There is a simple correspondence between the feature's section number and the binary weight of the Application switch.

For example, if APP Group A switches are set to 4, then the script defined in Section 4 of F68 is executed, and it determines the equipment port's behavior. If APP Group B switches are set to 10, then the script defined in Section 10 of F67 is executed, and it determines the output protocol that is used.

F67 (QUICK START PROTOCOL) and F68 (QUICK START PROFILE)

A generic Quick Start statement is as follows:

FNN SNNN PNN FINN = TTTTTTTTTTTT S..S

The Feature, Section, Page, and Field parameters are used to uniquely identify any piece of editable RAM resident data within the E-Link Gateway. The 12-character ASCII string defines what data should be assigned to the selected property. S..S represents the status of this line of script.

If the referenced E-Link Gateway Property is a character string, such as an object's name or descriptor, then whatever has been configured in the text section on the right side of the statement overwrites the current contents. For example, F02, S001, P01, Field 1 = OUTSIDE AIR, assigns OUTSIDE AIR to the F02 object's name.

If the referenced E-Link Gateway Property is a real number, such as an object's Relinquish Value, and if the text section of the statement is of the form X.X, the text value is converted into an Intel Real number and replaces the value of the Relinquish value property. For example, F04, S001, P07, Field 2 = 23.4, assigns 23.4 to be the F04 object's Relinquish Value property.

If the E-Link Gateway Property is an integer or enumeration, such as an object's engineering units, and if the text section of the statement is of the form X, then the text value is converted into an integer and applied to the current engineering unit selection property. For example, F04, S001, P01, Field 3 = 4, assigns ohms to the F04's object's engineering units.

Each line of the script has an associated status that informs the users whether the script has any syntax errors. If OK is displayed, then the script has been correctly configured and executes. The errors shown in Table 9 can be reported.

Table 9: Data Entry Prompts

Code	Meaning
“ ”	Nothing has been configured.
“OK ”	The script has been configured correctly (the specified address and the entered data are compatible).
“INVALID FEATURE”	An invalid Feature number has been entered, or the specified feature doesn't exist or does not contain any user-editable data.
“INVALID SECTION”	An invalid Section number has been entered, or the specified section doesn't exist or doesn't contain any user editable data.
“INVALID PAGE”	An invalid Page has been entered.
“INVALID FIELD”	An invalid Field has been entered.
“INVALID WRITE”	There is a data type mismatch between the referenced point and the configured value.
“INVALID DATA”	There is a data type mismatch between the point being referenced and the configured value.

The number of possible scripts contained by each of the Quick Start features is shown in Table 10.

Table 10: Data Entry Prompts

F67 ~ Protocol	F68 ~ Equipment Profile
20 Pages (scripts)	98 Pages (scripts)

If the number of scripts supported by the standard Quick Start feature is not enough to support the desired behavior, then you can use the Continuation feature to extend its capacity.

F70 QUICK START CONTINUATION FEATURE

The Quick Start continuation feature is designed to provide a user with the ability to increase the number of F68 Quick Start profile scripts that can be executed. The feature is organized in the same way as F68; but in addition to the script pages, it has a steering address located on P01, allowing it to be associated with other F68 or F70 script sections, which extend the overall script capacity that can be executed for a given Quick Start setting. The number of F70 sections is limited, so only a few Quick Starts may be extended in this way.

The Continuation feature is no more than a place holder for scripts that may be chained together with other F70 sections and/or F68 sections.

P01, Fi3 is a F68 section number that associates this particular F70 section to another section of F68.

If several F70 sections have the same section number configured in Fi3, then they collectively form an expanded script that consists of the original F68 section followed sequentially by any others that have been referenced within F70 sections.

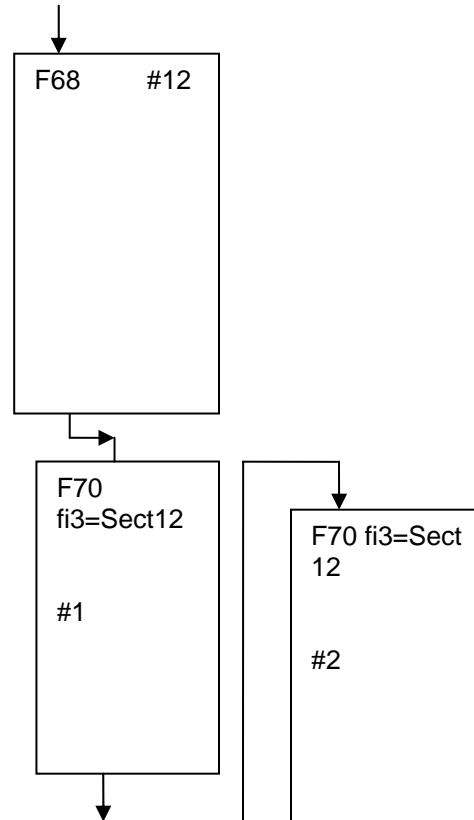


Figure 29: F70 Sections

Custom Quick Start

A user logged on with a level 5 password may edit any single section of F67 and F68. The `let me in` command is used to generate a password for saving these changes to flash.

Only F67 Section 15 and F68 Section 63 are able to be saved this way. To assist with this process, two commands are available to copy an existing Quick Start script into the last section of each of these features. In so doing, the amount of required data entry is minimized.

Two commands are used to copy the contents of a given Quick Start section of either F67 or F68 into the last available section supported by that Quick Start feature:

- copy f68snnn copies the contents of the selected section of this feature into the last custom section (that is, section 63).
- copy f67snnn copies the contents of the selected section of this feature into the last custom section (that is, section 15).

After selecting the Quick Start that needs to be edited, and copying it into the last section of F68 and or F67 using the previously described commands, you can then make functional changes by editing an existing line of script or adding new script lines.

To invoke a Custom Quick Start, set the APP Group A and or APP Group B switches to 63 and 15, respectively. The E-Link Gateway resets.

Algorithmic Password

If a user types `let me in` when connected to an E-Link Gateway in Terminal mode, the system generates an access string and automatically creates and stores a password that allows any custom Quick Start to be saved to flash. Concurrently with this process, the system starts a 120-minute down-timer which, on expiration, terminates the validity of the generated password. If a user types `let me in` during the countdown period, the system automatically terminates the active password, requiring another password to be generated.

LED Operation

The E-Link Gateway uses a series of LEDs to provide a visual indication of its current operating status. The IPU-II has a Power and Status LED, and the SIM has two LEDs assigned to each port.

The green Power LED indicates that the E-Link Gateway is supplied with an input source of power. It does not indicate that this voltage source is within specification to allow the E-Link Gateway to operate correctly, just that a power source is present.

The red Status LED is used to indicate the E-Link Gateway's operating conditions (as shown in Table 11). The Status LED flashes continuously when the system is operating correctly. This flash rate is defined as 500 ms on followed by 500 ms off. An error flash rate is defined as code sequence of 500 ms on followed by 500 ms off to indicate the applicable code, followed by a 2,000 ms delay before the sequence is repeated.

Table 11: LED Flash Rate Indicators

Flash Rate	Indication
LED OFF	No Application loaded. The E-Link Gateway is not configured, the system is in HALT or MONITOR mode, or the loaded Application does not match the host hardware. (The green Power LED should be used as an indication of whether power is currently applied.)
1 FLASH	Terminal mode has been invoked.
2 FLASHES	The communication between the E-Link Gateway and the equipment using F54, F65, and F66 has been lost.
3 FLASHES	A F67 or a F68 configuration error has been detected.
LED ON	Set during rebooting. No errors received with a F67/F68 patched Application or with a custom SIS developed Application.
Continuous FLASH	No errors with the standard Factory loaded Application. The E-Link Gateway is operating as expected.

The Status LED flashes quickly when the Quick Start activation push button is pressed, which indicates a user has requested the E-Link Gateway to be reinitialized. The Status LED is set to on when the push button is released, which indicates a reboot.

Each Port has an associated green and red LED, which are used to indicate the port's communication status. The LEDs are connected directly to the driver's hardware lines and are therefore a reflection of the electrical activity of that port.

When the green RX LED is on, it indicates that electrically this Port is receiving data. It does not imply that the quality of this data is good or whether it is actually being directed to this Port. In an RS-485 Application, the green RX LED is an indicator of all network activity. When the green RX LED is off, it indicates that the Port is not receiving any data.

When the red TX LED is on, it indicates that electrically this Port is transmitting data. It does not imply that the quality of this data is good. It simply means that this Port is outputting data. When the red TX LED is off, it indicates that the E-Link Gateway is not transmitting any data.

User Reports

User reports allow you to edit more advanced site specific parameters that cannot be selected within a Quick Start selection (for example, the setting of Max Masters, Device object instance).

To access the User reports, you must establish a connection and session with the E-Link Gateway. The following standard reports are available:

- BACnet MS/TP
- Modbus RTU Scaling
- YPAL DEST DE
- Support

To log on to a User report, type logon and press Enter. The E-Link Gateway responds with PLEASE ENTER PASSWORD.

The following passwords are valid and are associated with the following user types:

Table 12: Valid Passwords and User Types

Password	User Report
1111	BACnet MS/TP
2222	Modbus RTU Scaling
3333	YPAL DEST DE
4444	Support

Once the password has been entered, the E-Link Gateway responds with:

```

USER  USER n (n = 1, 2, 3, or 4)
TT....TT (name of the report)
TT ... TT (name of report)
Select Option
>
    
```

Enter **1** or **2** and press Enter to view a list of all the pages of the selected report.

Any changes that are made in any of the reports are saved to flash once the user has logged off of the report or the report has timed out.

User Report 1 allows certain BACnet parameters to be viewed and edited. These parameters are primarily used to facilitate on-site setup, avoid protocol conflicts (the same addresses), or optimize network performance (adjust timeouts).

User Report 2 provides a mechanism of altering the Modbus RTU scaling of two chiller parameters: run hours and number of starts. After an extended period of run time, these variables can exceed the maximum resolution of a Modbus RTU Register (65,353). To mitigate, the value can be scaled appropriately. For example, selecting X0.1 effectively divides the number of run hours or starts by 10, and extends the maximum value that can be represented.

User Report 3 is used to set the BACnet address of the YPAL unit.

User Report 4 is the Support report and is specifically designed to assist with the debugging process. It provides a convenient location for Firmware versions, released dates, and general status information. It provides a combination of both editable and non-editable pages.

Within this User access level there are two reports that can be selected: General Diagnostic and Port Configuration.

Figure 30 shows all the BACnet parameters that may be user-adjusted in the field.

```

PLEASE ENTER PASSWORD - 1111
VD SI-F      SAT 01-JAN-2005 01:47
USER USER 1
01. USER SET_UP
Select Option
>1
VD SI-F      SAT 01-JAN-2005 01:47
USER USER 1
USER SET_UP      BACNET MS/TP
P01 MAC ADDR-AUTO  MANUAL MAC= 0
P02 MS/TP BPS-AUTO  ACT: 76800
P03 DE MODIFIER ADDRESS: 50
P04 DE INSTANCE: 5003 AUTO
P05 DE NAME: VD SI-F      5003 AUTO
P06 MAX MASTERS=127
P07 APDU TIMEOUT: 3000MSEC
P08 LOCATION:
P09 DESCRIPTION:
    
```

Figure 30: BACnet Parameters

P01 enables the E-Link Gateway's MAC address to be manually configured. The default setting is AUTO, which obtains the MAC address from the setting on the MAC address switch (SW4).

Table 13: P01 Field Descriptions

P01	MAC ADDR	AUTO	MANUAL MAC	VVV
	=			
	Fi1	Fi2	Fi3	Fi4

If the protocol on Port 1 is BACnet MS/TP and the MAC address is set to AUTO, and if:

- MAC address > **127**, it is clamped to **127**
- MAC address > MAX MASTERS, then the MAX MASTERS are set to the new MAC address

To set a manual MAC address, set Fi2 to MAN and enter the desired MAC address into Fi4.

P02 displays and allows the Port 1 baud rate to be changed. The default setting is AUTO. If selected, the setting adjusts the E-Link Gateway's baud rate to match that of the network.

Table 14: P02 Field Descriptions 1

P02	P1 BPS:	MMMMM	ACT:	MMMMM
	Fi1	Fi2	Fi3	Fi4

Table 15: P02 Field Descriptions 2

P02	PARITY	MMM	STOP BITS	M
	Fi5	Fi6	Fi7	Fi8

P02, Fi2 allows Port 1 baud rate to be selected. Table 16 shows the available selections.

Table 16: Port 1 Baud Rate Selections

AUTO
1200
4800
9600
19200
38400
57600
76800

Note: To operate an E-Link Gateway on the same MS/TP network as an NAE, set the Port 1 baud rate to 38400.

Auto Baud

The automatic adjustment of a port's baud rate is not a new concept. This technique has been used for many years in the communications industry to synchronize newly added devices with an already established and operational network.

Note: Auto baud is only designed to work for BACnet MS/TP on Port 1.

If P02, Fi2 is set to AUTO, then Fi4 displays the actual baud rate that has been negotiated by the auto baud routine.

The DE Modifier parameter as shown on P03 is a concept introduced in previous York controllers to establish a logical linkage between the address of a Router and its children, to better visualize the network hierarchy when viewed from an Operator Workstation (OWS). Today, the DE Modifier parameter works in conjunction with the E-Link Gateway's MAC address to

algorithmically create the Device Object address. The default value of this parameter is 50.

Table 17: P03 Field Descriptions

P03	DE MODIFIER ADDRESS:	VVVV
	Fi1	Fi2

P04, Fi2 is used to manually set the Device Object address in circumstances when the automatically created device address is not suitable. This may be because it is not unique or because the site requires some particular numbering policy.

Table 18: P04 Field Descriptions

P04	DE INSTANCE:	VVVVVVV	MMMM
	Fi1	Fi2	Fi3

P04, Fi3 normally defaults to AUTO, which creates the address automatically, but it may be changed to MAN allowing a user to enter a manual address in Fi2.

If Fi3 is set to AUTO, the DE instance is created algorithmically by adding the unit's MAC address to the value of the DE Modifier multiplied by 100.

So, $Fi2 = DE \text{ Modifier (P03 setting)} \times 100 + nnn$ where nnn is the MAC address switch setting.

For example, if the unit's MAC address is 3, and the DE Modifier is 50, then the DE instance is $(50 \times 100) + 3 = 5003$.

If Fi3 is set to MAN, the DE instance must be entered manually in field 2. Valid entries must be in the range 0 to 4,194,303 decimal.

If the entry in Fi2 is $> 4,194,303$, then the value is forced to 0.

P05 is used to manually set the E-Link Gateway's BACnet name in situations where there may be duplication or the site policy dictates this.

Table 19: P05 Field Descriptions

P05	DE NAME	TT....TT	MMMM
	Fi1	Fi2	Fi3

Fi3 normally defaults to AUTO, which creates the DE NAME automatically. The DE NAME can be changed to MAN allowing a user to enter a user-created name, in Fi2.

If Fi3 is set to AUTO then the Device Object's name is created algorithmically by appending the text entered in F60, P01 and the controller's DE instance. This

action provides network uniqueness as required by BACnet.

P05, Fi2 = F60 P01 (text) + VVVVVVV (DE Instance)

For example, if the DE Instance is 5003 and the text entered on P01 of F60 is YPAL RTU then the Device Object's name is YPAL RTU 5003.

If Fi3 is set to MAN, then the DE NAME must be entered manually in field 2. A valid entry is any alphanumeric string of no more than 20 characters.

P06, Fi2 allows you to set the Max Masters parameter on Port 1. The Max Masters parameter defines the highest MAC address of any Master node on the MS/TP network. The default value is 127, but you can set it to any value between 1 and 127. If a User enters a value of 0, it is automatically changed to 127. If a user enters a number greater than 127, it is reset to 127.

Table 20: P06 Field Descriptions

P06	MAX MASTERS:	VVV
	Fi1	Fi2

Note: If the MAC address is changed during normal system operation and P05 is set to AUTO, then the DE INSTANCE and DE NAME are automatically updated.

Note: To ensure most efficient communications, set the Max Masters value no larger than the highest MAC address of any node on the MS/TP network.

P07, Fi2 is used to configure the time in milliseconds after which a returning acknowledgement (a simple ACK) or result (a complex ACK) is considered to have failed. The default value of this parameter is 6,000, but can be edited by a user to any value between 500 and 60,000. To ensure optimum network performance, this parameter should be set to the same value in all intercommunicating devices. If a user enters 0, this value is automatically set to 6,000. If a user enters any value less than 500, it is set to 500, and any value greater than 60,000 is reset to 60,000.

Table 21: P07 Field Descriptions

P07	APDU TIMEOUT	VVVVV
	Fi1	Fi2

P08, Fi2 is a text placeholder that allows you to define the Location of the E-Link Gateway. This BACnet property can be retrieved by requesting the Location property of the Device Object.

Table 22: P08 Field Descriptions

P08	LOCATION	TT..TT
	Fi1	Fi2

P09, Fi2 is a text place holder used to define the E-Link Gateway's Application. This BACnet property can be retrieved by requesting the Description property of the Device Object.

Table 23: P09 Field Descriptions

P09	DESCRIPTION	TT..TT
	Fi1	Fi2

Figure 31 displays the Modbus RTU scaling parameters that can be field-modified to change the resolution of the equipment run hours and the number of starts.

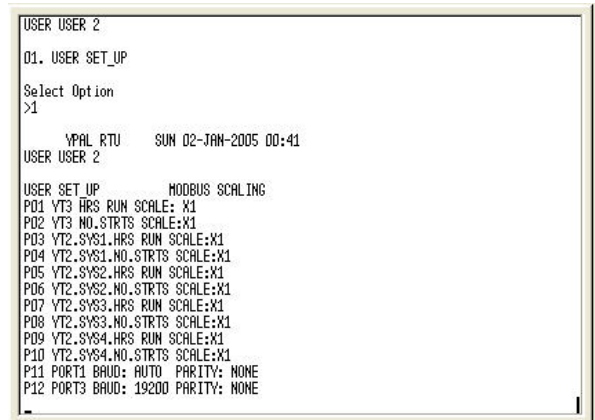


Figure 31: Modbus RTU Scaling Parameters

P01 and P02 represent the Modbus RTU scaling that is applied to the number of run hours and starts that a York Talk III-based chiller returns to a Modbus RTU client.

Table 24: P01 Field Descriptions

P01	YT3 HRS. RUN SCALE:	MMMMMMM
	Fi1	Fi2

Table 25: P02 Field Descriptions

P02	YT3 NO. STARTS SCALE:	MMMMMMM
	Fi1	Fi2

For both P01 and P02, Fi2 enables a user to select a scaling factor that may be selected. Table 26 shows the available multipliers for the scaling factor.

Table 26: Multipliers

Selection	Function
X10	Multiply the value by 10
X100	Multiply the value by 100
X1000	Multiply the value by 1000
X1	Multiply the value by 1
X0.1	Multiply the value by 0.1
X0.01	Multiply the value by 0.01
X0.001	Multiply the value by 0.001
X0.0001	Multiply the value by 0.0001

P03 through P10 represent the number of run hours and starts for a York Talk II-based system. This system may have one, two, three, or four compressors.

P11 and P12 are read-only and are used to provide the status of Port 1 and Port 3.

Figure 32 shows the YPAL BACnet address configuration screen.

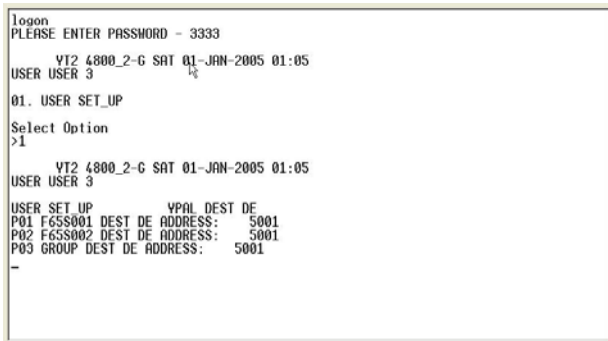


Figure 32: YPAL BACnet Address Configuration

P01 and P02 of this report are used to configure F65's section 1 and section 2 addresses. These addresses define the BACnet address of the YPAL unit.

Table 27: P01 Field Descriptions

P01	F65S001 DEST DE ADDRESS	VVVVVVV
	Fi1	Fi2

Table 28: P02 Field Descriptions

P02	F65S002 DEST DE ADDRESS	VVVVVVV
	Fi1	Fi2

These pages must be set up the same way, as they are used to identify the YPAL on the BACnet network. F65 uses this address in the BACnet device auto discovery process (WHO IS --- I-AM transaction).

Both P01 Fi2 and P02 Fi2 enable a user to enter a number between 0 and 4,194,303 that represents the YPAL's Device Object address. Each BACnet device must have a unique Device Object address on the network.

P03, Fi3 is used to set the destination address of the YPAL, to which write commands are sent. This must be the same as P01 and P02. This address is used by F57 (the Group feature) and the F28 (Analog Transfer feature) to determine where to send the data.

Table 29: P03 Field Descriptions

P03	GROUP DEST DE ADDRESS	VVVVVVV
	Fi1	Fi2

Figure 33 shows the two reports that can be generated using password 4444.

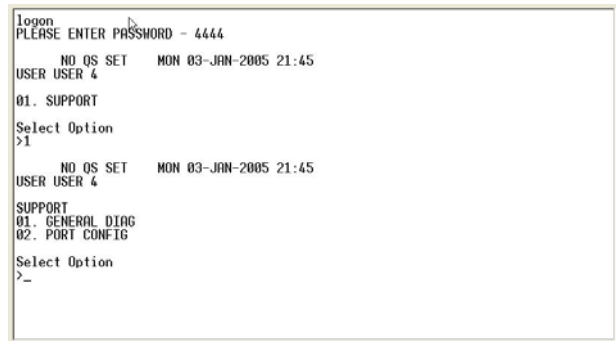


Figure 33: Password 4444 Reports

General Diagnostic Report

Figure 34 displays all the parameters contained in the General Diagnostic report.

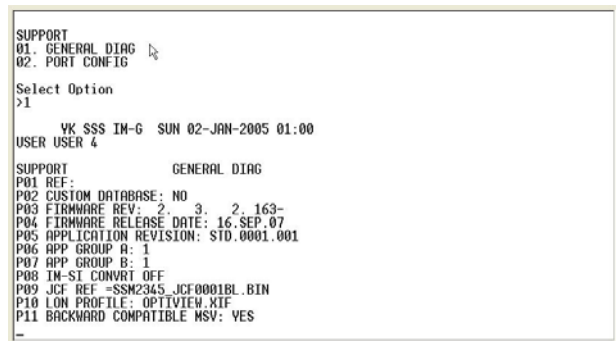


Figure 34: General Diagnostic Report Parameters

P01, Fi2 is used to document an SIS custom Application or a Field Support Center (FSC) sanctioned bug fix. Fi2 allows you to enter a 30-character text string. This text represents either an FSC incident number or an SIS reference number, or possibly a PO number.

Table 30: P01 Field Descriptions

P01	REF	TT..TT
	Fi1	Fi2

P02, Fi2 indicates whether a custom SIS created Application is currently active. This flag can only be set in F50, P45 by a developer using the E-Link Gateway's Master password. This flag can not be set in the field as a result of a FSC bug fix.

Table 31: P02 Field Descriptions

P02	CUSTOM APPLICATION	MMM
	Fi1	Fi2

P03 and P04 display the revision and the date when the Firmware was compiled and released.

Table 32: P03 Field Descriptions

P03	FIRMWARE REV	2.3.2.163-A
	Fi1	Fi2

Table 33: P04 Field Descriptions

P04	FIRMWARE RELEASE DATE	16-SEP-07
	Fi1	Fi2

P05 displays the Application Revision; this is the revision of the Application and may be configured in F45, P04, by a developer that has access to the E-Link Gateway's Master password.

Table 34: P05 Field Descriptions

P05	APPLICATION REVISION	ENG.001.023
	Fi1	Fi2

P06 and P07 display the decimal value of APP Group switch A and APP Group switch B, respectively. These pages effectively announce what Quick Starts are active.

Table 35: P06 Field Descriptions

P06	APP GROUP A:	MMM
	Fi1	Fi2

Table 36: P07 Field Descriptions

P07	APP GROUP B:	MMM
	Fi1	Fi2

P08 displays a flag that indicates whether the routine that converts imperial units to metric is currently active. If Fi2 is set to NO, then the routine is currently inactive. This is important for LON FTT10 implementations.

Table 37: P08 Field Descriptions

P08	IM-SI CONVRT	MMM
	Fi1	Fi2

P09 displays the version of the JCF image at the time the Application was created.

Table 38: P09 Field Descriptions

P09	JCF REF	SSM3456JCF0002BL.BIN
	Fi1	Fi2

P10 displays the LON FTT10 profile that is presently active. This is a read-only field that is generated by the type of equipment that has been Quick Started.

Table 39: P10 Field Descriptions

P10	LON FTT10 PROFILE	*.XIF
	Fi1	Fi2

P11, Fi2 is used to determine if the selected Quick Start profile should be backward compatible with the MicroGateway's BACnet implementation of Multi-State Value objects. In most cases the answer is YES, which is the default selection in this report. However, for new equipment profiles like the YD, when the selected output protocol is BACnet and BACnet ONLY, this flag should be set to NO.

Table 40: P11 Field Descriptions

P11	BACKWARD COMPATIBLE MSV	MMM
	Fi1	Fi2

Port Configuration Report

The Port Configuration report provides a status of all the communication ports and a means of software setting the MAC address for each port.

```

SUPPORT
01. GENERAL DIAG
02. PORT CONFIG

Select Option
>2

NO QS SET   MON 03-JAN-2005 21:52
USER USER 4

SUPPORT      PORT CONFIG
P01 P1 BACNET MS/IP
P02 P1 BPS:AUTO ACT:76800 PARITY:NONE STOP
P03 P1 MAC ADDR-AUTO MANUAL MAC= 0
P04 P2 VorkTalk 3
P05 P2 BPS:19200 PARITY:ODD STOP BITS:1
P06 P2 MAC ADDR-AUTO MANUAL MAC= 0
P07 P3 VorkTalk 3 SRVR
P08 P3 BPS:19200 PARITY:ODD STOP BITS:1
P09 P3 MAC ADDR-AUTO MANUAL MAC= 0
P10 P4 Terminal
P11 P4 BPS:38400 PARITY:NONE STOP BITS:1
P12 P4 MAC ADDR-MAN MANUAL MAC= 1

```

Figure 35: Port Configuration Report

Where PNN = P01, P04, P07, and P10, the parameters are used to display the currently selected protocol on Ports 1, 2, 3, and 4, respectively.

P02 displays the baud rate, parity and stop bits being used by Port 1.

Table 41: P02 Field Descriptions 1

P02	P1 BPS:	MMMMM	ACT:	MMMMM
	Fi1	Fi2	Fi3	Fi4

Table 42: P02 Field Descriptions 2

P02	PARITY	MMM	STOP BITS	M
	Fi5	Fi6	Fi7	Fi8

Where PNN = P05, P08, and P11, the parameters display the baud rate, parity and stop bits for Ports 2, 3, and 4, respectively.

Table 43: PNN – P05, P08, and P11 Descriptions 1

PNN	P1 BPS:	MMMMM
	Fi1	Fi2

Table 44: PNN – P05, P08, P11 Descriptions 2

PNN	PARITY	MMM	STOP BITS	M
	Fi5	Fi6	Fi7	Fi8

Where PNN = P03, P06, P09, and P12, the parameters provide a means for software setting the MAC address for Ports 1, 2, 3, and 4, respectively.

Table 45: PNN – P03, P09, and P12 Descriptions

PNN	MAC ADDR =	MMMM	MANUAL MAC =	VVV
	Fi1	Fi2	Fi3	Fi4

The default setting is AUTO, which obtains the MAC address from the setting on the MAC address switch (SW4).

To set a manual MAC address, set field 2 to MAN and enter the desired MAC address in Fi4.

Writing Values to the E-Link Gateway

The E-Link Gateway is a multi-port device that enables different communication protocols to concurrently read and write values. To facilitate a predictable outcome from any write sequence, priority arbitration has to be used. Figure 36 shows the port organization and data flow within the E-Link Gateway.

Only AV and BV objects that have their SOURCE set to R-Setpoint, R-Setup Flag or Network can accept a value from a network write command. As the data within the E-Link Gateway is represented as BACnet objects the BACnet priority array provides a very convenient way in which to manage all the write requests.

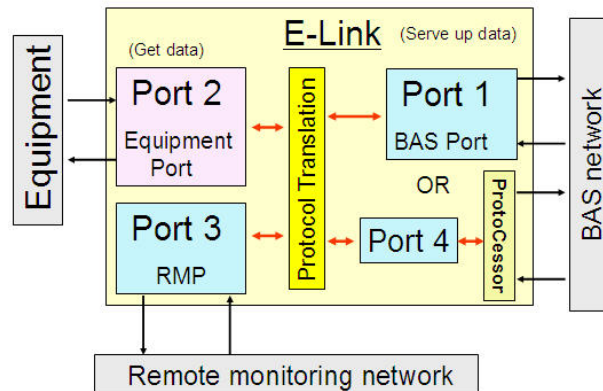


Figure 36: Port Organization and Data Flow

All BACnet commands to objects with their SOURCE set to R-Setpoint or R-Setup Flag is placed in the Priority array at the commanded priority level, and then saved to Flash after a timeout has expired.

BACnet writes to objects with their SOURCE set to NETWORK are placed in the Priority array at level 16. The last command received takes precedence. In this configuration, the value received from the network is not maintained after a power cycle.

LON FTT10 is provided by interfacing the ProtoCessor to the E-Link Gateway using BACnet services. From a writing perspective it can be considered as a BACnet write command at priority 16.

Any N2 or Modbus RTU writes are placed in the Priority array at level 16, and the last command received takes precedence.

Figure 37 shows the behavior of a Modbus RTU device writing on Port 1 and Modbus RTU or N2 on Port 3.

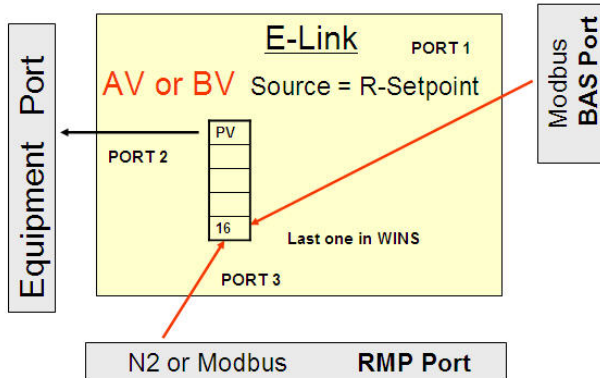


Figure 37: Modbus RTU Device Data Flow

Figure 38 shows the behavior of a BACnet device writing on Port 1 and N2 or Modbus RTU on Port 3.

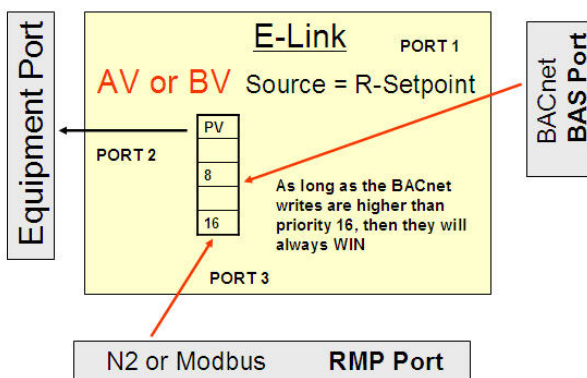


Figure 38: BACnet Device Data Flow

Figure 39 shows the behavior of a BACnet device writing on Port 1 and N2 or Modbus RTU on Port 3 when the SOURCE of the object is set to NETWORK.

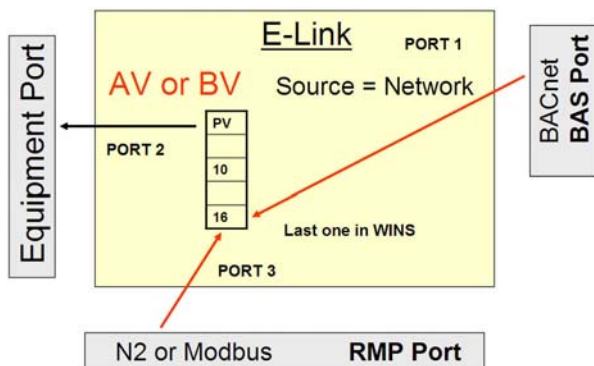


Figure 39: BACnet Device Data Flow with Network Object Source

Protocols

Each E-Link Gateway's port is configured by using a Quick Start selection. The script that is executed edits the appropriate pages within F45 selecting the protocol to be assigned to each port.

Table 46: Source Selections

Offset	PROTOCOL	FUNCTION
1	Modbus I/O	Supports York's Modbus RTU I/O cards
2	LON	Allows BACnet communications over TTL
3	Modbus Server	Serves up data to a Modbus RTU Client
4	API	Passes control to another Application (Café interface)
5	Modbus Client	Acts as a general purpose Modbus RTU Client (F66)
6	BACnet MS/TP	Allows BACnet communications over RS-485
7	YorkTalk 3	Acts as a York Talk 3 Client to an OptiView chiller
8	YorkTalk 2 V6	Acts as a York Talk 2 Client to Small Tonnage chillers
9	YorkTalk 2 V4	Acts as a York Talk 2 Client to Small Tonnage chillers
10	YorkTalk 3 SRVR	Acts as a Server to a York Talk 3 Client
11	YorkTalk 2 SRVR	Acts as a Server to a York Talk 2 Client
12	N2	Serves up data to a N2 Client
13	Disabled	
14	Terminal	Allows a VT-100 session

Port Policy

Any port may be set to any Table 46 selection as long as no two ports are the same.

The exceptions to this policy are BACnet MS/TP and Modbus RTU Server, which allow four concurrent instances. If a user tries to configure more than one instance of N2, the system automatically resets the new selection to its previous setting.

The numerically lowest port is active when you configure more than one instance of the other protocol selections.

In many cases, when you select a protocol on a particular port, a default baud rate, parity and number of stop bits is automatically assigned.

Normal Operation Port 3 Override: T Switch On

IF SW8 of the MAC address switch is on, then the protocol on Port 3 is automatically forced to Terminal @ 57K6 baud; with no parity.


IF SW8 of the MAC address switch is off, then the protocol on Port 3 is set to the configuration in F45 on Port 3 and uses the baud rate and parity that are assigned to this port.

Port 2 Override: All MAC Switches On

Note: The Port 2 Override is not designed for normal system operation. It is reserved for hardware debugging.

IF SW1 through SW8 of the MAC address switch are all set to on, then the protocol on Port 2 is forced to Terminal @ 57K6 baud; with no parity.

IF SW8 the MAC address switch is off, then the protocol on Port 2 is set to the configuration in F45 on Port 2. SW1 through SW7 = DON'T CARE.



CAUTION: Invoking this function breaks the communication link with the Equipment.

A star (*) displayed at the end of F45, P07 and P08 indicates that the current port's protocol selection has been overridden to Terminal.

If a port override is invoked, a Port 2 override always takes priority over a Port 3 override, and a Port 3 override always takes priority over a Terminal setting on Port 4. Likewise, a terminal setting on Port 1 usurps control from any other ports.

Figure 40 shows the default protocols selected on the ports when all the Quick Starts are set to off.

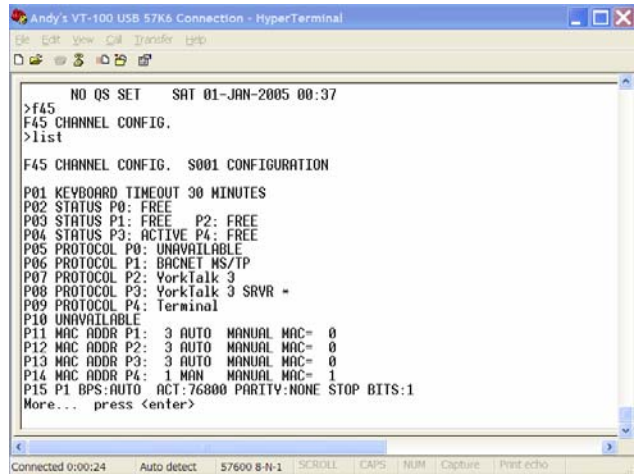


Figure 40: Default Protocols

N2

The E-Link Gateway's N2 Server uses the N2 Open protocol to access the Present Value (P01) of the following features: F01, F04, and F06. The N2 interface can be configured to operate at any of the available baud rates in F45; however, in practice only 9600 baud is used by the Quick Starts. The N2 protocol uses no parity, 8 data bits, and 1 Start and 1 Stop bit, which are automatically set by the Quick Starts.

In an N2-centric world, all data is referenced using objects. The E-Link Gateway supports three of the N2 object types: ADF, ADI, and BD. These are virtual points which align well with the gateway functionality offered by the E-Link Gateway (Table 47).

Table 47: N2 Objects

N2	E-Link Gateway Objects	Function
ADI	F01	Integer
ADF	F04	Float Internal value
BD	F06	Byte

Network Visibility

Any E-Link Gateway data that is required to be visible on an N2 network must be represented by a valid section address and be exposed in F20. If an object is not exposed in F20 but accessed by an N2 Master, an N10 error occurs.

N2 Addressing

The E-Link Gateway uses the corresponding BACnet object instance as the N2 object address. For example, AV102 is mapped to ADF102 and BV50 is mapped to BD50.

Reading N2 Values

All of the supported objects return Reliability, Overridden status and Present value when polled.

N2 Reliability is derived in the same way as it is for the corresponding BACnet object, whereas the Overridden state is set by the N2 Master performing the override command.

Table 48: N2 Attributes and Errors

	Attribute 1	Attribute 2	Error
ADI	Reliability Overridden	Present Value	N10, if section out of range or not in F20
ADF	Reliability Overridden	Present Value	N10, if section out of range or not in F20
BD	Reliability Overridden	Present Value	N10, if section out of range or not in F20
AI	Not Supported		N10
BI	Not Supported		N10
AO	Not Supported		N10
BO	Not Supported		N10

Writing to N2 Objects

An N2 Master may perform an Adjust or an Override on any of the objects shown in Table 49.

Table 49: N2 Attributes and Errors

	Out of Service = F	Out of Service = T	Source
	ADJUST	OVERRIDE	
ADI	PV not changed An ACK is returned	PV Writable	Any
ADF	PV Writable	PV Writable	R-Setpoint
ADF	PV Writable	PV Writable	Network
ADF	PV not changed ACK returned	PV Writable	Any other
BD	PV Writable	PV Writable	R-Setup Flg
BD	PV Writable	PV Writable	Network
BD	PV not changed ACK returned	PV Writable	Any other
AI	PV not changed, ACK returned		Any
BI	PV not changed, ACK returned		Any
AO	PV not changed, ACK returned		Any
BO	PV not changed, ACK returned		Any

An overridden object must be taken out of service before writing to its PV.

Note: If an object cannot be taken out of service, an N11 error occurs in the N2 Server.

Limit Checking

When Adjusting or Overriding an ADI or ADF object, any new value is first checked to ensure that it is within allowable limits.

In the case of the ADI object, the network value is first checked to determine if it exceeds the maximum number of states as configured on P10. If it does, an N10 error occurs. If it does not, the new value replaces the PV.

In the case of the ADF object, the network value is checked to determine if it is outside the limits configured on P10. If so, an N10 error occurs. Otherwise, the new value replaces the PV.

In the case of the BD object, the network value is checked to determine whether it is anything other than a 0 or 1. If it is, an N10 error occurs. Otherwise, the new value replaces the PV.

Modbus RTU

The E-Link Gateway's Modbus RTU Server provides a means for a third-party Modbus RTU Client to access the PV of the following features: F01, F02, F03, F04, F05, F06, F07, F08, and F09. However, only F01, F04, and F06 are used within the E-Link Gateway's Application.

The Modbus RTU interface can be configured to operate at any of the available baud rates, parities, and stop bits that are selectable in F45. However, in practice only certain selections that were used by the Modbus MicroGateway are supported by the Quick Starts.

Note: Unlike BACnet and N2, Modbus RTU data does not need the referenced objects to be exposed in F20 to make them network visible.

Modbus RTU Addressing

The E-Link Gateway references all its Modbus RTU data using 16-bit registers. These registers are expressed as decimal values within the E-Link Gateway's interface. Hexadecimal values are used within the Modbus RTU messages. All data addresses in a Modbus RTU message are zero-based. The first occurrence of a data item has an address value of 0 in the message, but is defined as Register 1 from a user perspective.

Algorithmic Addressing

In case of F02 through F09, the address that references the PV of these features is obtained by combining the feature number and the section number using the following rule:

The feature number expressed as a HEX value is appended with the section number also expressed as a HEX value to form a single 16-bit HEX address. The Feature and Section numbers are both converted into Hex and then appended to form a single address.

Some Applications require expressing the Modbus RTU address as a decimal number. In this case, the FSP address is calculated as follows:

1. The Feature number (ff) is converted into a HEX number so as to create FF. As this applies to Features 1 through 9, the decimal representation is also the HEX representation.
2. Next, the Section number (nnn) is converted into a HEX number, to create NNN.
3. The two parts are then appended together to form a single HEX number FFNNN.
4. This HEX number FFNNN is then converted into a decimal to create XXNNN.

Note: 1 is added to the converted value to take into account the inherent offset.

Examples

To reference the PV of F02, S001, use Modbus RTU register 0201H. If a user was using a typical Modbus RTU Client (for example, F66), convert this HEX address into a decimal number ($513 + 1 = 514$).

To reference the Present Value of F07, S110, use Modbus RTU register 076EH. If a user was using a typical Modbus RTU Client (for example, F66), convert this HEX address into a decimal number ($1902 + 1 = 1903$).

Manual Addressing

The E-Link Gateway also uses a mechanism within F01, F04, and F06 objects that allows a user to override the default algorithmic addressing method and to specify a specific Modbus RTU register address to be used by a given section. A separate page has been provided in these objects to specify this address. This value is represented as a decimal number and is defaulted to 0 to indicate that the actual Modbus RTU address is the algorithmic default.

Services

Table 50 shows the supported Modbus RTU Function codes by Feature used by the E-Link Gateway's Application.

Table 50: N2 Attributes and Errors

Function Codes	F01	F04	F06
01- Read Coil Status			X
02- Read Input Status			X
03- Read Holding Register	X	X	X
04- Read Input Registers	X	X	X
05- Force Single Coil			X
06- Preset Single Register		X	X
15- Force Multiple Coils			X
16- Preset Multiple Registers		X	X

Data Presentation

When the E-Link Gateway receives a request for the PV of the following features, F02, F04, F07, F08, and F09, it responds by returning a signed integer that is its P01 value multiplied by 10. For example if an F04, P01 value was 32.7, then the Server returns 327.

An F04 may also be configured individually to scale its data using different data types and scale multipliers.

If the P01 value of any of the previously mentioned features is less than -32,768 or greater than 32,767 then the E-Link Gateway Modbus RTU Server responds with an Illegal Data Value exception code.

If the Server receives a request for the PV of an F01 or an F03, it responds by returning an unsigned integer (for example, its P01 value) unmodified in any way. If the P01 value is less than 0 or greater than +65,535, the Server responds with an Illegal Data Value exception code.

BACnet/LON FTT10

The E-Link Gateway is essentially a BACnet device that uses BACnet objects to represent its data. It supports both Client and Server functionality and uses MS/TP for its data link. Whereas the E-Link Gateway supports many other standard and nonstandard BACnet objects, (AI, BI, AO, SCHD, CAL, NTF, YSV F03, and so on), its Application only uses the AV, BV and MSV for both internal manipulation and for exposing data onto a BACnet network. LON FTT10 is provided by the addition of an optional ProtoCessor module that translates between BACnet and LON FTT10.

Network Visibility

Any E-Link Gateway data that is required to be visible on BACnet or LON FTT10 networks must be represented by a valid section address and be exposed in F20. If an object is not exposed in F20 but accessed by a BACnet system an Object not Supported error occurs.

BACnet Addressing

In most cases, the E-Link Gateway uses the section number of the associated Feature as the BACnet instance. For example, 4102 maps to AV102 and 6050 to BV 50. A mechanism is included within F01, F04, and F06 that enables a specific BACnet instance to be configured, and so replaces the Feature's section number.

Note: The functionality of the E-Link Gateway from a BACnet perspective is fully defined within its Protocol Implementation Conformance Statement (PICS)/BACnet Interoperability Building Blocks (BIBBS) statement.

LON FTT10 ProtoCessor

The E-Link Gateway provides LON FTT10 access by the addition of a LON FTT10 ProtoCessor module. This is a two port device that has one of its ports dedicated to interfacing with the host (the E-Link Gateway), whereas the other port is used to connect to the LON FTT10 network.

The E-Link Gateway uses electrical TTL signals on Port 4 to connect to the LON FTT10 ProtoCessor module. BACnet MS/TP is used to transfer data between the two components. The ProtoCessor may store up to 10 different profiles. In the first E-Link Gateway Application only four profiles are supported. These are:

- OPTVIEW.XIF
- YDOPTI.XIF
- YORK2.XIF
- YPAL.XIF

The ProtoCessor BACnet network is limited to one other device - the E-Link Gateway. When the LON FTT10 Quick Start is invoked all the BACnet network communication parameters on Port 4 are prefixed to the following values:

- Baud Rate = 38.4 K Baud
- Max Masters =3
- E-Link Gateway's Port 4 Device Object's Instance (DE) = 100

- E-Link Gateway's MAC address = 1 (The ProtoCessor uses a MAC address of 2)
- Max info frames = 1
- The BACnet Description property is made non BACnet writable, but can still be changed by the Quick Starts

LON FTT10 Profile Selection

The selection of an equipment profile is performed automatically by the ProtoCessor reading a proprietary BACnet text property within the E-Link Gateway. This property is configured by selecting a GROUP A Quick Start, which writes the desired profile name into F45, S001, P43. Once the profile is selected, it represents the data that a LON FTT10 user may access from this piece of equipment.

Note: Whereas a SNVT may be defined in a profile it may not always be supported by the equipment. A User must reference the specific Point Maps for the equipment to determine if the point is actually available.

LON FTT10 Point Mapping

The E-Link Gateway has been organized so that only objects that are required to be made network visible are added to the Device object_list_property. The ProtoCessor reads this standard BACnet property to determine what objects need to be translated into LON FTT10 SNVTs.

Each standard AV, BV and MSV object used by the E-Link Gateway contains all the information needed to enable these objects to be represented on the LON FTT10 network. On determining what objects need to be exposed, the object's BACnet_Description_Property provides a string descriptor that is used to map this object to the appropriate location within the profile.

Objects

Certain objects added into the DE object_list_property are writable. These objects are known as Network Variable Inputs (NVI) and are explicitly defined by the profile. The ProtoCessor can also verify that the objects are writable within the E-Link Gateway by the first three characters of the Description property.

The LON FTT10 protocol requires that all data is expressed in SI units. The equipment however can represent its data in both Imperial and SI units and, therefore, the E-Link Gateway must be capable of converting from Imperial to SI units and visa versa.

Switching from Imperial to SI can often be easily accomplished through a software switch. However, in older chiller models, this process may require the replacing of Erasable Programmable Read-Only Memory (EPROMS).

Quick Start 9 and 11 – APP GROUP B

These two Quick Starts are used to convert Imperial to SI units when the data is sourced from the equipment and then from SI to Imperial when the data is coming from the LON FTT10 network.

These Quick Starts are used if the equipment is deployed in markets that require Imperial data to be displayed locally on the micro panel. The E-Link Gateway’s Application converts these values into SI units before transferring them to the ProtoCessor module.

Quick Start 10 and 12 – APP GROUP B

These two Quick Starts are used to pass through the equipment values without any conversion.

These Quick Starts are used if the equipment is deployed in markets that require SI data to be displayed locally on the micro panel. The E-Link Gateway transfers raw values from the equipment without any modification.

SNVT Data

Most of the SNVTs used within the E-Link Gateway profiles are simple data types (for example, unsigned long). However, `Snvt_switch` is a two-element structure that combines a binary and an unsigned short to support a more complex behavior.

When exposing a data value as an NVO of type `SNVT_switch`, the ProtoCessor reads the value from the associated BACnet BV object which offers a Boolean value of 0 or 1. If by chance a `SNVT_switch` NVO is specified in the profile but a BV object is not exposed in the E-Link Gateway’s *object_list_property*, then the NVO is set to a NULL (0xFF).

The ProtoCessor reads the BV object’s PV, assigning it to the `SNVT_switch` according Table 51.

Table 51: BV Values

BV Value	SNVT_switch Components	
	State	Value
0	0	0
1	1	100

Likewise, the ProtoCessor writes the `SNVT_switch` data to the BV object according to Table 52.

Table 52: SNVT Switch Data

SNVT_switch Components		BV Value
State	Value	
0	0	0
1	X-Don't Care	1

LON FTT10 Status

The ProtoCessor does not activate its LON FTT10 output until it has completely processed the configuration data obtained from the E-Link Gateway. From a LON FTT10 perspective, the ProtoCessor should appear off-line. If the ProtoCessor were to make the LON FTT10 side active too soon, then the LON FTT10 network has the option of asking for data that could not be answered.

Handling 8040 LonMARK® Profile

As well as providing the data that is defined within the profile, subscribing to the LonMARK 840 profile requires some mandatory Configuration Properties to be supported, these are:

- `nciChillerEnable`
- `nciMAXSendTime`
- `nciMinSendTime`
- `nciCapacityLim`
- `nciCoolsetPt`

The E-Link Gateway’s implementation handles the functionality of `nciChillerEnable`, `nciCapacityLim`, and `nciCoolSetPt` internally and, therefore, any LON FTT10 commands applied to these parameters are overwritten immediately.

`nciMaxSendTime` is the maximum time period before certain NVO values are transmitted. In the case of the E-Link Gateway’s OPTIVIEW configuration, the applicable NV should be:

- `nvoActiveSetpt – nvoLvgCndWTemp`
- `nvoActualCapacity – nvoEntCndWTemp`
- `nvoEntCndWTemp – nvoEntCHWTemp`

`nciMinSendTime` is the minimum time period before the objects can be retransmitted.

Table 53: OptiView Profiles

F54 Page	Descriptions	SNVT	F54 Page	Descriptions	SNVT
P03	nviCoolSetPt	SNVT_temp_p (105)	P45		
P04	nviCapacityLim	SNVT_lev_percent (81)	P46		
P05			P47		
P06			P48		
P07	nviChillerEnable	SNVT_switch (95)	P49		
P08			P50		
P09	nviVSDFixedSpd	SNVT_switch (95)	P51		
P10			P52		
P11	nvoLvgCHWTemp	SNVT_temp_p (105)	P53		
P12	nvoEntCHWTemp	SNVT_temp_p (105)	P54		
P13	nvoEvapPress	SNVT_press (30)	P55		
P14	nvoCondPress	SNVT_press (30)	P56	nvoAntiRecycle	SNVT_time_minutes (123)
P15	nvoOilDiffPress	SNVT_press (30)	P57	nvoWarnFault	SNVT_count (8)
P16	nvoEntCNDWTemp	SNVT_temp_p (105)	P58	nvoOperCode	SNVT_count (8)
P17	nvoLvgCNDWTemp	SNVT_temp_p (105)	P59	nvoSafetyCode	SNVT_count (8)
P18	nvoActualCapacit	SNVT_lev_percent (81)	P60	nvoCyclingFault	SNVT_count (8)
P19	nvoCurrent_A	SNVT_amp(1)	P61	nvoCode6	SNVT_count (8)
P20	nvoCurrent_B	SNVT_amp(1)	P62	nvoCode7	SNVT_count (8)
P21	nvoCurrent_C	SNVT_amp(1)	P63	nvoCode8	SNVT_count (8)
P22	nvoVoltage_A	SNVT_volt(44)	P64	nvoCode9	SNVT_count (8)
P23	nvoVoltage_B	SNVT_volt(44)	P65	nvoCode10	SNVT_count (8)
P24	nvoVoltage_C	SNVT_volt(44)	P66	nvoBearingPos	SNVT_lev_percent (81)
P25	nvoActiveSetpt	SNVT_temp_p (105)	P67	nvoBearingRef	SNVT_lev_percent (81)
P26	nvoCapacityLimit	SNVT_temp_p (105)	P68		
P27	nvoEvapSatTemp	SNVT_temp_p (105)	P69		
P28	nvoCondSatTemp	SNVT_temp_p (105)	P70		
P29	nvoDischTemp	SNVT_temp_p (105)	P71		
P30	nvoOilTemp	SNVT_temp_p (105)	P72		
P31			P73		
P32	nvoRunHours	SNVT_time_hours (124)	P74		
P33	nvoSystemStarts	SNVT_count (8)	P75		
P34			P76	nvoVSDOutFreq	SNVT_freq_hz (76)
P35			P77		
P36	nvoOnOff	SNVT_switch (95)	P78		
P37			P79		
P38	nvoCHPump	SNVT_switch (95)	P80		
P39	nvoPanelSwitch	SNVT_switch (95)	P81		
P40	nvoCHFlowSwitch	SNVT_switch (95)	P82		
P41			P83		
P42			P84		
P43					
P44					

Table 54: YD Profiles

F54 Page	Descriptions	SNVT	F54 Page	Descriptions	SNVT
P03	nviCoolSetPt	SNVT_temp_p (105)	P45	nvoVaneMtrS1	SNVT_switch (95)
P04	nviCapacityLim	SNVT_lev_percent (81)	P46	nvoVaneMtrS2	SNVT_switch (95)
P05			P47	nvoREFLower	SNVT_switch (95)
P06			P48	nvoREFRaise	SNVT_switch (95)
P07	nviChillerEnable	SNVT_switch (95)	P49	nvoOilRetSol	SNVT_switch (95)
P08			P50	nvoPRVOpen1	SNVT_switch (95)
P09			P51	nvoPRVOpen2	SNVT_switch (95)
P10			P52	nvoPRVClose1	SNVT_switch (95)
P11	nvoLvgCHWTemp	SNVT_temp_p (105)	P53	nvoPRVClose2	SNVT_switch (95)
P12	nvoEntCHWTemp	SNVT_temp_p (105)	P54		
P13	nvoEvapPress	SNVT_press (30)	P55		
P14	nvoCondPress	SNVT_press (30)	P56	nvoSysCode1	SNVT_count (8)
P15	nvoOilDP1	SNVT_press (30)	P57	nvoSysCode2	SNVT_count (8)
P16	nvoOilDP2	SNVT_press (30)	P58	nvoSysCode3	SNVT_count (8)
P17	nvoRCNDLTemp	SNVT_temp_p (105)	P59	nvoSysCode4	SNVT_count (8)
P18	nvoLCNDLTemp	SNVT_temp_p (105)	P60	nvoSysCode5	SNVT_count (8)
P19	nvoPCTFLA1	SNVT_amp(1)	P61	nvoSysCode6	SNVT_count (8)
P20	nvoPCTFLA2	SNVT_amp(1)	P62	nvoSysCode7	SNVT_count (8)
P21	nvoEvapRTmp	SNVT_temp_p (105)	P63	nvoSysCode8	SNVT_count (8)
P22	nvoDropLRFT	SNVT_temp_p (105)	P64	nvoSysCode9	SNVT_count (8)
P23	nvoActSetpt	SNVT_temp_p (105)	P65	nvoSysCode10	SNVT_count (8)
P24	nvoCapLim	SNVT_temp_p (105)	P66	nvoProxPos1	SNVT_count (8)
P25	nvoEvapSatT	SNVT_temp_p (105)	P67	nvoProxPos2	SNVT_count (8)
P26	nvoCondSatT	SNVT_temp_p (105)	P68	nvoRefLvISP	SNVT_lev_percent (81)
P27	nvoDischT1	SNVT_temp_p (105)	P69	nvoAntiRecy1	SNVT_time_sec (107)
P28	nvoDischT2	SNVT_temp_p (105)	P70	nvoAntiRecy2	SNVT_time_sec (107)
P29	nvoSumpOilT	SNVT_temp_p (105)	P71	nvoPRVPos1	SNVT_lev_percent (81)
P30	nvoRfgLevel	SNVT_lev_percent (81)	P72	nvoPRVPos2	SNVT_lev_percent (81)
P31	nvoUnitOpHrs	SNVT_time_hours (124)	P73	nvoVGDPos1	SNVT_lev_percent (81)
P32	nvoSysStarts	SNVT_count (8)	P74	nvoVGDPos2	SNVT_lev_percent (81)
P33	nvoOilSumpP	SNVT_press (30)	P75		
P34	nvoPumpOilP1	SNVT_press (30)	P76		
P35	nvoPumpOilP2	SNVT_press (30)	P77		
P36	nvoOnOff1	SNVT_switch (95)	P78		
P37	nvoOnOff2	SNVT_switch (95)	P79		
P38			P80	nvoDISVOpen1	SNVT_switch (95)
P39	nvoCHPump	SNVT_switch (95)	P81	nvoDISVOpen2	SNVT_switch (95)
P40	nvoPnlStopSw	SNVT_switch (95)	P82	nvoDISVClse1	SNVT_switch (95)
P41	nvoChlFlwSw	SNVT_switch (95)	P83	nvoDISVClse2	SNVT_switch (95)
P42	nvoCndFlwSw	SNVT_switch (95)	P84		
P43	nvoDisHPSw1	SNVT_switch (95)			
P44	nvoDisHPSw2	SNVT_switch (95)			

Table 55: York Talk II Section 1 Profiles

F54 Page	Descriptions	SNVT	F54 Page	Descriptions	SNVT
P03	nviYT_S01_P03	SNVT_count_f (51)	P45	nvoYT_S01_P45	SNVT_switch (95)
P04	nviYT_S01_P04	SNVT_count_f (51)	P46	nvoYT_S01_P46	SNVT_switch (95)
P05	nviYT_S01_P05	SNVT_count_f (51)	P47	nvoYT_S01_P47	SNVT_switch (95)
P06	nviYT_S01_P06	SNVT_count_f (51)	P48	nvoYT_S01_P48	SNVT_switch (95)
P07	nviYT_S01_P07	SNVT_switch (95)	P49	nvoYT_S01_P49	SNVT_switch (95)
P08	nviYT_S01_P08	SNVT_switch (95)	P50	nvoYT_S01_P50	SNVT_switch (95)
P09	nviYT_S01_P09	SNVT_switch (95)	P51	nvoYT_S01_P51	SNVT_switch (95)
P10	nviYT_S01_P10	SNVT_switch (95)	P52	nvoYT_S01_P52	SNVT_switch (95)
P11	nvoYT_S01_P11	SNVT_switch (95)	P53	nvoYT_S01_P53	SNVT_switch (95)
P12	nvoYT_S01_P12	SNVT_count_f (51)	P54	nvoYT_S01_P54	SNVT_switch (95)
P13	nvoYT_S01_P13	SNVT_count_f (51)	P55	nvoYT_S01_P55	SNVT_switch (95)
P14	nvoYT_S01_P14	SNVT_count_f (51)	P56	nvoYT_S01_P56	SNVT_count_f (51)
P15	nvoYT_S01_P15	SNVT_count_f (51)	P57	nvoYT_S01_P57	SNVT_count_f (51)
P16	nvoYT_S01_P16	SNVT_count_f (51)	P58	nvoYT_S01_P58	SNVT_count_f (51)
P17	nvoYT_S01_P17	SNVT_count_f (51)	P59	nvoYT_S01_P59	SNVT_count_f (51)
P18	nvoYT_S01_P18	SNVT_count_f (51)	P60	nvoYT_S01_P60	SNVT_count_f (51)
P19	nvoYT_S01_P19	SNVT_count_f (51)	P61	nvoYT_S01_P61	SNVT_count_f (51)
P20	nvoYT_S01_P20	SNVT_count_f (51)	P62	nvoYT_S01_P62	SNVT_count_f (51)
P21	nvoYT_S01_P21	SNVT_count_f (51)	P63	nvoYT_S01_P63	SNVT_count_f (51)
P22	nvoYT_S01_P22	SNVT_count_f (51)	P64	nvoYT_S01_P64	SNVT_count_f (51)
P23	nvoYT_S01_P23	SNVT_count_f (51)	P65	nvoYT_S01_P65	SNVT_count_f (51)
P24	nvoYT_S01_P24	SNVT_count_f (51)	P66	nvoYT_S01_P66	SNVT_count_f (51)
P25	nvoYT_S01_P25	SNVT_count_f (51)	P67	nvoYT_S01_P67	SNVT_count_f (51)
P26	nvoYT_S01_P26	SNVT_count_f (51)	P68	nvoYT_S01_P68	SNVT_count_f (51)
P27	nvoYT_S01_P27	SNVT_count_f (51)	P69	nvoYT_S01_P69	SNVT_count_f (51)
P28	nvoYT_S01_P28	SNVT_count_f (51)	P70	nvoYT_S01_P70	SNVT_count_f (51)
P29	nvoYT_S01_P29	SNVT_count_f (51)	P71	nvoYT_S01_P71	SNVT_count_f (51)
P30	nvoYT_S01_P30	SNVT_count_f (51)	P72	nvoYT_S01_P72	SNVT_count_f (51)
P31	nvoYT_S01_P31	SNVT_count_f (51)	P73	nvoYT_S01_P73	SNVT_count_f (51)
P32	nvoYT_S01_P32	SNVT_count_f (51)	P74	nvoYT_S01_P74	SNVT_count_f (51)
P33	nvoYT_S01_P33	SNVT_count_f (51)	P75	nvoYT_S01_P75	SNVT_count_f (51)
P34	nvoYT_S01_P34	SNVT_count_f (51)	P76	nvoYT_S01_P76	SNVT_count_f (51)
P35	nvoYT_S01_P35	SNVT_count_f (51)	P77	nvoYT_S01_P77	SNVT_count_f (51)
P36	nvoYT_S01_P36	SNVT_switch (95)	P78	nvoYT_S01_P78	SNVT_count_f (51)
P37	nvoYT_S01_P37	SNVT_switch (95)	P79	nvoYT_S01_P79	SNVT_count_f (51)
P38	nvoYT_S01_P38	SNVT_switch (95)	P80	nvoYT_S01_P80	SNVT_switch (95)
P39	nvoYT_S01_P39	SNVT_switch (95)	P81	nvoYT_S01_P81	SNVT_switch (95)
P40	nvoYT_S01_P40	SNVT_switch (95)	P82	nvoYT_S01_P82	SNVT_switch (95)
P41	nvoYT_S01_P41	SNVT_switch (95)	P83	nvoYT_S01_P83	SNVT_switch (95)
P42	nvoYT_S01_P42	SNVT_switch (95)	P84	nvoYT_S01_P84	SNVT_switch (95)
P43	nvoYT_S01_P43	SNVT_switch (95)			
P44	nvoYT_S01_P44	SNVT_switch (95)			

Table 56: York Talk II Section 2 Profiles

F54 Page	Descriptions	SNVT	F54 Page	Descriptions	SNVT
P03	nviYT_S02_P03	SNVT_count_f (51)	P45	nvoYT_S02_P45	SNVT_switch (95)
P04	nviYT_S02_P04	SNVT_count_f (51)	P46	nvoYT_S02_P46	SNVT_switch (95)
P05	nviYT_S02_P05	SNVT_count_f (51)	P47	nvoYT_S02_P47	SNVT_switch (95)
P06	nviYT_S02_P06	SNVT_count_f (51)	P48	nvoYT_S02_P48	SNVT_switch (95)
P07	nviYT_S02_P07	SNVT_switch (95)	P49	nvoYT_S02_P49	SNVT_switch (95)
P08	nviYT_S02_P08	SNVT_switch (95)	P50	nvoYT_S02_P50	SNVT_switch (95)
P09	nviYT_S02_P09	SNVT_switch (95)	P51	nvoYT_S02_P51	SNVT_switch (95)
P10	nviYT_S02_P10	SNVT_switch (95)	P52	nvoYT_S02_P52	SNVT_switch (95)
P11	nvoYT_S02_P11	SNVT_count_f (51)	P53	nvoYT_S02_P53	SNVT_switch (95)
P12	nvoYT_S02_P12	SNVT_count_f (51)	P54	nvoYT_S02_P54	SNVT_switch (95)
P13	nvoYT_S02_P13	SNVT_count_f (51)	P55	nvoYT_S02_P55	SNVT_switch (95)
P14	nvoYT_S02_P14	SNVT_count_f (51)	P56	nvoYT_S02_P56	SNVT_count_f (51)
P15	nvoYT_S02_P15	SNVT_count_f (51)	P57	nvoYT_S02_P57	SNVT_count_f (51)
P16	nvoYT_S02_P16	SNVT_count_f (51)	P58	nvoYT_S02_P58	SNVT_count_f (51)
P17	nvoYT_S02_P17	SNVT_count_f (51)	P59	nvoYT_S02_P59	SNVT_count_f (51)
P18	nvoYT_S02_P18	SNVT_count_f (51)	P60	nvoYT_S02_P60	SNVT_count_f (51)
P19	nvoYT_S02_P19	SNVT_count_f (51)	P61	nvoYT_S02_P61	SNVT_count_f (51)
P20	nvoYT_S02_P20	SNVT_count_f (51)	P62	nvoYT_S02_P62	SNVT_count_f (51)
P21	nvoYT_S02_P21	SNVT_count_f (51)	P63	nvoYT_S02_P63	SNVT_count_f (51)
P22	nvoYT_S02_P22	SNVT_count_f (51)	P64	nvoYT_S02_P64	SNVT_count_f (51)
P23	nvoYT_S02_P23	SNVT_count_f (51)	P65	nvoYT_S02_P65	SNVT_count_f (51)
P24	nvoYT_S02_P24	SNVT_count_f (51)	P66	nvoYT_S02_P66	SNVT_count_f (51)
P25	nvoYT_S02_P25	SNVT_count_f (51)	P67	nvoYT_S02_P67	SNVT_count_f (51)
P26	nvoYT_S02_P26	SNVT_count_f (51)	P68	nvoYT_S02_P68	SNVT_count_f (51)
P27	nvoYT_S02_P27	SNVT_count_f (51)	P69	nvoYT_S02_P69	SNVT_count_f (51)
P28	nvoYT_S02_P28	SNVT_count_f (51)	P70	nvoYT_S02_P70	SNVT_count_f (51)
P29	nvoYT_S02_P29	SNVT_count_f (51)	P71	nvoYT_S02_P71	SNVT_count_f (51)
P30	nvoYT_S02_P30	SNVT_count_f (51)	P72	nvoYT_S02_P72	SNVT_count_f (51)
P31	nvoYT_S02_P31	SNVT_count_f (51)	P73	nvoYT_S02_P73	SNVT_count_f (51)
P32	nvoYT_S02_P32	SNVT_count_f (51)	P74	nvoYT_S02_P74	SNVT_count_f (51)
P33	nvoYT_S02_P33	SNVT_count_f (51)	P75	nvoYT_S02_P75	SNVT_count_f (51)
P34	nvoYT_S02_P34	SNVT_count_f (51)	P76	nvoYT_S02_P76	SNVT_count_f (51)
P35	nvoYT_S02_P35	SNVT_count_f (51)	P77	nvoYT_S02_P77	SNVT_count_f (51)
P36	nvoYT_S02_P36	SNVT_switch (95)	P78	nvoYT_S02_P78	SNVT_count_f (51)
P37	nvoYT_S02_P37	SNVT_switch (95)	P79	nvoYT_S02_P79	SNVT_count_f (51)
P38	nvoYT_S02_P38	SNVT_switch (95)	P80	nvoYT_S02_P80	SNVT_switch (95)
P39	nvoYT_S02_P39	SNVT_switch (95)	P81	nvoYT_S02_P81	SNVT_switch (95)
P40	nvoYT_S02_P40	SNVT_switch (95)	P82	nvoYT_S02_P82	SNVT_switch (95)
P41	nvoYT_S02_P41	SNVT_switch (95)	P83	nvoYT_S02_P83	SNVT_switch (95)
P42	nvoYT_S02_P42	SNVT_switch (95)	P84	nvoYT_S02_P84	SNVT_switch (95)
P43	nvoYT_S02_P43	SNVT_switch (95)			
P44	nvoYT_S02_P44	SNVT_switch (95)			

Table 57: IPU-I YPAL Profiles

BACnet Objects	Descriptions	SNVT	BACnet Objects	Descriptions	SNVT
AI-001	nvoACT_DSP_SP	SNVT_count_f (51)	AI-051	nvoTEMP_2_SUUCT	SNVT_count_f (51)
AI-002	nvoACT_MIN_FLOW	SNVT_count_f (51)	AI-053	nvoTEMP_3_SUUCT	SNVT_count_f (51)
AI-003	nvoACT_MIN_POS	SNVT_switch (95)	AI-055	nvoUND_FLR_DEWP	SNVT_count_f (51)
AI-004	nvoACT SAT SP	SNVT_count_f (51)	AI-056	nvoUND FLR HUMD	SNVT_switch (95)
AI-005	nvoBLD_STAT_PRS	SNVT_count_f (51)	AI-057	nvoUND_FLR_TEMP	SNVT_count_f (51)
AI-006	nvoBYPASS_DAMPER	SNVT_switch (95)	AI-058	nvoUNIT_MODE	SNVT_count (8)
AI-007	nvoCO2_1_OUT	SNVT_count_f (51)	AI-059	nvoVENT_DEM_OUT	SNVT_switch (95)
AI-008	nvoCO2_2_INSIDE	SNVT_count_f (51)	AI-060	nvoZONE_TEMP	SNVT_count_f (51)
AI-016	nvoDCT_ST_PR_RT	SNVT_switch (95)	AV-001	nviBULD PRES SP	SNVT_count_f (51)
AI-017	nvoDCT_STAT_PRS	SNVT_count_f (51)	AV-002	nviCO2_OFFSET	SNVT_count_f (51)
AI-018	nvoECON_ME_USED	SNVT_count (8)	AV-003	nviDSP_HI_LIMIT	SNVT_count_f (51)
AI-019	nvoECON_STATUS	SNVT_count (8)	AV-004	nviDSP_LO_LIMIT	SNVT_count_f (51)
AI-020	nvoEVAP_AIR_TMP	SNVT_count_f (51)	AV-005	nviDSP_RST_BAS	SNVT_switch (95)
AI-021			AV-007	nviEL_AIR_TMP_H	SNVT_count_f (51)
AI-022	nvoHEAT_ENT_TMP	SNVT_count_f (51)	AV-008	nviEL_AIR_TMP_L	SNVT_count_f (51)
AI-023	nvoHEAT_STAGES	SNVT_count (8)	AV-009	nviHEATING SAT	SNVT_count_f (51)
AI-024	nvoHEATING_VALV	SNVT_switch (95)	AV-010	nviMAX_BYPASS	SNVT_switch (95)
AI-025	nvoOA_DAMPER	SNVT_switch (95)	AV-011	nviMAX_FLOW_DV	SNVT_count_f (51)
AI-026	nvoOA_ENTHALPY	SNVT_count_f (51)	AV-012	nviMECH_LCK_TMP	SNVT_count_f (51)
AI-027	nvoOA_FLO_PRS_1	SNVT_count_f (51)	AV-013	nviMIN_FLOW_DV	SNVT_count_f (51)
AI-028	nvoOA_FLO_PRS_2	SNVT_count_f (51)	AV-014	nviMIXD SAT LIM	SNVT_count_f (51)
AI-029	nvoOA_REL_HUMID	SNVT_switch (95)	AV-015	nviMORN_WUP_RAT	SNVT_count_f (51)
AI-030	nvoOA_TEMP	SNVT_count_f (51)	AV-016	nviOA_DAMP_POS1	SNVT_switch (95)
AI-031	nvoPRS_1_DISCH	SNVT_count_f (51)	AV-017	nviOA_DAMP_POS2	SNVT_switch (95)
AI-032	nvoPRS_1_SUUCTON	SNVT_count_f (51)	AV-018	nviOA_ENTH_LIMT	SNVT_count_f (51)
AI-033	nvoPRS_2_DISCH	SNVT_count_f (51)	AV-021	nviOCC_ZN_COOL	SNVT_count_f (51)
AI-034	nvoPRS_2_SUUCTON	SNVT_count_f (51)	AV-022	nviOCC_ZN_HEAT	SNVT_count_f (51)
AI-035	nvoPRS_3_DISCH	SNVT_count_f (51)	AV-023	nviRAT_COOL_SP	SNVT_count_f (51)
AI-036	nvoPRS_3_SUUCTON	SNVT_count_f (51)	AV-026	nviSAT_HIGH LIM	SNVT_count_f (51)
AI-037	nvoRET_AIR_BY_S	SNVT_switch (95)	AV-027	nviSAT_LOW LIM	SNVT_count_f (51)
AI-038	nvoRET_AIR_ENTH	SNVT_count_f (51)	AV-028	nviSAT_RST_BAS	SNVT_count_f (51)
AI-039	nvoRET_AIR_HUMD	SNVT_switch (95)	AV-031	nviSTG_1_COOL	SNVT_count_f (51)
AI-040	nvoRET_AIR_TEMP	SNVT_count_f (51)	AV-032	nviSTG_1_HEAT	SNVT_count_f (51)
AI-041			AV-033	nvoSTG_2_COOL	SNVT_count_f (51)
AI-042	nvoRET_FAN PRES	SNVT_count_f (51)	AV-034	nvoSTG_2_HEAT	SNVT_count_f (51)
AI-043	nvoSAT_SUC_TMP1	SNVT_count_f (51)	AV-035	nviSYSTEM_STOP	SNVT_count (8)
AI-044	nvoSAT_SUC_TMP2	SNVT_count_f (51)	AV-036	nviUND_HUMD_BAS	SNVT_switch (95)
AI-045	nvoSAT_SUC_TMP3	SNVT_count_f (51)	AV-037	nviUND_TEMP_BAS	SNVT_count_f (51)
AI-046	nvoSUP_AIR_TEMP	SNVT_count_f (51)	AV-038	nviUNOCC_ZN_COOL	SNVT_count_f (51)
AI-047	nvoSUP_AIR_TRST	SNVT_count_f (51)	AV-039	nviUNOCC_ZN_HEAT	SNVT_count_f (51)
AI-048			AV-040	nviZONE_TMP_BAS	SNVT_count_f (51)
AI-049	nvoTEMP_1_SUUCT	SNVT_count_f (51)	AV-077	nvoACT_SLAB_CTL	SNVT_switch (95)

Table 58: IPU-I YPAL Profiles

BACnet	Descriptions	SNVT
AV-080	nviDEW_PNT_RST	SNVT_switch (95)
AV-081	nviECONO_INSTAL	SNVT_switch (95)
AV-086	nviMORN_WUP_CMD	SNVT_switch (95))
AV-087	nviNIGHT_SETBAC	SNVT_switch (95)
AV-088	nviOCCUPNCY_CMD	SNVT_switch (95)
AV-093	nviUNIT_STOP	SNVT_switch (95)
AV-095	nviVENT_ENABLE	SNVT_switch (95)
BI-002	nvoCOL_HEAT_FLT	SNVT_switch (95)
BI-003	nvoCOMP_1A	SNVT_switch (95)
BI-004	nvoCOMP_1B	SNVT_switch (95)
BI-005	nvoCOMP_2A	SNVT_switch (95)
BI-006	nvoCOMP_2B	SNVT_switch (95)
BI-007	nvoCOMP_3A	SNVT_switch (95)
BI-008	nvoCOMP_3B	SNVT_switch (95)
BI-009	nvoCOMP_LPCO_1	SNVT_switch (95)
BI-010	nvoCOMP_LPCO_2	SNVT_switch (95)
BI-011	nvoCOMP_LPCO_3	SNVT_switch (95)
BI-012	nvoCOMP_STAT_1	SNVT_switch (95)
BI-013	nvoCOMP_STAT_2	SNVT_switch (95)
BI-014	nvoCOMP_STAT_3	SNVT_switch (95)
BI-021	nvoEXH_FAN_STAT	SNVT_switch (95)
BI-022	nvoEXHAUST_FAN	SNVT_switch (95)
BI-023	nvoFAN_FAULT	SNVT_switch (95)
BI-025	nvoFILTER_STATS	SNVT_switch (95)
BI-033	nvoHW_FRZ_STAT	SNVT_switch (95)
BI-052	nvoRET_FAN_STAT	SNVT_switch (95)
BI-054	nvoSEN_MSC_FLT	SNVT_switch (95)
BI-055	nvoSF_PROV_SW	SNVT_switch (95)
BI-059	nvoSUPPLY_FAN	SNVT_switch (95)
BI-060	nvoUNSTABLE_SYS	SNVT_switch (95)

E-Link Gateway Application Summary Highlights

Table 59: Equipment Profile Application Highlights

Switch Settings	Client Features Used	Sections Used	Poll Interval	Port 2 Protocol	Port 2 Baud Rate	Port Hardware	Port 2 Parity	Functionality
1	F54	1	5s	York Talk 3	19K2	RS-232	ODD	YK with SSS Imperial
2	F54	1	5s	York Talk 3	19K2	RS-232	ODD	YK with VSD Imperial
3	F54	4	5s	York Talk 3	19K2	RS-232	ODD	YT with SSS Imperial
4	F54	4	5s	York Talk 3	19K2	RS-232	ODD	YT with VSD Imperial
5	F54	5	5s	York Talk 3	19K2	RS-232	ODD	YS / YR with SSS Imperial
6	F54	1	5s	York Talk 3	19K2	RS-232	ODD	YK with SSS Metric
7	F54	1	5s	York Talk 3	19K2	RS-232	ODD	YK with VSD Metric
8	F54	4	5s	York Talk 3	19K2	RS-232	ODD	YT with SSS Metric
9	F54	4	5s	York Talk 3	19K2	RS-232	ODD	YT with VSD Metric
10	F54	5	5s	York Talk 3	19K2	RS-232	ODD	YS / YR with SSS Metric
11	F54	2	15 s	York Talk 2 V6	1200	RS-485	ODD	York Talk II, 1200, 1 Sect
12	F54	2	15 s	York Talk 2 V6	4800	RS-485	ODD	York Talk II, 4800, 1 Sect
13	F54	2 and 3	15 s	York Talk 2 V6	4800	RS-485	ODD	York Talk II, 4800, 2 Sects
14	F54	6	5s	York Talk 3	19K2	RS-232	ODD	YD Imperial
15	F54	6	5s	York Talk 3	19K2	RS-232	ODD	YD Metric
16	F65, F28	1&2, 1		BACnet MS/TP	38K4	RS-485	NONE	YPAL IPU-I
17 to 62								Reserved for the future

Table 60: Conversion Routines

Conversion Routines	
F13, Section #1	DEG F to DEG C
F13, Section #2	PSI to KPA
F13, Section #3	DEG C to DEG F

Table 61: BO References and Functions

BO Reference	Function	Where Used
BO1	YT COMMS FAIL	F54
BO2	BACnet FAIL	F65
BO3	MODBUS RTU FAIL	F66 (future)
BO4	IM-SI CONVRT	F04
BO5	TRANS.TIMER	F28
BO6	ACQUIS_FAIL	F65
BO7	USER RPT ENA	F48

BO-004 (9004) when ACTIVE enables the conversion from Imperial to Metric units. This flag is set to TRUE in the Output Protocol Quick Starts, 9 and 12.

Table 62: Quick Start to York Talk III Micro Object Mapping

Page #	QS 1,6	QS 2,7	QS 3,8	QS 4,9	QS 5,10	QS 14,15	Page #	QS 1,6	QS 2,7	QS 3,8	QS 4,9	QS 5,10	QS 14,15
P03	AV 1	AV 1	AV 1	AV 1	AV 1	AV 1	P45	0	0	0	0	0	BI 23
P04	AV 2	AV 2	AV 2	AV 2	AV 2	AV 2	P46	0	0	0	0	0	BI 24
P05	0	0	0	0	0	0	P47	0	0	0	0	0	BO 7
P06	0	0	0	0	0	0	P48	0	BV 42	0	BV 42	0	BO 8
P07	BV 1	BV 1	BV 1	BV 1	BV 1	BV 1	P49	0	BV 43	0	BV 43	0	BO 9
P08	0	0	BV 0	BV 0	BV 0	0	P50	0	BO 30	0	BO 30	0	BO 15
P09	BV 10	BV 10	BV 10	BV 10	0	0	P51	0	BV 46	0	BV 46	0	BO 16
P10	0	0	0	0	0	0	P52	0	BV 44	0	BV 44	0	BO 17
P11	AI 1	AI 1	AI 1	AI 1	AI 1	AI 1	P53	0	0	0	0	0	BO 18
P12	AI 2	AI 2	AI 2	AI 2	AI 2	AI 2	P54	0	0	0	0	0	0
P13	AI 5	AI 5	AI 5	AI 5	AI 5	AI 5	P55	0	0	0	0	BV 26	0
P14	AI 6	AI 6	AI 6	AI 6	AI 6	AI 6	P56	AV 19	AV 19	AV 19	AV 19	AV 19	SC 1
P15	AV 14	AV 14	AV 14	AV 14	AV 14	AV 27	P57	SC 4	SC 4	SC 4	SC 4	SC 4	SC 2
P16	AI 4	AI 4	AI 4	AI 4	AI 4	AV 28	P58	SC 1	SC 1	SC 1	SC 1	SC 1	SC 3
P17	AI 3	AI 3	AI 3	AI 3	AI 3	AI 4	P59	SC 2	SC 2	SC 2	SC 2	SC 2	SC 4
P18	AI 11	AI 11	AI 11	AI 11	AI 11	AI 3	P60	SC 3	SC 3	SC 3	SC 3	SC 3	SC 5
P19	AI 16	AI 53	AI 16	AI 53	AI 16	AI 20	P61	0	AI 58	0	AI 58	0	SC 6
P20	AI 17	AI 54	AI 17	AI 54	AI 17	AI 21	P62	0	AI 59	0	AI 59	0	SC 7
P21	AI 18	AI 55	AI 18	AI 55	AI 18	AI 7	P63	AI 50	AI 50	AI 50	AI 50	0	0
P22	AI 13	0	AI 13	AI 13	AI 13	AI 8	P64	0	AV 78	0	AV 78	0	0
P23	AI 14	0	AI 14	AI 14	AI 14	AV 51	P65	AV 42	AV 42	0	0	0	0
P24	AI 15	0	AI 15	AI 15	AI 15	AV 72	P66	AI 33	AI 33	0	0	AV 4	AI 14
P25	AV 1	AV 1	AV 1	AV 1	AV 1	AV 10	P67	AV 40	AV 40	0	0	AV 55	AI 15
P26	AV 20	AV 20	AV 20	AV 20	AV 20	AV 12	P68	0	0	0	0	0	AV 64
P27	AV 6	AV 6	AV 6	AV 6	AV 6	AI 12	P69	0	AV 79	0	AV 79	0	AV 37

Continued on next page . . .

Page # (Cont.)	QS 1,6	QS 2,7	QS 3,8	QS 4,9	QS 5,10	QS 14,15	Page #	QS 1,6	QS 2,7	QS 3,8	QS 4,9	QS 5,10	QS 14,15
P28	AV 7	AV 7	AV 7	AV 7	AV 7	AI 13	P70	0	AI 51	0	AI 51	0	AV 38
P29	AI 7	AI 7	AI 7	AI 7	AI 7	AI 10	P71	0	AV 71	0	AV 71	0	AI 16
P30	AI 32	AI 32	AI 32	AI 32	AI 41	AI 9	P72	0	AV 72	0	AV 72	0	AI 17
P31	AI 35	AI 35	AI 36	AI 36	AV 54	AV 2	P73	0	AI 56	0	AI 56	0	AI 24
P32	AV 15	AV 15	AV 15	AV 15	AV 15	AV 1	P74	0	AI 57	0	AI 57	0	AI 25
P33	AV 16	AV 16	AV 16	AV 16	AV 16	AI 11	P75	0	AV 75	0	AV 75	0	AI 26
P34	AI 30	AI 30	0	0	AV 56	AI 18	P76	0	AI 52	0	AI 52	0	0
P35	AI 31	AI 31	0	0	AI 37	AI 19	P77	0	AV 83	0	AV 83	0	0
P36	BO 1	BO 1	BO 1	BO 1	BO 1	BO 21	P78	AV 84	AV 84	AV 84	AV 84	0	0
P37	BO 14	BO 14	BO 15	BO 15	BO 12	BO 22	P79	AV 82	AV 82	AV 82	AV 82	0	0
P38	BO 2	BO 2	BO 2	BO 2	BO 2	0	P80	0	0	0	0	0	BO 11
P39	BI 4	BI 4	BI 4	BI 4	BI 4	BO 5	P81	0	0	0	0	0	BO 12
P40	BI 1	BI 1	BI 1	BI 1	BI 1	BI 9	P82	0	0	0	0	0	BO 13
P41	0	0	0	0	0	BI 13	P83	0	0	0	0	0	BO 14
P42	0	0	0	0	BI 35	BI 14	P84	0	0	0	0	0	0
P43	0	0	0	0	0	BI 17							
P44	0	0	0	0	0	BI 18							

Table 63 lists the objects, their names, and engineering units that are made network visible when a given Quick Start is selected. This is the data retrieved using the object list command.

Table 63: Network Visible Points Selected by Each Quick Start

BACnet Object ID	BACnet Object Name	Present Value	Engineering Units or State Codes
BASE APPLICATION	No Quick Starts selected		
0005000	NO QS SET 5000	N/A	N/A
FIL-001	APPLICATION	N/A	N/A
FIL-002	FIRMWARE	N/A	N/A
FIL-003	TEMPLATE	N/A	N/A
FIL-004	ICE PARAMETRIC DB	N/A	N/A
YK SSS	Quick Start =1 (Imperial Units)		Quick Start=6 (Metric Units)
AV-001	YT_S01_P03	XXXXXX	
AV-002	YT_S01_P04	XXXXXX	
AV-005	YT_S01_P11	XXXXXX	
AV-006	YT_S01_P12	XXXXXX	
AV-007	YT_S01_P13	XXXXXX	
AV-008	YT_S01_P14	XXXXXX	
AV-009	YT_S01_P15	XXXXXX	
AV-010	YT_S01_P16	XXXXXX	
AV-011	YT_S01_P17	XXXXXX	
AV-012	YT_S01_P18	XXXXXX	
AV-013	YT_S01_P19	XXXXXX	
AV-014	YT_S01_P20	XXXXXX	
AV-015	YT_S01_P21	XXXXXX	
AV-016	YT_S01_P22	XXXXXX	
AV-017	YT_S01_P23	XXXXXX	
AV-018	YT_S01_P24	XXXXXX	
AV-019	YT_S01_P25	XXXXXX	
AV-020	YT_S01_P26	XXXXXX	
AV-021	YT_S01_P27	XXXXXX	
AV-022	YT_S01_P28	XXXXXX	
AV-023	YT_S01_P29	XXXXXX	
AV-024	YT_S01_P30	XXXXXX	
AV-025	YT_S01_P31	XXXXXX	
AV-026	YT_S01_P32	XXXXXX	
AV-027	YT_S01_P33	XXXXXX	
AV-028	YT_S01_P34	XXXXXX	
AV-029	YT_S01_P35	XXXXXX	
AV-030	YT_S01_P66	XXXXXX	
AV-031	YT_S01_P67	XXXXXX	
BO-001	YT COMS FAIL	OFF/ON	
BV-001	YT_S01_P07	OFF/ON	
BV-005	YT_S01_P36	OFF/ON	
BV-006	YT_S01_P37	OFF/ON	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
BV-007	YT_S01_P38	OFF/ON	
BV-008	YT_S01_P39	OFF/ON	
BV-009	YT_S01_P40	OFF/ON	
0005000	YK SSS IM-G 5000		
FIL-001	APPLICATION		
FIL-002	FIRMWARE		
FIL-003	TEMPLATE		
FIL-004	ICE PARAMETRIC DB		
MSV-001	YT_S01_P56	MMM	
MSV-002	YT_S01_P57	MMM	
MSV-003	YT_S01_P58	MMM	
MSV-004	YT_S01_P59	MMM	
MSV-005	YT_S01_P60	MMM	
MSV-008	YT_S01_P63	MMM	
MSV-010	YT_S01_P65	MMM	
YK VSD	Quick Start =2 (Imperial Units) Quick Start =7 (Metric units)		
AV-001	YT_S01_P03	XXXXXX	
AV-002	YT_S01_P04	XXXXXX	
AV-005	YT_S01_P11	XXXXXX	
AV-006	YT_S01_P12	XXXXXX	
AV-007	YT_S01_P13	XXXXXX	
AV-008	YT_S01_P14	XXXXXX	
AV-009	YT_S01_P15	XXXXXX	
AV-010	YT_S01_P16	XXXXXX	
AV-011	YT_S01_P17	XXXXXX	
AV-012	YT_S01_P18	XXXXXX	
AV-013	YT_S01_P19	XXXXXX	
AV-014	YT_S01_P20	XXXXXX	
AV-015	YT_S01_P21	XXXXXX	
AV-019	YT_S01_P25	XXXXXX	
AV-020	YT_S01_P26	XXXXXX	
AV-021	YT_S01_P27	XXXXXX	
AV-022	YT_S01_P28	XXXXXX	
AV-023	YT_S01_P29	XXXXXX	
AV-024	YT_S01_P30	XXXXXX	
AV-025	YT_S01_P31	XXXXXX	
AV-026	YT_S01_P32	XXXXXX	
AV-027	YT_S01_P33	XXXXXX	
AV-028	YT_S01_P34	XXXXXX	
AV-029	YT_S01_P35	XXXXXX	
AV-030	YT_S01_P66	XXXXXX	
AV-031	YT_S01_P67	XXXXXX	
AV-033	YT_S01_P69	XXXXXX	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
AV-034	YT_S01_P70	XXXXXX	
AV-035	YT_S01_P71	XXXXXX	
AV-036	YT_S01_P72	XXXXXX	
AV-037	YT_S01_P73	XXXXXX	
AV-038	YT_S01_P74	XXXXXX	
AV-039	YT_S01_P75	XXXXXX	
AV-040	YT_S01_P76	XXXXXX	
AV-041	YT_S01_P77	XXXXXX	
AV-042	YT_S01_P78	XXXXXX	
AV-043	YT_S01_P79	XXXXXX	
BO-001	YT COMS FAIL	OFF/ON	
BV-001	YT_S01_P07	OFF/ON	
BV-003	YT_S01_P09	OFF/ON	
BV-005	YT_S01_P36	OFF/ON	
BV-006	YT_S01_P37	OFF/ON	
BV-007	YT_S01_P38	OFF/ON	
BV-008	YT_S01_P39	OFF/ON	
BV-009	YT_S01_P40	OFF/ON	
BV-017	YT_S01_P48	OFF/ON	
BV-018	YT_S01_P49	OFF/ON	
BV-019	YT_S01_P50	OFF/ON	
BV-020	YT_S01_P51	OFF/ON	
BV-021	YT_S01_P52	OFF/ON	
0005000	YK VSD IM-G 5000		
FIL-001	APPLICATION		
FIL-002	FIRMWARE		
FIL-003	TEMPLATE		
FIL-004	ICE PARAMETRIC DB		
MSV-001	YT_S01_P56	MMM	
MSV-002	YT_S01_P57	MMM	
MSV-003	YT_S01_P58	MMM	
MSV-004	YT_S01_P59	MMM	
MSV-005	YT_S01_P60	MMM	
MSV-006	YT_S01_P61	MMM	
MSV-007	YT_S01_P62	MMM	
MSV-008	YT_S01_P63	MMM	
MSV-009	YT_S01_P64	MMM	
MSV-010	YT_S01_P65	MMM	
YT SSS	Quick Start =3 (Imperial Units) Quick Start =8 (Metric units)		
AV-001	YT_S01_P03	XXXXXX	
AV-002	YT_S01_P04	XXXXXX	
AV-005	YT_S01_P11	XXXXXX	
AV-006	YT_S01_P12	XXXXXX	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
AV-007	YT_S01_P13	XXXXXX	
AV-008	YT_S01_P14	XXXXXX	
AV-009	YT_S01_P15	XXXXXX	
AV-010	YT_S01_P16	XXXXXX	
AV-011	YT_S01_P17	XXXXXX	
AV-012	YT_S01_P18	XXXXXX	
AV-013	YT_S01_P19	XXXXXX	
AV-014	YT_S01_P20	XXXXXX	
AV-015	YT_S01_P21	XXXXXX	
AV-016	YT_S01_P22	XXXXXX	
AV-017	YT_S01_P23	XXXXXX	
AV-018	YT_S01_P24	XXXXXX	
AV-019	YT_S01_P25	XXXXXX	
AV-020	YT_S01_P26	XXXXXX	
AV-021	YT_S01_P27	XXXXXX	
AV-022	YT_S01_P28	XXXXXX	
AV-023	YT_S01_P29	XXXXXX	
AV-024	YT_S01_P30	XXXXXX	
AV-025	YT_S01_P31	XXXXXX	
AV-026	YT_S01_P32	XXXXXX	
AV-027	YT_S01_P33	XXXXXX	
BO-001	YT COMS FAIL	OFF/ON	
BV-001	YT_S01_P07	OFF/ON	
BV-005	YT_S01_P36	OFF/ON	
BV-006	YT_S01_P37	OFF/ON	
BV-007	YT_S01_P38	OFF/ON	
BV-008	YT_S01_P39	OFF/ON	
BV-009	YT_S01_P40	OFF/ON	
0005000	YT SSS IM-G 5000		
FIL-001	APPLICATION		
FIL-002	FIRMWARE		
FIL-003	TEMPLATE		
FIL-004	ICE PARAMETRIC DB		
MSV-001	YT_S01_P56	MMM	
MSV-002	YT_S01_P57	MMM	
MSV-003	YT_S01_P58	MMM	
MSV-004	YT_S01_P59	MMM	
MSV-005	YT_S01_P60	MMM	
MSV-008	YT_S01_P63	MMM	
YT VSD	Quick Start =4 (Imperial Units) Quick Start =9 (Metric units)		
AV-001	YT_S01_P03	XXXXXX	
AV-002	YT_S01_P04	XXXXXX	
AV-005	YT_S01_P11	XXXXXX	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
AV-006	YT_S01_P12	XXXXXX	
AV-007	YT_S01_P13	XXXXXX	
AV-008	YT_S01_P14	XXXXXX	
AV-009	YT_S01_P15	XXXXXX	
AV-010	YT_S01_P16	XXXXXX	
AV-011	YT_S01_P17	XXXXXX	
AV-012	YT_S01_P18	XXXXXX	
AV-013	YT_S01_P19	XXXXXX	
AV-014	YT_S01_P20	XXXXXX	
AV-015	YT_S01_P21	XXXXXX	
AV-019	YT_S01_P25	XXXXXX	
AV-020	YT_S01_P26	XXXXXX	
AV-021	YT_S01_P27	XXXXXX	
AV-022	YT_S01_P28	XXXXXX	
AV-023	YT_S01_P29	XXXXXX	
AV-024	YT_S01_P30	XXXXXX	
AV-025	YT_S01_P31	XXXXXX	
AV-026	YT_S01_P32	XXXXXX	
AV-027	YT_S01_P33	XXXXXX	
AV-033	YT_S01_P69	XXXXXX	
AV-034	YT_S01_P70	XXXXXX	
AV-035	YT_S01_P71	XXXXXX	
AV-036	YT_S01_P72	XXXXXX	
AV-037	YT_S01_P73	XXXXXX	
AV-038	YT_S01_P74	XXXXXX	
AV-039	YT_S01_P75	XXXXXX	
AV-040	YT_S01_P76	XXXXXX	
AV-041	YT_S01_P77	XXXXXX	
AV-042	YT_S01_P78	XXXXXX	
AV-043	YT_S01_P79	XXXXXX	
BO-001	YT COMS FAIL	OFF/ON	
BV-001	YT_S01_P07	OFF/ON	
BV-003	YT_S01_P09	OFF/ON	
BV-005	YT_S01_P36	OFF/ON	
BV-006	YT_S01_P37	OFF/ON	
BV-007	YT_S01_P38	OFF/ON	
BV-008	YT_S01_P39	OFF/ON	
BV-009	YT_S01_P40	OFF/ON	
BV-017	YT_S01_P48	OFF/ON	
BV-018	YT_S01_P49	OFF/ON	
BV-019	YT_S01_P50	OFF/ON	
BV-020	YT_S01_P51	OFF/ON	
BV-021	YT_S01_P52	OFF/ON	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
0005000	YT VSD IM-G 5000		
FIL-001	APPLICATION		
FIL-002	FIRMWARE		
FIL-003	TEMPLATE		
FIL-004	ICE PARAMETRIC DB		
MSV-001	YT_S01_P56	MMM	
MSV-002	YT_S01_P57	MMM	
MSV-003	YT_S01_P58	MMM	
MSV-004	YT_S01_P59	MMM	
MSV-005	YT_S01_P60	MMM	
MSV-006	YT_S01_P61	MMM	
MSV-007	YT_S01_P62	MMM	
MSV-008	YT_S01_P63	MMM	
MSV-009	YT_S01_P64	MMM	
YS/YR SSS	Quick Start =5 (Imperial Units) Quick Start =10 (Metric units)		
AV-001	YT_S01_P03	XXXXXX	
AV-002	YT_S01_P04	XXXXXX	
AV-005	YT_S01_P11	XXXXXX	
AV-006	YT_S01_P12	XXXXXX	
AV-007	YT_S01_P13	XXXXXX	
AV-008	YT_S01_P14	XXXXXX	
AV-009	YT_S01_P15	XXXXXX	
AV-010	YT_S01_P16	XXXXXX	
AV-011	YT_S01_P17	XXXXXX	
AV-012	YT_S01_P18	XXXXXX	
AV-013	YT_S01_P19	XXXXXX	
AV-014	YT_S01_P20	XXXXXX	
AV-015	YT_S01_P21	XXXXXX	
AV-016	YT_S01_P22	XXXXXX	
AV-017	YT_S01_P23	XXXXXX	
AV-018	YT_S01_P24	XXXXXX	
AV-019	YT_S01_P25	XXXXXX	
AV-020	YT_S01_P26	XXXXXX	
AV-021	YT_S01_P27	XXXXXX	
AV-022	YT_S01_P28	XXXXXX	
AV-023	YT_S01_P29	XXXXXX	
AV-024	YT_S01_P30	XXXXXX	
AV-025	YT_S01_P31	XXXXXX	
AV-026	YT_S01_P32	XXXXXX	
AV-027	YT_S01_P33	XXXXXX	
AV-028	YT_S01_P34	XXXXXX	
AV-029	YT_S01_P35	XXXXXX	
AV-030	YT_S01_P66	XXXXXX	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
AV-031	YT_S01_P67	XXXXXX	
BO-001	YT COMS FAIL	OFF/ON	
BV-001	YT_S01_P07	OFF/ON	
BV-005	YT_S01_P36	OFF/ON	
BV-006	YT_S01_P37	OFF/ON	
BV-007	YT_S01_P38	OFF/ON	
BV-008	YT_S01_P39	OFF/ON	
BV-009	YT_S01_P40	OFF/ON	
BV-011	YT_S01_P42	OFF/ON	
BV-024	YT_S01_P55	OFF/ON	
0005000	YSYRSSS IM-G 5000		
FIL-001	APPLICATION		
FIL-002	FIRMWARE		
FIL-003	TEMPLATE		
FIL-004	ICE PARAMETRIC DB		
MSV-001	YT_S01_P56	MMM	
MSV-002	YT_S01_P57	MMM	
MSV-003	YT_S01_P58	MMM	
MSV-004	YT_S01_P59	MMM	
MSV-005	YT_S01_P60	MMM	
MSV-008	YT_S01_P63	MMM	
YT-2 1200 (Sect 1)	Quick Start =11 (Section 1)		
AV-001	YT_S01_P03	XXXXXX	
AV-002	YT_S01_P04	XXXXXX	
AV-003	YT_S01_P05	XXXXXX	
AV-004	YT_S01_P06	XXXXXX	
AV-005	YT_S01_P11	XXXXXX	
AV-006	YT_S01_P12	XXXXXX	
AV-007	YT_S01_P13	XXXXXX	
AV-008	YT_S01_P14	XXXXXX	
AV-009	YT_S01_P15	XXXXXX	
AV-010	YT_S01_P16	XXXXXX	
AV-011	YT_S01_P17	XXXXXX	
AV-012	YT_S01_P18	XXXXXX	
AV-013	YT_S01_P19	XXXXXX	
AV-014	YT_S01_P20	XXXXXX	
AV-015	YT_S01_P21	XXXXXX	
AV-016	YT_S01_P22	XXXXXX	
AV-017	YT_S01_P23	XXXXXX	
AV-018	YT_S01_P24	XXXXXX	
AV-019	YT_S01_P25	XXXXXX	
AV-020	YT_S01_P26	XXXXXX	
AV-021	YT_S01_P27	XXXXXX	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
AV-022	YT_S01_P28	XXXXXX	
AV-023	YT_S01_P29	XXXXXX	
AV-024	YT_S01_P30	XXXXXX	
AV-025	YT_S01_P31	XXXXXX	
AV-026	YT_S01_P32	XXXXXX	
AV-027	YT_S01_P33	XXXXXX	
AV-028	YT_S01_P34	XXXXXX	
AV-029	YT_S01_P35	XXXXXX	
AV-030	YT_S01_P66	XXXXXX	
AV-031	YT_S01_P67	XXXXXX	
AV-032	YT_S01_P68	XXXXXX	
AV-033	YT_S01_P69	XXXXXX	
AV-034	YT_S01_P70	XXXXXX	
AV-035	YT_S01_P71	XXXXXX	
AV-036	YT_S01_P72	XXXXXX	
AV-037	YT_S01_P73	XXXXXX	
AV-038	YT_S01_P74	XXXXXX	
AV-039	YT_S01_P75	XXXXXX	
AV-040	YT_S01_P76	XXXXXX	
AV-041	YT_S01_P77	XXXXXX	
AV-042	YT_S01_P78	XXXXXX	
AV-043	YT_S01_P79	XXXXXX	
BO-001	YT COMS FAIL	OFF/ON	
BV-001	YT_S01_P07	OFF/ON	
BV-002	YT_S01_P08	OFF/ON	
BV-003	YT_S01_P09	OFF/ON	
BV-004	YT_S01_P10	OFF/ON	
BV-005	YT_S01_P36	OFF/ON	
BV-006	YT_S01_P37	OFF/ON	
BV-007	YT_S01_P38	OFF/ON	
BV-008	YT_S01_P39	OFF/ON	
BV-009	YT_S01_P40	OFF/ON	
BV-010	YT_S01_P41	OFF/ON	
BV-011	YT_S01_P42	OFF/ON	
BV-012	YT_S01_P43	OFF/ON	
BV-013	YT_S01_P44	OFF/ON	
BV-014	YT_S01_P45	OFF/ON	
BV-015	YT_S01_P46	OFF/ON	
BV-016	YT_S01_P47	OFF/ON	
BV-017	YT_S01_P48	OFF/ON	
BV-018	YT_S01_P49	OFF/ON	
BV-019	YT_S01_P50	OFF/ON	
BV-020	YT_S01_P51	OFF/ON	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
YT-2 1200 (Sect 1)	Quick Start =11 (Section 1) cont		
BV-021	YT_S01_P52	OFF/ON	
BV-022	YT_S01_P53	OFF/N	
BV-023	YT_S01_P54	OFF/ON	
BV-024	YT_S01_P55	OFF/ON	
BV-025	YT_S01_P80	OFF/ON	
BV-026	YT_S01_P81	OFF/ON	
BV-027	YT_S01_P82	OFF/ON	
BV-028	YT_S01_P83	OFF/ON	
BV-029	YT_S01_P84	OFF/ON	
0005000	YT2 1200_1-G 5000		
FIL-001	APPLICATION		
FIL-002	FIRMWARE		
FIL-003	TEMPLATE		
FIL-004	ICE PARAMETRIC DB		
MSV-001	YT_S01_P56	MMM	
MSV-002	YT_S01_P57	MMM	
MSV-003	YT_S01_P58	MMM	
MSV-004	YT_S01_P59	MMM	
MSV-005	YT_S01_P60	MMM	
MSV-006	YT_S01_P61	MMM	
MSV-007	YT_S01_P62	MMM	
MSV-008	YT_S01_P63	MMM	
MSV-009	YT_S01_P64	MMM	
MSV-010	YT_S01_P65	MMM	
YT-2 4800 (Sect 1)	Quick Start =12 (Section 1)		
AV-001	YT_S01_P03	XXXXXX	
AV-002	YT_S01_P04	XXXXXX	
AV-003	YT_S01_P05	XXXXXX	
AV-004	YT_S01_P06	XXXXXX	
AV-005	YT_S01_P11	XXXXXX	
AV-006	YT_S01_P12	XXXXXX	
AV-007	YT_S01_P13	XXXXXX	
AV-008	YT_S01_P14	XXXXXX	
AV-009	YT_S01_P15	XXXXXX	
AV-010	YT_S01_P16	XXXXXX	
AV-011	YT_S01_P17	XXXXXX	
AV-012	YT_S01_P18	XXXXXX	
AV-013	YT_S01_P19	XXXXXX	
AV-014	YT_S01_P20	XXXXXX	
AV-015	YT_S01_P21	XXXXXX	
AV-016	YT_S01_P22	XXXXXX	
AV-017	YT_S01_P23	XXXXXX	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
AV-018	YT_S01_P24	XXXXXX	
AV-019	YT_S01_P25	XXXXXX	
AV-020	YT_S01_P26	XXXXXX	
AV-021	YT_S01_P27	XXXXXX	
AV-022	YT_S01_P28	XXXXXX	
AV-023	YT_S01_P29	XXXXXX	
AV-024	YT_S01_P30	XXXXXX	
AV-025	YT_S01_P31	XXXXXX	
AV-026	YT_S01_P32	XXXXXX	
AV-027	YT_S01_P33	XXXXXX	
AV-028	YT_S01_P34	XXXXXX	
AV-029	YT_S01_P35	XXXXXX	
AV-030	YT_S01_P66	XXXXXX	
AV-031	YT_S01_P67	XXXXXX	
AV-032	YT_S01_P68	XXXXXX	
AV-033	YT_S01_P69	XXXXXX	
AV-034	YT_S01_P70	XXXXXX	
AV-035	YT_S01_P71	XXXXXX	
AV-036	YT_S01_P72	XXXXXX	
AV-037	YT_S01_P73	XXXXXX	
AV-038	YT_S01_P74	XXXXXX	
AV-039	YT_S01_P75	XXXXXX	
AV-040	YT_S01_P76	XXXXXX	
AV-041	YT_S01_P77	XXXXXX	
AV-042	YT_S01_P78	XXXXXX	
AV-043	YT_S01_P79	XXXXXX	
BO-001	YT COMS FAIL	OFF/ON	
BV-001	YT_S01_P07	OFF/ON	
BV-002	YT_S01_P08	OFF/ON	
BV-003	YT_S01_P09	OFF/ON	
BV-004	YT_S01_P10	OFF/ON	
BV-005	YT_S01_P36	OFF/ON	
BV-006	YT_S01_P37	OFF/ON	
BV-007	YT_S01_P38	OFF/ON	
BV-008	YT_S01_P39	OFF/ON	
BV-009	YT_S01_P40	OFF/ON	
BV-010	YT_S01_P41	OFF/ON	
BV-011	YT_S01_P42	OFF/ON	
BV-012	YT_S01_P43	OFF/ON	
BV-013	YT_S01_P44	OFF/ON	
BV-014	YT_S01_P45	OFF/ON	
BV-015	YT_S01_P46	OFF/ON	
BV-016	YT_S01_P47	OFF/ON	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units/State Codes
BV-017	YT_S01_P48	OFF/ON	
BV-018	YT_S01_P49	OFF/ON	
BV-019	YT_S01_P50	OFF/ON	
BV-020	YT_S01_P51	OFF/ON	
YT-2 4800 (Sect 1)	Quick Start =12 (Section 1)		
BV-021	YT_S01_P52	OFF/ON	
BV-022	YT_S01_P53	OFF/ON	
BV-023	YT_S01_P54	OFF/ON	
BV-024	YT_S01_P55	OFF/ON	
BV-025	YT_S01_P80	OFF/ON	
BV-026	YT_S01_P81	OFF/ON	
BV-027	YT_S01_P82	OFF/ON	
BV-028	YT_S01_P83	OFF/ON	
BV-029	YT_S01_P84	OFF/ON	
0005000	YT2 4800_1-G 5000		
FIL-001	APPLICATION		
FIL-002	FIRMWARE		
FIL-003	TEMPLATE		
FIL-004	ICE PARAMETRIC DB		
MSV-001	YT_S01_P56	MMM	
MSV-002	YT_S01_P57	MMM	
MSV-003	YT_S01_P58	MMM	
MSV-004	YT_S01_P59	MMM	
MSV-005	YT_S01_P60	MMM	
MSV-006	YT_S01_P61	MMM	
MSV-007	YT_S01_P62	MMM	
MSV-008	YT_S01_P63	MMM	
MSV-009	YT_S01_P64	MMM	
MSV-010	YT_S01_P65	MMM	
YT-2 4800 (Sect 1&2)	Quick Start =13 (Section 1 and Section 2)		
AV-001	YT_S01_P03	XXXXXX	
AV-002	YT_S01_P04	XXXXXX	
AV-003	YT_S01_P05	XXXXXX	
AV-004	YT_S01_P06	XXXXXX	
AV-005	YT_S01_P11	XXXXXX	
AV-006	YT_S01_P12	XXXXXX	
AV-007	YT_S01_P13	XXXXXX	
AV-008	YT_S01_P14	XXXXXX	
AV-009	YT_S01_P15	XXXXXX	
AV-010	YT_S01_P16	XXXXXX	
AV-011	YT_S01_P17	XXXXXX	
AV-012	YT_S01_P18	XXXXXX	
AV-013	YT_S01_P19	XXXXXX	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
AV-014	YT_S01_P20	XXXXXX	
AV-015	YT_S01_P21	XXXXXX	
AV-016	YT_S01_P22	XXXXXX	
AV-017	YT_S01_P23	XXXXXX	
AV-018	YT_S01_P24	XXXXXX	
AV-019	YT_S01_P25	XXXXXX	
AV-020	YT_S01_P26	XXXXXX	
AV-021	YT_S01_P27	XXXXXX	
AV-022	YT_S01_P28	XXXXXX	
AV-023	YT_S01_P29	XXXXXX	
AV-024	YT_S01_P30	XXXXXX	
AV-025	YT_S01_P31	XXXXXX	
AV-026	YT_S01_P32	XXXXXX	
AV-027	YT_S01_P33	XXXXXX	
AV-028	YT_S01_P34	XXXXXX	
AV-029	YT_S01_P35	XXXXXX	
AV-030	YT_S01_P66	XXXXXX	
AV-031	YT_S01_P67	XXXXXX	
AV-032	YT_S01_P68	XXXXXX	
AV-033	YT_S01_P69	XXXXXX	
AV-034	YT_S01_P70	XXXXXX	
AV-035	YT_S01_P71	XXXXXX	
AV-036	YT_S01_P72	XXXXXX	
AV-037	YT_S01_P73	XXXXXX	
AV-038	YT_S01_P74	XXXXXX	
AV-039	YT_S01_P75	XXXXXX	
AV-040	YT_S01_P76	XXXXXX	
AV-041	YT_S01_P77	XXXXXX	
AV-042	YT_S01_P78	XXXXXX	
AV-043	YT_S01_P79	XXXXXX	
AV-105	YT_S02_P11	XXXXXX	
AV-106	YT_S02_P12	XXXXXX	
AV-107	YT_S02_P13	XXXXXX	
AV-108	YT_S02_P14	XXXXXX	
AV-109	YT_S02_P15	XXXXXX	
AV-110	YT_S02_P16	XXXXXX	
AV-111	YT_S02_P17	XXXXXX	
AV-112	YT_S02_P18	XXXXXX	
AV-113	YT_S02_P19	XXXXXX	
AV-114	YT_S02_P20	XXXXXX	
AV-115	YT_S02_P21	XXXXXX	
AV-116	YT_S02_P22	XXXXXX	
AV-117	YT_S02_P23	XXXXXX	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
AV-118	YT_S02_P24	XXXXXX	
AV-119	YT_S02_P25	XXXXXX	
AV-120	YT_S02_P26	XXXXXX	
AV-121	YT_S02_P27	XXXXXX	
AV-122	YT_S02_P28	XXXXXX	
AV-123	YT_S02_P29	XXXXXX	
AV-124	YT_S02_P30	XXXXXX	
AV-125	YT_S02_P31	XXXXXX	
AV-126	YT_S02_P32	XXXXXX	
AV-127	YT_S02_P33	XXXXXX	
YT-2 4800 (Sect 1&2)	Quick Start =13 (Section 1 and Section 2) cont.		
AV-128	YT_S02_P34	XXXXXX	
AV-129	YT_S02_P35	XXXXXX	
AV-130	YT_S02_P66	XXXXXX	
AV-131	YT_S02_P67	XXXXXX	
AV-132	YT_S02_P68	XXXXXX	
AV-133	YT_S02_P69	XXXXXX	
AV-134	YT_S02_P70	XXXXXX	
AV-135	YT_S02_P71	XXXXXX	
AV-136	YT_S02_P72	XXXXXX	
AV-137	YT_S02_P73	XXXXXX	
AV-138	YT_S02_P74	XXXXXX	
AV-139	YT_S02_P75	XXXXXX	
AV-140	YT_S02_P76	XXXXXX	
AV-141	YT_S02_P77	XXXXXX	
AV-142	YT_S02_P78	XXXXXX	
AV-143	YT_S02_P79	XXXXXX	
BO-001	YT COMS FAIL	OFF/ON	
BV-001	YT_S01_P07	OFF/ON	
BV-002	YT_S01_P08	OFF/ON	
BV-003	YT_S01_P09	OFF/ON	
BV-004	YT_S01_P10	OFF/ON	
BV-005	YT_S01_P36	OFF/ON	
BV-006	YT_S01_P37	OFF/ON	
BV-007	YT_S01_P38	OFF/ON	
BV-008	YT_S01_P39	OFF/ON	
BV-009	YT_S01_P40	OFF/ON	
BV-010	YT_S01_P41	OFF/ON	
BV-011	YT_S01_P42	OFF/ON	
BV-012	YT_S01_P43	OFF/ON	
BV-013	YT_S01_P44	OFF/ON	
BV-014	YT_S01_P45	OFF/ON	
BV-015	YT_S01_P46	OFF/ON	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
BV-016	YT_S01_P47	OFF/ON	
BV-017	YT_S01_P48	OFF/ON	
BV-018	YT_S01_P49	OFF/ON	
BV-019	YT_S01_P50	OFF/ON	
BV-020	YT_S01_P51	OFF/ON	
BV-021	YT_S01_P52	OFF/ON	
BV-022	YT_S01_P53	OFF/ON	
BV-023	YT_S01_P54	OFF/ON	
BV-024	YT_S01_P55	OFF/ON	
BV-025	YT_S01_P80	OFF/ON	
BV-026	YT_S01_P81	OFF/ON	
BV-027	YT_S01_P82	OFF/ON	
BV-028	YT_S01_P83	OFF/ON	
BV-029	YT_S01_P84	OFF/ON	
BV-101	YT_S02_P07	OFF/ON	
BV-102	YT_S02_P08	OFF/ON	
BV-103	YT_S02_P09	OFF/ON	
BV-104	YT_S02_P10	OFF/ON	
BV-105	YT_S02_P36	OFF/ON	
BV-106	YT_S02_P37	OFF/ON	
BV-107	YT_S02_P38	OFF/ON	
BV-108	YT_S02_P39	OFF/ON	
BV-109	YT_S02_P40	OFF/ON	
BV-110	YT_S02_P41	OFF/ON	
BV-111	YT_S02_P42	OFF/ON	
BV-112	YT_S02_P43	OFF/ON	
BV-113	YT_S02_P44	OFF/ON	
BV-114	YT_S02_P45	OFF/ON	
BV-115	YT_S02_P46	OFF/ON	
BV-116	YT_S02_P47	OFF/ON	
BV-117	YT_S02_P48	OFF/ON	
BV-118	YT_S02_P49	OFF/ON	
YT-2 4800 (Sect 1&2)	Quick Start =13 (Section 1 and Section 2) cont.		
BV-119	YT_S02_P50	OFF/ON	
BV-120	YT_S02_P51	OFF/ON	
BV-121	YT_S02_P52	OFF/ON	
BV-122	YT_S02_P53	OFF/ON	
BV-123	YT_S02_P54	OFF/ON	
BV-124	YT_S02_P55	OFF/ON	
BV-125	YT_S02_P80	OFF/ON	
BV-126	YT_S02_P81	OFF/ON	
BV-127	YT_S02_P82	OFF/ON	
BV-128	YT_S02_P83	OFF/ON	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
BV-129	YT_S02_P84	OFF/ON	
0005000	YT2 4800_2-G 5000		
FIL-001	APPLICATION		
FIL-002	FIRMWARE		
FIL-003	TEMPLATE		
FIL-004	ICE PARAMETRIC DB		
MSV-001	YT_S01_P56	MMM	
MSV-002	YT_S01_P57	MMM	
MSV-003	YT_S01_P58	MMM	
MSV-004	YT_S01_P59	MMM	
MSV-005	YT_S01_P60	MMM	
MSV-006	YT_S01_P61	MMM	
MSV-007	YT_S01_P62	MMM	
MSV-008	YT_S01_P63	MMM	
MSV-009	YT_S01_P64	MMM	
MSV-010	YT_S01_P65	MMM	
MSV-101	YT_S02_P56	MMM	
MSV-102	YT_S02_P57	MMM	
MSV-103	YT_S02_P58	MMM	
MSV-104	YT_S02_P59	MMM	
MSV-105	YT_S02_P60	MMM	
MSV-106	YT_S02_P61	MMM	
MSV-107	YT_S02_P62	MMM	
MSV-108	YT_S02_P63	MMM	
MSV-109	YT_S02_P64	MMM	
MSV-110	YT_S02_P65	MMM	
YD	Quick Start =14 (Imperial)		
AV-001	LCHW_SP	XXXXXX	F
AV-002	%CURR_LIMIT	XXXXXX	PCT
AV-005	LCHL_TEMP	XXXXXX	F
AV-006	RCHL_TEMP	XXXXXX	F
AV-007	EVAP_PRESS	XXXXXX	PSI
AV-008	COND_PRESS	XXXXXX	PSI
AV-009	OIL_DP_1	XXXXXX	PSI
AV-010	OIL_DP_2	XXXXXX	PSI
AV-011	RCNDL_TEMP	XXXXXX	F
AV-012	LCNDL_TEMP	XXXXXX	F
AV-013	%FLA_1	XXXXXX	PCT
AV-014	%FLA_2	XXXXXX	PCT
AV-015	EVAP_REF_T	XXXXXX	F
AV-016	DROPLEG_RF_T	XXXXXX	F
AV-017	LCHL_SP	XXXXXX	F
AV-018	%CURR_LIMIT	XXXXXX	PCT
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
AV-019	EVAPSAT_TEMP	XXXXXX	F
AV-020	CONDSAT_TEMP	XXXXXX	F
AV-021	DISCH_TEMP_1	XXXXXX	F
AV-022	DISCH_TEMP_2	XXXXXX	F
AV-023	SUMP_OIL_T	XXXXXX	F
AV-024	REFRIG_LEVEL	XXXXXX	PCT
AV-025	UNIT_OP_HRS	XXXXXX	
AV-026	UNIT_STARTS	XXXXXX	
AV-027	SUMP_OIL_PRS	XXXXXX	PSI
AV-028	PUMP_OIL_P_1	XXXXXX	PSI
AV-029	PUMP_OIL_P_2	XXXXXX	PSI
AV-030	PROX_POS_1	XXXXXX	PCT
AV-031	PROX_POS_2	XXXXXX	PCT
AV-032	REF_LEVEL_SP	XXXXXX	PCT
AV-033	ANTI_RECYC_1	XXXXXX	
AV-034	ANTI_RECYC_2	XXXXXX	
AV-035	PRV_POS_1	XXXXXX	PCT
AV-036	PRV_POS_2	XXXXXX	PCT
AV-037	VGD_POSTN#1	XXXXXX	PCT
AV-038	VGD_POSTN#2	XXXXXX	PCT
AV-039	OIL_SUMP_LEV	XXXXXX	PCT
BO-001	YT COMS FAIL	OFF/ON	
BV-001	START_STOP	OFF/ON	
BV-005	MOTOR_RUN_1	OFF/ON	
BV-006	MOTOR_RUN_2	OFF/ON	
BV-008	CHL_PUMP	OFF/ON	
BV-009	PNL_STOP_SW	OFF/ON	
BV-010	CHL_FLW_SW	OFF/ON	
BV-011	CND_FLW_SW	OFF/ON	
BV-012	DIS_HP_SW#1	OFF/ON	
BV-013	DIS_HP_SW#2	OFF/ON	
BV-014	VANEMTR_SW#1	OFF/ON	
BV-015	VANEMTR_SW#2	OFF/ON	
BV-016	REFLVL_LOWER	OFF/ON	
BV-017	REFLVL_RAISE	OFF/ON	
BV-018	OIL_RETN_SOL	OFF/ON	
BV-019	PRV_OPEN#1	OFF/ON	
BV-020	PRV_OPEN#2	OFF/ON	
BV-021	PRV_CLOSE#1	OFF/ON	
BV-022	PRV_CLOSE#2	OFF/ON	
BV-025	DIS_V_OPEN#1	OFF/ON	
BV-026	DIS_V_OPEN#2	OFF/ON	
BV-027	DIS_V_CLSE#1	OFF/ON	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
BV-028	DIS_V_CLSE#2	OFF/ON	
0005000	YD IM-F 5000		
FIL-001	APPLICATION		
FIL-002	FIRMWARE		
FIL-003	TEMPLATE		
FIL-004	ICE PARAMETRIC DB		
MSV-001	OPER_CODE	MMM	UNIT STOPPED - READY TO START
YD	Quick Start =14 (Imperial)		
MSV-002	SAFETY_FLT	MMM	NO SAFETY FAULTS PRESENT
MSV-003	CYCLING_FLT	MMM	NO CYCLING FAULTS PRESENT
MSV-004	WARNING_FLT	MMM	NO WARNINGS PRESENT
MSV-005	MOD_RUN_FLT	MMM	NO MODIFIED RUN CONDITNS PRESENT
MSV-006	INHIBIT_FLT	MMM	NO INHIBT FLTS PRESENT
MSV-007	INTERNAL_FLT	MMM	NO INTERNAL FLTS PRESENT
YD	Quick Start =15 (Metric)		
AV-001	LCHW_SP	XXXXXX	C
AV-002	%CURR_LIMIT	XXXXXX	PCT
AV-005	LCHL_TEMP	XXXXXX	C
AV-006	RCHL_TEMP	XXXXXX	C
AV-007	EVAP_PRESS	XXXXXX	KPA
AV-008	COND_PRESS	XXXXXX	KPA
AV-009	OIL_DP_1	XXXXXX	KPA
AV-010	OIL_DP_2	XXXXXX	KPA
AV-011	RCNDL_TEMP	XXXXXX	C
AV-012	LCNDL_TEMP	XXXXXX	C
AV-013	%FLA_1	XXXXXX	PCT
AV-014	%FLA_2	XXXXXX	PCT
AV-015	EVAP_REF_T	XXXXXX	C
AV-016	DROPLEG_RF_T	XXXXXX	C
AV-017	LCHL_SP	XXXXXX	C
AV-018	%CURR_LIMIT	XXXXXX	PCT
AV-019	EVAPSAT_TEMP	XXXXXX	C
AV-020	CONDSAT_TEMP	XXXXXX	C
AV-021	DISCH_TEMP_1	XXXXXX	C
AV-022	DISCH_TEMP_2	XXXXXX	C
AV-023	SUMP_OIL_T	XXXXXX	C
AV-024	REFRIG_LEVEL	XXXXXX	PCT
AV-025	UNIT_OP_HRS	XXXXXX	
AV-026	UNIT_STARTS	XXXXXX	
AV-027	SUMP_OIL_PRS	XXXXXX	KPA
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
AV-028	PUMP_OIL_P_1	XXXXXX	KPA
AV-029	PUMP_OIL_P_2	XXXXXX	KPA
AV-030	PROX_POS_1	XXXXXX	PCT
AV-031	PROX_POS_2	XXXXXX	PCT
AV-032	REF_LEVEL_SP	XXXXXX	PCT
AV-033	ANTI_RECYC_1	XXXXXX	
AV-034	ANTI_RECYC_2	XXXXXX	
AV-035	PRV_POS_1	XXXXXX	PCT
AV-036	PRV_POS_2	XXXXXX	PCT
AV-037	VGD_POSTN#1	XXXXXX	PCT
AV-038	VGD_POSTN#2	XXXXXX	PCT
AV-039	OIL_SUMP_LEV	XXXXXX	PCT
BO-001	YT COMS FAIL	OFF/ON	
BV-001	START_STOP	OFF/ON	
BV-005	MOTOR_RUN_1	OFF/ON	
BV-006	MOTOR_RUN_2	OFF/ON	
BV-008	CHL_PUMP	OFF/ON	
BV-009	PNL_STOP_SW	OFF/ON	
BV-010	CHL_FLW_SW	OFF/ON	
BV-011	CND_FLW_SW	OFF/ON	
BV-012	DIS_HP_SW#1	OFF/ON	
BV-013	DIS_HP_SW#2	OFF/ON	
BV-014	VANEMTR_SW#1	OFF/ON	
BV-015	VANEMTR_SW#2	OFF/ON	
BV-016	REFLVL_LOWER	OFF/ON	
OFF	REFLVL_RAISE	OFF/ON	
OFF	OIL_RETN_SOL	OFF/ON	
OFF	PRV_OPEN#1	OFF/ON	
OFF	PRV_OPEN#2	OFF/ON	
OFF	PRV_CLOSE#1	OFF/ON	
OFF	PRV_CLOSE#2	OFF/ON	
OFF	DIS_V_OPEN#1	OFF/ON	
OFF	DIS_V_OPEN#2	OFF/ON	
OFF	DIS_V_CLSE#1	OFF/ON	
BV-028	DIS_V_CLSE#2	OFF/ON	
0005000	YD SI-F 5000		
FIL-001	APPLICATION		
FIL-002	FIRMWARE		
FIL-003	TEMPLATE		
FIL-004	ICE PARAMETRIC DB		
MSV-001	OPER_CODE	MMM	UNIT STOPPED - READY TO START
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
YD	Quick Start =15 (Metric) cont.		
MSV-002	SAFETY_FLT	MMM	NO SAFETY FAULTS PRESENT
MSV-003	CYCLING_FLT	MMM	NO CYCLING FAULTS PRESENT
MSV-004	WARNING_FLT	MMM	NO WARNINGS PRESENT
MSV-005	MOD_RUN_FLT	MMM	NO MODIFIED RUN CONDITIONS PRESENT
MSV-006	INHIBIT_FLT	MMM	NO INHIBIT FLTS PRESENT
MSV-007	INTERNAL_FLT	MMM	NO INTERNAL FLTS PRESENT
YPAL	Quick Start =16		
AV-001	BNET_AVSP1	XXXXXX	
AV-002	BNET_AVSP2	XXXXXX	
AV-003	BNET_AVSP3	XXXXXX	
AV-004	BNET_AVSP4	XXXXXX	
AV-005	BNET_AVSP5	XXXXXX	
AV-006	BNET_AVSP6	XXXXXX	
AV-007	BNET_AVSP7	XXXXXX	
AV-008	BNET_AVSP8	XXXXXX	
AV-009	BNET_AVSP9	XXXXXX	
AV-010	BNET_AVSP10	XXXXXX	
AV-011	BNET_AVSP11	XXXXXX	
AV-012	BNET_AVSP12	XXXXXX	
AV-013	BNET_AVSP13	XXXXXX	
AV-014	BNET_AVSP14	XXXXXX	
AV-015	BNET_AVSP15	XXXXXX	
AV-016	BNET_AVSP16	XXXXXX	
AV-017	BNET_AVSP17	XXXXXX	
AV-018	BNET_AVSP18	XXXXXX	
AV-019	BNET_AVSP19	XXXXXX	
AV-020	BNET_AVSP20	XXXXXX	
AV-021	BNET_AVSP21	XXXXXX	
AV-022	BNET_AVSP22	XXXXXX	
AV-023	BNET_AVSP23	XXXXXX	
AV-024	BNET_AVSP24	XXXXXX	
AV-025	BNET_AVSP25	XXXXXX	
AV-026	BNET_AVSP26	XXXXXX	
AV-027	BNET_AVSP27	XXXXXX	
AV-028	BNET_AVSP28	XXXXXX	
AV-029	BNET_AVSP29	XXXXXX	
AV-030	BACNET AV1	XXXXXX	
AV-031	BACNET AV2	XXXXXX	
AV-032	BACNET AV3	XXXXXX	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
AV-033	BACNET AV4	XXXXXX	
AV-034	BACNET AV5	XXXXXX	
AV-035	BACNET AV6	XXXXXX	
AV-036	BACNET AV7	XXXXXX	
AV-037	BACNET AV8	XXXXXX	
AV-038	BACNET AV9	XXXXXX	
AV-039	BACNET AV10	XXXXXX	
AV-040	BACNET AV11	XXXXXX	
AV-041	BACNET AV12	XXXXXX	
AV-042	BACNET AV13	XXXXXX	
AV-043	BACNET AV14	XXXXXX	
AV-044	BACNET AV15	XXXXXX	
AV-045	BACNET AV16	XXXXXX	
AV-046	BACNET AV17	XXXXXX	
AV-047	BACNET AV18	XXXXXX	
AV-048	BACNET AV19	XXXXXX	
AV-049	BACNET AV20	XXXXXX	
AV-050	BACNET AV21	XXXXXX	
AV-051	BACNET AV22	XXXXXX	
AV-052	BACNET AV23	XXXXXX	
AV-053	BACNET AV24	XXXXXX	
AV-054	BACNET AV25	XXXXXX	
AV-055	BACNET AV26	XXXXXX	
AV-056	BACNET AV27	XXXXXX	
AV-057	BACNET AV28	XXXXXX	
AV-058	BACNET AV29	XXXXXX	
AV-059	BACNET AV30	XXXXXX	
AV-060	BACNET AV31	XXXXXX	
AV-061	BACNET AV32	XXXXXX	
AV-062	BACNET AV33	XXXXXX	
AV-063	BACNET AV34	XXXXXX	
AV-064	BACNET AV35	XXXXXX	
AV-065	BACNET AV36	XXXXXX	
AV-066	BACNET AV37	XXXXXX	
YPAL	Quick Start =16		
AV-067	BACNET AV38	XXXXXX	
AV-068	BACNET AV39	XXXXXX	
AV-069	BACNET AV40	XXXXXX	
AV-070	BACNET AV41	XXXXXX	
AV-071	BACNET AV42	XXXXXX	
AV-072	BACNET AV43	XXXXXX	
AV-073	BACNET AV44	XXXXXX	
AV-074	BACNET AV45	XXXXXX	
Continued on next page . . .			

BACnet Object ID (Cont.)	BACnet Object Name	Present Value	Engineering Units or State Codes
AV-075	BACNET AV46	XXXXXX	
BV-001	BACNET BV1	OFF/ON	
BV-002	BACNET BV2	OFF/ON	
BV-003	BACNET BV3	OFF/ON	
BV-004	BACNET BV4	OFF/ON	
BV-005	BACNET BV5	OFF/ON	
BV-006	BACNET BV6	OFF/ON	
BV-007	BACNET BV7	OFF/ON	
BV-008	BACNET BV8	OFF/ON	
BV-009	BACNET BV9	OFF/ON	
BV-010	BACNET BV10	OFF/ON	
BV-011	BACNET BV11	OFF/ON	
BV-012	BACNET BV12	OFF/ON	
BV-013	BACNET BV13	OFF/ON	
BV-014	BACNET BV14	OFF/ON	
BV-015	BACNET BV15	OFF/ON	
BV-016	BACNET BV16	OFF/ON	
BV-017	BACNET BV17	OFF/ON	
BV-018	BACNET BV18	OFF/ON	
BV-019	BACNET BV19	OFF/ON	
BV-020	BACNET BV20	OFF/ON	
BV-021	BACNET BV21	OFF/ON	
BV-022	BACNET BV22	OFF/ON	
BV-023	BACNET BV23	OFF/ON	
0005000	YPAL RTU 5000		
FIL-001	APPLICATION		
FIL-002	FIRMWARE		
FIL-003	TEMPLATE		
FIL-004	ICE PARAMETRIC DB		

Troubleshooting an E-Link Gateway

LEDs

Whenever possible, the E-Link Gateway's LEDs should be used for visual troubleshooting. In many instances, this is sufficient in diagnosing problems. (See the LED section for additional information on the behavior of the various LEDs).

The Status LED provides a simple indication of the E-Link Gateway's operation, indicating conditions such as whether communications between the E-Link Gateway and the equipment have failed, if a custom Application is being used, and if Port 3 has been overridden.

The red and green communication LEDs located on the SIM visually display the electrical activity on each of the port lines. There is no intelligence behind how these LEDs are driven. They provide an analog representation of the port's signals and sometimes offer indication of a malfunction. For example, if the green LED is always dimly illuminated, it could indicate an incorrectly biased network or electrical noise coupled onto the network.

Software Troubleshooting

In many cases the E-Link Gateway must be debugged by actually interrogating the Applications. In this circumstance, Port 3 is temporarily used to provide a VT-100 access to the system. (See the Accessing the E-Link Gateway section for the actual mechanics of invoking this functionality.)

Note: Using Port 3 to access the E-Link Gateway's Applications means that any connectivity normally used by Port 3 is temporarily disabled. Proper authorization to disable Port 3 should be obtained before proceeding.

Access and the syntax used to navigate through the E-Link Gateway's Applications are described in the Accessing the E-Link Gateway section. This section focuses only on the actual troubleshooting steps and not the mechanics.

In some instances the data being presented by the network is questioned, and it becomes necessary to follow it from input to output.

Expected Network-Visible Data

For a selected Quick Start there is an expected list of points that should be available to the network. Accessing the object list command displays this list and this can be compared against the lists shown in an earlier section of this document. If the standard Application is used, the two lists should be the same.

The object list command provides a snapshot of the points' Present values at a given point in time, so this can be used to correlate the data that the E-Link Gateway is delivering versus the data that the network device is retrieving.

Interpreting the Object List Data

The object list command returns the Object ID, Object Name, PV, and Engineering Units of any point that is in the BACnet Object_List_Property. So if the network protocol is BACnet, there is a one-to-one correspondence with this list and what the BACnet device should be seeing.

N2

The E-Link Gateway's N2 protocol implementation only supports the retrieval of the PV and the point's status, so the Name and Engineering units are superfluous. Each point's analog and binary values (ADF and BD objects) correlate directly with what is being displayed by the object list command.

In the case of the ADI objects the N2 values are always one less than that what is being displayed by the Object list command.

Modbus RTU

As with N2 Applications, the Name and Engineering units are superfluous in a Modbus RTU Application. Only the PV has any relevance. When correlating values being retrieved by a Modbus RTU Master and those displayed by the object list command, the following should be considered.

Registers displaying equipment CODES always have a value that is one less than that what is being displayed by the Object list command.

Any analog value displayed by a Modbus RTU Master must be processed according to the applied scaling. For example, the object list value is returned to a Modbus RTU network multiplied by the scale factor configured within the referenced object.

LON FTT10

When correlating the values retrieved by a LON FTT10 system with the values displayed by the object list command, the following information should be considered.

SNVTs displaying equipment codes always have a value that is one less than that what is being displayed by the Object list command. Both analog and binary values follow the PVs that are shown in the object list.

Reviewing the E-Link Gateway's Input Data

Sometimes it is helpful to view the raw data that is actually being retrieved by the E-Link Gateway. In the case of Applications that use the York Talk protocols, F54 should be interrogated.

Viewing F54, P02 provides an easy way of observing the integrity of the E-Link Gateway to chiller communications. Continuously refreshing P02 is a good way of ensuring that the link is reliable.

Note: If the long-term stability of the communication's link is suspect then BO-001 (9001) could be trended using F16 (Digital History). As the E-Link Gateway does not use any Battery Backed up RAM, all histories are LOST after a power cycle.

To view the value of a specific point, the Point Maps must first be used to determine which F54 page contains the point address. This page also displays the point's value. Continually refreshing the page provides real time update.

Note: The value of one or more points may be trended over time using F15 (Analog History). This could be useful if erroneous behavior of a point is suspected. As the E-Link Gateway does not use any Battery Backed up RAM all histories are LOST after a power cycle.

Table 64: Troubleshooting Guide

Symptom	Probable Cause	Solution
The Power LED is OFF.	No power to the unit. Malfunctioning power supply.	Ensure input voltage is on. Check input voltage (24 VAC, 12 VDC, 110 VAC or 220 VAC). Replace the E-Link Gateway.
STATUS LED is OFF.	No Application configuration is loaded, the E-Link Gateway is UNCONFIGURED, or the system is in HALT or MONITOR mode or the loaded Application doesn't match the host hardware. (The Green Power LED should be used as an indication of whether power is currently applied to the unit)	XMODEM in Application CNF file. Replace the E-Link Gateway.
1 FLASH	Terminal mode has been invoked.	Set SW8 on the MAC address switch to OFF.
2 FLASHES	The communications between the E-Link Gateway and the equipment using (F54, F65, and F66) have been lost	Check to see if the equipment is powered on and operational. Check that the correct Quick Start has been invoked Check that the wiring between the E-Link Gateway and the equipment is in place.
3 FLASHES	A F67 or a F68 configuration error has been detected.	Power cycle the E-Link Gateway. XMODEM in Application CNF file. Replace the E-Link Gateway.
LED ON	Set during rebooting. NO ERRORS with a F67/F68 patched Application or with a custom SIS developed Application.	Wait until the E-Link Gateway has initialized. CUSTOM Application
Port 1 Red and Green LEDs never flash (observe for 30 seconds).	The BAS device is not making any requests. The Port is not setup correctly. Incorrect wiring (RX and TX swapped) Defective Port 1 circuit	Ensure BAS device is online and communicating. Check that the correct Quick Start has been invoked on APP Group B. Ensure wiring is correctly installed. Replace the E-Link Gateway.
Continued on next page . . .		

Symptom (Cont.)	Probable Cause	Solution
Port 2 Red and Green LEDs never flash (observe for 30 seconds).	The Port is not set up correctly. Equipment micro panel is not communicating. Incorrect wiring (RX and TX swapped) Defective Port 2 driver	Check that the correct Quick Start has been invoked on APP Group A. Ensure the equipment is configured correctly. Ensure wiring is correctly installed. If Port 2A is being used replace the RS-485 driver. If Port 2 B is being used replace the E-Link Gateway.
Port 3 Red and Green LEDs never flash (observe for 30 seconds).	The BAS device is not making any requests. The Port is not set up correctly. Incorrect wiring (RX and TX swapped) Defective Port 1 driver	Ensure BAS device is online and communicating. Check that the correct Quick Start has been invoked on APP Group B. Ensure wiring is correctly installed. Replace the RS-485 driver.
Port 4 Red and Green LEDs never flash (observe for 5 seconds).	The Port is not set up correctly. Just the Red LED is flashing: Defective ProtoCessor Defective Port 4 circuitry	Check that the correct Quick Start has been invoked on APP Group A. The ProtoCessor is either not present or is badly seated. Replace the ProtoCessor. Replace the E-Link Gateway.
BAS system is unable to communicate, but the E-Link Gateway appears to be working.	Communication wiring is incorrect. The port is not setup correctly (incorrect protocol, baud rate, stop bits, etc.). The E-Link Gateway's MAC address isn't unique, or doesn't match that configured in the BAS system. For BACnet systems the E-Link Gateway's Device Object address doesn't match that configured in the BAS system.	Correct the wiring. Check that the correct Quick Start has been invoked on APP Group A. Change the E-Link Gateway's MAC address or the BAS system's configuration. Change the E-Link Gateway's Device Object address in User Report 1 or change the BAS system's configuration.
The communications between the BAS system and the E-Link Gateway are slow or unreliable.	The network wiring has been installed incorrectly (wrong cable, too close to high noise sources, etc.). The network cable's shields haven't been grounded. The network is terminated in more places than at its ends. The Port's drivers are defective.	Reinstall the cable per the recommended wiring instructions. Ground the shields. Terminate only at the two network extremes. For Port 2A and Port 3 change out the RS-485 drivers, for Port 1 change out the E-Link Gateway.
BAS system is communicating, but values appear to be suspect.	BAS system is referencing the incorrect data. Modbus RTU Scaling is not configured correctly.	Align the BAS system addressing scheme with the Point Maps. Adjust the scaling in the User Report.

Software

Feature Set

The E-Link Gateway's Application consists of a collection of Features defined numerically, that may be linked together to perform a specific purpose. Each Feature performs a particular function such as representing an analog value, performing a calculation, or acquiring data.

The Sections within each Feature (also expressed numerically as S001, S265, etc.) extend the Feature's capacity to perform its designated function. Pages defined as P01 up to P99 contain one or more attributes that may either display data or be edited to change a section's behavior.

Note: The details of the Feature Set are limited to assist with debugging the E-Link Gateway's Applications in the field.

Each of the lower-order addressable Features (F01 through F09, also referred to as the Input/Output [I/O] Features) are designed to offer a consistent user interface. For example, the same pages are used to contain the same data across all of these Features.

Note: An Addressable Feature is one that can be addressed within another Feature. For example, 4001 may be used in F54, F65, or F66 to either provide or accept a value.

Note: The Software portion of this User's Guide is limited to describing only the features and behavior that are relevant within the E-Link Gateway's Application.

I/O Features

The E-Link Gateway has been designed to use three of the I/O Features (MSV, AV, and BV) to move data around the Application and to expose it on the network. These Features have a number of common pages that are shown in Table 65 and briefly described in this section, as an aid to help in troubleshooting an Application in the field.

Every I/O Feature has an input source that specifies where it gets its data from, some inherent behavior that can be personalized by configuring one or more of its attributes, and an output (PV), which is always on P01.

For the three I/O Features used by the E-Link Gateway, the table that follows describes the functionality of the common pages defined in Table 65.

Table 65: Troubleshooting Guide

MSV	AV	BV	Definition
P01 through P08 are valid for F01, F04, and F06			
P01	P01	P01	Name, PV, Units, Status
P02	P02	P02	Description
P03	P03	P03	Source
P04	P04	P04	Direct Input
P06	P06	P06	NET, MAC
P07	P07	P07	Default Value/State
P08	P08	P08	Out of Service Writable
P92 and P93 are only valid for F01			
P92	P15	P12	Modbus RTU Address
P93	P16	P13	BACnet Instance

Because the E-Link Gateway's Features are based on BACnet objects, many of the properties described behave in ways described by the BACnet standard.

Table 66: P01 Descriptions

P01	Name	PV	Units	Status	Reliability	Priority
	Fi1	Fi2	Fi3	Fi4	Fi5	Fi6

P01, Fi1 is a 12-character user enterable string that is used to describe the Feature. It may also appear in response to a query for Object name.

P01, Fi2 represents the PV (Present Value), and is commonly the output of the Feature. It may be set as read only or maybe made network writable depending on how the source on P03 is configured.

P01, Fi3 represents the engineering units assigned to this Feature. In the case of F01, it represents the state text associated with the PV. Many of the E-Link Gateway objects do not use engineering units, making them system neutral.

P01, Fi4 represents the current status of the Feature; these states are shown in Table 67.

Table 67: Feature Statuses

Status	Description
OV	Overridden
OS	Out_Of_Service
BLANK	Normal

When OS is displayed, it indicates that the Feature's Present Value is decoupled from the input source that has been configured on P03. In this mode the PV may be written by BACnet services.

P01, Fi5 is a System Generated character. **U** is displayed to indicate that the object is **Unreliable** whereas a BLANK indicates **Reliable**.

P01, Fi6, **PP** is a two-character indicator that displays the current BACnet write Priority that is in effect and is controlling the Present Value, whereas **LO** indicates the PV is being controlled by some local process internal to the E-Link Gateway, typically another feature.

P02, Fi1 is a 24-character string that is used to further describe the Feature in more detail. It is BACnet readable and is used specifically within the E-Link Gateway's Application to define the LON FTT10 SNVT that is used to represent this Feature's data in a LON FTT10 network.

Table 68: P02 Descriptions

P02	Description
	Fi1

P03 is used to select the source which the Feature uses to generate its output. In the case of the E-Link Gateway's Application, the sources listed in Table 70 are used.

Table 69: P03 Descriptions

P03	SOURCE	MMMM	A	B	C	D
	Fi1	Fi2	Fi3	Fi4	Fi5	Fi6

Table 70: Feature Sources

Selection	Function
DEFAULT	Uses the Default Code, Value, or State to be displayed on P01.
YORK TALK	Allows a value from F54 to be assigned to this Feature
R-SETPOINT	Allows a value from the network to be written to this Feature
DIRECT I/P	Uses the value supplied by the Feature configured on P04
ACQUIS	Allows a value from F65 to be assigned to this Feature
MODBUS RTU	Allows a value from F66 to be assigned to this Feature

The format of P03 varies slightly depending on which of the three Features are used. F01 provides a static source configuration, whereas in F04 and F06 the source may be changed programmatically.

Fi1 Source Structure

Table 70 represents some, but not all of the source selections that may be entered in Fi1, whereas fields A through D are system generated descriptors that more completely define the source of the data.

For example, if the Source was set to YORK TALK, then A through D could display SECT 2 PAGE 22. This allows a user to trace data being sourced from F54, section 2, page 22.

Fi4 and Fi6 Source Structure

Table 71: P03 Descriptions 1

P03	SOURCE	MMMM	CNTR	SSSS
	Fi1	Fi2	Fi3	Fi4

Table 72: P03 Descriptions 2

P03	ACT	MMMM	A	B	C	D
	Fi5	Fi6	Fi7	Fi8	Fi9	Fi10

The source selection works the same way in F01, F04, and F06, except that a steering point has been added in F04 and F06 allowing for the automatic selection of the source. Fi4 is a user-defined analog point of the type (F01, F02, F03, F04, F07 and F08) that when set to a positive number determines which source selection is used. For example, if the PV of the point configured is set to 9, then York Talk is selected. In this case, 9 represents the offset in the Source Selection menu.

If the point's value is set to any negative number, then the selection defaults to that being manually selected in Fi2; however, if this value is set to a positive value, the behavior is shown in Table 73.

Table 73: Fi1 Source Selections

P03, field 5 Value	Functionality
Between 0 and <1	Selects menu offset of 0
Between 1 and < 2	Selects menu offset of 1
Between 2 and < 3	Selects menu offset of 2
Between 3 and < 4	Selects menu offset of 3
Between 29 and < 30	Selects menu offset of 29
Any number greater than the last menus selection	Defaults to Fi2 selection

P04 is the address of a Feature used to provide the P01 PV and engineering units (if appropriate) when P03 SOURCE is set to DIRECT I/P.

Table 74: P04 Descriptions

P04	DIRECT INPUT	SSSS	TT..TT	MMM
	Fi1	Fi2	Fi3	Fi4

When a binary Feature is used, a PV of OPEN sets a value of 0 while a value of MADE sets a value of 1.

P06 is system-generated and is used to display the Network and MAC address of a BACnet device that sent the last successful message to this object's PV. The network address is displayed in field 2 while the MAC address is displayed in fields 4 through 9.

Table 75: P06 Descriptions

P06	NET	V..V	MAC	A	B	C	D	E	F
	Fi1	Fi2	Fi3	Fi4	Fi5	Fi6	Fi7	Fi8	Fi9

The MAC address can be of a variable length depending on the type of device that is sending the message. MS/TP and ARCNET devices return a 1-byte address, Ethernet devices return 6 bytes, and devices that use LonTalk® communication return 2 bytes.

The A byte (field 4) of the MAC address is the Most Significant byte and the F byte (field 9) is the Least Significant byte. The MAC address is displayed as a decimal number.

MS/TP MAC addresses are displayed in field A; the other fields are set to zero (0). For example, if the MS/TP MAC address is 25, then it is displayed as 25.0.0.0.0.0.

P07, field 2 is used to specify the default CODE, VALUE, or STATE that is displayed on P01. In the case of F04 Field 4 also sets the engineering units to be used on P01.

Table 76: P07 Descriptions

P07	Default XXXX	V..V	ENG UNITS	M.M
	Fi1	Fi2	Fi3	Fi4

XXXX is either VALUE or STATE text, depending on whether the Feature is analog or binary.

P08, Fi2 allows a User to determine if the BACnet out of service property is writable. If Fi2 is set to YES, then this object may be set to out of service by another BACnet device. If set to NO, an error code of type WRITE ACCESS DENIED is returned to a requesting BACnet device. This is defaulted to YES, or writable.

Table 77: P01 Descriptions

P08	Out of Service Writable	MMM
	Fi1	Fi2

Configuring Modbus Addresses

While F01, F04, and F06 all have the capability of assigning individual Modbus addresses, they offer a slightly different user interface. The actual page format used by F01 and F06 is shown in Table 78, while Table 79 defines the interface used by F04..

Table 78: PXX F01 and F06 Modbus Addressing

PXX	Modbus RTU Address	V..V
	Fi1	Fi2

The Modbus RTU Address for a given Feature may either be created algorithmically by concatenating the Hex values of the relevant Feature and Section addresses (the default) or by using the address assigned in the Modbus RTU Address Page. F01 and F06 Page Formats

F01 and F06 Page Formats

PXX, field 2 (as shown in Table 78) is used to specify/display the Modbus RTU address assigned to this section. This value is represented as a decimal number. The default is 0, which indicates that the actual Modbus RTU address is derived in the background algorithmically.

F04 Page Format

F04 is used to represent a floating point value that may require more complete definition. Fi4 (as shown in Table 79) allows a user to select the data type used to expose the value on a Modbus network. The default type is SIGNED. Table 80 shows the supported selections.

Table 79: PXX Descriptions

PXX	Modbus RTU Address	V...V	DATA TYPE	M..M	SCALE	M..M
	Fi1	Fi2	Fi3	Fi4	Fi5	Fi6

Table 80: Data Type Selections

UNSIGNED	0 < 65,535
SIGNED	- 32,768 < 32,767

Fi6 allows a user to enter a scaling factor (Table 81) that manipulates the Modbus RTU data by moving the decimal point either to the left or to the right depending on whether the request is a READ or a WRITE.

When a Modbus RTU Client requests a register value from the E-Link Gateway, the scaling is processed as a multiplier. For example, an object value of 45.5 is returned as 455, if the scaling is set to X10.

If a Modbus RTU Client sends a value to a register, then the scaling is processed as a divisor. For example, if 378 is received by the object and its scaling is set to X10, then 37.8 is assigned to the object's PV.

Table 81 shows the available multipliers.

Table 81: Available Multipliers

Selection	Function
X10	Multiply the value by 10 (The Default setting)
X100	Multiply the value by 100
X1000	Multiply the value by 1,000
X1	Multiply the value by 1
X0.1	Multiply the value by 0.1
X0.01	Multiply the value by 0.01
X0.001	Multiply the value by 0.001
X0.0001	Multiply the value by 0.0001

Applications

Modbus RTU Clients read values from the E-Link Gateway as integers. F04 objects are used by the E-Link Gateway's Application to represent many analog values that are generated by the equipment. These objects express their values in a floating point number format. For example, an F04's PV is displayed on a terminal as 23.4 or 1234.7.

In most cases, the E-Link Gateway applies an X10 multiplier to optimize data resolution, so the previously mentioned examples return 234 and 12347.

Sometimes the equipment generates very large numbers that must be scaled down before they can be displayed. For example, equipment run hours may be a very large number that exceeds the resolution of the Modbus RTU protocol. To address this particular issue, the data type is selected first as UNSIGNED and secondly the scaling is set to X0.1. This effectively allows 655,340 hours to be represented by the Modbus RTU client.

As another example, if the run hours were 90,123 too large to be represented by a Word, then applying a X0.1 factor results in 90,12. This value can now be readily transmitted. Some resolution is lost, but the value may be represented.

Scaling may also be necessary when a value is received from the Modbus RTU network, as is the case for a Setpoint. The value received is an integer while the equipment needs to be passed a Real, so some form of scaling is necessary.

If Fi6 (scaling) has not been changed from the default (X10) then any commanded value is divided by 10 and then converted into a floating point number. For example, if a value of 567 is received over the Modbus RTU network, the E-Link Gateway applies a X0.1 scale factor and presents 56.7 as the desired equipment Setpoint. If Field 6 was set to X0.1 then any received value is divided by 0.1.

Duplicate Addresses

If a duplicate address is created in F01, F04, or F06 then the last address edited is valid and the previous address is reset. For example if F01, S002 is set to 10 and a user sets F01, S009 to 10, then F01, S009 is maintained at 10, whereas F01, S002 is reset to 0, meaning its Modbus RTU address is created algorithmically.

If as a result of changing a F01, F04, or F06 default address, a duplicate address is created in another feature (F01, F02, F03, F05, F07, F08, or F09) then the newly created address in F01, F04, or F06 takes precedence, leaving any duplicates in the other objects as inactive.

Note: The data type for F01 is always set to UNSIGNED and the scaling factor to X1.

Configuring BACnet Addresses

PYY, Fi2, as shown in Table 82, is used to specify/display the instance of a BACnet object that when requested by a BACnet Client returns the data contained in this Feature and Section. The idea behind this functionality is to provide a means by which a range of sections can be made to represent noncontiguous BACnet instances. Object redirection provides a convenient method of changing a BACnet object's ID reference.

Table 82: PYY Descriptions

PYY	BACnet Instance	V...V
	Fi1	Fi2

For example, assume that 20 AV objects have been provided in a given version of Firmware, but from a BACnet perspective the first ten are represented as AV1 through 10. The next ten are represented as AV101 through AV120. A user should not enter anything in F04, Fi2 for the first 10 sections. Enter 101 in section eleven, 102 in section twelve, and so on for all the sections that need redirecting. Any section of F04 that does not have Fi2 configured assumes the default addressing mechanism (the section's instance corresponding directly to its BACnet instance).

BACnet Redirection

All standard BACnet objects within the E-Link Gateway's Firmware are represented by the following lower order features: F01, F02, F04, F05, F07, and F09. The section number of each feature directly corresponds to the BACnet instance. Therefore, F04, Section 124, is a representation of AV Instance 124.

As the E-Link Gateway Firmware does not support the dynamic creation of objects, the number of a given object type must be fixed at compilation. Sometimes there is a need to redirect an object so that it assumes an instance other than the section number of the hosting feature. To facilitate this requirement the MSV, AV and BV objects (F01, F04, and F06) have a mechanism that allow a BACnet instance to be added that does not correlate to the section number of that feature. When entering a redirected BACnet object into F20, the user must enter the base object address, which is then exposed on the BACnet network as the redirected object. For example, if AV1 (4001) is redirected to 4567, then AV1 should be entered into F20. AV4567 is then made available on the BACnet network side.

Multi State Value - (MSV) - F01

F01 is primarily used to represent operational codes generated by the equipment. Typically equipment, especially York Talk based chillers set a 0 (zero) to indicate normal mode of operation, whereas a non-zero value indicates a warning or an operational code; for example, some kind of abnormal operation.

As F01 is a direct representation of a BACnet Multi State Value object, it must conform to the BACnet standard, which does not permit the PV to have a zero value. To that end F01 has an offset attribute that may be used to adjust the incoming data, and in most Applications the offset is set to 1.

As far as the MSV operation is concerned whenever any other Application passes a value to F01, the system checks if the value once added to the P05 OFFSET exceeds the P10 NUMBER OF STATES. If it does, the PV is set to the P10 value and the RELIABILITY flag is set to false.

P09, field 2 is a user configurable selection that determines whether the value returned to an N2 Client is preconditioned to make it backward compatible with the N2 MicroGateway functionality.

Table 83: P09 Description

P09	BACKWARD COMPATIBLE	MMM	VALUE RETURNED TO N2:	VVV
	Fi1	Fi2	Fi3	Fi4

Fi2 defaults to YES, resulting in the value that is returned to an N2 client being determined by the following relationship:

$$P09 (Fi4 \text{ value}) = \text{Object's PV } P01 (\text{value}) - P05 (\text{offset value})$$

Table 84: P05 Descriptions

P05	OFFSET	VV
	Fi1	Fi2

In most E-Link Gateway Applications P05 is set to 1, and so the value returned to N2 is the PV-1.

If P09, Fi2 is set to NO then any values returned to an N2 system are exactly the same as that for a BACnet system, such as the values displayed on P01.

The primary reason for this functionality is to support backward compatibility. The currently deployed N2 products directly use the value that is received from the source configured on P03 (York Talk, Modbus RTU, etc), and as the N2 ADI object uses the same data structure as the MSV object, the offsetting of the input value by 1 needed by a BACnet system to mitigate a zero value, creates a backward compatibility issue.

P10, field 2 allows a User to enter the maximum number of states that this object's instance supports. This number may not exceed 80 (or 160 if an F69 companion section is used) and is maintained at the current value if a user tries to enter a number larger than 80 or 160 respectively, either directly or through BACnet services.

Table 85: P10 Descriptions

P10	NUMBER OF STATES:	MMM	EFFECTIVE # OF STATES::	MM
	Fi1	Fi2	Fi3	Fi4

When the backward compatibility flag in F60 is set to YES, then Fi4 displays 65,395. When this flag is reset to NO, the effective number of states equates to the number of states configured in Fi2.

P11, field 2 allows a user to enter an F69 section number that expands the maximum number of states of this instance to 160. The system checks to see if a user has already used a specified companion section, and if so, it prevents the section from being assigned.

Table 86: P11 Descriptions

P11	COMPANION SECT:	VV
	Fi1	Fi2

PNN, field 2 allows a User to enter 31 characters of text that is used to describe the each code.

Table 87: PNN Descriptions

PNN	CODE NN:	TTTTT....TTTTT
	Fi1	Fi2

Analog Value (AV) - F04

F04 objects are used to represent analog values generated by the equipment or provide convenient placeholders for values being sent from the network.

Table 88: P11 Descriptions

P11	SETPOINT	V.....V
	Fi1	Fi2

Changing the Setpoint Locally

With the Source set to R SETPOINT a User may edit P11 thus changing the value of the PV and the value displayed on P01, at this time **LO** is displayed on P01. The mechanism employed to realize this change is through a pseudo BACnet service such as the new user entered value is placed in the priority array at the highest level currently in force, effectively overwriting any previous entry. Every time a new value is entered on P11, a function is called that determines where in the priority array the value should be placed. If the priority array is empty then the value is written at priority 16. If all the priorities are relinquished the Setpoint is set to the Relinquish value such as the Default (P07).

P10 field 2 is a User entered Real Number that corresponds to the minimum value that the PV on P01 may be set to. If a number generated internally by the system is lower than this value, it is automatically clamped to the PV min value. (P10 may be used irrespective of what P03 source selection has been made.)

Table 89: P10 Descriptions

P10	MIN PV	VV.VV	MAX PV:	VV.VV
	Fi1	Fi2	Fi3	Fi4

If this value has come from a BACnet network a reject parameter out of range error is returned and the received value is disregarded.

If this value has come from a Modbus RTU network an exception code illegal data value error is returned and the received value is disregarded.

P10, field 4 is a user-entered Real Number that corresponds to the maximum value that the PV on P01 value may be set to. If a number generated internally by the system is higher than this value it is automatically clamped to the PV max value.

If this value has come from a BACnet network, a reject parameter out of range error is returned and the received value is disregarded.

If this value has come from a Modbus RTU network, an exception code illegal data value error is returned and the received value is disregarded.

P12, field 2 is a User entered value that selects a section/table of F13 – (Sensor Input) that is to be used to post-process the value generated by this AV section.

Table 90: P12 Descriptions

P12	SENSOR INPUT SECTION	VVV
	Fi1	Fi2

This post processing capability is valid for all source selections; however, in a real life E-Link Gateway Application it is probably only used for the source selections shown in Table 91.

Table 91: Source Selections

L-SETPOINT
ACQUIS
MODBUS RTU
YORK TALK
R-SETPOINT

From a processing precedence standpoint, the F04 execution follows its normal mode of operation, and then as a final step before being displayed on P01 the resulting value it is conditioned by the relationship defined in F13.

The rationale for making this the final step in the process is that any clamping has already been accomplished on the unprocessed value and the post processing is just used to convert from one set of units to another, for example Deg C to Deg F, or PSI to Pascal or visa versa.

P13, field 2 is used to specify the address of a binary point (F05, F06 or F09) that when in the ACTIVE state enables the operation of the F13 post processing and disables it, when INACTIVE. P13, field 3 and field 4 are the point's descriptor text and status, respectively.

Table 92: P13 Descriptions

P13	SENSOR INPUT ENABLE	SSSS	T..T	M.M
	Fi1	Fi2	Fi3	Fi4

Note: There are some other F04 functions that are not described in this document. These relate to P05, which is used to configure BACnet algorithmic alarming and P14 that is used to setup BACnet COV subscriptions.

Note: P09 RESET ON POWERUP has no Application in an E-Link Gateway and is therefore not described.

Binary Value – BV- F06

F06 objects are used to represent binary values generated by the equipment or provide convenient placeholders for values being sent from the network.

Table 93: P10 Descriptions

P10	MADE:	MMM	OPEN:	MM
	Fi1	Fi2	Fi3	Fi4

Fi2 and Fi4 are User entered enumerations selected from a drop down menu that is displayed on P01 and correspond to a logic 1 and logic 0 state. Fi2 represents the text that is displayed on P01 when the object's PV = 1, and Fi4 represents the text displayed on P01 when the object's PV = 0.

Table 94: P11 Descriptions

P11	SETUP FLAG	M...M
	Fi1	Fi2

P11 Fi2 allows the state of the binary SETUP FLAG to be configured. A User may either select a MADE or an OPEN state. SETUP FLAG is analogous to SETPOINT in the analog world.

The configured state is displayed on P01 if the Source on P03 has been selected to be SETUP FLAG. A BACnet device writing to the PV of this object overwrites this state, and the new state is then used after a power failure.

Operation of F04 and F06 Objects

Source = Setpoint or Setup Flag

After a power up or after a reset the Firmware assigns the Default Value/State (the BACnet Relinquish Value) to the object's PV, this then becomes the value displayed on P01.

During the power up process the Firmware copies the Setpoint value or Setup Flag that has previously been stored in FLASH to the Default value/state page this way ensures that the last Setpoint value/state prior to the power outage or reset is used by the system. This value is maintained until it is changed by some action.

Normal Operation

The Firmware continuously monitors the BACnet priority array to determine what value it should use for its PV. It takes the value that is associated with the highest active priority array index (1 = highest, 16 = lowest), and then checks this value against any limits that may have been configured in F04, P10 before assigning this to the PV and writing it to the Setpoint value/Setup Flag on P11 and displaying it on P01.

Applications that have a high priority index must yield to Applications that have a lower index. For example, an Application operating with an index of 5 has its value replaced by an Application that has an index of 2. If an Application no longer wishes to influence this object's PV, then it sends a relinquish control command (write a NULL to the appropriate array index), allowing the next value in the priority array to take over. If there are no more entries in the priority array, the Firmware uses the Default value/state (the BACnet Relinquish value) assigning this to the PV. Once the 15 minute timeout has expired, the Setpoint/Setup Flag (the P11 value) is written into FLASH making it non-volatile.

Note: An N2 or Modbus RTU write to an AV or BV object assumes a priority array index of 16.

Note: There are some other F06 functions that are not described in this document. These relate to P05 that is used to configure BACnet algorithmic alarming.

Network Objects - F20

F20 is primarily used to enable BACnet objects both standard and proprietary to become network visible. Only objects that have been configured in this feature can be added to the *BACnet Device Object List Property* and so be available to the network.

Note: Whereas this is primarily designed for BACnet objects it is also applicable to N2 objects; however, Modbus RTU registers are not restricted in this way.

Like other Features within the E-Link Gateway, F20 has multiple sections that are used to extend its overall capacity. Each section has an Enable point that when activated includes the contents of that section to the overall F20 list.

Every section also has a manual means of updating the whole table, (such as scanning through all the sections) and including any new entries to the table.

If a controller receives a request for an object that has not been previously declared in F20, it returns the BACnet message Object not supported, or in the case of N2 Invalid Data.

P01, Fi2 displays the total number of objects that have been configured in ALL of the F20 sections such as in the whole table. In a totally unconfigured E-Link Gateway this is always set to five representing the Device Object and the four File Objects. Every time the BACnet Device Object List Property is updated the number of objects displayed on this page is updated.

Table 95: P01 Descriptions

P01	NUMBER OF OBJECTS	VVV
	Fi1	Fi2

P02, Fi1 is used to allow a User to manually transfer a new object entered on ANY page of ANY section into the BACnet Device Object List Property.

Table 96: P02 Descriptions

P02	PRESS ENTER TO ACCEPT LIST
	Fi1

P03, field 2 is used to specify the address of a binary addressable point that when placed in the ACTIVE state triggers the transfer of any objects configured in this section into the BACnet Device Object list Property.

Table 97: P03 Descriptions

P03	ACCEPT THIS SECTION OBJECTS	SSSS	T..T	M.M
	Fi1	Fi2	Fi3	Fi4

When the point's state changes to INACTIVE, all points configured in this section are removed from the BACnet Device Object List property.

The third and fourth fields represent the Binary object's name text and status, respectively.

P04 through P08 (as shown in Table 98) are system-generated and are used to display the Device Object and its network unique address as well as all the File objects and their fixed instances.

Table 98: Object Menu Selections

	File Object Instance	Purpose
P04	Controller Specific	Device Object (DE)
P05	1	Application
P06	2	Firmware
P07	3	Template
P08	4	Parametric Application

The main part of F20 is a collection of table entries that contain object addresses.

Table 99: PNN Descriptions

PNN	OBJECT TYPE	M..M	INSTANCE	VVV
	Fi1	Fi2	Fi3	Fi4

P09 through P58, Fi2 is used to select the object types that are to be exposed; the available objects can be selected from a menu shown in Table 100.

Table 100: Object Menu Selections

AI	YUP F18
AO	YUS F19
AV	YED F22
BI	YND F27
BO	YFS F30
BV	YOC F32
CALNDAR	YMD F34
SCHEDUL	YLS F35
NTF CLA	YLL F36
YSV F03	YAC F37
YCL F08	YDC F38
YHR F14	YAL F39
YAH F15	YDL F40
YDH F16	YCS F45
YOH F17	YSS F60

P09 through P58, Fi4 represents the particular instance of the object selected in field 2.

York Talk - F54

F54, the York Talk feature, is designed to send data to retrieve data from a York chiller using one of the proprietary York Talk protocols. The feature may be configured to be a Master (its normal mode of operation), or a Slave (if required for testing purposes). It can also be configured to either support the York Talk II or York Talk III protocols.

Note: The York Talk I protocol is not supported in the E-Link Gateway. Whereas the E-Link Gateway supports both York Talk II version 4 and York Talk II version 6, only version 6 is used by the Quick Starts. In the unlikely event that a York Talk II version 4 Application, is required then a custom solution must be offered.

The structure of F54 can be divided into several major functional blocks shown in Table 101, and is equally applicable for both York Talk II and York Talk III Applications.

Table 101: F54 Structure

Page Numbers	Functional Block
Pages 1-2	Setup parameters
Pages 3-6	4 analog output points (this data is sent to the chiller) TX
Pages 7-10	4 binary output points (this data is sent to the chiller) TX
Pages 11-35	25 analog input points (this data is retrieved from the chiller) RX
Pages 36-55	25 binary input points (this data is retrieved from the chiller) RX
Pages 56-65	10 code points (this data is retrieved from the chiller) RX
Pages 66-79	25 analog input points (this data is retrieved from the chiller) RX
Pages 80-84	5 binary input points (this data is retrieved from the chiller) RX
Pages 85-99	Diagnostic parameters

P01 Fi1 allows a User to configure a 12-character name which is typically used to describe the chiller that is being controlled or monitored.

P01, Fi3 is the chiller ID address and is used by the E-Link Gateway to identify a chiller on the York Talk II network in a multi-drop configuration. As the E-Link Gateway uses a one-to-one relationship with the equipment, this parameter is always set to 1 for a Master chiller panel, and 2 for the slave.

Table 102: P01 Descriptions

P01	TT...TT	NODE No:	NN	SS..SS	UU
	Fi1	Fi2	Fi3	Fi4	Fi5

Every York Talk II based chiller supports a means of setting its network identity, which sometimes is provided by a rotary switch that can be set to a value between 0 and 8. The actual node address as used within the York Talk message consists of the rotary switch setting plus 1. Chiller ID = (n +1) where n = address set on the chiller panel.

When F54 is used in the Server mode, the chiller ID represents its source address, effectively replicating the chiller's network identity.

P01, Fi4 allows a user to specify the type of York Talk that is required to be selected. Table 103 lists the available selections.

Table 103: F54 York Talk Options

Selection	Description
DISABLED	No Operation
YRTLK3	York Talk-III Master function
YRTLK2	York Talk-II Master function
YRTLK 3 SER	York Talk-III Server function
YRTLK 2 SER	York Talk-III Server function

The default selection is DISABLED and is used to suspend all York Talk communications.

P01, Fi5 allows a user to specify the type of engineering units that is used to express the Present Value of a York Talk III retrieved parameter; Table 104 shows the possible selections:

Table 104: F54 York Talk Options

Selection	Description
IM	Imperial
SI	Metric

If the engineering units have been selected to SI, and York Talk III is being used, then all the data returned from the panel is expressed in these selected units. For example, a temperature value of 21 with SI units selected is displayed as 70 if the units were changed to IM.

P02, Fi2, allows a user to configure a Binary Output, which can be used to annunciate a communication's failure condition (the source of the BO must be set to Automatic). If any message being sent by the York Talk Master fails to receive a reply within the designated time-out, and after all the retries have been exhausted a failure condition is flagged resulting in the configured BO point being switched into the "ACTIVE" state.

Table 105: P02 Descriptions

P02	FAILURE OUTPUT	SSSS	T..T	M..M
	Fi1	Fi2	Fi3	Fi4

If a Binary Output has not been configured in field 2, then the status of the communication's link is still monitored and is reflected in the reliability of any objects that have been assigned a value. P02, Fi3 and Fi4 are the point's descriptor text and status, respectively.

York Talk Protocols

The York Talk III protocol supports an object-based organization of the data. The data in the chiller is organized as micro-objects that may be requested individually, unlike the more monolithic York Talk II protocol in which all the data is written/read based on a single read or write command.

Writing a Value to the Chiller Panel

Pages 3 through 10 are used to write up to 4 analog and 4 binary values to the chiller panel.

Table 106: Pages 3-11 Descriptions

Pages 3 - 11	MO	I	SSSS	T..T	V..V	PT	M..M
	Fi1	Fi2	Fi3	Fi4	Fi5	Fi6	Fi7

Note: Fi1, Fi2, Fi6, and Fi7 are configurations that are only used in York Talk III Applications.

Note: The actual micro-objects that a chiller supports are documented in the equipment Point Maps.

Ppp, Fi1 allows for the type of micro-object that receives the data from F54 to be selected. For P03 through P06 an **AV** or an **AO** may be selected. For P07 through P10 a **BV** or a **BO** may be selected.

Ppp, Fi2 enables the micro-object selected in field 1 to be entered. A number up to 255 may be used.

Ppp, Fi3 enables an analog or binary addressable point to be defined. The PV is sent to the chiller.

In the case of a York Talk III Application, this is sent to the micro-object defined in Fi1 and Fi2. Or in the case of a York Talk II Application to the chiller panel whose address is defined on P01, Fi3.

Reading a Value from the Chiller Panel

Pages 11 through 84 are used to read both analog and binary values from the chiller panel.

Table 107: Pages 11-84 Descriptions

Pages 11- 84	MO	I	SSSS	T..T	V..V	PT	M..M
	Fi1	Fi2	Fi3	Fi4	Fi5	Fi6	Fi7

PPP, Fi1 allows for the type of micro-object that is interrogated by F54 to be selected.

For Pages that support analog reads the following micro-objects can be used **AV, AI, AO,** and **SC**.

For Pages that support binary reads the following micro-objects can be used **BV, BI,** and **BO**.

PPP, Fi3 enables an analog or binary addressable point to be defined. The PV displays on P01 the value or status that has been received from the chiller.

In order for this point's data to be usable by the E-Link Gateway its source (P03) must be set to YORKTALK.

Note: Fi4, Fi5, Fi6, and Fi7, are equally applicable for both READS and WRITES.

PPP, Fi4 is a hard coded generic descriptor that is used to describe the variable contained in this page.

PPP, Fi5 is the actual value being sent to or received from the chiller panel.

PPP, Fi6 defines the Poll Time, the frequency at which the micro-object defined in Fi1 is polled. This may be adjusted in the following way:

“ “ no Polling

1S, 2S, and **5S** (Seconds resolution)

1M and **5M** (Minutes resolution)

1H and **2H** (Hours resolution)

PPP, Fi7 defines the current status of the polled micro-object. The description messages are self explanatory.

F54 Setup and Diagnostics

P90, Fi2 is a system generated count that indicates the number of checksum errors that have been encountered by the York Talk III receive routine since the last system reset.

Table 108: P90 Descriptions

P90	INVALID CHECKSUM COUNT	VVVVV
	Fi1	Fi2

The value is a count of all “corrupted” messages received from the chiller panel. This parameter should in normal mode of operation be 0.

P91, Fi2 is the York Talk III communication timeout; it allows a user to set in milliseconds the amount of time that should elapse before any further action is taken by the transmitting routines. This parameter defines the amount of time that is available for the responding device to reply.

Table 109: P91 Descriptions

P91	YT3 TIMEOUT	VVVVVV
	Fi1	Fi2

Note: To ensure reliable communications this TIMEOUT should not be configured to any value less than **800** ms.

P92, Fi2 has two specific Applications. In the case of York Talk II the Poll Interval is the amount of time that has been allocated for F54 to poll and then to receive a response back from a York Talk II based chiller. It sets the amount of time that F54 waits before polling again.

Table 110: P92 Descriptions

P92	POLL INTERVAL	VV	SECONDS
	Fi1	Fi2	Fi3

The Poll Interval time should make allowances for the turn around time within the chiller panel and any time that might be required for the panel to switch its RS 485 driver into a receive mode of operation.

In the case of York Talk III the Poll Interval represents the amount of time that the system yields for before initiating the polling cycle. The intent of this dwell time is to provide more bandwidth for the OptiView panel to process its control cycles.

P93 Fi2 is a parameter that defines the number of times the York Talk client (F54):

- Polls a chiller panel which is not responding or is responding incorrectly before polling the next device in line, if a multi-drop network is used (for York Talk II), or
- Sends a message to a micro-object in the York Talk III based chiller that is not responding.

Table 111: P93 Descriptions

P93	NUMBER OF RETRIES	VV
	Fi1	Fi2

P94 Fi2 is a parameter that defines the number of first time transmission messages that have been sent by F54 to the chiller panel. It does not include any retries. In the case of a York Talk III interface every defined micro-object results in an outgoing message. In the case of a York Talk II interface a single message contains a number of values in its payload.

Table 112: P94 Descriptions

P94	TX MESSAGE COUNT	VVVVVV
	Fi1	Fi2

P95 Fi2 is a parameter that defines the number of TX messages that failed to reach their destination (such as after all the retries have been exhausted).

Table 113: P95 Descriptions

P95	TX MESSAGE FAILURE COUNT	VVVVVV
	Fi1	Fi2

P96 Fi2 is a system generated value that represents the average time taken for F54 to transmit a request message and then to receive a successful response back from the chiller panel.

P96 Fi5 is a system generated value that represents the maximum time taken for F54 to transmit a request message and then to receive a successful response back from the chiller panel since the system was last reset.

Table 114: P96 Descriptions

P96	RESPONSE TIME	VVV	MS	MAX	VVV	MS
	Fi1	Fi2	Fi3	Fi4	Fi5	Fi6

This calculation is performed by setting a timer when the first message is transmitted and then reset when the last response is received.

P97 Fi2 is a parameter that defines the number of attempts made by F54 to resend a message after the previous one has failed.

Table 115: P97 Descriptions

P97	RETRY COUNT	VVVVVV
	Fi1	Fi2

Pressing the Enter key while P98 is in focus results in P94 to P97 being reset to zero.

Table 116: P98 Descriptions

P98	PRESS ENTER TO RESET DIAGNOSTICS
	Fi1

P99 Fi1 is a parameter that defines number of retries taken on the last message poll, regardless if the poll was successful or not.

Table 117: P99 Descriptions

P99	PRESS ENTER TO RESET DIAGNOSTICS
	Fi1

Analog Transfers F28 and F57

F28 and F57 are used in concert to send a BACnet Write Property single command to one or more BACnet objects. The objects can be in a single device or in multiple devices.

P01 Fi2 is an addressable analog point address that provides the value that is transferred to the destination.

P01 Fi3 is system-generated text that describes the point configured in Fi2, and Fi4 is the value of the analog point configured in Fi2.

Table 118: P01 Descriptions

P01	I/O	SSSS	T...T	VVVVVV
	Fi1	Fi2	Fi3	Fi4

P02 and P03 are used to display a system generated status of all the destinations that this section is configured to service. All fields are BLANK unless a destination has been explicitly configured to be MADE. P02, Fi1 represents the first destination whereas P03, Fi12 represents the 25th destination.

Table 119: P02 Descriptions

P02	N	N
	Fi1	Fi13

Table 120: P03 Descriptions

P03	N	N
	Fi1	Fi12

If P16 Fi2 is configured with a valid DE address, then only Fi1 is used to display the status of this single destination. If however P04 Fi2 is non-zero, then Fi1 through 25 are used to display the statuses of all 25 destinations.

The status of each of the fields on P02 and P03 can represent one of the following states:

- Unbound (U): This status is returned by the Firmware if it determines that a DE within the Binding Table has no MAC and Network properties attached.
- Bound (B): This status is returned by the Firmware if it determines that a DE within the Binding Table has MAC and Network properties attached.
- Timeout (T): This status is returned by the Firmware when a request and a subsequent retry have not been responded to.
- Waiting (W): This status is returned by the Firmware when a request message has been posted but no reply has yet been received.
- Router Waiting (R): This status is returned by the Firmware when a request message has been posted but no reply has yet been received.
- Successful (S): This status is returned by the Firmware when a correct response has been received.
- Error (E): The destination device returns some error code when it is unable to process the request.
- Object Error (O): The destination device was unable to process the request because the specified object was not supported.
- Property Error (P): The destination device was unable to process the request because the specified property was not supported.
- Device Error (D): The destination device was unable to process the request because the specified property was not supported.
- Reject (X): The destination device was unable to process the request because the specified property was not supported.
- Abort (A): The destination device was unable to process the request because the specified property was not supported.

P04 Fi2 allows a user to enter the section number of F57 (Network Group) that is used to send the P01 Fi4 value to a group of devices whose DE addressees are defined in this section of F57. If zero is entered in this page, then the destination device address is governed by the configuration provided on P16 Fi2.

Table 121: P04 Descriptions

P04	NETWORK GROUP	VV
	Fi1	Fi2

If any device referenced in F57 does not support Dynamic binding then the whole section must be setup for Static binding. In effect, P14 Fi2 must be configured to STATIC. Every entry in this Network Group is then considered as statically configured devices.

P05 Fi2 allows a BO to be configured that is set into the MADE state if a message was sent and no response was received during the timeout period (Timeout Period = APDU_TIMEOUT). The point is returned into an OPEN state once a response has been received or if the unit is reset or power failed. The point is configured to using the OR logic operator.

P05 Fi3 is system-generated text that describes the point configured in Fi2 and Fi4 is the current state of the BO point configured.

Table 122: P05 Descriptions

P05	FAILURE OUTPUT	SSSS	T.....T	MMM
	Fi1	Fi2	Fi3	Fi4

Pressing the Enter key on P6 forces immediate transmission of the analog value and resets the Failure Output Point configured on P05 Fi2.

Table 123: P06 Descriptions

P06	PRESS ENTER TO RESET
	Fi1

P07 Fi2 allows a user to enter an addressable Binary point that when switched to the Reset Mode selected on P08 Fi2 immediately causes the re-transmission of the analog value on P01 Fi2.

P07 Fi3 is system-generated text that describes the point configured in Field 2 and Fi4 is the state of the binary object configured in Fi2.

Table 124: P07 Descriptions

P07	RESET POINT	SSSS	T.....T	MMM
	Fi1	Fi2	Fi3	Fi4

P08 Fi2 allows a user to select the sense of the Binary Point specified on P07 Fi2 that must be matched to allow the re-transmission of the transfer. Fi2 may either be set to MADE or OPEN.

Table 125: P08 Descriptions

P08	RESET MODE	MMMMM
	Fi1	Fi2

P09 Fi2 enables a value between 1 and 99 cycles to be entered that must expire before the analog transfer is transmitted to the destination unit.

Table 126: P09 Descriptions

P09	ANALOG TRANSMISSION DELAY	VV	CYCLES
	Fi1	Fi2	Fi3

P10 Fi2 allows a value to be entered that the analog point selected on P01 must change by since the last transmission before a new transmission occurs.

Table 127: P10 Descriptions

P10	ANALOG DIFFERENTIAL	VVVVV
	Fi1	Fi2

For example, if the value on P01 Fi4 was 50 and this resulted in a transfer, and if P10 Fi2 is set to 5.0, then the P01 Fi4 value must either equal or exceed 55 or be less than or equal to 45 before a new transfer is initiated.

Note: A transfer only occurs if the transmission delay as configured on P09 Fi2 has expired and if the value of the Analog Point has been changed to be greater or equal to or less or equal to the Analog Differential and then maintained during the whole Transmission Delay period.

Note: If P10 Fi2 is set to zero (0) then this section is disabled. However, once the Analog differential has been changed to a non-zero value a transmission occurs immediately if the value had changed.

P11 is not used by the E-Link Gateway.

Table 128: P11 Descriptions

P11	F27 SECTION	VV
	Fi1	Fi2

P12 Fi2 allows a user to enter a priority index that is used as part of writing a command. This field defaults to 12, but may be adjusted to any value between 1 and 16. Configuring a value of 1 (the highest priority) writes this section's P01 Fi4 value to the destination's priority array index, position 1. If this value is set to 0, then the command becomes a standard BACnet write property. Using a BACnet write (that is, with no priority index specified) to change a COMMANDABLE property in an object that supports a priority array results in the value being written at the lowest priority index (16).

Table 129: P12 Descriptions

P12	COMMAND PRIORITY	VV
	Fi1	Fi2

P13 Fi2 is an addressable Binary point whose primary function is to trigger the transmission of a Relinquish Control command.

Table 130: P13 Descriptions

P13	RELINQUISH CONTROL	SSSS	T.....T	MMM
	Fi1	Fi2	Fi3	Fi4

If the object configured in Fi2 is switched from an OPEN state into an MADE state then this section transmits ONE Relinquish control command to the destination defined on P16 Fi2. Concurrently, normal F28 transfers are suspended for the duration that the Relinquish control object is held in the MADE state. In order for another Relinquish command to be issued the object must again transition from MADE to OPEN and then go back to MADE.

P13 Fi3 is system generated text that describes the point configured in Fi2 and Fi4 is the state of the binary point configured in Fi2.

Note: P14 through P19 are described in the Binding section.

P19 is used to fully define the property of an object that is overwritten by the analog value being displayed on P01 Fi4. This can be either a standard BACnet object, or a Proprietary object. In all cases however, the DATA type must be REAL or ENUMERIC and the property must be WRITE permissible.

Table 131: P19 Descriptions

P19	DEST DATA OBJ	VVVV	INST	VVVV	PROP	VVVV
	Fi1	Fi2	Fi3	Fi4	Fi5	Fi6

BACnet Network Binding

The E-Link Gateway has a number of Client Applications (F28, F29, F42, F43, F46, F57 and F65) that read data from or write data to other BACnet controllers on the network. BACnet requires that every device on the network has a unique Device Object address known within the E-Link Gateway as a DE address.

BACnet like many other protocols uses a hierarchical addressing scheme that relies on a network and MAC addresses for the purpose of message navigation. Binding is the process of obtaining an association between the DE address of the destination device and its data link attributes, network address and MAC.

Every Client Application in the E-Link Gateway references the destination device in terms of its DE address, which infers that the User knows the DE address of the destination device. Binding may be accomplished either statically or dynamically; however, the majority of current third party implementations are now embracing dynamic binding due to its flexibility. Static binding is only used in devices that have a very low processing capability and are hence unable to deal with all the required network negotiation.

The E-Link Gateway uses a Binding Table to maintain the correspondence between DE addresses and the related data link parameters. This table is stored in a portion of memory that is initialized upon a power cycle or if the controller is reset using F50. The size of this table is designed to be 20 positions larger than the maximum number of sections of all the Client Applications that use a DE reference.

Static Binding

If STATIC binding is used then the association between the DE and its Network and MAC address is performed manually. In this case the User must still enter the DE address of the destination, but is also required to enter the device's Network and MAC address.

Dynamic Binding

If DYNAMIC binding is used, then the association between the DE and its Network and MAC address is performed automatically. In this case the User is only required to enter the DE address of the destination, and all the matching parameters are discovered using BACnet services. This method is the preferred way to identify a destination device as it allows for the destination device to be changed without requiring any changes to the Client's Application.

Table 132: Ppp A Descriptions

Ppp	DEST BINDING/STATUS	M...M	M...M
A	Fi1	Fi2	Fi3

Table 133: Ppp B Descriptions

Ppp	DEST ENABLE	SSSS	T...T	MMM
B	Fi1	Fi2	Fi3	Fi4

Table 134: Ppp C1 Descriptions

Ppp	DEST DE ADDRESS	V...V	DEST NET	V...V
C1	Fi1	Fi2	Fi3	Fi4

Table 135: Ppp C2 Descriptions

Ppp	VENDOR ID	VVV
C2	Fi5	Fi6

The following pages are generic and are used by ALL client Applications to provide the configurations to enable them to bind with the destination device.

Table 136: Ppp D Descriptions

Ppp	DEST SLAVE MAC	A	B	C	D	E	F
D	Fi1	Fi2	Fi3	Fi4	Fi5	Fi6	Fi7

Table 137: Ppp E Descriptions

Ppp	DEST SLAVE NETWORK	VVVVV
E	Fi1	Fi2

PppA Fi2 generically selects the type of binding that is used to create the relationship between the destination's DE address and its BACnet network and MAC address. The default is **DYNAMIC**, which automatically discovers the destination network and MAC address.

If PppA Fi2 is set to **STATIC**, then knowledge is required of the destination's network and MAC address.

PppA Fi3 is a manual user selection that sets the mode of operation of this section. It may either be set to **ENABLED** or **DISABLED**.

If set to **ENABLED** then the following sequence of operation takes place:

- The section is processed.
- If **DYNAMIC** has been selected, then the binding process may then commence.
- If **STATIC** has been selected and the relevant pages have been configured then the section is ready to start processing.

If set to **DISABLED** then the following sequence of operation takes place:

- The section is disabled, and is not processed.
- Any already established bindings are maintained until the next reset or power cycle.
- No BACnet requests are sent irrespective of the section's configuration.

PppB Fi2 supports an addressable binary point that, when switched into the **ACTIVE** state, enables the operation of this section. This point essentially controls this feature's transmission mechanism.

PppB Fi3 is system-generated text that describes the point configured in Fi2, whereas Fi4 is its state.

If no point has been configured on PppB Fi2, then the operation of the communications is totally controlled by the setting of PppA Fi3.

The previously described mode of operation applies to both **DYNAMIC** and **STATIC** binding.

The configurations of PppA and PppB provide the following collective functionality.

Table 138: PppA and PppB Functionality

Functionality	PA Fi3	PA Fi3 Display	PB Fi2
No Communications	DISABLED	DISABLED	SSSS not configured
Communications Active	ENABLED	ENABLED	SSSS not configured
No Communications	DON'T CARE	DISABLED	INACTIVE
Communications Active	DON'T CARE	ENABLED	ACTIVE

PppC1 Fi2 is used to configure the Destination Controller's Device Object Instance. This is the address of the BACnet controller with which communications are established. The value entered here must be between 0 and 4,194,303. This value must be unique on the BACnet inter-network.

PppC1 Fi4 is a system generated value that displays the address of the BACnet network in which the device specified on PppC Fi2 resides. This field only shows a value if the type of binding selected on PppA Fi2 is **DYNAMIC**.

PppC2 Fi6 is a system-generated value that displays the vendor ID of the BACnet device with which communications has been established. This field only shows a valid value if the type of binding selected on PppA Fi2 is **DYNAMIC**. If the type of binding selected is **STATIC** this field displays a 0.

Note: 0 is actually used to represent the vendor ID of ASHRAE, so if **STATIC** binding has been selected this value should be disregarded.

PppD is only used if **STATIC** binding has been configured on PppA Fi2. If **DYNAMIC** binding has been configured and values are entered on this page they are disregarded. This page is used to configure the MAC address of a slave device with which communications are to be established.

Note: When manually configuring slave addresses it is important that a unique number is also entered on PppC1 Fi2. This is necessary in order to reserve a unique location within the binding table. The DE of the destination could be this number, or it could be the MAC number as entered on this page. What is important is that it is unique within the network reachable by this device.

PppE is only used if STATIC binding has been configured on PppA Fi2. If DYNAMIC binding has been configured and values are entered on this page they are disregarded. This page is used to configure the network address of a slave device with which communications are to be established.

F65 Acquisition

In most cases F65 is applied to retrieve data from third party BACnet devices through a sequenced series of read requests. When using this feature care must be taken to carefully control the Application's load so as not to overload a controller. This may be accomplished by limiting the number of requests configured and or adjusting the inter section delay (configured on P25 in F45). The software is designed to cycle through all enabled requests within a section (such as pages that have been enabled) and then through all enabled sections in a round robin fashion.

F65 is designed to retrieve the following data types, REAL, ENUMERIC, BOOLEAN, UNSIGNED and CHARACTER STRING. Any other data type returned is considered as invalid and results in an error code being displayed.

This feature has been structured into four primary and one special data groups, where each of the primary groups may reference up to 17 data points, (proprietary or standard) and the special group may reference 6 data points within any other BACnet device that is resident on the network. Once the data is acquired by the Feature it may be assigned to an internal variable for manipulation or for exposing on the BACnet network in the form of a standard BACnet object, if the retrieved object was proprietary.

F45, P25, Fi3 is a user configurable field that defines the delay in milliseconds between successive sections of F65 issuing read requests. If a section is disabled this delay is ignored. For example, if S1 and S10 are enabled but all the in between sections are disabled, then an F65 delay is inserted between S1 and S2, and a 20 ms delay is added between all non-enabled sections followed by an F65 delay between S10 and the first section. This parameter is defaulted to 1000ms with a 100ms being the minimum and 5000ms being the max that may be configured.

General Object Interface

Table 139: Ppp Descriptions

Ppp	DEST DATA OBJ	V..V	INST	V...V	
	Fi1	Fi2	Fi3	Fi4	
	PROP	V..V	SSSS	V..V	M
	Fi5	Fi6	Fi7	Fi8	Fi9

Fi2 is used to define the BACnet Object Type that is required to be accessed. For example, an analog input AI, 0 is entered; for an analog output AO, 1 is entered. Whereas for a York proprietary F03 object, 903 is entered.

Fi4 represents the BACnet object's instance and can be any number between 0 and 4,194,303. For example, AI 100, BV 6, and so on; in these cases 100 and 6 are entered in this field.

Fi6 defines the BACnet Property Identifier required which is to be read and can be any number between 0 and 4,194,303. For example, for the Present Value of a standard object, 85 is entered. For the Object's name 77 is entered.

Fi7 allows a user to configure the address of an AV or BV (in the form of 4XXX or 6XXX) that acquires the value of the queried object.

Fi8 represents the value returned by the query; the value here is always displayed as a REAL, for example, 201.2.

Fi9 is a user entered menu that on a per page basis enables standard polling, COV subscription or disables this particular query.

Configuring a Query

When configuring a query a user must ensure that the data type returned is in the form of a REAL, INTEGER, ENUMERATED, or CHARACTER STRING, else an error is returned.

If the data returned is a REAL, then it simply replaces the PV of the AV that has been configured in Fi7.

If the data is returned as an INTEGER or an ENUMERATED value it is first converted into a REAL and then displayed as X.0, replacing the PV of the AV that was configured in Fi7.

If the data is returned as a CHARACTER STRING, as would be the case if an OCS or OCSX proprietary property was being read, then the CHARACTER STRING is converted into a REAL number and displayed in Fi8.

ASCII characters that can be converted to real number characters are 0 through 9, +, -. Any leading spaces are eliminated during the conversion process.

If the system is unable to convert the CHARACTER STRING into a REAL value the system checks a look up table for matching text and display the corresponding index number, else it displays 255.

Note: The Lookup Table is an advanced feature that is not normally used for field programming equipment Applications.

Note: Referencing queries that yield number results does not require the Lookup table to be invoked.

Standard Object Interface

Table 140: Ppp Descriptions

Ppp	DEST DATA OBJ	VV	INST	V..V	SSSS	V..V	M
	Fi1	Fi2	Fi3	Fi4	Fi5	Fi6	Fi7

Fi2 defines the standard BACnet Object that is required to be accessed. A user may select from the following AI, AO, AV, MI, or MSV.

Fi4 represents the BACnet object's instance, and can be any number between 0 and 4,194,303. For example, AI 100, BV 6, should have 100 and 6 entered in this field. The object's BACnet Property Identifier is fixed at 85, the present value.

Fi4 allows a user to configure the address of an AV or BV (in the form of 4XXX or 6XXX) that acquires the value of the queried object.

Fi6 represents the value returned by the query.

Fi7 is a user-entered menu that on a per page basis enables standard polling, COV subscription or disables this particular query.

Table 141: P07 Descriptions

P07	COV SUBSCRIPTION TIME	V..V	SECONDS
	Fi1	Fi2	Fi3

P07 Fi2 allows a user to enter the amount of time in seconds after which the subscription with the device defined on P03 is automatically cancelled. A value of zero indicates an indefinite lifetime subscription. This COV subscription time is triggered every time an individual page is set to COV, the section is enabled, or the controller reset or power cycled.

Table 142: P08 Descriptions

P08	COV SUBSCRIPTION STATUS	SSSSSSSS
	Fi1	Fi2

F08, Fi2 is a system generated field that indicates if the device specified in P03 is subscribed to send data to this controller.

If Fi2 shows **ACTIVE**, it indicates that an active link exists between the destination and source controller.

If **INACTIVE** is displayed it indicates that no link between the destination and source is in force.