BACnet Workshop Outline

Module 1: Introduction

Video 01: Introduction

1. Company History
2. Philosophy
3. AAM Advantages

Module 2: Product Overview

Video 02: Product Overview

1. General descriptions of the NB controllers
2. General descriptions of the variety of SBC-STATs

Video 03: Critical Environments

1. General descriptions of the products
2. Explain the Critical Environment Methodologies
3. Quiz #1: Introduction

Module 3: BACnet Overview

Video 04: BACnet Overview

1. The history of BACnet
2. What is BACnet?
3. Standard and non-standard objects
4. Standard and non-standard properties
5. BIBBs, PICs, and Profiles
6. Pros and Cons of the different transportation options

Module 4: Matrix Router

Video 05: Matrix Router

1. Brief intro
2. Product breakout
3. Hardware layout
4. How to connect to the Matrix Router and login

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5. Contents of the Control Panel, such as the network settings, system settings, and utilities

Module 5: NB-Pro Software Package

Video 06: How to Install and License the NB-Pro Software

1. Laptop and PC minimum requirements
2. Software installation procedure
3. Software licensing procedure
4. Explain how to upgrade a license
5. Explain how to replace a lost or destroyed license
6. *Exercise #1: Install and License NB-Pro*

Video 07: Network communication and power

1. Detail information on network connection, power connection, and other aspects pertaining to the NB-Link.
2. Instructions on how to connect the laptop or PC to a NB-Link, and the NB-Link to a controller
3. Instructions on how to connect a laptop or PC to a Matrix router, and the Matrix router to a controller
4. Recommended type of network wire
5. Explain how to properly run/connect the network shield wire
6. Explain how to properly power the NB-GPC1 controller
7. *Exercise #2: Connect the communications network from the communications device to the controllers (i.e. NB-Link, Matrix Router, NB-VAVta, NB-ASCe, and NB-GPC1).*
8. *Exercise #3: Connect a properly rated Power Supply to the controllers and/or Matrix Router (if used).*

Video 08: Establishing Communications

1. Discuss the different areas of NB-Pro
2. Discuss the different discover methods
3. Demonstrate how to discover controllers
4. Demonstrate how to save a list
5. Show what a plain text device list file looks like
6. Demonstrate how to load a device list file
7. Demonstrate how to discover objects for a controller
8. Demonstrate how to discover properties for an object
9. Demonstrate how to change a property value
7. *Exercise #4: Establish communications with each of the controllers using any of the methods demonstrated in the video. Discover the controller's objects and the object's properties.*
    a. Save and load a Device List

b. *Go to the PID Control 1 object and change the (SP) property to 72.0. Change a few of the other property values in that object to familiarize yourself with the different methods involved.*

Video 09: The Discovery Menu

1. Briefly go over the Send "who is" menu selection again
2. Explain what the Auto Send "who is" does
3. Demonstrate how to manually add a device and when you'd want to use the procedure
4. Demonstrate the Discover Object List and when you'd use this procedure
5. Demonstrate the Rediscover Object and when you'd use this procedure

Video 10: Flashing a Controller

1. Describe the contents of the Flash Window
2. Explain how to flash a NB-GPC1 and a NB-ASCe
3. Exercise #5: *Download the flash files from the AAM Toolbox that were used in the video. Flash the NB-GPC1 to the latest version. Flash the NB-VAV, and the NB-ASCe to the Roof Top application.*

Video 11: Compile, download and activate a SPL Program

1. How to create a SPL program for the NB-GPC1
2. How to compile a SPL program, check it for errors, and correct any errors
3. How to download a SPL program to a controller
4. How to activate a SPL program in a controller
5. Exercise #6: *Follow the steps in the video and create the program, compile it, correct any errors, download it to the NB-GPC1, and activate it.*

Video 12: Set Write Priority, Set Refresh Rate, and Manual Read/Write

1. Explain this is where you can change the write priority and when you'd want to use this procedure.
2. Describe what Refresh Rate pertains to, how to change it, and caution about making the value too small.
3. Demonstrate how to use the Manual Read/Write feature to change a (ST) property for one of the universal inputs.
4. Exercise #7: *Use the Manual Read/Write feature to change the (ST) Sensor Type property on the NB-GPC1's first 6 Universal Input Objects to -30.0 to 230.0*

Video 13: Time Synchronization, Prop ID lists, & Property/Object ID Generator

1. Explain the contents of the Time Synchronization window
2. Demonstrate how to sync the time and/or date of the controller using the NB-GPC1
3. Explain the purpose and demonstrate how to use the Prop ID list
4. Explain the purpose and demonstrate how to use the Property/Object ID generator
5. Exercise #8: Use NB-Pro to synchronize the time and date of the controllers using the laptop or PCs time and date and a User Defined time and date.

Video 14: Property Groups

1. Demonstrate how to add properties to a group.
2. Explain how to save and load a group
3. Mention the 32 limit
4. Exercise #9: *Create the same group as demonstrated in the video.*

Video 15: Capture and Download Capture File, and Report Generator

1. Explain the contents of the capture window
2. Demonstrate how to capture a NB-GPC1 controller
3. Explain how to clear the controller's Ram and download the capture file to the controller
4. Demonstrate how to create a report using the Report Generator
5. Exercise #10: *Capture or backup the NB-GPC1. Clear the controller's RAM. Download the capture file to the NB-GPC1 Use the Report Generator to generate the reports in the different formats*

Video 16: Trend Viewer

1. Explain the Trend Viewer buttons
2. Explain and demonstrate how to create and view a trend.
3. Exercise #11: *Follow the video and create and view a trend.*

Video 17: Alarm Viewer

1. Explain the purpose of the Alarm Viewer
2. Demonstrate how to generate alarms that can be viewed in the alarm viewer

Video 18: BACnet Error Viewer

1. Explain the contents of the BACnet Error Viewer Window
2. Explain where to find explanation of error codes in the manual

Video 19: SPL Editor

1. Explain Toolbar buttons
2. Explain Menu choices
3. Quiz #2: NB-Pro

Module 6: NB-GPC1

Video 20: NB-GPC1 Introduction

1. Introduction into the new features/enhancement

Video 21: NB-GPC1 Installation and Hardware

1. Overview of hardware features
2. Universal Input and Analog Output jumper configuration
3. STATbus Technology
4. Introduction into IOX modules (wiring, powering, mounting, and LEDs

Video 22: Device, File0, Program, Notification Class, & Ram Objects

1. Explanation of the Device, File0, Program, Notification Class and Ram Object properties
2. Explain how to download the file into the NB-GPC1

Video 23: Analog Input, Binary Input, and Piecewise Curve Objects

1. Explanation of the Analog Input, Binary Input, and Piecewise curve objects and their properties
2. Demonstrate how to connect a Precon Type 3 thermistor to UI1
3. Exercise #12: *Configure UI1 for a Precon Type 3 thermistor. Connect the thermistor to UI1 and verify UI1 is displaying a realistic temperature value. Configure the NB-GPC1 to broadcast the Outside air to the NB-ASCe, using UI1 as the OA to a NB-ASCe.*

Video 24: Analog and Binary Summary Objects

1. Explanation of the Analog and Binary Summary object and their properties

Video 25: Statbus Objects and IOX Module Mapping

1. Explanation of the StatBus Objects and their properties
2. Exercise #13: *Remove the thermistor from AI1 and connect it to the SSB-FI1 module, connect the SSB-FI1 module to the Statbus channel 1, and map the SSB-FI1 module to the first available UI channel.*
3. Exercise #14: *Connect the SSB-AO1 module to Statbus channel 2, and map it to the first available AO channel.*
4. Exercise #15: *Connect the SSB-DO1 module to Statbus channel 3, and map it to the first available DO channel.*
5. Exercise #16: *Connect the SBC-STAT3 to the Statbus channel 1, and map it to the second available UI channel.*

Video 26: Custom Display Sequence Editor

1. Explanation of the custom Display Sequence Editor Object's properties
2. Exercise #17: *Use the Stat Sequence Editor, create a sequence file the same as shown in the video, and download the file to the NB-GPC1. Use the SBC-STAT3 to insure the file displays correctly.*

Video 27: SPL Program and File Objects

1. Explanation of the SPL program and File and DO Objects and their properties

Video 28: Analog PID Objects

1. Explanation of the PID Objects and their properties
2. Explanation of how the PID loop controls
3. Explanation of how reset can affect the control of a PID loop
4. Exercise #18: *Follow the video and configure the NB-GPC1's PID Control 1 for a proportional only loop and use object UI1 as the input or MV for the loop.*
5. Explain how reset works and demonstrate it
6. Exercise #19: *Follow the video and add reset to the PID Control 1 loop. Configure UI2 as a thermistor, override the object, and use it as the input for the Reset Variable (RV). Change the value of (RV) to make sure the reset works as the video. (there will be a reset table in the video for the students to follow for the exercise)*

Video 29: Pulse Pair Loop Objects

1. Explanation of how the Pulse Pair Loops function

Video 30: Thermostatic Control Objects

1. Explanation of how Thermostatic control functions.
2. Exercise #20: *Follow the video and configure the NB-GPC1's Thermostatic Control 1 object and follow the exercise. Use AI2 as the input to the Thermostatic loop.*

Video 31: Schedule, Calendar, and Notification Class Objects

1. Explanation of the Schedule, Calendar, and Notification Class Objects and their properties

Video 32: Math, Min/Max/Avg, and Input Select Objects

1. Explanation of the Math, Min/Max/Avg, and Input Select Objects and their properties

Video 33: Staging Objects

1. Explanation of the Staging objects and their properties

Video 34: Broadcast, Local Remap, and Netmap Objects

1. Explanation of the Broadcast, Local Remap, and Netmap Objects and their properties
2. Demonstrate how to broadcast OA from the NB-GPC1 using UI1 as the OA to a NB-ASCe
3. Exercise #21: *Follow the video, and configure the NB-GPC1 to broadcast the Schedule state to a NB-VAV controller.*
4. Quiz #3: NB-GPC1

Video 35: Analog Value and Binary Value Objects

1. Explanation of the Analog Value and Binary Value objects and their properties

Video 36: Communication Status, Season, and Mfg Objects

1. Explanation of the Communication Status, Season, and Mrg objects and their properties

Module 7: Introduction into the NB Controllers

Video 37: NB Controller Overview

1. Overview of the hardware layout of the NB controllers

Video 38: NB Controller Hardware Overview

1. Explain how to properly install the controllers
2. Explain how to properly apply power to the controllers
3. Explain how to properly connect the controllers to the network
4. Examples on how to wire different devices to the inputs and outputs

Module 8: SBC-STAT/RH

Video 39: SBC-STAT/RH Overview

1. Discuss facts about the SBC-STATs (all of the STATs)
2. SBC-STAT wiring from a single SBC-STAT to multiple SBC-STATs to multiple SBC-STATs to multiple controllers
3. Explain the SBC-STAT LED indications
4. Explain the SBC-STAT3 menus
5. Exercise #22: *Connect a SBC-RH3 to the NB-VAVta controller. Go through the STAT3 Menus (i.e. balancing) and familiarize yourself with them.*

Module 9: NB-VAV Controller Software

Video 40: Device Object

1. Explanation of the Device Object and properties

Video 41: Zone Temperature, UI01, UI02, and Supply Temperature Objects

1. Explanation of the Zone Temperature, UI01, UI02, and Supply Temperature Objects and their properties

Video 42: Flow Control Objects

1. Explanation of the Flow Control Objects and their properties

Video 43: AO01 Object

1. Explanation of the AO01 Object and properties

Video 44: Cooling, Heating, and Warmup Setpoint Objects

1. Explanation of the Cooling, Heating, and Warmup Setpoint Objects and their properties

Video 45: BO Objects

1. Explanation of the BO Objects and their properties

Video 46: Schedule Objects

1. Explanation of the Schedule Objects and their properties

Video 47: Flow Setpoint Objects

1. Explanation of the Flow Setpoint Objects and their properties

Video 48: Electric Reheat Object

1. Explanation of the Electric Reheat Object and properties

Video 49: Valve Control Objects

1. Explanation of the Valve Control Objects and their properties

Video 50: Analog Control Objects

1. Explanation of the Analog Control Objects and their properties

Video 51: Occupancy Detection, Proof of Flow, and Broadcast Schedule Objects

1. Explanation of the Occupancy Detection, Proof of Flow, and Broadcast Schedule Objects and their properties
2. Exercise #23: *Configure the NB-VAV for four stages of heat*
3. Exercise #24: *Configure the NB-VAV for hot water valve control*

Module 10: NB-ASCe

Video 52: Introduction into the NB-ASCe Controller

1. Overview and explanation of the new features and functions in the latest version of firmware (BTL Certified)

Video 53: Roof Top Application

1. Explanation of the objects and properties in the Roof Top application

Video 54: Heat Pump Application

1. Overview of the objects and properties in the Heat Pump application

Video 55: Fan Coil Unit Application

1. Explanation of the objects and properties in the Fan Coil application
2. Exercise #25: *Remove the SBC-RH3 from the NB-VAV controller and connect it to the NB-ASCe controller. Follow the video and configure the NB-ASCe for 3 speed fan control*
3. Quiz #4: NB-VAV/SBC-STATs/NB-ASCe

Module 11: NB-SD and API Pro Overview

Video 56: Overview of the NB-SD and API Pro

1. Overview of API Pro and the NB-SD
2. Example of how to program the NB-SD through API Pro

Module 12: SPL Programming

Video 57 : Introduction into SPL Programming

1. Parts of the program
2. The .SPL, .PLB. and .LST Files
3. Properties and Registers
4. Compiler Control Statements
5. Comments
6. Labels

7. Expressions
8. Constants
9. Named Constants
10. Registers
11. Program Properties
12. Named BACnet Object Properties
13. RAM-based Tables

Video 58: Functions

1. Explain and provide program examples of the many different functions statements

Video 59: Expression Operators

1. Explain and provide program examples of the different expression operators

Video 60: Execution Error Control and Debugging Statements

1. Explain the different error statements and program examples
2. Explain the different debugging statements and program examples
3. SPL Programming Tips
4. Exercise #26: *Use NB-Pro to create a SPL program that will turn on the NB-GPC1's DOs 1 through 4, and then turn them off. Write the program to loop back to the top of the program so it will continue to run. Place a 2 second delay between turning on each of the outputs and a 2 second delay between turning each output off.*

Video 61: Fundamentals of SPL in BACnet

1. Explanation of the fundamentals of SPL as it pertains to the BACnet protocol

Video 62: SPL Programming Tips

1. Tips on SPL programming using the BACnet protocol

Module 13: MatrixBBC

Video 63: MatrixBBC Overview

1. Overview of the MatrixBBC

Video 64: Hardware Installation

1. Explanation of the installation and hardware of the MatrixBBC

Video 65: Basic Setup Part I

1. Explanation of the Basic setup of the MatrixBBC

Video 66: Basic Setup Part II

1. Explanation of the Basic setup of the MatrixBBC

Video 67: Programs and Files

1. Explanation of the Program and File objects and their properties

Video 68: Scheduling Part I

1. Explanation on how to configure Scheduling in the MatrixBBC

Video 69: Scheduling Part II

1. Explanation on how to configure Scheduling in the MatrixBBC

Video 70: Notification Class Objects

1. Explanation of the Notification Class objects and their properties

Video 71: Data Storage Objects

1. Explanation of the Data Storage objects and their properties

Video 72: Data Manipulation Objects

1. Explanation of the Data Manipulation objects and their properties

Video 73: Data Movement Objects

1. Explanation of the Data Movement objects and their properties

Video 74: Expansion Input and Output Objects

1. Explanation of the Expansion Input and Output objects and their properties

Video 75: Input Overview

1. An overview of the MatrixBBC inputs

Video 76: Output Overview

1. An overview of the MatrixBBC outputs

Video 77: Analog Control Loop Objects Part I

1. Explanation of the Analog Control Loop objects and their properties

Video 78: Analog Control Loop Objects Part II

1. Explanation of the Analog Control Loop objects and their properties

Video 79: Pulse Pair Control Loop Objects

1. Explanation of the Pulse Pair Control Loop objects and their properties

Video 80: Thermostatic Control Loop Objects

1. Explanation of the Thermostatic Control Loop objects and their properties

Video 81: Miscellaneous Object

1. Explanation of the Miscellaneous object and properties