

CENTAURUS PRIME

Integrations, Custom Programming, Consulting



“P1” Gateway Guide

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INTEGRATIONS, CUSTOM PROGRAMMING, AND CONSULTING

“P1” Gateway Guide

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Gateway Installation Basic Information

Summary

This section will help to give a basic overview and quick summary of the procedures needed to install the “P1” Gateway Panel. Detailed instructions are also provided later in this guide. The Centaurus Prime “P1” Gateway allows any front-end system (Modbus TCP/IP Master or BACnet/IP) that communicates using the either industry-standard Modbus or BACnet protocols to communicate to Siemens (also known as Staefa, Landis & Staefa, Landis & Gyr, Powers, or even MCC Mark Controls, for real old-timers) P1-trunk field equipment. These trunks are often called “FLN” trunks, for “Floor Level Network”. The P1-trunk field devices supported (TEC, MPU, DPU, MX22, and BIM devices) will appear to the front-end system as a series of Modbus SLAVE devices or true BACnet Devices. Real time point data from the Siemens P1-trunk controllers is then mapped to equivalent registers, coils, and bits on the Modbus system, or as AI, BI, AO, and BO objects on the BACnet system. All operations are transparent to the user and host computer.

Connections to the “P1” Gateway are simple and clearly marked. They consist of:

- Power Supply, 120 Volts AC (optionally, 220 or 240 Volts AC)
- Siemens P1 (called “FLN”) trunks (up to four; these are RS-485 multi-drop trunks)
- Modbus-TCP/IP Network or BACnet/IP Network
- Local Mode Port for commissioning via Laptop Computer

All Hardware necessary to connect the Gateway to the P1 devices is included in the 16” X 14” X 8” polycarbonate cabinet that is easily mounted in a convenient location.

The Gateway’s Ethernet connection is a 10-Mbaud Ethernet, only. Both the BACnet/IP and the Modbus-TCP/IP Network connects to the “P1” Gateway via this Ethernet. Due to lack

of interest (namely, no orders in over five years), we have dropped the Modbus-RTU connection, an RS-485 serial link.

Single Board Computer Basics

The Single Board Computer used in Centaurus Prime Gateways is the Ether-6 manufactured by JK Microsystems. It is made in the United States of America.

The controller is based on an Intel 386Ex processor running at 25Mhz. It is equipped with 1 megabyte of static ram organized as 512K 16-bit words. Also included are 512K bytes of flash memory organized as DOS drives A and B. A 40 Megabyte M-Systems DiskOnChip is added to the 32-pin DIP socket on the controller board, and acts as drive C: There is a switching power converter on the controller, which can accept 7-34 volts DC. Nominal current consumption is 250mA at 12 volts with 10Base-T Ethernet selected.

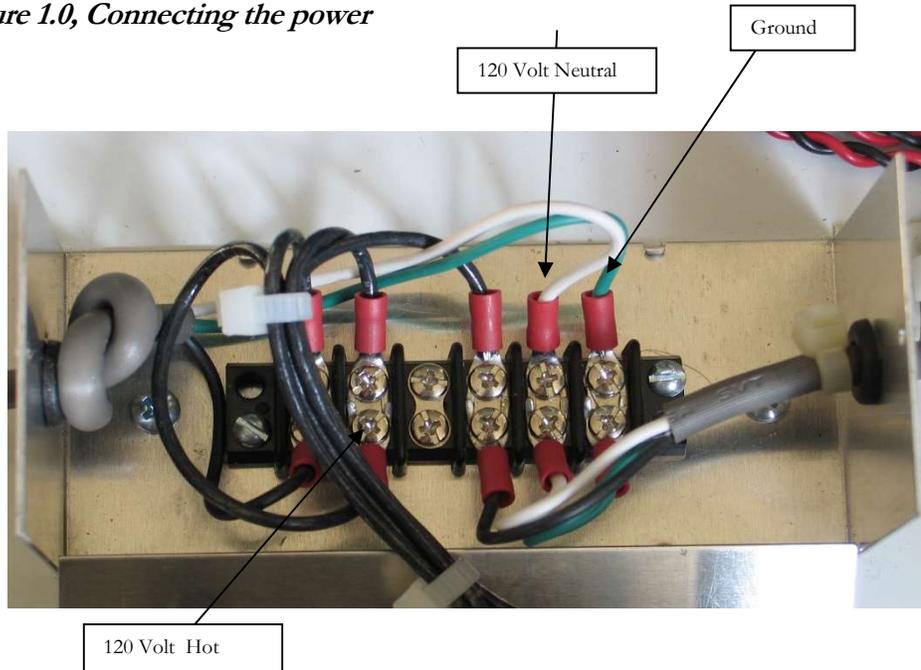
Specifications for the Ether 6 are:

Processor :	Intel 386Ex, 25MHz
Operating System :	XDOS (MS/PC DOS 3.3 compatible)
Memory :	1M SRAM, 512K Flash, 40MB Flash
Ethernet :	10BASE-T, NE2000 compatible automatic media detection, Link status and Activity LEDs
Serial Port 1 :	RS-232 with 5 handshake lines COM1, address 0x3F8, IRQ4 115200 baud maximum
Serial Port 2 :	RS-232 no handshaking or RS-485 half duplex, COM2, address 0x2F8, IRQ 3 115200 baud maximum
Serial Port 3-6 :	RS-232 with handshake lines, 16554 UART, COM3-6 115200 baud maximum 16 byte Rx and Tx FIFO
Digital I/O :	5 Bits (P1.4-P1.7 & P3.1) Pin configurable as input or output 8mA souce/sink
Watchdog :	Hardware, 1.6 second timeout Generates board wide Reset
Clock/Calendar :	Hardware, battery backup
Supply Power :	7-34V unregulated DC $\pm 10\%$, 3 Watts
Humidity :	5 - 90%, non-condensing
Temperature :	-4 to +158 °F (-20 to +70 °C)
Weight :	53 oz (1.5 kg)
Dimensions :	8.30" x 6.76" x 2.28" (210.8mm x 171.7mm x 57.9mm)

Connecting Power to the Gateway

Power connections are made by first removing the 2 screws on either side of the power terminal block enclosure. Then, you remove the temporary power cord (supplied for you; actually left in from our internal burn-in testing). Connect your PERMANENT power source to the HOT (Black), NEUTRAL (white) and GROUND (green) wires. Follow the diagram below for proper terminations.

Picture 1.0, Connecting the power



Connecting Siemens P1-Trunks to the Gateway

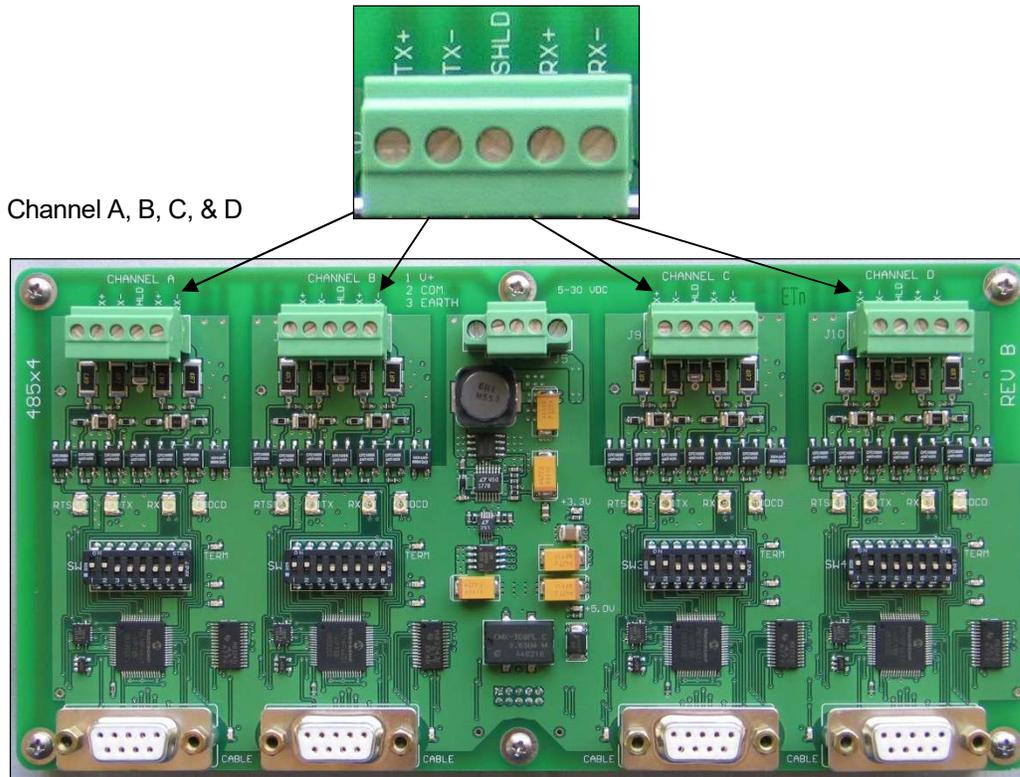
Typically, Siemens P1-trunks (possibly several trunks) are connected to “building-level” Siemens controllers: MBC, SCU, FLNC, MEC, PXCC or the like. Most of these devices have up to three P1-trunks (labeled FLN1, FLN2, and FLN3; the “FLN” stands for “Floor Level Network”). These are RS-485 multi-drop trunks. These trunks from the Siemens building controllers are removed from it and simply re-connected to the Centaurus Prime “P1” Gateway.

A usual Siemens/Landis controller, such as an PXCC, FNC, PXCC, MBC or SCU, has three “FLN” trunks. The Centaurus Prime “P1” gateway has four trunks. While this may be “one too many”, in many cases several Siemens controllers are installed in one location, and you can install fewer gateways than simple one-to-one Siemens controller replacements, due to the fourth FLN trunk on the “P1” Gateway

The trunk connections are clearly marked and each trunk is only a two-wire connection. The trunks have a “plus” and “minus” side, and also a “shield” connection that goes to cabinet (AC) ground. Be sure that the polarity is correct, and that the shields are ALL tied together and only connected to ground at ONE place (to avoid ground-loops). This is a two-wire trunk, so it does not matter if you land the field trunk wires on TX+/TX-, or on RX+/RX-. Just make sure the polarity is right!

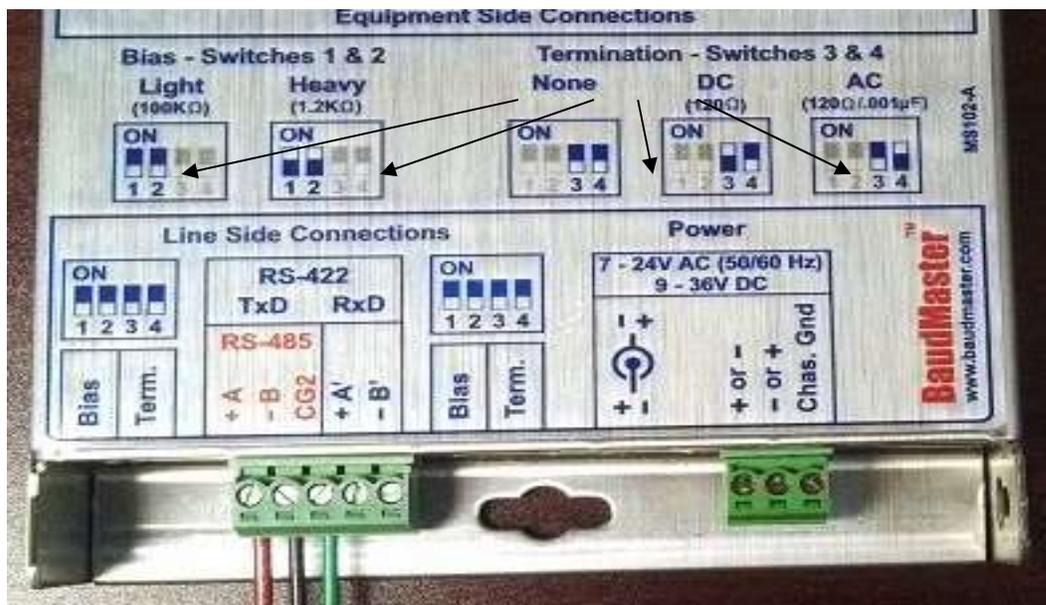
The avoidance of “ground” loops is VERY important, especially in long lines, electrically noisy environments, or between buildings on a campus. Also, termination of the RS-485 lines is very critical to good communications. Follow the RS-485 “rules” to the letter!

Picture 1.2, Connection of P1 (FLN) Trunks to the Gateway



Rev. 1: Channel A, B, C, & D are all on one board; They are trunks 1, 2, 3, and 4.

Rev. 2: Four independent RS-485 converters:



Plus is RED (+A'), Minus is BLACK (-B'), and GREEN (Shield) goes to "CG2" terminal

The Revision 1 Quad RS-485 card has individual switches for each channel on the board. You would not generally change any except for the termination (factory set to NO termination and the baud-rate switches (if other than factory configuration of 4800 baud for Trunks 1 through 4). Turning switch “6” ON for a channel will add 120 ohm DC termination to the trunk at the RS-485 converter (you will also note that a small “Term” light will appear just above the switch pack when you do this.

The Revision 2 RS-485 converter has several switches for bias and termination. The Gateway ships with the default of “light bias” and no termination. Should you need to add termination, this is done as per the drawing on the side of the RS-485 converter. Bias is unlikely to change to “Heavy” unless you have very poor FLN communications trunks. Go to this URL for the manual on the “BaudMaster” RS-485 converter:

http://www.interfaceconverter.com/wp-content/uploads/2012/05/users_manual.pdf

Connecting to the Modbus Master

Connecting to the Modbus Master is done easily:

If you have ordered the “P1” Gateway in the Modbus-TCP/IP configuration, then it is simple: You plug in an 8-pin Category 5 or Category 6 cable into the Ethernet connection on the top right-hand corner of the PC. You must set the IP address of the Gateway to a static, fixed address, on the segment that you are in. This is done with the CONFIG.TXT file, described in the next chapter.

The SOCKET.CFG file has the IP address you will use in it (or 0.0.0.1, if you want it to use DHCP). This is described later. The GATEWAY.INI file, also described below, is another place where you may set the static IP (but is not needed for DHCP operations).

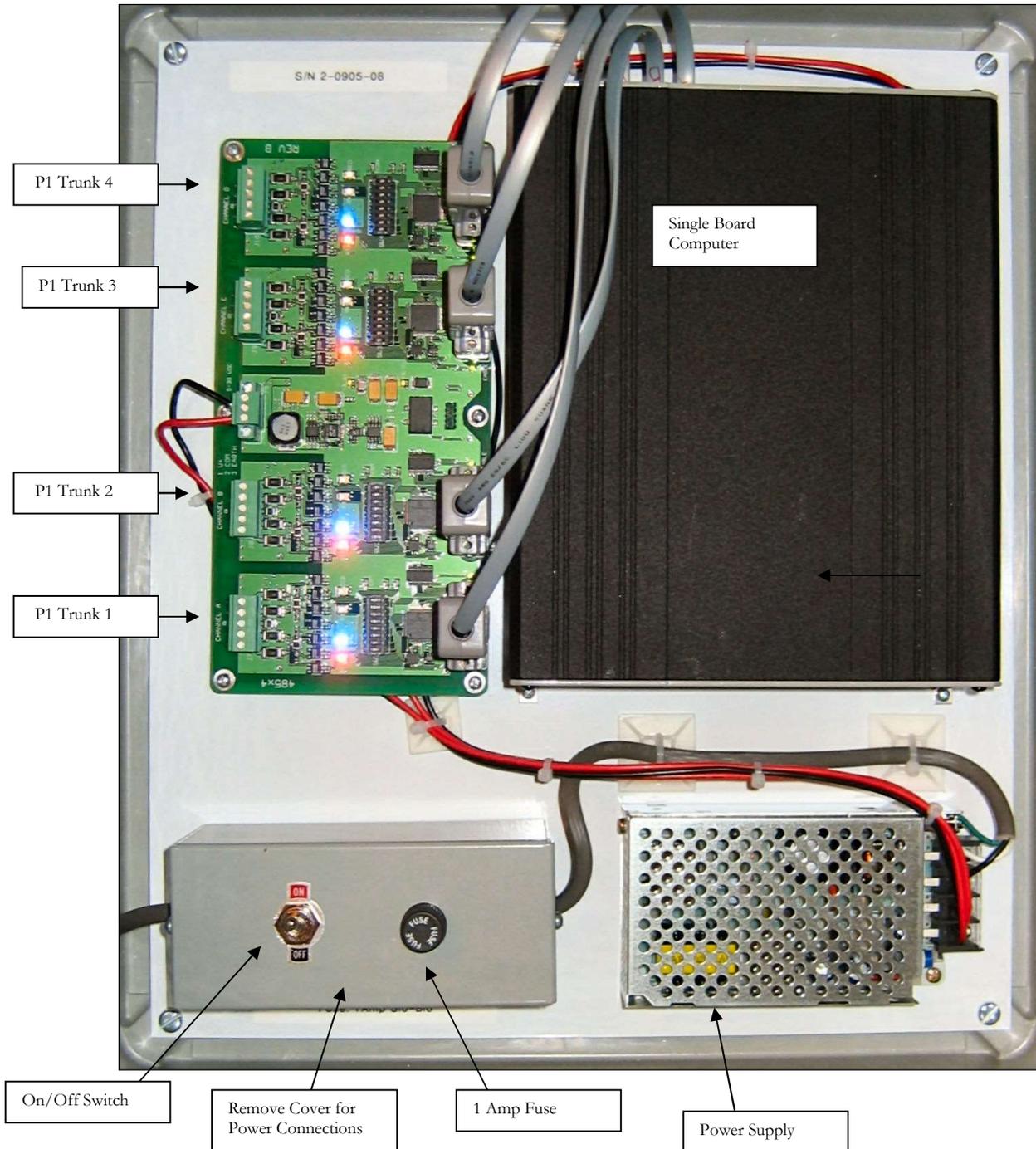
Modbus TCP/IP is a “connected” protocol, and uses TCP/IP port 502 (the default Modbus port), for it’s connection. Only one device (namely, your master controller for this Gateway), can be connected.

Connecting to a BACnet/IP Network

This is quite simple: You plug in an 8-pin Category 5 or Category 6 cable into the Ethernet connection on the top right-hand corner of the PC. You must set the IP address of the Gateway to a static, fixed address, on the segment that you are in. This is done with the GATEWAY.INI file, described in the following section. The same IP address **must** also be used in the SOCKET.CFG file, which is also described later. As described above, using an IP address of 0.0.0.1 in the SOCKET.CFG file makes the Gateway use DHCP, and it obtains an IP address from that segment’s DHCP server. If you do have DHCP, then remove any IP address from the GATEWAY.INI file. This is fully described, later.

Gateway Overview

Picture 1.3A, Gateway Overview and Identification, Revision 1:



Picture 1.3B, Gateway Overview and Identification, Revision 2:



Differences from Rev 1:

- Four independent RS-485 converters (rather than one four-port converter)
- Power supply has Surge/Overvoltage/EMI suppressor inside power box (for CE/UL rating)

Commissioning the Gateway with the Local User Interface

Creating and Uploading the GATEWAY.INI file

The following is an example of the GATEWAY.INI file that must be edited to match your particular installation. There are several sets of parameters in the INI file. One set of parameters deals with the BAUD rates on the four P1 trunks. Another parameter sets the Ethernet IP Address of the gateway (it must be set in this file if you are using a FIXED IP address),. And, if you are using BACnet, another set of parameters tells the gateway about several network options of BACnet.

The line for IP_ADDR is required only if you have a FIXED IP ADDRESS on the Ethernet in use (i.e., Modbus-TCP/IP or BACnet/IP protocols in operation. You have to set up the FIXED IP Address of this gateway computer in two places: here in the GATEWAY.INI file, and also in the SOCKET.CFG file (more on that later). But just be aware that they MUST match! If the SOCKET.CFG specifies a different IP address from the GATEWAY.INI file, you will never receive anything from the Gateway!

For the BACnet/IP (ASHRAE 135P Annex J) protocol, a couple other global parameters are necessary. Internally the gateway maps devices in a very simple fashion: Devices 1 through 60 on trunk 1; Devices 61 through 120 on trunk 2, Devices 121 through 180 on trunk 3, and Devices 181 through 240 on trunk 4. But you might not want to use those as your Device “Instance numbers”, if you have some other addressing scheme (or a number of these gateways) on a system. The BACNET_OFFSET allows you to have these devices show up as a different set of Instances rather than just 1 to 240. The number that you specify is added to the internal device number. Hence, if your offset is 5000, and you are interested in (local) device #64 (the fourth gizmo on trunk #2), the BACnet system sees this device as Instance # 5064.

Also, ASHRAE 135P Annex *al* states that if you have multiple gateways on one system, you will need to have each of them be a different Network Number (set via the BACNET_NETWORK parameter in the Gateway.ini file). This is so that there is no confusion between the devices on one gateway and any others (they all could have local device numbers be the same; by having different Network Numbers for each gateway, they become unique, as far as the underlying BACnet protocol works). If you want this Gateway to be compliant with the BACnet “*Annex al*” (issued in 2014), then you MUST have this Gateway set up to be a UNIQUE BACnet network number. Besides being ‘best practice’ for BACnet systems, it is required by the latest ASHRAE 135P committee directive in Annex *al*.

While not necessary, we have another INI parameter, "Router_Name". With this line you can specify three things: The BACnet NAME of the P1 Gateway (instead of the default "Router_to_Network_XYZ" where XYZ is the BACnet Network Number), the BACnet DESCRIPTION (default: "Physical CP Gateway") and LOCATION (default: "Router-to-Network Device") fields for the P1 Gateway itself.

Here is a sample GATEWAY.INI file:

```
// Gateway.INI file created for Spandex Prison, by Joe Technoweenie on 12/12/2012
//
// Required for 4 ports: Set the baud rate (set to 0 if channel unused)
//
// Valid baud rates are: 4800 – standard Siemens/Landis baud rate
//                       9600 or 19200 (possibly; newer or non-Siemens)
//                       0 -- <means that nothing is on that trunk>
BAUD1, 4800
BAUD2, 4800
BAUD3, 4800
BAUD4, 0
//
// "IP_ADDR" is used for the IP address of what you want this box to be.
// ( And it MUST match the SOCKET.CFG IP Address!) [NOTE: TAKE OUT for DHCP!}
//
IP_ADDR, 192.168.0.204
//
// "Router_Name" lets you name the router, specify it's description, and it's location
//
ROUTER_NAME, "COOL_P1_ROUTER", "COOL GIZMO", "DARK SIDE OF THE MOON"
//
// "BACNET_NETWORK" is used for what BACnet network number we are on
//
BACNET_NETWORK, 1042
//
// "BACNET_PORT" is the port number which this Gateway will use for BACnet packets
//
BACNET_PORT, 47808
//
// "BACNET_OFFSET" is what we will add to the local device numbers (1..240)
// to yield the BACnet object_ID instances of each mapped BACnet "device"
//
BACNET_OFFSET, 1000
//
// "MAKE_ROUTER_DEVICE" is TRUE only if the host supports Addendum "al" (B-GW)
//
MAKE_ROUTER_DEVICE, TRUE//
```

Creating and Uploading the SOCKET.CFG file

The following is an example of the SOCKET.CFG file that must be edited to match your particular installation, if you are using the Modbus/TCP or BACnet/IP protocols. If you are not doing an Ethernet connection, this text file is irrelevant, and can be ignored and left as it comes from the factory.

ONLY ONE LINE SHOULD BE CHANGED—the line that begins with “ip address”. Here is an example:

```
C:\>type socket.cfg
# SOCKET.CFG is the configuration file to be executed by SOCKETP.EXE

ip address 192.168.0.204

interface pdr if0 dix 1500 10 0x60
# The following line will just display the info for easy verification:
ip address
# The following lines set TCP/IP parameters (commented out in this case):
#ip ttl 15
#tcp mss 1460
#tcp window 2920
```

The “ip address 192.168.0.204” line should be modified to be whatever *static* IP address that the “P1” Gateway will have.

We ***HIGHLY RECOMMEND*** that the P1 Gateway be given a static IP, rather than DHCP.

Note that DHCP uses the IP address of 0.0.0.1. If you put this line, “ip address 0.0.0.1” in the SOCKET.CFG file, the PC, when booted, contacts the DHCP server to request an IP address, which is then used by the Gateway. Note that most DHCP servers “remember” a gizmo’s IP address, so if the Gateway is powered down for a while, then rebooted, the DHCP server will ***most likely*** give it the last IP address. But this is not guaranteed! Be careful!

Local Mode Menu Options

Once connected via the local mode port you may press <enter> at any time to display this top level menu:

```
(H)elp, (S)ummary, (D)evice, (P)oint, (C)ontrol, (W)atch, (A)utoDisc, (X)-it
```

When you type “H” <enter> you will get the following:

Hit a single key to get to a submenu. Your Options are:

- H (for Help), which gives you this screen.
- S (for Summary), which allows you to get various status summaries.
- D (for Devices), which allows you to manage and get data on devices.
- P (for Points), which allows you to manage and get data on points.
- C (for Control), which allows you to control various field objects.
- W (for Watch), which allows you to watch protocol streams.
- A (for AutoDisc), which allows you to auto-discover trunks.
- X (for "X-it"), which exits this gateway program.

(H)elp, (S)ummary, (D)evice, (P)oint, (C)ontrol, (W)atch, (A)utoDisc, (X)-it :

 **X – will always take you back to the top level menu options**

Auto Discovery and Database Generation

Before you can use any of the other menu options you must first create your database by using the (A) option, which will give you the following text:

AUT: (A)uto-Discovery, (S)ave Discovery, (X)-it :A

AUTODISCOVERY: You may select a TRUNK to auto-discover.
Enter a TRUNK NUMBER (1 through 4) : 1

Trunk #1 will now be auto-discovered...

AUT: (A)uto-Discovery, (S)ave Discovery, (X)-it :

State: "AutoDiscovery" on Trunk: 1, P1 Device #0

State: "AutoDiscovery" on Trunk: 1, P1 Device #1

*** Device Found, #1 Type: MPU

State: "AutoDiscovery" on Trunk: 1, P1 Device #2

*** Device Found, #1 Type: VV11

*** Device Found, #1 APP # 2023

State: "AutoDiscovery" on Trunk: 1, P1 Device #3

*** Device Found, #1 Type: FC10

*** Device Found, #1 APP # 2090

State: "AutoDiscovery" on Trunk: 1, P1 Device #4

State: "AutoDiscovery" on Trunk: 1, P1 Device #5

State: "AutoDiscovery" on Trunk: 1, P1 Device #6

...Etc...up to Device #99

State: "AutoDiscovery" on Trunk: 1, P1 Device #99

State: "AutoDiscovery" on Trunk 1, COMPLETED!

Simply put: When Auto Discover is invoked the Gateway will scan for all TEC device addresses possible on the requested trunk.

As you can see in the example above, “P1” Device address #1 was discovered, which was a MPU type device. Two TEC devices were found (one VAV gizmo, with application #2023, and another Fan Coil device, using application #2090).

This process should be completed for all trunks that have “P1” devices. When all trunks have been Auto Discovered, you can then use the (S)ave Discovery option (see below).

📁 Note 1: This is a lengthy process, taking 3-4 minutes per trunk on a 4800-baud trunk. Be patient--wait for it to complete! (Coffee is always good, here)

📁 Note 2: If a controller is dead, unplugged, or not communicating when Auto-Discover is done, you can manually add the controller to the discovered trunk’s data file. You must download the data file to your PC, edit it to add a line about the missing controller, and then upload the modified file back into the Gateway. **See “Uploading and Downloading files to the Gateway”**. Alternately, don’t bother; and if that gizmo comes alive later, you can always add it to the gateway via a simple edit to the CONFIG.TXT file. Your call.

📁 Note 3: MPU and DPU devices only know about addresses 1 to 32. They will respond to commands at MULTIPLES of 32 (i.e., an MPU at address #1 also responds at address #33, #65, and #97!) The auto-discover mode understands this, and if it finds an MPU or DPU at any address higher than 32, it flags it as being a “duplicate” and ignores it ever more.

📁 Files that are in the Gateway on drive C:, and their purpose, are:

STARTUP.BAT	- Startup Batch file
GATEWAY.INI	- Sets all baud rates, IP Address, BACnet parameters
SOCKET.CFG	- IP Configuration file
SOCKETP.EXE	- TCP/IP Socket stack
NE2000.COM	- Ethernet Driver
TRN_GWAY.EXE	- Does all the magic
DATABASE.DAT	- Database that is created from Save Discovery
DISC_1.TXT	- Trunk #1 Auto Disc File
DISC_2.TXT	- Trunk #2 Auto Disc File
DISC_3.TXT	- Trunk #3 Auto Disc File
DISC_4.TXT	- Trunk #4 Auto Disc File
CONFIG.TXT	- Device configuration file created when the Auto-Discovery files are merged
XPING.EXE	- Test program to verify Ethernet connectivity
TPL_xyz.CSV	- Many files, the templates for the TEC “Application” (note: xyz is the application number). Discussed later.

A note about TECs at address #99. 99 is the Factory default for all TECs, but they can NOT be used at this address. But, some old TECs, even though they have been configured as another address, continue to randomly respond to #99 during AutoDiscovery. **Ignore ALL #99 devices!**

```
(H)elp, (S)ummary, (D)evice, (P)oint, (C)ontrol, (W)atch, (A)utoDisc, (X)-it :A
AUT: (A)uto-Discovery, (S)ave Discovery, (X)-it :S
AUTODISCOVERY: You may SAVE and MERGE all trunk auto-discovery maps.
ARE YOU SURE? If so, enter "Y" for YES; and then the ENTER key.
```

(or any other keys if you do NOT want to merge the maps :Y

```
Discovery File Merging, trunk #1
Merging P1 unit #1, Trunk #1; Type = MPU
Merging P1 unit #2, Trunk #1; Type = TEC #2023
Merging P1 unit #3, Trunk #1; Type = TEC #2090
Discovery File Merging, trunk #2
Merging P1 unit #1, Trunk #1; Type = TEC #53
Merging P1 unit #50, Trunk #1; Type = TEC #714
Discovery File Merging, trunk #3
Merging, P1 unit #44; Trunk #3; Type = TEC #2218
Merging, P1 unit #67; Trunk #3; Type = TEC #2052
No Discovery File on trunk #4
```

This option will merge all of the discovery files for each trunk thereby giving you a completed database for the Siemens P1 devices on all “FLN” trunks.

After the merge is complete, the Gateway will have created a file called CONFIG.TXT. When the Gateway is rebooted, this new Database Configuration file will be initialized and communications to the field devices will commence.

The Save Discovery option automatically assigns Modbus device numbers (slave addresses) or BACnet device numbers to the Siemens/Landis devices it finds, in order. First, devices on trunk #1 are assigned, in order of Modbus slave devices (or BACnet devices) 1 through 60 (note that there are a maximum of 60 P1 devices for EACH trunk – this is a “reasonable” limit, and 99.99% of Siemens installations will not have more than 60 devices on any trunk. 99% will only have a maximum of 32 TECs on a trunk, since Siemens did (mostly) honor the 32-device-limit for RS-485. However, we offer an option that does allow for more devices per trunk, but it sacrifices the fourth trunk. If this is your situation, please consult the factory for the one additional file you will have to download into the P1 Gateway to do any non-standard device assignments (this file is called “PARTITION.TXT”, because it partitions the three trunks in a particular fashion to accommodate your installation). This is a VERY rare occurrence; contact Centaurus Prime if this is your case.

Similarly, the P1 devices found on Trunk #2 are assigned (in the order that they are discovered) to Modbus slave devices 61 through 120 (same BACnet device numbers). And of course, Modbus slave addresses/BACnet device numbers 121 to 180 are for the P1 devices found on Trunk #3, and finally Modbus slave addresses/BACnet device numbers 181 to 240 are assigned to P1 devices on Trunk #4 (in order of discovery).

“Summary” Menu Options

SUM: (D)evices, (A)larms, (C)ontrolled, (U)nreliable, (X)-it :

After the (S)ave Discovery has been completed, you can then reboot and the Gateway will begin to poll the discovered devices. The summary menu option will display further options detailed below.

(D)evices : Devices will display all the status of all devices configured for the Gateway.

```
SUM: (D)evices, (A)larms, (C)ontrolled, (U)nreliable, (X)-it :D
B-GW Device: "Cool_p1_Gateway" Scan Bitmap: 15 First Scan Complete
# 1 TagID: "P1#11, TRUNK 1" is ON-LINE & RELIABLE
# 2 TagID: "P1#42, TRUNK 1" is ON-LINE & RELIABLE
# 61TagID: "P1 #1, TRUNK 2" is OFF-LINE! <MUST INIT> (SlowScan)
# 62TagID: "P1 #2, TRUNK 2" is ON-LINE & RELIABLE
#121 TagID: "P1 #4, TRUNK 3" is ON-LINE & RELIABLE
#122 TagID: "P1 #5, TRUNK 3" is ON-LINE & RELIABLE
#123 TagID: "P1 #6, TRUNK 3" is ON-LINE & RELIABLE
```

(A)larms: Not available with Modbus (does not support alarm states). With BACnet, this does have meaning, but only for points that have alarm states or limits (intrinsic alarms) defined. At the present time, the Centaurus Prime gateways do NOT support BACnet alarming, either “intrinsic” or “algorithmic”.

(C)ontrolled: This command will display all controlled points for all Modbus or BACnet devices.

```
SUM: (D)evices, (A)larms, (C)ontrolled, (U)nreliable, (X)-it :C
Internal Global Controls Queue: Head = 987 Tail = 987; Controls Today = 1529
*** Gateway has NO controls to do! ***
```

This is the usual condition of the gateway. If you have a bunch of controls that happen at a particular time, you may be able to catch the gateway with some controls that it needs to do. In that case, it will list all the objects in the queue that need to be controlled, and what those controls are. The “head and tail” numbers will then be different, too. If you find that the gateway has lots of controls to do, or the number of controls keeps building up, you have some run-away logic external to the gateway which is over-controlling!

(U)nreliable: This will display all unreliable points for all devices.

```
SUM: (D)evices, (A)larms, (C)ontrolled, (U)nreliable, (X)-it :U
DEVICE #1 is field device/subdevice/type 4/0/2092
--BACnet ID 4 (AI) ROOM TEMP is UNRELIABLE
DEVICE #121 is field device/subdevice/type 42/0/52
--BACnet ID 15 (AI) AUX TEMP UNRELIABLE
```

“Devices” Menu Options

The Devices menu is used to display all of the configured devices (A) or to “target” a specific device and get data about it.

(S)elect: Target a specific device. This allows you to work with ONE device, rather than them all. This is the FIRST thing you do when you want to look at one point, on one device, or control a point. First, you select the device, then go to the POINT menu, to select the point. (And if you want to control it, then go to the CONTROL menu, and issue controls to it)

Here’s how you would select device #2 (the second device on trunk #1):

```
DEV: (S)elect, (A)ll, (D)etail, (O)ff-line, (C)omms, (R)echar, (X)-it :S
```

```
DEV: You may select a DEVICE to target into.  
Enter a DEVICE number (1..240 or 0 for all): 2
```

```
Device #2 is now the targeted device.
```

(A)ll: View all configured devices. This is just a summary of the current status of all devices. In the following example, Device #62 is dead, but all the others are doing just fine:

```
DEV: (S)elect, (A)ll, (D)etail, (O)ff-line, (C)omms, (R)echar, (X)-it :A
```

```
B-GW Device: “Router-to-Network-1023” Scan Bitmap: 15 First Scan Complete.  
# 1 TagID: "P1#11, TRUNK 1" is ON-LINE & RELIABLE  
# 2 TagID: "P1#42, TRUNK 1" is ON-LINE & RELIABLE  
# 61 TagID: "P1 #1, TRUNK 2" is OFF-LINE! <MUST INIT> (SlowScan)  
# 62 TagID: "P1 #2, TRUNK 2" is ON-LINE & RELIABLE  
#121 TagID: "P1 #4, TRUNK 3" is ON-LINE & RELIABLE  
#122 TagID: "P1 #5, TRUNK 3" is ON-LINE & RELIABLE  
#123 TagID: "P1 #6, TRUNK 3" is ON-LINE & RELIABLE
```

(D)etail: Will display the following details of selected device.

```
DEV: (S)elect, (A)ll, (D)etail, (O)ff-line, (C)omms, (R)echar,, (X)-it :D
```

```
DEVICE #2 is field device/subdevice/type 42/0/2092  
Device Name: TEC #99  
Device Description: TEC #99, , Insurance Company  
Location: West Conference Room VAV  
# 2 TagID: "P1#42, TRUNK 1" is ON-LINE & RELIABLE  
I/O Trunk: 1, had last COMM at 17:13:12 on Mar 28, 2006  
Scan time (secs): 142. Device has 41 objects under it. First link =54
```

A note about the “Detail”. While the above example is for one device (you “Selected” one device), if you did not select a device (or selected 0 for the device number), then ALL the devices, in gory detail, are displayed. AND, as a bonus, you get the Gateway’s own details, as shown here:

```
DEV: (S)elect, (A)ll, (D)etail, (O)ff-line, (C)omms, (R)echar,, (X)-it :D
```

```
THIS GATEWAY (B-GW) is a BACNET "ROUTER-TO-DEVICE", to BACnet Network Number 269  
Device Name: Router-to-Network-269  
Description: Physical CP Gateway  
Location : Router-to-Network Device
```

```
DEVICE #1 is field device/subdevice/type 2/0/3  
Device Name: DI_Exp_EXH_Fans  
Description: MX22 #2; Trunk 1 (#1)  
Location : Boiler Plant  
# 1 TagID: "MX22 #2; Trunk 1 (BACnet #1)" is ON-LINE & RELIABLE  
I/O Trunk: 1, had last COMM at 13:46:37 on Jul 29, 2018  
Scan Time (secs): 54 Device has 12 objects under it; First Link #12
```

Etc...for all the other devices (so this can report be brutally long)

O)ffline: This will display the Offline status of devices. Hopefully none are, but if any are, they will be displayed in a list.

```
DEV: (S)elect, (A)ll, (D)etail, (O)ff-line, (C)omms, (R)echar,, (X)-it :O
```

```
# 61TagID: "P1 #1, TRUNK 2" is OFF-LINE! <MUST INIT> (SlowScan)
```

(C)omms: This will display communication statistics of the selected device.

```
DEV: (S)elect, (A)ll, (D)etail, (O)ff-line, (C)omms, (R)echar, (X)-it :C
```

```
#2 TagID: "P1 #42statistics:  
Packets Today: 101902  
RX Errors Today: 92 % Error: 0.090  
TX Errors Today: 509 % Error: 0.499  
Last Comm at: 17:13:26 on Mar 28, 2006
```

(R)echar: This will force a recharacterization (a Siemens word) of the selected device (just one!).

```
DEV: (S)elect, (A)ll, (D)etail, (O)ff-line, (C)omms, (R)echar, (X)-it :R
```

```
Device #3 on trunk #1 will be recharacterized..  
***** RECONFIGURATION STARTS! Trunk: 1 Device #3 P1 Address:20 *****  
***** RECONFIGURATION COMPLETE! Trunk: 1 Device #3 P1 Address:20 *****
```

“Point” Menu Options

The “Point” menu has four options, Select, All, Detail, and Every.

PNT: (S)elect, (A)ll, (D)etail, (E)very, (X)-it :

(A)ll: This will display all points and their current values for the targeted device. What follows below is an example from a Modbus gateway. A BACnet gateway will display the BACnet object type and Instance number in the first part of each line, rather than the Modbus register number). Data is the same for both gateway “flavors”, it is just the object mapping which is different in the two protocol systems (register addresses versus object type/instances).

PNT: (S)elect, (A)ll, (D)etail, (E)very, (X)-it :A

DEVICE #2 is field device/subdevice/type 42/0/2023

TagID: "TEC #42", has 41 objects under it, 1st one at: 55

```
-- MB Reg 30099 (AI) "      ERROR STATUS" Fld: 0 ==> 0.00
-- MB Reg 30098 (AI) "      LOOP TIME " Fld: 5 ==> 5.00
-- MB Reg 30097 (AI) "      DUCT AREA " Fld: 20 ==> 0.50
-- MB Reg 30096 (AI) "      CAL TIMER " Fld: 12 ==> 12.00
-- MB Reg 30095 (AI) "      CAL SETUP " Fld: 1 ==> 1.00
-- MB Reg 10394 (BI) "      CAL AIR " Fld: 0 ==> NO
-- MB Reg 30092 (AI) "      CTL STPT" Fld: 136 ==> 82.00
-- MB Reg 10387 (BI) "      CAL MODULE " Fld: 0 ==> NO
-- MB Reg 30059 (AI) "      DO DIR.REV " Fld: 0 ==> 0.00
-- MB Reg 30058 (AI) "      MTR SETUP " Fld: 5 ==> 5.00
-- MB Reg 30057 (AI) "      DPR2 ROT ANG" Fld: 90 ==> 90.00
-- MB Reg 30056 (AI) "      DPR1 ROT ANG" Fld: 90 ==> 90.00
-- MB Reg 30055 (AI) "      MTR2 TIMING " Fld: 90 ==> 90.00
-- MB Reg 30053 (AI) "      MTR2 POS " Fld: 0 ==> 0.00
-- MB Reg 30052 (AI) "      MTR2 COMD " Fld: 0 ==> 0.00
-- MB Reg 30051 (AI) "      MTR1 TIMING " Fld: 90 ==> 90.00
-- MB Reg 30049 (AI) "      MTR1 POS" Fld: 250 ==> 100.00
-- MB Reg 30048 (AI) "      MTR1 COMD " Fld: 250 ==> 100.00
-- MB Reg 446 (BO) "      DO 6" Fld: 0 ==> OFF
-- MB Reg 429 (BO) "      DAY.NGT " Fld: 1 ==> NIGHT
-- MB Reg 10325 (BI) "      DI 3" Fld: 0 ==> OFF
-- MB Reg 10324 (BI) "      DI 2" Fld: 0 ==> OFF
-- MB Reg 40120 (AO) "      OVRD TIME " Fld: 1 ==> 1.00
-- MB Reg 10319 (BI) "      DI OVRD SW " Fld: 0 ==> OFF
-- MB Reg 10318 (BI) "      WALL SWITCH " Fld: 0 ==> NO
-- MB Reg 414 (BO) "      STPT DIAL " Fld: 0 ==> NO
-- MB Reg 40112 (AO) "      RM STPT MAX " Fld: 124 ==> 79.00
```

```

-- MB Reg 40111 (AO) "      RM STPT MIN " Fld: 28 ==> 55.00
-- MB Reg 40109 (AO) "      NGT HTG STPT" Fld: 68 ==> 65.00
-- MB Reg 40108 (AO) "      NGT CLG STPT" Fld: 136 ==> 82.00
-- MB Reg 40107 (AO) "      DAY HTG STPT" Fld: 92 ==> 71.00
-- MB Reg 40106 (AO) "      DAY CLG STPT" Fld: 104 ==> 74.00
-- MB Reg 5 (BO) "          HEAT.COOL " Fld: 0 ==> COOL
-- MB Reg 30004 (AI) "      ROOM TEMP " Fld: 0 ==> <UNREL/BAD>
-- MB Reg 30002 (AI) "      APPLICATION" Fld: 2023 ==> 2023.00
-- MB Reg 30001 (AI) "      CTLR ADDRESS" Fld: 42 ==> 42.00

```

The display is slightly different for the BACnet flavor of this gateway, because BACnet uses Object Type/Instances rather than registers. The order is slightly different, but the data is identical. Here is the same display, in “BACyap” format:

```

PNT: (S)elect, (A)ll, (D)etail, (E)very, (X)-it :A

DEVICE #2 is field device/subdevice/type 42/0/2023
TagID: "TEC #42", has 41 objects under it, 1st one at: 55
--BACnet ID 99 (AI) "      ERROR STATUS" Fld: 0 ==> 0.00
--BACnet ID 98 (AI) "      LOOP TIME " Fld: 5 ==> 5.00
--BACnet ID 97 (AI) "      DUCT AREA" Fld: 20 ==> 0.50
--BACnet ID 96 (AI) "      CAL TIMER" Fld: 12 ==> 12.00
--BACnet ID 95 (AI) "      CAL SETUP " Fld: 1 ==> 1.00
--BACnet ID 394 (BI) "      CAL AIR" Fld: 0 ==> NO
--BACnet ID 92 (AI) "      CTL STPT" Fld: 136 ==> 82.00
--BACnet ID 387 (BI) "      CAL MODULE " Fld: 0 ==> NO
--BACnet ID 59 (AI) "      DO DIR.REV " Fld: 0 ==> 0.00
--BACnet ID 58 (AI) "      MTR SETUP " Fld: 5 ==> 5.00
--BACnet ID 57 (AI) "      DPR2 ROT ANG" Fld: 90 ==> 90.00
--BACnet ID 56 (AI) "      DPR1 ROT ANG" Fld: 90 ==> 90.00
--BACnet ID 55 (AI) "      MTR2 TIMING " Fld: 90 ==> 90.00
--BACnet ID 53 (AI) "      MTR2 POS " Fld: 0 ==> 0.00
--BACnet ID 52 (AI) "      MTR2 COMD " Fld: 0 ==> 0.00
--BACnet ID 51 (AI) "      MTR1 TIMING " Fld: 90 ==> 90.00
--BACnet ID 49 (AI) "      MTR1 POS" Fld: 250 ==> 100.00
--BACnet ID 48 (AI) "      MTR1 COMD " Fld: 250 ==> 100.00
--BACnet ID 446 (BO) "      DO 6" Fld: 0 ==> OFF
--BACnet ID 429 (BO) "      DAY.NGT " Fld: 1 ==> NIGHT
--BACnet ID 325 (BI) "      DI 3" Fld: 0 ==> OFF
--BACnet ID 324 (BI) "      DI 2" Fld: 0 ==> OFF
--BACnet ID 120 (AO) "      OVRD TIME " Fld: 1 ==> 1.00
--BACnet ID 319 (BI) "      DI OVRD SW " Fld: 0 ==> OFF
--BACnet ID 318 (BI) "      WALL SWITCH " Fld: 0 ==> NO
--BACnet ID 414 (BO) "      STPT DIAL " Fld: 0 ==> NO
--BACnet ID 112 (AO) "      RM STPT MAX " Fld: 124 ==> 79.00
--BACnet ID 111 (AO) "      RM STPT MIN " Fld: 28 ==> 55.00

```

--BACnet ID 109 (AO) "	NGT HTG STPT"	Fld: 68 ==>	65.00
--BACnet ID 108 (AO) "	NGT CLG STPT"	Fld: 136 ==>	82.00
--BACnet ID 107 (AO) "	DAY HTG STPT"	Fld: 92 ==>	71.00
--BACnet ID 106 (AO) "	DAY CLG STPT"	Fld: 104 ==>	74.00
--BACnet ID 405 (BO) "	HEAT.COOL "	Fld: 0 ==>	COOL
--BACnet ID 4 (AI) "	ROOM TEMP "	Fld: 0 ==>	<UNREL/BAD>
--BACnet ID 2 (AI) "	APPLICATION"	Fld: 2023 ==>	2023.00
--BACnet ID 1 (AI) "	CTLR ADDRESS"	Fld: 42 ==>	42.00
--BACnet ID 201 (AV) "	Analog Value 1 (user)"	Fld: 0 ==>	0.00
--BACnet ID 202 (AV) "	Analog Value 2 (user)"	Fld: 0 ==>	0.00
--BACnet ID 203 (AV) "	"K-Packets TX/RX Today"	Fld: 102 ==>	101.90
--BACnet ID 204 (AV) "	TX Error Rate"	Fld: 0 ==>	0.90
--BACnet ID 205 (AV) "	RX Error Rate"	Fld: 0 ==>	0.50
--BACnet ID 206 (AV) "	Scan Time"	Fld: 0 ==>	109.00

(S)elect: With Select, you can target a specific point for the Device that you have targeted using the “Devices” menu. This, along with the DEVICE that you have selected, now uniquely defines a point of interest to you. Here is what the MODBUS version of select looks like:

```
PNT: (S)elect, (A)ll, (D)etail, (E)very, (X)-it :S
PNT: You may select an OBJECT ID to target into.
      Enter a valid, existing, Object ID (1 to 49999) : 30001
The object at ID #30001 is now selected.
```

The BACnet version is slightly different. You have to select the object TYPE and ID for BACnet, to uniquely specify an object. Here is what the BACnet version of select looks like:

```
PNT: (S)elect, (A)ll, (D)etail, (E)very, (X)-it :S
PNT: You may select an OBJECT ID to target into.
      Enter an existing BACnet Object TYPE/ID (0 to 4, 1 to 1000) : 0, 1
The object with TYPE 0 and Object ID #1 is now selected.
```

You have to remember that BACnet types are an “enumerated value” (in BACnet-speak). These are, for those who don’t remember such minutiae:

- 0 = AI
- 1 = AO
- 2 = AV
- 3 = BI
- 4 = BO

(D)etail: will display details associated with the selected point, for MODBUS points:

```
PNT: (S)elect, (A)ll, (D)etail, (E)very, (X)-it :D

MB Address: 30004, Type = AI, "Zone Temperature"
Field Unit / Subunit : 4 / 0 Field Address :30001
Object Flags / Errors : 0 / 0
Field In / Out Counts : 0 / 0 Field Value : 0.000
Field Lo / Hi Range : 0.000 / 255.000
Eng. Units : Deg F.
```

(D)etail: will display details associated with the selected point, for BACnet points, in a format like this:

```
PNT: (S)elect, (A)ll, (D)etail, (E)very, (X)-it :D

BACnet Object ID = 112, Type = AO
Object Name: "RM STPT MAX"
Description: "Room Setpoint Maximum"
...No elements in priority/control array
...BACnet Relinquish Default Value: NULL
Field Unit / Subunit : 42 / 0 Field Address :40012
Object Flags / Errors : 3 / 0
Field In / Out Counts : 124 / 0 Field Value : 79.000
Field Lo / Hi Range : 48.000 / 0.250
Eng. Units : Deg F.
```

(E)veryl: this displays the SAME point that you selected (with the "S" menu option), on EVERY device under the Gateway. This is useful, say, when you want to know what all the VAVs think their zone temperature is, or what the damper or valve positions are, or the error rates. Say we want to look at all the zone temps (and have selected AI #4 previously. The "E" command will display one line per device with data for the selected point, in a format like this:

```
PNT: (S)elect, (A)ll, (D)etail, (E)very, (X)-it :E

Device #1 = P1 Unit #2 Obj_ID: (AI) 4 Value : 72.250 DEG F
Device #3 = P1 Unit #20 Obj_ID: (AI) 4 Value : 75.250 DEG F
Device #6 = P1 Unit #47 Obj_ID: (AI) 4 Value : 63492.000 UNITS<UNREL:7>
Device #61 = P1 Unit #9 Obj_ID: (AI) 4 Value : 74.500 DEG F
Device #62 = P1 Unit #20 Obj_ID: (AI) 4 Value : 72.750 DEG F
Device #63 = P1 Unit #31 Obj_ID: (AI) 4 Value : 72.000 DEG F
Device #121 = P1 Unit #3 Obj_ID: (AI) 4 Value : 65.083 DEG F
Device #122 = P1 Unit #7 Obj_ID: (AI) 4 Value : 73.500 DEG F
Device #123 = P1 Unit #20 Obj_ID: (AI) 4 Value : 52.000 DEG F
Device #124 = P1 Unit #42 Obj_ID: (AI) 4 Value : 75.000 DEG F
Device #125 = P1 Unit #69 Obj_ID: (AI) 4 Value : 74.250 DEG F
```

```
Device #181 = P1 Unit #55  Obj_ID: (AI) 4 Value : 89.500 DEG F
Device #182 = P1 Unit #66  Obj_ID: (AI) 4 Value : 76.250 DEG F
Device #183 = P1 Unit #77  Obj_ID: (AI) 4 Value : 87.000 DEG F
```

“Control” Menu Options

This is slightly different for Modbus and BACnet. In BACnet, you control things at sixteen different priority levels, and you can “release” control from any particular level.

Let’s consider the simpler, Modbus case first. Control just “happens” when you select a point and give it a new value. No priorities at all. The last control to a point “wins”, and stays until some other control is given to that point.

Now, before you can control a point object you must first have selected a device number and point number (see Modbus point map, Chapter 3).

(S)elect: Use this to select a valid point. Here is the Modbus variant:

```
CTL: (S)elect, (C)ontrol, (D)etail, (X)-it :S
```

```
CTL: You may select an OBJECT ID to target into.
Enter a valid, existing, Object ID (0 to 49999) : 11
```

```
The object at ID #1 is now selected.
```

And, here is the BACnet variation on the same theme:

```
CTL: (S)elect, (P)riority, (C)ontrol, (R)elease, (D)etail, (X)-it :S
```

```
CTL: You may select an OBJECT ID to target into.
Enter a valid, existing, BACnet Object TYPE/ID (0 to 4), (1 to 16000): 1,114
```

```
The object with Type 1 and Instance #114 is now selected.
```

(C)ontrol: (MODBUS version). This option will let you control the selected point. Here is a simple MODBUS example of a digital point control to “off” (zero):

```
CTL: (S)elect, (C)ontrol, (D)etail, (X)-it :C
```

```
CTL: You may enter a new value to set the selected object to.
Enter a field value (0 or 1 for digitals; valid number for analogs) : 0
```

```
The new value of the object will be : 0
Adding to Control Queue, at #2. MB #1, Register: 1
```

OK...so much for simple. Now let's talk about BACnet (alias BADnet). There are sixteen priorities. These are given below:

Priority	BACnet Default	Comments
1	Manual Life-Safety	User-Emergency use only!
2	Automatic Life-Safety	Critical! (Programmatic; no mins)
3	Miscellaneous	
4	Miscellaneous	
5	Critical Equipment Control	Commonly: Demand Limiting
6	Minimum On/Off	Commonly: "Minimum on/off"
7	Custom Programming—High	Custom Programming—High Pri.
8	Manual Operator	Standard "Operator Control"
9	VAV Air Systems	Commonly: VAV "group" control
10	Chiller Plant Control	Usually Chiller Plant Control
11	Area Control	Usually: Area Control (non-VAV)
12	Manual Operator—Low	Infrequently used
13	Miscellaneous	
14	Timed-Override	Overrides a "standard" schedule
15	Time-of-Day Scheduling	Time-of-Day Scheduling
16	Custom Programming—Low	Custom Programming—Low Pri.
N/A	Relinquish Default	Relinquish Default

Note in the "Comments" we have given what the majority of control systems use for their "Default" was for the priorities in question. This is informational only, but might help.

Each controllable point in BACnet (that is, an AO or a BO) has a "priority array" which is generally sparsely populated. Nothing in a particular priority level is specified by "Null", which means that priority level is unused.

As an example, consider a warehouse exhaust fan which is turned on and off by a time schedule at priority 15. In a demand-limiting situation, this point may also have control at priority 5 (shut down ancillary systems in energy peak situations). But programmatically, a logic block that detects a fire might want to override everything and keep the fan on in order to pressurize an area and keep the fire from spreading, so that might be at priority 2. When control is "released" from the higher levels, the next lowest control is issued. Hence, after the fire is over, the fan that was overridden ON might go OFF from its priority 7 demand-limiting shutdown. But if that priority 7 control had been released, then the control descends to the priority 15 time-schedule control. You have to know what your plant's priority system is, and what each point's capabilities and control options are—this is not a trivial control philosophy!

The "Relinquish Default" value, if any is specified, is the control that is given out to a point if there is NOTHING in this priority array (that is, all 16 levels of control have been released). If there is no "Relinquish Default" value (i.e., "NULL"), then the point just sits there, at it's last control; the Gateway also issues a RELEASE command to the TEC for that point (this is important! This is

the only way that a TEC can go back to “automatic mode” for its control points. If you want the TEC to modulate the damper itself (as it normally would), then you must make sure you have NO RELINQUISH DEFAULT VALUE. We stress this, because many systems “automatically” give you some value for the relinquish default. That’s fine for something that the TEC would not control, but for its valves and dampers and other AO points that the internal logic would control, you can’t have a RELINQUISH DEFAULT value! In the template files that Centaurus Prime provides, we indicate in the seventh column (labeled “ACTION”) if a point is an OUTPUT point (via the “W”, for “Writable” parameter, and if that point is OVERRIDEABLE and RELEASABLE (via the “O” for “Overridable” parameter). As a general rule, if a point can be overridden and released, it should have NULL for the Relinquish Default.

Now, before you can control a point object you must first have selected a device number , a point type/instance, and a priority. Then you can set the control value, and that value will go into the object’s priority-array. That does NOT mean that control will be issued, remember, since you may be at a lower priority level than what is controlling the point right now.

(P)riority: (BACnet ONLY) Use this to select the priority that you will issue subsequent control and release operations at.

CTL: (S)elect, (P)riority, (C)ontrol, (R)elease, (D)etail, (X)-it :P

PRI: Enter a PRIORITY to do your controls at (1 to 16): 4

Control and Release Operations will now be done at Priority 4.

(C)ontrol: (BACnet version) This option will let you control the selected point, at whatever priority level you are currently at.

CTL: (S)elect, (P)riority, (C)ontrol, (R)elease, (D)etail, (X)-it :C

CTL: You may enter a new value to set the selected object to.

Enter a field value (0 or 1 for digitals; valid number for analogs) : 70

The new value of the object will be : 0

Adding to Control Queue, at #2. Device #6, AO #114

Queued Control; Trunk #1, Device #6, AO #114 -- to: 70.000 pri = 4

(R)elease: This option will let you release control for the selected point at your selected priority level (valid for the BACnet variant of the Gateway, only!):

CTL: (S)elect, (P)riority, (C)ontrol, (R)elease, (D)etail, (X)-it :R

RLS: Are you sure that you want to RELEASE this object?

ARE YOU SURE? If so, enter Y for Yes, and then the ENTER key.

(or any other keys if you do NOT want to RELEASE the object) : Y

The object AO #114 has been released from Priority #4.

(D)etail: will display details associated with the selected point.. Let's first look at a Modbus version of an object's detail:

CTL: (S)elect, (P)riority, (C)ontrol, (R)elease, (D)etail, (X)-it :D

MB Address: 30001, Type = AI, "Zone Temperature"
Field Unit / Subunit : 4 / 0 Field Address :30001
Object Flags (bits) : 0 Error Counter :0
Field In / Out Counts : 0 / 0 Field Value : 0.000
Field Hi / Lo Range : 255.000 / 0.000 Eng. Units : Deg F.

And this is what is displayed for an example BACnet controllable object that has been released from all controls (note the line that says "No elements in priority/control array"):

CTL: (S)elect, (P)riority, (C)ontrol, (R)elease, (D)etail, (X)-it :D

BACnet Obj_ID 113, Type = AO
Object Name: "COOL FLOW MAX SPT"
Description: "Maximum Cooling Flow SPT"
...No elements in priority/control array
...BACnet Relinquish Default Value: 65.000
Field Unit / Subunit : 4 / 0 Field Address :30051
Object Flags / Errors : 0 / 0
Field In / Out Counts : 67 / 67 Field Value : 67.000
Field Hi / Lo Range : 0.000 / 1.000
Engineering Units : Percnt

Had any priorities have controls in them, it would have displayed the priority and the control value, for EACH priority level.

“Watch” Menu Options

The “Watch” menu will let you select various methods for monitoring the real time data from the field.

(Q)uiet: Use the (Q) key to halt any of the following monitoring options.

(1),(2),(3),(4) to Watch Trunks: Enter the number of a P1 trunk to monitor (1-4). This will display the field scan of all Trunk devices and the status of their points in real time. What is displayed

below is the Modbus variant (it shows the register numbers in the second column); the BACnet variation is the same except it shows the BACnet object instances in the second column:

```
WCH: (Q)uiet, (1),(2),(3),(4) to watch trunks; (V)erbose, (M)odbus, (X)-it :1
```

```
*** TRUNK 1 is now being MONITORED ***
==POLL: Trunk #1, Device #1, P1 Unit #4 Type: MPU = 1
==SCAN: Trunk #1, Device #1, P1 Unit #4 Point #4
P1 #1, AI 4 KWH Usage Counts = 128 = 524.15 KWH
==POLL: Trunk #1, Device #2, P1 Unit #42 Type: 2023
==SCAN: Trunk #1, Device #2, P1 Unit #42 Point #20
P1 #1, AI 120 Override Time Counts = 1 = 1.00 Hours
==POLL: Trunk #1, Device #3, P1 Unit #65 Type: 2092
==SCAN: Trunk #1, Device #3, P1 Unit #65 Point #19
P1 #1, BI 319 DI Override Switch Counts = 0 = Off
...etc...
```

(V)erbose: When (V) is pressed while in monitor mode, the full protocol data packets will be displayed as well for each scanned device.

```
*** Now in VERBOSE MODE (full packets) for monitored trunks
```

```
==POLL: Trunk #1, Device #1, P1 Unit #4 Type: MPU = 1
-TO Trunk 1: 16 04 04 02 EC B8
-FRM Trunk 1: 16 05 01 15 FB 57 7C <Valid>
==SCAN: Trunk #1, Device #1, P1 Unit #4 Point #4
-TO Trunk 1: 16 05 04 06 08 BE 77
-FRM Trunk 1: 16 06 04 06 88 00 1C B3 <Valid>
P1 #1, AI 4 KWH Usage Counts = 128 = 524.15 KWH
==POLL: Trunk #1, Device #2, P1 Unit #1 Type: 2023
-TO Trunk 1: 16 04 01 02 C5 D8
-FRM Trunk 1: 16 05 01 15 FB 57 DC <Valid>
==SCAN: Trunk #1, Device #2, P1 Unit #1 Point #20
-TO Trunk 1: 16 04 63 02 EC B8
-TIMEOUT on Trunk: 1, error count = 0
...etc...
```

(M)odbus: When (M) is pressed while in monitor mode, the full Modbus RTU data packets will be displayed as well for each scanned device (Modbus version only).

(B)ACnet: When (B) is pressed while in monitor mode, the full BACnet protocol data packets (addressed globally or to this gateway only) will be displayed in real-time. Note that this *significantly* slows down the BACnet channel, and we recommend that this mode NOT be utilized for any length of time.

Uploading and Downloading files to the Gateway

In order to upload/download files to the Gateway, you will need to use a VT-100 Terminal emulator (Hyperterminal, TeraTerm or the like). You will need to set it up to use a Comm Port (Comm1 typically) and use the following settings: Baud=9600, Databits=8, Stop bits=1, Parity=None, and no Flow Control.

While many terminal emulator programs work well (ProComm, PowerTerm, HyperAccess, etc.), some should be put into the Smithsonian, and may or may not run well with current operating systems. Our favorite terminal emulator program is TeraTerm, for several reasons: (1) it's FREE, and we like free stuff, (2) it is open source and updated frequently, and (3) it just works! You can download TeraTerm, free, from: <https://tera-term.en.sofonic.com>. And did we mention: FREE!

As a side note: PuTTY ("Putty") does NOT work, since it has no X-modem file transfer, just telnet. Sorry, you old grizzled Unix hackers, but it's even too ancient for us!

The Gateway has two utilities for transferring files. **UP.COM** is used to send files **to** the Gateway and **DOWN.COM** is used to received files **from** the gateway. ***Remember this!!!!***

One other word of wisdom: unplug the Ethernet while you do a file transfer. A very busy Ethernet will impact the file transfer process, and give errors (so many sometimes, that the file transfer fails).

When you are connected to the gateway in local mode, hit X-it once or twice and you will be asked to type "YES" to quit the program which will take you to DOS prompt. (After you hit the space bar when it requests you to; you have ten seconds to do that, to get into DOS).

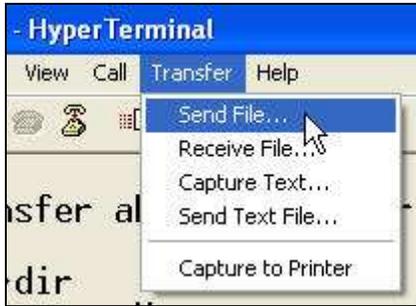
Sending a file to the Gateway (uploading):

From the dos prompt, you must type "UP filename" (filename being the name of the file to send with extension). The response will look like the following.

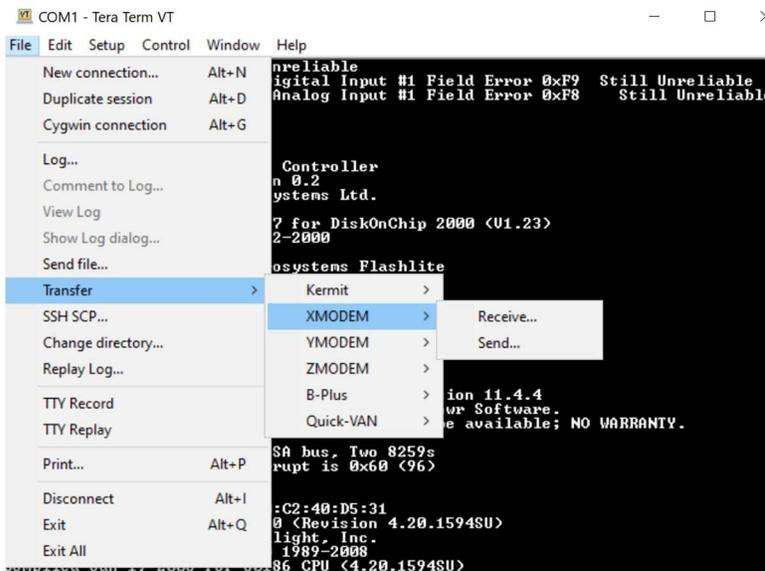
```
C:\>up test.txt
Ready, start X-modem upload now,
Press CNTL-C to abort...
.....
```

In Hyperterminal, start the file transfer by selecting **Transfer/Send File...** and follow the following sequence below.

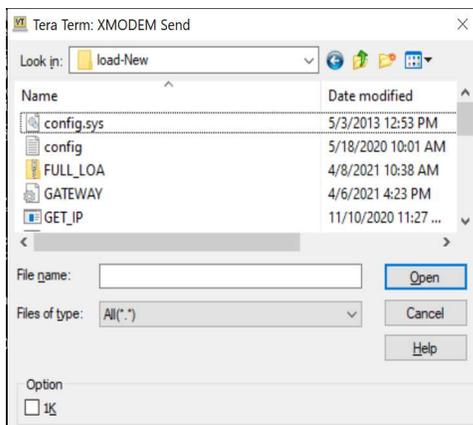
Click Transfer > Send File: Browse for file to send and make sure that Xmodem is selected. Click the send button and the file will be sent to the Gateway.



To do the same thing with TeraTerm, start the file transfer by selecting **Transfer/Xmodem/Send...** and follow the following sequence below.



When you select “Send...”, then a dialog box pops up asking you what file you want to send. It looks like this:



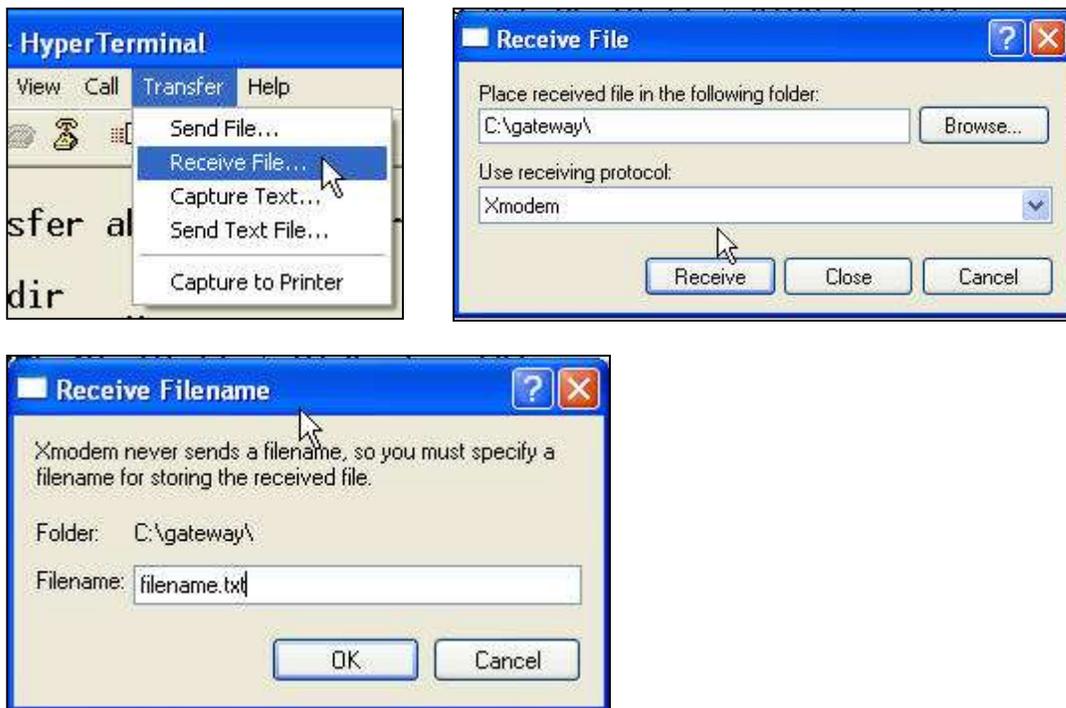
Do NOT use the “1K” option, and when you click “Open”, the file transfer will start.

Receiving a file from the Gateway (downloading):

From the dos prompt, you must type “DOWN filename” (filename being the name of the file to receive with extension). The response will look like the following.

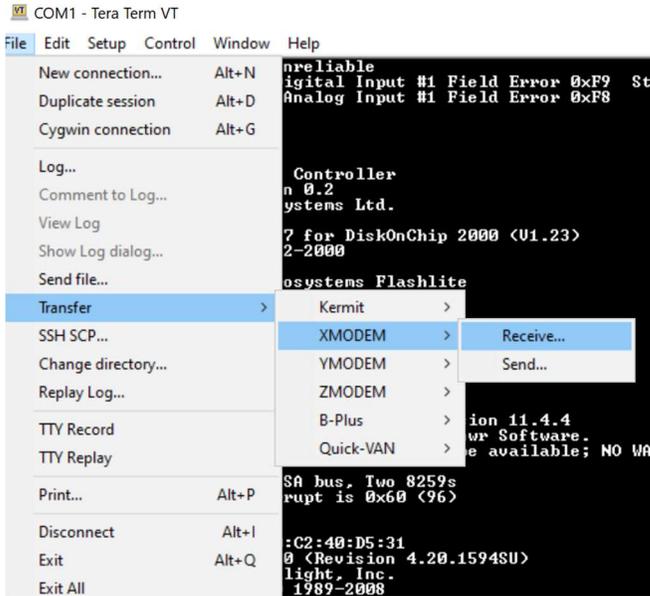
```
C:\>down disc_1.txt
Ready, start X-modem download now..
```

In Hyperterminal, start the file transfer by selecting **Transfer/Receive File...** and follow the following sequence below.

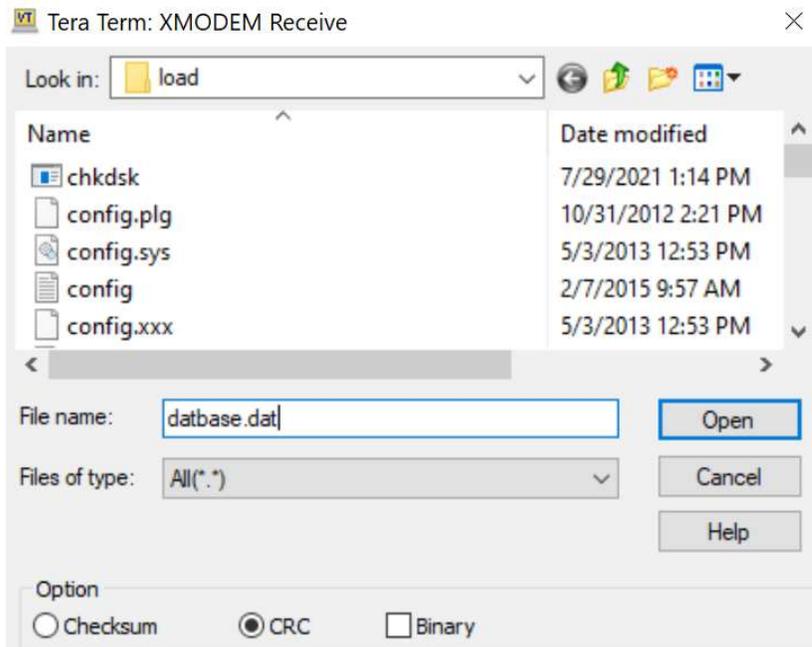


Click Transfer > Receive File: Enter the location to save the file and make sure that Xmodem is selected and then click the Receive button. The next dialog box will ask you to specify a filename and when you click “OK” the file will be received from the Gateway.

In TeraTerm, start the file transfer by selecting **Transfer/Xmodem/Receive...** from the top TeraTerm menu, like this shows:



Then, you are given a dialog box that looks like this:



Be SURE to look at the bottom three options: only the “CRC” should be checked!!!

Setting up the Modbus Driver

After the Gateway is ready to go and you have your database configured, one of the last steps is to make sure that you have the Modbus driver settings for the Host/Master setup correctly. The following information should be kept in mind when configuring the driver

Modbus commands that are accepted by the Gateway are:

- 1 - Read Coils (0000's)
- 2 - Read Discretes (10000's)
- 3 - Read Holding Registers (40000's)
- 4 - Read Input Registers (30000's)
- 5 - Force Single Coil
- 6 - Preset Single Register
- 7 - Read Exception Status (Status is 0 if OK; o/w internal error-code)
- 15 - Force Multiple Coils
- 16 - Preset Multiple Registers
- 17 - Report Slave ID (Emulates Modicon Micro-84)

Most Modbus drivers have many setup options and each vendor is different. Following are some limits with the Modbus Gateway that you need to consider when setting up your driver.

```
MAXIMUM number of coils read at once (CMD #1) is 64
MAXIMUM number of discretes read at once (CMD #2) is 64
MAXIMUM number of holding registers read at once (CMD #3) is 32
MAXIMUM number of input registers read at once (CMD #4) is 32
MAXIMUM number of coils forced at once (CMD #15) is 8
MAXIMUM number of registers preset at once (CMD #16) is 8
```

```
TIMEOUT for a command should be a minimum of 350 milliseconds
(500 ms recommended)
```

```
TIME BETWEEN commands should be a minimum of 50 milliseconds (100
ms recommended)
```

```
NUMBER OF TIMEOUTS before "slow polling" should be a minimum of 3
(3recommended)
```

BE SURE you have the IP address of the P1 Gateway set up correctly in the Modbus driver (most drivers require a static IP, for this reason), and that the connection is TCP/IP and uses **port 502** (default for Modbus).

Setting up the BACnet System

After the Gateway is ready to go and you have your database configured, one of the most important steps is to make sure that you have your BACnet system configured properly to communicate with the Centaurus Prime Gateway.

The most important parameter that some BACnet systems need to know is whether a device supports READ-MULTIPLE and WRITE-MULTIPLE services. The Centaurus Prime Gateways only support READ-MULTIPLE, not WRITE-MULTIPLE services. All Centaurus Prime Gateways conform to the BACnet “PICS” statement published and available on our web site, www.CentaurusPrime.com.

While some systems have different interpretations of how the source and destination are specified in a BACnet packet, some things are pretty much true on all systems:

- (1) Every Gateway should have a unique BACnet network number, to avoid conflicts. This applies to Centaurus Prime Gateways, but also to any other gateway devices on your system. This is set by the **BACNET_NETWORK** line in the GATEWAY.INI file.
- (2) Every Centaurus Prime Gateway should have an offset value so that no other BACnet device on the network is within the range of that **BACNET_OFFSET** value to **BACNET_OFFSET + 255**.
- (3) The head-end system must be configured to be “BACnet” enabled. On Johnson systems, this means that the “site” checkbox for BACnet must be set, then all JCI controllers restarted. For Siemens, the appropriate drivers must be installed (Cimetrix stack). For Trane, anything used from or to the BCUs must be “exposed” as BACnet objects.
- (4) Some systems default their controllers to some value (e.g., JCI uses 500; Siemens uses 7000). You should review your system to make sure that no two BACnet devices have the same BACnet device ID. *This WILL cause conflicts!*
- (5) Depending upon the system, some systems require that the controllers communicating to the Gateways have unique BACnet network numbers, also. Consult your vendor’s technical support desk on this.

Typically, installers have chosen the **BACNET_NETWORK** to be a certain number, and then made the **BACNET_OFFSET** to be 1000 times that number; so that the BACnet instance numbers of the devices are all prefixed by the network number. As an example, if you set the **BACNET_NETWORK** number to 333 and the **BACNET_OFFSET** to 333000, then you would end up with BACnet device numbers 333001, 333002, 333003, etc., on network #333. Makes it simple, no? Just a suggestion!

DO NOT over-tax the BACnet network! At about 30 BACnet/IP packets per second directed **TO THE GATEWAY**, the Gateway will saturate; any more packets than that, and they are lost. Any more than that will cause retries and actually SLOW DOWN the BACnet system! This is because BACnet/IP is a “connectionless” system—the requestor sends a packet to the Gateway, and the network gives it a “best effort” to deliver it. If the network is saturated, and our Gateway does not receive the packet, the requestor has to time-out, and then retries its request packet. This may mean that control logic will “stall” (depending upon the software implementation in the controller) until that retry occurs.

A Few Words About Controls

The TEC devices are not state-of-the-art: they were designed in the 1980's and 1990's. The trunks are 4800 baud, which is not really speedy by today's 100-Megabaud standards. As such, their controls are "leisurely" and have several limitations. We want you to be aware of these limits when you design your logic and controls in your front-end system.

First, you should NOT just continuously write output values to the controllers. Most of the parameters you WRITE (that is, AO and BO points) are not only changing things within the RAM of the TEC controller, but that value is also written to EPROM. This is "safe", because the last thing you wrote to a TEC device it remembers (usually), and that value is what is used when it has a power-bump or failure and reboots. But, the EPROM used in some of the TEC device designs was never designed to take more than 100,000 writes (but they would usually last 250,000 to 500,000). Now, if you write to a parameter once per minute, that is 1440 times per day, or 525,600 times per year. Ooops...it's easy to see that continuously bumping a setpoint is a bad idea: the EPROM can fail in less than a year. We think that you should write to EPROM only on a "significant" change, and only when really necessary.

Second, some of the parameters are "modes", and are mapped as BI/BO points. For example, the Occupied and Unoccupied modes for a VAV is really controlling the fan, modulating dampers, turning heating and cooling ON as needed, etc. TEC devices have "occupied" as their default control mode, and it is their power-up state.

Third, and most important, do NOT re-control any AO or BO object continuously. Controls take priority over scanning, and the Gateway interrupts the scanning cycle to perform controls. There is a queue (huge; 1000 controls!) that host controls are put in, and the Gateway issues these controls in the order received. If your logic is such that you continuously control a setpoint to the same value, or a BO to OFF continuously, those redundant commands will go out to the field equipment, over and over again, taking time on the trunk. You should always use "deadbands" in your logic that only issues controls when things change "enough", and do NO continuous re-control.

We also wish to stress what we mentioned previously about RELINQUISH DEFAULT values in the BACnet priority array. For anything that you want to set-and-forget, and that the TEC would never change itself, it is fine to have a RELINQUISH DEFAULT value. But if the point is one that the TEC would normally change (a valve, a damper, fan on/off, heater controls, etc.) then do NOT have a RELINQUISH DEFAULT (it must be NULL), as that is the only way that the TEC will be given a RELEASE command, to restore automatic control, if there is no BACnet control values in the 16-element control array and a NULL in the "RELINQUISH DEFAULT".

TEMPLATE Files

You need to download to the Gateway and “regular” and “custom” templates that will be used in your building. Say that you had a system with a couple DPUs and many TECs. Perhaps you have several VAV box types, like this:

- Many Application 2021 TECs (cooling only VAV for internal zones)
- Many Application 2022 TECs (VAVs with baseboard or electric reheat)
- A few 2051 TECs (Blower coils)
- One Application 2384 (I/O only--to handle a rooftop unit with it's own controls)

You would have to download (at least) the following templates to the Gateway: TPL_2021.CSV, TPL_2022.CSV, TPL_2051.CSV, and TPL_2384.CSV. Note the extension: CSV means “comma separated variable”, which is a standard text-type spreadsheet file. Because it is a text file, you can edit these files with either a simple text editor or a spreadsheet program. If you do edit it with a spreadsheet, some spreadsheets (like Excel) will give you the option to save the file in their own internal format (e.g., .XLS format). **DO NOT DO THIS!** Keep the file in text format (.CSV), so that it is transferable and readable by the Gateway.

Standard Templates, and Customizing Them:

Centaurus Prime supplies these TEMPLATE files. You can obtain them by contacting us, either by e-mail or telephone, and we will e-mail any that you need back to you.

Let's look at one of these template files, for example, TPL_2021.CSV

```
// Application #2021 (Simple VAV; cooling OR heating)
//
//Type,Point,Siemens Name,0-Units/Int.,1-Units/Slope,Ana. Units,Action,Sensible Name,Comments
//
AO, 2, APPLICATION , 0, 1, APP, ,Application Number ,
AI, 4, ROOM TEMP , 48, 0.25, DEG F, ,Room Temperature ,
BO, 5, HEAT.COOL , COOL, HEAT, , ,Heating/Cooling Status ,
AO, 6, DAY CLG STPT, 48, .25, DEG F, w,Occupied Cooling Setpoint ,
AO, 7, DAY HTG STPT, 48, 0.25, DEG F, w,Occupied Heating Setpoint ,
AO, 8, NGT CLG STPT, 48, 0.25, DEG F, w,Unoccupied Cooling Setpoint,
AO, 9, NGT HTG STPT, 48, 0.25, DEG F, w,Unoccupied Heating Setpoint,
AO, 11, RM STPT MIN , 48, 0.25, DEG F, w,Room Setpoint Minimum ,If dial exists
AO, 12, RM STPT MAX , 48, 0.25, DEG F, w,Room Setpoint Maximum ,If dial exists
AI, 13, RM STPT DIAL, 48, 0.25, DEG F, ,Setpoint Dial Setting ,If dial exists
BO, 14, STPT DIAL , NO, YES, , w,Setpoint Dial Control ,If dial exists
AI, 15, SUPPLY TEMP , 37.5, 0.5, DEG F, ,Supply Temperature ,
BO, 18, WALL SWITCH , NO, YES, , w,Wall Switch Control ,if DI2 used this way
BI, 19, DI OVRD SW , OFF, ON, , ,Override Switch Status ,if existant
AO, 20, OVRD TIME , 0, 1, HRS, w,Override Time ,if existant
BO, 21, CLG OVRD , DAY, NIGHT, , ,Night Override Control ,Use as BI
BI, 24, DI 2 , OFF, ON, , ,DI 2 ,If not used for #18
BO, 29, DAY.NGT , DAY, NIGHT, , w,Occ/Unocc Control ,
AO, 31, CLG FLOW MIN, 0, 4, CFM, w,Cooling Flow Minimum ,
AO, 32, CLG FLOW MAX, 0, 4, CFM, w,Cooling Flow Maximum ,
AO, 33, HTG FLOW MIN, 0, 4, CFM, w,Heating Flow Minimum ,
AO, 34, HTG FLOW MAX, 0, 4, CFM, w,Heating Flow Maximum ,
AI, 35, AIR VOLUME , 0, 4, CFM, ,Air Volume ,
AO, 36, FLOW COEFF , 0, 0.01, CFM, ,Flow Coeff. (Calib.) ,Danger--Config ONLY
AO, 37, MTR3 COMD , 0, 0.4, PCT,wO,Motor3 Command ,
AO, 38, MTR3 POS , 0, 0.4, PCT, ,Motor3 Position ,Use as AI
```

```

AO, 39, MTR3 TIMING , 0, 1, SEC, ,Motor3 Timing Setup ,Danger--Config ONLY
BO, 41, DO 1 , OFF, ON, ,WO,DO 1 ,Usually w/DO2 (Motor1)
BO, 42, DO 2 , OFF, ON, ,WO,DO 2 ,Usually w/DO1 (actuator)
BO, 43, DO 3 , OFF, ON, ,WO,DO 3 ,Usually w/DO4 (Motor2)
BO, 44, DO 4 , OFF, ON, ,WO,DO 4 ,Usually w/DO3 (actuator)
BO, 45, DO 5 , OFF, ON, ,WO,DO 5 ,Usually w/DO6 (Motor3)
BO, 46, DO 6 , OFF, ON, ,WO,DO 6 ,Usually w/DO5 (actuator)
AO, 48, DMPR COMD , 0, 0.4, PCT,WO,Damper Command ,
AO, 49, DMPR POS , 0, 0.4, PCT, ,Damper Position ,Use as AI
AO, 51, MTR1 TIMING , 0, 1, SEC, ,Motor1 Timing Setup ,Danger--Config ONLY
AO, 52, MTR2 COMD , 0, 0.4, PCT,WO,Motor2 Command ,
AO, 53, MTR2 POS , 0, 0.4, PCT, ,Motor2 Position ,Use as AI
AO, 55, MTR2 TIMING , 0, 1, SEC, ,Motor2 Timing Setup ,Danger--Config ONLY
AO, 56, DMPR ROT ANG, 0, 1,DEGREES, ,Damper Rotation Angle ,Danger--Config ONLY
AO, 58, MTR SETUP , 0, 1, CODE, ,Motor Setup ,Danger--Config ONLY
AO, 59, DO DIR. REV , 0, 1,0=DIRCT, ,Forward/Reverse Setup ,Danger--Config ONLY
AO, 61, COOL TEMP , 37.5, 0.5, DEG F, w,Heat-to-Cool Switch Temp ,Ref: DA temp
AO, 62, HEAT TEMP , 37.5, 0.5, DEG F, w,Cool-to-Heat Switch Temp ,Ref: DA temp
AO, 63, CLG P GAIN , 0, 0.25, P-GAIN, w,Cooling P-Gain ,
AO, 64, CLG I GAIN , 0, 0.001, I-GAIN, w,Cooling I-Gain ,
AO, 65, CLG D GAIN , 0, 2, D-GAIN, w,Cooling D-Gain ,
AO, 66, CLG BIAS , 0, 0.4, PCT, w,Cooling Bias ,
AO, 67, HTG P GAIN , 0, 0.25, P-GAIN, w,Heating P-Gain ,
AO, 68, HTG I GAIN , 0, 0.001, I-GAIN, w,Heating I-Gain ,
AO, 69, HTG D GAIN , 0, 2, D-GAIN, w,Heating D-Gain ,
AO, 70, HTG BIAS , 0, 0.4, PCT, w,Heating Bias ,
AO, 71, FLOW P GAIN , 0, 0.05, P-GAIN, w,Flow P-Gain ,
AO, 72, FLOW I GAIN , 0, 0.001, I-GAIN, w,Flow I-Gain ,
AO, 73, FLOW D GAIN , 0, 2, D-GAIN, w,Flow D-Gain ,
AO, 74, FLOW BIAS , 0, 0.4, PCT, w,Flow Bias ,
AO, 75, FLOW , 0, 0.25, PCT, ,Flow ,Use as AI
AO, 76, CTL FLOW MIN, 0, 4, CFM, ,Control Flow Min Calc ,Use as AI
AO, 77, CTL FLOW MAX, 0, 4, CFM, ,Control Flow Max Calc ,Use as AI
AO, 78, CTL TEMP , 48, 0.25, DEG F, w,Control Temp Calc ,Use IFF Rm Tmp fails
AO, 79, CLG LOOPOUT , 0, 0.4, PCT, ,Cooling Loop Output Calc ,Use as AI
AO, 80, HTG LOOPOUT , 0, 0.4, PCT, ,Heating Loop Output Calc ,Use as AI
BO, 84, DMPR STATUS , CAL, RECAL, , ,Calibration Adjustment ,Use as BI
BO, 87, CAL MODULE , NO, YES , , ,Calibration Mode ,AutoZero enabled
AO, 91, TOTAL VOLUME, 0, 4, CFM, w,Total Volume ,Totalized; Reset to 0
AO, 92, CTL STPT , 48, 0.25, DEG F, ,Control Setpoint Calc ,Use as AI
AO, 93, FLOW STPT , 0, 0.25, PCT, ,Flow Setpoint Calc ,Use as AI
BO, 94, CAL AIR , NO, YES, , w,Calibration Air ,Calibrates Velocity
AO, 95, CAL SETUP , 0, 1, CODE, ,Calibration Setup ,Danger--Config ONLY
AO, 96, CAL TIMER , 0, 1, HRS, ,Calibration Timer ,Danger--Use as AI
AO, 97, DUCT AREA , 0, 0.025, SQ. FT, ,Duct Area ,Danger--Config ONLY
AO, 98, LOOP TIME , 0, 1, SEC, ,Loop Time ,Use as AI
AO, 99, ERROR STATUS, 0, 1, CODE, ,Error Status Code ,Use as AI

```

This is ALL the valid points that can come from this particular device (using this application number, #2021). That does not mean that ALL these points are used, nor does it mean that you should map ALL the points. Some can never (or should never change), such as point #2 (the application number), points #36, 39, 97, etc. The calibration-only points (rotation travel, motor timing parameters, duct square area, etc.) will NOT change. And if they do, it is because the hardware has changed. Then these parameters should be changed by the hand-held calibration device or a laptop with DataMate (the Siemens/Landis software to setup, calibrate, and commission the TECs). It is recommended that you NOT put these points in the database, so that the user is not tempted to try to mess with them from their control room La-Z-Boy recliner.

One philosophy is to put all points in the Gateway (i.e., keep these files just as they are and download them to the Gateway), and just NOT map the ones that you don't want. The other philosophy is to DELETE the points you will never want to expose from these template files, before you download them to the Gateways. The good point of the first philosophy is that all the points are there, if you ever want to map them later; the bad news is that the Gateway has to scan these points, and that affects performance in a bad way. The good point of the second philosophy is that the scan is quicker, and you are only getting the data you want; the bad news is that if you want to add points in the future, you will need to download modified TEMPLATE files to the Gateway in order

to add those points. Our personal opinion is that the speed improvement far outweighs the minor inconvenience of downloading new templates, if ever they are needed.

Our example device is interesting: There are “Motor2” and “Motor3” parameters, but you can ONLY hook one damper up to the 2021 VAV—the two “Motors” are never used. You really should axe them (you really need to review the Siemens documentation on the particular TEC applications you have!)

So let’s go with philosophy #2 and follow it for awhile. Let’s say that we only wanted a few, very important points out of this template. We might trim it to remove the setup parameters, the D-GAIN and BIAS terms (generally unused in Siemens systems, anyway), and the timing/polarity/rotation parameters. Perhaps the T’stat does NOT have a setpoint dial (so you can of course remove the points 11, 12, 13, and 14 that deal with it), nor does it have a button for night override (so you can remove points 18, 19, 20, and 21 that handle this). Say you do NOT want them to twiddle the digital output points directly (but you WILL let them control the heating/cooling valves and damper with the AO control point), and thus points 41 through 46 you don’t need at all. Perhaps it does have an auto-zero module, so you WILL keep the related point (but only the point that lets you do the calibration, point #94). Most people believe that you should not let the operators, in the control room, tune a PID loop in the field (that should be done with the hand-held, while watching the controller), so even the P and I terms would be removed. This then will whittle the template file down considerably, as shown below:

```
// Application #2021 (reduced, for speed!)
//
//Type,Point,Siemens Name,0-Units/Int.,1-Units/Slope,Ana. Units,Action,Sensible Name,Comments
//
AI, 4, ROOM TEMP , 48, 0.25, DEG F, ,Room Temperature ,
BO, 5, HEAT.COOL , COOL, HEAT, , ,Heating/Cooling Status ,
AO, 6, DAY CLG STPT, 48, .25, DEG F, w,Occupied Cooling Setpoint ,
AO, 7, DAY HTG STPT, 48, 0.25, DEG F, w,Occupied Heating Setpoint ,
AO, 8, NGT CLG STPT, 48, 0.25, DEG F, w,Unoccupied Cooling Setpoint,
AO, 9, NGT HTG STPT, 48, 0.25, DEG F, w,Unoccupied Heating Setpoint,
AI, 15, SUPPLY TEMP , 37.5, 0.5, DEG F, ,Supply Temperature ,
BO, 29, DAY.NGT , DAY, NIGHT, , w,Occ/Unocc Control ,
AO, 31, CLG FLOW MIN, 0, 4, CFM, w,Cooling Flow Minimum ,
AO, 32, CLG FLOW MAX, 0, 4, CFM, w,Cooling Flow Maximum ,

AO, 33, HTG FLOW MIN, 0, 4, CFM, w,Heating Flow Minimum ,
AO, 34, HTG FLOW MAX, 0, 4, CFM, w,Heating Flow Maximum ,
AI, 35, AIR VOLUME , 0, 4, CFM, ,Air Volume ,
AO, 48, DMPR COMD , 0, 0.4, PCT,w,Damper Command ,
AI, 49, DMPR POS , 0, 0.4, PCT, ,Damper Position ,Use as AI
AO, 61, COOL TEMP , 37.5, 0.5, DEG F, w,Heat-to-Cool Switch Temp ,Ref: DA temp
AO, 62, HEAT TEMP , 37.5, 0.5, DEG F, w,Cool-to-Heat Switch Temp ,Ref: DA temp
AI, 76, CTL FLOW MIN, 0, 4, CFM, ,Control Flow Min Calc ,Use as AI
AI, 77, CTL FLOW MAX, 0, 4, CFM, ,Control Flow Max Calc ,Use as AI
AI, 79, CLG LOOPOUT , 0, 0.4, PCT, ,Cooling Loop Output Calc ,Use as AI
AI, 80, HTG LOOPOUT , 0, 0.4, PCT, ,Heating Loop Output Calc ,Use as AI
BI, 84, DMPR STATUS , CAL, RECAL, , ,Calibration Adjustment ,Use as BI
AI, 92, CTL STPT , 48, 0.25, DEG F, ,Control Setpoint Calc ,Use as AI
AI, 93, FLOW STPT , 0, 0.25, PCT, ,Flow Setpoint Calc ,Use as AI
BO, 94, CAL AIR , NO, YES, , w,Calibration Air ,Calibrates Velocity
AI, 99, ERROR STATUS, 0, 1, CODE, ,Error Status Code ,Use as AI
```

The advantage here is that it’s only a quarter the number of points. Thus, the scan is four times as fast! This is important, for a system that gets new values from the TECs only for those points that have COS/COV enabled on them (a closely kept Siemens secret, as far as we can tell). Those that don’t send COS/COV values up when data changes must be scanned, and that may take many minutes. The faster the scan, the faster you will get these scanned (non-COS/COV point) values. Keep this in mind.

Another thing that you can do is to send down “custom” templates for a particular device. Say that you have a TEC of type 2384. This is a “dumb” TEC that handles things like Roof-Top Units (RTUs), that have their own internal controls. This is the default template for Application 2384, which is file “TPL_2384.CSV”:

```
// Application #2384
//
//Type,Point,Siemens Name,0-Units/Int.,1-Units/Slope,Ana. Units,Action,Sensible Name,Comments
//
AO, 2, APPLICATION, 0, 1, APP, ,Application Number ,
AI, 4, ROOM TEMP, 48, 0.25, DEG F, ,Return Temperature ,
AI, 13, RM STPT DIAL, 48, 0.25, DEG F, ,Setpoint Dial Setting ,If dial exists
BO, 14, STPT DIAL, NO, YES, , w,Setpoint Dial Control ,if existant
AI, 15, AI3, 37.5, 0.5, DEG F, ,AI3 ,Any usage
BI, 19, DI OVRD SW, OFF, ON, , ,Override Switch Status ,if existant
BI, 24, FAN PRF, OFF, ON, , ,Fan Status Proof ,
BI, 26, LO TMP DET, OFF, ON, , ,Low Temp Detection ,
BO, 29, DAY.NGT, DAY, NIGHT, , w,Occ/Unocc Control ,
AO, 40, HT VLV, 0, 0.01, VOLTS,wO,Heating Valve Output ,
AO, 41, MIX DMPR, OFF, ON, , wO,Mixing Damper ,
BO, 42, DO 2, OFF, ON, , wO,DO 2 ,Any usage
BO, 43, DO 3, OFF, ON, , wO,DO 3 ,Any usage
BO, 44, STG1 DX, OFF, ON, , wO,Stage 1 DX Cooling ,
BO, 45, STG2 DX, OFF, ON, , wO,Stage 2 DX Cooling ,
BO, 46, FAN, OFF, ON, , wO,Fan Control ,
AI, 47, DISCH TEMP, 37.5, 0.5, DEG F, ,Discharge Air Temp ,
AI, 48, MA TEMP, 37.5, 0.5, DEG F, ,Mixed Air Temp ,
AO, 59, DO DIR. REV, 0, 1,0=DIRCT, ,Forward/Reverse Setup ,Danger--Config ONLY
AI, 99, ERROR STATUS, 0, 1, CODE, ,Error Status Code ,Use as AI
```

Now, let’s say that you know a lot about this device. Turns out there is no room t’sat. AI #4 (where the Room Temperature normally is), is actually used for the Supply temperature, and AI #3 is used for the return temperature. DO #2 and DO #3 are unused, and the direct/reverse setup point is irrelevant. We can modify this template to be “special”, for whatever TEC device that it is for, and download it to the Gateway. We might have modified this for TEC #15 on Trunk #2, and we would create a special “custom template” called “TPL_2_15.CSV” (the “2” being for trunk #2, the “15” being for TEC #15). Our custom file would be modified to look like this:

```
// Application #2384 (“TPL_2_15.CSV”, for TEC #15 on Trunk #2)
//
//Type,Point,Siemens Name,0-Units/Int.,1-Units/Slope,Ana. Units,Action,Sensible Name,Comments
//
AI, 4, SUPPLY TEMP, 48, 0.25, DEG F, ,Supply Temperature ,SPECIAL usage
AI, 15, RETURN TEMP, 37.5, 0.5, DEG F, ,Return Temperature ,SPECIAL usage
BI, 24, FAN PRF, OFF, ON, , ,Fan Status Proof ,
BI, 26, LO TMP DET, OFF, ON, , ,Low Temp Detection ,
BO, 29, DAY.NGT, DAY, NIGHT, , w,Occ/Unocc Control ,
AO, 40, HT VLV, 0, 0.01, VOLTS,wO,Heating Valve Output ,
AO, 41, MIX DMPR, OFF, ON, , wO,Mixing Damper ,
BO, 44, STG1 DX, OFF, ON, , wO,Stage 1 DX Cooling ,
BO, 45, STG2 DX, OFF, ON, , wO,Stage 2 DX Cooling ,
BO, 46, FAN, OFF, ON, , wO,Fan Control ,
AI, 47, DISCH TEMP, 37.5, 0.5, DEG F, ,Discharge Air Temp ,
AI, 48, MA TEMP, 37.5, 0.5, DEG F, ,Mixed Air Temp ,
AI, 99, ERROR STATUS, 0, 1, CODE, ,Error Status Code ,Use as AI
```

By downloading these custom files to the Gateway, you can get the Gateway to use them for a certain P1 device on a particular trunk, instead of the “standard” template for that application.

How sweet it is! You can customize the system to your heart’s desire!

Unique Templates, for DPU and MPU Devices:

The DPU and MPU are very old (read: antique) devices from the Powers / Landis & Gyr era. The DPU (Digital Point Unit) and MPU (Multiple Point Unit) are pure “dumb” I/O. The DPU has up to 12 digital inputs and 12 relay outputs. The MPU has a mix: two analog inputs, two digital inputs, and four digital relay outputs.

We do have two “sample” templates for the DPU and MPU devices. These are just examples, as every one will be unique. Here is the sample:

```
// MPU Template
//
//Type, Point, Siemens Name,0-Units/Int., 1-Units/Slope, Ana. Units, Action, Sensible Name, Comments
//
AI, 6, AI-6, 0.0, 0.5, DEG F, , Analog Input #6, If existant
AI, 8, AI-8, -40.0, 1.098, DEG F, , Analog Input #8, If existant
BO, 23 ,DO-23, OFF, ON, , W, Digital Output #23,
BO, 24 ,DO-24, OFF, ON, , W, Digital Output #24,
BO, 25 ,DO-25, OFF, ON, , W, Digital Output #25,
BO, 26 ,DO-26, OFF, ON, , W, Digital Output #26,
BI, 27, DI-27, OFF, ON, , , Digital Input #27,
BI, 28 ,DI-28, OFF, ON, , , Digital Input #28,
```

You will have to change the names (column 3) and descriptions (column 8), along with the engineering units (analog) and off/on descriptors. If you only have one MPU or DPU in a P1 Gateway, you can leave it with this name. Otherwise, change the name of the template to be device specific as described above (e.g., “TPL_1_22..CSV” if it were Siemens device #22 on trunk #1).

Unique Templates, for MX-22 Devices:

The MX-22 devices come in several flavors. These are commonly called “extenders”, but are just limited-functionality I/O devices. Like the MPU or DPU, but a tad newer; but not much more in the way of “brains”.

One variant has eight analog inputs (let’s call it MX22a). We have a template for this puppy, called (not surprisingly, and because we have no imagination), TPL_mx22a.csv. It looks like this:

```
// Application MX-22-Ana (Analog expansion module #549-209)
// -- Probably use a special template for each one!
//
//Type, Point, Siemens Name, 0-Units/Int., 1-Units/Slope, Ana. Units, Action, Sensible Name, Comments
//
AI, 1, AI 1 ,0.0 , 1.0, UNITS, , AI #1
AI, 2, AI 2 ,0.0 , 1.0, UNITS, , AI #2
AI, 3, AI 3 ,0.0 , 1.0, UNITS, , AI #3
AI, 4, AI 4 ,0.0 , 1.0, UNITS, , AI #4
AI, 5, AI 5 ,0.0 , 1.0, UNITS, , AI #5
```

```

AI, 6, AI 6 ,0.0 , 1.0, UNITS, , AI #6
AI, 7, AI 7 ,0.0 , 1.0, UNITS, , AI #7
AI, 8, AI 8 ,0.0 , 1.0, UNITS, , AI #8

```

You would normally take this template, and use it as a basis for a device-specific template. Like one of our users did in Tacoma, Washington. They had a MEC at address 4, trunk #1 of a P1 Gateway. Each point on it had a unique name, description, address, engineering units, and slop/intercept. All of that is easily obtained from the existing Siemens system, of course.

Here is what their TPL1_3.CSV looks like:

```

// MEC Template For "SCI.MEC.03". Siemens System, FLN #1, Drop #4
//
//Type, Point, Siemens Name, 0-Units/Int, 1-Units/Slope, Ana. Units, Action, Sensible Name, Comments
//
AI, 1, SCL104.CO2, -500.0, 0.08138, PPM, , SCI Room 104 CO2
AI, 2, SCL105.CO2, -500.0, 0.08138, PPM, , SCI Room 105 CO2
AI, 3, SCL106.CO2, -500.0, 0.08138, PPM, , SCI Room 106 CO2
AI, 4, SCL107.CO2, -500.0, 0.08138, PPM, , SCI Room 107 CO2
AI, 5, SCILS1.101.DAT, 0.0, 1.0, DEG F, , SCI LS1 Room 101 Disc Air Temp
AI, 6, SCILS1.102.DAT, 0.0, 1.0, DEG F, , SCI LS1 Room 102 Disc Air Temp
AI, 7, SCILS1.105.DAT, 0.0, 1.0, DEG F, , SCI LS1 Room 105 Disc Air Temp
AI, 8, SCILS1.106.DAT, 0.0, 1.0, DEG F, , SCI LS1 Room 106 Disc Air Temp

```

Not to belabor anything, but there are two other MX-22 gizmos, and they are quite similar. What we call a MX22b has four digital inputs and four digital outputs. Our MX22c has four analog inputs and four analog outputs. Here are those two default templates (included in the ZIP file of templates that comes with the Gateway):

```

// Application MX-22-Bin (Binary expansion module #549-212) -- Probably use a special template for each.
//
//Type, Point, Siemens Name, 0-/Int., 1-/Slope, Ana.Units, Action, Sensible Name, Comments
//
BI, 1, DI 1 ,OFF , ON, , , Digital Input #1
BI, 2, DI 2 ,OFF , ON, , , Digital Input #2
BI, 3, DI 3 ,OFF , ON, , , Digital Input #3
BI, 4, DI 4 ,OFF , ON, , , Digital Input #4
BO, 5, DO 5 ,OFF , ON, , WO , Digital Output #5
BO, 6, DO 6 ,OFF , ON, , WO , Digital Output #6
BO, 7, DO 7 ,OFF , ON, , WO , Digital Output #7
BO, 8, DO 8 ,OFF , ON, , WO , Digital Output #8

```

And the final template for the MX-missiles is this one:

```

// Application MX-22-AI/AO (Analog expansion module #549-215)
//-- Probably use a special template for each one!
//
//Type, Point, Siemens Name, 0-/Int., 1-/Slope, Ana. Units, Action, Sensible Name, Comments
//
AI, 1, AI 1 ,0.0 , 1.0, UNITS, , Analog Input #1
AI, 2, AI 2 ,0.0 , 1.0, UNITS, , Analog Input #2
AI, 3, AI 3 ,0.0 , 1.0, UNITS, , Analog Input #3

```

AI, 4, AI 4 ,0.0 , 1.0, UNITS, , Analog Input #4
 AO, 5, AO 5 ,0.0 , 1.0, UNITS, WO , Analog Output #5
 AO, 6, AO 6 ,0.0 , 1.0, UNITS, WO , Analog Output #6
 AO, 7, AO 7 ,0.0 , 1.0, UNITS, WO , Analog Output #7
 AO, 8, AO 8 ,0.0 , 1.0, UNITS, WO , Analog Output #8

Unique Templates, for BIM (“P1 Bus Interface Module”) Devices:

The P1-BIM (hereafter called BIM, for short) device, and it’s sub-devices, is a Siemens addition to the party. It is actually a German PLC that has been reprogrammed to talk on the FLN (P1) trunk. After Siemens bought Landis, they of course rammed Deutsch products down the throat of the American market. One friend, who worked at the main office outside of Chicago, was privileged to be at a rant by a German engineer who was dissing TEC technology, and said “How can you see this sheisse? Ve would not sell this to a pig!”. And of course, the American offices now started selling PXCCs and BIMs, based on the German PLCs.

With that history in mind, the BIM appears on the P1 (FLN) trunk as the “brains” of a sorta-smart TEC, with other TECs under it. The BIM itself maps to a TEC device. Each I/O module under the BIM maps to another TEC device. So, a BIM with three modules on it takes up four TEC addresses. There is absolutely NO requirement that they be in order, or a row, or anything sensible. The first job we encountered these on had the BIM itself at address 6, the first module at address 47, the second module at address 24, and the third module at address 35. Go figure.

There are many, many “flavors” of these little I/O modules for a BIM. They are:

- Digital Input Module TXM1.8D 8 digital input points, dry contacts
- Digital Input Module TXM1.16D 16 digital input points, dry contacts
- Digital Output Module TXM1.6R 6 digital output points, NO or NC latched dry contacts
- Digital Output Module TXM1.6R – M Same as previous, but has manual override switches
- Universal I/O Module TXM1.8U 8 points, each configurable as DI, AI, or AO
- Universal I/O Module TXM1.8U – ML Same as above, but with LED and local override switches
- Super Universal I/O Module TXM1.8X Same as 8U, but AI and AO can be 4-20 mA
- Super Universal I/O Module TXM1.8X- ML Same as 8U-ML, but AI and AO can be 4-20 mA

Each of these I/O modules you will have a unique template for. The BIM itself already has a template (TPL_BIM.CSV), which give you the paltry information obtainable from the BIM itself.

The I/O modules you will of course make separate templates for, as each point will have a different name, analog ranges or digital states, and we have three “stars” for you. These are:

1. TPL_BIMDI.CSV -- For the two digital input modules
2. TPL_BIMDO.CSV -- For the two digital output modules
3. TPL_BIMUX.CSV -- For the for Universal Modules (normal and “super duper”)

The two digital templates are pretty simple; no need to rehash digitals here. Just remember, if you do have a DO module and you want it to be controllable, don’t forget the “W” or “WO” in the ACTION column!

The universal thingies are much more interesting. Points can be of many flavors, completely configurable. Here is our sample template, to get you started:

```
// Fancy Module: TXM1.8X or .8U module (Universal I/O module types) -- A special template for each one!  
//  
//Type, Point, Siemens Name, 0-/Int., 1-/Slope, Ana., Action, Sensible Name, Comments  
//  
BI, 1, DI 1, OFF, ON, , , Digital Input #1  
BI, 2, DI 2, OFF, ON, , , Digital Input 2  
AI, 3, AI 3, 0.0, 1.0, UNITS, , Analog Input #3  
AI, 4, AI 4, 0.0, 1.0, UNITS, , Analog Input #4  
AI, 5, AI 5, 0.0, 1.0, UNITS, , Analog Input #5  
AI, 6, AI 6, 0.0, 1.0, UNITS, , Analog Input #6  
AO, 7, AO 7, 0.0, 1.0, UNITS, WO, Analog Output #7  
AO, 8, AO 8, 0.0, 1.0, UNITS, WO, Analog Output #8
```

Now, say we have a system with just one digital input on address #1, for an exhaust fan. Nothing on #2. Three temperature AIs followed by a flow AI on addresses 3, 4, 5, and 6. Nothing at #7. And #8 is an AO point for a valve. Look at the Siemens database to get the analog slope/intercepts and engineering units (because they have to match in your template!) In this example, with whimsical names, you might create this, and you would name the file TPL2_8.CSV, of course:

```
// TEC #8 on Trunk #2 (TPL2_8.CSV) Module: TXM1.8U - ML or .8U module (Universal I/O)  
//  
//Type, Point, Siemens Name, 0-/Int., 1-/Slope, Ana., Action, Sensible Name, Comments  
//  
BI, 1, CAS_EXH_FAN, OFF, ON, , , Casino Exhaust Fan, Always ON due to smokers  
//  
AI, 3, CAS_PKR_ZNT, 48.0, 0.25, DEG F, , Casino/Poker Room Zone Temp, Heat them up  
AI, 4, CAS_BLKJ_ZNT, 48.0, 0.25, DEG F, , Casino/Blackjack Zone Temp, Make it medium  
AI, 5, CAS_SLOTS_ZNT, 48.0, 0.25, DEG F, , Casino/Slot Machines Zone Temp, Maintain cool  
AI, 6, CAS_EXH_FLOW, 0.0, 4.0, CFM, , Casino Exhaust Flow, Like a Polar Express  
//  
AO, 8, CAS_DMPR_CTL, 0.0, 0.4, PCT, WO, Casino Damper Control, Use 25% minimum (smokers!)
```

Happy templating!

System Profile (Apogee) files

Our *System Profile Decoder* Program

We recognized that many integration installers were having to do a lot of typing, even after the quick and (fairly) painless auto-discover process. The reason for that, as described before, is that our Gateway cannot get the NAMES of the TECs (they are not in the TEC; they are in the host Apogee system). Many, many sites really want to use the old Siemens names for things, as it (a) makes it an easy transition for the operators, (2) improves accuracy, and (3) gets more buy-in from the customer.

Most sites have an existing Apology...er...Apogee system, and you can use it to get the *System Profile Report*. This report is generated by hitting the “Computer Tree” icon on Apogee Main Menu. It looks like this, and is described by Siemens:

-  - **System Profile** - System Profile gives you graphical, system-wide control for defining, configuring, and maintaining your entire building control network.

While most System Profile operations are to the screen, when you ask for a report, specify that it goes to a printer (and use a printer-capture program, or the “print-to-text” feature of Windows). The format should be .TXT (standard text) or .CSV (comma-separated-variable; an old spreadsheet format). Either way, get the report into a file, and then it will be used by our program.

The beginning of the file has lots of data about the job site, the Insight computers that will be used, what the BLN (“Building Level Network”) is called, the language used, etc. We don’t care about any of that. What we care about are the lines that start with “**Field Panel**” – these are the Siemens gizmos that have FLN (“Floor Level Newtork”, a.k.a. P1) trunks under them. Under each of these gizmos that do have FLN trunks they have lines that say

Let’s call that report “My_System_Profile.CSV”, as an example. It might look something like this, but the names may have been changed to protect the innocent (or guilty, Sargent Friday):

Job Site:	Insight Job	
Language:	English (United States)	
Event Logging:	45 Days	
First weekday:	Monday	
Sync Time:		10:22
Configuration:	Local	
BLN:	bln0	
Descriptor:	Universal Compression	
Network Type:	Protocol 2/3	
Channel #:		0
Network Speed:	19200 Baud	
Primary MSD:		0
Backup MSD:	<Undefined>	
Report Printer:	<Undefined>	
1st Alarm Printer:		0
2nd Alarm Printer:	<Undefined>	
3rd Alarm Printer:	<Undefined>	
Insight:	USHOUSIE01	
Descriptor:		
Address:		0
Connection:	Direct	
Alarm Bell:	Disabled	
Graphics Blinking:	Disabled	
Event Printer:	No	
Fire Control:	No	
Field Panel:	FLNC01	
Descriptor:	1ST FLR ELEC RM	
Address:		3
Panel Type:	FLN Controller	
Firmware Revision:	FLNC V2.5 Apogee	
Revision Level:		2.5
Local Printer:	No	
Logical Points:		1754
FLN:		1
Descriptor:	FLN 1	
FLN Device:	HTX.1.4D1	
Device Type:	TEC	
Secure Mode:	Unknown	
Application:	2290 - Heat Pump Multi-Stage - Slave Mode	
Drop:		24

(continued on next page)

FLN Device:	HTX.1.6D1S	
Device Type:	TEC	
Secure Mode:	N/A	
Application:	2290 - Heat Pump Multi-Stage - Slave Mode	
Drop:		23
FLN Device:	HTX.1.B02405	
Device Type:	TEC	
Secure Mode:	N/A	
Application:	2413 - Hines VAV with Variable Spd Series Fan, Elec Heat	
Drop:		9
FLN Device:	HTX.1.B02413	
Device Type:	TEC	
Secure Mode:	N/A	
Application:	2413 - Hines VAV with Variable Spd Series Fan, Elec Heat	
Drop:		20
FLN Device:	HTX.1.B02509	
Device Type:	TEC	
Secure Mode:	N/A	
Application:	2413 - Hines VAV with Variable Spd Series Fan, Elec Heat	
Drop:		7
This goes on and on....		

The program uses this file to create a “WORLD OF FLNs” file, that you then can use to create specific CONFIG.TXT files for use in individual P1 Gateways.

Main Operations of the Program

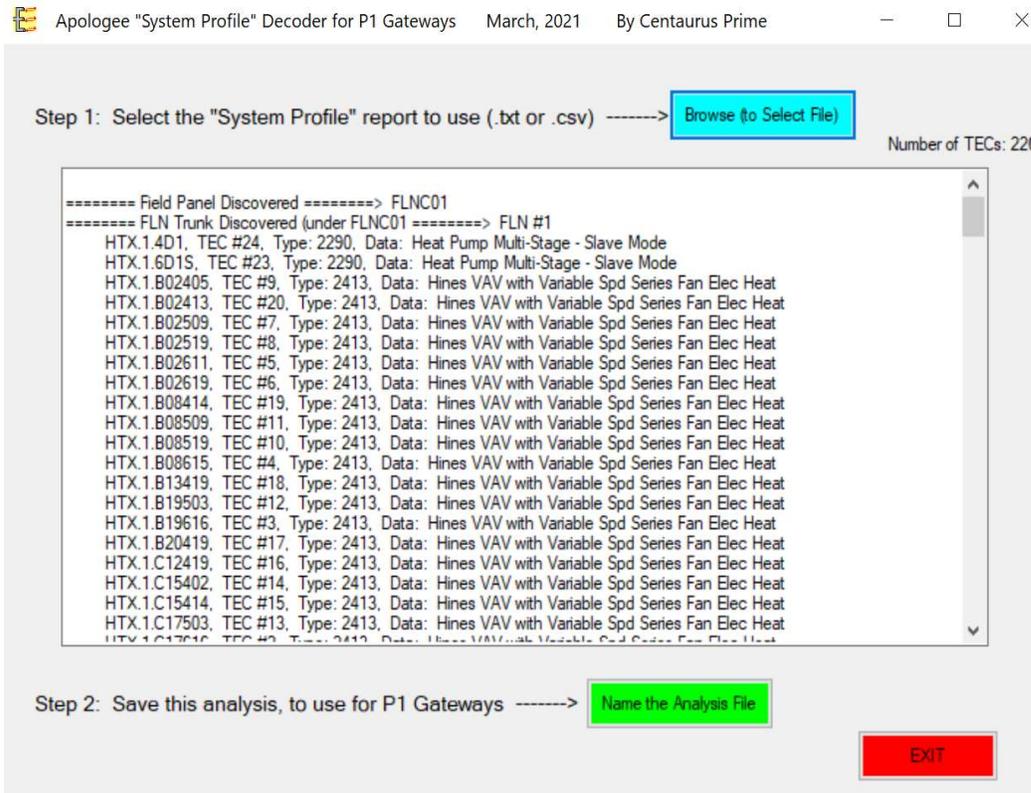
Running the System_Profile_Decoder.exe program is simple. Take it off the flash drive that came with your P1-Gateway, and put it in a folder on your PC or Laptop. We HIGHLY recommend that you use a file structure that is BY SITE, and put the program under that folder. For example if you had all of your files for “My Office” in a directory called “C:\Jobs\My_Office\”, that would be the best place to put both our program and the Apogee System profile file.

Running program is simple. Just double-click on it (it does require that Microsoft’s “dot-net” be installed on your PC, at least at version 4.0 or greater; if you do not have it, you can simply download the latest “dot-net” from Microsoft.com).

This screen comes up:



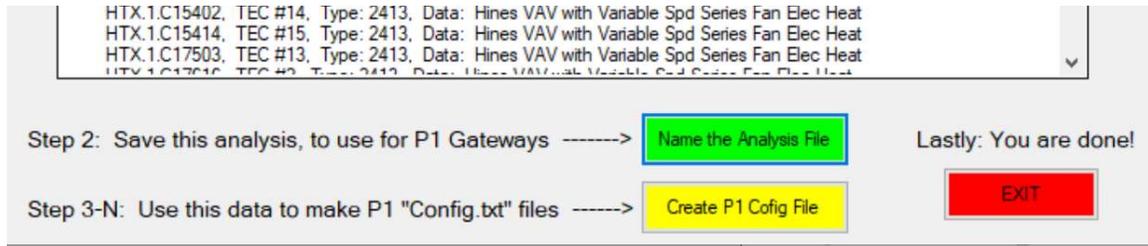
Not terribly interesting, huh? You simply hit the BLUE button, to browse for that Siemens System Profile file, and select it. The program then springs into action, doing something like this:



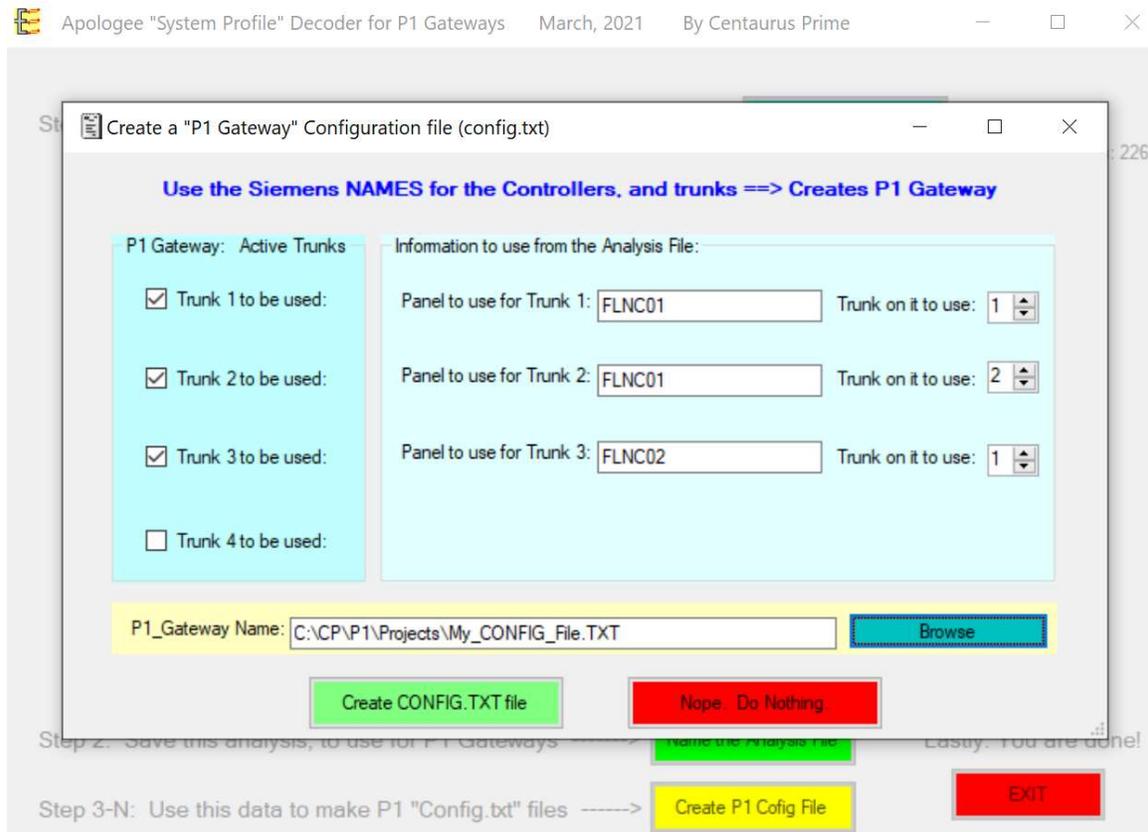
What it has done at this point is show you what it found in the large center box (go ahead, look through it...it's all the goodies on that job site). The analysis tells you there are 226 TECs in this site (upper right), which is a small job—we've had some with almost 8000 TECs!

Step #2 is to save all this in a text file that will be used to generate all the CONFIG.TXT files (and is useful for documenting the project). You name the analysis file something by hitting the GREEN button, which brings up a file dialog to allow you to name the file.

After you have done step 2, another step appears and a YELLOW button at the bottom of the program:



What you want to do now is hit the YELLOW button, to generate ONE file that will be the CONFIG.TXT file for ONE P1-Gateway. You have to decide what trunks you are going to be putting on this gateway, and what you will name this CONFIG.TXT file:



Making a CONFIG file

This operation (“Step 3”) of the System Profile Decoder Program can be done many times, to generate multiple CONFIG.TXT files. In the previous example, we created a CONFIG.TXT for the P1-Gateway that is replacing the two trunks on the Siemens “FLNC01” device and one on the “FLNC02” device. Here’s what it created (called “My_CONFIG_File.TXT”, as shown in the light yellow box:

```
// Created from System Profile Analysis on Monday, March 15, 2021 at 1:15 PM
//
// 'DEVICE', TRNK, P1-UNIT, P1-TYPE, BN/MB-UNIT, NAME, DESCRIPTION, LOCATION (Opt)
//
// FLNC01, P1 Trunk #1
//
DEVICE, 1, 24, 2290, 1, "HTX.1.4D1", "Heat Pump Multi-Stage - Slave Mode", "TEC #24 on Trunk #1"
DEVICE, 1, 23, 2290, 2, "HTX.1.6D1S", "Heat Pump Multi-Stage - Slave Mode", "TEC #23 on Trunk #1"
DEVICE, 1, 9, 2413, 3, "HTX.1.B02405", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #9 on Trunk #1"
DEVICE, 1, 20, 2413, 4, "HTX.1.B02413", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #20 on Trunk #1"
DEVICE, 1, 7, 2413, 5, "HTX.1.B02509", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #7 on Trunk #1"
DEVICE, 1, 8, 2413, 6, "HTX.1.B02519", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #8 on Trunk #1"
DEVICE, 1, 5, 2413, 7, "HTX.1.B02611", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #5 on Trunk #1"
DEVICE, 1, 6, 2413, 8, "HTX.1.B02619", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #6 on Trunk #1"
DEVICE, 1, 19, 2413, 9, "HTX.1.B08414", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #19 on Trunk #1"
DEVICE, 1, 11, 2413, 10, "HTX.1.B08509", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #11 on Trunk #1"
DEVICE, 1, 10, 2413, 11, "HTX.1.B08519", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #10 on Trunk #1"
DEVICE, 1, 4, 2413, 12, "HTX.1.B08615", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #4 on Trunk #1"
DEVICE, 1, 18, 2413, 13, "HTX.1.B13419", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #18 on Trunk #1"
DEVICE, 1, 12, 2413, 14, "HTX.1.B19503", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #12 on Trunk #1"
DEVICE, 1, 3, 2413, 15, "HTX.1.B19616", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #3 on Trunk #1"
DEVICE, 1, 17, 2413, 16, "HTX.1.B20419", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #17 on Trunk #1"
DEVICE, 1, 16, 2413, 17, "HTX.1.C12419", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #16 on Trunk #1"
DEVICE, 1, 14, 2413, 18, "HTX.1.C15402", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #14 on Trunk #1"
DEVICE, 1, 15, 2413, 19, "HTX.1.C15414", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #15 on Trunk #1"
DEVICE, 1, 13, 2413, 20, "HTX.1.C17503", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #13 on Trunk #1"
DEVICE, 1, 2, 2413, 21, "HTX.1.C17616", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #2 on Trunk #1"
DEVICE, 1, 1, 2290, 22, "HTX.1.H1N", "Heat Pump Multi-Stage - Slave Mode", "TEC #1 on Trunk #1"
DEVICE, 1, 25, 723, 23, "HTX.1.DEM", "723", "TEC #25 on Trunk #1"
DEVICE, 1, 21, 2457, 24, "HTX.1.B02420", "2457", "TEC #21 on Trunk #1"
DEVICE, 1, 22, 2290, 25, "HTX.1.6D1N", "Heat Pump Multi-Stage - Slave Mode", "TEC #22 on Trunk #1"
//
// FLNC01, P1 Trunk #2
//
DEVICE, 2, 8, 2413, 61, "HTX.1.B02704", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #8 on Trunk #2"
DEVICE, 2, 7, 2413, 62, "HTX.1.B02714", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #7 on Trunk #2"
DEVICE, 2, 5, 2413, 63, "HTX.1.B08603", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #5 on Trunk #2"
DEVICE, 2, 9, 2413, 64, "HTX.1.B08702", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #9 on Trunk #2"
DEVICE, 2, 4, 2413, 65, "HTX.1.B08714", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #4 on Trunk #2"
DEVICE, 2, 10, 2413, 66, "HTX.1.B16702", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #10 on Trunk #2"
DEVICE, 2, 3, 2413, 67, "HTX.1.B19708", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #3 on Trunk #2"
DEVICE, 2, 11, 2413, 68, "HTX.1.C04702", "Hines VAV with Variable Spd Series Fan Elec Heat", "TEC #11 on Trunk #2"
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//
...etc...(shortened the third trunk for brevity)
```

This might be one of several CONFIG.TXT files that you will make, because the site needs quite a few (one for every P1_Gateway). You can make them all at the same time, just pushing the YELLOW “Create P1 Config File” button several times.

What to do with the CONFIG files

Say you have a site with three P1 Gateways. The unique files that will be in each gateway are:

- GATEWAY.INI --- Master file: how the Gateway operates, and BACnet properties.
- SOCKET.CFG --- IP data (IP address, subnet mask; possibly the “Gateway” address).
- CONFIG.TXT --- The database of TECs on this Gateway.

You will have to edit the last two yourself, with the IT and FMS folks at the site, to integrate each into their BACnet network.

Here’s our two cents: Put all these files in the same directory for this site. Name them something that means where the files are. For example, if you have one P1-Gateway in the basement, another on Floor #4, and a third in the mechanical penthouse, you might want to name them:

- 📁 Gateway_Basement.ini
- 📁 Socket_Basement.cfg
- 📁 Config_Base,emt.txt
- 📁 Gateway_Floor4.ini
- 📁 Socket_Floor4.cfg
- 📁 Config_Floor4t.txt
- 📁 Gateway_Penthouse.ini
- 📁 Socket_Penthouse.cfg
- 📁 Config_Penthouse.txt

When you UPLOAD these files to each individual P1-Gateway, it becomes a simple matter to select the proper files, based on where you are.

One final note about these CONFIG files. You are making them FROM the EXISTING APOGEE SYSTEM. So, if the Apogee system can’t see one of their own TECs, you won’t be able to either. Don’t chase ghosts—first ask the operators: Did this get ripped out in a remodel? Did it fail and nobody has fixed it? Is it powered? Is the trunk OK to it? Did the magic smoke come out of it? A lot of times, they will know why it is not communicating. ***Spend your time wisely with non-communicating TECs!***

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