Operations Manual for the Original SiteMonitor Base Unit and SiteMonitor Base Unit II

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Note to customers: At this point, we consider the Base Unit and Base Unit II to be nearing the end of their product life. Although we continue to sell these products (as of Mid-2021) to support our existing customers, we do not plan any future updates to the software for these products. We will continue to support these as we can, but new deployments should use the SiteMonitor Base 3 product (or it's successor) instead of the Base II.

In order to help our customers who will be using these products into the future, we've attempted to consolidate all of the documentation and other assets for these products into this document. If you seem to be missing some information you need in relation to these units, please send email to custsvc@packetflux.com.

Working with the Base Unit

Physical Mounting

SiteMonitor Products are designed to mount either to the Wall or to a DIN rail. We recommend DIN rail mounting wherever possible. The plastic clip included with the products is needed for both DIN rail and wall mounting.

The cabling included with the expansion units is based on mounting the Base unit at one end, and then all of the expansion units to one side of the base unit, with the large flat sides touching. If you do not mount in this fashion, the enclosed cabling will likely not reach.

For wall mounting, screw the plastic bracket to a suitable surface, ensuring multiple brackets are spaced far enough apart that the units can mount side by side. Snap the SiteMonitor unit onto the bracket. To release a previously mounted unit, grab the top and bottom of the mounted unit and pull while twisting the unit either upward or downward.

For DIN rail mounting, mount the din rail in a suitable fashion, and then snap the plastic bracket onto the rail, and the SiteMonitor unit onto the bracket. To release the unit from the rail, reach behind the unit and pull forward on an exposed tab of the DIN rail mounting bracket. This will be easier if you pull on the tab which has a "springy U shape" built into the bracket.

Cabling the Expansion Bus

It is important that the Expansion Bus connectors are never inserted or removed with the power on. Failure to heed this warning may cause damage to the base unit or one or more of the expansion modules.   Note that this is less critical in later editions of the Base Unit, but it is still a good practice.

This section is only relevant if you are using expansion modules in your SiteMonitor System.

MAKE SURE ALL POWER HAS BEEN REMOVED BEFORE CONNECTING OR DISCONNECTING ANY PART OF THE EXPANSION BUS.

For the first expansion unit, connect the supplied 6p6c cable from the expansion port on the base unit to the expansion port on the expansion unit. For additional expansion units, repeat the process, connecting each expansion unit to the previous expansion unit.

There is no difference between the expansion ports on the expansion units. As a result, you can connect either port in whichever manner is easiest. We find that connecting directly adjacent ports tends to be neater. All that matters is that there is a continuous chain from the first to the last unit.

If you need to use a longer cable than the provided expansion cable, you can use any 6p6c phone cable, either straight or reversed. In order to prevent damage to the units, it is important to ensure that all 6 pins are connected, either straight through (pin 1 to pin 1, pin 2 to pin 2, and so on), or reversed (pin 1 to pin 6, pin 2 to pin 5, and so on). The expansion bus is designed to only traverse a few dozen feet, so please keep all cables as short as possible.

Powering the Base Unit

For most SiteMonitor systems, all power for the Base and Expansion modules is obtained from the base unit. As a result, the power requirements for a complete system will vary widely.

All SiteMonitor systems can operate on the voltages typically found in a 12 or 24V battery system. With the SiteMonitor Base II we added the capability to operate on voltages found in a 48V battery system.

Note that the original base unit had a lower maximum voltage rating, up to an absolute maximum under any conditions of 30V. In addition, expansion modules with a Revision prior to revision H have the same limits. If you have either an original base unit, or you have earlier expansion modules (serial numbers prior to 32767), you must limit the power supply voltage to under 30V in all cases.

For the SiteMonitor Base II and the later expansion modules, the maximum voltage is 60V.

On the lower end, all devices are best powered off of a 12V or higher system. The units will operate slightly below 12V, but will start to drop off for low voltage around 9-10V.

The amount of current needed for the SiteMonitor System will vary depending on the voltage provided to the unit. Higher supply voltages will generally result in lower current draw - but will also generally

result in higher power consumption since some SiteMonitor components use the same current regardless of voltage.

Almost all smaller SiteMonitor systems (up to a few expansion modules) will operate off of a 12V power supply at 1A, or a 24V or 48V power supply at 0.5A. Most need even less than that – with 1 Watt being the typical consumption of a SiteMonitor Base unit and a couple of expansion modules.

When powering from a source capable of providing more than 2 Amps, an external fuse is REQUIRED. The fuse should typically be 1A fast blow unless a lot of modules have been added to the system.

On the SiteMonitor base unit, there are two power inputs labeled as "Pwr1" and "Pwr2". Either or both of these inputs can be used to power the SiteMonitor unit. If both are connected, the SiteMonitor will draw power from the input with the highest voltage.

When operating at a site with both commercial and conditioned (UPS) power, we recommend connecting the SiteMonitor to two power sources. Typically one which is derived directly from the commercial power, and one which is derived from the UPS power. This will permit two things. The first is the monitoring of commercial power availability separately from the UPS power. The second is permitting remote control of the conditioned power source without affecting the SiteMonitor availability.

When operating at a site with a battery system, we realize that only one power source is often available. As a result, we expect that many solar sites will only use one of the two power inputs. There is minimal benefit to connecting both power connections to the same source. We do **not** recommend connecting one of the power inputs directly to solar cells or a similar "unregulated" source, as the open-circuit voltage across a typical solar array will often exceed the maximum rating of the SiteMonitor system causing damage. In addition, many charge controllers expect the solar array to be isolated from the rest of the system, and the Base Unit will cause this isolation to be broken.

In addition, it is important to ensure that any source connected to the power inputs is capable of providing sufficient current to power the unit. That is, don't try to use the unused power input as a spare "voltmeter input".

When connecting the power, it is important to observe proper polarity. In addition, it is important to understand that the negative on both inputs is electrically connected internally. Or stated differently, there is a wire internal to the SiteMonitor which connects the negative (-) pin of Pwr1 with the negative (-) pin of Pwr2. If power is connected incorrectly, you can damage the SiteMonitor simply by causing a short through this internal connection. As a result, we recommend verifying proper connection and polarity with a voltmeter before plugging the removable terminal strip into the unit.

To connect power, simply attach the power to the appropriate screw terminals, and attach to the unit (if the screw terminal block was removed to simplify connections).

The use of the remaining terminals on the base unit is documented in the "Module Specifics" section of this document.

Connecting the Network

To physically connect the SiteMonitor to an Ethernet network, simply use a standard CAT5 cable to connect the Ethernet Port to an Ethernet Switch.

Under no circumstances should the SiteMonitor unit be plugged directly into a port with active Power over Ethernet on it. If the SiteMonitor needs to be powered at a location where it is desirable to use the spare CAT5 pairs to provide power, it is possible to split those pairs off and connect them to the PWR1 or PWR2 input. This is documented in the "Special Configuration" section of this documentation.

The Ethernet Port is hardwired for 10BaseT, Half Duplex. The internal electronics are not capable of 100BaseT, and Full Duplex is not needed due to the low bandwidth requirements. As a result, the switch port which the unit is plugged into will either need to be set to automatically negotiate speed and duplex, or will need to be configured to 10BaseT half duplex.

In addition, the unit does not have Auto-MDIX capability. For most applications, this does not matter, but if you are attempting to connect the SiteMonitor to a PC or another device which also does not have Auto-MDIX capabilty, a crossover cable may be needed.

Note that some modern switches have some or all ports which are not wired correctly for 10BaseT. Specifically, 10BaseT is polarity sensitive and often one or more ports will have either the TX or RX pairs wired backwards.   If the base unit does not work in a specific port on a switch, try a different switch port or possibly even a different switch.   Sometimes it will also be necessary to hard code the port to 10Mb/s, half duplex.

Additional Base Unit Connections

The 12 position terminal block has the following pinout:

Note: Pin 1 is the position closest to the Ethernet and 6p6c Jacks.

Pin Number	Function
1	Relay Common
2	Relay Normally Open
3	Relay Normally Closed
4	Not used
5	Switch Closure Input
6	Switch Closure Common
7	Shunt Monitoring Input +
8	Shunt Monitoring Input -
9	Power Source A
10	Power Source Common

Pin Number	Function
11	Power Source B
12	Power Source Common

The following are specific notes for each connection:

Relay Output (Pins 1, 2 and 3):

The Base unit includes a built-in Single Pole Dual Throw (SPDT) relay.

This relay is capable of switching loads which do not exceed 2A or 60W.   This means that under 30V, you are limited to 2A, and above 30V you are limited to 60W loads. Exceeding the switching capability of this relay will result in permanent damage to the relay and will necessitate non-warranty repair of the unit.

- Pin 1 is the common terminal on the relay, and will need to be connected if the relay is to be used. The remaining two relay pins (2 and 3) will need to be connected depending on your application.

- Pin 2 is the Normally Open contact. This contact will never be connected to the common terminal (pin 1) unless a command to activate the relay is received.

- Pin 3 is the Normally Closed contact. This contact will always be connected to the common terminal (pin 1), unless a command to activate the relay is received.

When power is lost to the unit, the relay will revert back to it's default state. As a result, we encourage users of the SiteMonitor system to pick the contacts based on what state is desired when the power is off, or recently restored.

This output will appear on the Boolean I/O tab. The value is also readable or settable via OID 1.3.6.1.4.1.32050.2.1.26.5.0.   You can also do a timed cycle of this device by writing the number of 0.1S periods to 1.3.6.1.4.1.32050.2.1.26.7.0 (for example, writing 50 will result in a 5 second cycle). Additional functionality is documented on the Boolean I/O section of this manual.

Switch Closure Input (Pins 5 and 6):

Pins 4 and 5 form a switch closure input, which can be read remotely.

The intent of this input is to read a relay or switch closure from an external device. For example, a security loop or status output on a device.

This input is not isolated internally and as such, care must be taken to ensure that voltage is not applied to either of the closure input pins. Applying voltage to either pin may cause damage and will likely result in a non-warranty repair, and may result in a potentially hazardous situation.

To use this input, simply connect the switch to be read between pins 4 and 5. A common application for this input is as a security loop. That is, one or more normally closed security sensors, such as a door sensor, or a loop of wire placed strategically through a solar panel such that it has to be cut to be

removed, are connected in series to these inputs. In this way, notification can be received when a security event occurs.

The value from this input will appear on the Boolean I/O tab. The value is readable via OID 1.3.6.1.4.1.32050.2.1.26.5.1. The number of events is also readable (and resettable) via OID 1.3.6.1.4.1.32050.2.1.26.8.1. Additional SNMP and User Interface functionality is described in the Boolean I/O user interface section of this manual.

Current Shunt Input (Pins 6 and 7):

This input is designed to accept an analog voltage input from a shunt or other similar device which has a maximum output voltage of no more than +-100mV (aka+-1/10th of a volt). Care must be taken to ensure that this voltage is not exceeded.

For the base II this input supports high or low side shunt inputs, with high side shunts preferred. The original Base unit supported only low side shunts. This means that the shunt has to be on the negative side of the circuit, not on the positive side for the original base unit, but can be on either side for a Base II.

!WARNING! This is a non-isolated input. Be careful of what you attach it to.

The Value from this input appears on the Analog I/O tab and is readable via SNMP using the OID 1.3.6.1.4.1.32050.2.1.27.5.1. Note that the units are in 0.1mV, so 100mV will read as 1000.

Power Source Inputs (Pins 9, 10, 11 and 12):

The SiteMonitor Base Unit (and all daisy chained units which do not have separate power inputs) receive their operating power through these inputs. The unit has been designed to be connected to up to two separate sources of power, so that it will still operate when one of the two sources is unavailable. In addition, the voltage of each of these inputs can be read remotely.

The values from these inputs will appear on the Analog I/O tab. They can also be read via SNMP using the OIDs 1.3.6.1.4.1.32050.2.1.27.5.2 and 1.3.6.1.4.1.32050.2.1.27.5.3. These values are given in 0.1V units, so 12.6V would appear as 126.

The details on how to attach power to these pins are covered in an earlier section.

Internal Temperature Sensor

The Base Unit also has an internal temperature sensor. It reads in 0.1 degrees Celsius increments, and is visible on the Analog I/O tab and also via SNMP through the OID 1.3.6.1.4.1.32050.2.1.27.5.0. A reading of 296 indicates a temperature of 29.6°C. Note that this generally will run a little warmer than ambient due to internal heating of the Base Unit enclosure.

Automatic Control of the Relay In the Base Unit II via Temperature.

In the Base Unit II (and not the Original Base Unit) you can control the Relay on the Base II using the temperature sensor as a rudimentary thermostat.

In the Analog I/O Tab, you will find two values, "Relay on Above" and "Relay on Below". By setting either or both of these values the relay will become thermostatically controlled, and the relay will be energized based on these settings. A summary of options is as follows:

To control a fan, set "Relay on above" to a value as appropriate. Note that the value is in 10ths of degrees centigrade. For instance, to turn on the relay when the temperature exceeds 25.0*C (77*F), set the value to 250. To disable this functionality set this value to 1000. Please be aware that disabling this functionality does not automatically return the relay to an off status - please verify the status of the relay on the binary tab after disabling.

To control a heater, set "Relay on below" to a value as appropriate. For instance, to turn on the relay when the temperature gets below 10.0*C (50.0*F), set the value to 100. To disable this functionality, set this value to -1000. Please be aware that disabling this functionality does not automatically return the relay to an off status - please verify the status of the relay on the binary tab after disabling.

If both values are set, they will both operate the relay. This could be used as a high/low temperature alarm output or similar. Where Relay on Above is set to a higher value than Relay on Below, the relay will energize as described above. For instance if Relay on Above is set to 250 and Relay on Below is set to 100, the relay will energize if the temperature is either above 25.0C or below 10.0C. If the Relay on Above setting is lower than the Relay on Below setting, then the relay will only energize between the settings. For instance if Relay on Above is set to 100 and Relay on Below is set to 250, the relay will energize between 10C and 25C.

All settings include a 1 degree dead zone. This eliminates relay chattering as the relay is turned on and off. However, this also means that the relay will turn on and off at a slightly different temperature. For instance if you set the unit to turn on a fan at 25C, the unit will not turn the fan off until the temperature drops below 24C.

Please note that the internal relay has a limited current capacity as described elsewhere in this document. For larger loads, a secondary relay will need to be added, with the base unit relay controlling the coil on the secondary relay which then switches the actual load.

In addition to the above notes, a reminder is in order that because the temperature sensor is inside the base unit enclosure, it generally runs a few degrees hotter than the outside temperature. This should be taken into account when choosing setpoints.

User Interface Overview

As the Original SiteMonitor Base Unit and the SiteMonitor Base II were designed using a SNMP-first model, The user interface usually mirrors the structure of the data available via SNMP.

The original Base Unit did not have a web interface.   Instead, it used a PC-based software to manage it. This tool is called the "SiteMonitor Manager". It makes SNMP queries to the original Base Unit.

The Base Unit 2 added a web interface which performed the same functions as the PC-based tool, and operated in a very similar way. Due to the fact that some functionality of the Base II is not available

when using the SiteMonitor Manager with it, we highly recommend that you use the SiteMonitor Manager only when using the original Base Unit, and the Web Interface on the Base II.

Both interfaces are tab based, and each tab has data from a different part of the SNMP tree.   In the SiteMonitor manager, you'll need to click on "Refresh" for the data to be updated after changing tabs, or if you want to see new data.   In the web interface this refresh happens automatically.

The User Interface of the SiteMonitor will vary slightly between versions and whether you are using the SiteMonitor manager or the Web Interface. The following documentation will attempt to point out important differences.

Default login credentials

The SiteMonitor ships with a default username and password which you will need to use to log into the device.

The default IP address of the Base Unit is **169.254.1.20**.

The default community string or password for the Base Unit is the word **private**

We highly recommend you change the password as soon as possible after logging into the unit.

Connecting to an original base Unit with the SiteMonitor Manager

If you have an original base unit, you will need to download the SiteMonitor manager from our web site.

Once you have installed this program, you will notice that near the top there are two fields labeled "IP" and "Community" and a button labeled "Refresh".   To connect to a SiteMonitor, you'll need to enter the IP address of the SiteMonitor in the field labeled "IP", and the read-write SNMP community string in the field labeled "Community".   The button labeled "Refresh" will then read the data from the SiteMonitor for that page.   It will need to be clicked each time you wish to get data from the SiteMonitor, as the SiteMonitor manager does not automatically refresh data.

Connecting to a SiteMonitor Base II with a web browser

Using a standard web browser, navigate to the IP address of the SiteMonitor and when it prompts for a password, enter the password for the SiteMonitor in the password field.   The SiteMonitor does not check the username field so you can enter anything (or nothing) into it.

Understanding the User Interface

Both the SiteMonitor Manager and the Web Interface are tab-based.   The functionality of each tab is practically the same in both interfaces.   As a result, this section will cover each tab's functionality and will cover those places where they are different.

Functionality Common to All Tabs

Hovering over most items in the user interface will show the SNMP OID of that value in the lower right portion of the screen. This should help with identifying the OID of a specific value you are interested in monitoring via SNMP.

In the SiteMonitor Manager, you can right click on a value and copy the OID address to the clipboard as well. This functionality does not exist in the Web Interface due to browser clipboard permission issues in many browsers.

Certain values are changeable in the User Interface. In the SiteMonitor Manager, clicking on any editable value will permit you to change that value. Note that this click must be on the value itself, not the area around the value. If you accidentally click on a value (or change it to an incorrect value before submitting), pushing the "escape" key on your keyboard will revert back to normal mode without saving the value. Once you have changed a value and want to save it, the best way to do so in the SiteMonitor Manager is to simply press the "Enter" key on your keyboard. It will then write the value to the SiteMonitor, and if the value is really writeable, it will be changed and the new value will appear once you click on Refresh.

In the Web Interface on the Base II, the process is similar, except that there is a "pencil" icon for you to click on. This will pop up a small window which will allow you to change the value.

Base Tab

This tab is where you see and change settings specific to the base unit. The following fields are available:

Field	Description of Field	SNMP OID
Description	A factory-set description of the unit, I.E. "PacketFlux SiteMonitor Base Unit"	1.3.6.1.2.1.1.1
Software Revision (Base II Only)	This is the software revision of the firmware running in the Base Unit. It is also available on the Expansion unit tab on both the original Base Unit and Base Unit II	1.3.6.1.4.1.32050.2.1.25.3.0
MAC Address (Base II Only)	This is the MAC address of the unit. It also functions as the unit's serial number.	Not available via SNMP
ObjectID	This value is only shown in the SiteMonitor Manager or via SNMP. A Unique OID which will uniquely identify this model of the Base Unit. This is set to 1.3.6.1.4.1.32050.1.1 for the Orginal Base Unit, and 1.3.6.1.4.1.32050.1.2 for the Base II	1.3.6.1.2.1.1.2

Field	Description of Field	SNMP OID
Uptime	The amount of time this Base Unit has been operational since the last Software, Hardware or Power-on Reset. NOTE: Due to internal storage restrictions in the sitemonitor, this value may roll over periodically. For some hardware, this will occur approximately every 248 days. This means that this value will reset to zero occasionally, and does not mean that the sitemonitor has rebooted.	1.3.6.1.2.1.1.3
Last Reset Reason (Base II Only)	This shows the reason why the unit restarted last. I.E. due to power on, or via a software reset.	Not available via SNMP
Contact	This read-write object is intended to be able to store the contact information for this device. The sitemonitor hardware will store a string of up to 31 characters in this object which can be read with subsequent reads from this object. Attempting to set a string value over 31 characters in length will result in an error.	1.3.6.1.2.1.1.4
System Name	This read-write object is intended to be able to store a human-readable name for this device. The sitemonitor hardware will store a string of up to 31 characters in this object which can be read with subsequent reads from this object. Attempting to set a string value over 31 characters in length will result in an error.	1.3.6.1.2.1.1.5
Location	This read-write object is intended to be able to store location information for this device. The sitemonitor hardware will store a string of up to 31 characters in this object which can be read with subsequent reads from this object. Attempting to set a string value over 31 characters in length will result in an error.	1.3.6.1.2.1.1.6
Services	This value is only shown in the SiteMonitor Manager or via SNMP. Used internally by SNMP to specify what networking services this sitemonitor provides.	1.3.6.1.2.1.1.7
IP Address	This is the IP address assigned to the device. Writing an IP address to this object will store it in nonvolatile memory. To take effect, the sitemonitor device will need to be rebooted.	1.3.6.1.4.1.32050.2.1.1.0
Netmask	This is the netmask for the network the sitemonitor device is attached to. Writing a netmask to this object will store it in nonvolatile memory. To take effect, the sitemonitor device will need to be rebooted.	1.3.6.1.4.1.32050.2.1.2.0

Field	Description of Field	SNMP OID
Gateway	This is the default gateway or router for the network the sitemonitor device is attached to. Writing an IP address to this object will store it in nonvolatile memory. To take effect, the sitemonitor device will need to be rebooted.	1.3.6.1.4.1.32050.2.1.3.0
R/O Community	Writing a string to this object will set the read-only SNMP community for this device. Once the private (read/write) community string is written, access control is enabled, and SNMP packets bearing this community string will be permitted read-only access to the SiteMonitor device. Packets without a valid community string will be silently ignored.	1.3.6.1.4.1.32050.2.1.4.0
R/W Community	Writing a string to this object will set the read-write SNMP community for this device. Once this object is written, access control is enabled, and SNMP packets must include this community string to be able to write to the sitemonitor device.	1.3.6.1.4.1.32050.2.1.5.0
Web R/O Password (Base II Only)	The password which is used to access the web interface in read-only mode. As the original Base Unit does not have a web interface, this field does not exist in the original Base Unit	Not available via SNMP
Web R/W Password (Base II Only)	The password which is used to access the web interface in read-write mode. As the original Base Unit does not have a web interface, this field does not exist in the original Base Unit	Not available via SNMP
Last Reboot Cause	A text string which describes why this device rebooted last.	1.3.6.1.4.1.32050.2.1.9.0

There are one or two additional buttons at the bottom of the page which perform additional functions:

- **Reboot SiteMonitor** causes the base unit to reboot. Note that this only reboots the base unit. Expansion modules may or may not reset as a result depending on how they are powered. Generally if the expansion modules have their own power source they will not reset as a result of this functionality. This can also be caused via SNMP by writing the value 83620342 to the OID 1.3.6.1.4.1.32050.2.1.6.0.

- **Rescan Expansion** (moved to the Expansion Unit Tab on the Base II) causes the base unit to look for expansion modules it did not previously detect. This is useful if a expansion module is attached but isn't being detected after a reboot for some reason. This can also be caused via SNMP by writing the value 35478258 to the OID 1.3.6.1.4.1.32050.2.1.6.0.

Expansion Tab

The Expansion Tab Shows the devices attached to the SiteMonitor Base Unit.   The base unit will always be shown in 'Slot 0'.

The columns in this field are as follows:

Title	Column Description	OID
Slot or Idx	The slot number assigned to the attached device. It should be noted that this is dynamically assigned and is not necessarily related to the order the devices are physically attached to the system. This index number is added to the OID value in this table (replacing the .x) to make the full OID.	1.3.6.1.4.1.32050.2.1.25.1.x
Description	A Factory-Set description of this module. For example "Base Unit" or "6 Channel Switch Input"	1.3.6.1.4.1.32050.2.1.25.2.x
FW Version or Firmware	The firmware version Currently installed in this module.	1.3.6.1.4.1.32050.2.1.25.3.x
SerialNum or Serial #	The Electronic Serial Number of this device (the base unit will always report zero in this field). This field is writable to enable reordering of modules in this table, see the discussion below.	1.3.6.1.4.1.32050.2.1.25.4.x
Available or Avail	Whether the device is currently attached to the expansion bus and ready to operate. A zero in this field means the device was previously detected but isn't currently available. A one means that the device is currently connected.	1.3.6.1.4.1.32050.2.1.25.5.x
#BinaryIO or #Binary	The number of Binary I/O values shown on the Boolean I/O Tab for this device.	1.3.6.1.4.1.32050.2.1.25.6.x
#AnalogIO or #Analog	The number of Analog I/O values shown on the Analog I/O Tab for this device.	1.3.6.1.4.1.32050.2.1.25.7.x
#StringIO or #String	The number of String I/O values shown on the String I/O Tab for this device	1.3.6.1.4.1.32050.2.1.25.8.x

In the web interface on the Base II only, there is a "Rescan Expansion" button at the bottom of the page.   (This same button can be found on the Base Unit page in the SiteMonitor Manager for the Original Base Unit).   This button causes the base unit to look for expansion modules it did not previously detect. This is useful if an expansion module is attached but isn't being detected after a reboot for some reason. This can also be caused via SNMP by writing the value 35478258 to the OID 1.3.6.1.4.1.32050.2.1.6.0.

On this tab, there is only one field which can be modified, and that is the "Serial Number" field. By clicking on any of the values (besides the base unit) you can modify the serial number for that row. This is to enable reordering of this table. The following explanation of how the Base Unit manages serial numbers will help you to understand how this functionality is used.

At each restart of the Base Unit, or when the "rescan" button is clicked on the 'Base' tab, the Base Unit attempts to detect new expansion modules. Any modules it detects will be added to the bottom of the list in the order it detected them. This will not necessarily be the order they are physically attached to the unit, as there is no way for the Base Unit to detect the order the modules are physically attached.

Once the modules are detected and added to the table, they will never be removed from the table, unless they are manually removed through this tab. The design reason behind this choice is that the OIDs (SNMP addresses) which are used to retrieve the values from the expansion modules are determined based on the order the modules appear in this table. If the order changed every time the base unit restarted, or when a module was added or removed, the OIDS which would need to be monitored would change, requiring reconfiguration of the monitoring tools at every reboot.

To avoid this, the Base unit remembers all devices, and the order they appear. However, there are times which one needs to remove devices from this table due to failures. In addition, many customers try to keep a consistent module order to simplify configuration of their SNMP tools.

To remove an item from this table, simply enter '0' in the serial number field, and click on the "Rescan" button either on this page (Web Interface) or in the "Base" tab (SiteMonitor Manager). The Base Unit will remove the row containing the "0" and will move all of the successive rows up. If the device is still attached to the Base Unit, the device will also be re-detected and will appear at the bottom of the table. Due to this behavior, this functionality can also be used to reorder this table.

Another way to reorder the table is to type a valid serial number in the row you'd like it it appear. This is useful when replacing a failed module. For example, if a module has failed and been removed and you add a replacement module, you'll find that the new module will appear at the end of the list. If you'd like it to appear where the failed module was in the list, simply change the serial number on the row corresponding to the failed module to the new module's serial number and then click on the "Rescan" button in the base tab. The Base Unit will remove the module's entry from the bottom of the list and replace the old module's entry with it.

The Boolean I/O or Binary I/O Tab

This tab is where the SiteMonitor displays and permits editing of values which are on/off. These are also known as "Boolean" or "Binary" values.

All of the Boolean Values will show up as a 1 or 0 in this tab. "1" means on, and "0" means off in most cases, although sometimes these values are reversed depending on how you have wired an expansion module. (For example, using the Normally Closed contact on a relay will mean that "0" actually means on – since "0" is off, which means the relay is NOT engaged, which means that the Normally Closed contact is closed, turning on your circuit).

The following Columns are in this table:

Column	Description	OID Values
Index or Idx	This is a sequential number simply corresponding to the row number. This index number is added to the OID value (replacing the .x) listed in this table to make the full OID.	1.3.6.1.4.1.32050.2.1.26.1.x
Description	This is a 16 character field which describes this I/O. We recommend either leaving it as is, or setting it to a better description of what is connected to this I/O point.	1.3.6.1.4.1.32050.2.1.26.2.x
Slot	This is the internal number of the expansion unit which contains that I/O. These numbers correspond to the 'Index' numbers on the Expansion Tab.	1.3.6.1.4.1.32050.2.1.26.3.x
Pos	This is the position of the I/O in the specific Expansion Unit. This is consistent for each type of Expansion Unit (I.E. position 0 is always the first switch input on a switch input module). The definition of the Position values for each expansion module will vary depending on the expansion module type and possibly the firmware in the expansion module.	1.3.6.1.4.1.32050.2.1.26.4.x
Value	This is the actual value of the parameter for this row. For Boolean values it will be a '0' for off, or '1' for on. Some values are able to be changed by clicking on the value in this row and editing it. For outputs, writing a 1 or a 0 to this value will set that output to a state corresponding to the value written. For inputs, writing to this value will have no effect.	1.3.6.1.4.1.32050.2.1.26.5.x
PowerOn or @PwrOn	At power on or reset (and only at power on or reset), the SiteMonitor restores the value of this I/O to this value. This is useful to restore an output to a given state. Like other values, if it is editable, it can be changed by clicking on the value and editing it (provided it can be written to). For inputs, this value always reads as zero and writes are ignored.	1.3.6.1.4.1.32050.2.1.26.6.x
Cycle	By writing a non-zero value to this field, the output will be cycled for that number of tenths of seconds. For instance, if a output is set to '1', and then the value '30' is written, the output will be set to 0 immediately, and then set back to '1' after 3.0 seconds. This is useful to power cycle an attached device. Reading this value will show either 0 if the cycle timer is not active, or the remaining time if it is. For inputs, this value always reads as a '0', and writes are ignored.	1.3.6.1.4.1.32050.2.1.26.7.x

Column	Description	OID Values
Events	This counter counts the number of toggles of the value for this I/O. On power-on it is reset to 0, and then each change from 1 to 0 or 0 to 1 adds one to the value. This value is rate-limited (debounced) on most modules to help prevent one event from incrementing the counter multiple times due to switch bounce or other similar "noise" sources. Any value can be written to the event counter, but the most common use is to write a '0' to reset the counter.	1.3.6.1.4.1.32050.2.1.26.8.x

The Analog I/O Tab

The Analog I/O Tab is where the SiteMonitor displays and permits editing of values which have a numeric value, such as a temperature.

Note that SNMP primarily only supports integer values. This poses a problem when representing non-integer values with a fractional/decimal part like '12.6'.   As a result the SiteMonitor system usually represents these with an implied decimal point.   So a voltage of '12.6' will likely be read as 126. Most SNMP monitoring tools will allow you to multiply or divide the read value by a fixed amount, so you can adjust the read value to match the real world values.

The following Columns are in the Analog I/O Table:

Column	Description	OID Values
Index or Idx	This is a sequential number simply corresponding to the row number. This index number is added to the OID value (replacing the .x) listed in this table to make the full OID.	1.3.6.1.4.1.32050.2.1.27.1.x
Description	This is a 16 character field which describes that I/O. We recommend either leaving it as is, or setting it to a better description of what is connected to this I/O point.	1.3.6.1.4.1.32050.2.1.27.2.x
Slot	This is the internal number of the expansion unit which contains that I/O. These numbers correspond to the 'Index' numbers on the Expansion Tab.	1.3.6.1.4.1.32050.2.1.27.3.x
Pos	This is the position of the I/O in the specific Expansion Unit. This is consistent for each type of Expansion Unit (I.E. position 0 is always the first switch input on a switch input module). The definition of the Position values for each expansion module will vary depending on the expansion module type and possibly the firmware in the expansion module.	1.3.6.1.4.1.32050.2.1.27.4.x
Value	This read-write value contains the actual status of the Analog I/O. When reading this value, it will typically	1.3.6.1.4.1.32050.2.1.27.5.x

Column	Description	OID Values
	correspond to the current status of the Analog I/O. For outputs, changing this value will cause the output to change to match that value. For inputs, writing to this value will have no effect. It should be noted that many Analog I/O modules will require additional math before the value is usable. For some modules, the value is in tenths or hundredths of the expected unit (for instance voltage might be read as 240 or 2400 for 24 volts)	
PowerOn	At power on or reset (and only at power on or reset), the SiteMonitor restores the value to this value (provided it is a writeable value).	1.3.6.1.4.1.32050.2.1.27.6.x

The String I/O Tab

The String I/O Tab is where the SiteMonitor displays and permits editing of values which have a string value. This is most often used for descriptive strings such as the make and model of a device attached to an expansion module.

The following Columns are in the String I/O Table:

Column	Description	OID Values
Index or Idx	This is a sequential number simply corresponding to the row number. This index number is added to the OID value (replacing the .x) listed in this table to make the full OID.	1.3.6.1.4.1.32050.2.1.28.1.x
Description	This is a 16 character field which describes that I/O. This can be changed to a user-provided description by clicking on it.	1.3.6.1.4.1.32050.2.1.28.2.x
Slot	This is the internal number of the expansion unit which contains that I/O. These numbers correspond to the 'Index' numbers on the Expansion Tab.	1.3.6.1.4.1.32050.2.1.28.3.x
Pos	This is the position of the I/O in the specific Expansion Unit. This is consistent for each type of Expansion Unit (I.E. position 0 is always the first switch input on a switch input module). The definition of the Position values for each expansion module will vary depending on the expansion module type and possibly the firmware in the expansion module.	1.3.6.1.4.1.32050.2.1.28.4.x
Value	This is the actual value of the parameter for this row. If editable, clicking on the existing value will allow you to change the value.	1.3.6.1.4.1.32050.2.1.28.5.x

Column	Description	OID Values
PowerOn	At power on or reset (and only at power on or reset), the SiteMonitor restores the value of this I/O to this value (provided it can be written to).	1.3.6.1.4.1.32050.2.1.28.6.x

The AutoCycle Tab (Applicable to the Original Base Unit Only)

This tab allows you to configure the base unit to periodically ping a given IP, and if that IP does not respond after a certain time to reset connected modules.   In addition, the base unit can be configured to automatically reboot if it does not receive any packets, or SNMP packets after a given amount of time.

The following Fields are found on this page:

Field	Description	OID Values
IP to Ping	This is the IP address of the device to ping. It should be configured to correctly respond to ICMP pings. A common setting is the default gateway for the device.	1.3.6.1.4.1.32050.2.1.40
Ping Every _ Seconds	How often to ping the IP address listed above. We recommend you set this to a low value, typically under 5, and with 1 being fairly typical.1.3.6.1.4.1.32050.2.1.40	1.3.6.1.4.1.32050.2.1.41
Permitted Failures	How many times in a row the ping must be missed before action is taken. For example, if you set the SiteMonitor to Ping every 5 seconds, and you set this to 6 failures, the SiteMonitor will only take action after approximately 30 seconds of lost pings. We recommend that this is set to a high number of pings so that intermittent network issues don't cause the actions to be triggered.	1.3.6.1.4.1.32050.2.1.42
Failures after Fail	This is the number of pings that have to be missed after the first failure for the unit to take action a second time. This starts counting immediately after the unit takes action the first (or successive) times. In most cases you want to set this to a higher value to ensure that the unit doesn't continously restart a device over and over too quickly.	1.3.6.1.4.1.32050.2.1.44
Current Failures	This is the number of pings which have been lost in a row at the last time this page was refreshed.	1.3.6.1.4.1.32050.2.1.51

Field	Description	OID Values
Cycle for _ 0.1 Seconds	Once the base unit detects the number of loss pings configured above, it will cycle up to two devices. This configures how long it will leave the units off, and is in 0.1 Second Increments. So if you want to cycle the devices for 10 seconds, this value needs to be set to 100.	1.3.6.1.4.1.32050.2.1.43
First Cycle Slot and Pos	The Base unit will cycle the device at the specified Slot and Pos. To determine the value that needs to be set in this field, consult the "Slot" and "Pos" columns on the Boolean Tab for the device you want to cycle.	1.3.6.1.4.1.32050.2.1.45 (Slot) 1.3.6.1.4.1.32050.2.1.46 (Pos)
First Cycle Value	This determines which order the cycle occurs on the boolean value. If you set this value to a '0', then when the unit takes action (based on the rules above), the value is immediately changed to '0', then after the delay specified, back to '1'. Setting this to a '1' means that the unit, when taking action, will change the value to a '1' and then after a delay, change it back to a '0'.	1.3.6.1.4.1.32050.2.1.47 (Value)
Second Cycle Slot, Pos, and Value	These fields are identical in function to the first Cycle Slot, Pos and Value. If you need to cycle a second device, add it in these fields.	1.3.6.1.4.1.32050.2.1.48 (Slot) 1.3.6.1.4.1.32050.2.1.49 (Pos) 1.3.6.1.4.1.32050.2.1.50 (Value)
Reboot Base Unit if no Packets are received for _ Seconds	If a value is set in this field, then if the Base Unit does not receive a packet from the network of any type (ping, broadcast, SNMP, etc.) for a given period, the unit will automatically restart. We recommend setting this to a fairly high value to avoid nuisance restarts during brief network outages. Note that if this value is set and the SiteMonitor is plugged into a you have a remotely managed Ethernet switch that the SiteMonitor is plugged into, then you can remotely force a reboot of a crashed SiteMonitor by disabling the Ethernet interface for the SiteMonitor for a period exceeding this setting.	1.3.6.1.4.1.32050.2.1.7

Field	Description	OID Values
Or if no valid SNMP packets are received for _ Seconds	This functions identically to the above setting, however it only monitors SNMP packets. If this is set you can cause a remote reboot of the unit by disabling SNMP polling or otherwise preventing SNMP packets from reaching the device for a period exceeding the value set in this field. (Remember the SiteMonitor Manager also	1.3.6.1.4.1.32050.2.1.8

The Autocycle Tab (Applicable to the Base II Only)

The Autocycle Tab on the Base II is where the "Autocycle" functionality of the Base II is configured. This functionality allows the cycling of one or more devices based on the loss of pings to a single IP address.

As the operation of this tab is described well in this tab, we will not cover this functionality in more detail here with the exception of the following common questions:

- The Slot and Pos shown in the table on this tab refers to the Slot and Pos listed on the Binary I/O tab.   To determine what number should be placed in one of these fields, you simply refer to the Binary I/O tab to determine which item needs to be cycled, and then replicate the Slot and Pos from that tab here.

- The 'Cycle Procedure' describes what the unit will do to the value on the Binary I/O tab for the Slot and Pos you selected.   That is, whether it changes it to '0' and then back to '1' or changes it to '1' and then back to '0'.

The Watchdog Tab (Applicable to the Base II Only)

The Watchdog Tab on the Base II is where the "Watchdog" functionality is configured.   This functionality allows the Base Unit to automatically reset itself when it detects certain events.

This functionality is well described on the Watchdog tab so this manual will not cover this functionality in any more detail.

The Firmware(Base) and Firmware (Exp) Tab (SiteMonitor Manager Only)

These tabs only appear in the SiteMonitor Manager software.   Documentation on how to use these tabs appear in the "Other Procedures" section of this manual.

Other Procedures

This section includes procedures which should only need to be rarely followed.

Recovering an IP Address

If you have lost track of the IP Address in your base unit, there is a procedure available to determine it without resetting the unit to factory defaults.   This is accomplished through using a special program which runs on a Windows Computer. This program sends out a special packet which the device watches for during the first few seconds the device is powered on.

The following is the procedure to do so:

1. Obtain and install the correct program (if not already installed). For the original SiteMonitor Base Unit (not Base II), the correct tool is the SiteMonitor Manager program. For the Base II, the correct tool is the PacketFlux Ethernet Upgrade tool. Both of these are available from our web site.

2. Connect the PacketFlux device to the same Ethernet segment that the computer you will be running the upgrade tool on is connected to.

3. Check to ensure that no other SiteMonitors are in the middle of being upgraded (or are in upgrade mode) on the same Ethernet segment.

4. Launch the correct software program.

5. Select the correct Tab in the user interface. In the SiteMonitor Manager, this is the Firmware (Base) Tab. In the Ethernet Upgrade Tool, this is the Base Unit Firmware Tab.

6. If you are using the SiteMonitor Manager, Click on the 'I've read the instructions' checkbox at the bottom of the tool.

7. Click on "Discover IP Address"

8. Either Power Cycle the PacketFlux device, or Apply power (as applicable).

9. The tool should detect the PacketFlux device and display the MAC and IP address in the status bar.

10. Power Cycle the PacketFlux device to return it to normal operation.

Occasionally this does not work due to configuration of the network and/or Windows, especially on later versions of windows. If it does not work the first time, we recommend exiting the upgrade tool completely, and then repeating the instructions above, starting at step 4. If that does not work after a couple of tries, then consult the section "Troubleshooting Local Operation of the SiteMonitor Manager or SiteMonitor Ethernet Upgrade Tool".

Resetting the Base Unit to Factory Defaults

Occasionally it is necessary to reset one of the above devices to factory defaults, usually due to either a lost IP address and/or password.

This is accomplished through using a special program which runs on a Windows Computer. This program sends out a special packet which the device watches for during the first few seconds the device is powered on.

The following is the procedure to do so:

1. Obtain the correct program and install (if not already installed). For the original SiteMonitor Base Unit (not Base II), the correct tool is the SiteMonitor Manager program. For all other devices (including the Base II), the correct tool is the PacketFlux Ethernet Upgrade tool. Both of these are available from our web site.

2. Connect the PacketFlux device to the same Ethernet segment that the computer you will be running the upgrade tool on is connected to.

3. Check to ensure that no other SiteMonitors are in the middle of being upgraded (or are in upgrade mode) on the same Ethernet segment.

4. Launch the correct software program.

5. Select the correct Tab in the user interface. In the SiteMonitor Manager, this is the Firmware (Base) Tab. In the Ethernet Upgrade Tool, this is the Base Unit Firmware Tab.

6. If you are using the SiteMonitor Manager, Click on the 'I've read the instructions' checkbox at the bottom of the tool.

7. Click on "Reset to Factory Defaults"

8. Either Power Cycle the PacketFlux device, or Apply power (as applicable).

9. The tool should detect the PacketFlux device and reset it to factory defaults.

10. Power Cycle the device to resume normal operation.

Occasionally this does not work due to configuration of the network and/or Windows, especially on later versions of windows. If it does not work the first time, we recommend exiting the upgrade tool completely, and then repeating the instructions above, starting at step 3. If that does not work after a couple of tries, then consult the section "Troubleshooting Local Operation of the SiteMonitor Manager or SiteMonitor Ethernet Upgrade Tool".

Upgrading the Original Base Unit Firmware (Not Base II)

There are two upgrade procedures, depending on whether the SiteMonitor is running with a normal IP address and you wish to upgrade it remotely, or if you would like to upgrade a SiteMonitor connected locally to the computer which the Upgrade software is running on. The first option will work anywhere in the network, but requires you to know the IP address and read/write community string for the SiteMonitor.

The second requires physical access to the device, but does not require knowledge of the device's IP address or password.

To upgrade the original base unit's firmware when the device's IP Address and Read/Write Community String is known, follow the directions below:

1. Obtain and install the SiteMonitor Manager program (if has not already been installed)

2. Obtain the latest version of the SiteMonitor Base Unit Firmware from our web site

3. Start the SiteMonitor Manager.

4. Ensure that the IP address and Community string at the top of the window is set correctly. You may want to refresh the Base Tab to ensure you are connected to the right SiteMonitor.

5. Click on the Firmware(Base) tab in the SiteMonitor Manager

6. Check the box next to the "I have read the instructions on how to use this page" on the bottom of the screen.

7. Ensure the "Local Device Upgrade" box near the middle of the screen is not checked.

8. In the "Firmware Upgrade" section near the middle of the screen, click on "Select File" and then select the Base Unit Firmware. WARNING: The software does not check the firmware image to ensure that it is for the hardware you are attempting to upgrade. Make absolutely certain it matches the unit being upgraded.

9. Click the "Start Upgrade" button. This will switch the remote SiteMonitor into Upgrade Mode, copy the Upgrade file, and then restore the remote SiteMonitor to operation.

10. If the upgrade fails, check all the settings and then immediately retry. If the SiteMonitor has been switched to upgrade mode, transferring a correct file is the only way to switch it back to normal operation mode.

To upgrade an original base unit locally, where the device's IP address and SNMP community string is not necessarily known, perform the following steps:

1. Obtain and install the SiteMonitor Manager program (if has not already been installed)

2. Obtain the latest version of the SiteMonitor Base Unit Firmware from our web site

3. Start the SiteMonitor Manager.

4. Check to ensure that the SiteMonitor is attached to the same network segment as the computer running the SiteMonitor Manager Program, and that the SiteMonitor is powered on.

5. Check to ensure that no other SiteMonitors are in the middle of being upgraded (or are in upgrade mode) on the same Ethernet segment

6. Click on the Firmware(Base) tab in the SiteMonitor Manager

7. Check the box next to the "I have read the instructions on how to use this page" on the bottom of the screen.

8. Check the "Local Device Upgrade" box near the middle of the screen. This switches the software to local upgrade mode.

9. In the "Firmware Upgrade" section near the middle of the screen, click on "Select File" and then select the Base Unit Firmware. WARNING: The software does not check the firmware image to ensure that it is for the hardware you are attempting to upgrade. Make absolutely certain it matches the unit being upgraded.

10. Click the "Start Upgrade" button.

11. If the Upgrade does not start within 2-3 seconds, power cycle the SiteMonitor to switch it to upgrade mode. If this does not succeed, we recommend exiting the management tool and trying again. If that does not work after a couple of tries, then consult the section "Troubleshooting Local Operation of the SiteMonitor Manager or SiteMonitor Ethernet Upgrade Tool".

12. Once the upgrade starts, it will copy the Upgrade file. If you do not know the IP address of the SiteMonitor, it can be noted during the upgrade just below the Status Bar.

13. If the upgrade fails, try the transfer again. Once an upgrade has started, the firmware in the unit is invalidated, and a correct firmware image must be loaded before the device can resume correct operation.

14. Once the Upgrade file has been copied successfully, power cycle the SiteMonitor to restore correct operation.

Upgrading the Base II Firmware (Not Original Base II)

There are two upgrade procedures, depending on whether the SiteMonitor is running with a normal IP address and you wish to upgrade it remotely, or if you would like to upgrade a SiteMonitor connected locally to the computer which the Upgrade software is running on. The first option will work anywhere in the network, but requires you to know the IP address and read/write community string for the SiteMonitor.

The second requires physical access to the device, but does not require knowledge of the device's IP address or password.

To upgrade the base unit firmware when the device's IP Address and Read/Write Community String is known, follow the directions below:

1. Obtain and install the Ethernet Upgrade Tool (if has not already been installed)

2. Obtain the latest version of the SiteMonitor Base Unit II Firmware from our web site

3. Start the Ethernet Upgrade Tool.

4. Ensure that the IP address and Community string at the top of the window is set correctly.

5. Ensure the "Base Unit Firmware" tab is selected

6. Select "Device is located at the IP address above" in the Device Location box.

7. In the "Firmware Upgrade" section near the middle of the screen, click on "Select File" and then select the Base Unit Firmware. WARNING: The software does not check the firmware image to ensure that it is for the hardware you are attempting to upgrade. Make absolutely certain it matches the unit being upgraded.

8. Click the "Start Upgrade" button. This will switch the remote SiteMonitor into Upgrade Mode, copy the Upgrade file, and then restore the remote SiteMonitor to operation.

9. If the upgrade fails, check all the settings and then immediately retry. If the SiteMonitor has been switched to upgrade mode, transferring a correct file is the only way to switch it back to normal operation mode.

To upgrade a base unit locally, where the device's IP address and SNMP community string is not necessarily known, perform the following steps:

1. Obtain and install the Ethernet Upgrade Tool (if has not already been installed)

2. Obtain the latest version of the SiteMonitor Base Unit II Firmware from our web site

3. Start the Ethernet Upgrade Tool.

4. Check to ensure that the SiteMonitor is attached to the same network segment as the computer running the SiteMonitor Manager Program, and that the SiteMonitor is powered on.

5. Check to ensure that no other SiteMonitors are in the middle of being upgraded (or are in upgrade mode) on the same Ethernet segment

6. Ensure the "Base Unit Firmware" tab is selected

7. Select "Device is attached to the same Ethernet segment as this computer" in the Device Location box.

8. In the "Firmware Upgrade" section near the middle of the screen, click on "Select File" and then select the Base Unit Firmware. WARNING: The software does not check the firmware image to ensure that it is for the hardware you are attempting to upgrade. Make absolutely certain it matches the unit being upgraded.

9. Click the "Start Upgrade" button.

10. If the Upgrade does not start within 2-3 seconds, power cycle the SiteMonitor to switch it to upgrade mode.   If this does not succeed, we recommend exiting the management tool and trying again. If that does not work after a couple of tries, then consult the section "Troubleshooting Local Operation of the SiteMonitor Manager or SiteMonitor Ethernet Upgrade Tool".

11. Once the upgrade starts, it will copy the Upgrade file. If you do not know the IP address of the SiteMonitor, it can be noted during the upgrade just below the Status Bar.

12. If the upgrade fails, try the transfer again. Once an upgrade has started, the firmware in the unit is invalidated, and a correct firmware image must be loaded before the device can resume correct operation.

13. Once the Upgrade file has been copied successfully, power cycle the SiteMonitor to restore correct operation.

Upgrading the Firmware in Expansion Modules

Occasionally, we will release newer firmware for the expansion modules.   This section explains how to upgrade the firmware to the latest version.

In addition, this procedure is also used to reinstall the firmware in a Module after an upgrade to a Base 3 to enable it to work again with the Original Base Unit or Base II.

The procedure for upgrading the firmware in a module is module is as follows:

1. Ensure the Base Unit is running the latest firmware available for it. If not, upgrade it first using the instructions found elsewhere in this documentation.

2. Obtain and Install the correct upgrade program. For the original SiteMonitor Base Unit (not Base II), the correct tool is the SiteMonitor Manager program. For the Base II, the correct tool is the PacketFlux Ethernet Upgrade tool. Both of these are available from our web site.

3. Obtain the correct firmware file for your module.

4. Using the Expansion Tab on either the Web Interface (Base II) or SiteMonitor Manager (original Base Unit), verify the module you want to upgrade is attached and listed as 'available'. Any module you want to upgrade will need to be available before upgrading.

    ○ If you have a module which does not want to be detected, it might be a bug covered in the section "Resolving Module Detection Problems on Early Revision H SiteMonitor Modules".

5. Start the Ethernet Upgrade Tool or SiteMonitor Manager as applicable.

6. Enter the IP address and read/write community string for your base unit at the top of the page.

7. Click on the Expansion Unit Firmware or Firmware (Exp) tab near the top of the page.

8. If you are using the SiteMonitor Manager, check the box next to the "I have read the instructions on how to use this page" on the bottom of the screen.

9. Click on Select File.

10. Select the expansion module firmware file for your device.   Once selected, the upgrade tool should show your module in the list on the screen. If not, try clicking on refresh and/or check the IP address and community string you have configured. If those are correct, double check

that the module is detected and connected by looking at the expansion unit tab in the web interface on the base unit, and you have the correct firmware for that module.

11. Click on one of the listed modules to select it to be upgraded.

12. Click on the correct button in 'Upgrade'.   This should be the 'Start' button for the Base II (using the Ethernet Upgrade Tool) or the 'Base' button when using the SiteMonitor Manager with the original Base Unit.

13. Wait for the firmware upgrade to complete.

14. Verify the firmware version as shown on the screen once the upgrade is correct.

15. Repeat for additional modules as needed until all are upgraded

Resolving Module Detection Problems on Early Revision H SiteMonitor Modules

Back in 2015, we discovered a bug where certain Revision H expansion modules were not able to be reliably detected by the SiteMonitor Base Unit.   This has been resolved in the latest firmware for all modules.

This bug is triggered primarily in a situation where the expansion bus is already carrying traffic while the expansion module is booting. If a module sees data on the expansion bus before it is fully booted, it will often cause the communications hardware used to talk on the expansion bus to lock up. In the previous version of the firmware, this state was neither detected nor cleared correctly, causing the expansion module to simply cease listening to *any* messages on the bus, until such time as that module is rebooted.

In most cases, ensuring that the Base Unit is running the latest firmware will resolve this issue and allow the expansion module to be upgraded after the entire system (including base unit and expansion module) is power cycled simultaneously.

However, some modules seem to continue to refuse to be detected, even after a power cycle. The following procedure will permit these modules to be upgraded to the latest firmware which resolves this particular bug.

The procedure is as follows:

1. Upgrade all detected modules with the latest firmware. This includes the Base Unit and the Expansion modules.

2. Detach all secondary power sources from the expansion modules. This primarily applies to SyncInjectors, PowerInjectors, 5 Channel PDU's, and Single Port Gigabit PoE Injectors.   These modules are powered by both the base unit and the power input on the device, and need to have the power removed from the power input on the device itself in order to be rebooted.

3. In the SiteMonitor Base II web interface, go to the Binary I/O, and set the value for expansion power to '0'. This will turn off expansion power.   If this is not a Base II, either switch to a Base

II temporarily (highly recommended for this procedure) or contact us for a significantly higher risk procedure which may work.

4. In the SiteMonitor Base II, go into the Expansion Units tab. Make note of the serial numbers of all devices so you can restore them in order later.

5. Click on each serial number, and enter '0'. When you are done, all serial numbers should be listed as '0'.

6. Click on Rescan. This should clear out all modules *other* than the base unit, and prevent the base unit from attempting to reach modules on the expansion bus. If there are *any* modules other than the base unit listed, go back to step 3 and repeat until only the base unit is listed.

7. Go back to the Binary I/O tab, and set the value for expansion power back to '1'. This will turn the expansion unit back on. Wait several seconds for the unit to reboot fully.

8. Go back into the Expansion Units tab, and click on rescan. The modules should appear in the list of expansion modules.

9. Upgrade the detected modules with the latest firmware.

10. If not all modules are detected, you may want try to connect only the non-detected module to the Base II and start over at step 3.

11. Once you have all the modules upgraded, reattach them and their power, and go into the expansion tab. Enter the serial numbers you recorded in step 4 in order on the screen. Click on rescan and the devices should reattach in the order you specified.

Troubleshooting Local Operation of the SiteMonitor Manager or SiteMonitor Ethernet Upgrade Tool

Occasionally the local Upgrade, Factory Reset, or IP Address detection of the SiteMonitor Manager or SiteMonitor Ethernet Upgrade tool does not work even after multiple tries. This usually due to configuration of the network and/or Windows, especially on later versions of windows. If it does not work the first time, we recommend exiting the upgrade tool completely, and then restarting the procedure you are attempting to perform. If that does not work after a couple of tries, then one or more of the following items may be the cause:

- Certain newer Ethernet switches and adapters are not fully compatible with the 10BaseT specification, due to lack of care by the switch manufacturer in preserving polarity inside the switch on the Ethernet ports (this is required for 10BaseT, but not for 100BaseT and later, so often this goes undiscovered). Unless you know for a fact that the specific port on that specific Ethernet switch works with PacketFlux devices, you may want to try a different Ethernet switch.

- The windows firewall often gets in the way of proper operation of the upgrade tools. We recommend either adding the firmware tool as an exception to the windows firewall or disabling it temporarily, or both.

- Certain versions of windows seem to require authority escalation in order to correctly send out the specialized packets. Running the tool as administrator by right clicking on it and selecting the appropriate selection seems to help sometimes.

- Occasionally windows will get confused when multiple network devices are enabled. If you have several interfaces (such as a wireless and an Ethernet connection), try disabling all but the Ethernet connection.

- Sometimes, a good old fashioned reboot of Windows works.

Expansion Modules

This section documents the function of common expansion modules for the Base Unit. It is our intention to replace this documentation with separate, more in depth, documentation for each expansion module, and as such you may want to check to see if this additional documentation exists.

We are also aware that several expansion modules are not currently represented below. If they are not documented elsewhere, contact us at custsvc@packetflux.com if you need more information.

4 Channel Relay Output Module

This module adds four relays to the SiteMonitor System. Each relay is capable of switching the lower of 2A or 60W. That is, below 30V, the limit is 2A. Above 30V, the limit is 60W.

The 12 position terminal block has the following pinout:

Note: Pin 1 is the position closest to the 6p6c Jacks.

Pin Number	Function
1	Relay #1 Common
2	Relay #1 Normally Open
3	Relay #1 Normally Closed
4	Relay #2 Common
5	Relay #2 Normally Open
6	Relay #2 Normally Closed
7	Relay #3 Common
8	Relay #3 Normally Open
9	Relay #3 Normally Closed
10	Relay #4 Common
11	Relay #4 Normally Open
12	Relay #4 Normally Closed

The Common terminal of each relay will need to be connected if the relay is to be used. The remaining two relay pins will need to be connected depending on your application.

The Normally Open contact will never be connected to the common terminal unless a command to activate the relay is received.

The Normally Closed contact will always be connected to the common terminal unless a command to activate the relay is received.

When power is lost to the unit, the relay will revert back to it's default state. As a result, we encourage users of the SiteMonitor system to pick the contacts based on what state is desired when the power is off, or recently restored.

6 Channel Switch Input

This module adds six switch inputs to the SiteMonitor System. Each input can be used to monitor a relay or switch closure from an external device. For example, a security loop or status output on a device.

The 12 position terminal block has the following pinout:

Note: Pin 1 is the position closest to the 6p6c Jacks.

Pin Number	Function
1	Switch #1 Input
2	Switch #1 Common
3	Switch #2 Input
4	Switch #2 Common
5	Switch #3 Input
6	Switch #3 Common
7	Switch #4 Input
8	Switch #4 Common
9	Switch #5 Input
10	Switch #5 Common
11	Switch #6 Input
12	Switch #6 Common

To use this input, simply connect the switch to be read between pins 4 and 5. A common application for this input is as a security loop. That is, one or more normally closed security sensors, such as a door sensor, or a loop of wire placed strategically through a solar panel such that it has to be cut to be removed, are connected in series to these inputs. In this way, notification can be received when a security event occurs.

This input is not isolated internally and as such, care must be taken to ensure that voltage is not applied to either of the closure input pins. Applying voltage to either pin may cause damage and will likely result in a non-warranty repair, and may result in a potentially hazardous situation.

2 Relay Output / 3 Switch Input Module

This module adds two relays and three switch inputs to the SiteMonitor System. Each Input and Output is identical in function to those found in the 4 Relay Output or 6 Switch Input Module. As such, you should consult that portion of this documentation for information about each type of input.

The 12 position terminal block has the following pinout:

Note: Pin 1 is the position closest to the 6p6c Jacks.

Pin Number	Function
1	Relay #1 Common
2	Relay #1 Normally Open
3	Relay #1 Normally Closed
4	Relay #2 Common
5	Relay #2 Normally Open
6	Relay #2 Normally Closed
7	Switch #1 Input
8	Switch #1 Common
9	Switch #2 Input
10	Switch #2 Common
11	Switch #3 Input
12	Switch #3 Common

2 Shunt / 4 Voltmeter Input Module

This module adds two shunt and four voltmeter inputs to the SiteMonitor System.

The 12 position terminal block has the following pinout:

Note: Pin 1 is the position closest to the 6p6c Jacks.

Pin Number	Function
1	Shunt #1 Positive (+) Input
2	Shunt #1 Negative (-) Input
3	Shunt #2 Positive (+) Input
4	Shunt #2 Negative (-) Input
5	Voltmeter #1 Positive (+) Input
6	Voltmeter #1 Negative (-) Input
7	Voltmeter #2 Positive (+) Input
8	Voltmeter #2 Negative (-) Input

Pin Number	Function
9	Voltmeter #3 Positive (+) Input
10	Voltmeter #3 Negative (-) Input
11	Voltmeter #4 Positive (+) Input
12	Voltmeter #4 Negative (-) Input

The shunt inputs are designed to accept an analog voltage input from a shunt or other similar device which has a maximum output voltage of no more than +-100mV (aka+-1/10th of a volt). Care must be taken to ensure that this voltage is not exceeded.

This input supports high or low side shunt inputs, with high side shunts preferred. **!WARNING! This is a non-isolated input. Be careful of what you attach it to.**

The voltmeter inputs are semi-isolated inputs designed to measure a voltage between 0 and 75V. The input circuit is designed to support reading of voltages above or below the common ground used to power the sitemonitor system.   However, it is not designed to read voltages which must remain isolated from the common ground or return (as defined by the negative (-) voltage inputs on the base unit) as the inputs are only semi-isolated. In addition, it is not designed to measure voltages which are not referenced to this same comm ground.

What this means in practice is that you can read a positive voltage by hooking the voltage source up to the input in a normal fashion – that is hook the + voltage up to the + input, and hook the – lead up to the negative input.

You can also read a negative voltage such as -48VDC by hooking up the voltage to the input in a 'backwards' fashion. That is, you hook the -48VDC power source up to the – input, and the return/common to the + input.   This will result in a reading of 48V in the SiteMonitor system.

However, you cannot use these inputs to measure a voltage which is not referenced to the same return.

3 Shunt / 3 Voltmeter Input Module

This module adds three shunt and three voltmeter inputs to the SiteMonitor System.   As the inputs are identical to those in the 2 Shunt / 4 Voltmeter module, that section of this manual should be consulted for information on using these inputs.

The 12 position terminal block has the following pinout:

Note: Pin 1 is the position closest to the 6p6c Jacks.

Pin Number	Function
1	Shunt #1 Positive (+) Input
2	Shunt #1 Negative (-) Input
3	Shunt #2 Positive (+) Input
4	Shunt #2 Negative (-) Input

Pin Number	Function
5	Shunt #3 Positive (+) Input
6	Shunt #3 Negative (-) Input
7	Voltmeter #1 Positive (+) Input
8	Voltmeter #1 Negative (-) Input
9	Voltmeter #2 Positive (+) Input
10	Voltmeter #2 Negative (-) Input
11	Voltmeter #3 Positive (+) Input
12	Voltmeter #3 Negative (-) Input

6 Voltmeter Input Module

This module adds six voltmeter inputs to the SiteMonitor System. As the voltmeter inputs are identical to those in the 2 Shunt / 4 Voltmeter module, that section of this manual should be consulted for information on using these inputs.

The 12 position terminal block has the following pinout:

Note: Pin 1 is the position closest to the 6p6c Jacks.

Pin Number	Function
1	Voltmeter #1 Positive (+) Input
2	Voltmeter #1 Negative (-) Input
3	Voltmeter #2 Positive (+) Input
4	Voltmeter #2 Negative (-) Input
5	Voltmeter #3 Positive (+) Input
6	Voltmeter #3 Negative (-) Input
7	Voltmeter #4 Positive (+) Input
8	Voltmeter #4 Negative (-) Input
9	Voltmeter #5 Positive (+) Input
10	Voltmeter #5 Negative (-) Input
11	Voltmeter #6 Positive (+) Input
12	Voltmeter #6 Negative (-) Input

Intelligent Temperature Controller

This module adds 2 temperature sensors and 4 SPST relay outputs to the SiteMonitor System. The relays are controlled using a rules based system which allows flexible temperature control based on the readings of the two temperature sensors.

The 12 position terminal block has the following pinout:

Note: Pin 1 is the position closest to the 6p6c Jacks.

Pin Numbers	Function
1, 2	Temperature Sensor A Input
3, 4	Temperature Sensor B Input
5, 6	Relay 1 Output
7, 8	Relay 2 Output
9, 10	Relay 3 Output
11, 12	Relay 4 Output

The configuration for the temperature controller is handled by rules set up in the 'strings' portion of the user Interface. These rules are rather simple to implement, and are described below:

A rule consists of multiple 'terms' which are each separated by '&'.

For instance, a rule could be something like "A>23&A<B&NOT1&H=10". This rule has three terms: A>23, A<B, and NOT1. All three of these terms have to be true for the relay to be activated.

There are only a limited number of terms available, which are described below:

Temperature setpoint terms. These are in the form of a temperature input letter (A or B), followed by a greater than (>) or less than (<) symbol, and then a numeric temperature in Celsius.

Some examples:

- A<5, means turn the relay on whenever temperature A is less than 5*C.

- B>23 means turn the relay on when temperature B is more than 23 degrees Celsius..

There are only four possible rules in this category: basically A>#, A<#, B>#, and B<#.

Temperature comparison terms. These are used to permit the operation only when the temperature of one of the sensors is higher or lower than the other one.

There are only two rules in this category, A>B, and A<B:

- A>B means operate the relay only when temperature A is higher than temperature B.

- A<B works similary except B must be higher than A.

An example application of the rules in this category is where you want to ensure that a ventilation fan is not turned on if the outside temperature is hotter than the inside temperature.

Interlock terms. These rules are used to prevent the simultaneous engagement of two relays, where this operation is not desired. For instance, heating and cooling at the same time. These rules are in the form of "NOT#" where # is a relay number.

Adding a NOT term to a relay rule means that this relay will not be activated if the relay with the number included in the term is activated.

For instance, adding NOT2, means don't turn this relay on if relay 2 is activated.

Two things should be noted at this point: First, even relays which are interlocked in this way can be on at the same time for a brief period, due to the way the software operates internally.

Second, it is not wise to create interlocking loops: for instance where relay 1 has a NOT2 term included, and relay 2 has a NOT1 term. This can cause interesting interactions and may prevent proper operation of the system.

Hysteresis Terms.   The final term available is a hysteresis value.   This term provides a 'dead zone' to prevent a relay from turning on and off repeatedly at the setpoint.   The value is in tenths of a degree Celsius.

A value of &H=10 (the default), means that once a rule takes effect, the temperature has to change by a full degree Celsius before the rule will clear.   As an example, if you have a rule which is set up to turn a heater on at 10 degrees Celsius, and it contains a H=10 term, the temperature will have to climb to 11 degrees before the heater will turn off.

Generally the default H=10 term is sufficient.   In some cases a higher hysteresis will be desired to reduce cycling of a heater or cooling device.