SyncSystem 4380A Frequently Asked Questions (FAQs)

Q1: How do I power up the SyncSystem 4380A?

A1: There is no "on/off" switch for the SyncSystem 4380A. To power up the unit, simply plug the female end of the power cord (IEC 60320 C-14 inlet, 100-240 VAC, 45-65 Hz) into the AC power supply module located at the rear panel of the chassis and the male end of the power cord into an appropriately rated AC wall receptacle. If only DC power supplies are installed (requires DC option in chassis), then use a 3 pin DC power supply connector (AMP #1-350346-0, 22-60 VDC).

When power is applied to the 4380A, the front panel will go through a self test and then the 4380A will begin booting up. If power is applied to both power supplies, the Status Indicator on the front panel of both power supplies should be green. If power is applied to only one of the two supplies, then the power supply without input power should have a red Status Indicator and the unit's Alarm Indicator should be red.

The following 4380A front panel Power-On Self Test (POST) will occur even if the software flash has been removed from the unit:

1. The Date/Time display will sequentially test each segment on each individual position within the display.

2. One at a time, each position of the display will display the number 8 starting from the far left and working to the right.

3. Each Light Emitting Diode (LED) below the Date/Time Display (Alarm, Sync, & Output) will be turned on one at a time starting from the left to right. As each LED is tested, it will be green, then red, and then turn off, with the exception of the Sync indicator. This indicator will turn red, then green, then off.

4. The Date/Time display will then display "-9876543210" on the front panel.

5. Lastly, the Date/Time display will have a "-" in the center of each position in the display.

6. When the unit starts the application, the Alarm and Sync lights will turn Red. The Outputs indicator will remain red until NTP is locked and the outputs are turned on.

To power down the 4380A, simply remove the input power sources from the two power supplies.

Q2: How do I communicate with the SyncSystem 4380A?

A2: Operators are capable of communicating with the 4380A through an Ethernet LAN connection or via one of the USB ports when using an adapter cable to access the command port. Further details are provided by way of the answer to Question 4 in this list of FAQs.

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Q3: Can I use any USB serial cable to communicate with the unit?

A3: No. A special USB serial cable (Part No. 94000-115200) is available from Microsemi which has been programmed to provide users access to the 4380A command port.

Q4: How do I set the IP address for the unit?

A4: The 4380A runs DHCP by default and will therefore automatically be assigned an IP address if it is connected to a network with a DHCP server. The 4380A will display the current IP address assigned to the unit in the Date/Time display after pressing and releasing the Status pushbutton on the front panel. Users can use this IP Address to access the system command port. Alternatively, if a static IP address is required, there are two options to set the network parameters in the system: 1) using the network connection, and 2) using the console cable.

Network: If the network has a DCHP server, you can obtain the IP Address (ip addr) by pressing and releasing the Display pushbutton on the front panel. Telnet into the system using "telnet ip addr 1700". Once the "4380A>" prompt is displayed, run the network_config command to manually configure the IP address for the unit.

Command format:

```
network_config  --mode <DHCP|static>  --ip <ip addr>  --mask <mask>  --broadcast
<broadcast>  --gateway <gateway>]
```

Example use:

```
network_config --mode static  --ip 192.168.1.50  --mask 255.255.255.0  --broadcast
192.168.1.255  --gateway 192.168.1.1
```

If the network does not have a DHCP Server, press and hold the front panel Status pushbutton for approximately 10 seconds until the display shows the IP Address of 192.168.0.1. This temporarily sets the IP Address of the unit. Telnet into the system using "telnet 192.168.0.1 1700". Once the "4380A>" prompt is displayed, use the network_config command to manually configure the IP address for the unit as detailed above.

Note: If the LAN cable is removed and reconnected, the unit will attempt to obtain an IP Address from the DHCP server. If the default static IP Address (192.168.0.1) was set, it may get reset. Press the Status Button on the front panel again to make sure the IP Address is still set. If not, press and hold the button until the default static IP Address is set again.

Console Cable: This feature allows local users to set the unit up without having to access the system via the network. Connect a terminal to one of the USB ports on the rear panel using the USB to Serial adapter cable (Part No. 94000-115200). Changes can be made using any terminal program (e.g., HyperTerm, TeraTerm) from the serial port of a computer/terminal. The communication settings are 115200 Baud, No Parity, 8 Data Bits, and 1 Stop Bit. Once connectivity is established, the user will see the "4380A>" command prompt. Execute the network_config command to set the IP Address, Netmask, Broadcast IP, and/or Default Gateway for the system if you are using a static IP Address.

Command format:

```
network_config  --mode <DHCP|static>  --ip <ip addr>  --mask <mask>  --broadcast
<broadcast>  --gateway <gateway>]
```

Example use:

```
network_config --mode static  --ip 192.168.1.50  --mask 255.255.255.0  --broadcast
192.168.1.255  --gateway 192.168.1.1
```

We recommend that the USB-to-Serial adapter is installed in one of the two USB ports when the system is powered on. If not, you may need to power the system down, plug the cable in and re-apply power. The USB-to-Serial adapter cables are programmed to provide users access to the command port (Part No. 94000-115200) or to communicate with a 5071A Cesium Clock (Part No. 94001-5071A). These cables are NOT interchangeable. By default, pressing and holding the Display pushbutton on the front panel for approximately 10 seconds will reset the IP address to the default of 192.168.0.1. The default IP address will display on the front panel after it is set. If the button is held down too long and the IP Address is set to the default by mistake, you may be able to clear this by pulling the LAN connection on the rear panel and plugging the connector back in. If not, power-cycle the unit to restore the proper network settings. This front panel IP reset feature can be disabled using the `frontpanel_button` command. Users are cautioned that the reset feature is ON by default and must be turned off if this is not the desired behavior.

Users can view the current network settings using the network command. This will display the current user settings.

```
4380A>network
[mode] static
    [static]
        [broadcast] 192.168.150.255
        [default_gateway] 192.168.150.1
        [ip] 192.168.150.61
        [netmask] 255.255.255.0
[OK] 2015-08-05T14:23:28Z
```

Q5: Is the GNSS antenna included with the purchase of the SyncSystem 4380A?

A5: Yes. A dual band (L1 & L2) NovAtel GPS-704-WB antenna is included with the purchase of the unit. Use of this antenna is strongly recommended since there are several key performance benefits associated with using both bands, e.g., real-time corrections for ionospheric effects and improvements in the precision of the automated antenna survey results.

Q6: Will the SyncSystem 4380A work with a different antenna?

A6: Yes, but the antenna should support the L1 and L2 bands. Be sure to check that the antenna will work with the voltages provided by the 4380A (+5 or +12 Volts DC) and set the correct operating voltage based on the antenna's specifications. If the antenna requires different voltages, we recommend setting the antenna voltage to ZERO and using a BIAS-T to

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provide power to the antenna. Changing the antenna model will impact the system calibration, so users should take that into consideration if they choose to switch to a different antenna.

Q7: What type of GNSS antenna cable should I use?

A7: The antenna cable should have less than 10 dB of loss at 1.5 GHz. If this is not possible due to the cable type or length of cable, then additional in-line amplifiers will be need to be installed or you will need a cable type with less loss. Microsemi recommends use of "LMR-240" or "LMR-400" type antenna cables, which are available for purchase from multiple vendors. Prefabricated antenna cables of both types in standard lengths, e.g., 20 m, 30 m, 40 m, 45 m and 60 m (LMR-400 only), can be purchased directly from Microsemi. These cables include TNC(M) connectors at both ends. The unit requires a minimum of 15 dB of gain from the antenna combined with the loss in the antenna cable. The antenna included with the 4380A has 25 dB of gain, so as noted earlier, the total cable losses in the system must not exceed 10 dB at 1.5 GHz. Please ensure the antenna gain combined with the cable loss will provide sufficient signal strength for the 4380A if you are using a different antenna.

Q8: How do I determine my GNSS antenna cable delay?

A8: Accurately measuring the signal delay for a GNSS antenna cable can be challenging without the right equipment. One method is to use a high quality oscilloscope in conjunction with the 4380A to measure the transit time of a pulse over the length of the cable. That method requires that the 4380A is configured with a pulse output module (4394A) and a 10 MHz output module (4395B-10). A second method is to use a 4380A that is configured with a pulse input measurement module (4393A) that serves as a Time Interval Counter (TIC), along with a pulse output module (4394A). Alternatively, for a nominal additional charge, the antenna cable delay can be precisely measured at the Microsemi factory. The delay is then printed on a plastic coated label that is affixed to the cable. For the highest performance applications, a full system calibration can be performed at the Microsemi factory that accounts for time delays in the GNSS antenna, antenna cable, and GNSS receiver.

Q9: How do I know when I need to use a GNSS signal amplifier with my antenna cable?

A9: If the location of the antenna dictates that a longer cable must be used, then a line amplifier will need to be inserted into the signal path or you will need to run an antenna cable with less loss. A line amplifier is a device used to amplify the GNSS signal to overcome the losses resulting from longer cable runs. In selecting a line amplifier, it is necessary to make sure that it provides an adequate amount of gain and that it operates from 1200 MHz to 1600 MHz.

The amount of gain required from a line amplifier can be calculated by knowing the total loss of the antenna cables being used. The signal loss due to a cable varies depending upon the quality of the cable and the frequency of the signal. For the purposes of GNSS antennas, the cable loss should be calculated at 1500 MHz. The manufacturer of the cable being used should be able to provide an estimate of the cable loss at 1500 MHz. Once the cable loss is known, it can be inserted into the equation below to calculate the required gain of the line amplifier.

$$MIN\_Gain(dB) = \frac{Cable\_Loss(dB/100\,ft) * Cable\_Length(ft)}{100} - 12$$

The *MIN_Gain* value shown in equation above serves as the minimum gain required from the line amplifier being used. It is possible to use amplifiers with a slightly higher gain than the minimum value but it will not improve the performance of the system. Using amplifiers with significantly higher gain values can also cause degradation of the GNSS signal because it overdrives the input of the GNSS receiver.

Placement of the line amplifier is also a concern in a properly designed system. Placing the amplifier too far from the antenna may cause unexpected degradation in the GNSS signal and the performance will remain poor. The best place for the amplifier is typically half way between the antenna and the 4380A. This allows the line amplifier to benefit from any surge protection that may be installed near the antenna, but is still close enough to the antenna so as not to degrade the signal significantly. Another consideration when installing the line amplifier is how it will receive power. Some amplifiers are powered using a DC bias on the antenna cable and others are powered from AC adapters directly. Please contact Microsemi if you require assistance in selecting the right amplifier for your application.

Q10: How do I know if the GNSS signals are good?

A10: To determine if the carrier to noise ratios (C/N_o) of the GNSS signals that are being received by the unit are within their normal operating range, initiate a Telnet communication session with port 1700 of the 4380A via the Ethernet connection on the rear panel of the unit. Once at the "4380A>" command prompt, enter `status gps` as shown in the example below:

```
4380A>status gps
    [auto_positioning]
        [time_remaining] 0 seconds
    [mode]
        [tracking]
        [value] 4
    [model]
        [hw_version] OEM628-2.01
        [name] G2SB0GTTN
        [serial number] FBN15160339
        [sw_version] OEM060220RN0000
    [position]
        [alt] 1.590260000000000e+03
        [fixed] true
        [lat] 4.001941930600000e+01
        [lon] -1.052390921940000e+02
    [satellite]
        [number] 10
```

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```
        [signal]
            [avg]  4.520029449462891e+01
            [desc]  Good
            [enum]  2
            [freq]  dual
            [max]  5.070899963378906e+01
            [min]  3.785400009155273e+01
    [OK]  2016-01-06T19:05:02Z
```

Description of the overall quality of the GPS satellite signals that are being received by the unit.

The "desc" parameter within the satellite signal parameter family will read "Good" as shown above if the C/N_o values of the GNSS signals that are being received by the unit are within their normal operating range. If the C/N_o values are outside of their normal operating range but still acceptable, the "desc" parameter will read "Fair". If the C/N_o values are low enough to potentially cause performance issues, the "desc" parameter will read "Poor".

Q11: How do I know how many satellites are being tracked by the SyncSystem 4380A?

A11: Initiate a Telnet communication session with port 1700 of the SyncSystem 4380A via the Ethernet connection on the rear panel of the unit. Once at the "4380A>" command prompt, enter `status gps` as shown in the example below:

```
4380A>status gps
    [auto_positioning]
        [time_remaining]  0 seconds
    [mode]
        [tracking]
        [value]  4
    [model]
        [hw_version]  OEM628-2.01
        [name]  G2SB0GTTN
        [serial number]  FBN15160339
        [sw_version]  OEM060220RN0000
    [position]
        [alt]  1.590260000000000e+03
        [fixed]  true
        [lat]  4.001941930600000e+01
        [lon]  -1.052390921940000e+02
    [satellite]
        [number]  10
        [signal]
            [avg]  4.520029449462891e+01
            [desc]  Good
            [enum]  2
            [freq]  dual
```

Number of satellites that are being tracked by the unit.

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```
            [max]  5.070899963378906e+01
            [min]  3.785400009155273e+01
     [OK]  2016-01-06T19:05:02Z
```

Q12: Why is my SyncSystem 4380A not tracking the GNSS satellite signals?

A12: There are several reasons why the 4380A may have trouble with properly tracking the GNSS satellite signals. Microsemi recommends that you begin the trouble shooting process by asking yourself the following questions:

- Are you using the GNSS antenna that was provided with the unit?

  The GNSS antenna (NovAtel GPS-704-WB) that is provided with the 4380A ensures optimal performance. Microsemi strongly recommends use of this dual frequency band (L1 & L2) antenna with the 4380A.

- Has the GNSS antenna voltage been properly set?

  Many high performance GNSS antennas must be powered externally. Typical operating voltages include 5 VDC and 12 VDC. The 4380A is capable of providing antenna power (0, 5, 12 VDC) by DC biasing the antenna cable, but this can cause damage to an antenna if the wrong voltage is applied. Prior to connecting an antenna to the unit, ensure the antenna voltage is set properly. The 4380A is shipped from the factory with the default antenna voltage of 0 volts.

- Has the antenna cable failed?

  Ensure the cable has continuity end to end. If a DC bias voltage is being applied to the antenna, measure the center pin to the shield at the antenna and make sure that the bias voltage is present.

- Is the GNSS antenna located outside where it has an unobstructed view of the sky?

  Make sure that there are no obstructions between the GNSS antenna and the sky. If you are inside a building, surrounded by tall buildings, or in a tunnel, the GNSS antenna will not have a clear view of the sky. The GNSS receiver requires signals from at least four satellites, and even partial obstructions can prevent your GNSS receiver from functioning properly. The Sync LED on the front panel will start flashing red if the 4380A is not tracking at least four GNSS satellites.

- Is the GNSS antenna mask angle set correctly?

  Ensure the mask angle is not set too low or too high. If set too low, the receiver might not be able to track the satellites because of obstructions. If set too high, the receiver will not be able to use all of the available satellites to determine a fix and the correct time. Ensure the mask angle is correct using the settings gps:mask_angle command. Default = 10 degrees.

- Are you using the correct positioning datum?

The default positioning datum used in the 4380A is WGS84, however, the system is capable of using the NAD-83 datum. Ensure that any manually entered position is using the correct datum by using the settings gps:datum command.

- Is the GNSS antenna cable connected at both ends and undamaged?

    The antenna cable may have failed due to exposure to the weather, kinking, or bending. Inspect the antenna cable and correct any issues and replace any cables that appear to be weathered. Also, check the antenna cable connectors to make sure that they are properly affixed to the cable ends and that the connectors are properly threaded onto the connectors at both ends. If a lightning protection device has been installed in the RF and DC path, ensure that the device has not failed and is not open (no continuity).

- Is there some other source of radio frequency energy located close to the GNSS antenna?

    Nearby sources of radio frequency (RF) radiation, especially those that operate near the L-band frequencies used by GNSS satellites, can sometimes cause problems with reception of the extremely low power GNSS signals at the GNSS antenna. It's best to mount the GNSS antenna well away from other sources of RF radiation to reduce the likelihood of interference.

- Is the GNSS antenna setting in the 4380A set to manual position mode?

    If the operator enters the manual position incorrectly, the system will indicate it is tracking satellites in the status output, however the system may show the gnss status as "not tracking" both in the status results and on the front panel. To correct this problem, ensure that the position is entered correctly. If this does not work, set the unit to the auto position mode and re-survey the antenna position.

Q13: How do I determine the position of my GNSS antenna?

A13: The 4380A offers three different modes for determining the antenna position and determining receiver operation: Dynamic, Auto, and Manual. The Dynamic mode is typically used for systems located on mobile platforms. The system default mode is Dynamic. Users at static locations should change this to Auto or Manual based on the information provided below.

The Auto mode is recommended for static locations where the antenna location has not been surveyed. When using the Auto mode, the 4380A will automatically determine the location of its antenna. It does this by averaging its calculated position solutions over a period specified by the `auto_hours` parameter. The factory default for the position period is 12 hours. It is recommended that the auto positioning period should be set to at least 4 hours. Once the `position_period` expires, the 4380A will enter the fixed position mode (`status gnss:position:fixed`). Fixing the antenna position reduces the noise of the GNSS measurements and increases the frequency stability of the timing outputs.

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To set the positioning mode to Auto, use the `position_mode` command on the command port.

```
4380A>position_mode auto
[OK] 2015-08-05T15:26:06Z
```

To set the positioning period, use the `position_period` command. If not specified, the value will be in hours. Users can set this value to minutes using the letter `m` after the value.

```
4380A>position_period 12
[OK] 2015-08-05T15:26:06Z
```

Select the proper datum, WGS84 (default) or NAD83, using the datum command.

```
4380A>datum wgs84
[OK] 2015-08-05T15:28:14Z
```

Use the settings gps command to verify that the correct datum is being used.

```
4380A>settings gps
[antenna_delay] 2.650000000000000e-07
    [antenna_voltage] 1.200000000000000e+01
    [datum] wgs84
    [mask_angle] 1.000000000000000e+01
    [positioning]
        [auto_hours] 1.200000000000000e+01
        [manual_position]
            [altitude] 1.963545000000000e+02
            [latitude] 3.992275796000000e+01
            [longitude] -7.758566956000000e+01
        [mode] auto
    [tracking_timeout] 1800
[OK] 2015-08-05T15:27:19Z
```

If these settings are correct, type `save` to save the current user default configuration on the system to ensure that the system uses the positioning mode and period after a reboot or power cycle.

If the unit is rebooted, power cycled, or the application is restarted with the positioning mode set to Auto, the system will go through the process of determining its antenna position based on the position period (`auto_hours`). Once that period expires, the system will again set itself fixed and use the newly determined solution as the fixed position. It will do this each time this occurs. The phase time difference [ptd] or UTC offset value reported by the system will be noisier during the Auto position period and will become significantly quieter when the antenna position is fixed.

In addition to automatically determining its antenna location, the 4380A generates a RINEX (Receiver INdependent EXchange) format observation file. This file format is a standard used by the GNSS community and provides all of the necessary GNSS measurements for determining the antenna location. The file can be retrieved from the system by using ftp (login: ftp,

password: ftp) to log in and retrieve the file. The file will be in the "rinex" subdirectory and will have a ".[yy]o" extension where [yy] represents the last two digits of the current year. Many online processing centers are available (e.g., http://www.ngs.noaa.gov/OPUS, http://sopac.ucsd.edu/cgi-bin/SCOUT.cgi) and will process the observation file free of charge. Doing this improves the position estimate of the antenna and is recommended for precise time recovery. After this process is complete, it is possible to set the position mode to Manual using the coordinates provided by those services.

The receiver has a countdown timer to show the amount of time left (`position_period`) while in the auto positioning mode. Once this timer counts to zero, the RINEX file will be generated, the receivers position (`status gps:position:fixed`) will be true, and the [`time_remaining`] field will no longer be present in the status message.

```
4380A>status gps:auto_positioning
    [time_remaining] 10 hours, 51 minutes
[OK] 2015-08-05T15:32:05Z

4380A>status gps:position
   [alt] 1.965699000000000e+02
   [fixed] false
   lat] 3.992275579961000e+01
   [lon] -7.758567122127999e+01
[OK] 2015-08-05T15:32:33Z
```

**Q14: What are the benefits of surveying my GNSS antenna position?**

A14: The primary benefit of surveying the position of the GNSS antenna is that the antenna coordinates can be entered into the 4380A using the `fix_position` command to improve the timing accuracy and stability of the unit. When observed over short timeframes, the GNSS signals are noisy, so the instantaneous position solution for the antenna is less accurate and stable than one that has been averaged over a longer time period. For a high performance system like the 4380A, the improved accuracy and stability of a surveyed antenna position translate directly into improvements in timing accuracy and stability.

Q15: How do I set the on-time-point (OTP) of the system?

A15: The OTP of a system is defined as the point at which the timing signals coincide with UTC(USNO). Typical systems use distribution amplifiers and cabling to distribute timing signals from a single source to multiple users. This distribution network will delay the timing signals and affect their accuracy. For this reason, it is important to select an appropriate OTP so that the desired timing signals are accurate when they reach the user.

As received, the OTP for the 4380A signal outputs is at the rear panel of the unit, at the plane of the output module connectors. This is not generally a convenient location for the OTP of the system because there will be a delay associated with the distribution of the signals to the user. The figure below illustrates how to move the OTP of the system from the rear panel of the

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4380A to the user inputs. In moving the OTP of the system, it is imperative that the distribution delays from the 4380A to each of the users is equal. This will ensure that all users receive accurate timing signals.
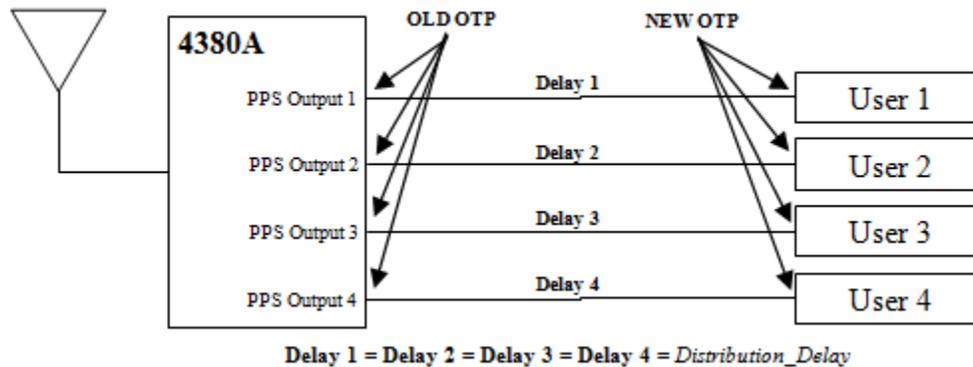
Once the delay of the distribution network is known, the OTP of the system can be shifted from the output of the 4380A to the input of user equipment. The equation shown below is used to calculate the antenna_delay value that should be entered into the system to adjust the OTP.

$$ANTENNA\_DELAY = 4380\_Delay \text{ (seconds)} + Distribution\_Delay \text{ (Seconds)}$$

The Distribution_Delay is the measured delay of the timing distribution network as shown in the figure. The 4380_Delay is the delay calculated in the equation below or the calibrated delay given by Microsemi.

$$4380\_Delay(\sec onds) = \frac{Length\_of\_Antenna\_Cable(meters)}{Signal\_Velocity(meters/\sec)} - 48.5E - 9$$

Q16: Are the SyncSystem 4380A input/output cards hot swappable?

A16:   Yes. The input/output cards are hot swappable and can be installed into any of the six card slots located at the rear panel of the unit while the unit is powered. When the unit starts up, it configures the slots for the cards that are installed. If you install a new card with the same model number or one of the same type (i.e., 4395B-XX or 4387A series) the card will operate normally. If you install a new card model in a slot, the system will bring the card up and will apply the factory settings to the card. In order the have the desired behavior, users will need to set the card for the proper operating parameters, save the settings, and then warm restart the unit to ensure that the new card is properly configured.

Q17: Are the SyncSystem 4380A power supplies hot swappable?

A17: Yes. The power supplies are hot swappable which allows for the replacement of a failed power supply in the field without having to power down the unit and take it off line. Be sure to install only the AC power supply module in an AC power supply bay of the chassis and the DC power supply module in a DC power supply bay of the chassis (see Question 18).

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Q18: Can I install a DC power supply in an AC power supply bay or vice versa in the SyncSystem 4380A chassis?

A18: No. The AC power supply only works when installed in the AC power supply bay within the 4380A chassis and the DC power supply only works in the DC power supply bay within the 4380A chassis. The power supply configuration for the 4380A chassis is specified when ordering the unit.

Q19: If the alarm light is red on the front panel of the SyncSystem 4380A, how do I determine what is causing the alarm condition?

A19: To determine what alarm condition has activated the red alarm light, initiate a Telnet communication session with port 1700 of the 4380A via the Ethernet connection on the rear panel of the unit. Once at the "4380A>" command prompt, enter `alarm` as shown in the example below:

```
4380A>alarm
[alarm] no alarm
[OK] 2016-01-06T19:05:02Z
```

This is equivalent to entering the `status alarm` command. If there is no alarm condition, then the system will respond as shown in the example above. Otherwise, the returned alarm information provides the most significant alarm condition that is currently active. It does not necessarily indicate all alarm conditions currently present. For that purpose, use the *alarms* command or review the health nodes that are used to monitor the current state of the system. The health nodes themselves are part of the status tree and can be viewed by typing `status health` at the command prompt.

**Q20: How do I configure the output signals from my SyncSystem 4380A?**

A20: The PPS signal from the GNSS receiver/reference source is used to align both the IRIG-B signal and the CPU clock to UTC(USNO). At startup, this PPS is used to align the internally generated 1 PPS and IRIG-B signal with the correct 10 MHz clock cycle. From that point on, the 1 PPS and IRIG-B signals are kept on time by using the OCXO 10 MHz signal as its reference. The 1 PPS signal from the GNSS receiver generates an interrupt to the processor which serves as an indicator of the top-of-second. This is used by the CPU, along with messages received from the GNSS receiver, to set the CPU time to UTC(USNO). In doing this, the CPU can serve as a Stratum-1 network time protocol (NTP) server and provide time to computers and other systems on the network.

The 4380A will operate with several different types of input and output cards. These cards can be operated in any of the six slots. The unit will automatically detect and configure the system based on the card(s) installed. The card slots are identified by slot number so the operator is capable of identifying a card's physical location in the chassis. The view below is from the rear of the unit from left to right.

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Slot 1	Slot 3	Slot 5
Slot 2	Slot 4	Slot 6

Rear Panel Output Card Locations

Each input/output card typically has four connectors with the port number identified as shown in the figure below.
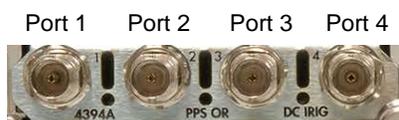
Port Locations for Input/Output Modules

See Appendix A of the SyncSystem 4380A Operations and Maintenance Manual for the specifications of each card. For certain cards, the outputs can be configured via the 4380A command interface. Further details are provided in the SyncSystem 4380A Software Users Guide.